

Millwater Arran Hills Residential Subdivision Precinct 6 Stage 1C

Geotechnical Completion Report

WFH Properties Limited



Reference: 773-AKLGE206639-BK

11 January 2023

MILLWATER ARRAN HILLS RESIDENTIAL SUBDIVISION, PRECINCT 6, STAGE 1C

Geotechnical Completion Report

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This Geotechnical Completion Report presents all supporting geotechnical data, Woods Limited as-built plans, and our Suitability Statement in relation to land development works undertaken to form Stage 1C of the Millwater Arran Hills Precinct 6 residential subdivision.

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

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

For and on behalf of Tetra Tech Coffey

Stephen Parkes

Associate Engineering Geologist

QUALITY INFORMATION

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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 subdivision 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 1C 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 1C Subdivision As-Built Plans

Title	Reference No.	Date
Final Surface As-built Plan	P22-006-00-1000-AB	20/12/2022
Cut and Fill As-built Plan – Original Surface to Final Surface	P22-006-00-1100-AB	20/12/2022
Cut and Fill As-built Plan – Lowest Surface to Final Surface	P22-006-00-1102-AB	20/12/2022
Cut and Fill As-built Plan – Original Surface to Lowest Surface	P22-006-00-1104-AB	20/12/2022
Subsoil Drainage As-built Plan	P22-006-00-1200-AB	20/12/2022
Retaining Wall As-built Plans	P22-006-00-1400 to 1402-AB	20/12/2022
Roading As-built Plans	P22-006-00-2000 to 2002-AB	16/01/2023
Stormwater As-builts	P22-006-00-3000 to 3003-AB	20/12/2022
Wastewater As-builts	P22-006-00-4000 to 4002-AB	13/01/2023

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

Table 2: Summary of Appended Reference Drawings

Title	Reference No.	Date
Tetra Tech Coffey Geotechnical Investigation Plan ⁽¹⁾	BK/001	11/01/2023
Tetra Tech Coffey Geotechnical Works Plan ⁽²⁾	BK/002	11/01/2023
Coffey Geotechnical Remediation Plan Design Drawings	AG/001 and AG/005	20/07/2020
Coffey Undercut Detail Plan Design Drawing	AG/008	20/11/2019
Coffey Shear Key 1 Geotechnical Treatment Layout Plan	Figure 3	19/06/2019
Coffey Shear Key 1B/1C, 1D and 1E Detail – Design Drawings	AB/006 to AB/008	06/09/2019
Woods Retaining Wall 311 Longitudinal Section	37600-01-159-EW	11/09/2019
Coffey Wall 311 / RE Slope 311 Design Detail Drawing	AL/004 Rev. D	18/06/2020
Woods Retaining Wall 700 Longitudinal Section	37600-01-173-EW	08/08/2019
Coffey Wall 700 Design Detail Drawing	AL/006 Rev. F	13/07/2020
Woods Retaining Wall 701 Longitudinal Section	37600-03-174-EW	24/03/2021
Coffey Wall 701 Design Detail Drawing	AL/007 Rev. D	01/04/2021

Woods Gully 1 Drainage Long Section	37600-02-EW-160	30/09/2019
Coffey Gully 1 Manhole / Anti-seepage Collar Design Detail	NTE08/002	04/12/2019
Coffey Settlement Monitoring Plan	AN/01	03/10/2019
Auckland Council Stormwater Pipe and Manhole Construction Clearance Requirements	SW22	November 2015
Watercare Pipe and Manhole Construction Clearance	WW 53	19-05-2015
Watercare Building Close to or Over Local Network Sewer	WW 54	20-09-2013

Notes (relating to Table 2)

- (1) Depicts Tetra Tech Coffey Geotechnical Investigation locations, carried out at the completion of Stage 1C 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 February 2023 and is intended to be used for certification purposes for the following lots associated with subdivision consent SUB60305557:

- 2 residential superlots numbered Lots 1002 and 1003;
- 1 Jointly Owned Access Lot (JOAL) numbered Lot 501;
- 1 esplanade reserve numbered Lot 802;
- 2 new public roads named Tuahere Road (formerly Road 4) and Skulander Crescent (formerly Road 1); and
- 1 new public timber boardwalk linking the subdivision with completed Precinct 5 to the north (Lot 6000).

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

Stage 1C is bound by future subdivision stages currently undergoing bulk earthworks to the west. A tributary of the Orewa River and completed Millwater subdivision Precinct 5 are to the north and private residential lots within completed Subdivision Stage 1 are located immediately to the south and 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-AB Rev.1, dated 24 October 2019 – Geotechnical Design Report for Shear Key 1;
- 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-AG Rev. 1, dated 25 August 2020 – General Earthworks Design Report
- 773-AKLGE206639-AI, dated 9, December 2019 – Settlement Assessment Report;
- 773-AKLGE206639-NTE08 Rev. 1, dated 3 December 2019 – Gully 1 Geotechnical Works;
- 773-AKLGE206639-AL Rev. 2, dated 15 April 2021 – Geotechnical Design Report for Mass Block Walls;
- 773-AKLGE206639-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-BN, dated 29 November 2022 – Producer Statement – PS4 (Construction Review) for Retaining Wall 700; and
- 773-AKLGE206639-XX, dated XXXXXX – Producer Statement – PS4 (Construction Review) for Retaining Wall 701.

The following historic report was prepared by Tonkin and Taylor (T&T) detailing initial earthworks within the Stage 1C boundary, and was 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

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 1C, JG 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 1C involved:

- Stripping of vegetation and organic material;
- Construction of a temporary sediment retention pond within 1002, involving cutting of a ridgeline to depths of up to 3.5m.

3.2.2 Bulk Earthworks (June 2019 to April 2022)

Bulk earthworks within Stage 1C commenced in June 2019 with the stripping of topsoil within a North-South orientated gully (Gully 1) located in the west of the subdivision. The location of Gully 1 is shown on the Geotechnical Works Plan, ref: BK/002 in Appendix B.

Construction of the portion of Shear Key SK1 within Stage 1C commenced in September 2019 in the western half of the subdivision and gradually progressed eastwards throughout the 2019-2020 earthworks season. The requirement for a shear key was identified following the initial geotechnical site investigation, to achieve the minimum required factors of safety against instability for subdivision development.

The shear key construction works involved the undercutting of natural soils down to 1m into bedrock, as per the specifications prescribed in the approved geotechnical design (the Shear key design drawings are presented in Appendix B), and replacement with subsoil drainage and Engineered clay backfill. Shear Vane and Nuclear Densometer compaction testing of the engineered clay backfill was carried out daily to ensure quality of the structural fill. Compaction testing records are provided in Appendix D.

Construction of the shear key was completed in March 2020.

General cut to fill earthworks across the broader Stage 1C area commenced the following earthworks season. This involved mucking out lower Gully 1 of soft alluvial and organic material and installation of underfill drainage, prior to commencement of filling in the lower gully. To ensure redundancy was incorporated into the subsoil drainage network, subsoil drainage from the upper and lower gully's were separated via anti-seepage collars, a buried concrete manhole and separate drainage outlet structures. Following completion of the subsoil drainage, all drains were positively flush tested. The Gully 1 subsoil drainage design is shown on the Appended Woods 'Gully 1 Drainage Long Section' in Appendix B.

Upon completion of the Gully 1 subsoil drainage network, a settlement monitoring plate (S08) was placed on the underlying stripped natural subgrade surface, and gradually extended in length in unison with the filling operation. This enabled monthly settlement monitoring readings to be carried out within the deepest fill area of Stage 1C during the bulk earthworks stage. The Coffey 'Settlement Location Plan' provided in Appendix B shows the location of S08. Settlement monitoring records are provided in Appendix E. Further discussion on the completed settlement monitoring is provided in Section 5.3.

General cut and fill earthworks progressed throughout the 2019-2020 earthworks season allowing for the construction of segmental block retaining walls 700 and 311 to commence in May and November 2020 respectively. These walls were constructed using the no-fines concrete Mass Bloc facing system and comprised varying lengths of High-Density Polyethylene (HDPE) geogrid reinforcement connected to the

blocks and embedded in the wall backfill which comprised a combination of compacted hardfill and Engineered clay fill. Drainage for Wall 700 discharged to the water course north of Stage 1C via concrete wingwall outlet structures. Drainage for Wall 311 was extended beneath future JOAL 501, to be connected to the future Stage 1C subdivision stormwater network off Skulander Crescent. Wall 700 was completed in February 2021 and Wall 311 was completed in April 2021.

In February 2021, a temporary sediment retention pond (SRP) was constructed within Lot 1003 to treat earthworks surface run-off. This remained in place until post-commencement of the civil works package.

In November 2021, excavations were carried out to form the retaining wall footing for segmental block retaining wall 701, and to construct the drainage and drainage outlets for this structure. Following this, works to construct the wall commenced, comprising placement of Mass Bloc facing blocks, geogrid reinforcement and compacted hardfill and clay fill to bring the wall up to finished level. This was achieved in April 2022.

3.2.3 Civil Works (May 2022 to February 2023)

Stage 1C civil construction works commenced in May 2022 with the decommissioning of the temporary SRP located within Lot 1003. This involved the undercutting of soft unsuitable subgrade soils from the base of the pond and filling of the pond up to finished subgrade level with engineered clay fill.

Finished subgrade level was reached within Lots 1002 and 1003 by mid-May, allowing both lots to be topsoiled.

Roading works commenced in May, with the lime stabilisation of road subgrades and installation of the underchannel subsoil drains. GAP65 subbase was placed across all roads by the end of May.

Public stormwater and wastewater drainage construction commenced at the end of May 2022, reaching completion at the end of June.

Kerbing works on all public roads commenced in July and were completed by the end of the month.

Underground services were installed throughout June.

JOAL 501 was trimmed to subgrade in early August, followed by placement of basecourse aggregate and pouring of concrete, which was completed by mid-September.

Basecourse was placed across all public roads in August, allowing roads to be sealed with chipseal and asphalt in September. All roads were marked and signage erected in October.

All concrete footpaths were poured throughout August and September, allowing berms to be topsoiled and landscaping works to be completed throughout October.

Installation of the pedestrian and crash barriers behind Segmental Block Wall 700 was carried out in October.

Also in October, two additional subsoil drains were installed within Reserve Lot 802, to provide additional drainage downslope of Wall 700. The locations of these drains are shown on the Woods Subsoil Drainage As-built Plan in Appendix A.

Construction of the pedestrian boardwalk linking Stage 1C with Godfrey Drive, located within Lot 6000, was commenced in January 2023 with the installation of the bored timber piles.

4. QUALITY ASSURANCE AND CONTROLS

4.1 CONSTRUCTION OBSERVATIONS

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

- Ground conditions exposed in the shear key excavations (base and faces)
- Installation of shear key drainage including placement and construction of drainage outlets;
- Topsoil stripping and benching of slopes prior to the placement of earth fills;
- Excavation and construction of segmental block retaining walls including foundation preparation, geogrid placement and lateral extent, drainage construction and backfill compaction;
- Ground conditions and founding material exposed in undercuts beneath retaining walls;
- 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 1 beneath the main fill area, prior to fill placement;
- Construction of subsoil drainage;
- Flush testing of underfill drains upon completion; and
- Observation of ground conditions within pile holes for construction of the timber boardwalk.

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 (Allan Block & Mass Block) retaining wall backfill;
- Dynamic Cone Penetrometer Resistance 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 1500m³ 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. shear key excavations, 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

5.1 STABILITY EVALUATION

5.1.1 General

Global stability conditions in Precinct 6 Stage 1C 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 1 residential lots are not subject to natural hazards as described in 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.

Additional comments and recommendations are described below in Sections 5.1.2 to 5.12.

5.1.2 Shear Key SK1

Global stability conditions for the subdivision have been enhanced by construction of a Shear Key (SK1) adjacent to the northern site boundary (see drawing BK/002 in Appendix B for shear key extent).

The shear key was excavated into competent bedrock and installed with subsoil drainage which discharges into the adjacent watercourse via several concrete wingwall outfall structures.

The shear key excavation was logged during construction by a Tetra Tech Coffey Engineering Geologist and compared with the design model for Quality Assurance purposes.

The shear key design drawings are provided in Appendix B for reference.

5.2 RETAINING WALLS

5.2.1 Existing Retaining Walls

Two segmental block retaining walls, namely Walls 700 and 701, have been constructed in Precinct 6 Stage 1C, and one segmental block retaining wall, namely Wall 311, has been constructed adjacent to the southern stage boundary. The walls were constructed under Building Consent numbers BCO10301029-2,

BCO10301029-7 and BCO10301029-3 respectively. The Producer Statement – Construction Review (PS4s) for these walls are 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)
311	188	Mass Bloc	3m width of GAP65 hardfill behind the blocks, then engineered clay fill to the extent of geogrid reinforcement	Tensar RE580	5.8	12
700	130	Mass Bloc		Tensar RE580	6.5	12
701	113	Mass Bloc		Tensar RE580	11.50	12

The retaining walls were constructed with subsoil drainage, with regular outlet connections into the sealed public stormwater drainage network or separate outfall structures to adjacent water courses, at the locations shown on the Woods Retaining Wall as-built drawings reference P22-006-00-1400 to 1402-AB. If any of the retaining wall drains are intercepted by future construction works within JOAL 501 or Esplanade Reserve 802, 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 12kPa uniformly distributed surcharge load above the walls 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.

Advice should be sought from Tetra Tech Coffey prior to any excavations being carried out within JOAL 501, as undercuts made downslope of Wall 311 may have detrimental effects on the stability of the wall and/or upslope private lots.

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 that vertical and lateral movements were within design tolerances for the retaining walls. The majority of the deflections of the monitoring points observed were attributed 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 private lots may be designed in accordance with the soil parameters provided in Table 4 below:

Table 4: Summary of Retaining Wall Design Parameters

Soil Unit Weight, γ (kN/m ³)	Effective Cohesion, c' (kPa)	Effective Internal Angle of Frictional Resistance, ϕ' (degrees)	Undrained Shear Strength of Foundation Soils, s_u (kPa)
18	0	30	60

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.

5.3 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 settlement magnitude and time for post-filling settlements to attenuate.

A series of settlement monitoring devices were installed across Stage 1, adjacent to Stage 1C, 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 at finished ground level to monitor surface movements upon completion of the earthworks.

Each of the monitoring locations were selected to monitor where settlements were expected to be at their greatest (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 trends have attenuated to low levels and that T_{90} (90% of primary consolidation) has most likely been attained. The markers were decommissioned to allow site operations to continue, following approval from the Geotechnical Engineer that fill induced settlement had likely surpassed T_{90} .

5.4 SUBSOIL DRAINAGE

The following sub-sections contain a description of the subsoil drainage installed during bulk earthworks to control groundwater levels across Stage 1C and allow for the dissipation of generated pore water pressures. The drain locations are shown on the Woods Subsoil Drainage as-built plans referenced P22-006-00-1200-AB in Appendix A, and Tetra Tech Coffey Geotechnical Works Plan referenced BK/002 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 construction 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.

Specific discussion on retaining wall drainage is provided in Section 5.2.1 above.

5.4.1 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 of groundwater. These drains require no specific maintenance.

The locations of the underfill drains are shown on Woods drawings P22-006-00-1200-AB in Appendix A. These drains have been installed beneath the fill areas, which in places is over 8m 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.

5.4.2 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. All of the subsoil drains were successfully flush tested prior to placement of the subsoil drain capping layer of engineered clay fill.

5.5 SHARED TIMBER BOARDWALK WITHIN LOT 6000

5.6 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. The 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) 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.

5.7 EXPANSIVE SOILS

Two sets of Laboratory Expansive Soil Tests were carried out on soil samples retrieved from Lots 1002 and 1003 (as shown on Tetra Tech Coffey drawing BK/001 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 to calculate the characteristic surface movement (y_s) and expansive soil class.

The 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 Lots 1002 and 1003.

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 become wet 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 to allow for infiltration into the soil) 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.

5.8 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 in this subdivision.

5.9 SERVICE TRENCHES

As is normal on all subdivisions, construction of foundations within the 45-degree zone of influence from 0.5m beneath pipe inverts will require Engineering input. The Auckland Council drawing referenced SW22 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, and drawings WW53 and WW54 taken from Watercare CoP for Land Development and Subdivision Version 1.5 May 2015, depicts bridging requirements for wastewater pipes. These drawings are provided in Appendix B for reference.

As shown on the Woods Wastewater as-built drawings referenced P22-006-00-4000 to 4002-AB, Lots 1002 and 1003 are shown to have wastewater service trenches within their boundaries. The resulting limitations are discussed in the following Suitability Statement. These drawings are presented in Appendix A.

5.10 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 BK/001 in Appendix B) to assess indicative topsoil depths on all residential lots.

Depths of topsoil were found to range from 150 to 200mm, however, due to both the nature of the method of investigation and the method of topsoil placement, variation in topsoil depths across the lots from those reported is expected.

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

5.11 PUBLIC ROAD AND JOAL SUBGRADES

Dynamic Cone Penetrometer (Scala) Tests were undertaken at regular intervals along the road and JOAL subgrades in Stage 1C. 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.

5.12 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

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 1C, 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 1C construction and shown on the appended Woods Limited as-built plans 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.
- (b) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on all residential lots in Stage 1C.

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.

- (c) The function of the subsoil drains (including outlets), as depicted on the appended Woods Limited Subsoil Drainage as-built plans referenced P22-006-00-1200-AB (Appendix A), should not be compromised by any future building development, landscaping or roading works. Any bored or driven piles should be positioned to avoid damaging the drains. **Where any subsoil drain is intercepted by building works, it must be reinstated under the direction of a Chartered Professional Engineer to ensure the long-term function and integrity of the subsoil drainage system is maintained.**
- (d) 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 taken 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 P22-006-00-3000 to 3003-AB and P22-006-00-4000 to 4002-AB (Appendix A) should be referred to for the locations of public drainage lines on all lots. A copy of drawings SW22, WW53 and WW54 extracted from Auckland Council and Watercare Codes of Practice of Land Development and Subdivision are provided in Appendix B for guidance.

Any bridging piles that may be required can be designed in accordance with the following soil parameters:

Table 5: Pile Design Parameters

Effective Internal Angle of Frictional Resistance, ϕ' (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	60	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.

- (e) 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. This is 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.
- (f) The assessed AS 2870 expansive site Class is M (Moderately reactive) for Lots 1002 and 1003.
- (g) The seismic site subsoil category on all Lots 1002 and 1003 is assessed to be Class C (shallow soil site) in accordance with NZS1170.5.
- (h) 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) and 4(g) above, it is considered that:
 - i. The cut, filled and undisturbed original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 (that incorporate specific foundation and associated structural design considering the expansive soils site class) and related documents.
 - ii. On all lots in Stage 1C, shallow foundation design may be carried out in accordance with AS 2870 (Class M as indicated in 4(f) above), 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, effective 28 November 2019.

Table 6 below summarises the status of each residential lot covered by this Suitability Statement.

7. LIMITATIONS

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

Stephen Parkes

Associate Engineering Geologist

Reviewed By:

Peter Marchant

Principal Geotechnical Engineer
CPEng / CMEngNZ

Authorised By:

Chris Armstrong

Principal Geotechnical Engineer
CPEng / CMEngNZ

Table 6: Suitability Statement Summary

Lot #	Comments	Tospoil Depth (mm)	Ultimate Bearing Capacity (kPa)	AS2870 Expansive Site Class
1002	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(c))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (d))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (e))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(g))</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
1003	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(c))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (d))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (e))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(g))</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>	150	300	M

APPENDIX A: WOODS AS-BUILT DRAWINGS

NOTES

- COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
- LEVELS SHOWN ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
- CONTOURS ARE AT 0.25m INTERVALS.
- BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
- PLANS HAVE BEEN REVIEWED BY TETRA TECH COFFEY.
- PLANS SHOULD BE READ IN CONJUNCTION WITH THE GCR.

LEGEND

- CONTOURS MAJOR
- CONTOURS MINOR
- STAGE BOUNDARIES
- LOT BOUNDARIES
- EXISTING CONTOURS MAJOR
- EXISTING CONTOURS MINOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	MD	20/12/22

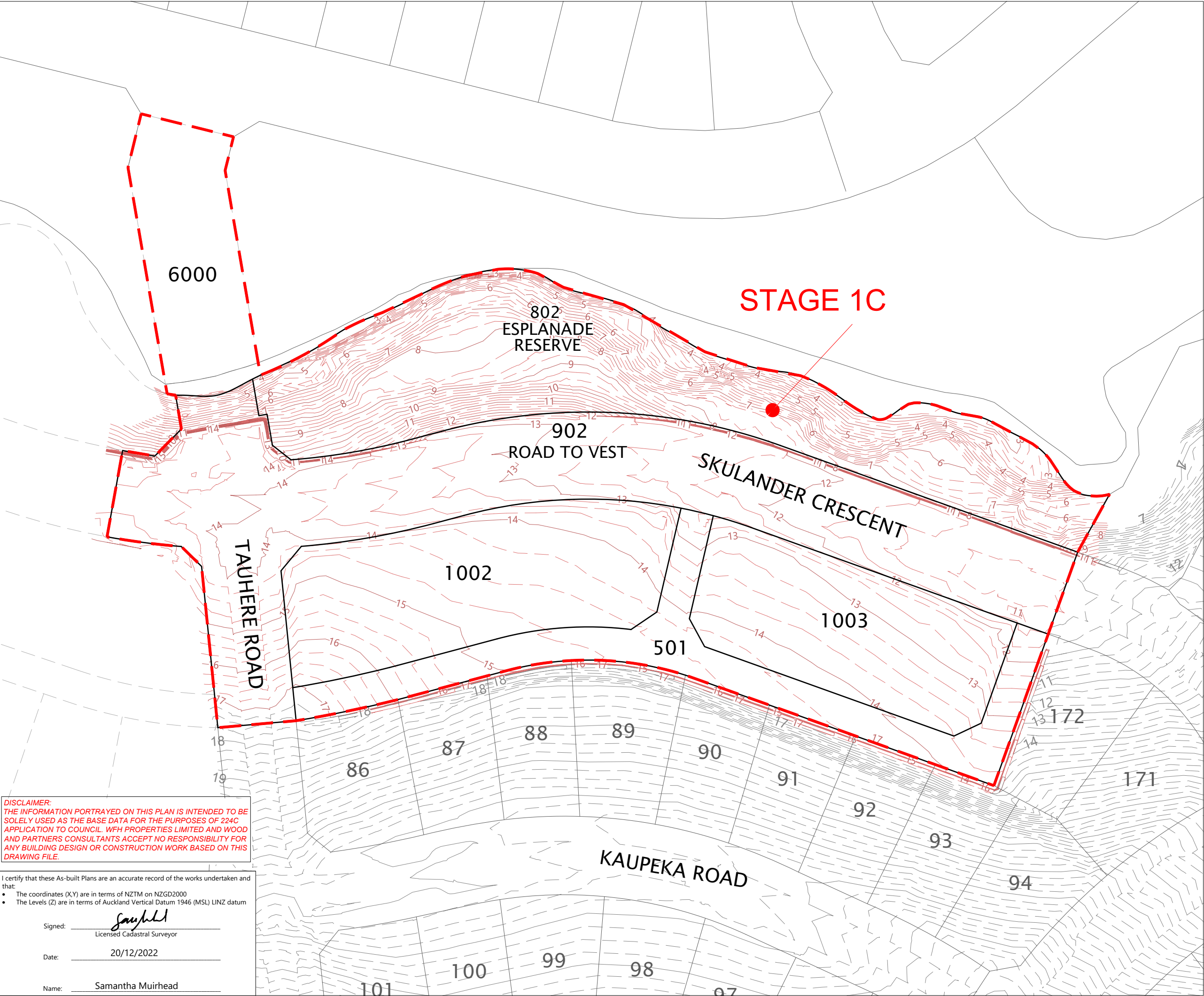
SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	SM	
		WOODS.CO.NZ



MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

FINAL SURFACE ASBUILT PLAN

STATUS	AS-BUILT	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-1000-AB	



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

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

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

Signed: *Samantha Muirhead*
Licensed Cadastral Surveyor

Date: 20/12/2022

Name: Samantha Muirhead

- NOTES
- 1. COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
 - 2. CONTOURS ARE AT 0.25m INTERVALS.
 - 3. BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
 - 4. PLANS HAVE BEEN REVIEWED BY TETRA TECH COFFEY.
 - 5. PLANS SHOULD BE READ IN CONJUNCTION WITH THE GCR.

LEGEND

- ZERO CONTOUR
- CUT CONTOUR
- FILL CONTOUR
- STAGE BOUNDARIES
- LOT BOUNDARIES

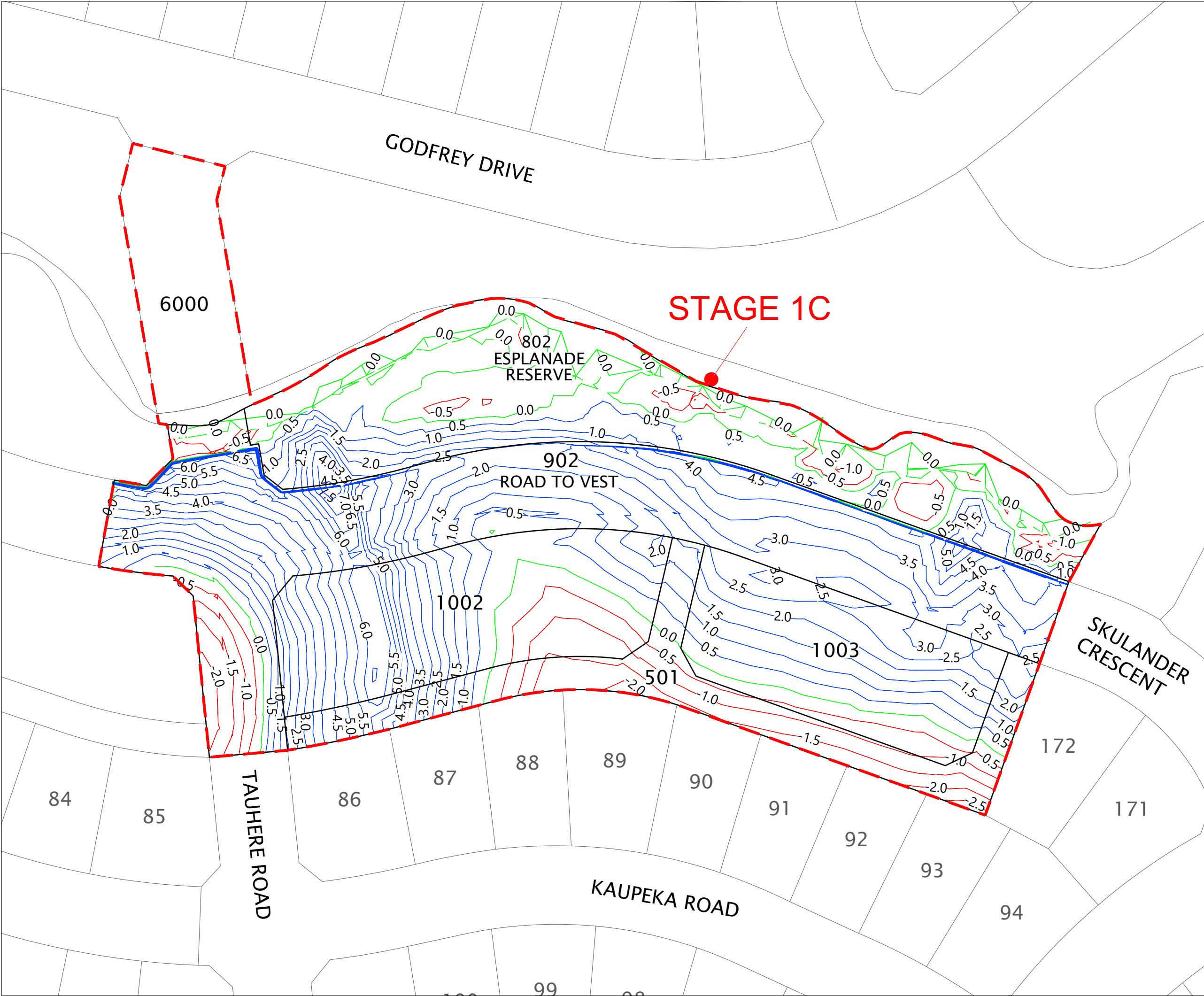
DISCLAIMER:
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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	MD	20/12/22

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

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C
CUT AND FILL ASBUILT
SHEET 1 OF 6
ORIGINAL SURFACE TO
FINAL SURFACE

STATUS	AS-BUILT	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-1100-AB	



NOTES

1. COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
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3. BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
4. PLANS HAVE BEEN REVIEWED BY TETRA TECH COFFEY.
5. PLANS SHOULD BE READ IN CONJUNCTION WITH THE GCR.

LEGEND

- ZERO CONTOUR
- CUT CONTOUR
- FILL CONTOUR
- STAGE BOUNDARIES
- LOT BOUNDARIES

DISCLAIMER:
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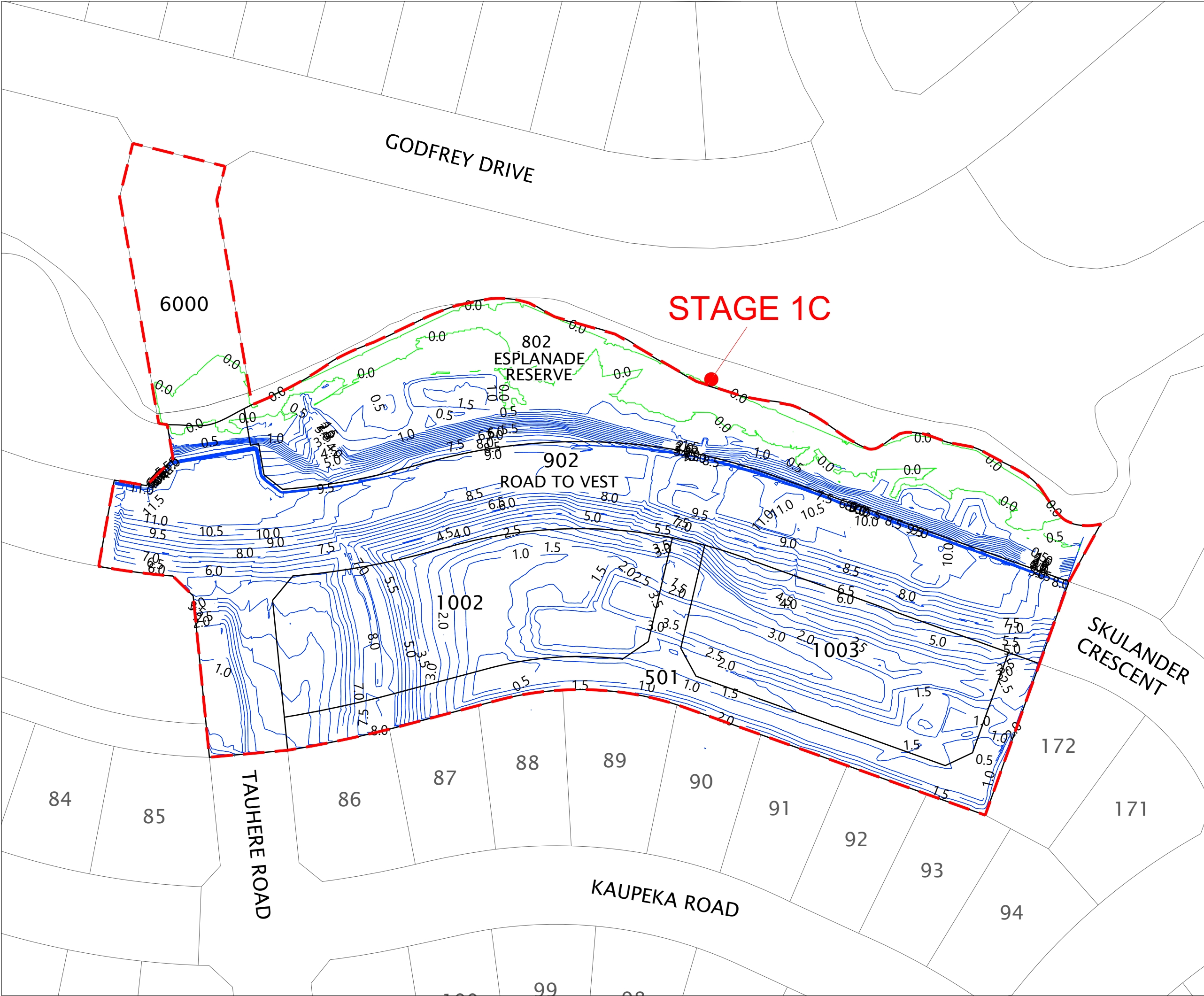
REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	MD	20/12/22

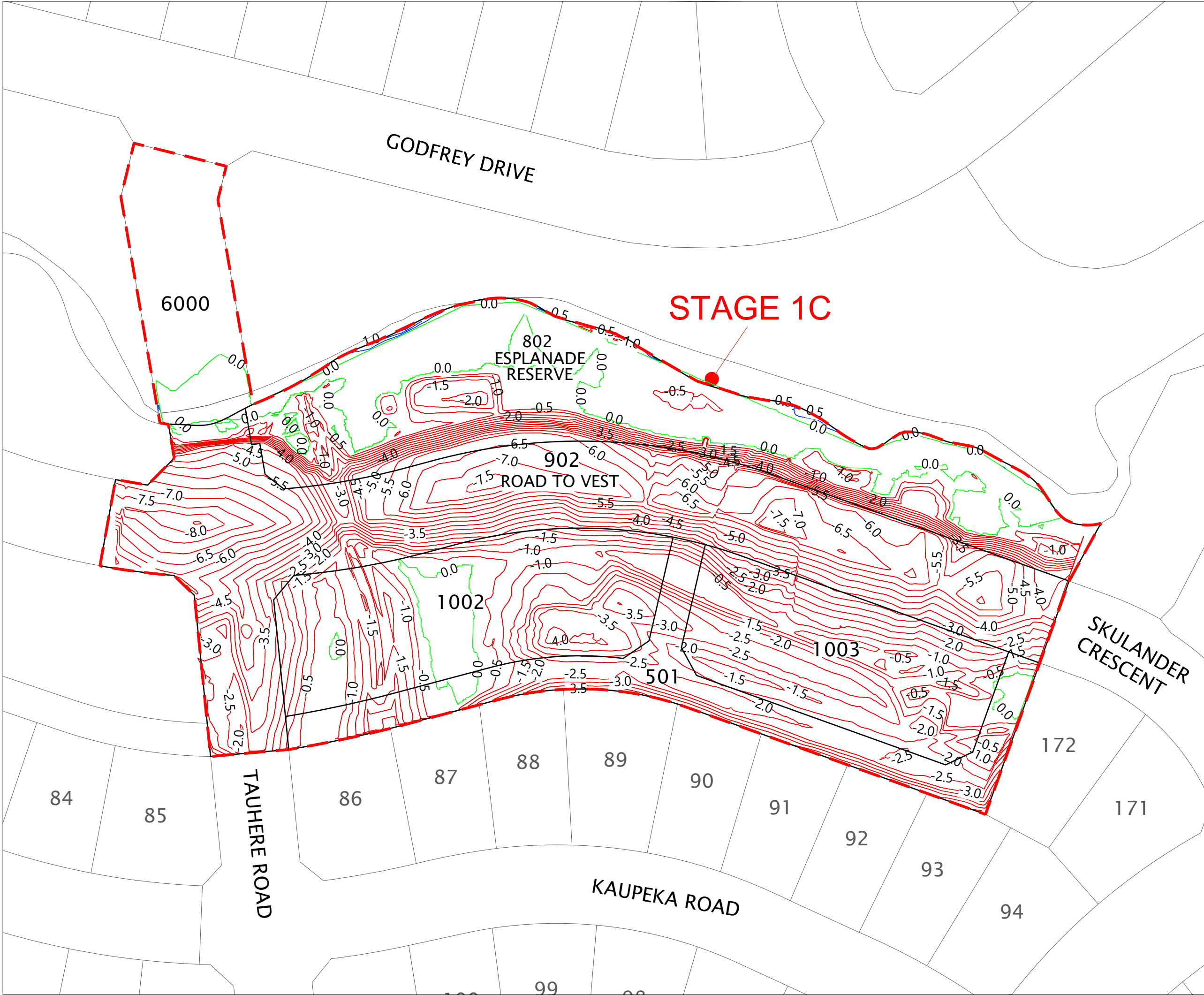
SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	SM	



MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C
CUT AND FILL ASBUILT
SHEET 3 OF 6
LOWEST SURFACE TO
FINAL SURFACE

STATUS	AS-BUILT	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-1102-AB	





- NOTES**
1. COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
 2. CONTOURS ARE AT 0.25m INTERVALS.
 3. BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
 4. PLANS HAVE BEEN REVIEWED BY TETRA TECH COFFEY.
 5. PLANS SHOULD BE READ IN CONJUNCTION WITH THE GCR.

LEGEND

- ZERO CONTOUR
- CUT CONTOUR
- FILL CONTOUR
- STAGE BOUNDARIES
- LOT BOUNDARIES

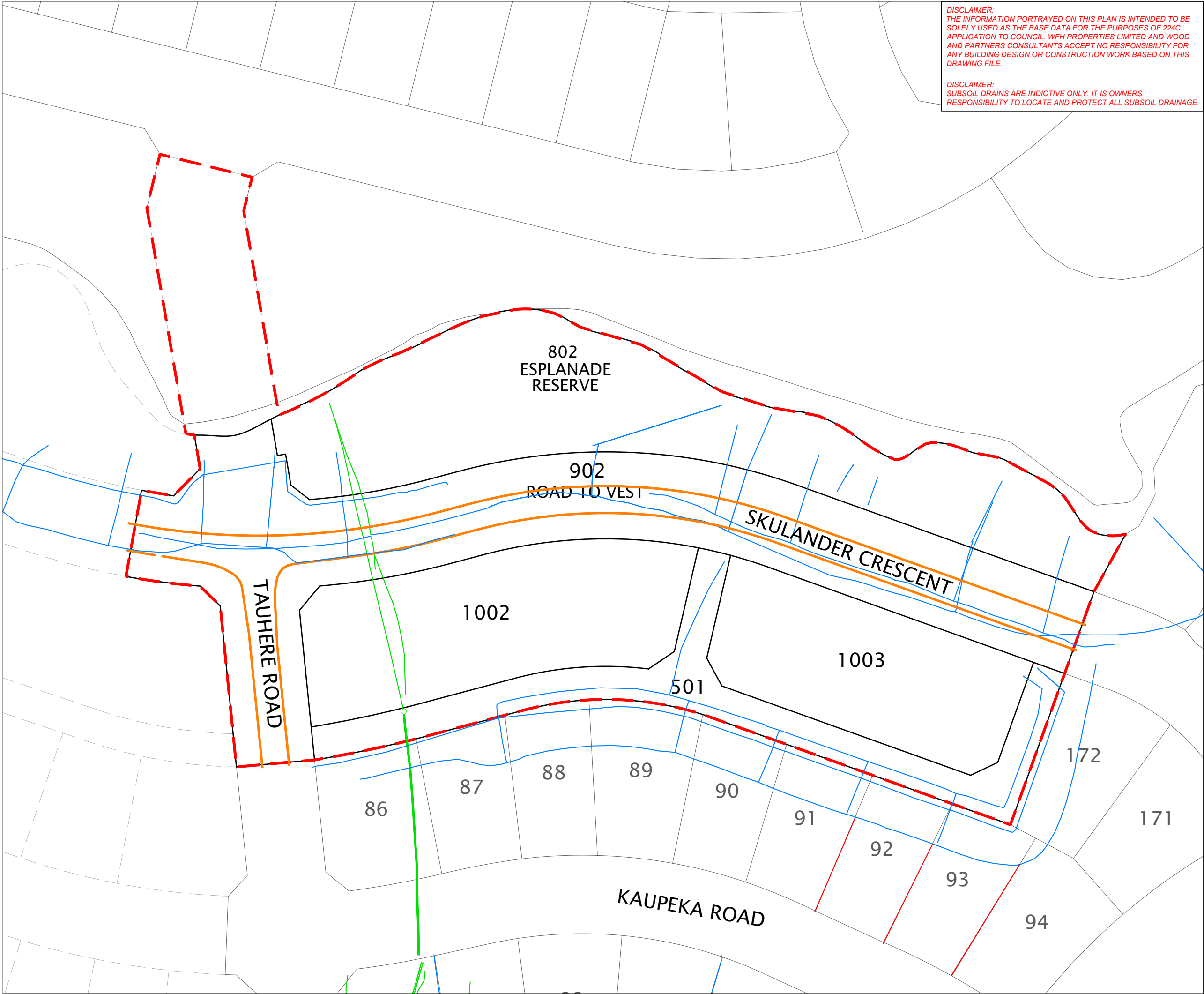
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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	MD	20/12/22

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

**MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C**
CUT AND FILL ASBUILT
SHEET 5 OF 6
ORIGINAL SURFACE TO
LOWEST SURFACE

STATUS	AS-BUILT	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-1104-AB	



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DISCLAIMER:
SUBSOIL DRAINS ARE INDICTIVE ONLY. IT IS OWNERS RESPONSIBILITY TO LOCATE AND PROTECT ALL SUBSOIL DRAINAGE.



NOTES

- 1. COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
- 2. LEVELS SHOWN ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
- 3. SUBSOIL DRAINAGE DATA SUPPLIED BY CONTRACTOR.
- 4. BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
- 5. PLANS HAVE BEEN REVIEWED BY TETRA TECH COFFEY.
- 6. PLANS SHOULD BE READ IN CONJUNCTION WITH THE GCR.

LEGEND

- RE SLOPE/ RETAINING WALL DRAINAGE
- UNDERFILL DRAINS
- UNDER CHANNEL DRAINS
- COUNTERFORT DRAINS
- STAGE BOUNDARIES
- LOT BOUNDARIES

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	EY	20/12/22

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

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

SUBSOIL DRAINAGE ASBUILT PLAN

STATUS	AS-BUILT	REV
SCALE	1:750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-1200-AB	



DISCLAIMER:
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SEE SHEET 1402

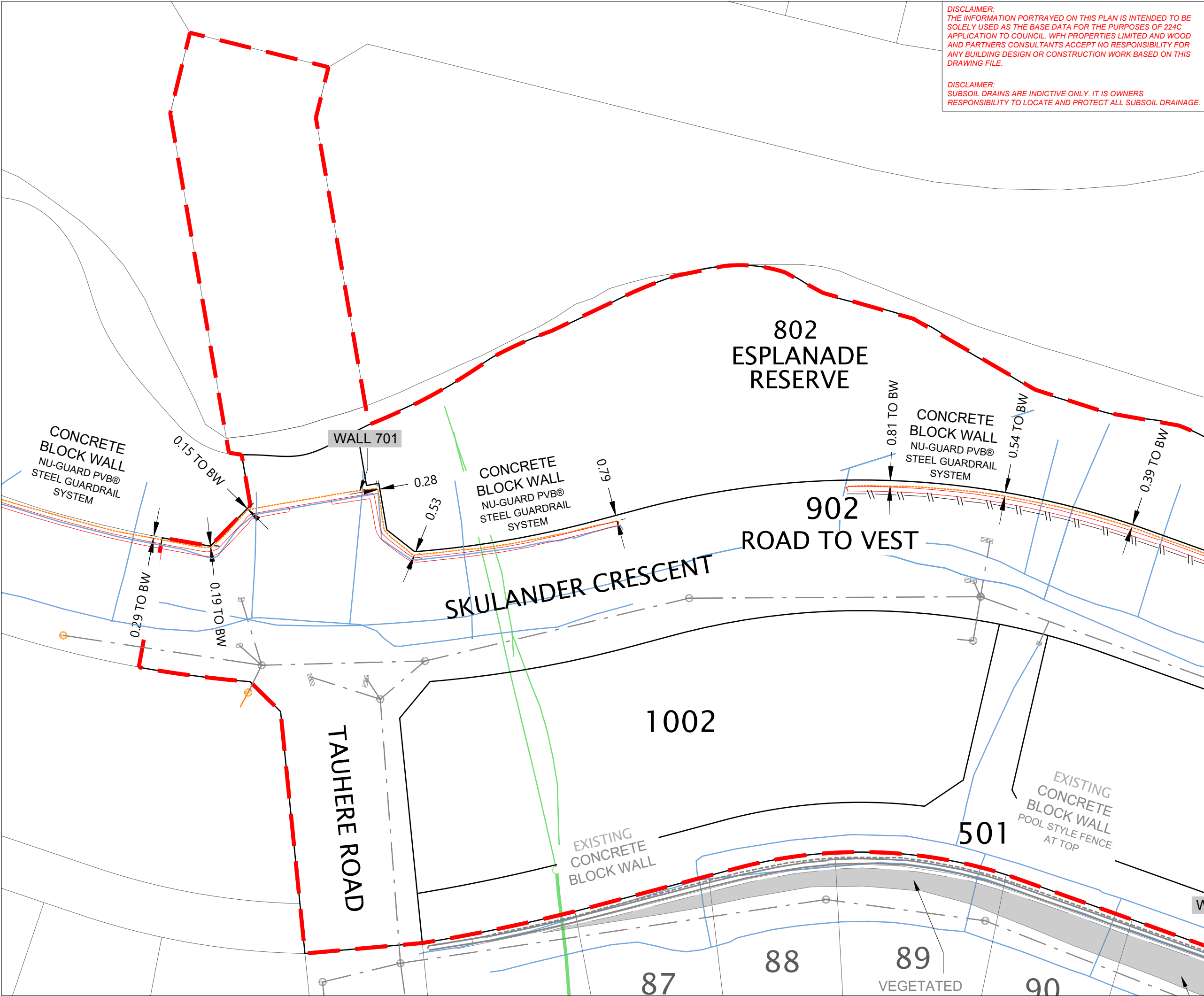
STATUS	AS-BUILT	REV 1
SCALE	1:750 @ A3	
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-1400-AB	



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DISCLAIMER:
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- LEGEND:
- BOTTOM FACE OF WALL
 - TOP FACE OF WALL
 - RE SLOPE / RETAINING WALL DRAINAGE
 - UNDERFILL DRAINS
 - FENCE
 - TOP OF BANK
 - BOTTOM OF BANK
 - BOUNDARY
 - OFFSET TO BOUNDARY (FROM WALL)
 - STORMWATER LINE & MANHOLE



REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	MD	20/12/22

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

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

RETAINING WALL ASBUILT PLAN
SHEET 2 OF 3

STATUS	AS-BUILT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-1401-AB	

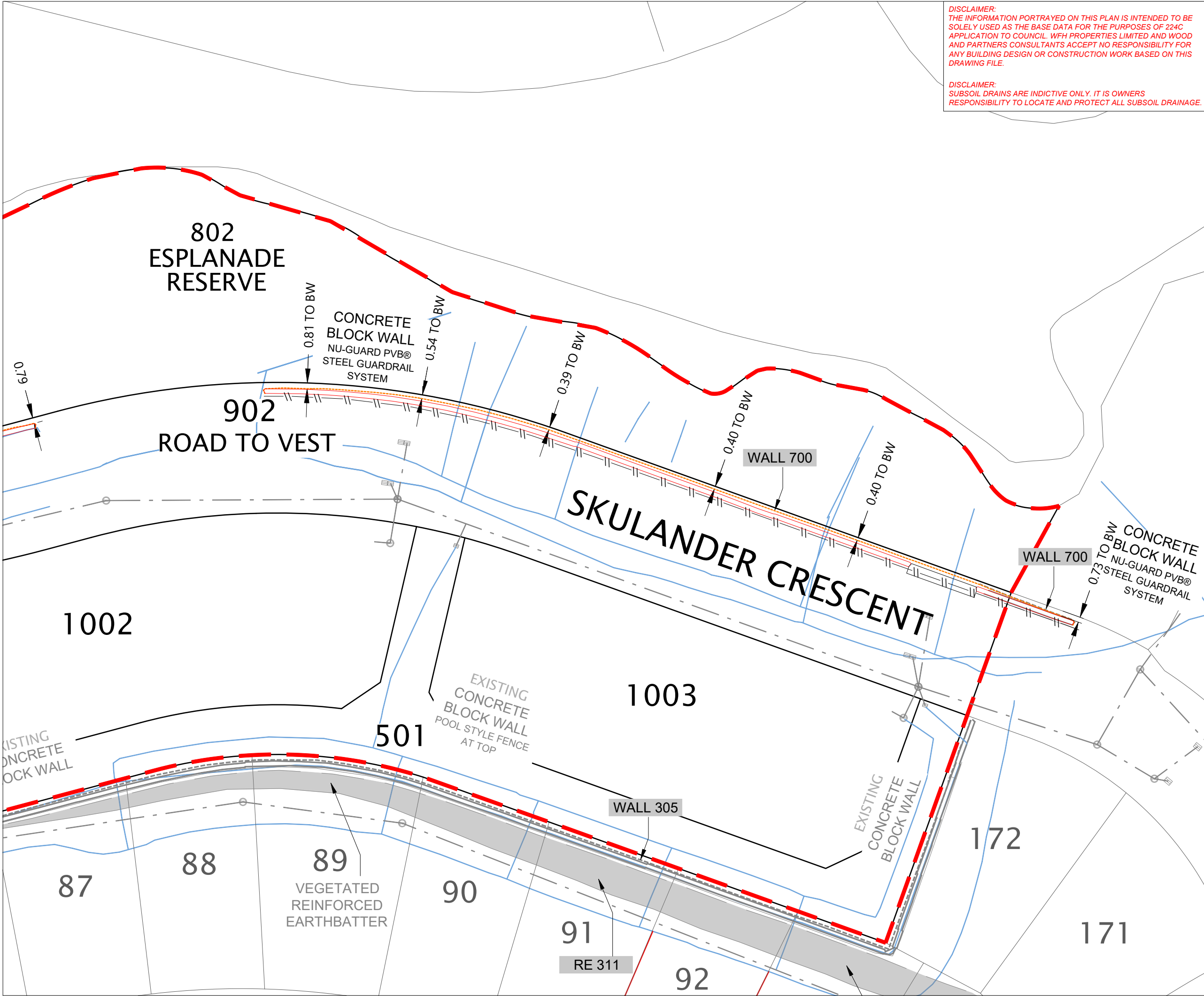
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DISCLAIMER:
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APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD
AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR
ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS
DRAWING FILE.

DISCLAIMER:
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RESPONSIBILITY TO LOCATE AND PROTECT ALL SUBSOIL DRAINAGE.

LEGEND:

- BOTTOM FACE OF WALL
- TOP FACE OF WALL
- RE SLOPE / RETAINING WALL DRAINAGE
- UNDERFILL DRAINS
- FENCE
- TOP OF BANK
- BOTTOM OF BANK
- BOUNDARY
- OFFSET TO BOUNDARY (FROM WALL)
- STORMWATER LINE & MANHOLE



REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	MD	20/12/22

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

N

WFH PROPERTIES

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

RETAINING WALL ASBUILT PLAN
SHEET 2 OF 3

STATUS	AS-BUILT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-1402-AB	

DISCLAIMER:
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FOR THE PURPOSES OF 224C APPLICATION TO
COUNCIL. WFH PROPERTIES LIMITED AND WOOD
AND PARTNERS CONSULTANTS ACCEPT NO
RESPONSIBILITY FOR ANY BUILDING DESIGN OR
CONSTRUCTION WORK BASED ON THIS DRAWING
FILE.

SCHEDULE OF COORDINATES		
NAME	EASTING	NORTHING
STREETLIGHTS		
SL01	1749280.62	5949033.88
SL02	1749235.80	5949040.06
SL03	1749192.01	5949047.00
SL04	1749152.91	5949039.57
SL05	1749148.01	5949027.48
SL06	1749121.13	5949040.97

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

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

Signed: 
Licensed Cadastral Surveyor

Date: 16/01/23












Name: SAMANTHA MUIRHEAD

SCHEDULE OF COORDINATES			
ID	EASTING	NORTHING	SPECIES
STREET TREES			
ST01	1749310.82	5949022.95	PRYUS
ST02	1749303.33	5949016.59	
ST03	1749292.99	5949029.28	
ST04	1749275.16	5949027.12	
ST05	1749266.50	5949038.77	
ST06	1749249.96	5949044.62	
ST07	1749246.85	5949037.03	
ST08	1749226.99	5949049.27	
ST09	1749203.03	5949048.76	
ST10	1749196.31	5949039.52	
ST11	1749179.32	5949043.67	
ST12	1749162.52	5949040.41	
ST13	1749160.75	5949032.14	
ST14	1749140.03	5949013.95	PRUNUS
ST15	1749148.89	5949011.08	
ST16	1749141.05	5949003.84	

NOTES

- ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.
- BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.

LEGEND

-  STREET LIGHT
-  ROAD NAME SIGN
-  CATCH PIT/BERM SUMP
-  STORMWATER MANHOLE
-  RG-6 SIGN (GIVE WAY)
-  STREET TREE
-  SS MANHOLE
-  WATER SLUICE VALVE
-  WATER PEET VALVE
-  WATER FIRE HYDRANT
-  WATER MANIFOLD BOX
-  TELECOMMUNICATIONS MH
-  POWER BOX
-  TELECOM PLINTH
-  TACTILE PAVING
-  PW39 SIGN (SPEED HUMP)
-  POWER LINK PILLAR
-  FENCE
- WORKS TO BE COMPLETED

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/12/22
2	BRIDGE DETAILS ADDED	SM	16/01/23

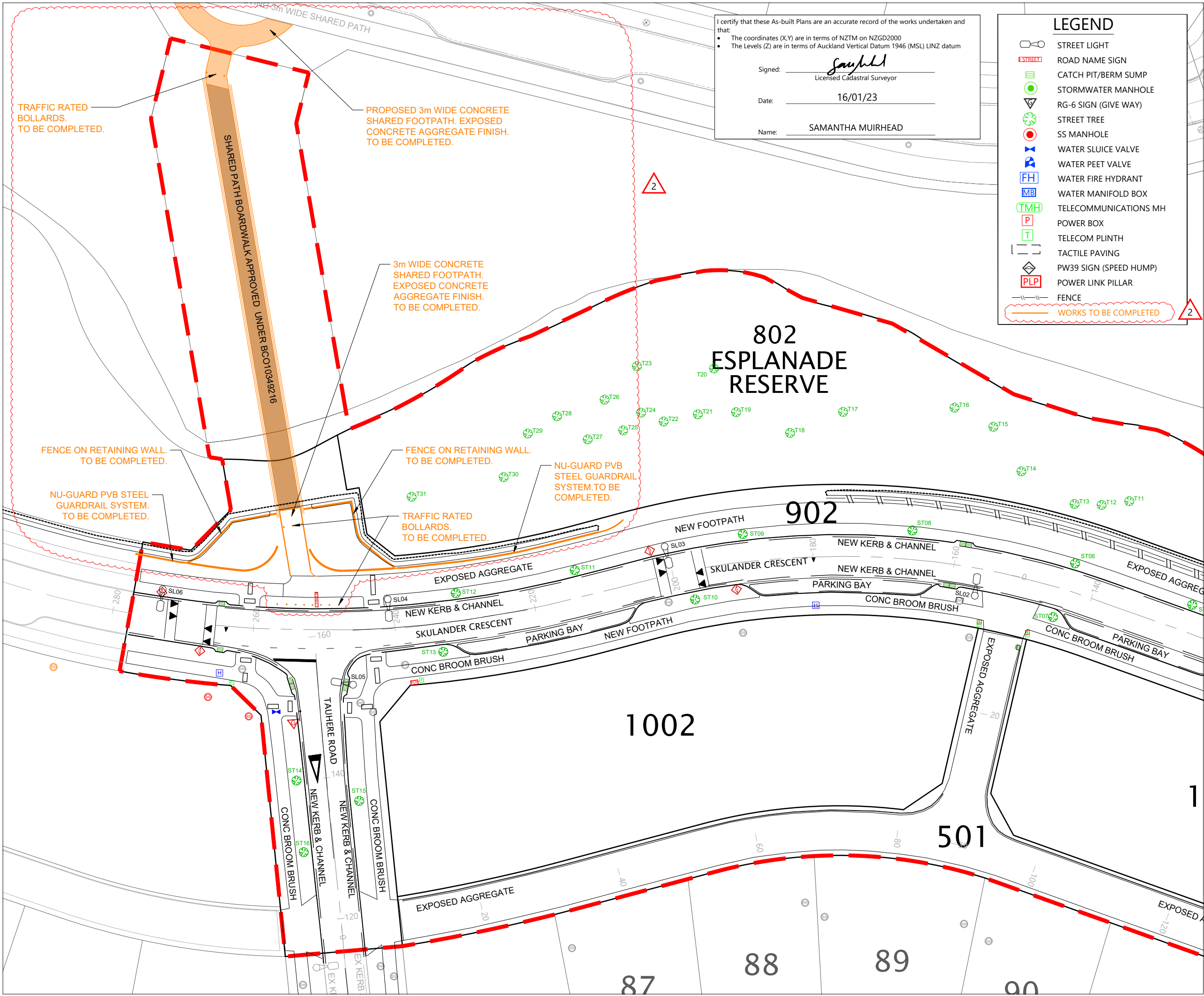
SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	SM	



MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

ROADING ASBUILT PLAN
LAYOUT SHEET
SHEET 1 OF 3

STATUS	AS-BUILT	REV
SCALE	1:750 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-2000-AB	



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

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

Signed: *Samantha Muirhead*
Licensed Cadastral Surveyor

Date: 16/01/23

Name: SAMANTHA MUIRHEAD

- ### LEGEND
- STREET LIGHT
 - ROAD NAME SIGN
 - CATCH PIT/BERM SUMP
 - STORMWATER MANHOLE
 - RG-6 SIGN (GIVE WAY)
 - STREET TREE
 - SS MANHOLE
 - WATER SLUICE VALVE
 - WATER PEET VALVE
 - WATER FIRE HYDRANT
 - WATER MANIFOLD BOX
 - TELECOMMUNICATIONS MH
 - POWER BOX
 - TELECOM PLINTH
 - TACTILE PAVING
 - PW39 SIGN (SPEED HUMP)
 - POWER LINK PILLAR
 - FENCE
 - WORKS TO BE COMPLETED

NOTES

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DISCLAIMER:
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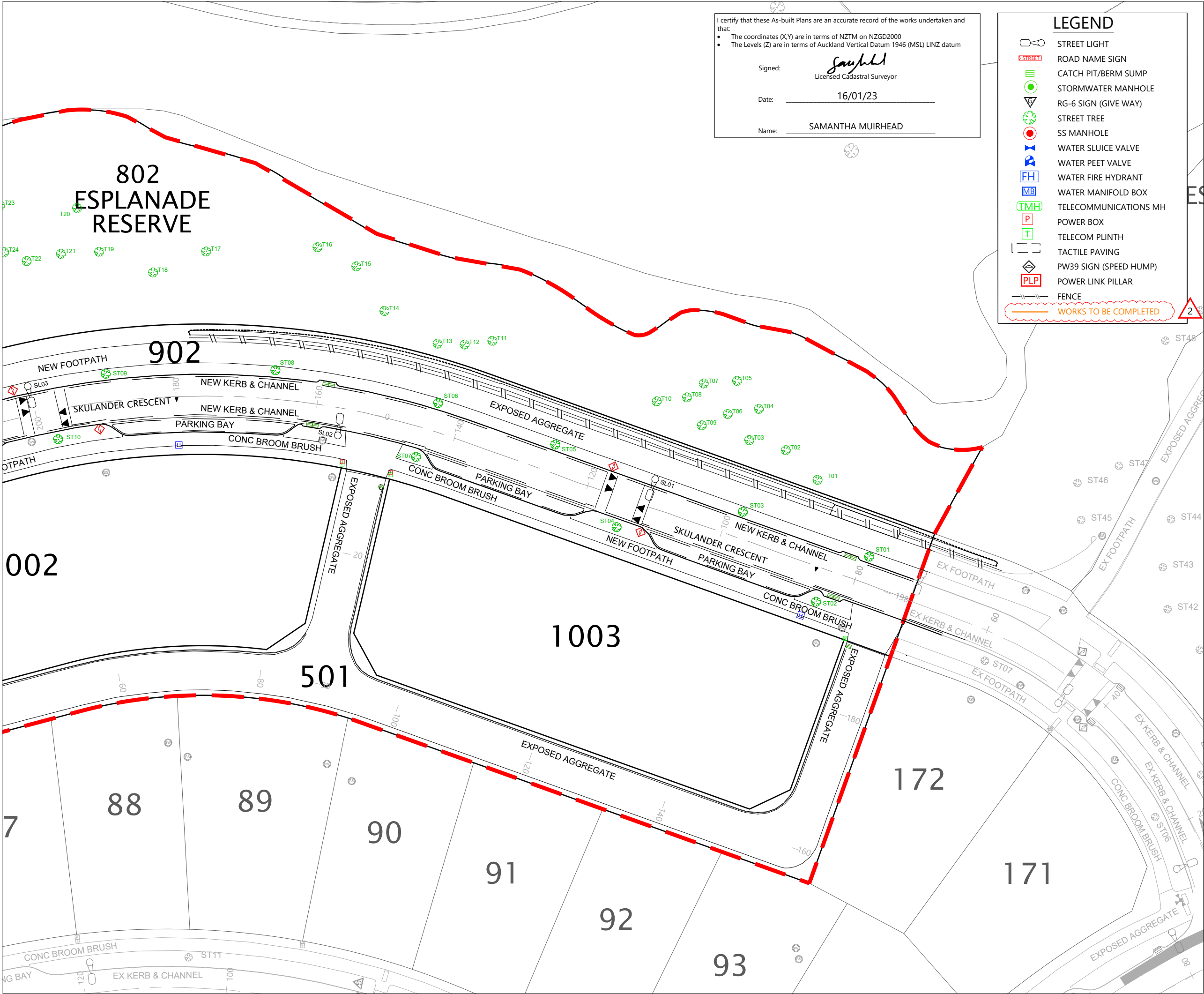
REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/12/22
2	BRIDGE DETAILS ADDED	SM	16/01/23

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

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

ROADING ASBUILT PLAN
SHEET 2 OF 3

STATUS	AS-BUILT	REV
SCALE	1:500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-2001-AB	



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

Signed: *Samantha Muirhead*
Licensed Cadastral Surveyor

Date: 16/01/23

Name: SAMANTHA MUIRHEAD

- ### LEGEND
- STREET LIGHT
 - ROAD NAME SIGN
 - CATCH PIT/BERM SUMP
 - STORMWATER MANHOLE
 - RG-6 SIGN (GIVE WAY)
 - STREET TREE
 - SS MANHOLE
 - WATER SLUICE VALVE
 - WATER PEET VALVE
 - WATER FIRE HYDRANT
 - WATER MANIFOLD BOX
 - TELECOMMUNICATIONS MH
 - POWER BOX
 - TELECOM PLINTH
 - TACTILE PAVING
 - PW39 SIGN (SPEED HUMP)
 - POWER LINK PILLAR
 - FENCE
 - WORKS TO BE COMPLETED

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/12/22
2	BRIDGE DETAILS ADDED	SM	16/01/23

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

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

ROADING ASBUILT PLAN
SHEET 3 OF 3

STATUS	AS-BUILT	REV
SCALE	1:500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-2002-AB	



SCHEDULE OF COORDINATES		
STORMWATER LOT CONNECTIONS		
NAME	EASTING	NORTHING
LOT 1002	1749230.36	5949033.34
LOT 1003	1749303.27	5949009.44
LOT 173	1749283.18	5948856.18
LOT 152	1749293.71	5948870.28
LOT 153	1749304.24	5948885.86
STORMWATER LOT CONNECTIONS (FOR FUTURE LOTS)		
LOT 1001	1749129.32	5949023.80

LEGEND

STORMWATER MANHOLE

STORMWATER CESSPIT

NEW STORMWATER

EXISTING STORMWATER

FUTURE STORMWATER

LOT BOUNDARY

STAGE BOUNDARY

FUTURE BOUNDARY

SW

SW

SW

SW

SW

SW

SW

NOTE: LNS= LID NOT SET AT FINAL LEVEL
LL= LID LEVEL

- NOTES
1. ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

2. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.

3. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	SM	20/12/22

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

N

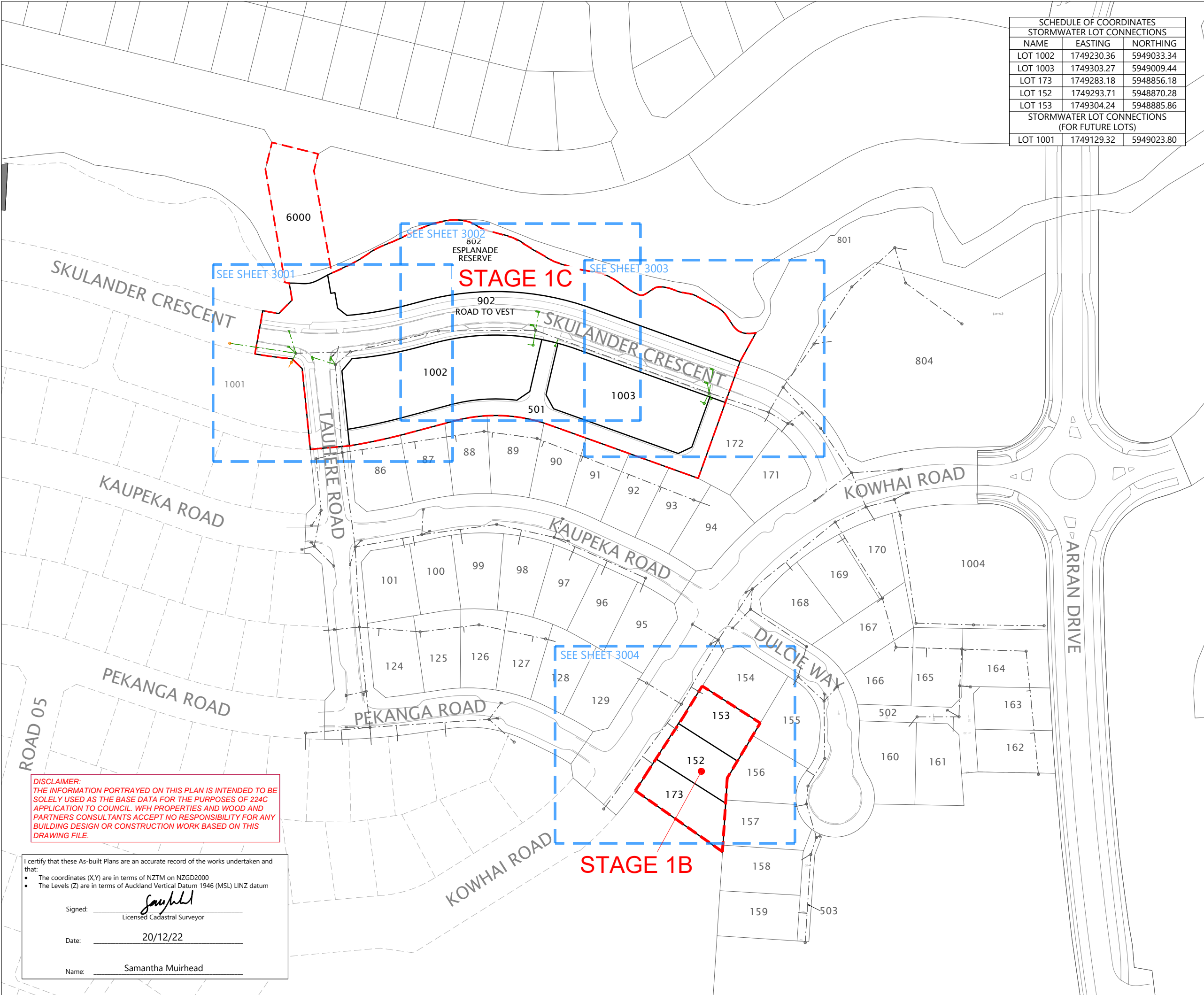
WFH

PROPERTIES

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

STORMWATER ASBUILT PLAN
OVERALL LAYOUT
SHEET 1 OF 5

STATUS	AS-BUILT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-3000-AB	



Plot Date: 9:57:45 pm, 20 December 2022, SAMANTHAM
File: C:\12DS\ENERGY\DATA\WP-PEN-APP-01\P22-006 - ARRAN HILL P6 STAGE 1C 20922\CADD\SURV\AB\P22-006-00-3000-AB STORMWATER.DWG



Plot Date: 9:57:45 pm, 20 December 2022, SAMANTHAM

LEGEND

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

NOTE: LNS= LID NOT SET AT FINAL LEVEL
LL= LID LEVEL

NOTES

- ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	SM	20/12/22

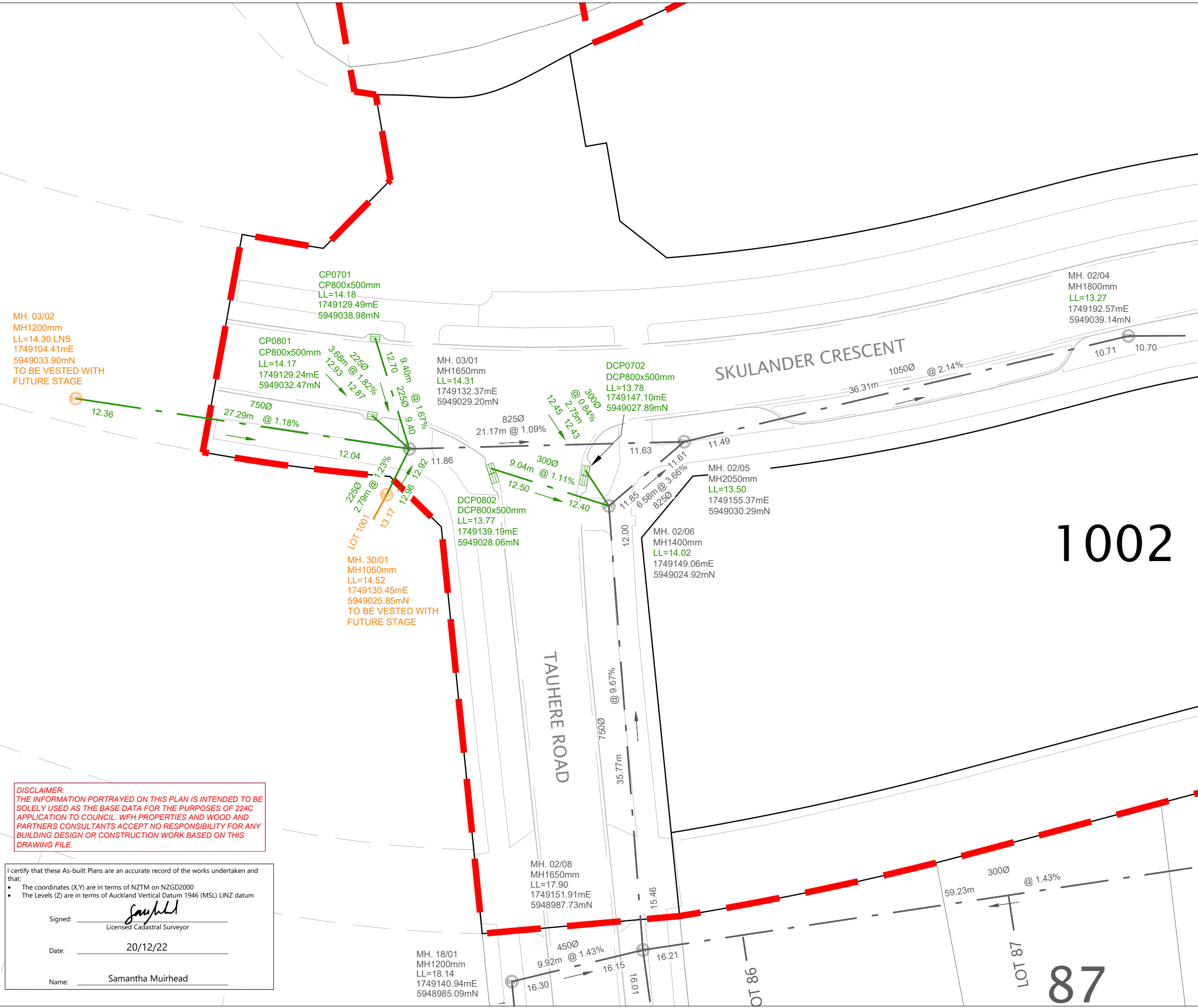
SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	SM	
		WOODS.CO.NZ



MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

STORMWATER ASBUILT PLAN
SHEET 2 OF 5

STATUS	AS-BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-3001-AB	



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

Signed:
Licensed Cadastral Surveyor

Date: 20/12/22

Name: Samantha Muirhead

802 ESPLANADE RESERVE

902

SKULANDER CRESCENT

MH. 02/04
MH1800mm
LL=13.27
1749192.57mE
5949039.14mN

DCP 0601
DCP800x500mm
LL=12.36
1749232.65mE
5949041.52mN

DCP0501
DCP800x500mm
LL=12.31
1749234.96mE
5949047.22mN

MH. 02/03
MH2050mm
LL=12.52
1749233.62mE
5949039.35mN

MH. 29/01
MH1050mm
LL=13.60
1749232.58mE
5949033.15mN

CP. 0401
CP 675x450mm
LL=12.54
1749241.88mE
5949032.76mN

1002

501

1003

LEGEND

STORMWATER MANHOLE

STORMWATER CESSPIT

NEW STORMWATER

EXISTING STORMWATER

FUTURE STORMWATER

LOT BOUNDARY

STAGE BOUNDARY

FUTURE BOUNDARY

NOTE: LNS= LID NOT SET AT FINAL LEVEL
LL= LID LEVEL

NOTES

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- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	SM	20/12/22

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

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

STORMWATER ASBUILT PLAN
SHEET 3 OF 5

STATUS	AS-BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-3002-AB	

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

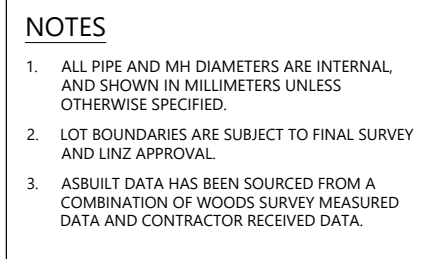
- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed:

Date: 20/12/22

Name: Samantha Muirhead

Licensed Cadastral Surveyor



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

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

STORMWATER ASBUILT PLAN
SHEET 4 OF 5

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-006 - ARRAN HILL P6 STAGE 1C_20922\CAD\SURVAB\P22-006-00-3000-AB STORMWATER.DWG

DISCLAIMER:
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Name: Samantha Muirhead

172

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









Signed: 
Licensed Cadastral Surveyor

Date: 13/01/2023

Name: SAMANTHA MUIRHEAD

SCHEDULE OF COORDINATES		
WASTEWATER LOT CONNECTIONS		
NAME	EASTING	NORTHING
LOT 1002	1749233.81	5949029.90
LOT 1003	1749301.12	5949006.86
LOT 173	1749284.12	5948854.30
LOT 152	1749293.50	5948867.51
LOT 153	1749305.14	5948885.68
WASTEWATER LOT CONNECTIONS (FOR FUTURE LOTS)		
LOT 1001	1749125.61	5949023.40

LEGEND

- NEW SANITARY SEWER MANHOLE TO VEST 
- NEW SANITARY SEWER TO VEST 
- EXISTING SANITARY SEWER 
- FUTURE SANITARY SEWER 
- LOT BOUNDARY 
- FUTURE BOUNDARY 
- STAGE BOUNDARY 
- DROP-PROTECTION STRUCTURE (DPS) 

LNS= LID NOT SET AT FINAL LEVEL.
TO BE SET IN FUTURE STAGE

NOTES

- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
- ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS SPECIFIED OTHERWISE.
- ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.
- ALL NEW SANITARY SEWER LINES ARE 150mmØ uPVC CLASS SN16 UNLESS SPECIFIED OTHERWISE.

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224c	SM	20/12/22
2	NOTES AMENDED	SM	10/01/23
3	ADDITIONAL NOTES ADDED	SM	13/01/23

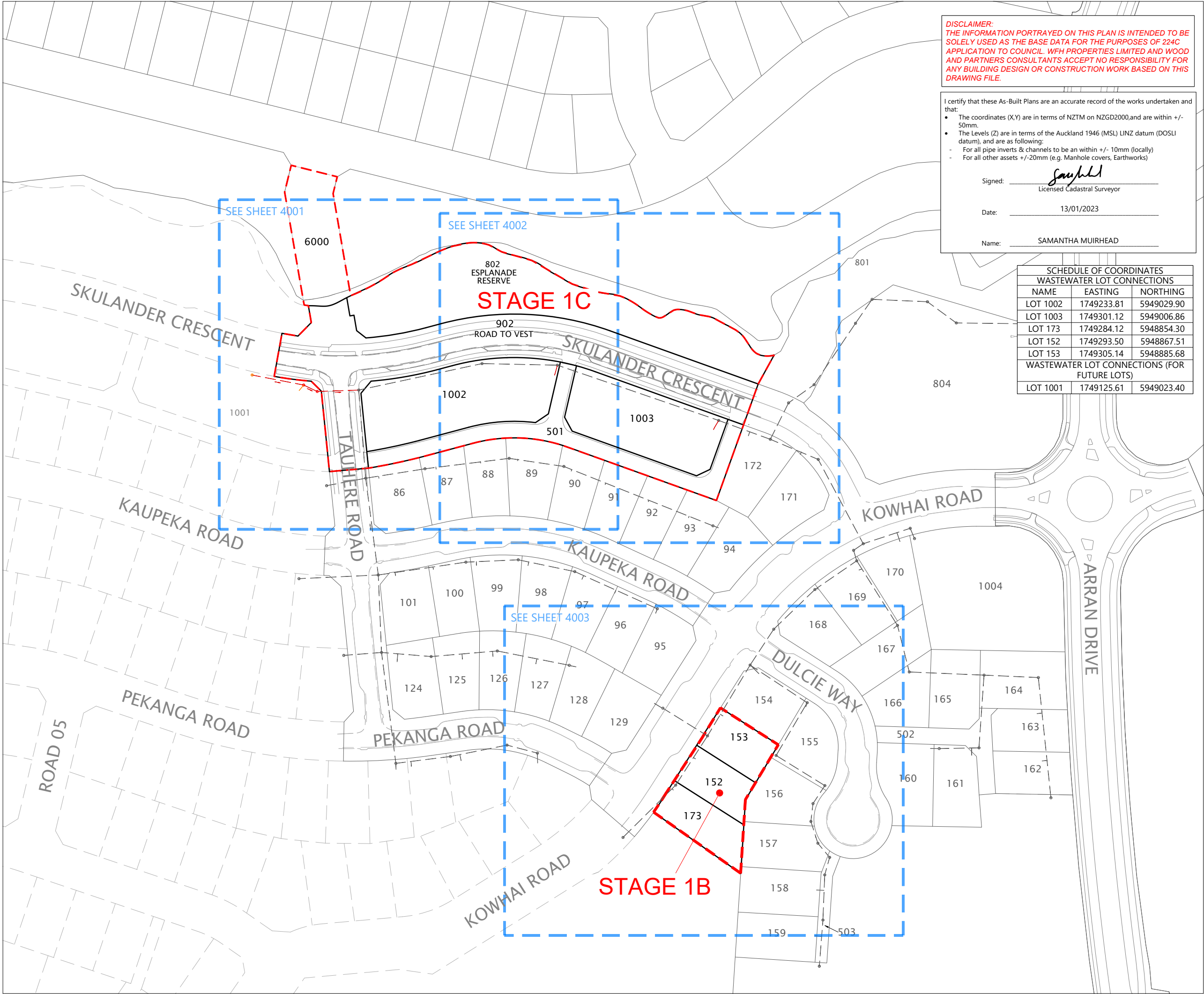
SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	SM	
		WOODS.CO.NZ

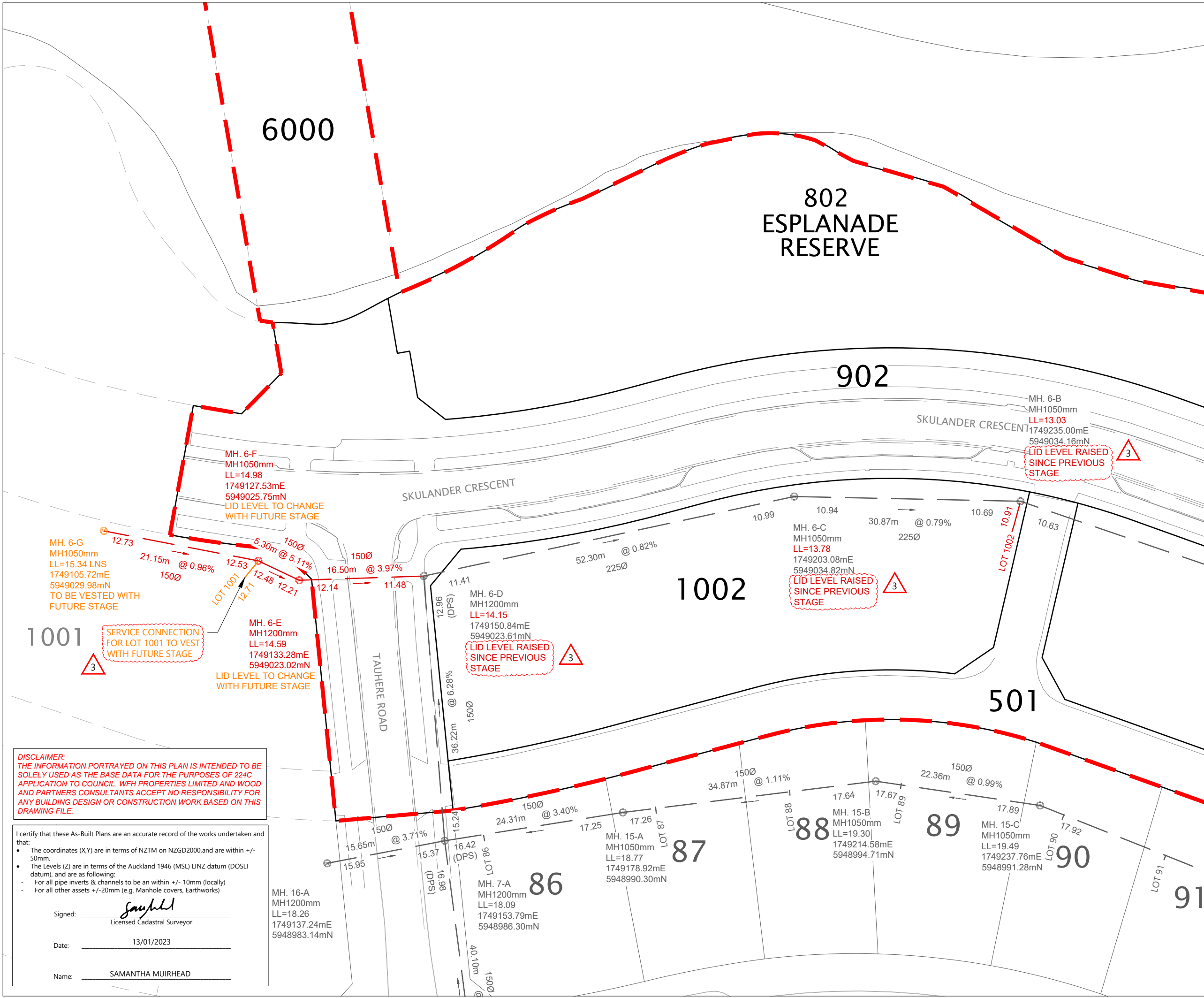


**MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C**

**WASTEWATER ASBUILT PLAN
LAYOUT SHEET
SHEET 1 OF 4**

STATUS	AS-BUILT	REV
SCALE	1:1500 @ A3	3
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-4000-AB	





LEGEND

NEW SANITARY SEWER MANHOLE TO VEST (SS)

NEW SANITARY SEWER TO VEST (SS)

EXISTING SANITARY SEWER (SS)

FUTURE SANITARY SEWER (SS)

LOT BOUNDARY (SS)

FUTURE BOUNDARY (SS)

STAGE BOUNDARY (SS)

DROP-PROTECTION STRUCTURE (DPS)

LNS= LID NOT SET AT FINAL LEVEL. TO BE SET IN FUTURE STAGE

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224c	SM	20/12/22
2	NOTES AMENDED	SM	10/01/23
3	ADDITIONAL NOTES ADDED	SM	13/01/23

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	SM	

Woods Properties logo and north arrow.

MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C

WASTEWATER ASBUILT PLAN
SHEET 2 OF 4

STATUS	AS-BUILT	REV
SCALE	1:500 @ A3	3
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-4001-AB	

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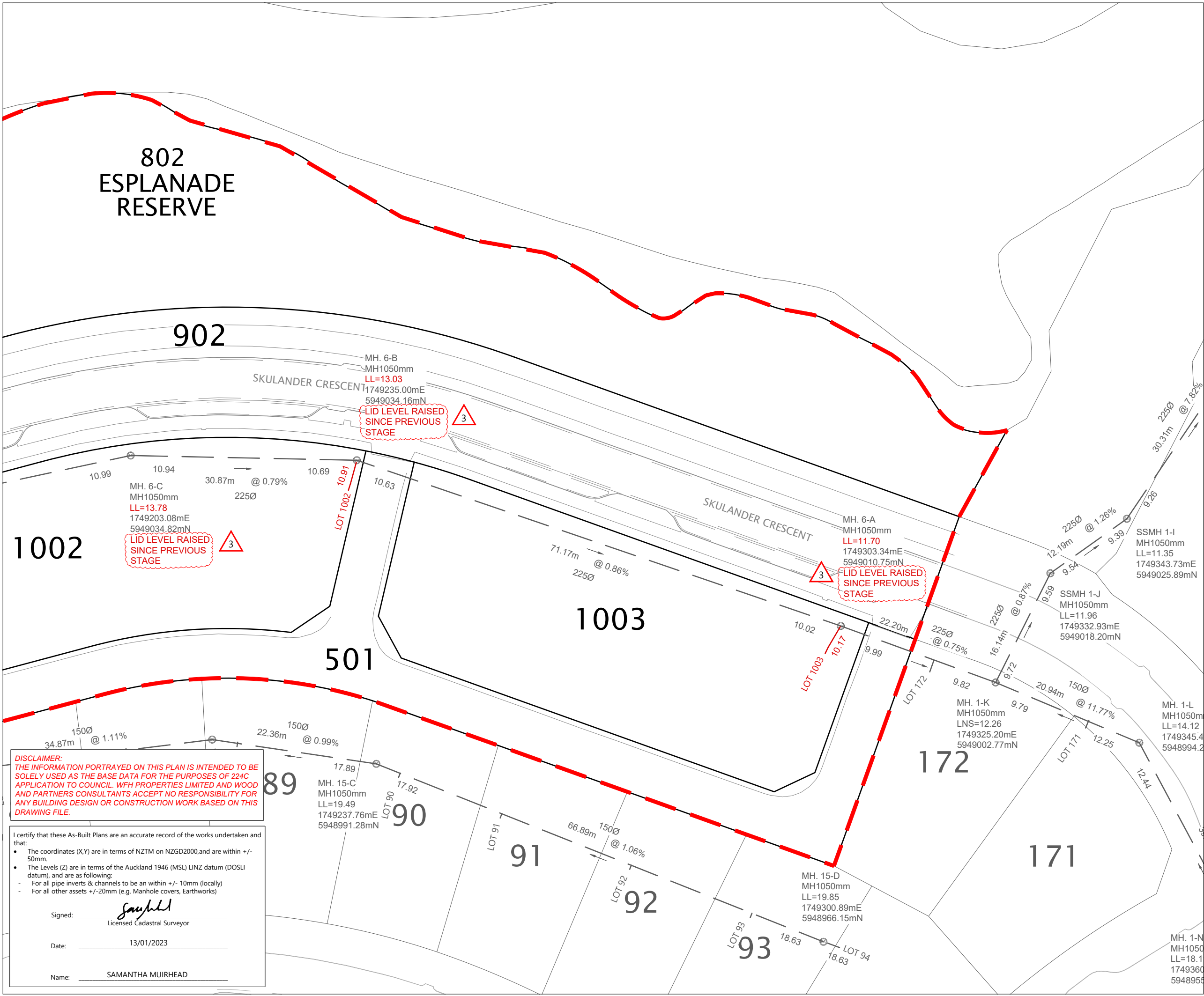
I certify that these As-Built Plans are an accurate record of the works undertaken and that:

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

Signed: *Samantha Muirhead*
Licensed Cadastral Surveyor

Date: 13/01/2023

Name: SAMANTHA MUIRHEAD



LEGEND

NEW SANITARY SEWER MANHOLE TO VEST (SS)

NEW SANITARY SEWER TO VEST (SS)

EXISTING SANITARY SEWER (SS)

FUTURE SANITARY SEWER (SS)

LOT BOUNDARY

FUTURE BOUNDARY

STAGE BOUNDARY

DROP-PROTECTION STRUCTURE (DPS)

LNS= LID NOT SET AT FINAL LEVEL TO BE SET IN FUTURE STAGE

NOTES

- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
- ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS SPECIFIED OTHERWISE.
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- ALL NEW SANITARY SEWER LINES ARE 150mmØ uPVC CLASS SN16 UNLESS SPECIFIED OTHERWISE.

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224c	SM	20/12/22
2	NOTES AMENDED	SM	10/01/23
3	ADDITIONAL NOTES ADDED	SM	13/01/23

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

 **WFH**
PROPERTIES

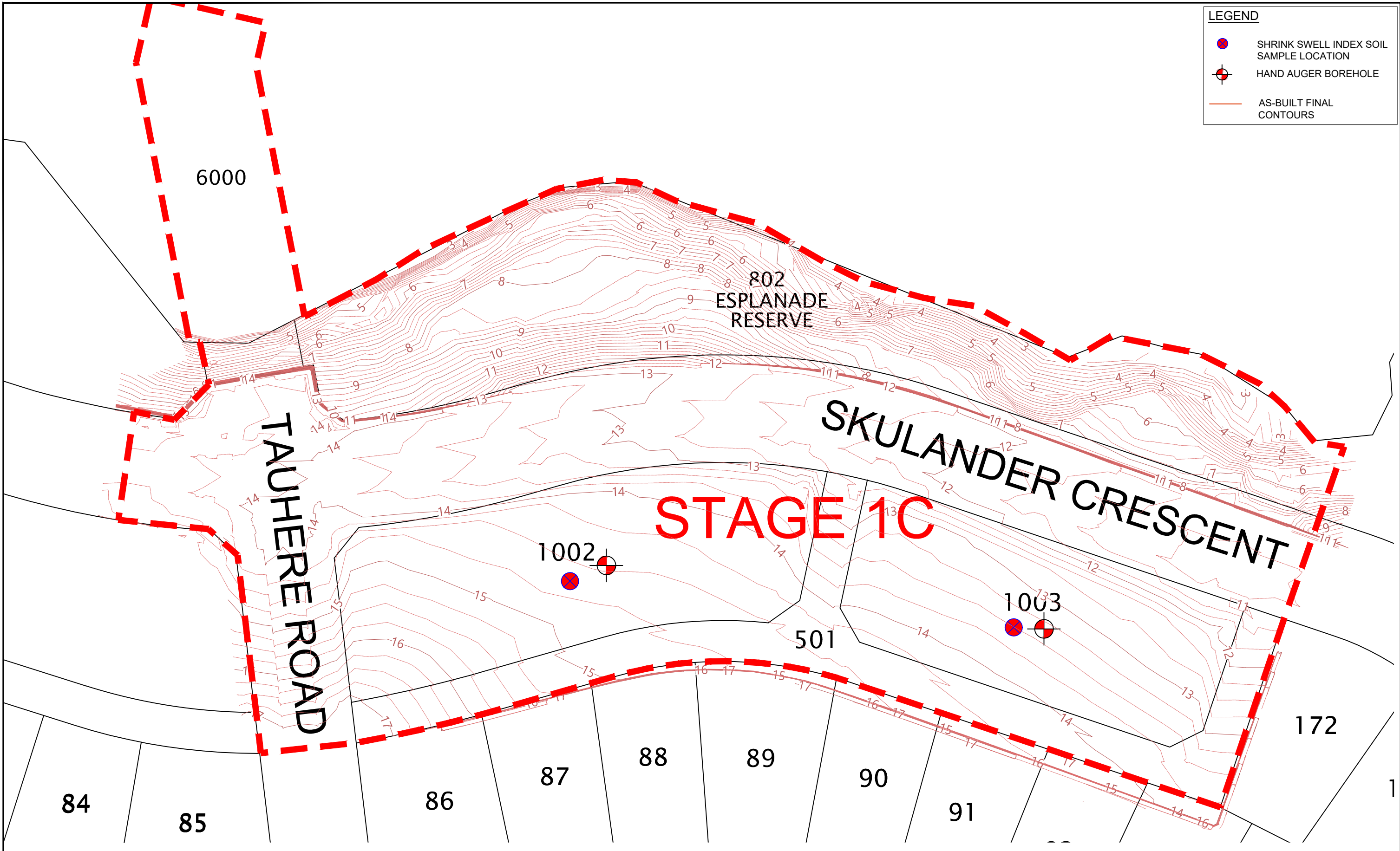
**MILLWATER OREWA WEST
PRECINCT 6 - STAGE 1B/1C**

**WASTEWATER ASBUILT PLAN
SHEET 3 OF 4**

STATUS	AS-BUILT	REV
SCALE	1:500 @ A3	3
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-006-00-4002-AB	

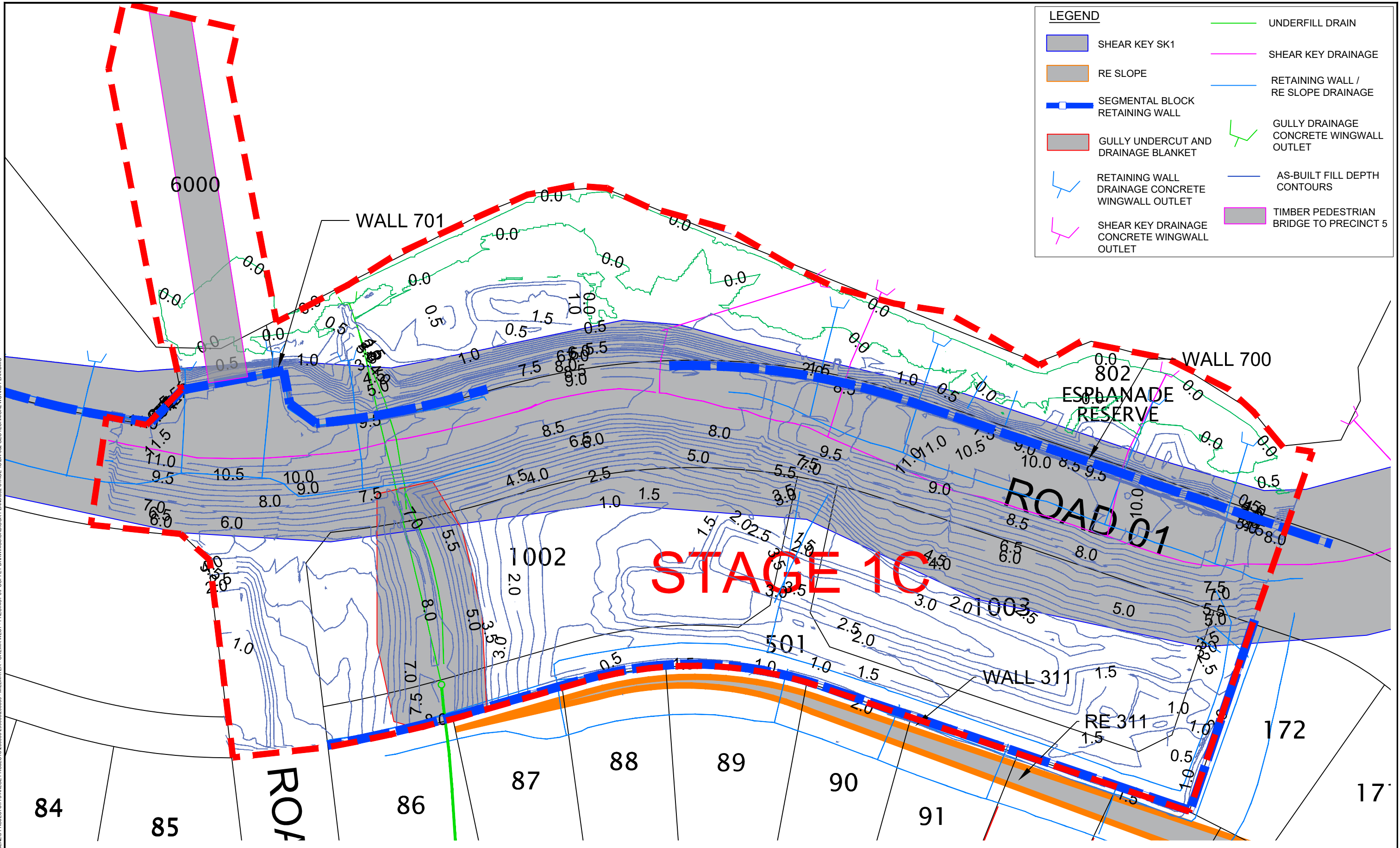
APPENDIX B: REFERENCE DRAWINGS

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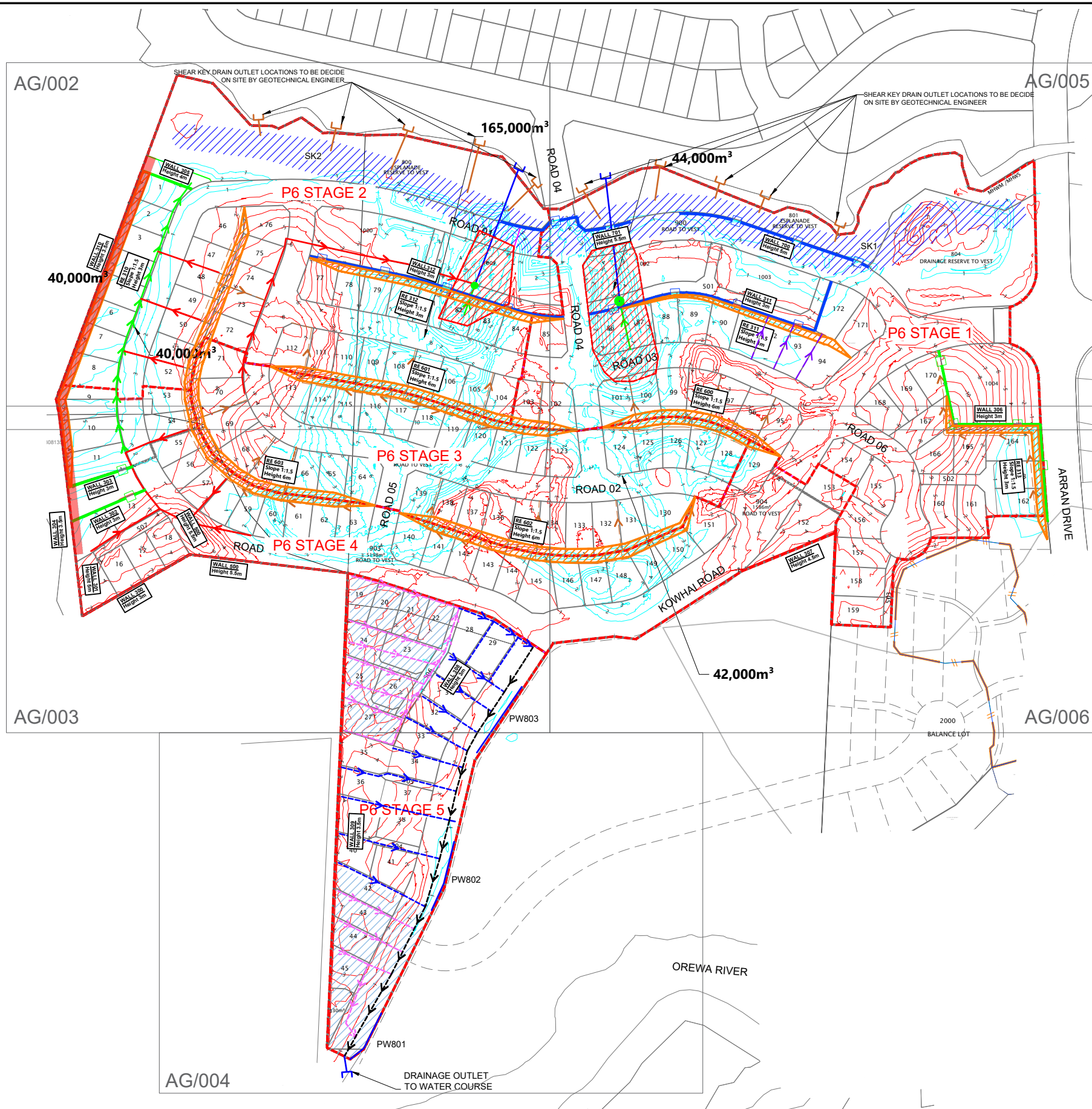
revision	no.	description			drawn	approved	date	<div>0612 SCALE 1:600 (A3) METRES</div>	drawn	SP	<div>TtTETRA TECH COFFEY</div>	client: WFH PROPERTIES LTD		
	A	FOR STAGE 1C GEOTECHNICAL COMPLETION REPORT			SP	SP	11/01/2023		approved	SP		project: MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 1C		
									date	11/01/2023		title: GEOTECHNICAL INVESTIGATION PLAN		
									scale	AS SHOWN		project no: 773-AKLGE206639		
									original size	A3		figure no: BK/001		rev: A

PLOT DATE: 12/01/2023 3:18:35 pm DWG FILE: F:\P\GEN\2\0 PROJECTS\773-AKLGE PROJECTS\200000-296000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\GR PLANS\002 STAGE 1C\BK-002 GEOTECHNICAL WORKS PLAN.DWG



revision	no.	description	drawn	approved	date	 0 6 12 18 24 30 SCALE 1:600 (A3) METRES	drawn	SP		client: WFH PROPERTIES LTD		
	A	FOR STAGE 1C GEOTECHNICAL COMPLETION REPORT	SP	SP	11/01/2023		approved	SP		project: MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 1C		
							date	11/01/2023		title: GEOTECHNICAL WORKS PLAN		
							scale	AS SHOWN		project no: 773-AKLGE206639 figure no: BK/002 rev: A		
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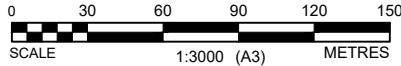
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EARTHWORKS VOLUMES		
STAGE	CUT	FILL
STAGE 1	109,000m3	50,000m3
STAGE 2	45,000m3	94,000m3
STAGE 3	26,000m3	93,000m3
STAGE 4	21,000m3	60,400m3
STAGE 5	39,000m3	-

- 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	UPDATE TO CF DRAIN LAYOUT	RZ	SP	20/07/2020

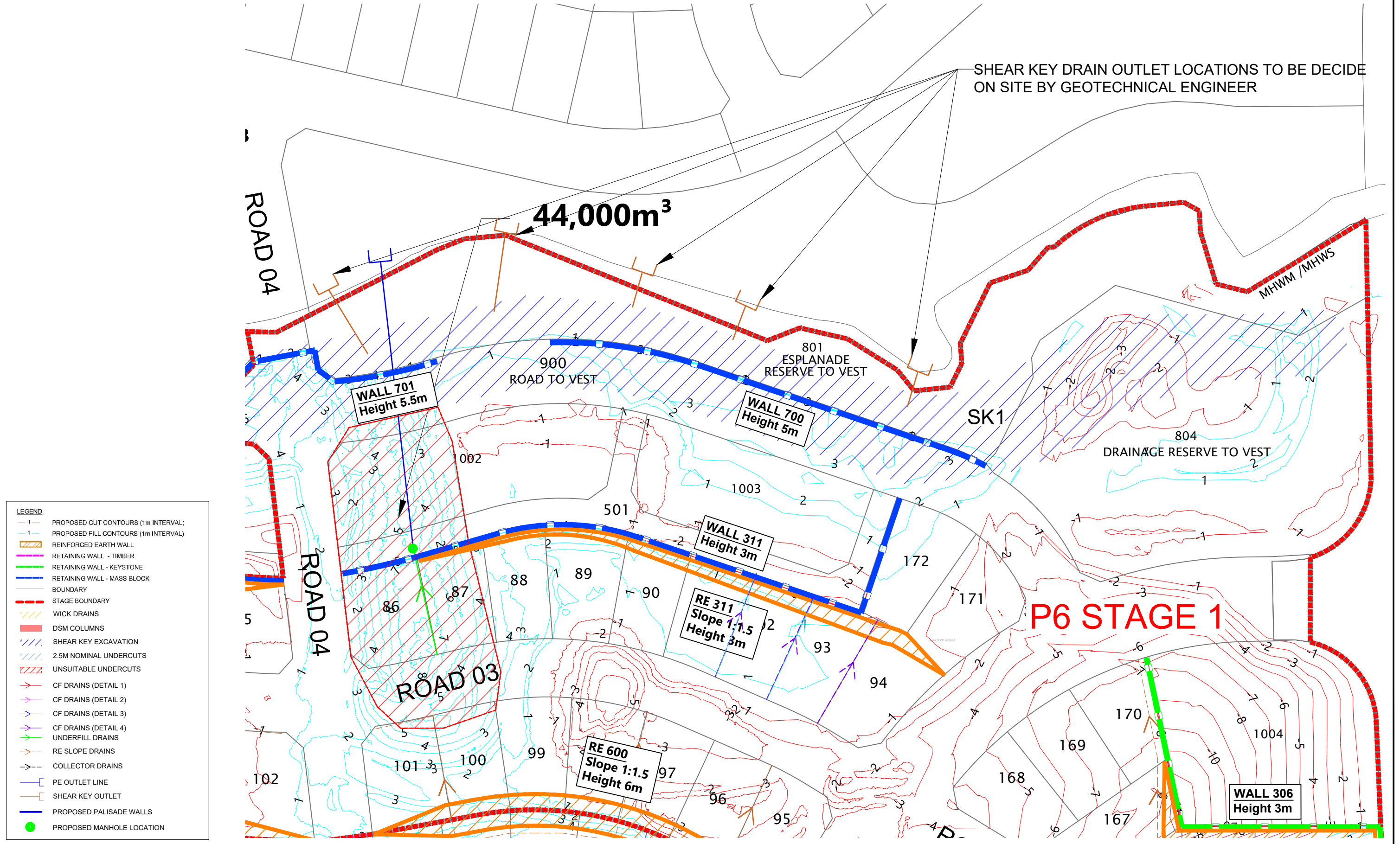


drawn	RZ
approved	SP
date	20/07/2020
scale	AS SHOWN
original size	A3

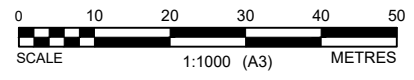


client:	WFH PROPERTIES LTD		
project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	GEOTECHNICAL REMEDIATION PLAN		
project no:	773-AKLGE206639	figure no:	AG/001
rev:	B		

PLOT DATE: 20/07/2020 4:08:35 PM DWG FILE: \\NTS0808F\GEN\2019 PROJECTS\773-AKLGE PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\COFFEY DRAWINGS\STEPHEN\773-AKLGE206639-AG.DWG



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE (FOR EW GDR)	RZ	SP	04/12/2019
	B	UPDATE TO CF DRAIN LAYOUT	RZ	SP	20/07/2020

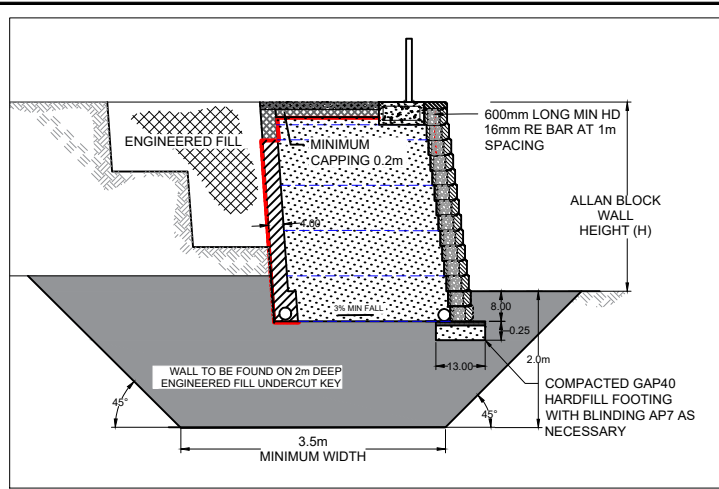


drawn	RZ
approved	SP
date	20/07/2020
scale	AS SHOWN
original size	A3

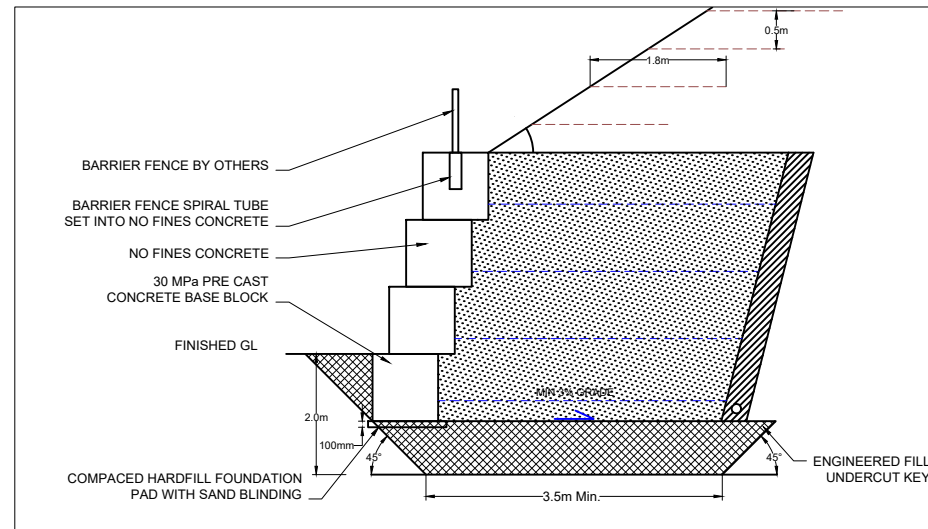


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project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	GEOTECHNICAL REMEDIATION PLAN		
project no:	773-AKLGE206639	figure no:	AG/005
		rev:	B

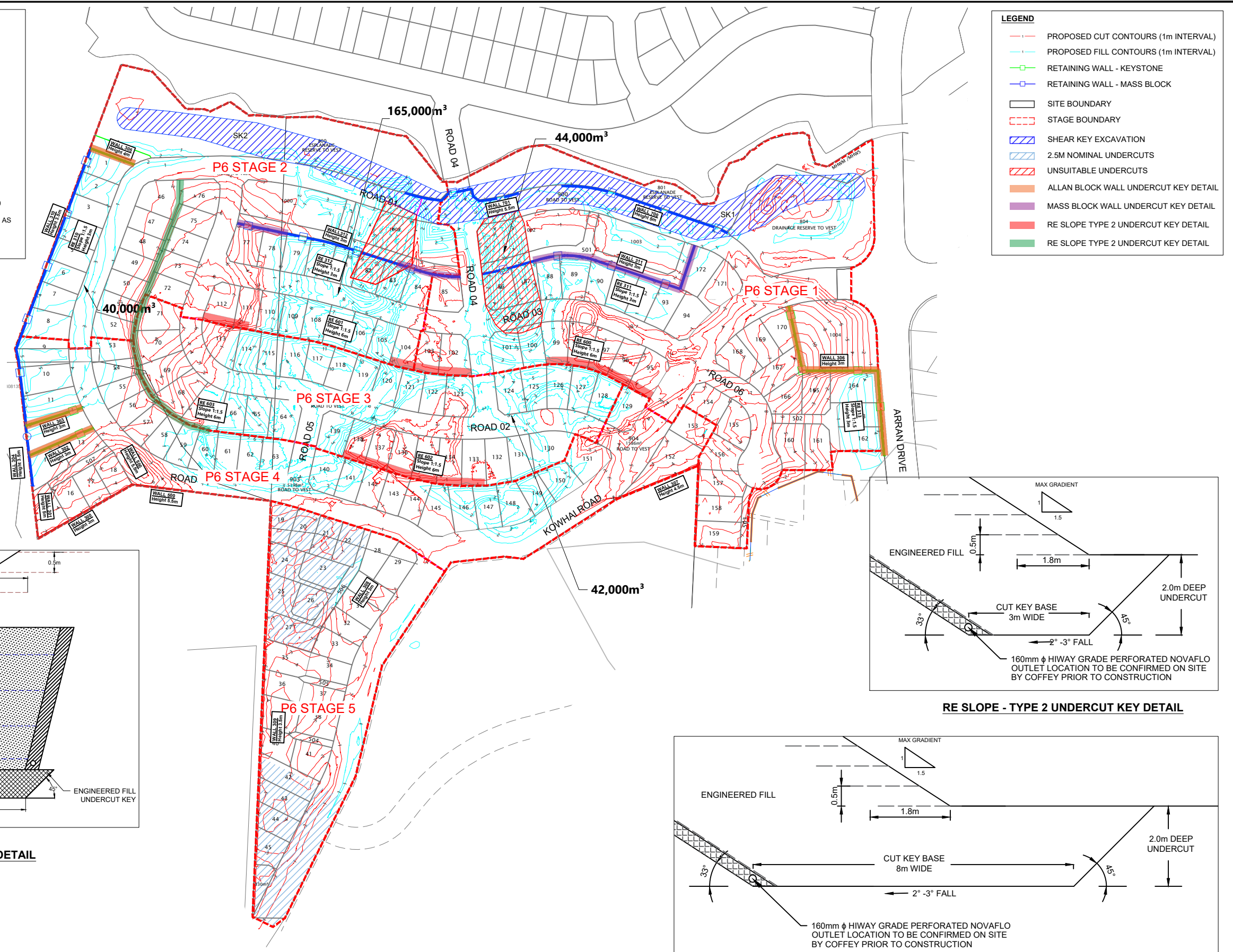
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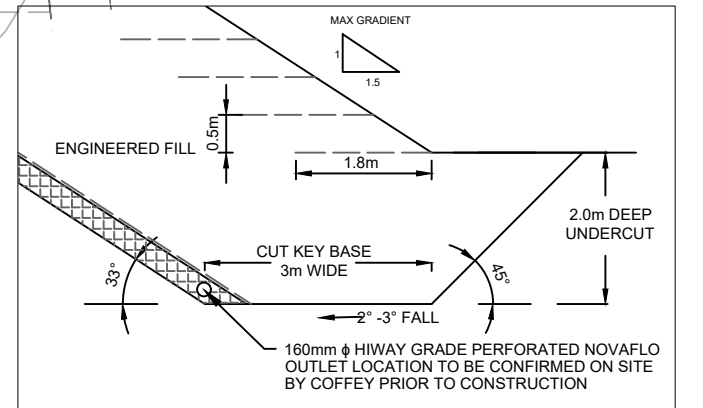
ALLAN BLOCK WALL UNDERCUT KEY DETAIL



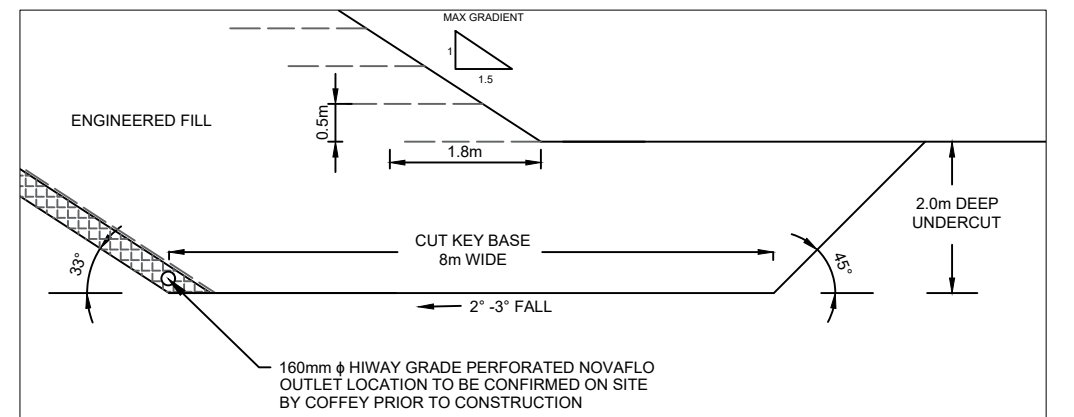
MASS BLOCK WALL UNDERCUT KEY DETAIL



- LEGEND**
- PROPOSED CUT CONTOURS (1m INTERVAL)
 - PROPOSED FILL CONTOURS (1m INTERVAL)
 - RETAINING WALL - KEYSTONE
 - RETAINING WALL - MASS BLOCK
 - 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
 - RE SLOPE TYPE 2 UNDERCUT KEY DETAIL

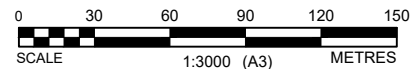


RE SLOPE - TYPE 2 UNDERCUT KEY DETAIL



RE SLOPE - TYPE 3 UNDERCUT KEY DETAIL

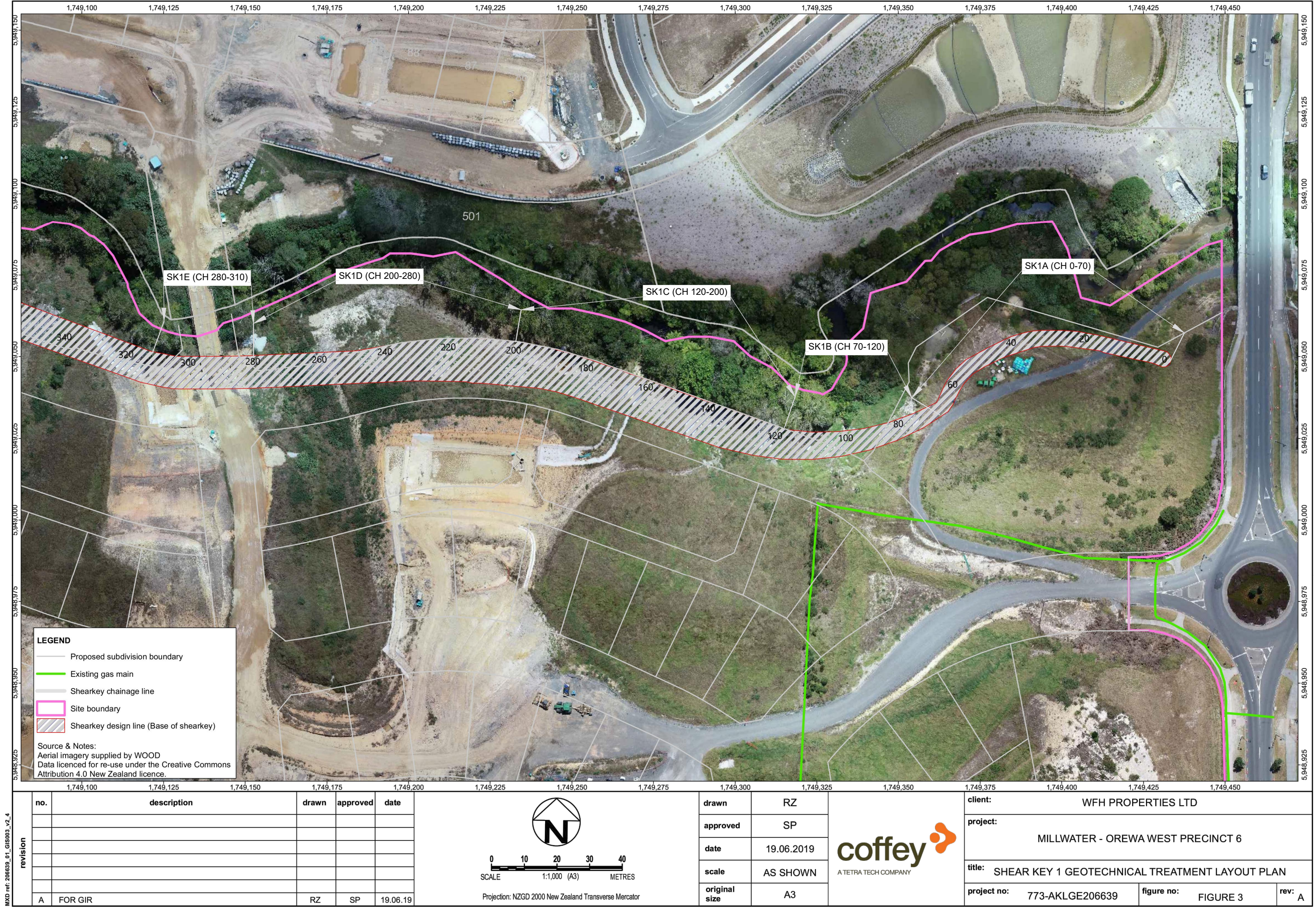
no.	description	drawn	approved	date
A	ORIGINAL ISSUE (FOR EW GDR)	RZ	SP	20/11/2019



drawn	RZ
approved	SP
date	20/11/2019
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:	A




LEGEND


- Proposed subdivision boundary
- Existing gas main
- Shearkey chainage line
- Site boundary
- Shearkey design line (Base of shearkey)

Source & Notes:
Aerial imagery supplied by WOOD
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revision	no.	description			drawn	approved	date
	A	FOR GIR			RZ	SP	19.06.19


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SCALE 1:1,000 (A3) METRES
Projection: NZGD 2000 New Zealand Transverse Mercator

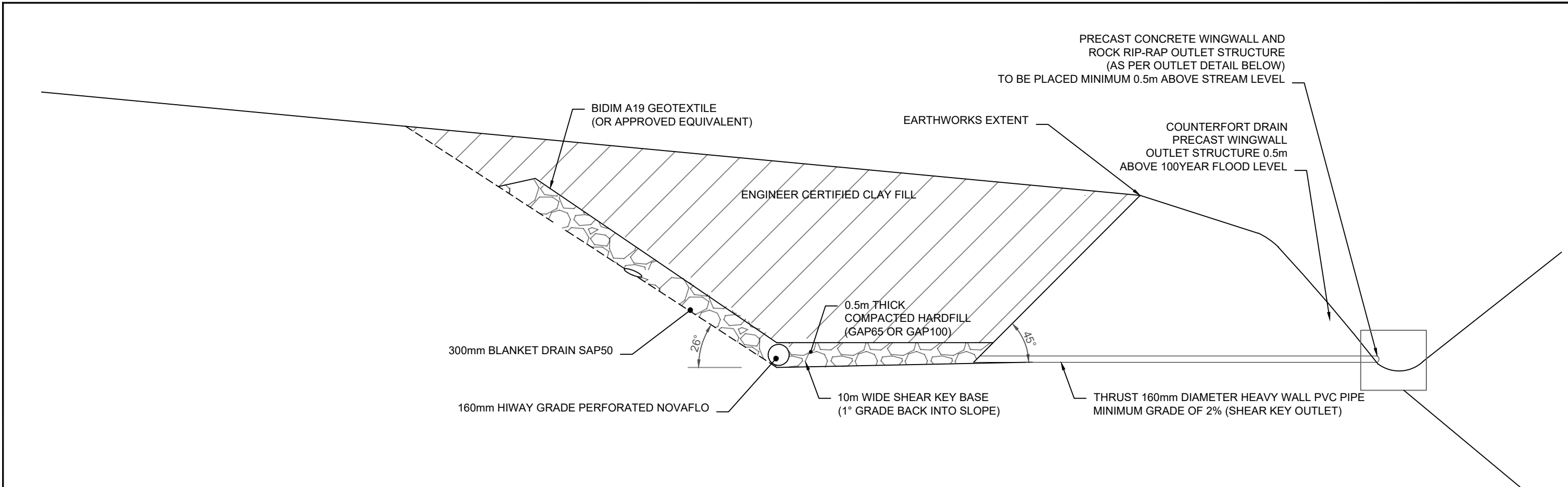
drawn	RZ
approved	SP
date	19.06.2019
scale	AS SHOWN
original size	A3



A TETRA TECH COMPANY

client: WFH PROPERTIES LTD	
project: MILLWATER - OREWA WEST PRECINCT 6	
title: SHEAR KEY 1 GEOTECHNICAL TREATMENT LAYOUT PLAN	
project no: 773-AKLGE206639	figure no: FIGURE 3
rev: A	

PLOT DATE: 22/10/2019 12:38:31 PM DWG FILE: \\TTSR08FS2\808\GEN2\9 PROJECT\73\AKLGE PROJECT\9206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\LONG SECTION.DWG



HOLD POINTS:

OBSERVATIONS OF ALL ASPECTS OF THE SHEAR KEY 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 ARE NOT LIMITED TO OBSERVATIONS OF THE FOLLOWING HOLD POINTS:

1. SHEAR KEY FOUNDING LEVEL;
2. SHEAR KEY DRAINAGE (PLACEMENT OF ALL DRAIN COIL INCLUDING OUTLET);
3. PLACEMENT OF GEOTEXTILE CLOTH OVER BASAL HARDFILL AND BLANKET DRAINAGE;
4. COMPACTION OF HARDFILL AT THE BASE OF THE SHEAR KEY;
5. DIMENSIONS OF CONSTRUCTED SHEAR KEY (INCLUDING BASE WIDTH AND BATTER ANGLES)

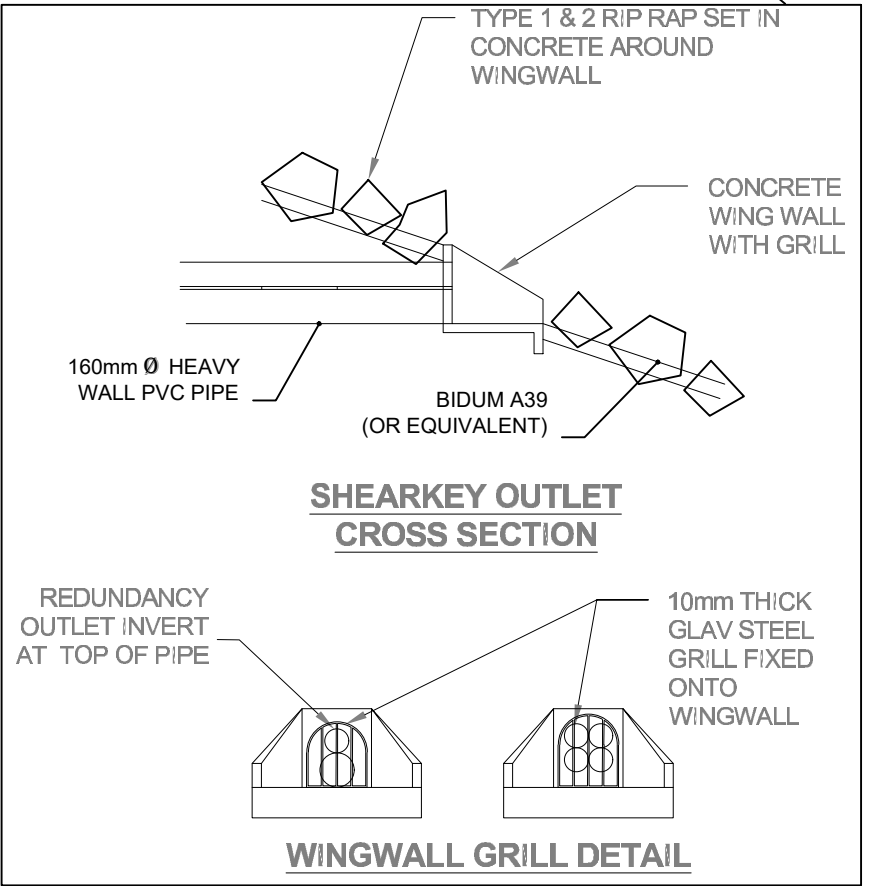
ASBUILT:

ACCURATE ASBUILT INFORMATION WILL BE REQUIRED WHICH SHOULD INCLUDE:

1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

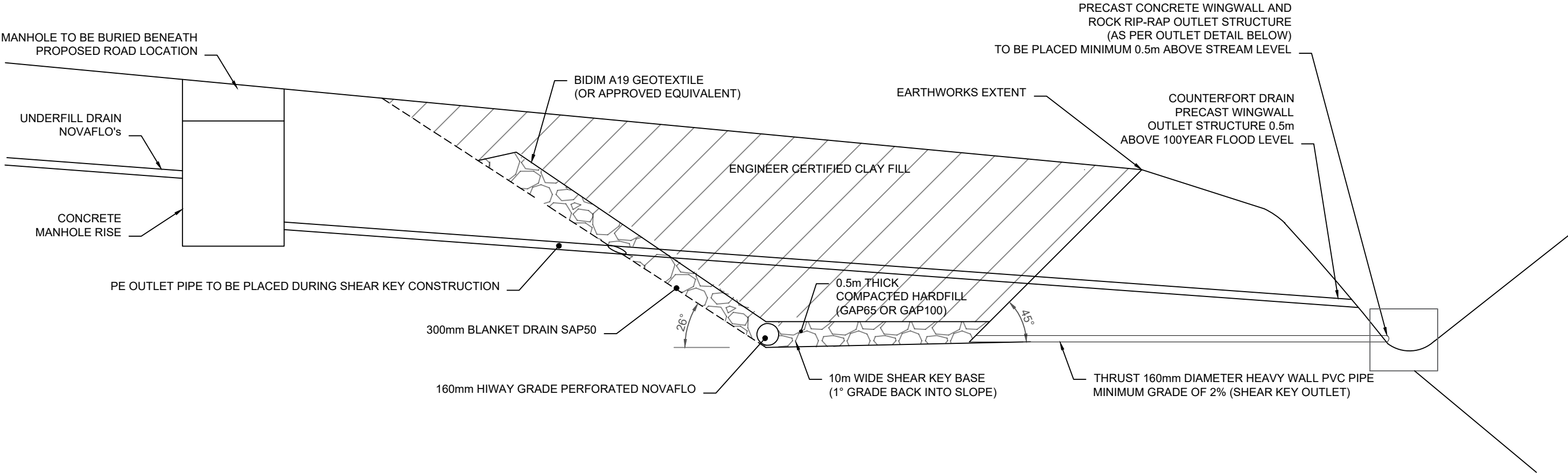
NOTES:

1. SHEAR KEY BASE TO BE EXCAVATED A MINIMUM DEPTH OF 1m INTO COMPETENT IDENTIFIED WAITEMATA GROUP N>50 BEDROCK, (LIKELY TO BE RL 2 BETWEEN CH120 AND CH200, BUT MAY REQUIRE FURTHER EXCAVATION TO RL. 1 BETWEEN CH150-CH180);
2. SHEAR KEY BASAL DRAINAGE SHOULD CONSIST OF 160mm HIWAY NOVAFLO DRAINS PLACED WITHIN THE COMPACTED HARDFILL AND WILL BE CONFIRMED DURING CONSTRUCTION;
3. FILL COMPACTION TESTING ON SHEAR KEY CLAY FILL IS REQUIRED EVERY 0.5m VERTICAL LIFT;
4. COHESIVE FILL TO ACHIEVE AN AVERAGE UNDRAINED SHEAR STRENGTH of >140 KPa (MINIMUM SINGLE VALUE OF 110KPa). AVERAGE AIR VOIDS TO BE LESS THAN 10% (MAXIMUM SINGLE TEST OF 12%). BASAL HARDFILL TO ACHIEVE A MINIMUM CLEGG IMPACT VALUE OF 25;
5. THRUST SHEAR KEY OUTLETS REQUIRED APPROXIMATELY EVERY 25m. FINAL POSITIONS TO BE CONFIRMED BY COFFEY ONSITE TO ENSURE LOW POINTS ARE DRAINED AND ADEQUATE FALL IS ACHIEVED.



revision	no.	description		drawn	approved	date	<div>012345 SCALE1:100 (A3)METRES</div>		drawn	RZ	<div>coffeyA TETRA TECH COMPANY</div>		client: WFH PROPERTIES LTD		
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									date	06/09/2019			title: SHEAR KEY 1B/C DETAIL (CH70 - CH200)		
									scale	1:100			project no: 773-AKLGE206639		
									original size	A3			figure no: AB/006		
													rev: A		

PLOT DATE: 22/10/2019 12:37:02 PM DWG FILE: \\TTSR08FS2\808\GEN2\9 PROJECTS\73-AKLGE PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\LONG SECTION.DWG



HOLD POINTS:

OBSERVATIONS OF ALL ASPECTS OF THE SHEAR KEY 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 ARE NOT LIMITED TO OBSERVATIONS OF THE FOLLOWING HOLD POINTS:

1. SHEAR KEY FOUNDING LEVEL;
2. SHEAR KEY DRAINAGE (PLACEMENT OF ALL DRAIN COIL INCLUDING OUTLET);
3. PLACEMENT OF GEOTEXTILE CLOTH OVER BASAL HARDFILL AND BLANKET DRAINAGE;
4. COMPACTION OF HARDFILL AT THE BASE OF THE SHEAR KEY;
5. DIMENSIONS OF CONSTRUCTED SHEAR KEY (INCLUDING BASE WIDTH AND BATTER ANGLES)

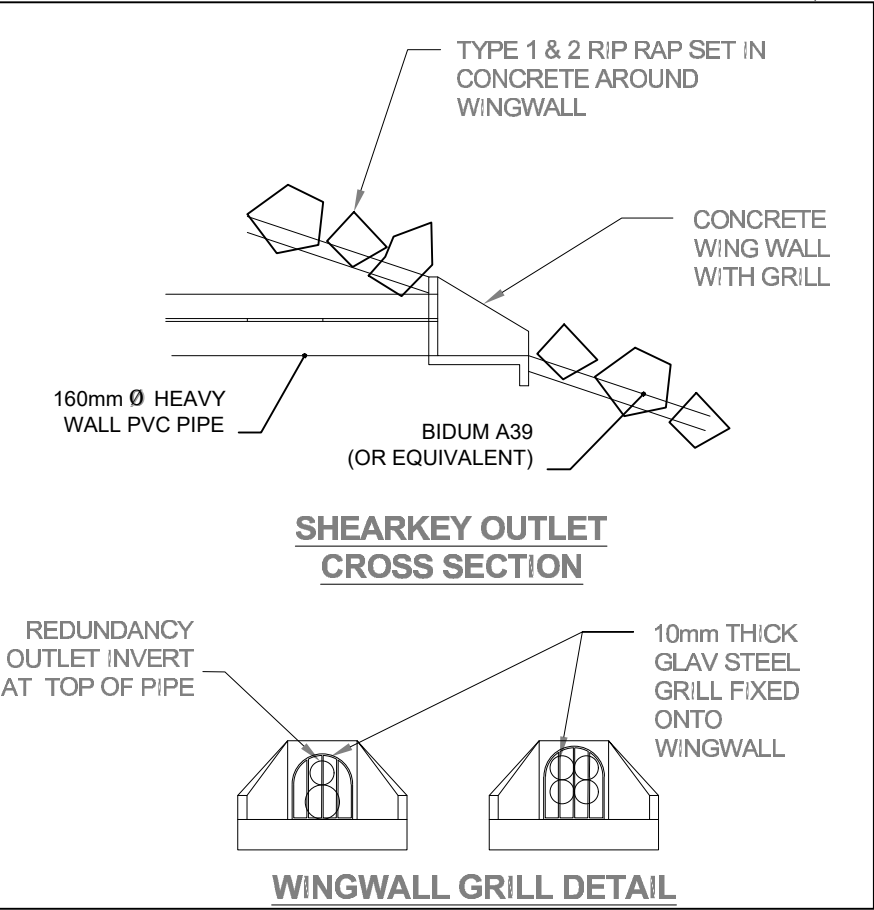
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ACCURATE ASBUILT INFORMATION WILL BE REQUIRED WHICH SHOULD INCLUDE:

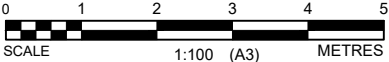
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

NOTES:

1. SHEAR KEY BASE TO BE EXCAVATED A MINIMUM DEPTH OF 1m INTO COMPETENT IDENTIFIED WAITEMATA GROUP N>50 BEDROCK, (LIKELY TO BE RL 4 BETWEEN CH220 AND CH280);
2. SHEAR KEY BASAL DRAINAGE SHOULD CONSIST OF 160mm HIWAY NOVAFLO DRAINS PLACED WITHIN THE COMPACTED HARDFILL AND WILL BE CONFIRMED DURING CONSTRUCTION;
3. FILL COMPACTION TESTING ON SHEAR KEY CLAY FILL IS REQUIRED EVERY 0.5m VERTICAL LIFT;
4. COHESIVE FILL TO ACHIEVE AN AVERAGE UNDRAINED SHEAR STRENGTH of >140 KPa (MINIMUM SINGLE VALUE OF 110KPa). AVERAGE AIR VOIDS TO BE LESS THAN 10% (MAXIMUM SINGLE TEST OF 12%). BASAL HARDFILL TO ACVHIEVE A MINIMUM CLEGG IMPACT VALUE OF 25;
5. THRUST SHEAR KEY OUTLETS REQUIRED APPROXIMATELY EVERY 25m. FINAL POSITIONS TO BE CONFIRMED BY COFFEY ONSITE TO ENSURE LOW POINTS ARE DRAINED AND ADEQUATE FALL IS ACHIEVED.



revision	no.	description		drawn	approved	date
	A	ORIGINAL ISSUE		RZ	SP	06/09/2019

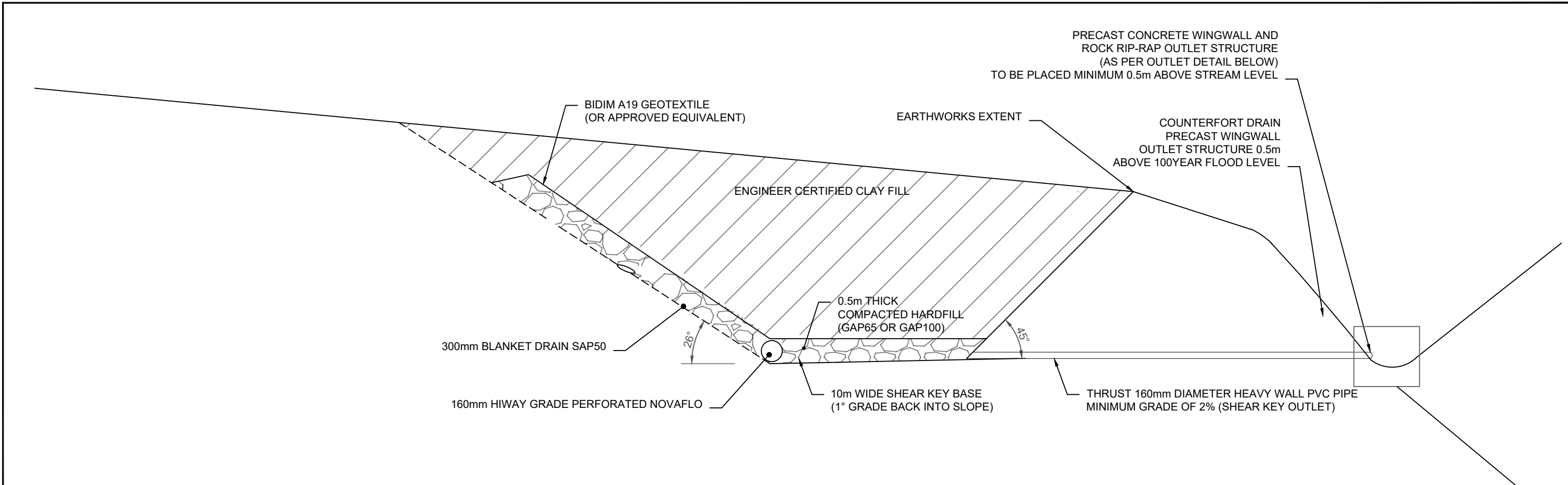


drawn	RZ
approved	SP
date	06/09/2019
scale	1:100
original size	A3



client:	WFH PROPERTIES LTD		
project:	MILLWATER PRECINCT 6		
title:	SHEAR KEY 1D DETAIL (CH200 - CH280)		
project no:	773-AKLGE206639	figure no:	07
		rev:	A

PLOT DATE: 22/10/2019 12:37:38 PM DWG FILE: \\TTSR08FS2\808\GEN2\9 PROJECT\73-AKLGE PROJECT\9206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\LONG SECTION.DWG



HOLD POINTS:

OBSERVATIONS OF ALL ASPECTS OF THE SHEAR KEY 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 ENGZ MONITORING LEVEL CM4. THESE INCLUDE, BUT ARE NOT LIMITED TO OBSERVATIONS OF THE FOLLOWING HOLD POINTS:

1. SHEAR KEY FOUNDING LEVEL;
2. SHEAR KEY DRAINAGE (PLACEMENT OF ALL DRAIN COIL INCLUDING OUTLET);
3. PLACEMENT OF GEOTEXTILE CLOTH OVER BASAL HARDFILL AND BLANKET DRAINAGE;
4. COMPACTION OF HARDFILL AT THE BASE OF THE SHEAR KEY;
5. DIMENSIONS OF CONSTRUCTED SHEAR KEY (INCLUDING BASE WIDTH AND BATTER ANGLES)

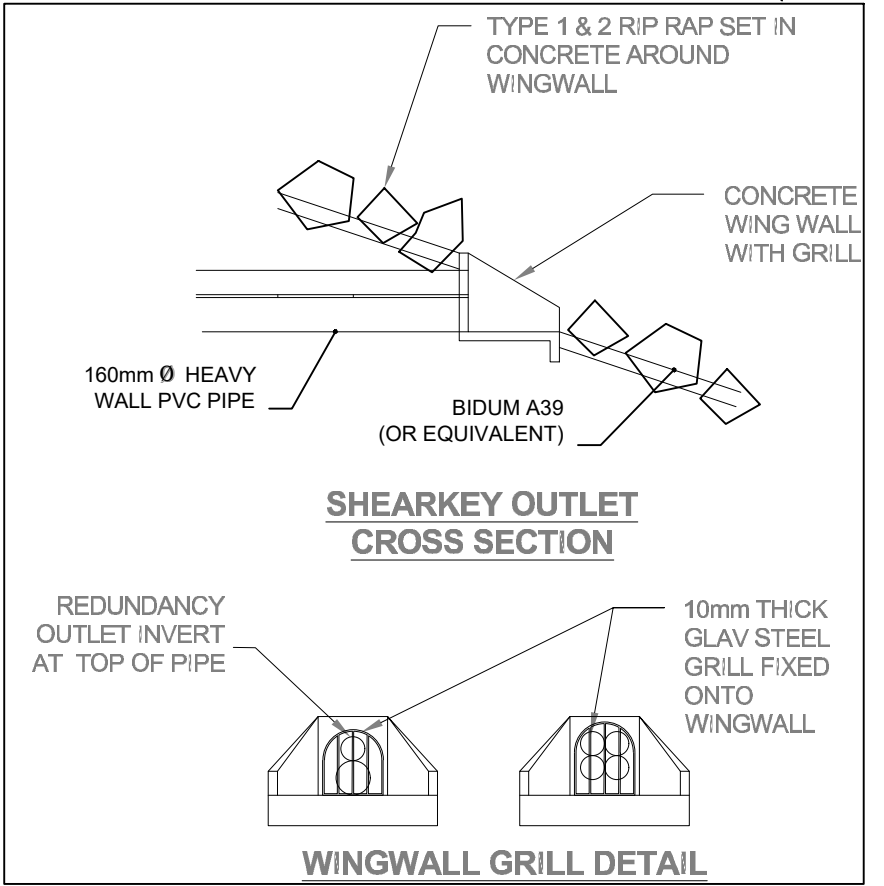
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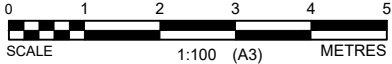
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

NOTES:

1. SHEAR KEY BASE TO BE EXCAVATED A MINIMUM DEPTH OF 1m INTO COMPETENT IDENTIFIED WAITEMATA GROUP N>50 BEDROCK, (LIKELY TO BE RL 3 BETWEEN CH280 AND CH310);
2. SHEAR KEY BASAL DRAINAGE SHOULD CONSIST OF 160mm HIWAY NOVAFLO DRAINS PLACED WITHIN THE COMPACTED HARDFILL AND WILL BE CONFIRMED DURING CONSTRUCTION;
3. FILL COMPACTION TESTING ON SHEAR KEY CLAY FILL IS REQUIRED EVERY 0.5m VERTICAL LIFT;
4. COHESIVE FILL TO ACHIEVE AN AVERAGE UNDRAINED SHEAR STRENGTH of >140 KPa (MINIMUM SINGLE VALUE OF 110KPa). AVERAGE AIR VOIDS TO BE LESS THAN 10% (MAXIMUM SINGLE TEST OF 12%). BASAL HARDFILL TO ACVHIEVE A MINIUUM CLEGG IMPACT VALUE OF 25;
5. THRUST SHEAR KEY OUTLETS REQUIRED APPROXIMATELY EVERY 25m. FINAL POSITIONS TO BE CONFIRMED BY COFFEY ONSITE TO ENSURE LOW POINTS ARE DRAINED AND ADEQUATE FALL IS ACHIEVED.



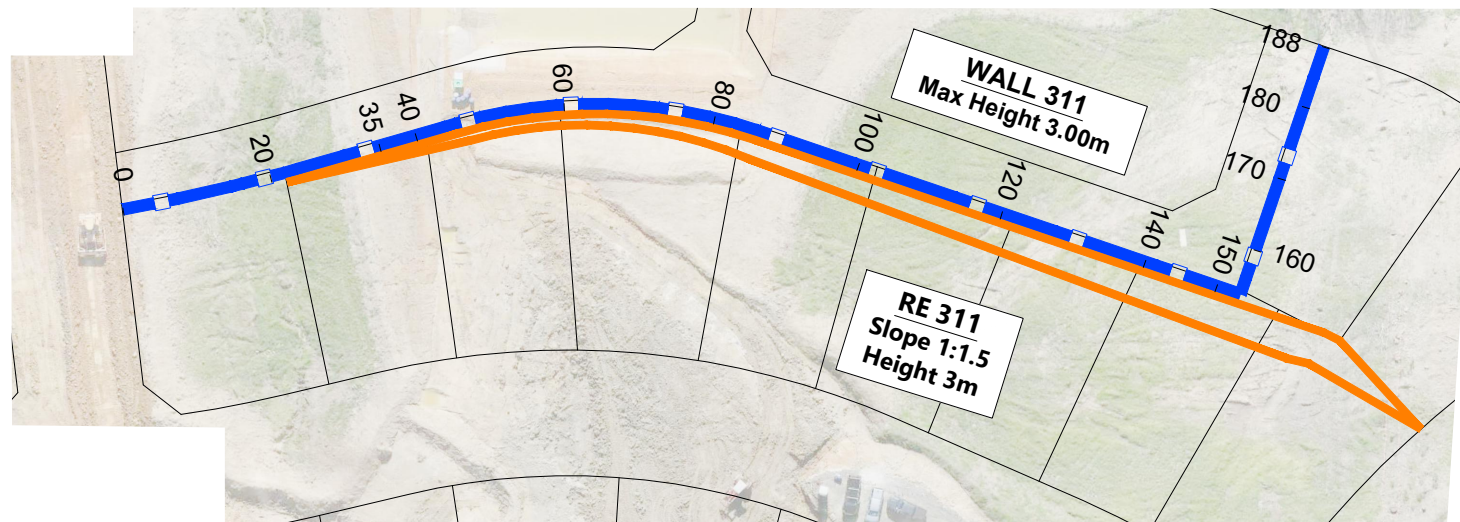
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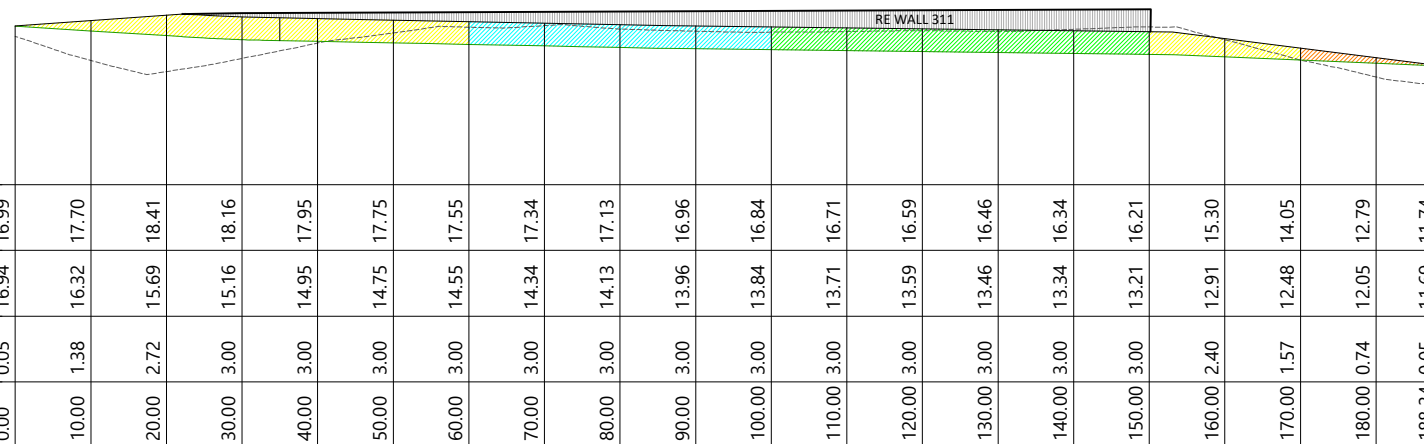
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client:	WFH PROPERTIES LTD		
project:	MILLWATER PRECINCT 6		
title:	SHEAR KEY 1E DETAIL (CH280 - CH310)		
project no:	773-AKLGE206639	figure no:	08
rev:	A		





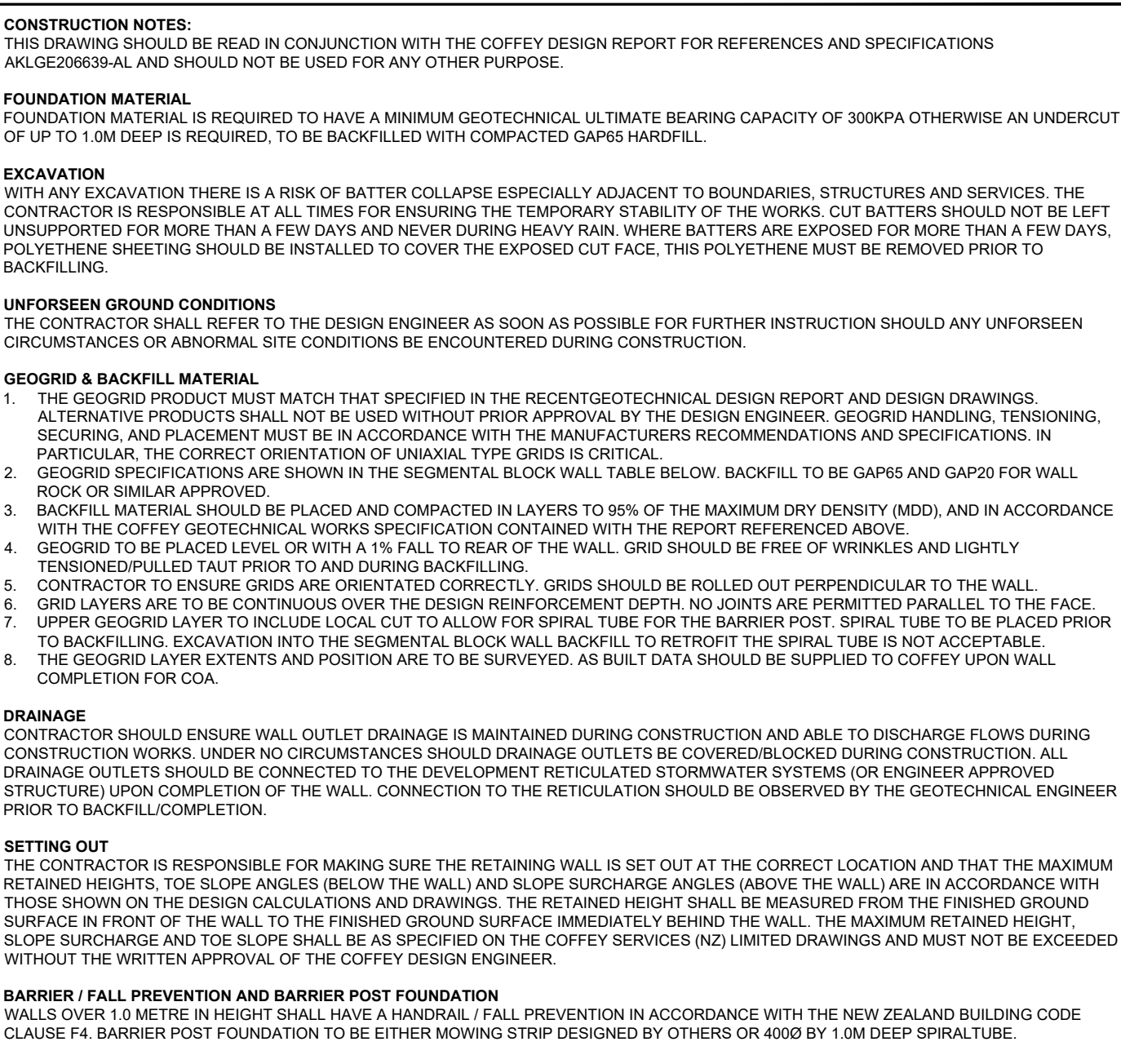
MASS BLOCK RETAINING WALL 311 PLAN



RETAINING WALL 311 LONGITUDINAL SECTION



REVISION DETAILS		INT	DATE	SURVEYED	.	<div>ARRAN DRIVE OREWA AUCKLAND</div> <div></div>	<div>MILLWATER - PRECINCT 6 OREWA WEST RETAINING WALL PLAN & LONG SECTION</div>	<div></div>	STATUS	ISSUED FOR INFORMATION	REV
1	ISSUED FOR CONSENT	RV	JULY 2017	DESIGNED	NSC				4	SCALE	H 1:1000 @A3 V 1:500 @A3
2	ISSUED FOR INFORMATION	NSC	21/06/19	DRAWN	NSC					COUNCIL	AUCKLAND COUNCIL
3	WALL DETAIL HATCHING ADDED	NSC	08/08/19	CHECKED	.					DWG NO	37600-01-159-EW
4	WALL HATCHING UPDATED	NSC	11/09/19	APPROVED	.					WOODS.CO.NZ	



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 ENGZ MONITORING LEVEL CM4. THESE INCLUDE, BUT MAY NOT BE LIMITED TO INSPECTION AT THE FOLLOWING **HOLD POINTS**:

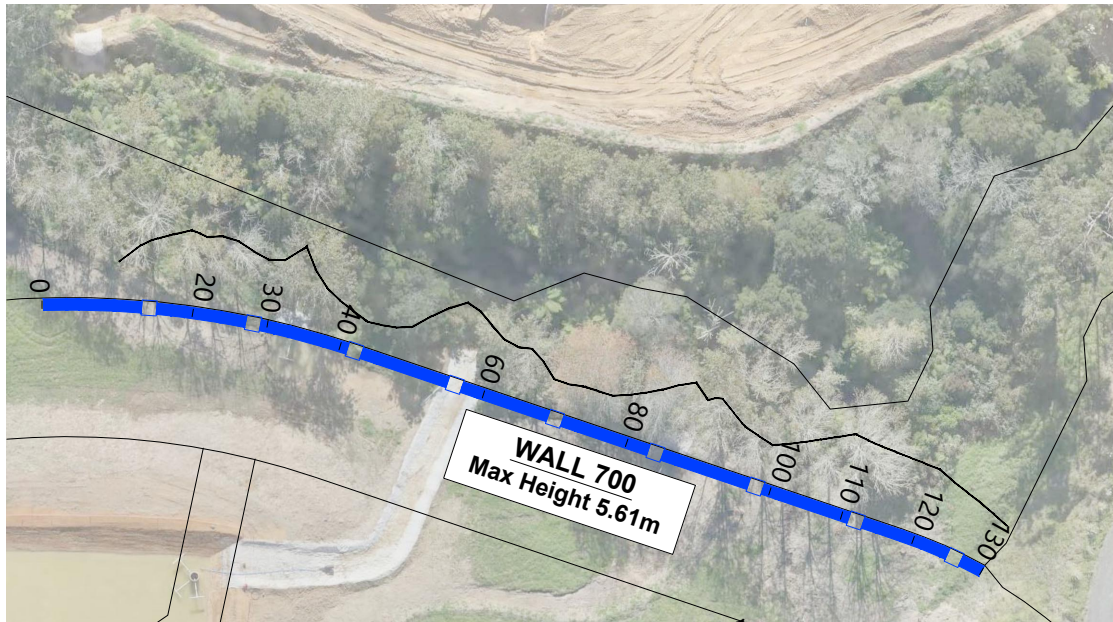
- MASS BLOCK WALL FOUNDATION EXCAVATIONS, STRENGTH AND BENCHING;
- FOUNDATION HARDFILL PLACEMENT (FOOTING AND SERVICE CROSSING);
- DRAINAGE AND GEOTEXTILE PLACED AT REAR OF WALL;
- HARDFILL, GEOGRID PLACEMENT AND COMPACTION TESTING;
- DRAINAGE OUTLET CONSTRUCTION;
- BARRIER POST FOUNDATION (SPIRAL SLEEVES),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

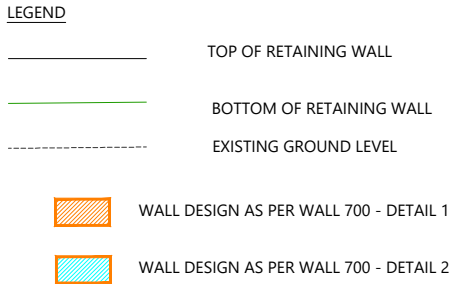
revision	no.	description	drawn	approved	date	<p>Horizontal Scale (metres)</p> <p>Vertical Scale (metres)</p>	drawn	RZ		client: WFH PROPERTIES LTD			
	A	ORIGINAL ISSUE	RZ	AC	27/11/2019		approved	AC		project: MILLWATER - OREWA WEST - PRECINCT 6			
	B	UPDATE AFTER AMENDMENTS TO DESIGN	RZ	AC	26/02/2020		date	18/06/2020		title: WALL 311 / RE SLOPE 311 DESIGN DETAIL			
	C	DRAINAGE DETAIL ADDED	RZ	AC	21/05/2020		scale	NTS		project no: 773-AKLGE206639		figure no: AL/004	rev:
	D	WITH BARRIER DETAIL	RZ	SP	18/06/2020		original size	A3					



MASSBLOCK RETAINING WALL 700

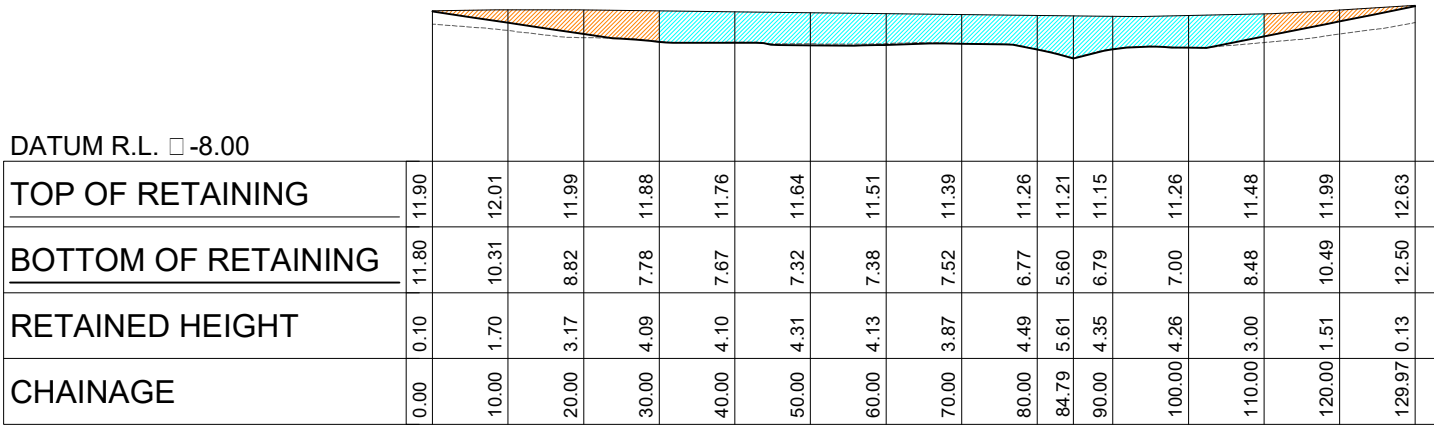
PLAN

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.
6. CONTRACTOR TO ENSURE HE HAS ALL APPROVALS FROM LOCAL AUTHORITIES PRIOR TO COMMENCING WORKS.
7. SEDIMENT AND EROSION CONTROL ARE TO BE IN ACCORDANCE WITH ARC TP90 AND ARE TO BE IN PLACE PRIOR TO EARTHWORKS COMMENCING.
8. ALL WORKS ARE TO BE IN ACCORDANCE WITH THE GEOTECHNICAL SPECIFICATION
9. RETAINING WALLS TO BE CLEAR OF BOUNDARIES.

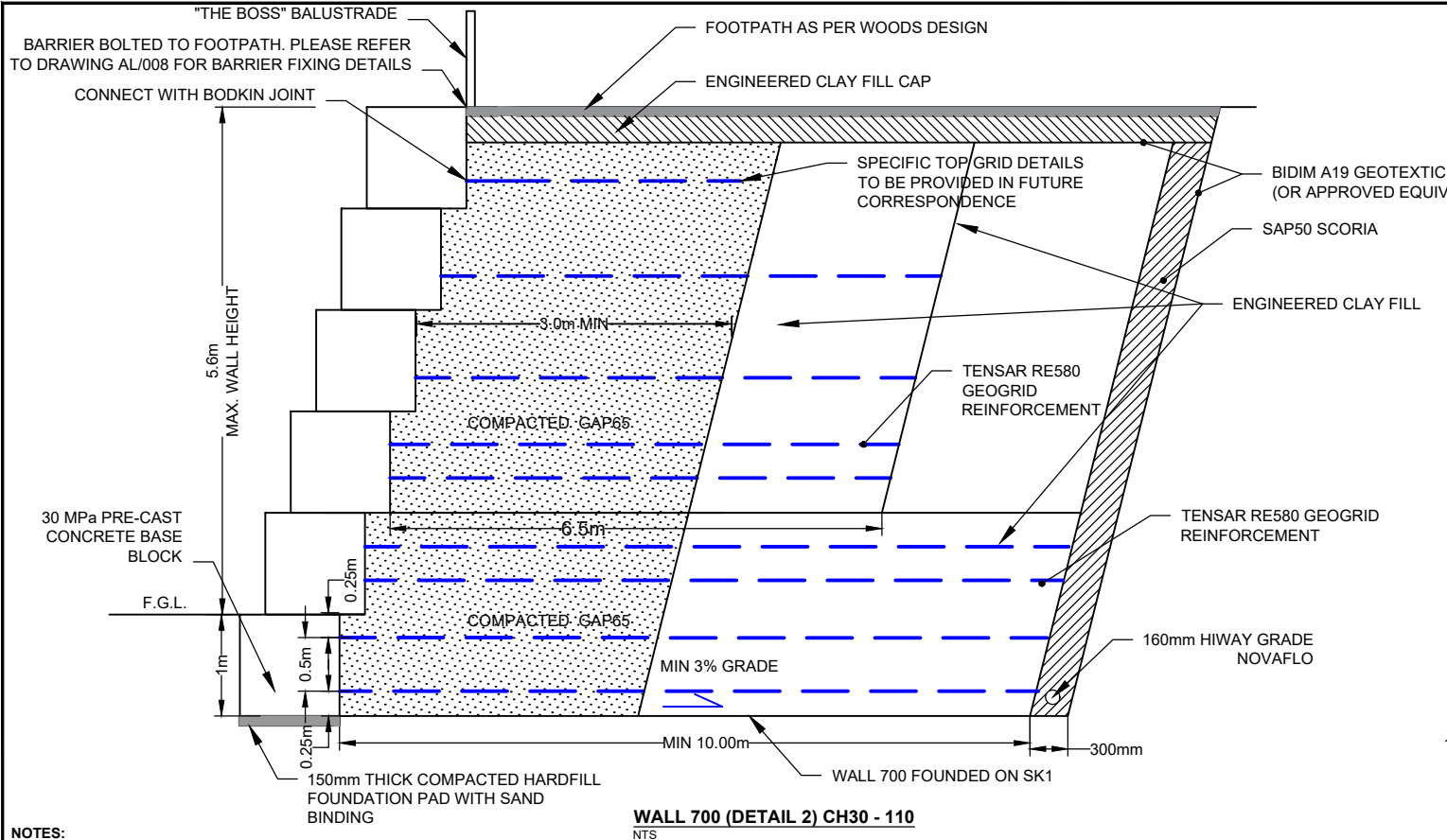


RETAINING WALL 700 LONGITUDINAL SECTION



REVISION DETAILS		INT	DATE	SURVEYED	.	ARRAN DRIVE OREWA AUCKLAND		MILLWATER - PRECINCT 6 OREWA WEST RETAINING WALL PLAN & LONG SECTION		STATUS	ISSUED FOR INFORMATION	REV
1	ISSUED FOR CONSENT	RV	JULY 2017	DESIGNED	RV					SCALE	H 1:1000 @A3 V 1:500 @A3	3
2	ISSUED FOR INFORMATION	NSC	21/06/19	DRAWN	NSC					COUNCIL	AUCKLAND COUNCIL	
3	WALL DETAIL HATCHING ADDED	NSC	08/08/19	CHECKED	.					DWG NO	37600-01-173-EW	
				APPROVED	.	WOODS.CO.NZ						

PLOT DATE: 13/07/2020 3:24:09 PM DWG FILE: \\NTS0808\F52\808\GEN\9 PROJECTS\73\AKLGE PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\TINY\173-AKLGE206639-AL.06.DWG



NOTES:
WALL HEIGHT CHANGES BETWEEN CH30-110. REGARDLESS OF WALL HEIGHT, ALL SECTIONS OF WALL 700 BETWEEN THESE CHAINAGES MUST HAVE 4 LAYERS OF 10M ENBEDDED RE560 CONNECTED TO THE BOTTOM 2 BLOCKS (AS SHOWN ABOVE)

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.

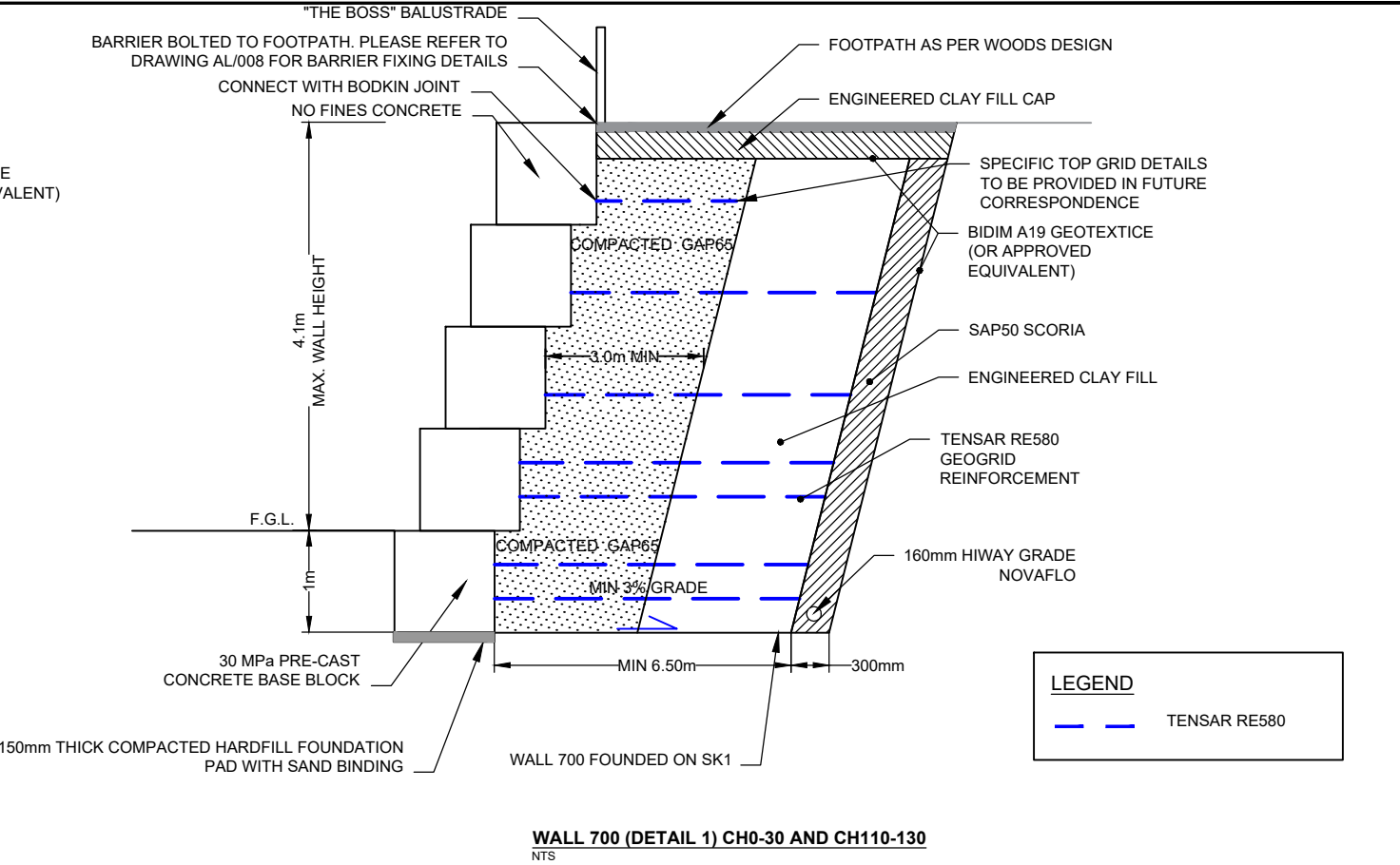
FOUNDATION MATERIAL
FOUNDATION MATERIAL IS REQUIRED TO HAVE A MINIMUM GEOTECHNICAL ULTIMATE BEARING CAPACITY OF 300KPA OTHERWISE AN UNDERCUT OF UP TO 1.0M DEEP IS REQUIRED, TO BE BACKFILLED WITH COMPACTED GAP65 HARDFILL.

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**
1. THE GEOGRID PRODUCT MUST MATCH THAT SPECIFIED IN THE RECENTGEOTECHNICAL 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.
 2. GEOGRID SPECIFICATIONS ARE SHOWN IN THE SEGMENTAL BLOCK WALL TABLE BELOW. BACKFILL TO BE GAP65 AND GAP20 FOR WALL ROCK OR SIMILAR APPROVED.
 3. 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.
 4. 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.
 5. CONTRACTOR TO ENSURE GRIDS ARE ORIENTATED CORRECTLY. GRIDS SHOULD BE ROLLED OUT PERPENDICULAR TO THE WALL.
 6. GRID LAYERS ARE TO BE CONTINUOUS OVER THE DESIGN REINFORCEMENT DEPTH. NO JOINTS ARE PERMITTED PARALLEL TO THE FACE.
 7. 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.
 8. THE GEOGRID LAYER EXTENTS AND POSITION ARE TO BE SURVEYED. AS BUILT DATA SHOULD BE SUPPLIED TO COFFEY UPON WALL COMPLETION FOR COA.

Chainage Interval (m)	Wall detail #	Max Retained Height (m)	Total Wall Height Including Embedment (m)	Max Surcharge Slope		Max Toe Slope Angle	Geogrid				Additional notes
				Angle (°)	Height (m)		Length (m)	No. of reinforcement layers (Max.)	Vertical spacing of geogrid (m)	Type	
0 - 30 & 110 - 130	1	4.1	5.0	4	1	1 in 3	6.50	8	0.5/1.0	RE580	Wall to be founded on shear key 1. undercut required beneath base block
30 - 110	2	5.0	6.0	4	1	1 in 3	6.5/10.0	9	0.5/1.0	RE580	



WALL 700 (DETAIL 1) CH0-30 AND CH110-130
NTS

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 SPIRALTUBE.

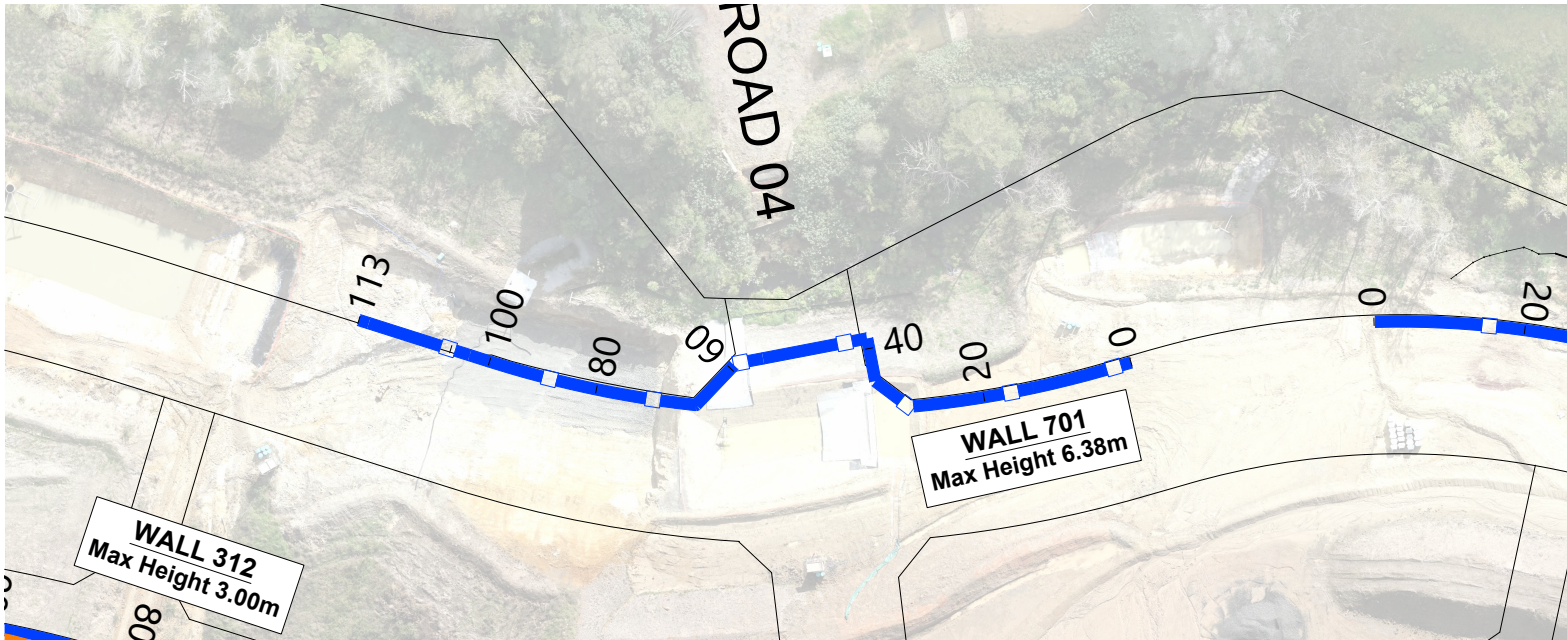
WASTE MATERIAL
ALL WASTE MATERIALS MUST BE REMOVED FROM SITE ON COMPLETION OF THE WORKS. IT IS NOT ACCEPTABLE TO PLACE THESE MATERIALS BEHIND THE WALL WITHIN THE BACKFILL MATERIAL.

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.

FOR CONSTRUCTION

revision	no.	description	drawn	approved	date	<div><div><div>00.51.01.52.02.53.0</div><div>Horizontal Scale (metres)</div></div><div><div>00.51.01.52.02.53.0</div><div>Vertical Scale (metres)</div></div></div>	drawn	RZ	<div><div><div>coffey</div><div>A TETRA TECH COMPANY</div></div></div>	client: WFH PROPERTIES LTD		
	A	ORIGINAL ISSUE	RZ	AC	15/08/2019		approved	AC		project: MILLWATER - OREWA WEST - PRECINCT 6		
	B	DESIGN AS OF 20.02.2020 (NOT APPROVED)	LM	AC	20/02/2020		date	13/07/2020		title: WALL 700 DESIGN DETAIL		
	C	UPDATE AFTER AMENDMENTS TO DESIGN	RZ	AC	26/02/2020		scale	NTS		project no: 773-AKLGE206639 figure no: AL/006 rev: F		
	D	FOR CONSTRUCTION	RZ	AC	01/05/2020		original size	A3				
	E	WITH BARRIER DETAIL 18/06/2020	RZ	SP	18/06/2020							
	F	UPDATE TO BARRIER DETAIL	RZ	SP	13/07/2020							



LEGEND

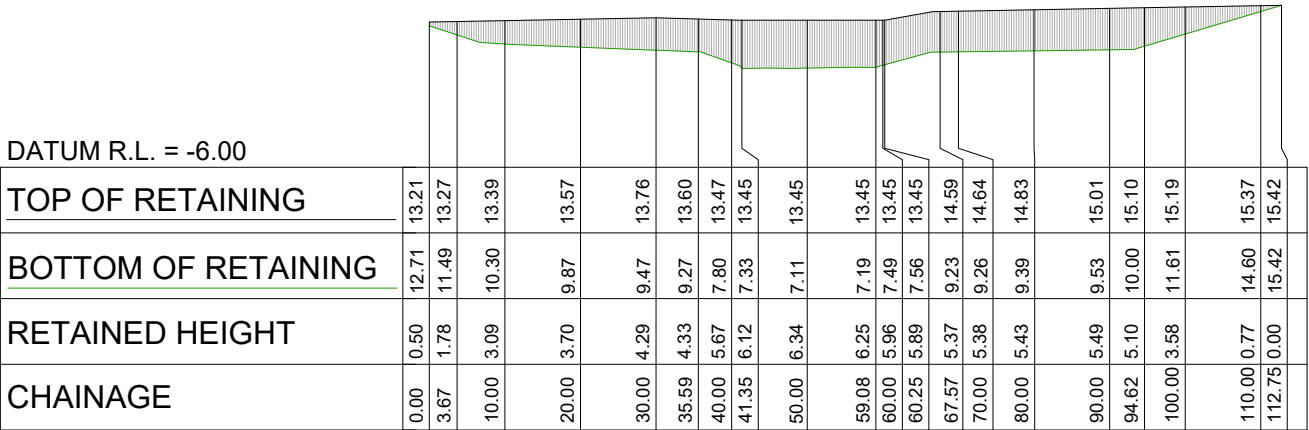
TOP OF RETAINING WALL

BOTTOM OF RETAINING WALL

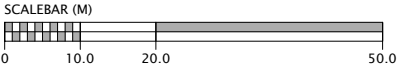
EXISTING GROUND LEVEL

MASSBLOCK RETAINING WALL 701
PLAN
SCALE 1:1000

B

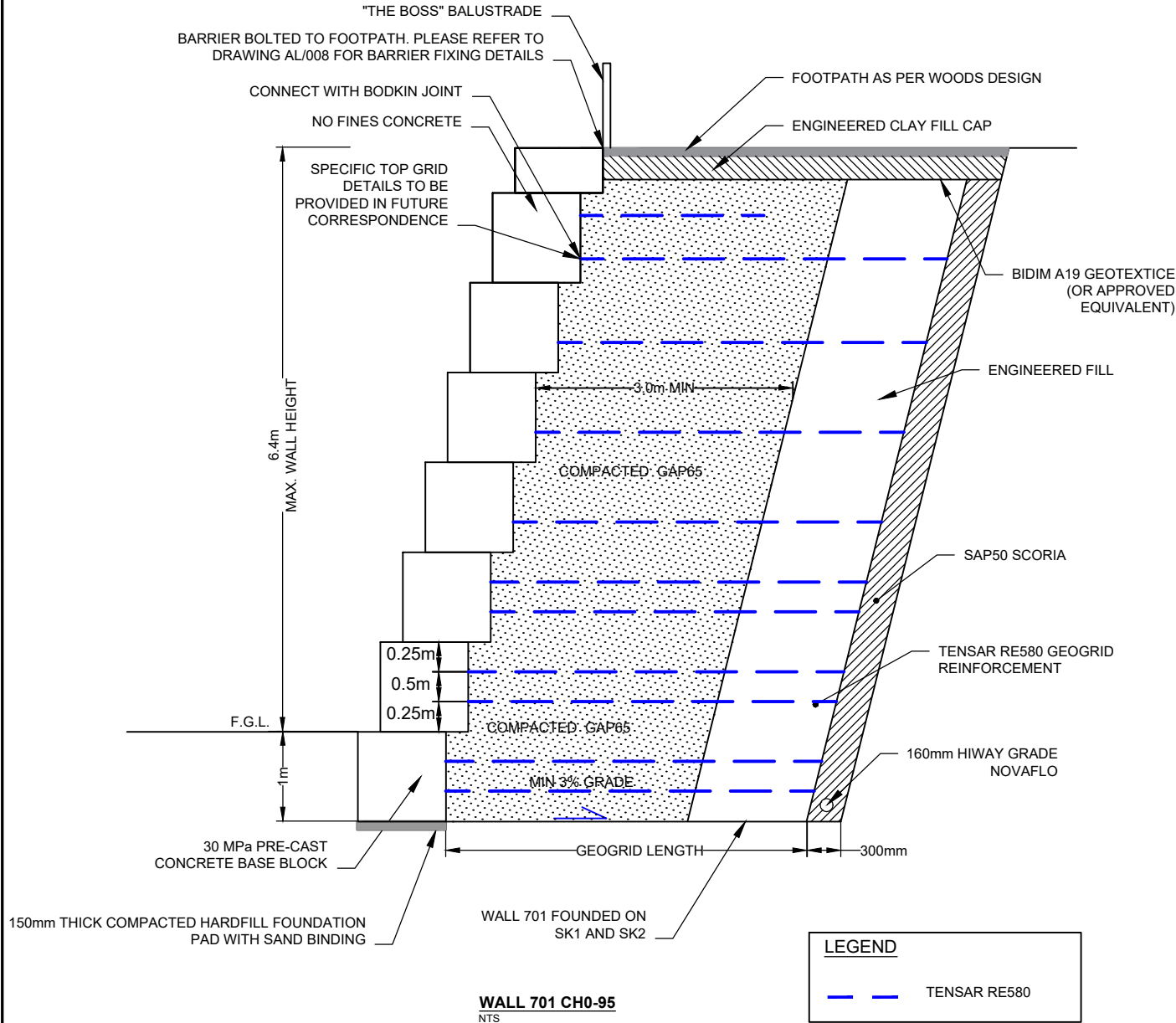


RETAINING WALL 701 LONGITUDINAL SECTION



REVISION DETAILS		INT	DATE	SURVEYED			MILLWATER - PRECINCT 6 OREWA WEST BULK EARTHWORKS AND GEOTECHNICAL REMEDIATION RETAINING WALL PLAN & LONG SECTION		STATUS	ISSUED FOR CONSTRUCTION	REV
A	ISSUED FOR CONSTRUCTION	NC	16/09/19	DESIGNED	NC				SCALE	H 1:1000 @A3 V 1:1000 @A3	B
B	WALL EXTENDED & VERTICAL ALIGNMENT	NC	24/03/21	DRAWN	NC				COUNCIL	AUCKLAND COUNCIL	
	CHANGED			CHECKED					DWG NO	37600-03-174-EW	
				APPROVED					WOODS.CO.NZ		

PLOT DATE: 1/04/2021 2:11:31 PM DWG FILE: \\TTS808F526808GEN20 PROJECTS\\73-AKLGE PROJECTS\\06639 - MILLWATER - OREWA WEST - PRECINCT 6\\73-AKLGE206639-AL07.DWG



NOTES:

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CONSTRUCTION NOTES:

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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.

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MASS BLOCK RETAINING WALL INSPECTION

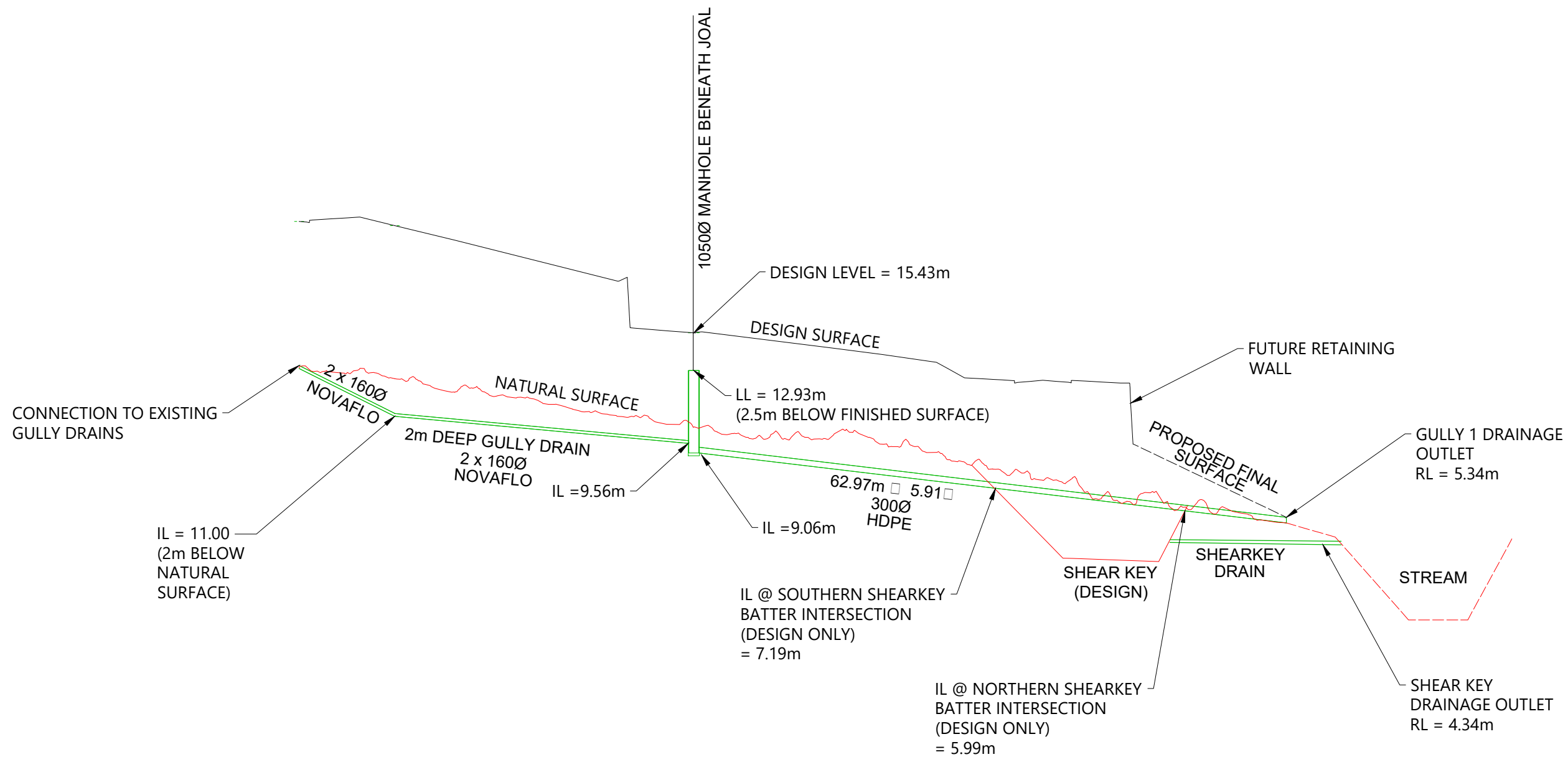
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- REINFORCING BAR AND CONCRETE PLACEMENT FOR TOP THREE BLOCK COURSES.

Chainage Interval (m)	Wall detail #	Max Retained Height (m)	Total Wall Height Including Embedment (m)	Max Surcharge Slope		Max Toe Slope Angle	Geogrid				Additional notes
				Angle (°)	Height (m)		Length (m)	No. of reinforcement layers (Max.)	Vertical spacing of geogrid (m)	Type	
0-25 98-113	1	4.0	5.0	4°	1	1 in 10	8.00	8	0.5/1.0	RE580	Wall to be Founded on shear key 1 and 2. Undercut required beneath base block.
25 - 98	2	6.4	7.4	4°	1	1 in 10	11.50	11	0.5/1.0	RE580	Wall to be Founded on shear key 1 and 2. Undercut required beneath base block.

FOR CONSTRUCTION

revision	no.	description	drawn	approved	date	<div><div>00.51.01.52.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.100.101.102.103.104.105.106.107.108.109.110.111.112.113.114.115.116.117.118.119.120.121.122.123.124.125.126.127.128.129.130.131.132.133.134.135.136.137.138.139.140.141.142.143.144.145.146.147.148.149.150.151.152.153.154.155.156.157.158.159.160.161.162.163.164.165.166.167.168.169.170.171.172.173.174.175.176.177.178.179.180.181.182.183.184.185.186.187.188.189.190.191.192.193.194.195.196.197.198.199.200.201.202.203.204.205.206.207.208.209.210.211.212.213.214.215.216.217.218.219.220.221.222.223.224.225.226.227.228.229.230.231.232.233.234.235.236.237.238.239.240.241.242.243.244.245.246.247.248.249.250.251.252.253.254.255.256.257.258.259.260.261.262.263.264.265.266.267.268.269.270.271.272.273.274.275.276.277.278.279.280.281.282.283.284.285.286.287.288.289.290.291.292.293.294.295.296.297.298.299.300.301.302.303.304.305.306.307.308.309.310.311.312.313.314.315.316.317.318.319.320.321.322.323.324.325.326.327.328.329.330.331.332.333.334.335.336.337.338.339.340.341.342.343.344.345.346.347.348.349.350.351.352.353.354.355.356.357.358.359.360.361.362.363.364.365.366.367.368.369.370.371.372.373.374.375.376.377.378.379.380.381.382.383.384.385.386.387.388.389.390.391.392.393.394.395.396.397.398.399.400.401.402.403.404.405.406.407.408.409.410.411.412.413.414.415.416.417.418.419.420.421.422.423.424.425.426.427.428.429.430.431.432.433.434.435.436.437.438.439.440.441.442.443.444.445.446.447.448.449.450.451.452.453.454.455.456.457.458.459.460.461.462.463.464.465.466.467.468.469.470.471.472.473.474.475.476.477.478.479.480.481.482.483.484.485.486.487.488.489.490.491.492.493.494.495.496.497.498.499.500.501.502.503.504.505.506.507.508.509.510.511.512.513.514.515.516.517.518.519.520.521.522.523.524.525.526.527.528.529.530.531.532.533.534.535.536.537.538.539.540.541.542.543.544.545.546.547.548.549.550.551.552.553.554.555.556.557.558.559.560.561.562.563.564.565.566.567.568.569.570.571.572.573.574.575.576.577.578.579.580.581.582.583.584.585.586.587.588.589.590.591.592.593.594.595.596.597.598.599.600.601.602.603.604.605.606.607.608.609.610.611.612.613.614.615.616.617.618.619.620.621.622.623.624.625.626.627.628.629.630.631.632.633.634.635.636.637.638.639.640.641.642.643.644.645.646.647.648.649.650.651.652.653.654.655.656.657.658.659.660.661.662.663.664.665.666.667.668.669.670.671.672.673.674.675.676.677.678.679.680.681.682.683.684.685.686.687.688.689.690.691.692.693.694.695.696.697.698.699.700.701.702.703.704.705.706.707.708.709.710.711.712.713.714.715.716.717.718.719.720.721.722.723.724.725.726.727.728.729.730.731.732.733.734.735.736.737.738.739.740.741.742.743.744.745.746.747.748.749.750.751.752.753.754.755.756.757.758.759.760.761.762.763.764.765.766.767.768.769.770.771.772.773.774.775.776.777.778.779.780.781.782.783.784.785.786.787.788.789.790.791.792.793.794.795.796.797.798.799.800.801.802.803.804.805.806.807.808.809.810.811.812.813.814.815.816.817.818.819.820.821.822.823.824.825.826.827.828.829.830.831.832.833.834.835.836.837.838.839.840.841.842.843.844.845.846.847.848.849.850.851.852.853.854.855.856.857.858.859.860.861.862.863.864.865.866.867.868.869.870.871.872.873.874.875.876.877.878.879.880.881.882.883.884.885.886.887.888.889.890.891.892.893.894.895.896.897.898.899.900.901.902.903.904.905.906.907.908.909.910.911.912.913.914.915.916.917.918.919.920.921.922.923.924.925.926.927.928.929.930.931.932.933.934.935.936.937.938.939.940.941.942.943.944.945.946.947.948.949.950.951.952.953.954.955.956.957.958.959.960.961.962.963.964.965.966.967.968.969.970.971.972.973.974.975.976.977.978.979.980.981.982.983.984.985.986.987.988.989.990.991.992.993.994.995.996.997.998.999.1000.1001.1002.1003.1004.1005.1006.1007.1008.1009.1010.1011.1012.1013.1014.1015.1016.1017.1018.1019.1020.1021.1022.1023.1024.1025.1026.1027.1028.1029.1030.1031.1032.1033.1034.1035.1036.1037.1038.1039.1040.1041.1042.1043.1044.1045.1046.1047.1048.1049.1050.1051.1052.1053.1054.1055.1056.1057.1058.1059.1060.1061.1062.1063.1064.1065.1066.1067.1068.1069.1070.1071.1072.1073.1074.1075.1076.1077.1078.1079.1080.1081.1082.1083.1084.1085.1086.1087.1088.1089.1090.1091.1092.1093.1094.1095.1096.1097.1098.1099.1100.1101.1102.1103.1104.1105.1106.1107.1108.1109.1110.1111.1112.1113.1114.1115.1116.1117.1118.1119.1120.1121.1122.1123.1124.1125.1126.1127.1128.1129.1130.1131.1132.1133.1134.1135.1136.1137.1138.1139.1140.1141.1142.1143.1144.1145.1146.1147.1148.1149.1150.1151.1152.1153.1154.1155.1156.1157.1158.1159.1160.1161.1162.1163.1164.1165.1166.1167.1168.1169.1170.1171.1172.1173.1174.1175.1176.1177.1178.1179.1180.1181.1182.1183.1184.1185.1186.1187.1188.1189.1190.1191.1192.1193.1194.1195.1196.1197.1198.1199.1200.1201.1202.1203.1204.1205.1206.1207.12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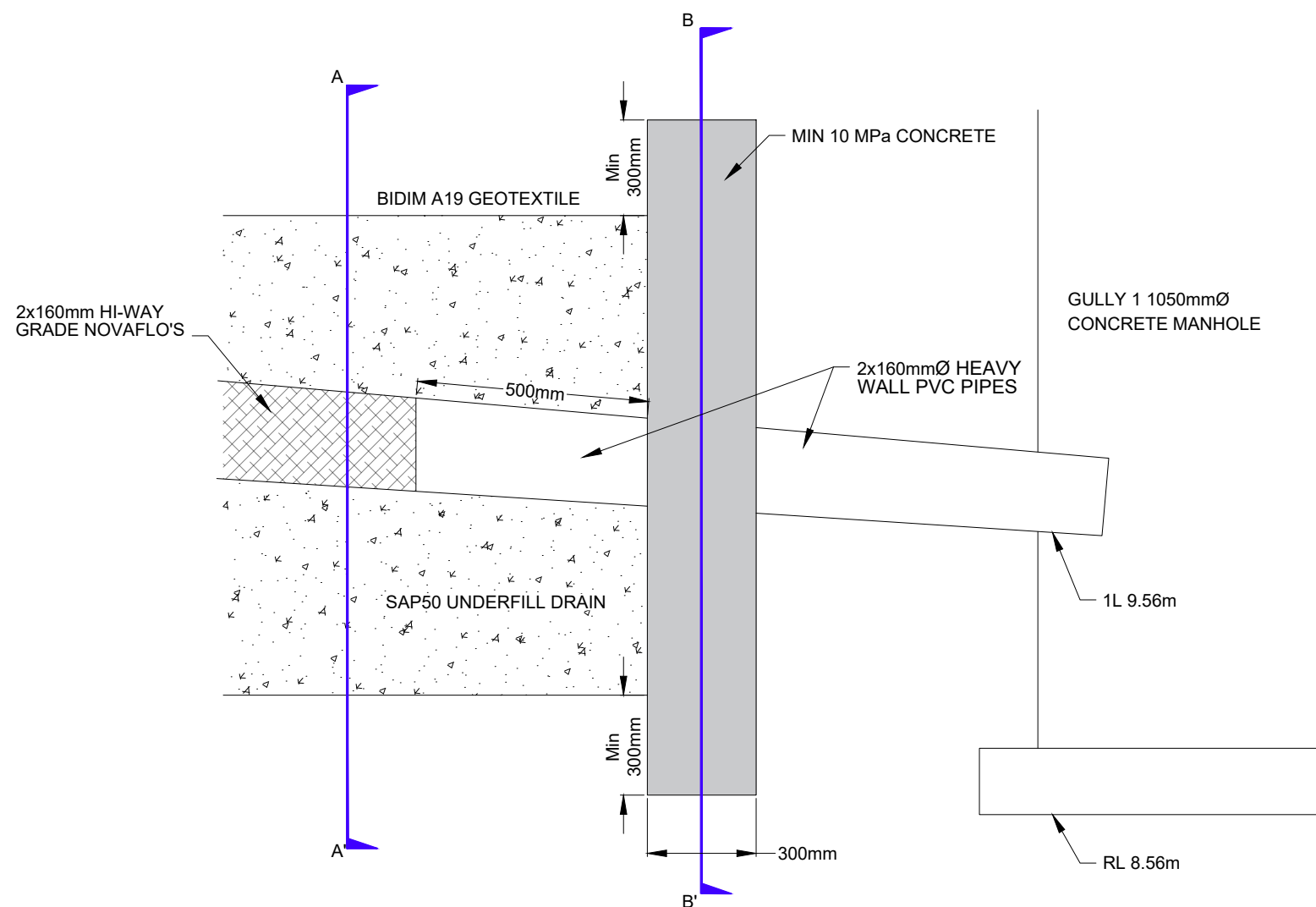


REVISION DETAILS					ARRAN DRIVE OREWA AUCKLAND
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				DRAWN	
				CHECKED	
				APPROVED	

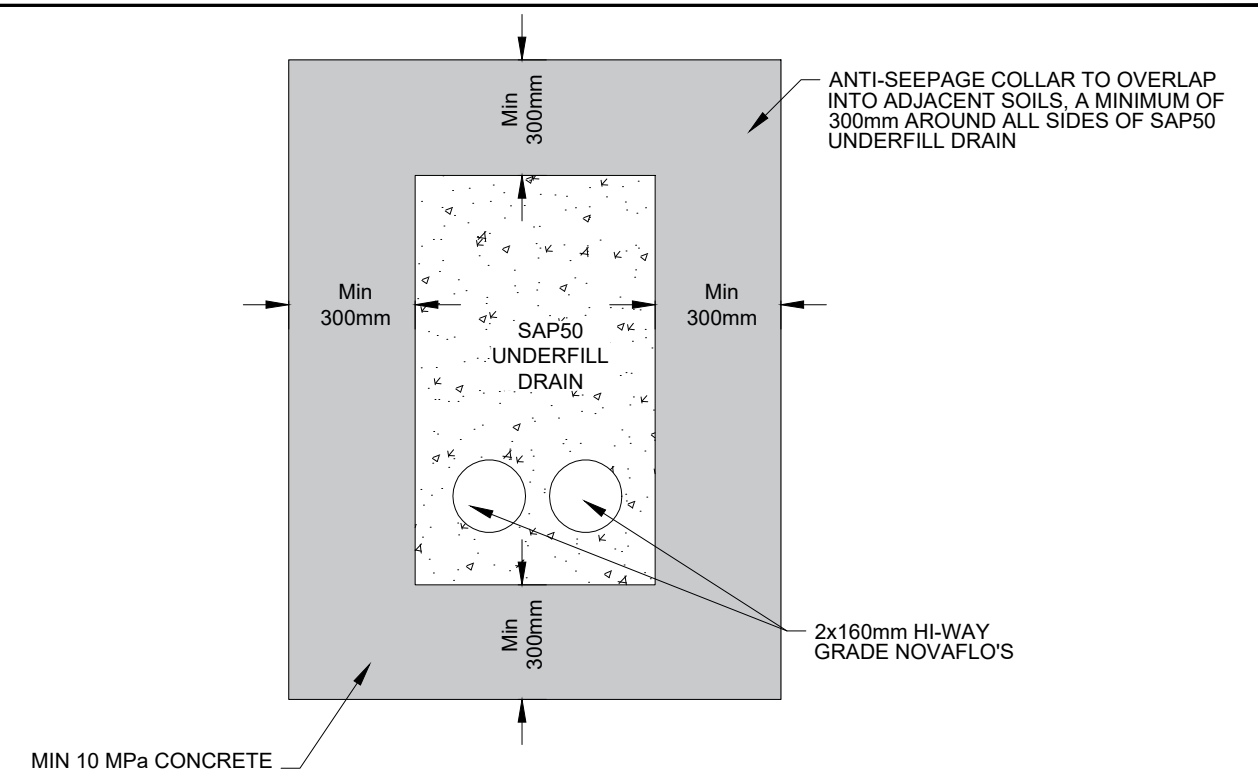


MILLWATER - PRECINCT 6
OREWA WEST
GULLY 1 DRAINAGE LONGSECTION

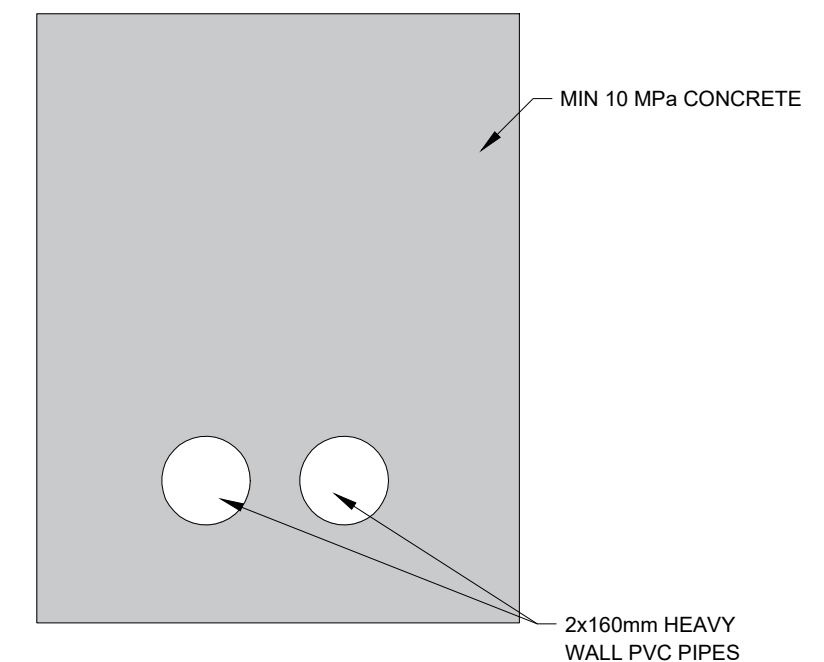
STATUS	ISSUED FOR CONSTRUCTION	REV
SCALE	N.T.S.	A
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-02-EW-160	



GULLY 1 MANHOLE / ANTI-SEEPAGE COLLAR CROSS SECTION
SCALE: 1:20

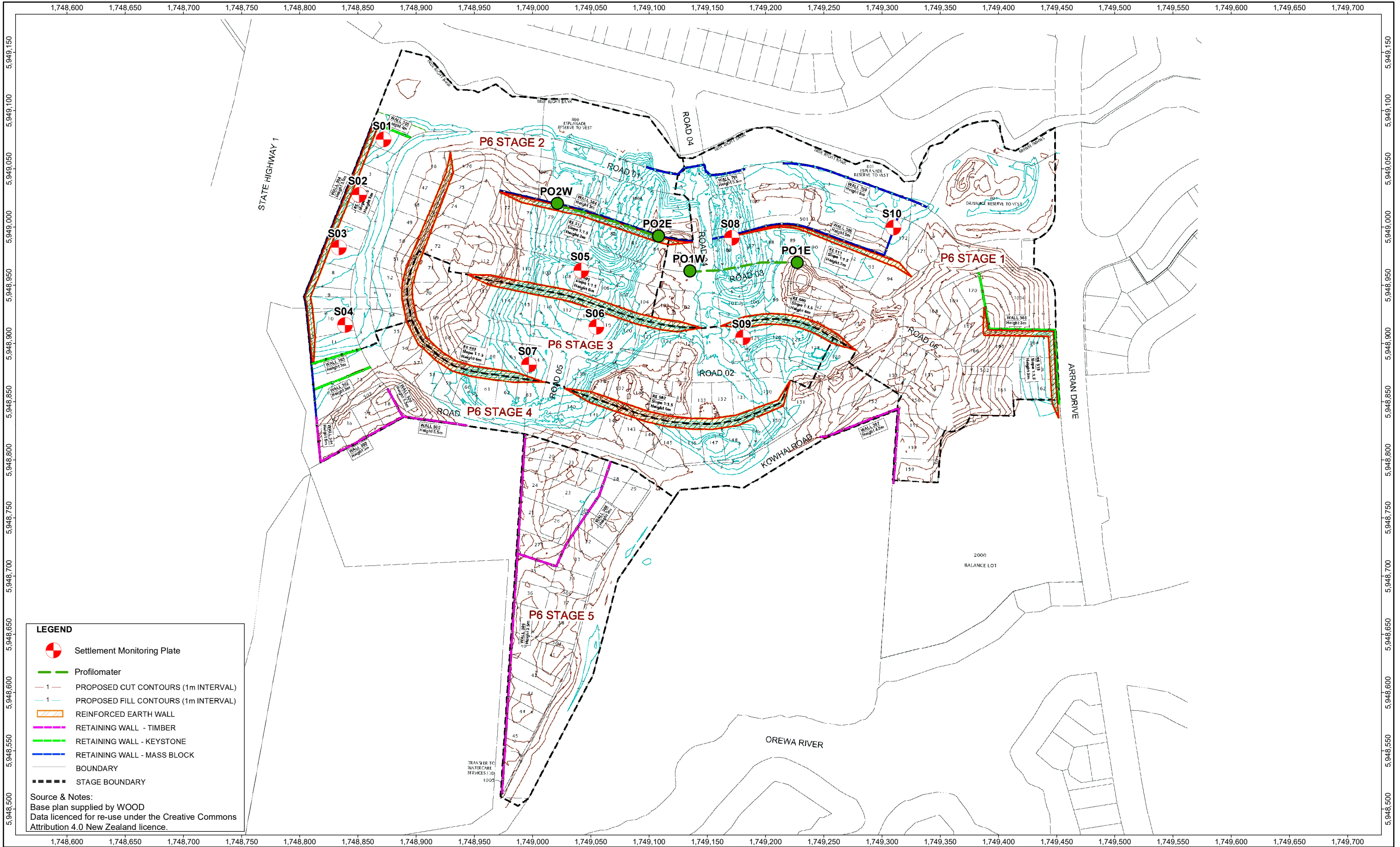


CROSS SECTION LINE A-A'
SCALE: 1:20

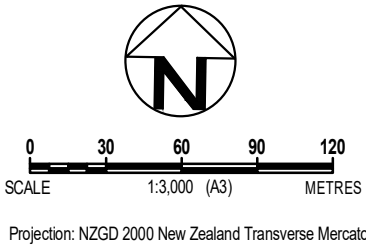


CROSS SECTION LINE B-B'
SCALE: 1:20

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revision	no.	description			drawn	approved	date
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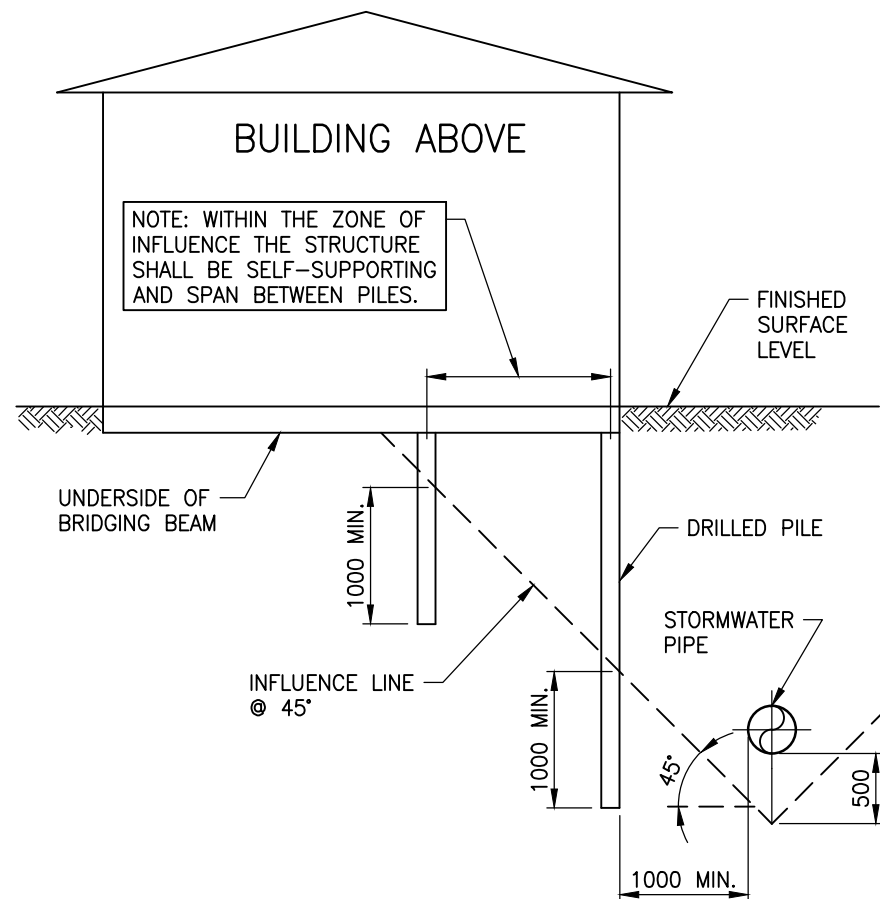


drawn	RZ
approved	AC
date	03.10.2019
scale	AS SHOWN
original size	A3



client: WFH PROPERTIES LTD		
project: MILLWATER - OREWA WEST PRECINCT 6		
title: SETTLEMENT MONITORING PLAN		
project no: 773-AKLGE206639	figure no: AN/01	rev: B

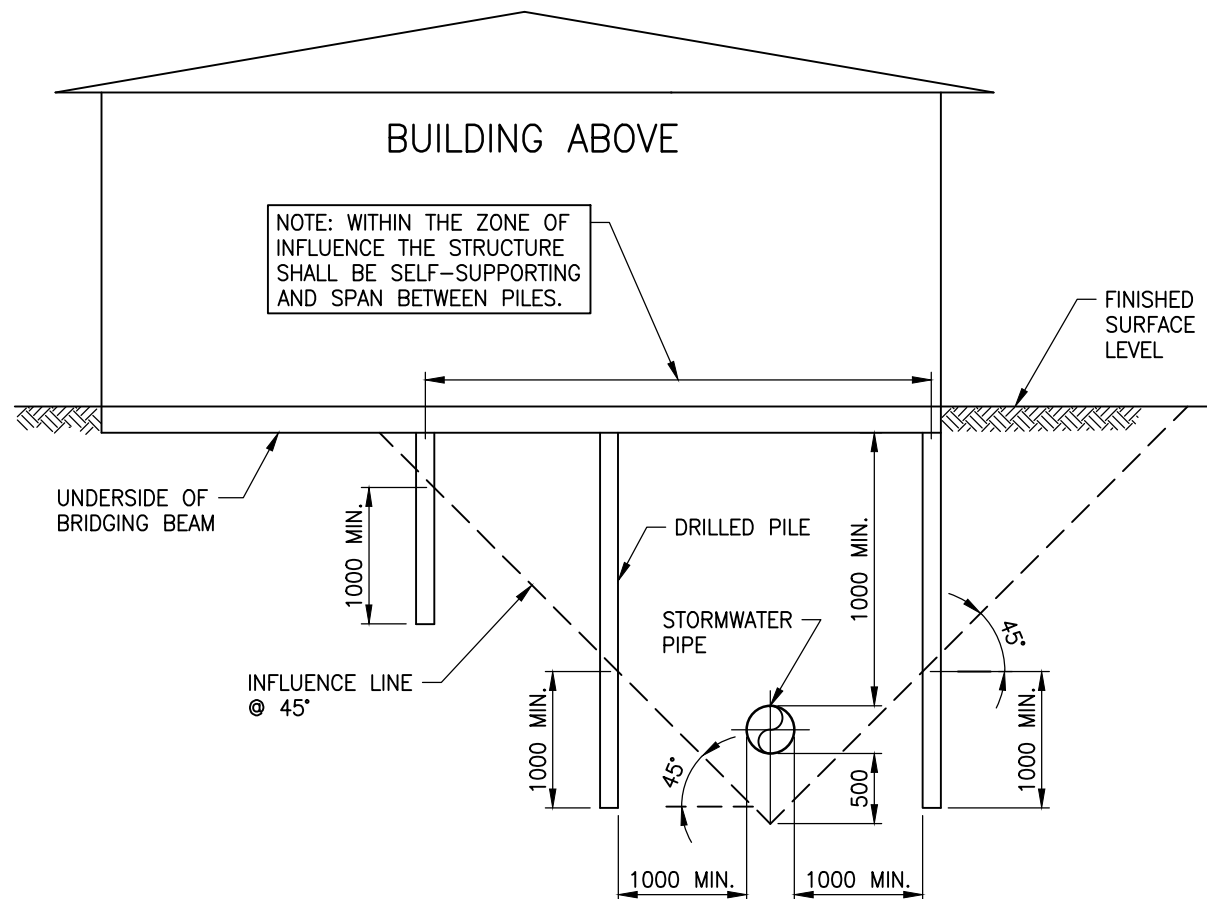
PLOT DATE 12/8/2015 11:54 AM I:\AENVA\Projects\AED4840 AC CoP Ch1\04 Deliverables\Drawings\AC-STD-SW22.dwg



BUILD CLOSE

"BUILD CLOSE" NOTES:

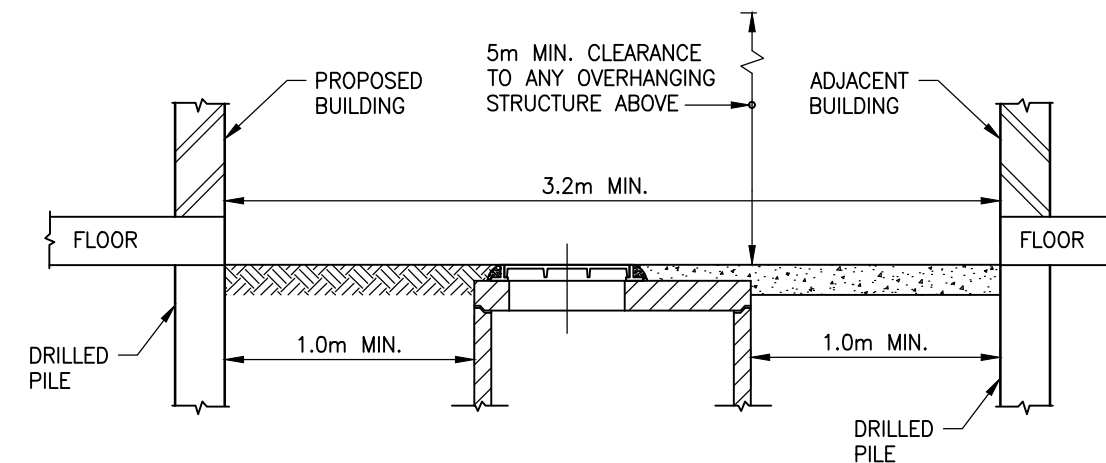
1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL IF BUILDING IS ADJACENT TO PIPES LARGER THAN 375mm INTERNAL DIAMETER, OR GREATER THAN 2.0m DEEP.
3. BUILDING SHALL GENERALLY BE OUTSIDE ALL OVERLAND FLOW PATHS AND FLOODPLAINS. SEE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



BUILD OVER

"BUILD OVER" NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. THE DETAIL APPLIES TO STORMWATER PIPES 375mm NOMINAL DIAMETER OR LESS.
3. BRIDGING OVER PIPES LARGER THAN 375mm NOMINAL DIAMETER IS GENERALLY NOT ALLOWED.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.
5. BRIDGING IS GENERALLY 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

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. REQUIREMENTS FOR FOUNDATION DESIGN, ETC. APPLY TO BOTH SIDES OF THE PIPE.
3. NO DRIVEN PILES ARE PERMITTED WITHIN 10m OF BRICK STORMWATER STRUCTURES, OR WITHIN 5m OF ALL OTHER STORMWATER STRUCTURES.
4. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL FOR DRIVEN PILES IN PARTIALLY DRILLED HOLES, WITHIN THE 5m-10m ZONE.
5. PILES THAT MAY BE REQUIRED TO RESIST HORIZONTAL FORCES WILL REQUIRE SPECIFIC DESIGN.
6. PILE/FOOTING LOCATION POINT MUST BE BELOW 45° "ZONE OF INFLUENCE".
7. ALL MANHOLES SHALL HAVE 24 HOURS UNOBSTRUCTED ACCESS.
8. MANHOLES IN BASEMENTS, OR IN LOCATIONS WHERE SUFFICIENT CLEARANCE IS UNAVAILABLE, ARE NOT PERMITTED.
9. ALL PIPE BUILDOVERS WILL REQUIRE APPROVAL BY AUCKLAND COUNCIL.
10. REFER TO SECTION 4.3.23 OF THE SWCoP FOR PIPE BUILDOVER REQUIREMENTS.
11. FOR MANHOLES GREATER THAN 4m DEEP OR LARGER THAN 1200mm DIA. SPECIFIC DESIGN (INCLUDING CLEARANCE REQUIREMENTS) IS REQUIRED.

STORMWATER CODE OF PRACTICE
STANDARD DETAILS

REVISION: 2
REV DATE: 1 NOVEMBER 2015
CAD FILENAME: AC-STD-SW22.DWG

AUCKLAND COUNCIL

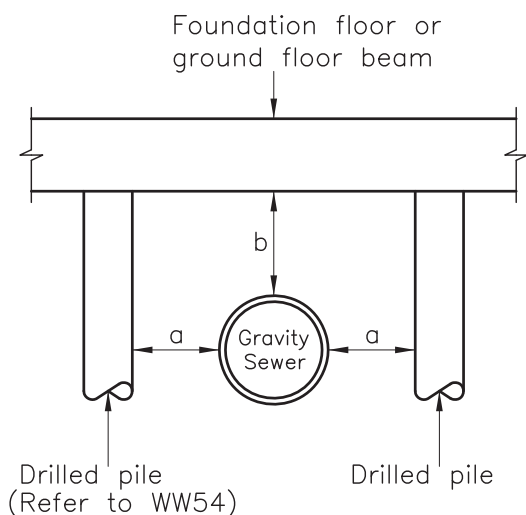
STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS
MANHOLES NEAR BUILDINGS AND BUILDING CLOSE OVER PIPES

ENVIRONMENTAL-SW

Auckland Council
Te Kaitiaki o Tāmaki Makaurau

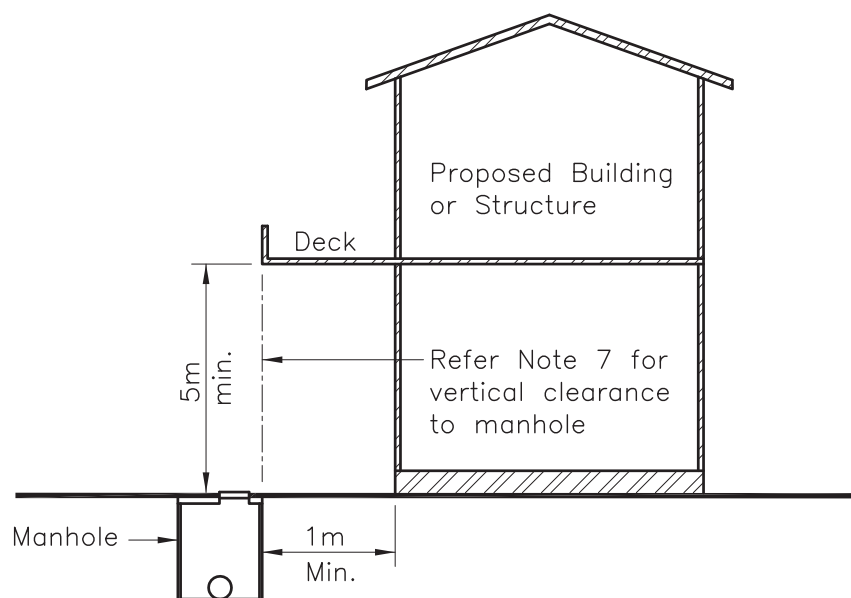
ORIGINAL SCALE A3
SCALE: N.T.S.

DRAWING SET SHEET
SWCoP 1 OF 1
DRAWING No. REV
SW22 2



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



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. Rising mains shall not be built over.
6. Brick sewers and those sewers in poor condition shall not be built over unless they are replaced with new sewers which will be to current standard.
7. Vertical clearance from the top of the chamber shall be 5m Min. over the full width of the chamber.

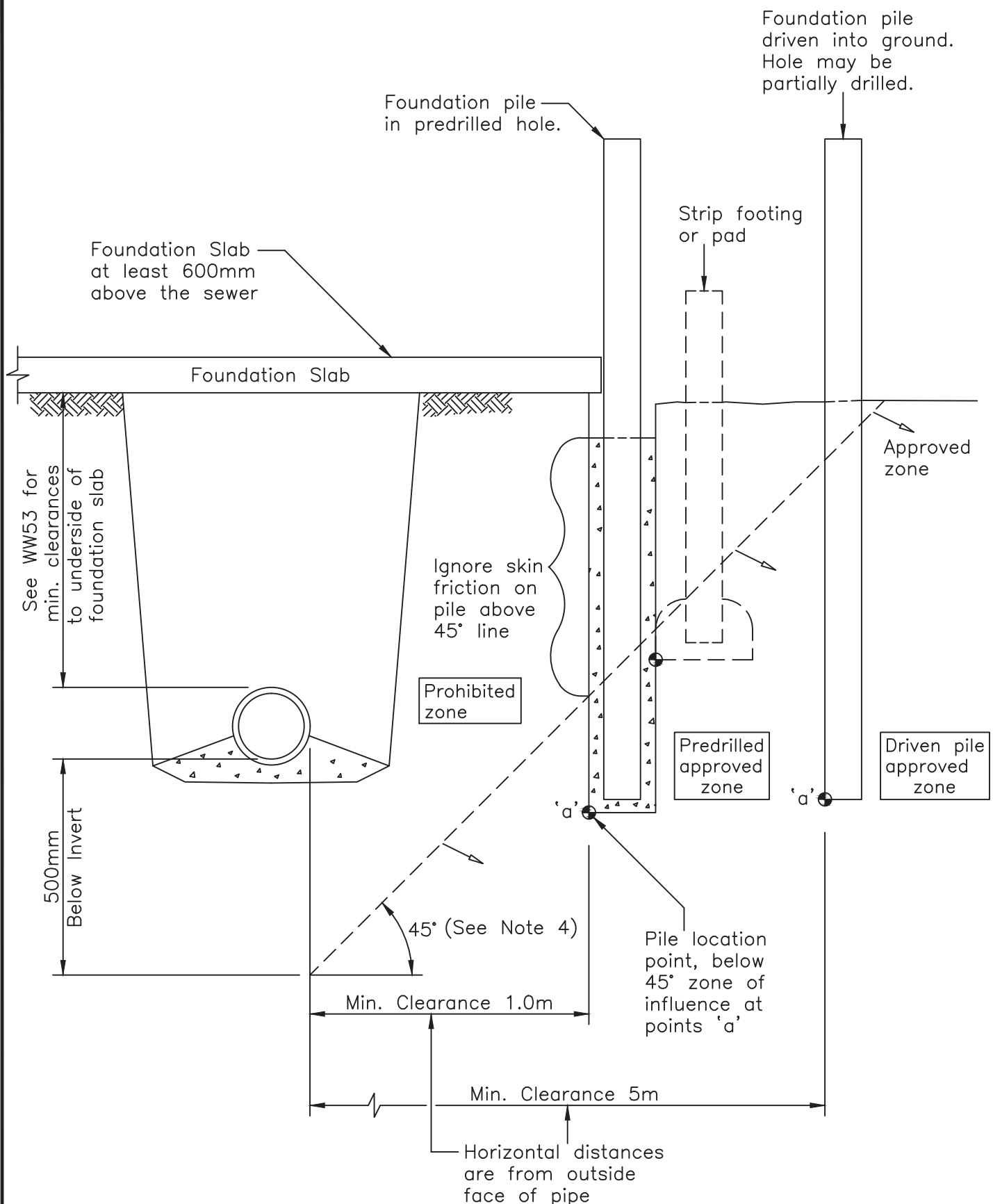
L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.044B .DWG



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PIPE AND MANHOLE CONSTRUCTION CLEARANCE

SCALE:	N.T.S.
ISSUE DATE:	19-05-2015
DWG No.	2010070.044B
REFERENCE No.	WW 53



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.

L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.045 .DWG



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BUILDING CLOSE TO OR OVER LOCAL NETWORK SEWER

SCALE:	N.T.S.
ISSUE DATE:	20-9-2013
DWG No.	2010070.045
REFERENCE No.	WW 54

APPENDIX C: CLASSIFICATION TESTS



Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-07709

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - **TRN:** -



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

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 1/09/2022

Sample Details

Sample ID: ETAM22S-07709

Date Sampled: 21/08/2022

Date Submitted: 25/08/2022

Date Tested: 25/08/2022

Project Location: 117 Kowhai Road, Orewa

Sample Location: Lot 1002

Borehole Number: Lot 1002

Borehole Depth (m): -

Sampling Method: Unknown (Not IANZ Endorsed)

Material: Undisturbed Soil

Source: Unknown (Sampled by Client)

Swell Test

AS 1289.7.1.1

Swell on Saturation (%): 0.9

Moisture Content before (%): 24.4

Moisture Content after (%): 25.9

Est. Unc. Comp. Strength before (kPa): 450

Est. Unc. Comp. Strength after (kPa): 250

Shrink Test

AS 1289.7.1.1

Shrink on drying (%): 3.6

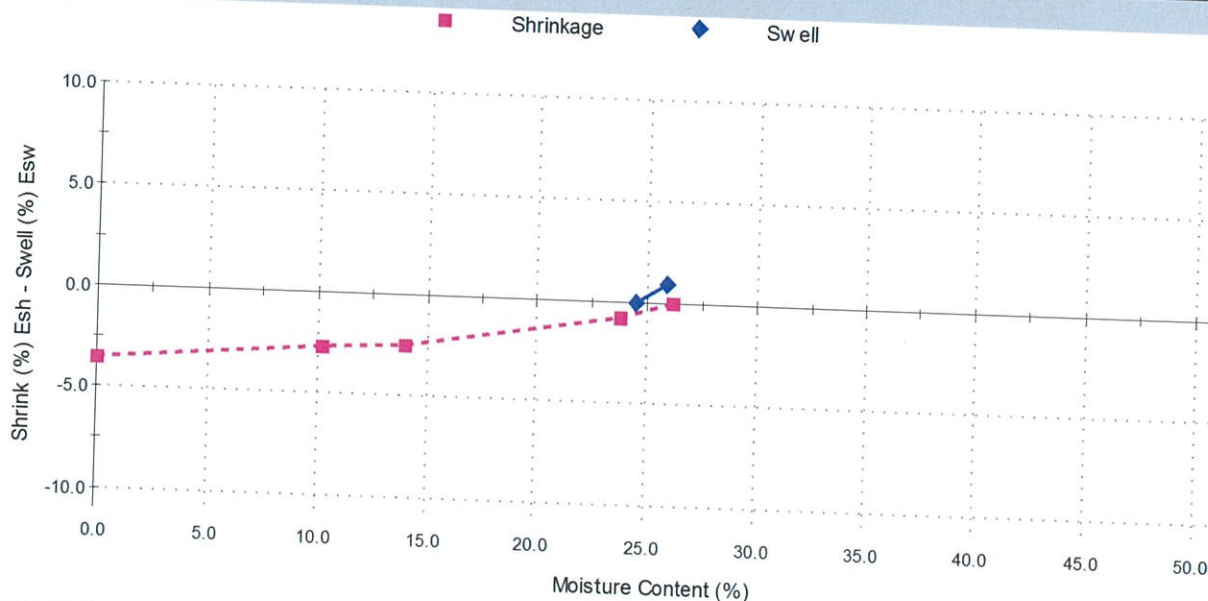
Shrinkage Moisture Content (%): 26.1

Est. inert material (%): 14%

Crumbling during shrinkage: 0.5%

Cracking during shrinkage: 1%

Shrink Swell



Shrink Swell Index - Iss (%): 2.2

Comments

Not accredited

Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.

Work Order No : ETAM22W01552

Tested By: JM

Shrink Swell Index Report

Report No: SSI:ETAM22S-07710

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: 1/09/2022

Sample Details

Sample ID: ETAM22S-07710

Date Sampled: 21/08/2022

Date Submitted: 25/08/2022

Date Tested: 25/08/2022

Project Location: 117 Kowhai Road, Orewa

Sample Location: Lot 1003

Borehole Number: Lot 1003

Borehole Depth (m): -

Sampling Method: Unknown (Not IANZ Endorsed)

Material: Undisturbed Soil

Source: Unknown (Sampled by Client)

Swell Test

AS 1289.7.1.1

Swell on Saturation (%): -0.4

Moisture Content before (%): 23.8

Moisture Content after (%): 25.2

Est. Unc. Comp. Strength before (kPa): 450+

Est. Unc. Comp. Strength after (kPa): 450+

Shrink Test

AS 1289.7.1.1

Shrink on drying (%): 1.5

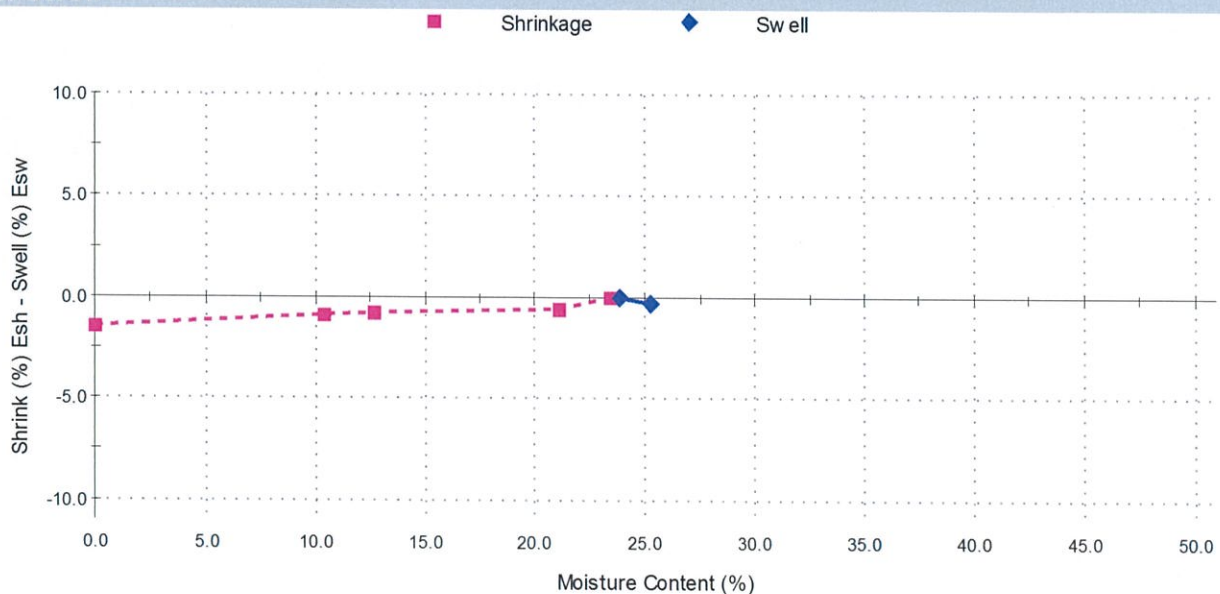
Shrinkage Moisture Content (%): 23.4

Est. inert material (%): 14%

Crumbling during shrinkage: 5%

Cracking during shrinkage: 3%

Shrink Swell



Shrink Swell Index - Iss (%): 0.9

Comments



Not accredited

Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.

Work Order No : ETAM22W01552

Tested By: JM

APPENDIX D: EARTHWORKS FIELD DENSITY SUMMARY SHEETS

Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Joshua Fisher c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div> <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 23/04/2019</p> </div> </div>										
Test method: Test Methods in accordance with: *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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
17/04/2019	19W01518	TR	1	Fill	Silty CLAY	Shear Key	1749405	5949050	-	150	~2.3m to Finished Level	UTP	UTP	UTP	UTP	1.92	27.2	1.51	2.70	3
17/04/2019	19W01518	TR	2	Fill	Gravelly CLAY	Shear Key	1749417	5949056	-	150	~2.4m to Finished Level	UTP	UTP	UTP	UTP	1.88	26.2	1.49	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01518

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below



Tested by:

TR

Date tested:

17/04/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Joshua Fisher c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between; padding-top: 10px;"> <div style="text-align: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 6/05/2019 </div> </div>																																																																																					
Test method: Test Methods in accordance with: *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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																																																																																						
<table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #d9e1f2;"> <th rowspan="2">Date</th> <th rowspan="2">Work Order No: ETAM...</th> <th rowspan="2">Tested by</th> <th rowspan="2">Test No.</th> <th rowspan="2">Layer</th> <th rowspan="2">Material tested</th> <th rowspan="2">Location</th> <th rowspan="2">Easting</th> <th rowspan="2">Northing</th> <th rowspan="2">RL(m)</th> <th rowspan="2">Probe Test Depth (mm)</th> <th rowspan="2">Comments</th> <th colspan="4">Field Shear Strength in kPa</th> <th rowspan="2">Wet Density (T/m³)</th> <th rowspan="2">Oven Water Content (%)</th> <th rowspan="2">Dry Density (T/m³)</th> <th rowspan="2">Solid Density (T/m³) Assumed</th> <th rowspan="2">Air Voids (%)</th> </tr> <tr style="background-color: #d9e1f2;"> <th colspan="4">UTP = Unable to penetrate</th> </tr> </thead> <tbody> <tr> <td>3/05/2019</td> <td>19W01662</td> <td>TR</td> <td>5</td> <td>Fill</td> <td>Sandy CLAY</td> <td>Shear Key 1</td> <td>1749397</td> <td>5949055</td> <td>-</td> <td>150</td> <td>~ 6.0m from base</td> <td>193</td> <td>193</td> <td>224</td> <td>200</td> <td>1.81</td> <td>34.0</td> <td>1.35</td> <td>2.70</td> <td>4</td> </tr> <tr> <td>3/05/2019</td> <td>19W01662</td> <td>TR</td> <td>6</td> <td>Fill</td> <td>Sandy CLAY</td> <td>Shear Key 1</td> <td>1749405</td> <td>5949051</td> <td>-</td> <td>150</td> <td>~ 6.0m from base</td> <td>175</td> <td>175</td> <td>224</td> <td>238</td> <td>1.87</td> <td>33.2</td> <td>1.41</td> <td>2.70</td> <td>1</td> </tr> </tbody> </table>																				Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	UTP = Unable to penetrate				3/05/2019	19W01662	TR	5	Fill	Sandy CLAY	Shear Key 1	1749397	5949055	-	150	~ 6.0m from base	193	193	224	200	1.81	34.0	1.35	2.70	4	3/05/2019	19W01662	TR	6	Fill	Sandy CLAY	Shear Key 1	1749405	5949051	-	150	~ 6.0m from base	175	175	224	238	1.87	33.2	1.41	2.70	1
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed													Air Voids (%)																																																						
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3/05/2019	19W01662	TR	5	Fill	Sandy CLAY	Shear Key 1	1749397	5949055	-	150	~ 6.0m from base	193	193	224	200	1.81	34.0	1.35	2.70	4																																																																		
3/05/2019	19W01662	TR	6	Fill	Sandy CLAY	Shear Key 1	1749405	5949051	-	150	~ 6.0m from base	175	175	224	238	1.87	33.2	1.41	2.70	1																																																																		

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01662

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below


Tested by:

TR

Date tested:

3/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Joshua Fisher c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 14/05/2019 </div> </div>
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Test method: Test Methods in accordance with: *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): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
9/05/2019	19W01760	TR	7	Fill	Sandy CLAY	Shear Key 1	1749407	5949054	-	150	~ 6.0m from base	238	238	UTP	UTP	1.79	30.7	1.37	2.70	7
9/05/2019	19W01760	TR	8	Fill	Sandy CLAY	Shear Key 1	1749427	5949046	-	150	~ 6.0m from base	155	175	238	234	1.85	27.0	1.46	2.70	7
9/05/2019	19W01760	TR	9	Fill	Sandy CLAY	Shear Key 1	1749424	5949035	-	150	~ 6.2m from base	210	193	175	238	1.84	30.6	1.41	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01760



Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 9/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between; padding-top: 10px;"> <div style="text-align: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 23/05/2019 </div> </div>									
Test method: Test Methods in accordance with: *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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
17/05/2019	19W01847	TR	10	Fill	Sandy CLAY	Shear Key 1	1749371	5949036	-	150	~ 4.5m from base	210	143	155	175	1.83	31.7	1.39	2.70	5
17/05/2019	19W01847	TR	11	Fill	Sandy CLAY	Shear Key 1	1749372	5949046	-	150	~ 4.5m from base	210	195	155	163	1.85	32.0	1.40	2.70	3

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01847

Page No: 2 of 2


Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 17/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center;">  <div> <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 23/05/2019</p> </div> </div>										
Test method: Test Methods in accordance with: *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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																					
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
20/05/2019	19W01872	TR	12	Fill	Sandy CLAY	Shear Key 1	1749373	5949044	-	150	~ 6.5m from base	155	175	193	200	1.88	28.9	1.46	2.70	4	
20/05/2019	19W01872	TR	13	Fill	Sandy CLAY	Shear Key 1	1749385	5949050	-	150	~ 6.5m from base	238	238	238	238	1.86	30.7	1.42	2.70	3	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01872

Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 20/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between; padding-top: 10px;"> <div style="text-align: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 24/05/2019 </div> </div>																																																																																					
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed													Air Voids (%)																																																						
												UTP = Unable to penetrate																																																																										
21/05/2019	19W01934	TR	14	Fill	Sandy CLAY	Pond	1749395	5949020	-	150	~ 6.8m from base	238	234	234	193	1.84	33.4	1.38	2.70	3																																																																		
21/05/2019	19W01934	TR	15	Fill	Sandy CLAY	Pond	1749405	5949023	-	150	~ 6.8m from base	238	232	155	193	1.80	32.9	1.35	2.70	5																																																																		

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01934

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below



Tested by:

TR

Date tested:

21/05/2019





Client: Coffey Services NZ Ltd (Auckland) Address PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 24/05/2019</p> </div> </div>										
Test method: Test Methods in accordance with: *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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
22/05/2019	19W01936	TR	16	Fill	Stabilised Sandy CLAY	Pond	1749406	5949025	-	150	~ 7.6m from base	238	179	207	155	1.82	36.9	1.33	2.70	2

NOT TO SCALE

Work Order No: ETAM19W01936
Page No: 2 of 2

Tested by: TR
Date tested: 22/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 28/05/2019</p> </div> </div>									
Test method: Test Methods in accordance with: *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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
23/05/2019	19W01938	TR	17	Fill	Stabilised Sandy CLAY	Pond	1749411	5949028	8.2	150		238	238	200	171	1.87	31.4	1.42	2.70	3
23/05/2019	19W01938	TR	18	Fill	Stabilised Sandy CLAY	Pond	1749390	5949029	8.2	150		141	141	143	150	1.85	33.4	1.39	2.70	2

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01938


2 of 2

Location: As below

Tested by: TR

Date tested: 23/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  Tests indicated as not accredited are outside the scope of the laboratory's accreditation Approved Signatory: Cesar Pura Issue date: 28/05/2019									
Test method: Test Methods in accordance with: *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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
24/05/2019	19W01946	TR	19	Fill	Stabilised Sandy CLAY	Shear Key 1	1749409	5949053	7.5	150		UTP	238	155	193	1.83	31.4	1.39	2.70	5
24/05/2019	19W01946	TR	20	Fill	Stabilised Sandy CLAY	Shear Key 1	1749387	5949051	7.5	150		234	234	210	210	1.75	32.3	1.32	2.70	8



NOT TO SCALE

Page No: 2 of 2

TR

24/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="font-size: 0.8em;"> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 13/01/2020</p> </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
9/01/2020	20W00024	JJ	68	Fill	Silty CLAY	Gully 1	1749172	5949024	-	150	~0.8m to Finished Level	UTP	UTP	UTP	UTP	1.92	26.4	1.52	2.70	4
9/01/2020	20W00024	JJ	69	Fill	Silty CLAY	Gully 1	1749175	5949010	-	150	~0.8m to Finished Level	UTP	UTP	UTP	UTP	1.85	29.2	1.43	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00024

Page No: 2 of 2


Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: JJ

Date tested: 9/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 15/01/2020</p> </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
13/01/2020	20W00037	TR	73	Fill	Silty CLAY	Gully 1	1749170	5949039	9.40	150		202	202	173	192	1.88	28.1	1.46	2.70	5
13/01/2020	20W00037	TR	74	Fill	Silty CLAY	Gully 1	1749178	5949011	9.80	150		202	202	195	192	1.92	27.9	1.50	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00037

Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 13/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 22/01/2020 </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
14/01/2020	20W00048	MP	75	Fill	Silty CLAY	Gully 1	1749177	5948974	10.31	150		UTP	UTP	UTP	183	1.92	26.0	1.53	2.70	4
14/01/2020	20W00048	MP	76	Fill	Silty CLAY	Gully 1	1749174	5948983	10.25	150		UTP	UTP	UTP	UTP	1.85	26.8	1.46	2.70	7
14/01/2020	20W00048	MP	77	Fill	Silty CLAY	Gully 1	1749176	5948798	10.05	150		183	183	166	UTP	1.89	28.2	1.47	2.70	4

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00048

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

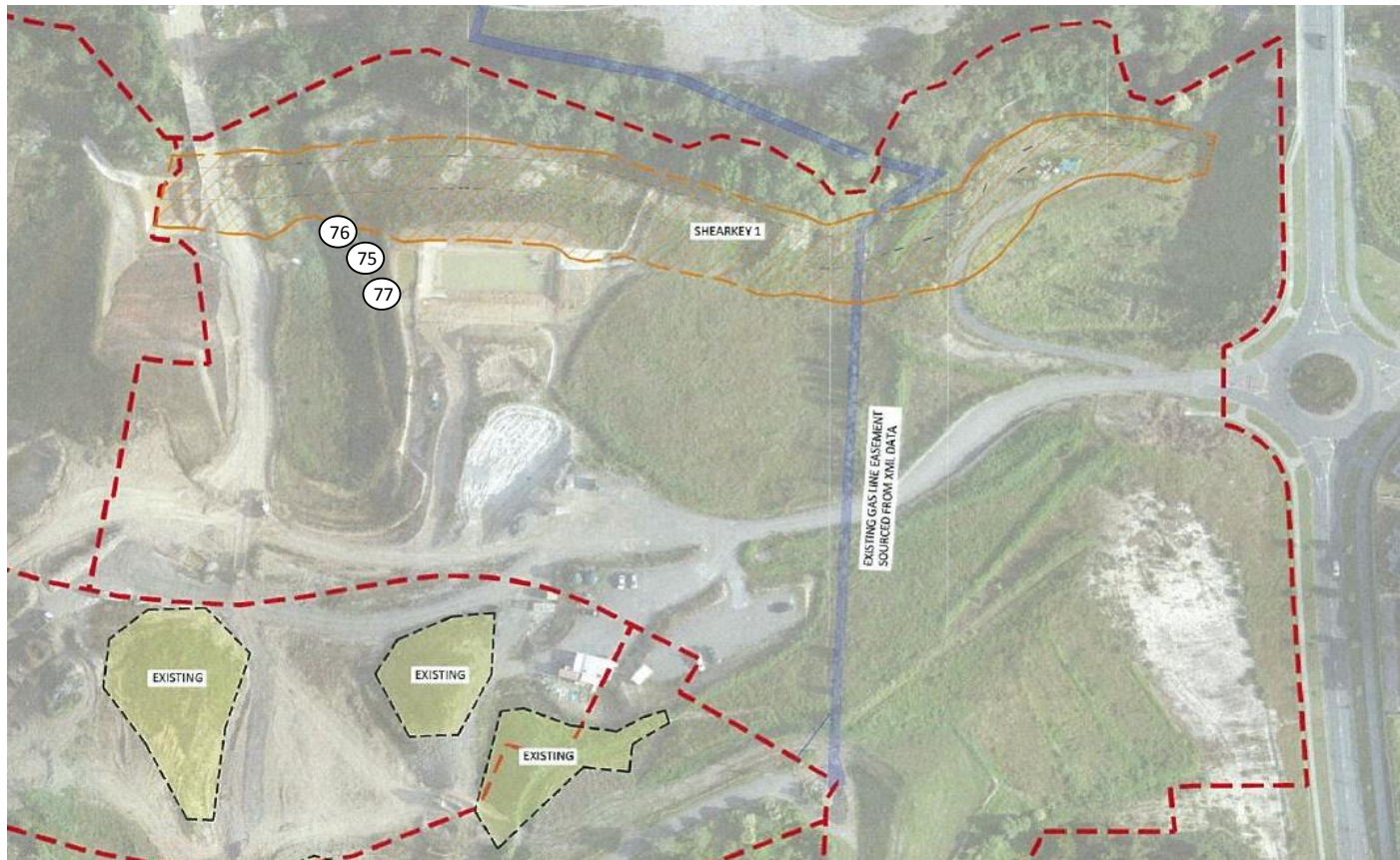
Location: As below



Tested by:

MP

Date tested:

14/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 22/01/2020 </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
16/01/2020	20W00065	TR	78	Fill	Gravelly CLAY	East Gully	1749214	5948942	12.50	150		202	202	202	202	1.90	31.1	1.45	2.70	1
16/01/2020	20W00065	TR	79	Fill	Gravelly CLAY	East Gully	1749229	5948465	22.00	150		202	163	150	152	1.89	31.2	1.44	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00065

Page No: 2 of 2


Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 16/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 22/01/2020</p> </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
17/01/2020	20W00069	TR	80	Fill	Gravelly CLAY	Gully 1	1749177	5948951	11.65	150		152	155	166	173	1.89	31.4	1.44	2.70	2
17/01/2020	20W00069	TR	81	Fill	Gravelly CLAY	Gully 1	1749175	5949010	11.30	150		159	162	202	157	1.88	36.0	1.38	2.70	0

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00069

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below



Tested by:

TR

Date tested:

17/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 22/01/2020 </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
20/01/2020	20W00086	TR	82	Fill	Gravelly CLAY	Gully 1	1749159	5949008	12.50	150		UTP	UTP	UTP	UTP	1.90	22.6	1.55	2.70	8
20/01/2020	20W00086	TR	83	Fill	Gravelly CLAY	Gully 1	1749171	5948992	12.30	150		UTP	UTP	UTP	UTP	1.86	25.5	1.48	2.70	7
20/01/2020	20W00086	TR	84	Fill	Gravelly CLAY	Gully 1	1749178	5948975	12.20	150		UTP	UTP	UTP	UTP	1.85	28.2	1.45	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00086

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below



Tested by:

TR

Date tested:

20/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 23/01/2020</p> </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
21/01/2020	20W00100	TR	85	Fill	Silty CLAY	Gully 1	1749170	5948938	-	150		202	202	162	152	1.81	27.6	1.42	2.70	8
21/01/2020	20W00100	TR	86	Fill	Silty CLAY	Gully 1	1749182	5948970	-	150		152	162	150	202	1.79	40.7	1.28	2.70	1

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00100

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below



Tested by:

TR

Date tested:

21/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div style="font-size: small;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 29/01/2020 </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
22/01/2020	20W00118	TR	87	Fill	Silty CLAY	Gully 1	1749165	5949017	13.00	150		202+	162	192	UTP	1.89	26.8	1.49	2.70	5
22/01/2020	20W00118	TR	88	Fill	Silty CLAY	Gully 1	1749189	5948993	13.00	150		UTP	182	202	185	1.90	24.0	1.53	2.70	7
22/01/2020	20W00118	TR	89	Fill	Silty CLAY	Undercut Wall 306	1749387	5948934	17.10	150		150	150	162	159	1.82	34.1	1.36	2.70	3
22/01/2020	20W00118	TR	90	Fill	Silty CLAY	Undercut Wall 306	1749393	5948916	18.10	150		150	171	185	155	1.71	40.8	1.22	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00118

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below


Tested by:

TR

Date tested:

22/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 29/01/2020</p> </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
23/01/2020	20W00123	TR	91	Fill	Silty CLAY	Gully 1	1749175	5949010	13.23	150		162	159	202+	202+	1.82	27.2	1.43	2.70	8
23/01/2020	20W00123	TR	92	Fill	Silty CLAY	Gully 1	1749176	5948989	13.19	150		169	198	162	192	1.87	28.0	1.46	2.70	5
23/01/2020	20W00123	TR	93	Fill	Silty CLAY	Gully 1	1749177	5948973	14.30	150		185	195	182	202	1.87	28.1	1.46	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00123

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below


Tested by:

TR

Date tested:

23/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 29/01/2020</p> </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																					
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
24/01/2020	20W00128	TR	94	Fill	Silty CLAY	Gully 1	1749156	5949011	13.91	150		UTP	UTP	UTP	UTP	1.89	32.2	1.43	2.70	1	
24/01/2020	20W00128	TR	95	Fill	Silty CLAY	Gully 1	1749180	5948962	14.92	150		157	202	195	150	1.78	36.1	1.30	2.70	5	
24/01/2020	20W00128	TR	96	Fill	Silty CLAY	Wall 306	1749411	5948910	18.88	150		126	124	140	121	1.78	37.7	1.29	2.70	4	
24/01/2020	20W00128	TR	97	Fill	Silty CLAY	Wall 306	1749429	5948912	18.98	150		140	126	124	138	1.77	38.9	1.27	2.70	3	
24/01/2020	20W00128	TR	98	Fill	Silty CLAY	Wall 306	1749412	5948911	18.88	150	Retest of Test No. 96	202	202	202	189	1.82	36.3	1.33	2.70	2	
24/01/2020	20W00128	TR	99	Fill	Silty CLAY	Wall 306	1749430	5948909	18.98	150	Retest of Test No. 97	189	182	185	198	1.82	32.7	1.37	2.70	5	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00128

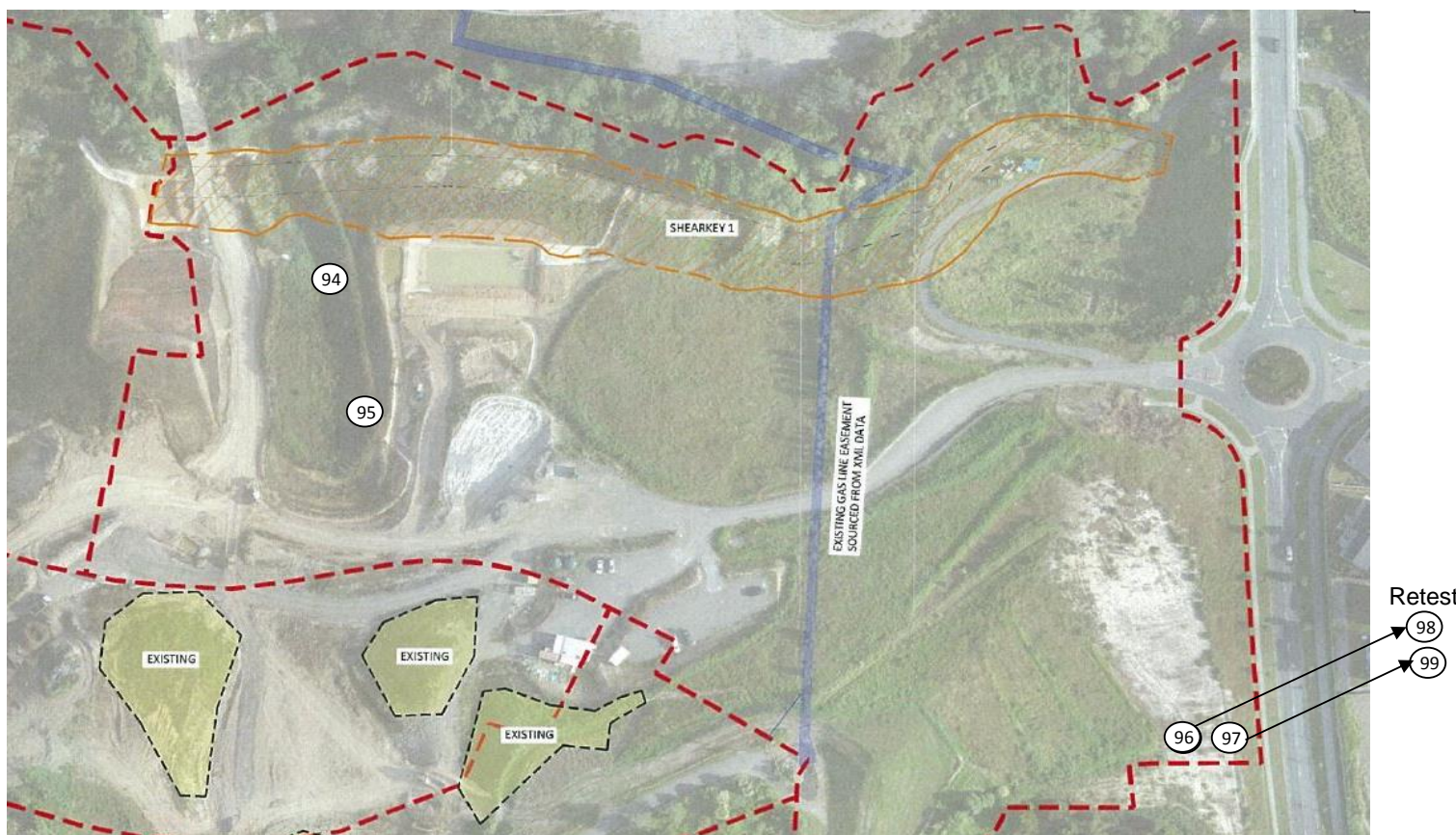
Page No: 2 of 2


Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 24/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 4/02/2020</p> </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
28/01/2020	20W00171	MP	100	Fill	Silty CLAY	Gully 1	1749183	5948956	-	150		176	202	189	185	1.91	24.9	1.52	2.70	5
28/01/2020	20W00171	MP	101	Fill	Silty CLAY	Gully 1	1749167	5948986	-	150		173	185	202	202	1.89	26.6	1.49	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00171

Page No: 2 of 2


Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP

Date tested: 28/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 4/02/2020</p> </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
29/01/2020	20W00215	TR	102	Fill	Silty CLAY	Gully 1	1749184	5948964	17.50	150		202	202	202	189	1.87	28.0	1.46	2.70	5
29/01/2020	20W00215	TR	103	Fill	Silty CLAY	Gully 1	1749162	5948981	17.50	150		182	152	173	189	1.88	33.9	1.40	2.70	0

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00215

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below


Tested by:

TR

Date tested:

29/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 4/02/2020</p> </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
30/01/2020	20W00219	TR	104	Fill	Silty CLAY	Gully 1	1749162	5948975	18.00	150		150	173	185	159	1.87	33.6	1.40	2.70	1
30/01/2020	20W00219	TR	105	Fill	Silty Sandy CLAY	Shearkey	1749253	5949039	6.30	150		150	171	185	202	1.83	39.1	1.31	2.70	0
30/01/2020	20W00219	TR	106	Fill	Silty Sandy CLAY	Shearkey	1749268	5949038	4.88	150		157	159	202	182	1.81	35.5	1.33	2.70	3
30/01/2020	20W00219	TR	107	Fill	Silty CLAY	Gully 1	1749175	5948960	18.00	150		150	159	164	189	1.87	28.8	1.45	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00219

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

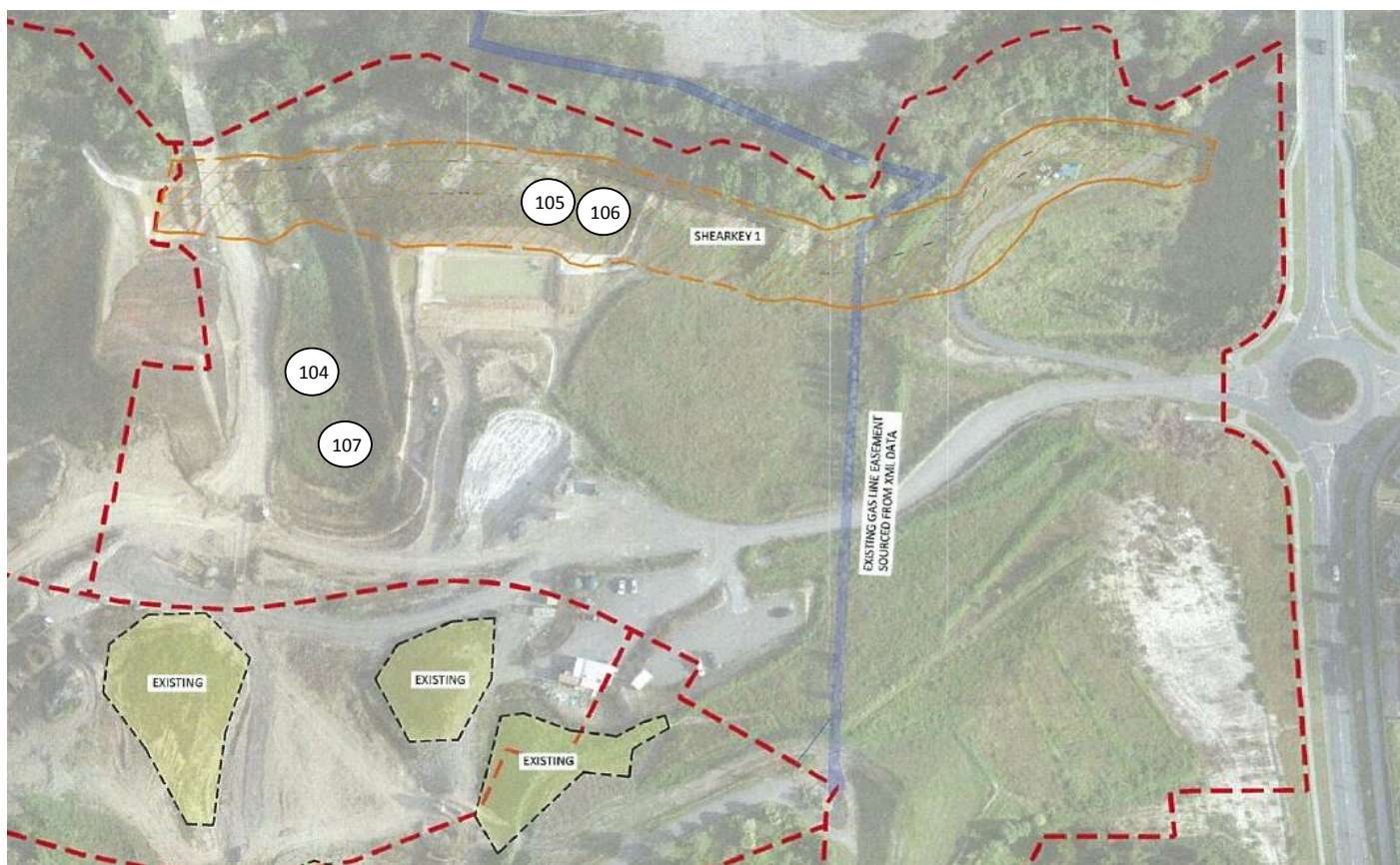
Location: As below



Tested by:

TR

Date tested:

30/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div style="text-align: center;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 4/02/2020 </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
31/01/2020	20W00230	MP	108	Fill	CLAY	Shearkey	1749264	5949039	5.50	150		UTP	UTP	202+	202+	1.90	32.2	1.44	2.70	0
31/01/2020	20W00230	MP	109	Fill	CLAY	Shearkey	1749251	5949042	7.00	150		185	162	150	150	1.81	36.4	1.33	2.70	2
31/01/2020	20W00230	MP	110	Fill	CLAY	Gully 1	1749161	5948951	19.04	150		150	150	150	185	1.80	34.0	1.35	2.70	4
31/01/2020	20W00230	MP	111	Fill	CLAY	Gully 1	1749192	5948974	17.80	150		150	150	150	138	1.82	38.0	1.32	2.70	1
31/01/2020	20W00230	MP	112	Fill	CLAY	Undercut	1749450	5948854	20.00	150		202	202	202	202	1.83	30.6	1.40	2.70	5
31/01/2020	20W00230	MP	113	Fill	CLAY	Undercut	1749448	5948873	20.00	150		150	150	162	162	1.84	33.6	1.37	2.70	3

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00230

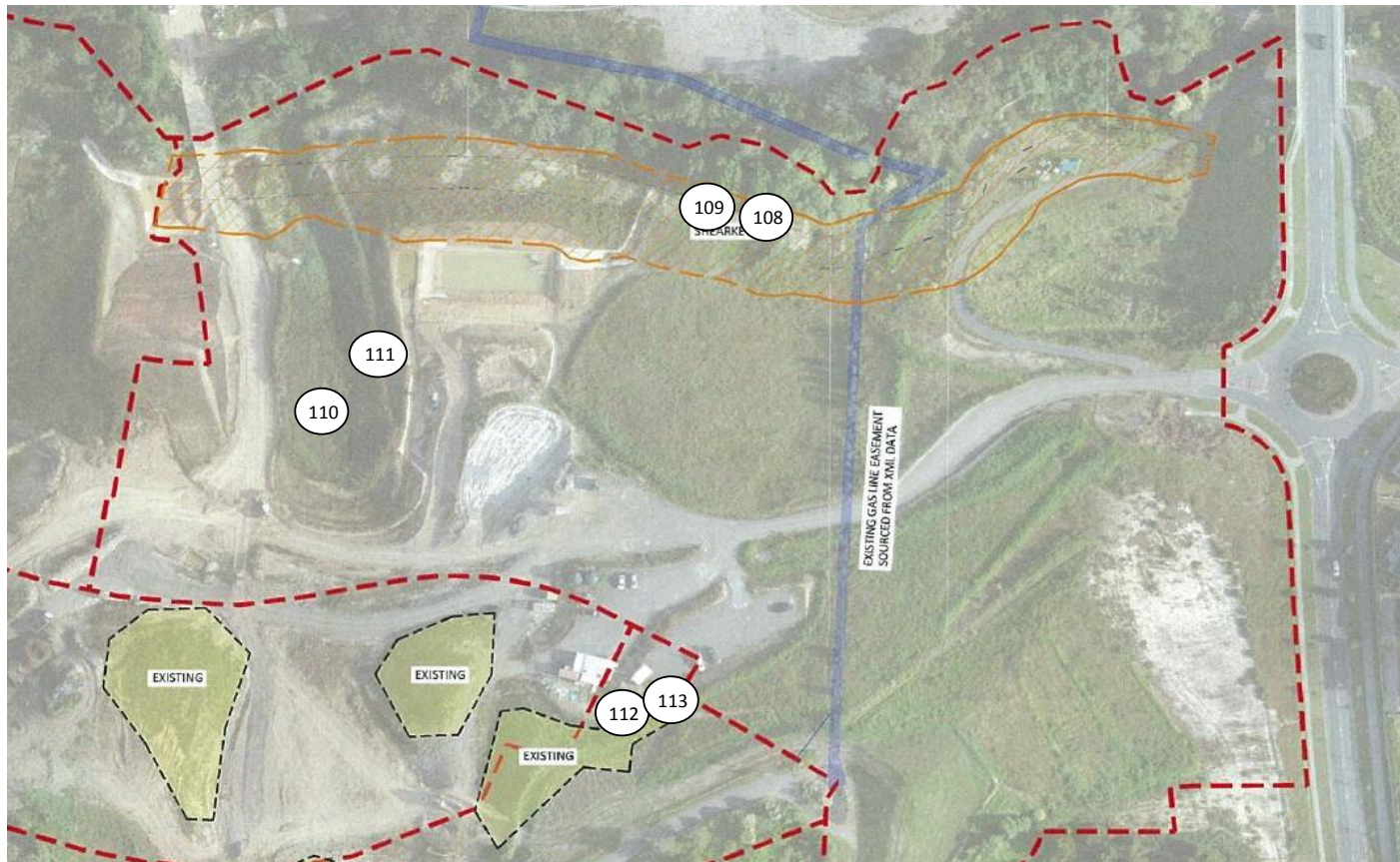
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP

Date tested: 31/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 8/02/2020</p> </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																					
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
3/02/2020	20W00250	TR	114	Fill	Silty CLAY	Gully 1	1749161	5948967	-	150		202	202	UTP	UTP	1.83	31.8	1.39	2.70	4	
3/02/2020	20W00250	TR	115	Fill	Silty CLAY	Gully 1	1749193	5948958	-	150		202	202	189	182	1.88	28.5	1.46	2.70	4	
3/02/2020	20W00250	TR	116	Fill	Silty CLAY	306 Undercut	1749449	5948897	21.00	150		171	198	202	162	1.72	34.8	1.28	2.70	8	
3/02/2020	20W00250	TR	117	Fill	Silty CLAY	306 Undercut	1749444	5948876	21.00	150		171	198	UTP	164	1.82	34.2	1.35	2.70	4	
3/02/2020	20W00250	TR	118	Fill	Silty CLAY	306 Undercut	1749443	5948856	21.00	150		202	202	198	162	1.78	33.7	1.33	2.70	6	
3/02/2020	20W00250	TR	119	Fill	Silty CLAY	306 Undercut	1749449	5948839	21.00	150		202	171	182	166	1.82	34.2	1.36	2.70	3	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00250

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

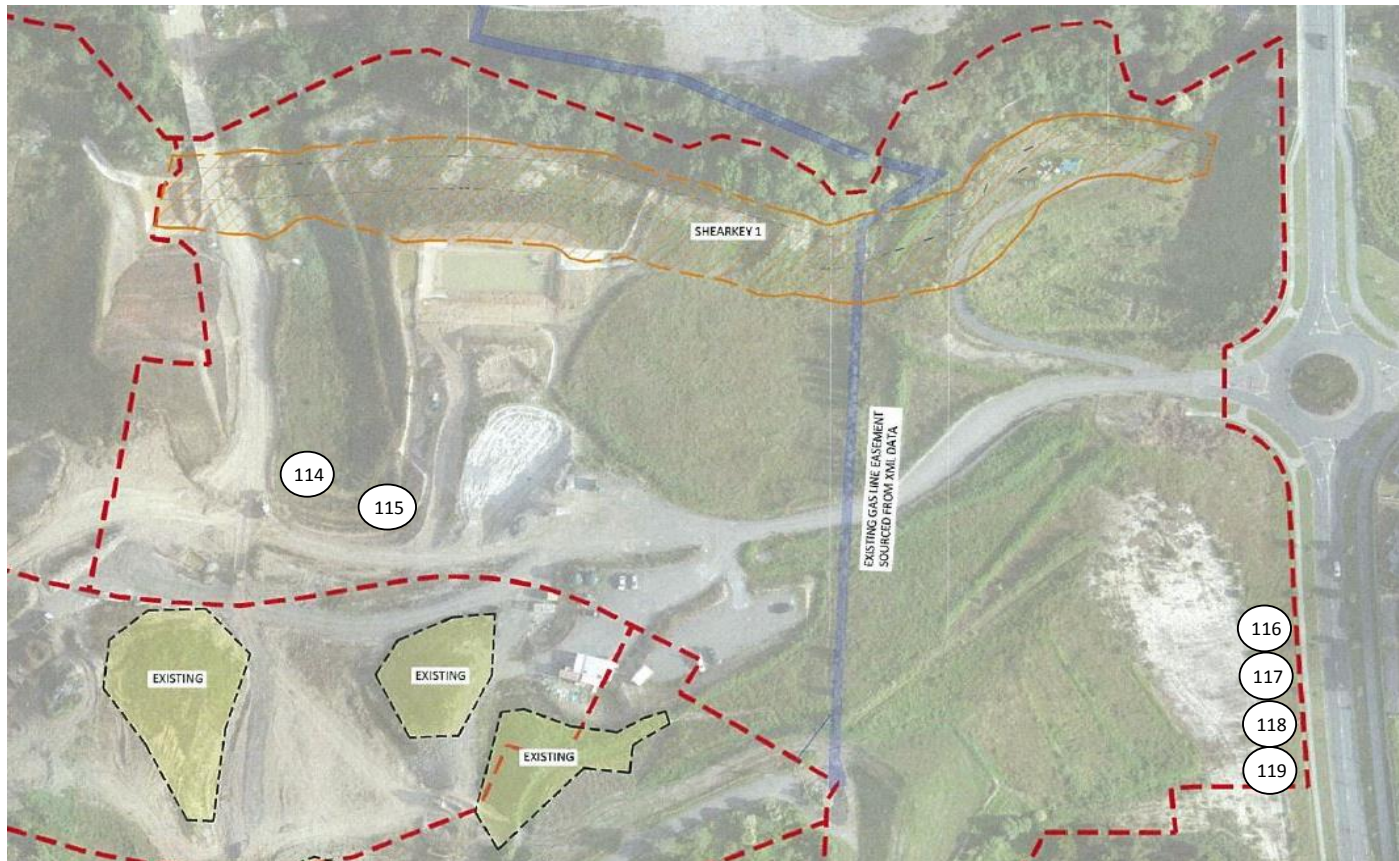
Location: As below

Tested by:

TR

Date tested:

3/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 11/02/2020</p> </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
4/02/2020	20W00269	TR	120	Fill	Silty CLAY	Gully 1	1749191	5948942	20.50	150		202	198	171	182	1.87	32.9	1.41	2.70	2
4/02/2020	20W00269	TR	121	Fill	Silty CLAY	Gully 1	1749188	5948975	20.50	150		198	185	202	195	1.83	28.9	1.42	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00269

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below


Tested by:

TR

Date tested:

4/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 11/02/2020</p> </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
5/02/2020	20W00285	TR	122	Fill	Silty CLAY	Gully 1	1749156	5948939	21.75	150		202	202	182	162	1.89	24.6	1.52	2.70	6
5/02/2020	20W00285	TR	123	Fill	Silty CLAY	Gully 1	1749176	5948966	20.50	150		202	202	189	185	1.91	31.6	1.45	2.70	1
5/02/2020	20W00285	TR	124	Fill	Silty CLAY	Gully 1	1749188	5948944	20.60	150		202	202	202	185	1.90	32.1	1.43	2.70	1

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00285

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

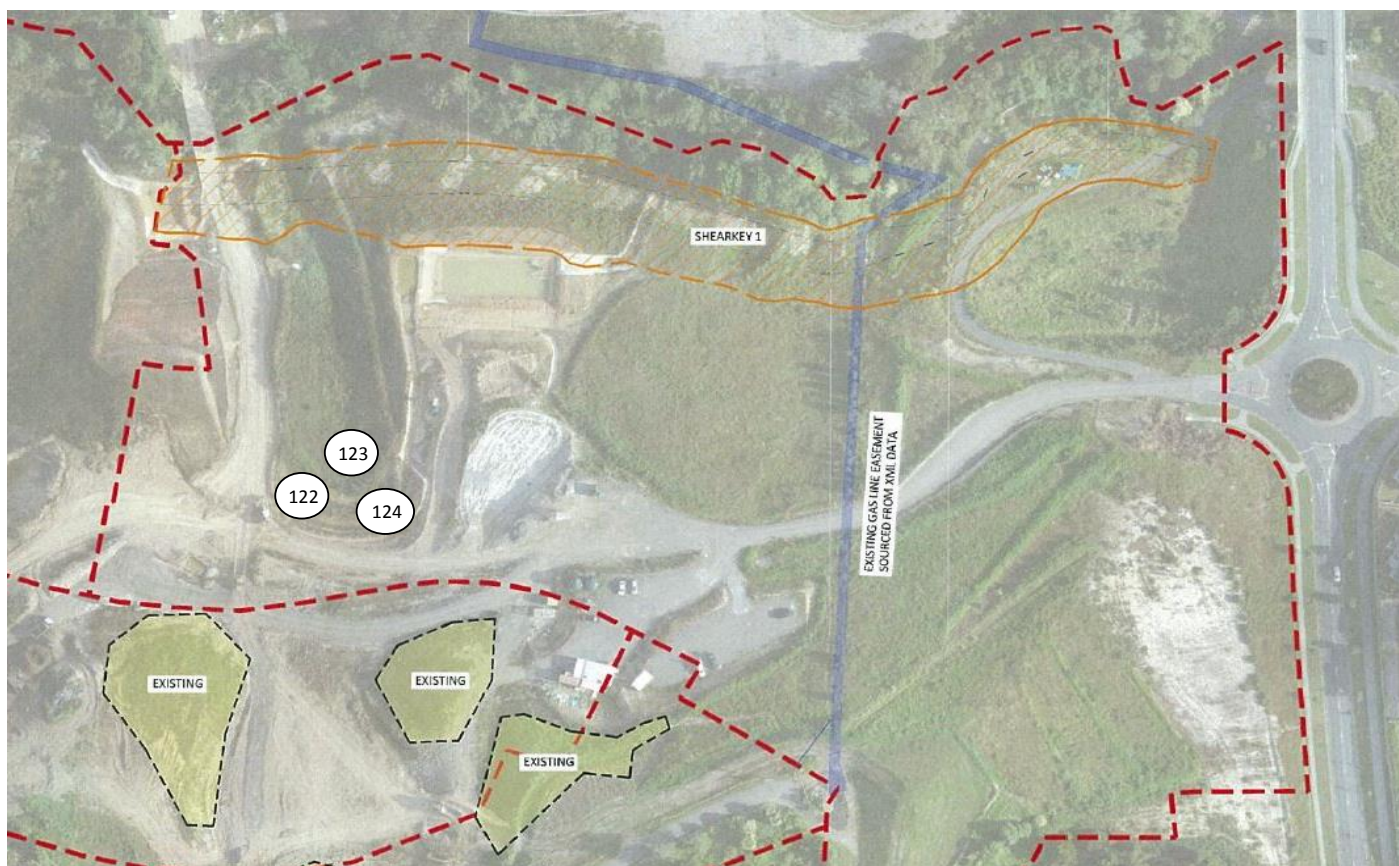
Location: As below



Tested by:

TR

Date tested:

5/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 12/02/2020 </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
8/02/2020	20W00286	MA	125	Fill	CLAY	Area F Shearkey 1	1749704	5949027	4.65	150		152	150	157	192	1.85	34.6	1.37	2.70	2
8/02/2020	20W00286	MA	126	Fill	CLAY	Area F Shearkey 1	1749285	5949033	4.96	150		185	202+	192	176	1.84	36.3	1.35	2.70	1
8/02/2020	20W00286	MA	127	Fill	CLAY	Area F Shearkey 1	1749261	5949034	5.45	150		202+	202+	202+	202+	1.90	29.6	1.46	2.70	3
8/02/2020	20W00286	MA	128	Fill	CLAY	Gully 1	1749215	5948966	21.45	150		202+	202+	198	202+	1.87	28.4	1.46	2.70	5
8/02/2020	20W00286	MA	129	Fill	CLAY	Gully 1	1749191	5948934	21.40	150		UTP	UTP	UTP	UTP	1.91	18.7	1.61	2.70	10

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00286

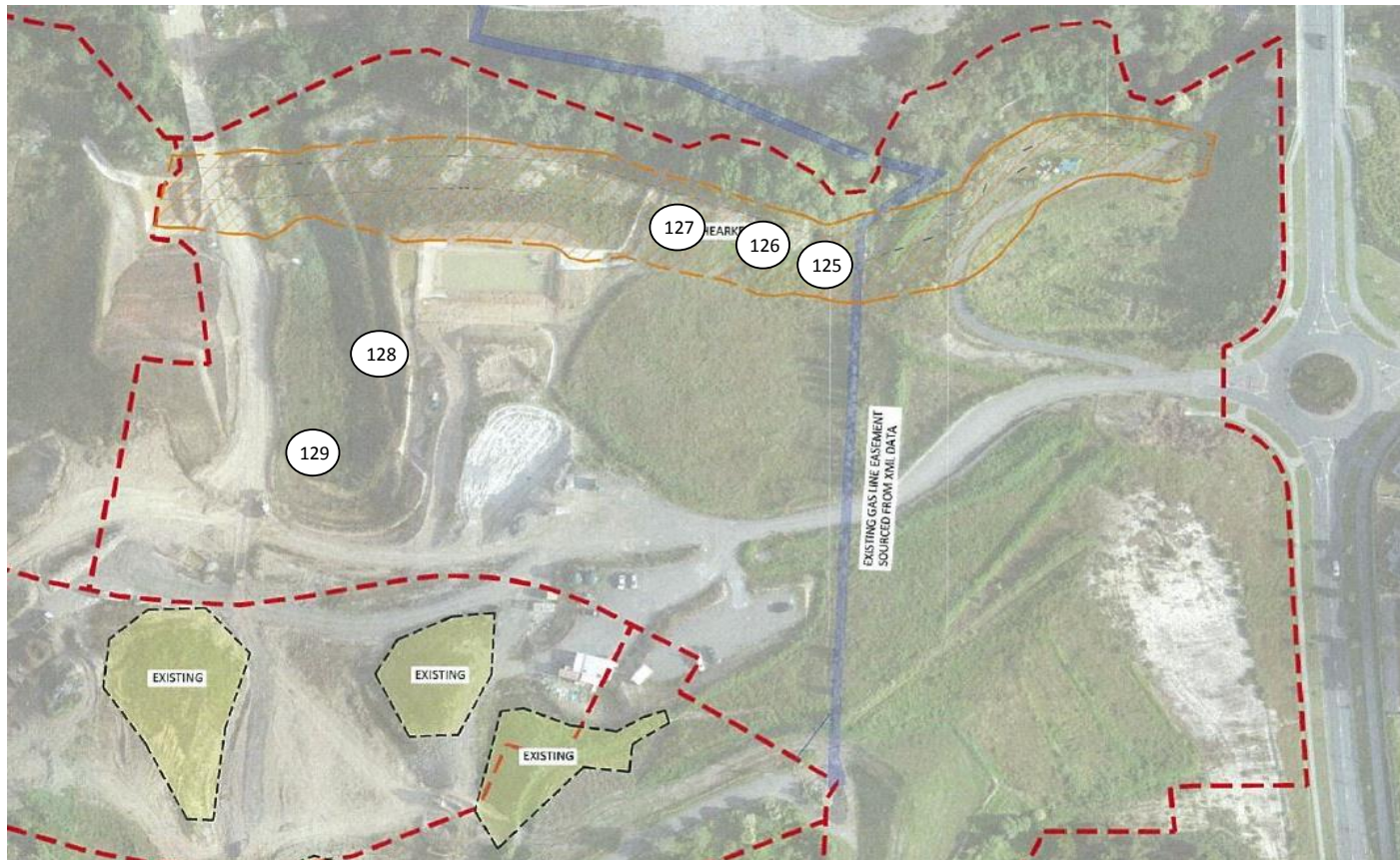
Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MA

Date tested: 8/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>ACCREDITED LABORATORY</p> </div> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 12/02/2020</p> </div> </div>									
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
10/02/2020	20W00298	TR, VD	130	Fill	Silty CLAY	Gully 1	1749198	5948931	23.20	150		171	202+	UTP	152	1.87	23.8	1.51	2.70	8
10/02/2020	20W00298	TR, VD	131	Fill	Silty CLAY	Gully 1	1749212	5948959	21.30	150		178	182	202+	157	1.89	30.0	1.46	2.70	2
10/02/2020	20W00298	TR, VD	132	Fill	Silty CLAY	Shearkey	1749275	5949041	5.60	150		UTP	202+	202+	202+	1.93	29.3	1.49	2.70	1
10/02/2020	20W00298	TR, VD	133	Fill	Silty CLAY	Shearkey	1749301	5949025	4.90	150		171	202+	175	159	1.83	33.6	1.37	2.70	3
10/02/2020	20W00298	TR, VD	134	Fill	Silty CLAY	Gully 1	1749191	5948952	21.40	150		173	185	UTP	UTP	1.94	26.1	1.54	2.70	3

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00298

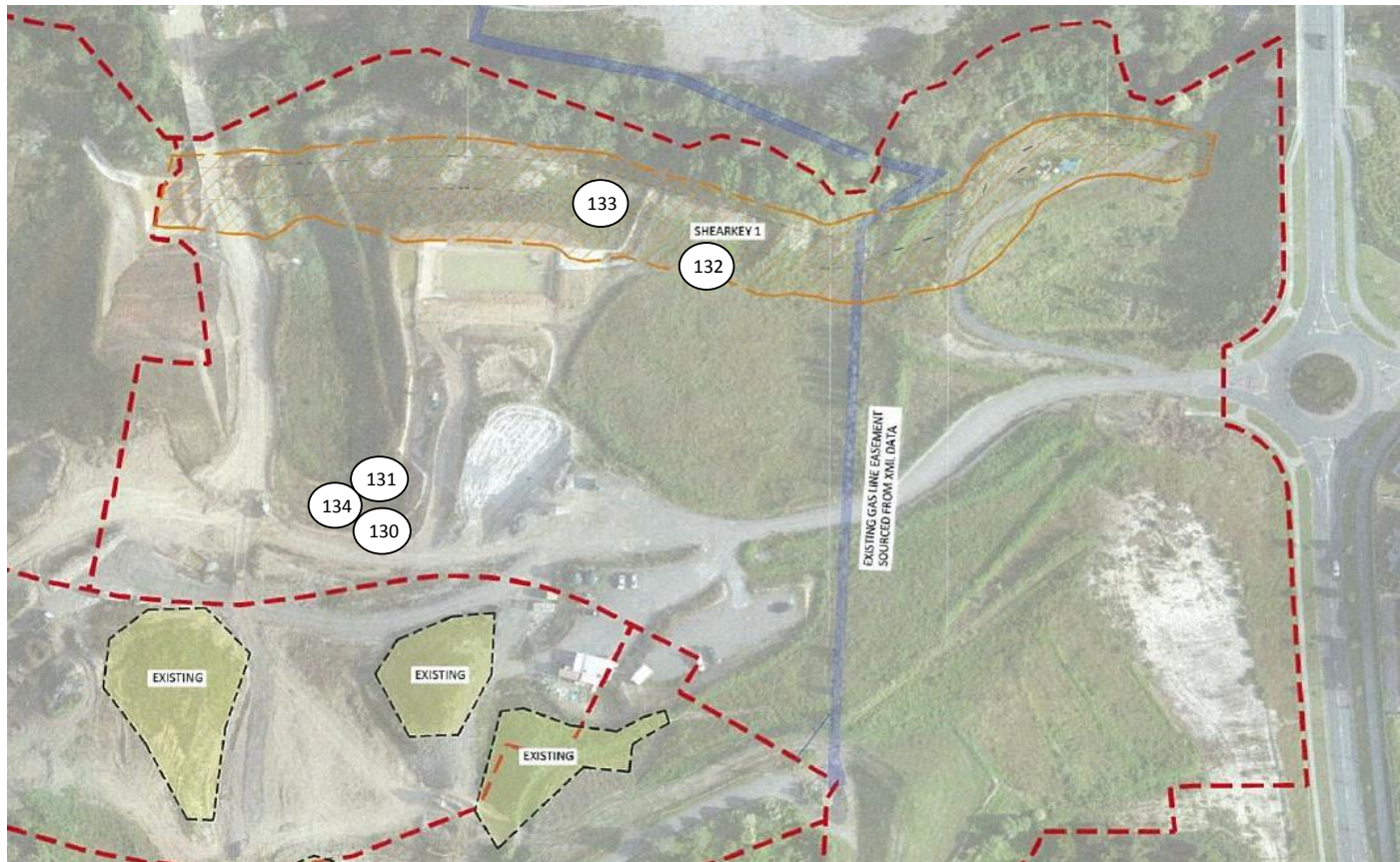
Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR, VD

Date tested: 10/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  All tests reported herein have been performed in accordance with the laboratory's scope of accreditation <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 19/02/2020 </div>									
Test method: Test Methods in accordance with: 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); Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
13/02/2020	20W00321	LW	146	Fill	Clayey SILT	Shearkey 1	1749264	5949026	8.80	150		145	179	184+	151	1.83	32.4	1.38	2.70	4
13/02/2020	20W00321	LW	147	Fill	Clayey SILT	Shearkey 1	1749280	5949021	8.60	150		138	147	179	174	1.88	28.6	1.46	2.70	4
13/02/2020	20W00321	LW	148	Fill	Clayey SILT	Refer to plan	1749185	5948815	35.80	150		170	147	184+	156	1.88	31.3	1.43	2.70	2
13/02/2020	20W00321	LW	149	Fill	Clayey SILT	Refer to plan	1749206	5948834	35.30	150		179	161	134	147	1.78	33.0	1.34	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00321

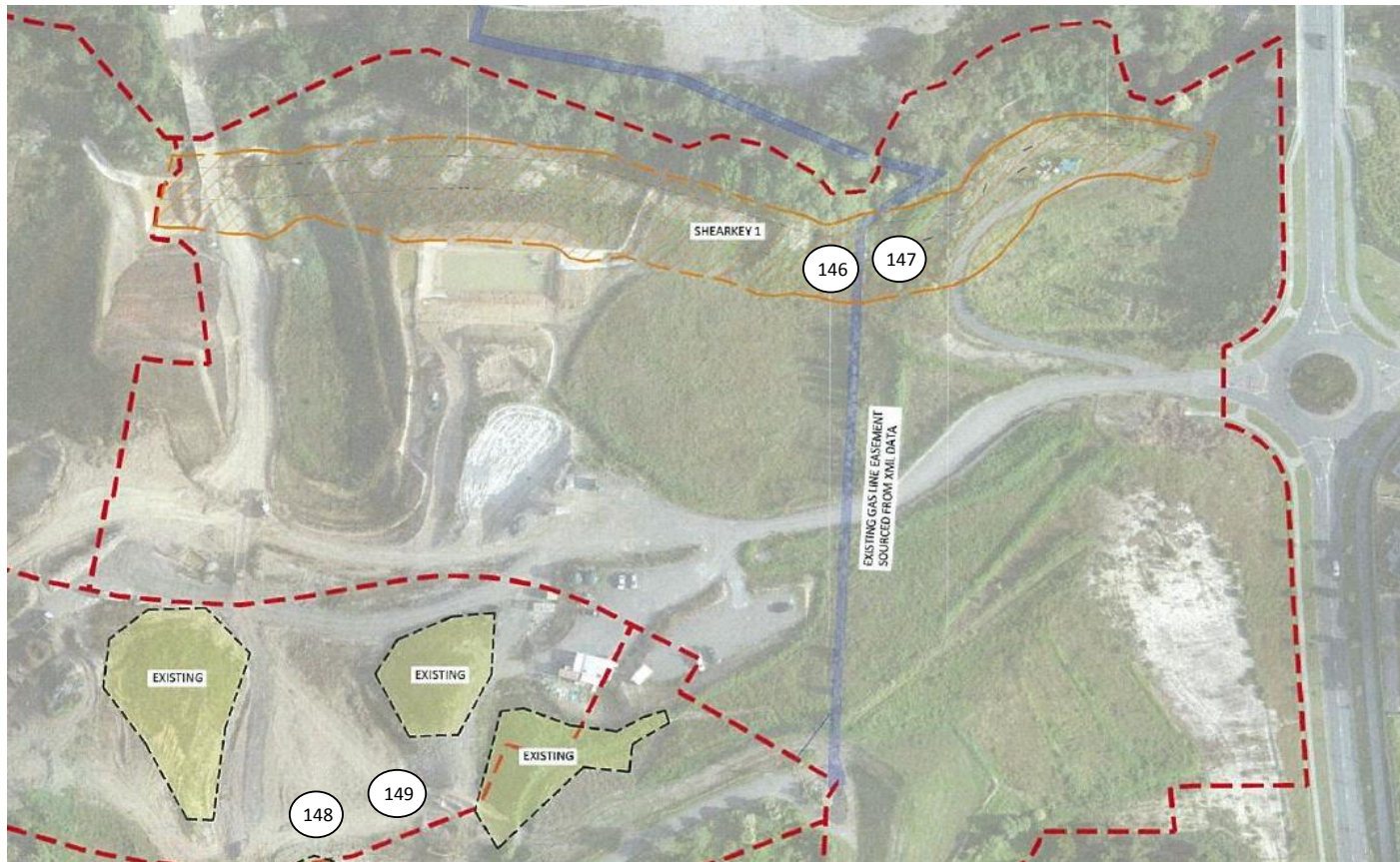
Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW

Date tested: 13/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 19/02/2020</p> </div> </div>																																																																																																																																																				
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																																																																																																																																																					
<table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #e6f2ff;"> <th rowspan="2">Date</th> <th rowspan="2">Work Order No: ETAM...</th> <th rowspan="2">Tested by</th> <th rowspan="2">Test No.</th> <th rowspan="2">Layer</th> <th rowspan="2">Material tested</th> <th rowspan="2">Location</th> <th rowspan="2">Easting</th> <th rowspan="2">Northing</th> <th rowspan="2">RL(m)</th> <th rowspan="2">Probe Test Depth (mm)</th> <th rowspan="2">Comments</th> <th colspan="4">Field Shear Strength in kPa</th> <th rowspan="2">Wet Density (T/m³)</th> <th rowspan="2">Oven Water Content (%)</th> <th rowspan="2">Dry Density (T/m³)</th> <th rowspan="2">Solid Density (T/m³) Assumed</th> <th rowspan="2">Air Voids (%)</th> </tr> <tr style="background-color: #e6f2ff;"> <th colspan="4">UTP = Unable to penetrate</th> </tr> </thead> <tbody> <tr> <td>14/02/2020</td> <td>20W00335</td> <td>LW</td> <td>150</td> <td>Fill</td> <td>Clayey SILT</td> <td>Shearkey 1</td> <td>1749288</td> <td>5949021</td> <td>8.90</td> <td>150</td> <td></td> <td>184</td> <td>170</td> <td>184+</td> <td>179</td> <td>1.81</td> <td>35.8</td> <td>1.33</td> <td>2.70</td> <td>3</td> </tr> <tr> <td>14/02/2020</td> <td>20W00335</td> <td>LW</td> <td>151</td> <td>Fill</td> <td>Clayey SILT</td> <td>Shearkey 1</td> <td>1749236</td> <td>5949040</td> <td>10.50</td> <td>150</td> <td></td> <td>UTP</td> <td>UTP</td> <td>UTP</td> <td>184+</td> <td>1.88</td> <td>25.9</td> <td>1.49</td> <td>2.70</td> <td>6</td> </tr> <tr> <td>14/02/2020</td> <td>20W00335</td> <td>LW</td> <td>152</td> <td>Fill</td> <td>Clayey SILT</td> <td>Refer to plan</td> <td>1749161</td> <td>5948823</td> <td>36.60</td> <td>150</td> <td></td> <td>UTP</td> <td>UTP</td> <td>184+</td> <td>156</td> <td>1.87</td> <td>31.9</td> <td>1.42</td> <td>2.70</td> <td>2</td> </tr> <tr> <td>14/02/2020</td> <td>20W00335</td> <td>LW</td> <td>153</td> <td>Fill</td> <td>Clayey SILT</td> <td>Refer to plan</td> <td>1749170</td> <td>5948806</td> <td>36.60</td> <td>150</td> <td></td> <td>UTP</td> <td>UTP</td> <td>UTP</td> <td>170</td> <td>1.87</td> <td>31.7</td> <td>1.42</td> <td>2.70</td> <td>2</td> </tr> <tr> <td>14/02/2020</td> <td>20W00335</td> <td>LW</td> <td>154</td> <td>Fill</td> <td>Clayey SILT</td> <td>Refer to plan</td> <td>1749201</td> <td>5948819</td> <td>36.50</td> <td>150</td> <td></td> <td>184</td> <td>165</td> <td>156</td> <td>184+</td> <td>1.85</td> <td>32.0</td> <td>1.40</td> <td>2.70</td> <td>3</td> </tr> </tbody> </table>																				Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	UTP = Unable to penetrate				14/02/2020	20W00335	LW	150	Fill	Clayey SILT	Shearkey 1	1749288	5949021	8.90	150		184	170	184+	179	1.81	35.8	1.33	2.70	3	14/02/2020	20W00335	LW	151	Fill	Clayey SILT	Shearkey 1	1749236	5949040	10.50	150		UTP	UTP	UTP	184+	1.88	25.9	1.49	2.70	6	14/02/2020	20W00335	LW	152	Fill	Clayey SILT	Refer to plan	1749161	5948823	36.60	150		UTP	UTP	184+	156	1.87	31.9	1.42	2.70	2	14/02/2020	20W00335	LW	153	Fill	Clayey SILT	Refer to plan	1749170	5948806	36.60	150		UTP	UTP	UTP	170	1.87	31.7	1.42	2.70	2	14/02/2020	20W00335	LW	154	Fill	Clayey SILT	Refer to plan	1749201	5948819	36.50	150		184	165	156	184+	1.85	32.0	1.40	2.70	3
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed													Air Voids (%)																																																																																																																					
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14/02/2020	20W00335	LW	153	Fill	Clayey SILT	Refer to plan	1749170	5948806	36.60	150		UTP	UTP	UTP	170	1.87	31.7	1.42	2.70	2																																																																																																																																	
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SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00335

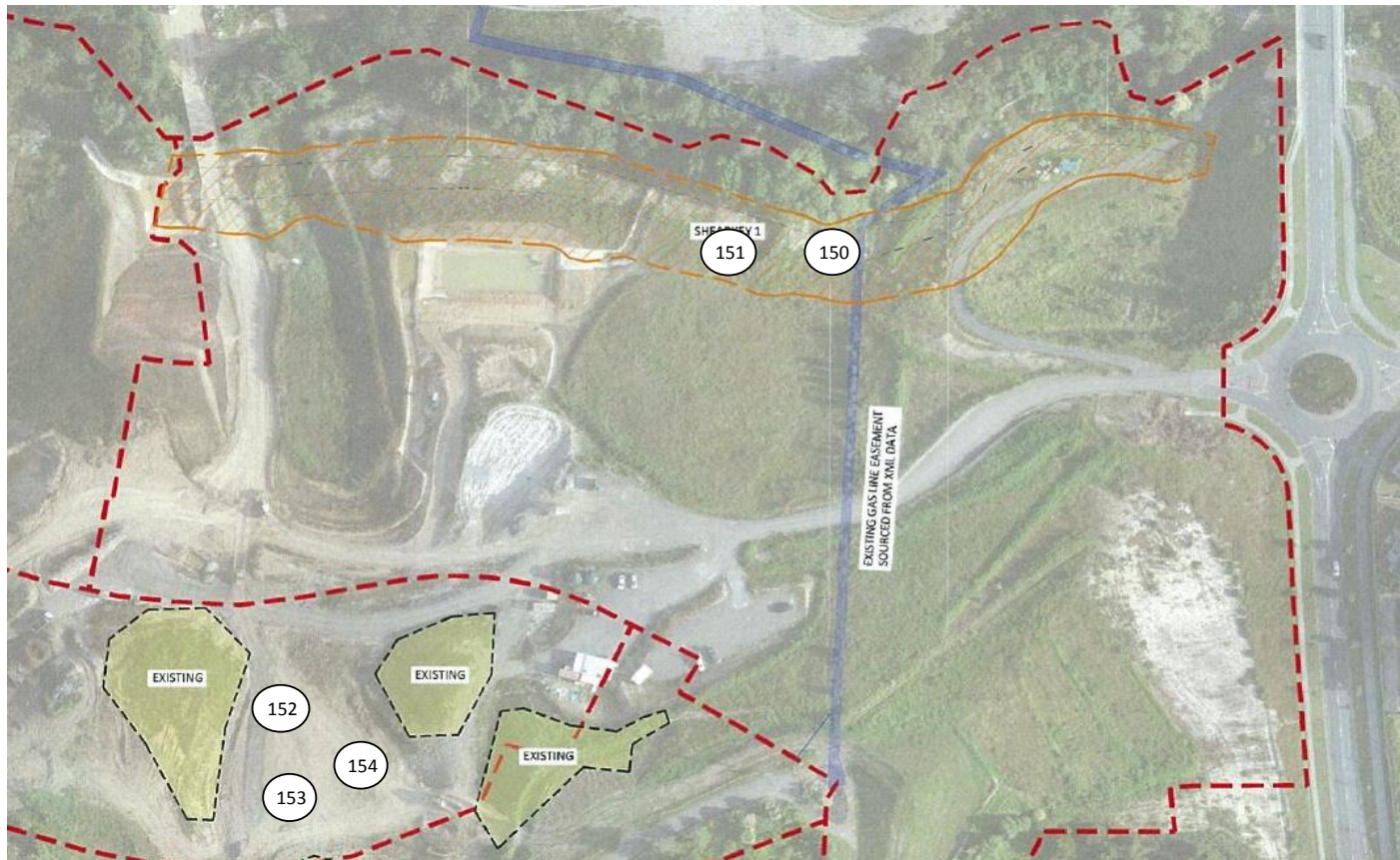
Page No: 2 of 2


Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW

Date tested: 14/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>ACCREDITED LABORATORY</p> </div> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 21/02/2020</p> </div> </div>										
Test method: Test Methods in accordance with: 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); Moisture contents and dry densities are corrected against oven dried moisture content testing.																					
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
18/02/2020	20W00350	TR	158	Fill	Silty CLAY	Refer to plan	1749239	5949032	12.34	150		UTP	UTP	202	202	1.83	30.3	1.41	2.70	5	
18/02/2020	20W00350	TR	159	Fill	Silty CLAY	Refer to plan	1749259	5949014	12.61	150		202	202	202	UTP	1.83	30.0	1.41	2.70	6	
18/02/2020	20W00350	TR	160	Fill	Silty CLAY	Refer to plan	1749285	5949017	11.10	150		162	176	182	185	1.84	30.2	1.41	2.70	5	
18/02/2020	20W00350	TR	161	Fill	Silty CLAY	Shearkey 1	1749333	5949026	4.60	150		185	182	198	173	1.74	32.7	1.31	2.70	9	
18/02/2020	20W00350	TR	162	Fill	Silty CLAY	Shearkey 1	1749317	5949027	4.75	150		162	182	173	185	1.80	32.3	1.36	2.70	6	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00350

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

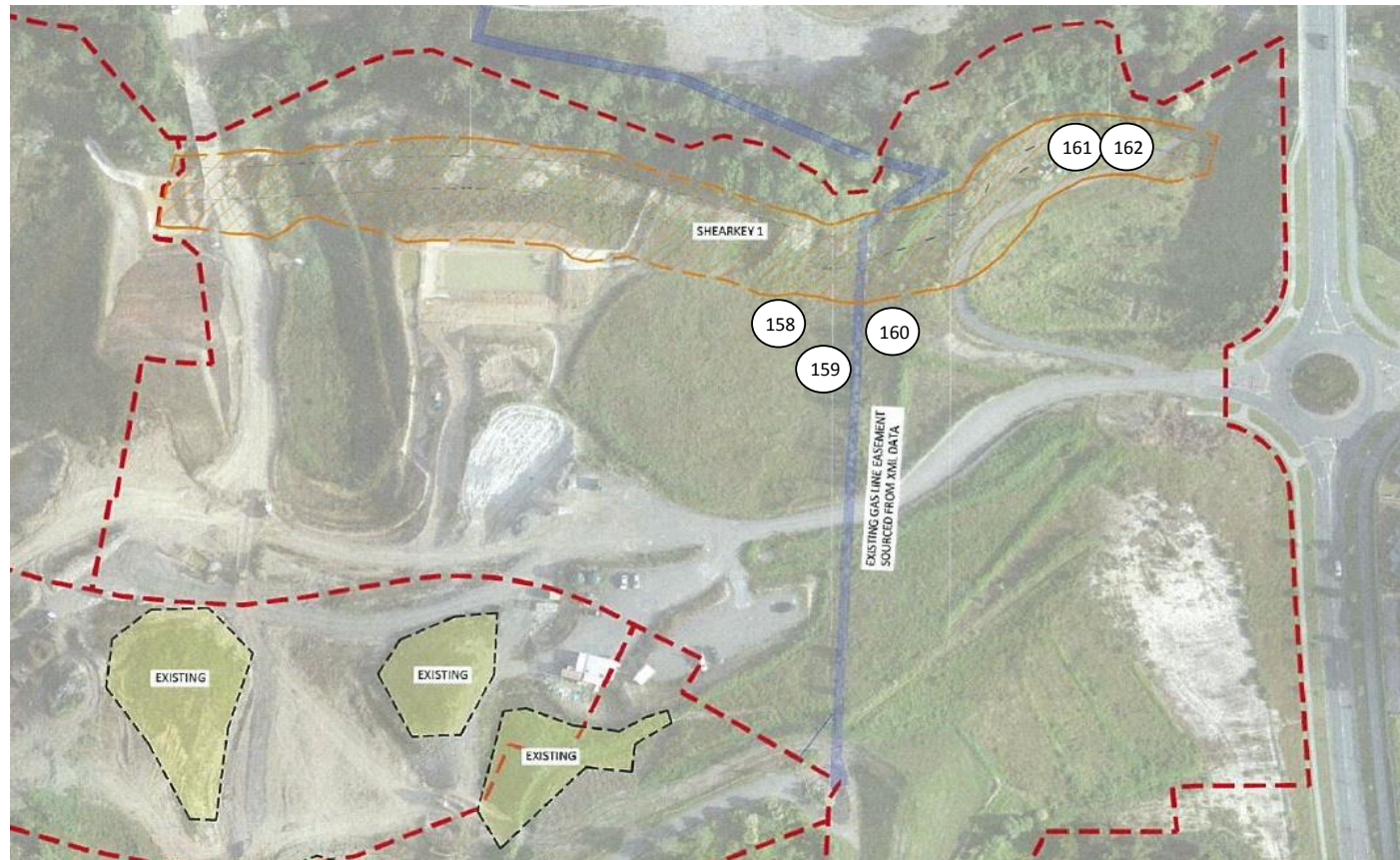
Location: As below

Tested by:

TR

Date tested:

18/02/2020



Client:

Coffey Services NZ Ltd (Auckland)

Address

PO Box 8261, Symonds Street, Auckland 1150

Attention:

Stephen Parkes

c.c.:

-

Project:

773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location:

Access off Arran Drive, Orewa

PROJECT CODE:

773-ETAM00991AA

Page:

1 of 2

IANZ

ACCREDITED LABORATORY

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

Approved Signatory:

Cesar Pura

Issue date:

2/24/2020

Test method:

Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
19/02/2020	20W00361	TR	163	Fill	Silty CLAY	Gully 1	1749179	5948827	37.20	150		155	UTP	169	UTP	1.89	24.7	1.52	2.70	6
19/02/2020	20W00361	TR	164	Fill	Silty CLAY	Gully 1	1749174	5948807	36.80	150		155	162	169	155	1.86	31.3	1.42	2.70	3
19/02/2020	20W00361	TR	165	Fill	Silty CLAY	Gully 1	1749219	5948842	37.50	150		UTP	UTP	UTP	UTP	1.86	33.4	1.39	2.70	2
19/02/2020	20W00361	TR	166	Fill	Silty CLAY	Shearkey 1	1749310	5949023	5.90	150		143	148	155	182	1.81	35.6	1.33	2.70	3
19/02/2020	20W00361	TR	167	Fill	Silty CLAY	Shearkey 1	1749320	5949018	5.70	150		148	155	147	162	1.81	33.3	1.36	2.70	5

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This report relates only to the positions tested.
IANZ Accredited Laboratory No:105
LPS-07F11 Issue date 04072016

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00361

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below



Tested by:

TR

Date tested:

19/02/20



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
25/02/2020	20W00403	TR	179	Fill	Silty CLAY	Gully 1	1749183	5948799	39.50	150		181+	181+	181+	181+	1.85	27.1	1.45	2.70	7
25/02/2020	20W00403	TR	180	Fill	Silty CLAY	Gully 1	1749156	5948809	39.80	150		169	176	179	181	1.90	30.1	1.46	2.70	2
25/02/2020	20W00403	TR	181	Fill	Silty CLAY	Shearkey 1	1749347	5949027	4.50	150		169	162	155	166	1.76	36.3	1.29	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00403

Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 25/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>									
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
26/02/2020	20W00425	TR	182	Fill	Silty CLAY	Shearkey 1	1749330	5949023	6.30	150		181+	169	142	155	1.81	36.1	1.33	2.70	3
26/02/2020	20W00425	TR	183	Fill	Silty CLAY	Shearkey 1	1749341	5949031	5.80	150		155	158	142	162	1.80	39.3	1.29	2.70	1
26/02/2020	20W00425	TR	184	Fill	Silty CLAY	Shearkey 1	1749353	5949025	5.50	150		181+	181+	162	169	1.76	45.6	1.21	2.70	0

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00425

Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 26/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>									
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
27/02/2020	20W00428	TR	185	Fill	Silty CLAY	Shearkey 1	1749336	5949032	6.80	150		UTP	181+	181+	155	1.81	33.8	1.35	2.70	4
27/02/2020	20W00428	TR	186	Fill	Silty CLAY	Shearkey 1	1749343	5949026	6.90	150		UTP	181+	181+	156	1.78	39.7	1.27	2.70	2
27/02/2020	20W00428	TR	187	Fill	Silty CLAY	Shearkey 1	1749354	5949026	6.90	150		UTP	UTP	181+	181+	1.82	31.6	1.38	2.70	5
27/02/2020	20W00428	TR	188	Fill	Gravelly CLAY	Gully 1	1749165	5948910	25.50	150		UTP	UTP	UTP	UTP	1.84	32.1	1.40	2.70	4
27/02/2020	20W00428	TR	189	Fill	Gravelly CLAY	Gully 1	1749195	5948918	25.10	150		UTP	181+	181+	169	1.86	32.7	1.40	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00428

Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below



Tested by:

TR

Date tested:

27/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>										
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
28/02/2020	20W00451	TR	190	Fill	Silty CLAY	Shearkey 1	1749325	5949023	7.60	150		181+	181+	181+	181+	1.79	41.4	1.27	2.70	1
28/02/2020	20W00451	TR	191	Fill	Silty CLAY	Shearkey 1	1749341	5949022	8.10	150		155	170	181+	181+	1.75	46.2	1.20	2.70	0
28/02/2020	20W00451	TR	192	Fill	Silty CLAY	Shearkey 1	1749356	5949032	8.40	150		170	162	181+	181+	1.78	36.1	1.30	2.70	5
28/02/2020	20W00451	TR	193	Fill	Gravelly CLAY	Gully 1	1749183	5948908	27.70	150		UTP	181+	181+	181+	1.80	31.3	1.37	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00451

Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 28/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
2/03/2020	20W00469	TR	194	Fill	Silty CLAY	Gully 1	1749213	5948920	26.00	150		UTP	UTP	UTP	169	1.91	29.2	1.48	2.70	2
2/03/2020	20W00469	TR	195	Fill	Silty CLAY	Gully 1	1749190	5948895	26.30	150		UTP	UTP	UTP	UTP	1.91	24.3	1.53	2.70	6
2/03/2020	20W00469	TR	196	Fill	Silty CLAY	Gully 1	1749170	5948905	26.90	150		UTP	UTP	UTP	UTP	1.98	25.4	1.58	2.70	2
2/03/2020	20W00469	TR	197	Fill	Gravelly CLAY	Shearkey 1	1749355	5949018	9.80	150		UTP	181+	148	155	1.87	32.3	1.41	2.70	2
2/03/2020	20W00469	TR	198	Fill	Gravelly CLAY	Shearkey 1	1749319	5949005	9.80	150		181+	155	UTP	UTP	1.86	27.9	1.45	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00469

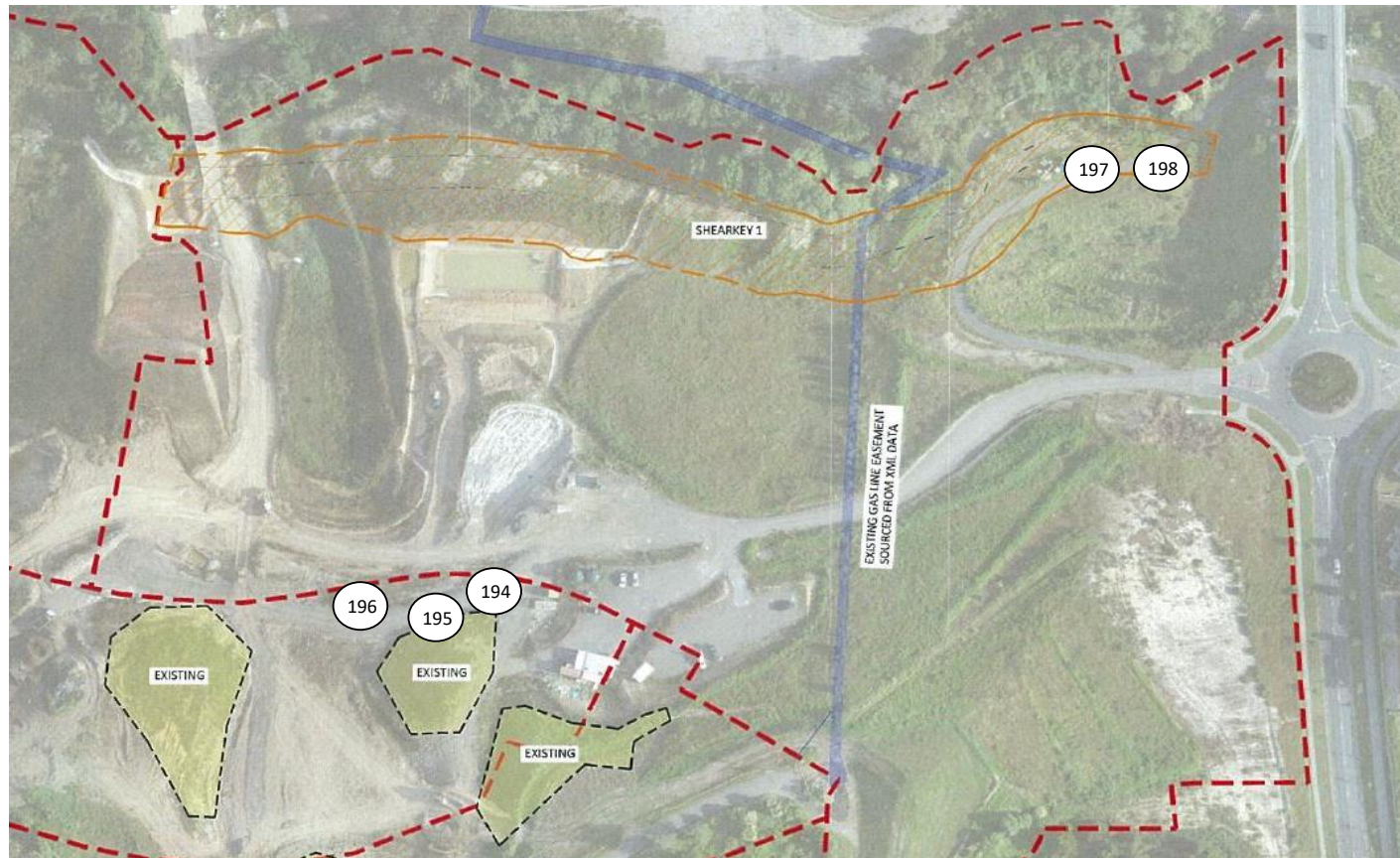
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 28/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
3/03/2020	20W00471	TR	199	Fill	Silty CLAY	Gully 1	1749203	5948910	26.40	150		181+	181+	181+	142	1.88	31.4	1.43	2.70	2
3/03/2020	20W00471	TR	200	Fill	Silty CLAY	Gully 1	1749198	5948894	26.40	150		181+	181+	148	155	1.85	30.8	1.41	2.70	4
3/03/2020	20W00471	TR	201	Fill	Silty CLAY	Gully 1	1749176	5948900	2.70	150		181+	181+	181+	UTP	1.86	32.6	1.41	2.70	2
3/03/2020	20W00471	TR	202	Fill	Gravelly CLAY	Shearkey 1	1749311	5949009	12.90	150		UTP	UTP	UTP	UTP	1.85	24.1	1.49	2.70	9
3/03/2020	20W00471	TR	203	Fill	Silty CLAY	Shearkey 1	1749331	5949012	10.90	150		181+	181+	UTP	UTP	1.88	28.5	1.46	2.70	4

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00471

Page No: 2 of 2


Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 3/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  All tests reported herein have been performed in accordance with the laboratory's scope of accreditation <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 20/03/2020 </div>
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Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
5/03/2020	20W00495	TR	206	Fill	Silty CLAY	Shearkey 1	1749331	5949010	11.30	150		148	148	154	155	1.84	36.2	1.35	2.70	1
5/03/2020	20W00495	TR	207	Fill	Silty CLAY	Shearkey 1	1749340	5949022	10.90	150		181+	181+	181+	181+	1.80	36.9	1.31	2.70	3
5/03/2020	20W00495	TR	208	Fill	Silty CLAY	Gully 1	1749192	5948879	27.90	150		181+	181+	181+	181+	1.89	32.3	1.43	2.70	1
5/03/2020	20W00495	TR	209	Fill	Gravelly CLAY	Gully 1	1749232	5948908	26.90	150		UTP	181+	181+	181+	1.95	26.8	1.54	2.70	2

SITE PLAN

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Project No: 773-ETAM00991AA

Work Order No: ETAM20W00495

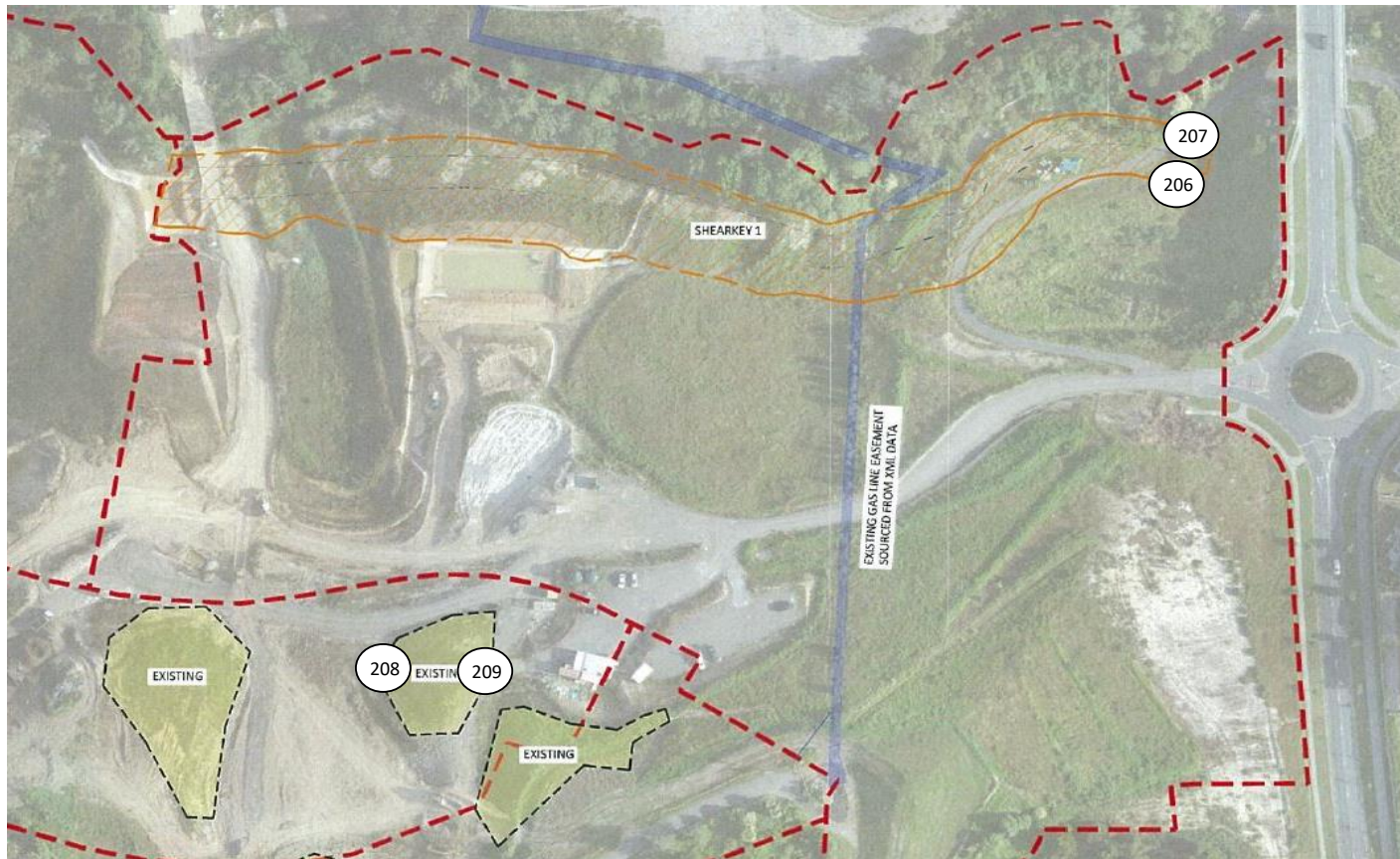
Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 5/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 20/03/2020 </div> </div>										
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
6/03/2020	20W00496	LW	210	Fill	Clayey SILT	Behind Wall 700	1749311	5949004	12.05	150		UTP	UTP	UTP	UTP	1.89	24.1	1.52	2.70	7
6/03/2020	20W00496	LW	211	Fill	Clayey SILT	Behind Wall 700	1749328	5949002	11.99	150		UTP	UTP	UTP	UTP	1.89	22.8	1.54	2.70	8
6/03/2020	20W00496	LW	212	Fill	Clayey SILT	Behind Wall 700	1749328	5949008	12.05	150		UTP	UTP	UTP	UTP	1.90	29.0	1.47	2.70	3
6/03/2020	20W00496	LW	213	Fill	Clayey SILT	General Fill	1749221	5948909	27.30	150		UTP	UTP	UTP	UTP	1.85	27.6	1.45	2.70	7
6/03/2020	20W00496	LW	214	Fill	Clayey SILT	General Fill	1749180	5948886	28.10	150		UTP	UTP	UTP	UTP	1.89	28.2	1.47	2.70	4

SITE PLAN

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Project No: 773-ETAM00991AA

Work Order No: ETAM20W00496

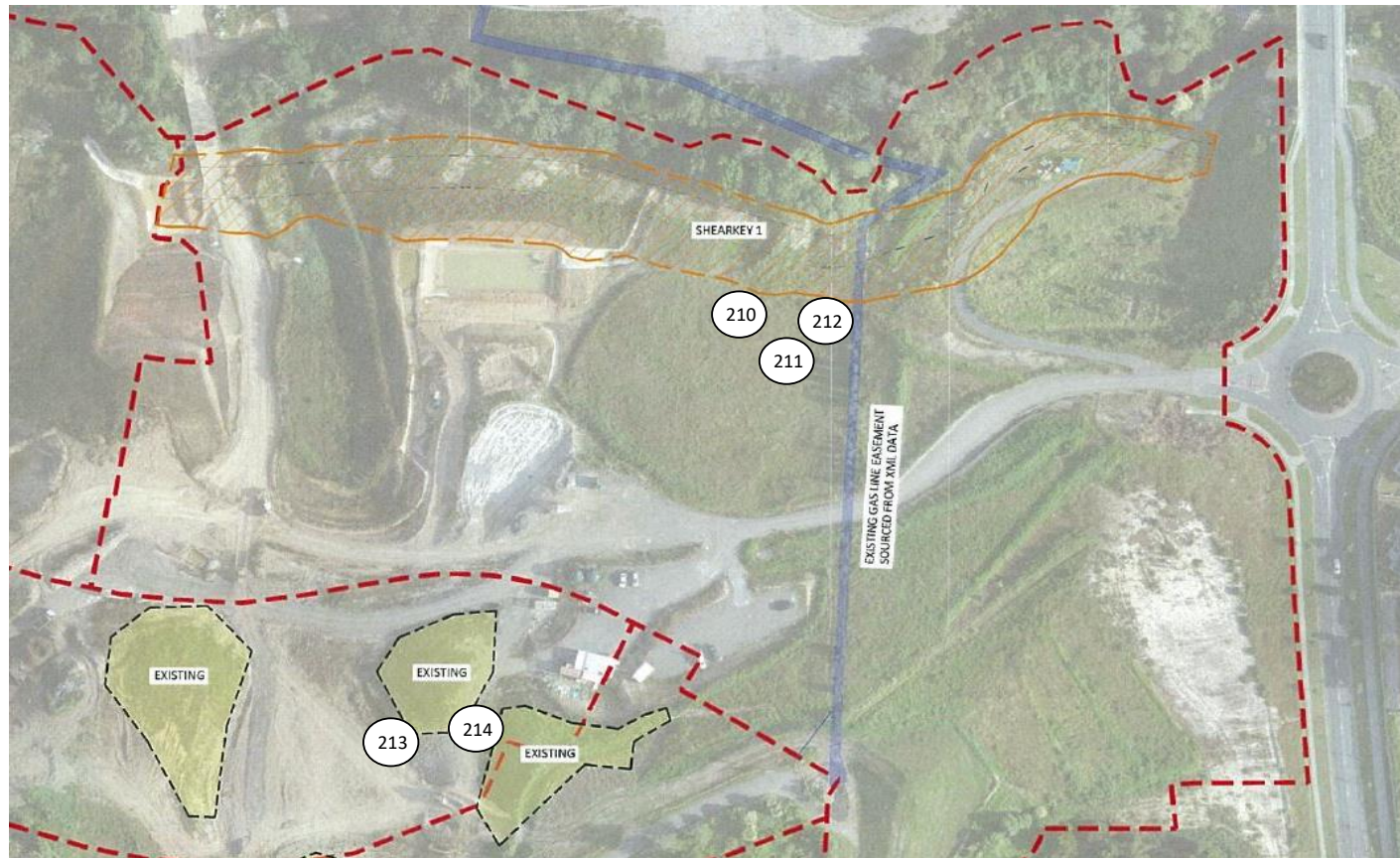
Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW

Date tested: 6/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 20/03/2020 </div> </div>										
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
9/03/2020	20W00517	TR	215	Fill	Silty CLAY	Gully 1	1749196	5948888	27.60	150		181+	181+	181+	181+	1.85	31.8	1.41	2.70	3	
9/03/2020	20W00517	TR	216	Fill	Silty CLAY	Gully 1	1749228	5948912	28.30	150		UTP	UTP	UTP	UTP	1.84	27.3	1.44	2.70	7	
9/03/2020	20W00517	TR	217	Fill	Silty CLAY	Refer to plan	1749271	5948983	13.00	150		UTP	UTP	UTP	UTP	1.78	27.8	1.39	2.70	10	
9/03/2020	20W00517	TR	218	Fill	Silty CLAY	Refer to plan	1749288	5948979	12.61	150		181+	181+	181+	181+	1.84	33.3	1.38	2.70	3	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00517

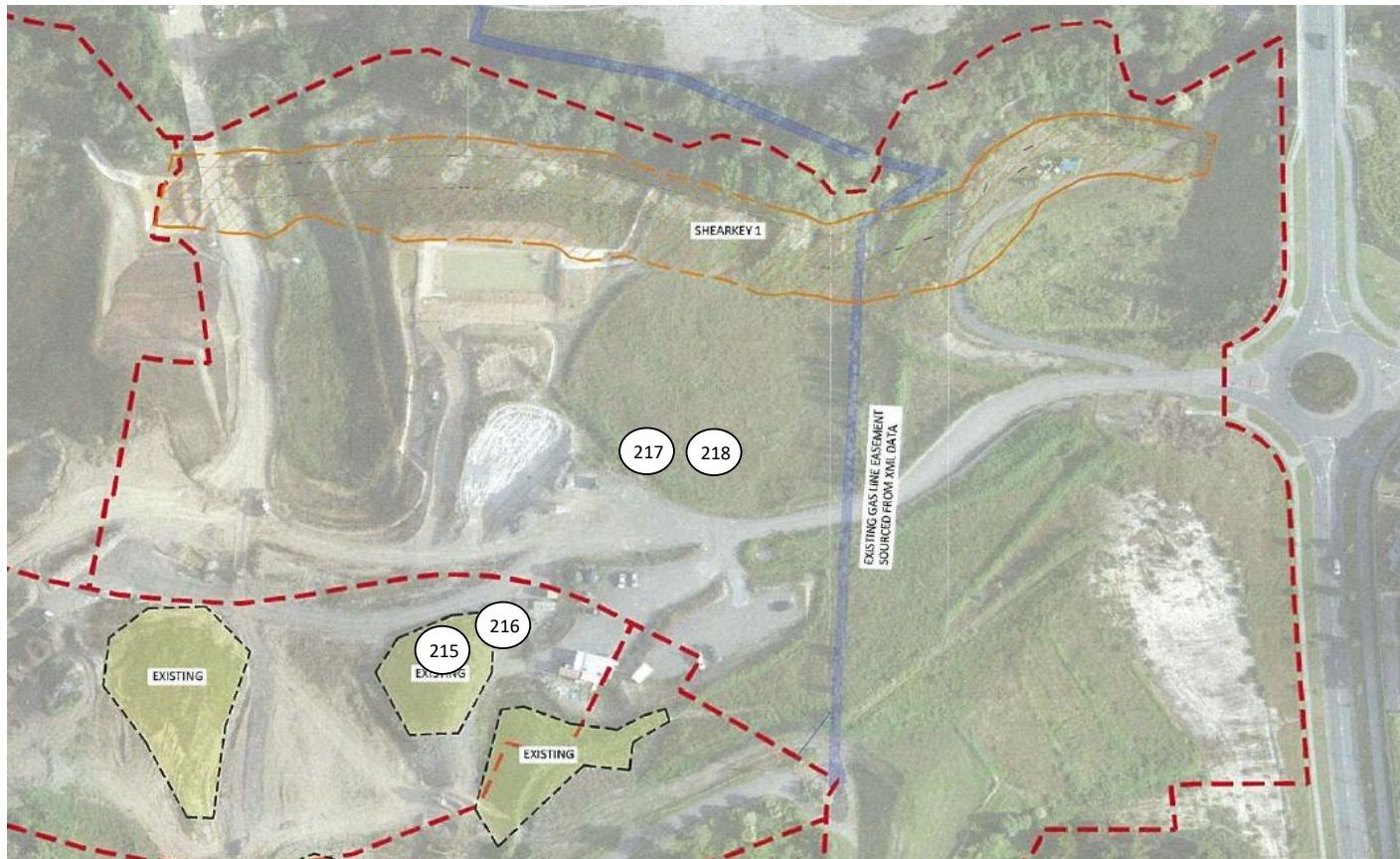
Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 9/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 20/03/2020 </div> </div>										
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
10/03/2020	20W00532	TR	219	Fill	Silty CLAY	Gully 1	1749185	5948896	28.80	150		181+	181+	181+	181+	1.86	29.5	1.44	2.70	4
10/03/2020	20W00532	TR	220	Fill	Silty CLAY	Gully 1	1749203	5948884	28.50	150		181+	181+	172	144	1.85	31.1	1.41	2.70	4
10/03/2020	20W00532	TR	221	Fill	Silty CLAY	Refer to plan	1749298	5948986	12.50	150		181+	181+	181+	181+	1.74	32.8	1.31	2.70	9

SITE PLAN

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Project No: 773-ETAM00991AA

Work Order No: ETAM20W00532

Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 10/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 20/03/2020 </div> </div>										
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
11/03/2020	20W00549	TR	222	Fill	Silty CLAY	Gully 1	1749199	5948906	29.10	150		169	170	155	162	1.91	33.5	1.43	2.70	0
11/03/2020	20W00549	TR	223	Fill	Silty CLAY	Gully 1	1749218	5948905	28.80	150		UTP	UTP	181	181	1.87	31.2	1.43	2.70	3
11/03/2020	20W00549	TR	224	Fill	Silty CLAY	Refer to plan	1749382	5948941	18.50	150		181+	181+	UTP	169	1.75	40.8	1.24	2.70	3

SITE PLAN

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Project No: 773-ETAM00991AA

Work Order No: ETAM20W00549

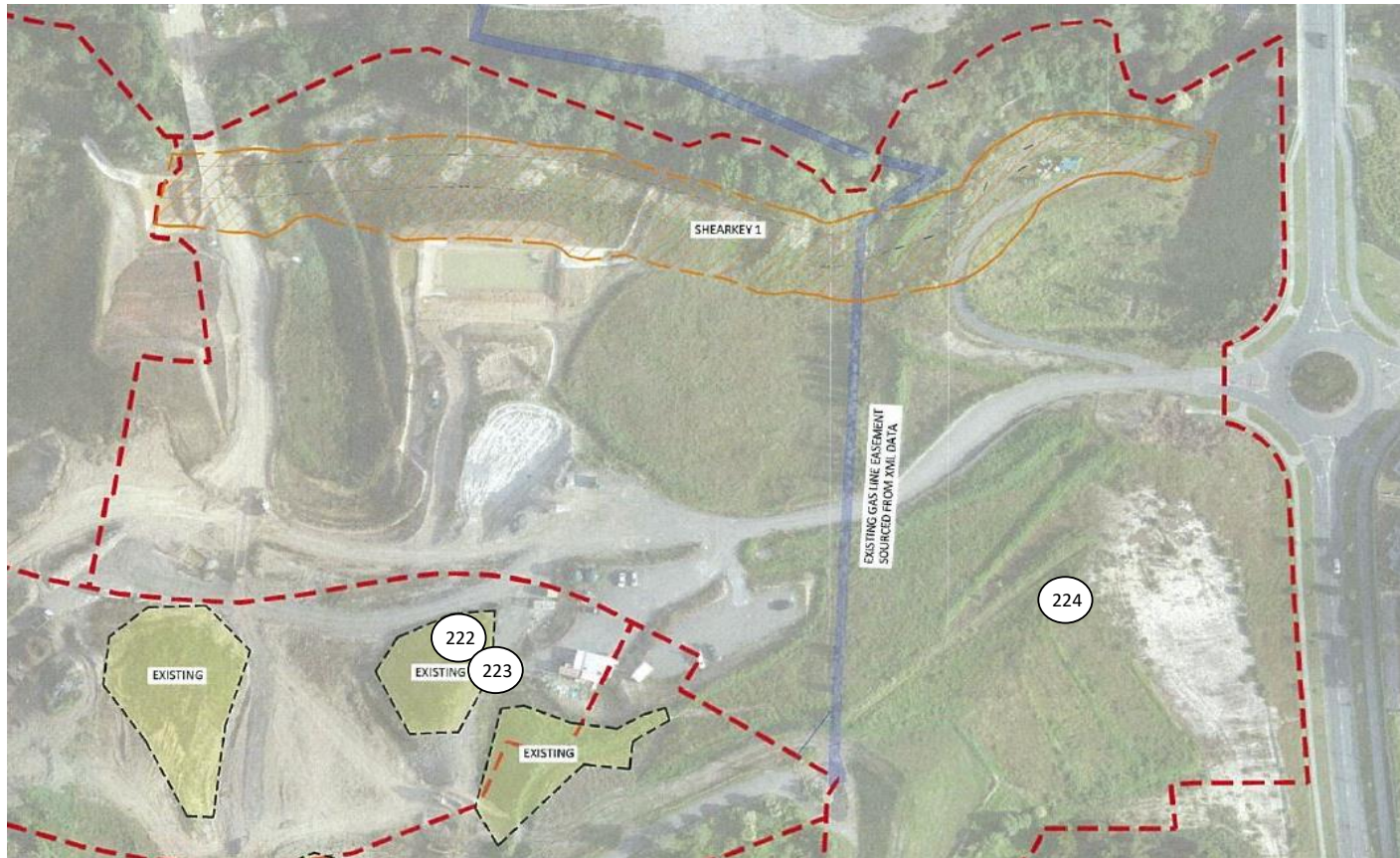
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 11/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 23/03/2020</p> </div> </div>										
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
12/03/2020	20W00562	TR	225	Fill	Silty CLAY	Gully 1	1749197	5948887	29.30	150		181+	181+	169	155	1.84	33.2	1.38	2.70	3
12/03/2020	20W00562	TR	226	Fill	Silty CLAY	Gully 1	1749196	5948902	29.40	150		148	169	155	181+	1.90	25.6	1.51	2.70	5
12/03/2020	20W00562	TR	227	Fill	Silty CLAY	Gully 1	1749175	5948893	29.60	150		UTP	UTP	181+	181+	1.86	36.6	1.36	2.70	0
12/03/2020	20W00562	TR	228	Fill	Silty CLAY	Undercut 5	1749249	5948992	12.60	150		148	155	170	175	1.82	33.2	1.36	2.70	4
12/03/2020	20W00562	TR	229	Fill	Silty CLAY	Undercut 5	1749205	5948998	13.40	150		UTP	UTP	181+	181+	1.84	32.7	1.39	2.70	3
12/03/2020	20W00562	TR	230	Fill	Gravelly CLAY	Wall 306	1749382	5948937	19.12	150		UTP	UTP	UTP	UTP	1.77	29.8	1.37	2.70	9
12/03/2020	20W00562	TR	231	Fill	Gravelly CLAY	Wall 306	1749386	5948908	19.65	150		UTP	UTP	181+	181+	1.76	37.2	1.28	2.70	5

SITE PLAN

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Project No: 773-ETAM00991AA

Work Order No: ETAM20W00562

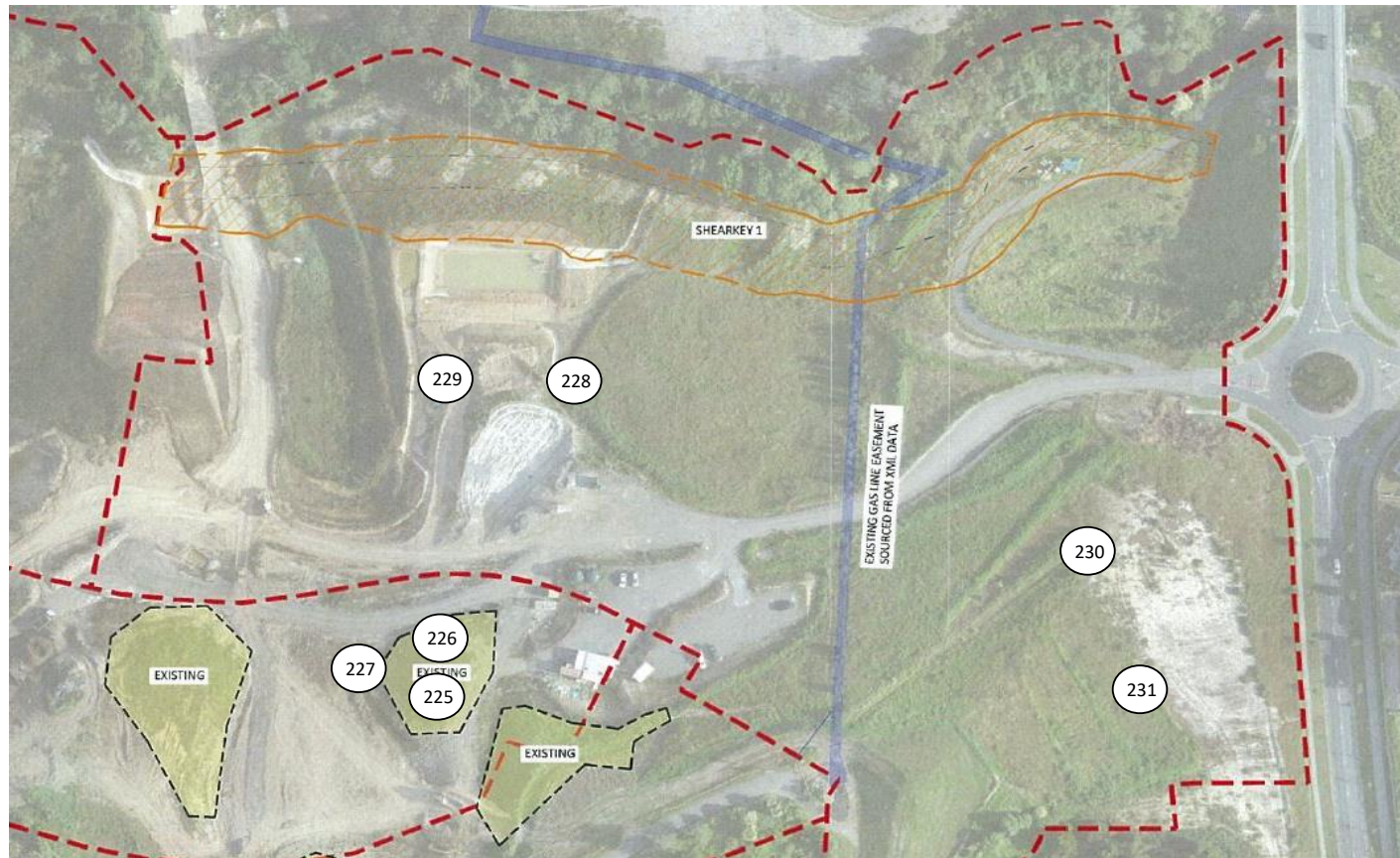
Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 12/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ <small>ACCREDITED LABORATORY</small> </div> <div style="font-size: small;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 23/03/2020 </div> </div>																																																																																																																											
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<table border="1" style="width:100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr style="background-color: #e6f2ff;"> <th>Date</th> <th>Work Order No: ETAM...</th> <th>Tested by</th> <th>Test No.</th> <th>Layer</th> <th>Material tested</th> <th>Location</th> <th>Easting</th> <th>Northing</th> <th>RL(m)</th> <th>Probe Test Depth (mm)</th> <th>Comments</th> <th colspan="4">Field Shear Strength in kPa <small>UTP = Unable to penetrate</small></th> <th>Wet Density (T/m³)</th> <th>Oven Water Content (%)</th> <th>Dry Density (T/m³)</th> <th>Solid Density (T/m³) <small>Assumed</small></th> <th>Air Voids (%)</th> </tr> </thead> <tbody> <tr> <td>13/03/2020</td> <td>20W00570</td> <td>MP</td> <td>232</td> <td>Fill</td> <td>Silty CLAY</td> <td>Wall 306</td> <td>391586</td> <td>831736</td> <td>21.27</td> <td>150</td> <td></td> <td>157</td> <td>UTP</td> <td>120</td> <td>171</td> <td>1.73</td> <td>41.4</td> <td>1.22</td> <td>2.70</td> <td>4</td> </tr> <tr> <td>13/03/2020</td> <td>20W00570</td> <td>MP</td> <td>233</td> <td>Fill</td> <td>Silty CLAY</td> <td>Wall 306</td> <td>391572</td> <td>831752</td> <td>21.38</td> <td>150</td> <td></td> <td>UTP</td> <td>UTP</td> <td>UTP</td> <td>163</td> <td>1.77</td> <td>41.3</td> <td>1.25</td> <td>2.70</td> <td>2</td> </tr> <tr> <td>13/03/2020</td> <td>20W00570</td> <td>MP</td> <td>234</td> <td>Fill</td> <td>Silty CLAY</td> <td>Undercut 5</td> <td>391423</td> <td>831826</td> <td>13.90</td> <td>150</td> <td></td> <td>UTP</td> <td>UTP</td> <td>UTP</td> <td>UTP</td> <td>1.90</td> <td>24.9</td> <td>1.52</td> <td>2.70</td> <td>6</td> </tr> <tr> <td>13/03/2020</td> <td>20W00570</td> <td>MP</td> <td>235</td> <td>Fill</td> <td>Silty CLAY</td> <td>Undercut 5</td> <td>391384</td> <td>831825</td> <td>14.80</td> <td>150</td> <td></td> <td>UTP</td> <td>UTP</td> <td>UTP</td> <td>UTP</td> <td>1.93</td> <td>24.0</td> <td>1.55</td> <td>2.70</td> <td>5</td> </tr> </tbody> </table>																				Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)	13/03/2020	20W00570	MP	232	Fill	Silty CLAY	Wall 306	391586	831736	21.27	150		157	UTP	120	171	1.73	41.4	1.22	2.70	4	13/03/2020	20W00570	MP	233	Fill	Silty CLAY	Wall 306	391572	831752	21.38	150		UTP	UTP	UTP	163	1.77	41.3	1.25	2.70	2	13/03/2020	20W00570	MP	234	Fill	Silty CLAY	Undercut 5	391423	831826	13.90	150		UTP	UTP	UTP	UTP	1.90	24.9	1.52	2.70	6	13/03/2020	20W00570	MP	235	Fill	Silty CLAY	Undercut 5	391384	831825	14.80	150		UTP	UTP	UTP	UTP	1.93	24.0	1.55	2.70	5
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)																																																																																																								
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SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00570

Page No: 2 of 2



Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP

Date tested: 13/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: 1 of 1 <div style="display: flex; align-items: center; justify-content: space-between; padding-top: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: center;">  <p>Approved Signatory: Joanna Jones Issue date: 26/05/2020</p> </div> </div>																																																																																									
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<table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #d9e1f2;"> <th>Date</th> <th>Work Order No: ETAM...</th> <th>Tested by</th> <th>Test No.</th> <th>Layer</th> <th>Material tested</th> <th>Location</th> <th>Chainage (m)</th> <th>Offset (m)</th> <th>Easting</th> <th>Northing</th> <th>RL(m)</th> <th>Probe Test Depth (mm)</th> <th>Comments</th> <th colspan="4">Field Shear Strength in kPa UTP = Unable to penetrate</th> <th>Wet Density (T/m³)</th> <th>Oven Water Content (%)</th> <th>Dry Density (T/m³)</th> <th>Solid Density (T/m³) Assumed</th> <th>Air Voids (%)</th> </tr> </thead> <tbody> <tr> <td>21/05/2020</td> <td>20W00804</td> <td>LW</td> <td>261</td> <td>Fill</td> <td>Clayey SILT</td> <td>Shear Key 1</td> <td>150</td> <td></td> <td>1749304</td> <td>5949026</td> <td>6.56</td> <td>150</td> <td></td> <td>157</td> <td>163</td> <td>144</td> <td>148</td> <td>1.87</td> <td>32.2</td> <td>1.41</td> <td>2.70</td> <td>2</td> </tr> <tr> <td>21/05/2020</td> <td>20W00804</td> <td>LW</td> <td>262</td> <td>Fill</td> <td>Clayey SILT</td> <td>Shear Key 1</td> <td>150</td> <td></td> <td>1749288</td> <td>5949032</td> <td>6.54</td> <td>150</td> <td></td> <td>174</td> <td>166</td> <td>183+</td> <td>183+</td> <td>1.88</td> <td>29.6</td> <td>1.45</td> <td>2.70</td> <td>3</td> </tr> </tbody> </table>																						Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Chainage (m)	Offset (m)	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	21/05/2020	20W00804	LW	261	Fill	Clayey SILT	Shear Key 1	150		1749304	5949026	6.56	150		157	163	144	148	1.87	32.2	1.41	2.70	2	21/05/2020	20W00804	LW	262	Fill	Clayey SILT	Shear Key 1	150		1749288	5949032	6.54	150		174	166	183+	183+	1.88	29.6	1.45	2.70	3
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Chainage (m)	Offset (m)	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)																																																																				
21/05/2020	20W00804	LW	261	Fill	Clayey SILT	Shear Key 1	150		1749304	5949026	6.56	150		157	163	144	148	1.87	32.2	1.41	2.70	2																																																																				
21/05/2020	20W00804	LW	262	Fill	Clayey SILT	Shear Key 1	150		1749288	5949032	6.54	150		174	166	183+	183+	1.88	29.6	1.45	2.70	3																																																																				

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00804

Page No: 2 of 2



Project: 8

Location: As below

Tested by: LW

Date tested: 21/05/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>ACCREDITED LABORATORY</p> </div> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 3/06/2020</p> </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
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22/05/2020	20W00820	LW	263	Fill	Clayey SILT	Shear Key 1	1749300	5949027	7.02	150		UTP	UTP	UTP	UTP	1.89	29.9	1.46	2.70	2
22/05/2020	20W00820	LW	264	Fill	Clayey SILT	Shear Key 1	1749288	5949032	7.09	150		UTP	UTP	UTP	UTP	1.85	29.5	1.43	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00820

Page No: 2 of 2



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

Location: As below

Tested by: LW

Date tested: 22/05/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 19/06/2020 </div> </div>										
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
17/06/2020	20W01017	MA	265	Fill	CLAY	Wall 306	391631.9	831716.0	23.40	150	GPS Coordinates supplied by Contractor - MA	150	145	175	159	1.84	34.3	1.37	2.70	2
17/06/2020	20W01017	MA	266	Fill	CLAY	Wall 306	391595.3	831736.2	21.95	150		UTP	UTP	UTP	UTP	1.78	33.2	1.34	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01017

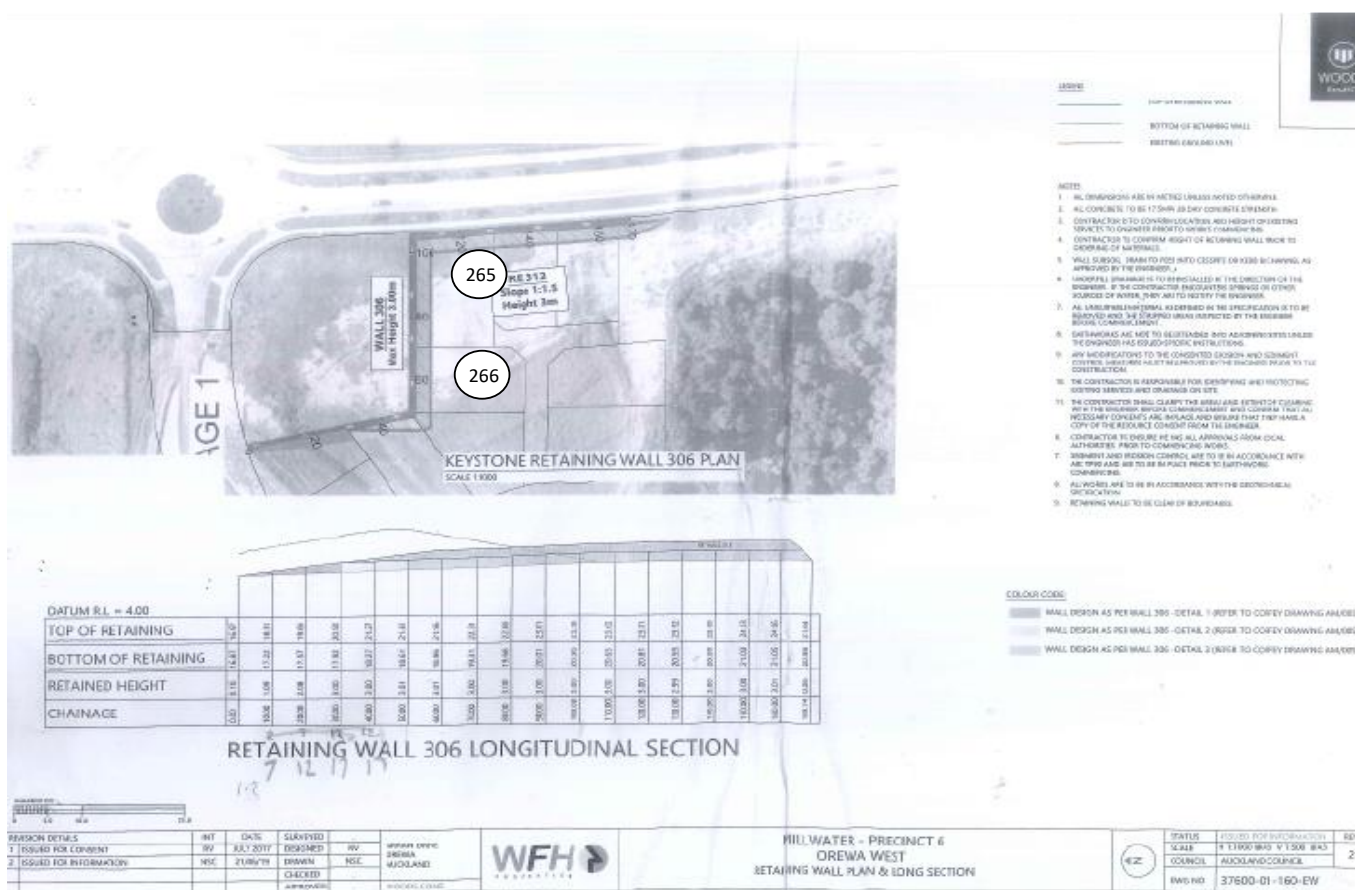
Page No: 2 of 2

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


Location: As below

Tested by: MA

Date tested: 17/06/2020





Client:	Coffey Services NZ Ltd (Auckland)	PROJECT CODE:	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes	<div><div>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</div><div>Approved Signatory: Cesar Pura</div><div>Issue date: 2/11/2020</div></div>	
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
30/10/2020	20W01670	LW	269	Fill	Clayey SILT	Pond 5 Western Wall	1749026	5948991	20.85	150		144	161	UTP	UTP	1.85	29.8	1.43	2.70	5
30/10/2020	20W01670	LW	270	Fill	Clayey SILT	Pond 5 Western Wall	1749018	5948982	20.85	150		UTP	177+	177+	167	1.87	31.0	1.42	2.70	3

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NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01670

Page No: 2 of 2


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

Location: Pond 5

Tested by: LW

Date tested: 30/10/2020



Client: Coffey Services NZ Ltd (Auckland)										PROJECT CODE: 773-ETAM00991AA										
Address PO Box 8261, Symonds Street, Auckland 1150										Page: 1 of 2										
Attention: Stephen Parkes										<div><div>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</div><div>Approved Signatory: Cesar Pura</div><div>Issue date: 2/11/2020</div></div>										
c.c: -																				
Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6																				
Location: Access off Arran Drive, Orewa																				
Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
31/10/2020	20W01671	LW	271	Fill	Silty CLAY	Pond 5 Western Wall	1749024	5948995	21.10	150		170	170	170	170	1.83	28.6	1.42	2.70	7
31/10/2020	20W01671	LW	272	Fill	Silty CLAY	Pond 5 Western Wall	1749026	5948977	21.30	150		170	170	170	170	1.88	28.6	1.46	2.70	4

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01671

Page No: 2 of 2

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


Location: Pond 5

Tested by: SC

Date tested: 31/10/2020





Client:	Coffey Services NZ Ltd (Auckland)	PROJECT CODE:	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes	<div><div>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</div><div>Approved Signatory: Cesar Pura</div><div>Issue date: 5/11/2020</div></div>	
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
												UTP = Unable to penetrate								
3/11/2020	20W01694	LW	273	Fill	Clayey SILT	Pond 5 Western Wall	1749028	5948970	-	150	At Finished Level	UTP	UTP	177+	177+	1.88	33.1	1.41	2.70	1
3/11/2020	20W01694	LW	274	Fill	Clayey SILT	Pond 5 Western Wall	1749025	5948984	-	150	At Finished Level	140	164	150	177+	1.87	36.7	1.37	2.70	0
3/11/2020	20W01694	LW	275	Fill	Clayey SILT	Gully 1, RW 302	1749158	5948873	-	150		UTP	UTP	UTP	UTP	1.85	29.8	1.43	2.70	5
3/11/2020	20W01694	LW	276	Fill	Clayey SILT	Gully 1, RW 302	1749138	5948846	-	150		UTP	UTP	UTP	UTP	1.91	33.8	1.43	2.70	0
3/11/2020	20W01694	LW	277	Fill	Clayey SILT	Gully 1, RW 302	1749196	5948865	-	150		UTP	UTP	UTP	177+	1.92	41.5	1.36	2.70	0


NOT TO SCALE

Page No: 2 of 2

Date tested: 3/11/2020





Client:	Coffey Services (NZ) Limited (Auckland)	PROJECT CODE:	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes	<div><div>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</div><div>Approved Signatory: Cesar Pura</div><div>Issue date: 23/11/2020</div></div>	
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m³)	Oven Water Content (%)	Dry Density (T/m³)	Solid Density (T/m³) Assumed	Air Voids (%)
												UTP = Unable to penetrate								
20/11/2020	20W01795	LW	284	Fill	Clayey SILT	Refer to plan	1749118	5948998	16.78	150		147	164	151	177+	1.87	36.9	1.37	2.70	0
20/11/2020	20W01795	LW	285	Fill	Clayey SILT	Refer to plan	1749146	5949010	15.88	150		140	147	161	171	1.86	33.1	1.40	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01795

Page No: 2 of 2

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


Location: As below

Tested by: LW

Date tested: 20/11/2020





Client:	Coffey Services (NZ) Limited (Auckland)	PROJECT CODE:	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes	<div><div>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</div></div> <div><div>Approved Signatory:</div><div>Cesar Pura</div></div> <div><div>Issue date:</div><div>25/11/2020</div></div>	
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
												UTP = Unable to penetrate								
23/11/2020	20W01810	LW	286	Fill	Clayey SILT	Refer to plan	1749170	5949015	16.08	150		UTP	UTP	UTP	UTP	1.91	29.0	1.48	2.70	2
23/11/2020	20W01810	LW	287	Fill	Clayey SILT	Refer to plan	1749148	5949011	16.38	150		UTP	UTP	UTP	UTP	1.87	27.5	1.47	2.70	5
23/11/2020	20W01810	LW	288	Fill	Clayey SILT	Refer to plan	1749127	5948997	16.98	150		UTP	UTP	UTP	UTP	1.87	25.9	1.48	2.70	7

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01810

Page No: 2 of 2



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

Location: As below

Tested by: LW

Date tested: 23/11/2020



Client: Coffey Services (NZ) Limited (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="text-align: center;">  <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: James McKelvey Issue date: 4/12/2020 </div>
---	--

Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
2/12/2020	20W01858	LW	289	Fill	Clayey SILT	Refer to plan	1749079	5949055	-	150	Shear key	158+	158+	144	140	1.88	31.0	1.43	2.70	2
2/12/2020	20W01858	LW	290	Fill	Clayey SILT	Refer to plan	1749076	5949065	-	150	Shear key	140	149	144	158	1.89	31.0	1.44	2.70	2
2/12/2020	20W01858	LW	291	Fill	Clayey SILT	Refer to plan	1749286	5949027	7.80	150	Retaining Wall 700	UTP	UTP	UTP	UTP	1.90	28.8	1.48	2.70	3
2/12/2020	20W01858	LW	292	Fill	Clayey SILT	Refer to plan	1749257	5949039	7.80	150	Retaining Wall 700	UTP	UTP	UTP	UTP	1.91	30.8	1.46	2.70	1

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01858

Page No: 2 of 2

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

Location: As below



Tested by:

LW

Date tested:

2/12/2020



Client: Coffey Services (NZ) Limited (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="text-align: center;">  <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: James McKelvey Issue date: 7/12/2020 </div>																																																																																																																															
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<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #e6f2ff;"> <th rowspan="2">Date</th> <th rowspan="2">Work Order No: ETAM...</th> <th rowspan="2">Tested by</th> <th rowspan="2">Test No.</th> <th rowspan="2">Layer</th> <th rowspan="2">Material tested</th> <th rowspan="2">Location</th> <th rowspan="2">Easting</th> <th rowspan="2">Northing</th> <th rowspan="2">RL(m)</th> <th rowspan="2">Probe Test Depth (mm)</th> <th rowspan="2">Comments</th> <th colspan="4">Field Shear Strength in kPa</th> <th rowspan="2">Wet Density (T/m³)</th> <th rowspan="2">Oven Water Content (%)</th> <th rowspan="2">Dry Density (T/m³)</th> <th rowspan="2">Solid Density (T/m³) Assumed</th> <th rowspan="2">Air Voids (%)</th> </tr> <tr style="background-color: #e6f2ff;"> <th colspan="4">UTP = Unable to penetrate</th> </tr> </thead> <tbody> <tr> <td>4/12/2020</td> <td>20W01867</td> <td>SC</td> <td>295</td> <td>Fill</td> <td>Clayey SILT</td> <td>Refer to plan</td> <td>1749077</td> <td>5949050</td> <td>-</td> <td>150</td> <td>Shear key</td> <td>153</td> <td>153</td> <td>153</td> <td>153</td> <td>1.84</td> <td>29.8</td> <td>1.42</td> <td>2.70</td> <td>5</td> </tr> <tr> <td>4/12/2020</td> <td>20W01867</td> <td>SC</td> <td>296</td> <td>Fill</td> <td>Clayey SILT</td> <td>Refer to plan</td> <td>1749090</td> <td>5949054</td> <td>-</td> <td>150</td> <td>Shear key</td> <td>153</td> <td>153</td> <td>153</td> <td>143</td> <td>1.88</td> <td>31.1</td> <td>1.43</td> <td>2.70</td> <td>2</td> </tr> <tr> <td>4/12/2020</td> <td>20W01867</td> <td>SC</td> <td>297</td> <td>Fill</td> <td>Clayey SILT</td> <td>Refer to plan</td> <td>1749182</td> <td>5948965</td> <td>-</td> <td>150</td> <td></td> <td>170</td> <td>170</td> <td>170</td> <td>170</td> <td>1.89</td> <td>31.4</td> <td>1.43</td> <td>2.70</td> <td>2</td> </tr> <tr> <td>4/12/2020</td> <td>20W01867</td> <td>SC</td> <td>298</td> <td>Fill</td> <td>Clayey SILT</td> <td>Refer to plan</td> <td>1749174</td> <td>5948951</td> <td>-</td> <td>150</td> <td></td> <td>170</td> <td>170</td> <td>170</td> <td>170</td> <td>1.87</td> <td>29.6</td> <td>1.44</td> <td>2.70</td> <td>4</td> </tr> </tbody> </table>																				Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	UTP = Unable to penetrate				4/12/2020	20W01867	SC	295	Fill	Clayey SILT	Refer to plan	1749077	5949050	-	150	Shear key	153	153	153	153	1.84	29.8	1.42	2.70	5	4/12/2020	20W01867	SC	296	Fill	Clayey SILT	Refer to plan	1749090	5949054	-	150	Shear key	153	153	153	143	1.88	31.1	1.43	2.70	2	4/12/2020	20W01867	SC	297	Fill	Clayey SILT	Refer to plan	1749182	5948965	-	150		170	170	170	170	1.89	31.4	1.43	2.70	2	4/12/2020	20W01867	SC	298	Fill	Clayey SILT	Refer to plan	1749174	5948951	-	150		170	170	170	170	1.87	29.6	1.44	2.70	4
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed													Air Voids (%)																																																																																																
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4/12/2020	20W01867	SC	295	Fill	Clayey SILT	Refer to plan	1749077	5949050	-	150	Shear key	153	153	153	153	1.84	29.8	1.42	2.70	5																																																																																																												
4/12/2020	20W01867	SC	296	Fill	Clayey SILT	Refer to plan	1749090	5949054	-	150	Shear key	153	153	153	143	1.88	31.1	1.43	2.70	2																																																																																																												
4/12/2020	20W01867	SC	297	Fill	Clayey SILT	Refer to plan	1749182	5948965	-	150		170	170	170	170	1.89	31.4	1.43	2.70	2																																																																																																												
4/12/2020	20W01867	SC	298	Fill	Clayey SILT	Refer to plan	1749174	5948951	-	150		170	170	170	170	1.87	29.6	1.44	2.70	4																																																																																																												

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01867

Page No: 2 of 2

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

Location: As below

Tested by:



SC

Date tested:

4/12/2020





Client:	Coffey Services (NZ) Limited (Auckland)	PROJECT CODE:	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes	<div><div>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</div><div></div><div>Approved Signatory: Cesar Pura</div><div>Issue date: 14/12/2020</div></div>	
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

Test method: Test Methods in accordance with: 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): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
												UTP = Unable to penetrate								
12/12/2020	20W01927	LW	304	Fill	Clayey SILT	Retaining Wall 700	1749255	5949038	9.00	150		158+	158+	UTP	UTP	1.90	26.1	1.51	2.70	5
12/12/2020	20W01927	LW	305	Fill	Clayey SILT	Retaining Wall 700	1749284	5949026	9.00	150		UTP	UTP	UTP	158+	1.89	26.8	1.49	2.70	5
12/12/2020	20W01927	LW	306	Fill	Clayey SILT	Retaining Wall 700	1749304	5949018	9.00	150		UTP	UTP	UTP	UTP	1.91	26.6	1.50	2.70	4
12/12/2020	20W01927	LW	307	Fill	Clayey SILT	Shear Key	1749044	5949075	-	150		UTP	UTP	UTP	UTP	1.92	28.4	1.50	2.70	2
12/12/2020	20W01927	LW	308	Fill	Clayey SILT	Shear Key	1749046	5949065	-	150		UTP	UTP	UTP	UTP	1.89	29.3	1.46	2.70	3
12/12/2020	20W01927	LW	309	Fill	Clayey SILT	Retaining Wall 311	1749290	5948976	-	150	1.0m from base of wall, CH 140	158+	158+	158+	149	1.87	31.5	1.42	2.70	3
12/12/2020	20W01927	LW	310	Fill	Clayey SILT	Retaining Wall 311	1749309	5948976	-	150	1.0m from base of wall, CH 160	140	158+	158+	154	1.89	31.0	1.44	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01927

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 12/12/2020



Report No: EFIL:ETAM20W01960
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01960

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

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 Approved Signatory: Cesar Pura
 Senior Technician

IANZ Site Number: 105

Date of Issue: 18/12/2020

Earthworks Fill Report

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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/12/2020	ETAM20W01960	LW	311	1.89	28.6	1.47	2.70	3	UTP	UTP	UTP	UTP	Retaining Wall 311, CH100	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	312	1.91	30.1	1.46	2.70	2	UTP	UTP	UTP	UTP	Retaining Wall 311, CH150	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	313	1.93	29.6	1.49	2.70	1	UTP	UTP	UTP	UTP	Retaining Wall 311, CH170	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	314	1.83	31.6	1.39	2.70	4	158+	158+	158+	144	Shear Key	1749070	5949059	-	Clayey SILT	-
14/12/2020	ETAM20W01960	LW	315	1.87	30.0	1.44	2.70	4	140	154	149	158	Shear Key	1749077	5949063	-	Clayey SILT	-
14/12/2020	ETAM20W01960	LW	316	1.83	29.9	1.41	2.70	6	UTP	UTP	UTP	UTP	Gully 1 above RW 311	1749190	5948966	-	Clayey SILT	0.6m below top of Blocks
14/12/2020	ETAM20W01960	LW	317	1.90	30.2	1.46	2.70	2	UTP	UTP	UTP	UTP	Gully 1 above RW 311	1749175	5948949	-	Clayey SILT	0.3m below top of Blocks

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01960

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 14/12/2020



Earthworks Fill Report

Report No: EFIL:ETAM20W01962

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM20W01962

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.
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Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 18/12/2020

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
15/12/2020	ETAM20W01962	LW	318	1.87	28.6	1.46	2.70	5	UTP	UTP	UTP	UTP	Shear Key	1749053	5949067	6.5	Clayey SILT	
15/12/2020	ETAM20W01962	LW	319	1.91	29.1	1.48	2.70	2	UTP	UTP	UTP	UTP	Shear Key	1749060	5949068	6.8	Clayey SILT	
15/12/2020	ETAM20W01962	LW	320	1.85	26.7	1.46	2.70	7	158+	158+	158+	158+	Gully 1	1749139	5948974	-	Clayey SILT	At finished level
15/12/2020	ETAM20W01962	LW	321	1.92	28.7	1.50	2.70	2	158+	158+	158+	158+	Gully 1	1749110	5948963	-	Clayey SILT	At 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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01962

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 15/12/2020



Issue date: 05/05/17

Earthworks Fill Report

Report No: EFIL:ETAM20W01963
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01963

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.
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Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 18/12/2020

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
16/12/2020	ETAM20W01963	LW	322	1.87	37.2	1.36	2.70	0	158+	158+	158+	158+	Gully 2	1749071	5949068	8.5	Clayey SILT	
16/12/2020	ETAM20W01963	LW	323	1.89	36.1	1.39	2.70	0	158+	158+	158+	158+	Gully 2	1749051	5949066	8.6	Clayey SILT	
16/12/2020	ETAM20W01963	LW	324	1.90	32.5	1.43	2.70	0	UTP	UTP	158+	158+	Shear Key	1749091	5949049	7.0	Clayey SILT	
16/12/2020	ETAM20W01963	LW	325	1.91	33.3	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749081	5949031	7.0	Clayey SILT	
16/12/2020	ETAM20W01963	LW	326	1.88	33.9	1.41	2.70	0	UTP	UTP	UTP	UTP	Gully 1	1749127	5948956	-	Clayey SILT	0.8m below finished level
16/12/2020	ETAM20W01963	LW	327	1.92	34.5	1.43	2.70	2	UTP	UTP	UTP	UTP	Gully 1	1749128	5948930	-	Clayey SILT	0.8m 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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01963

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 16/12/2020



Earthworks Fill Report

Report No: EFIL:ETAM20W01998

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM20W01998

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: 22/12/2020

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
21/12/2020	ETAM20W01998	LW	334	1.85	37.6	1.35	2.70	0	140	154	158	158	Retaining Wall 700	1749263	5949036	9.50	Clayey SILT	
21/12/2020	ETAM20W01998	LW	335	1.84	33.8	1.38	2.70	3	158+	158+	144	154	Retaining Wall 700	1749299	5949020	9.50	Clayey SILT	
21/12/2020	ETAM20W01998	LW	336	1.88	37.8	1.36	2.70	0	158+	158+	158+	158+	Shear Key	1749070	5949063	9.60	Clayey SILT	
21/12/2020	ETAM20W01998	LW	337	1.89	23.1	1.54	2.70	8	UTP	UTP	UTP	UTP	Shear Key	1749067	5949050	9.80	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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01998

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 21/12/2020



Issue date: 050517

Earthworks Fill Report

Report No: EFIL:ETAM21W00038
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00038

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: 13/01/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
11/01/2021	ETAM21W00038	LW	344	1.93	27.8	1.51	2.70	2	UTP	UTP	UTP	UTP	Gully 2	1749081	5949048	10.2	Clayey SILT	
11/01/2021	ETAM21W00038	LW	345	1.90	21.1	1.57	2.70	9	UTP	UTP	UTP	UTP	Gully 2	1749076	5949033	11.0	Clayey SILT	
11/01/2021	ETAM21W00038	LW	346	1.85	30.4	1.42	2.70	4	UTP	UTP	158+	158+	RW 311 Drainage Fill	1749308	5949003	-	Clayey SILT	Base of wall.
11/01/2021	ETAM21W00038	LW	347	1.93	29.1	1.49	2.70	1	UTP	UTP	UTP	UTP	RW 311 Drainage Fill	1749276	5948989	-	Clayey SILT	Base of wall.

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00038

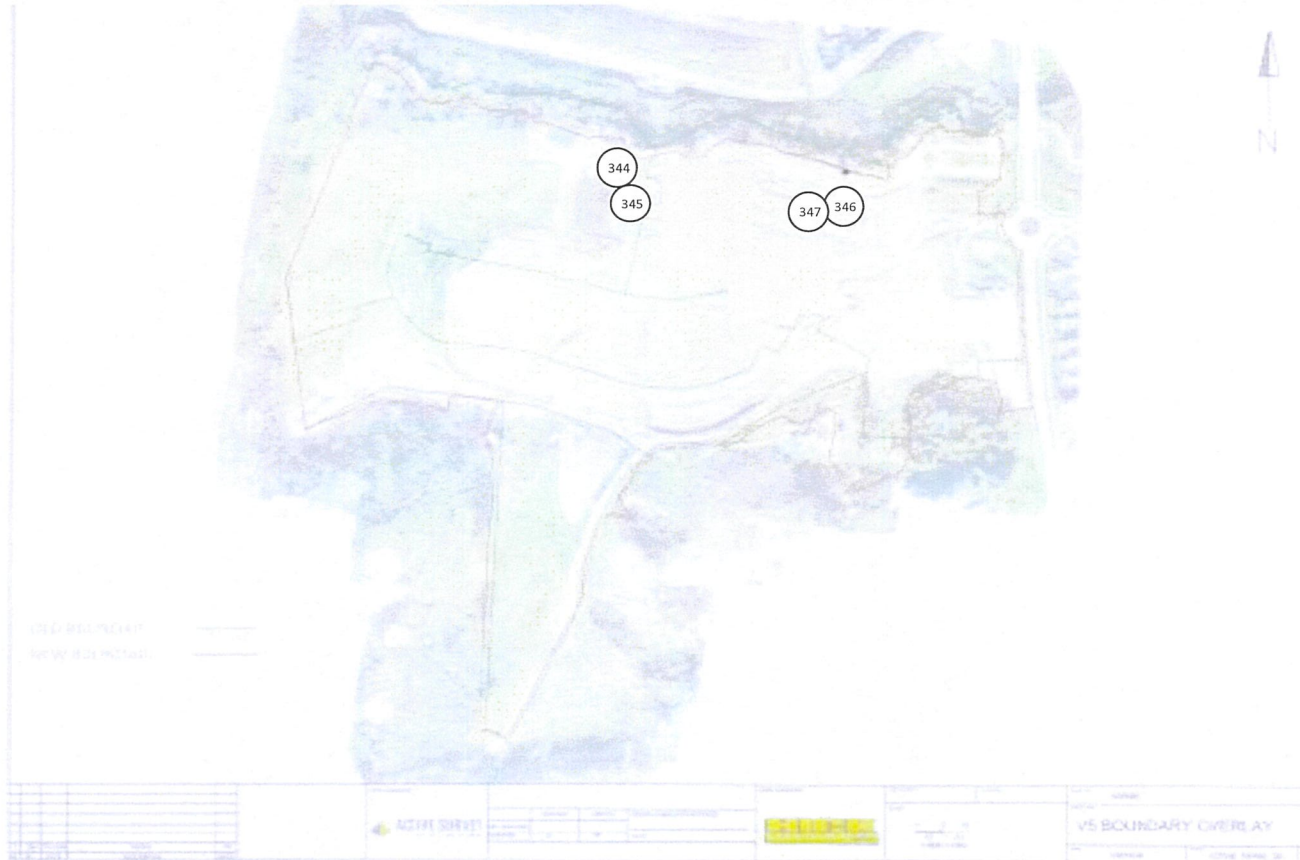
Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 11/01/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00144

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00144

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: 28/01/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
27/01/2021	ETAM21W00144	LW	371	1.97	30.2	1.51	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749002	5949088	8.50	Clayey SILT	
27/01/2021	ETAM21W00144	LW	372	1.97	31.6	1.50	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749033	5949075	8.15	Clayey SILT	
27/01/2021	ETAM21W00144	LW	373	1.83	30.1	1.41	2.70	6	UTP	UTP	158+	158+	RE Wall 313	1749450	5949820	-	Clayey SILT	0.3m above base

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00144

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 27/01/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00157

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00157

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: 29/01/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
28/01/2021	ETAM21W00157	LW	374	1.95	28.9	1.51	2.70	0	158+	UTP	UTP	UTP	RE Wall 313	1749451	5948820	-	Clayey SILT	0.6m above base
28/01/2021	ETAM21W00157	LW	375	1.96	29.6	1.51	2.70	0	158+	158+	158+	UTP	Shear Key	1749029	5949077	8.90	Clayey SILT	
28/01/2021	ETAM21W00157	LW	376	1.94	27.9	1.51	2.70	2	158+	158+	UTP	UTP	Shear Key	1749027	5949065	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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00157

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 28/01/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00160
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00160

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: 2/02/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
29/01/2021	ETAM21W00160	LW	377	1.96	30.0	1.51	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749008	5949081	9.80	Clayey SILT	
29/01/2021	ETAM21W00160	LW	378	1.97	34.0	1.47	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749033	5949062	10.00	Clayey SILT	
29/01/2021	ETAM21W00160	LW	379	1.83	31.9	1.38	2.70	5	140	158+	144	154	RE Wall 313	1749440	5948837	-	Clayey SILT	
29/01/2021	ETAM21W00160	LW	380	1.82	32.2	1.38	2.70	5	158+	158+	158+	144	RE Wall 313	1749436	5948869	-	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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00160

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 29/01/2021



Issue date: 050517

Earthworks Fill Report

Report No: EFIL:ETAM21W00195

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00195

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: 9/02/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
5/02/2021	ETAM21W00195	LW	397	1.91	32.7	1.44	2.70	0	140	140	158	154	Retaining Wall 306	1749394	5948903	22.50	Clayey SILT	
5/02/2021	ETAM21W00195	LW	398	1.94	29.7	1.49	2.70	0	UTP	UTP	158+	158+	Retaining Wall 306	1749422	5948908	23.80	Clayey SILT	
5/02/2021	ETAM21W00195	LW	399	1.95	42.6	1.37	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749016	5949066	11.00	Clayey SILT	
5/02/2021	ETAM21W00195	LW	400	1.95	35.5	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749039	5949056	11.50	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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00195

Page No: 2 of 2

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

Location: As below

Tested by:

LW

Date tested:

5/02/2021



Report No: EFIL:ETAM21W00206

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00206



All tests reported herein have been performed in accordance with the 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: 10/02/2021

Earthworks Fill Report

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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
9/02/2021	ETAM21W00206	LW	401	1.92	36.9	1.40	2.70	0	140	158+	158+	158+	Retaining Wall 306	1749396	5948905	23.60	Clayey SILT	
9/02/2021	ETAM21W00206	LW	402	1.89	32.4	1.43	2.70	1	140	144	144	140	Retaining Wall 306	1749421	5948906	24.30	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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00206

Page No: 2 of 2

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

Location: As below

Tested by: LW
Date tested: 9/02/2021



Report No: EFIL:ETAM21W00248
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00248

 All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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 Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 24/02/2021

Earthworks Fill Report

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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/02/2021	ETAM21W00248	LW	405	1.91	32.6	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749039	5949058	11.80	Clayey SILT	
22/02/2021	ETAM21W00248	LW	406	1.88	34.0	1.40	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749063	5949061	11.90	Clayey SILT	
22/02/2021	ETAM21W00248	LW	407	1.94	33.1	1.46	2.70	0	UTP	UTP	UTP	UTP	Gully 2	1749104	5949039	12.65	Clayey SILT	
22/02/2021	ETAM21W00248	LW	408	1.91	44.2	1.45	2.70	0	158+	158+	UTP	UTP	Gully 2	1749048	5949013	14.80	Clayey SILT	
22/02/2021	ETAM21W00248	LW	409	1.96	31.3	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully 2	1749062	5948988	16.20	Clayey SILT	
22/02/2021	ETAM21W00248	LW	410	1.79	44.2	1.24	2.70	0	140	144	132	154	Retaining Wall 306	1749407	5948897	26.30	Silty CLAY	
22/02/2021	ETAM21W00248	LW	411	1.79	43.0	1.25	2.70	0	140	158	154	154	Retaining Wall 306	1749429	5948899	26.50	Silty CLAY	
22/02/2021	ETAM21W00248	LW	412	1.80	40.7	1.28	2.70	0	144	158	144	140	Retaining Wall 306	1749438	5948888	26.80	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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00248

Page No: 2 of 2

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

Location: As below

Tested by:

LW

Date tested:

22/02/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00268

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00268

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: 25/02/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
24/02/2021	ETAM21W00268	LW	416	1.88	39.1	1.35	2.70	0	158+	158+	158+	158+	Retaining Wall 306	1749399	5948889	28.00	Clayey SILT	
24/02/2021	ETAM21W00268	LW	417	1.91	40.0	1.36	2.70	0	158+	158+	158+	158+	Retaining Wall 306	1749421	5948881	27.65	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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00268

Page No: 2 of 2

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

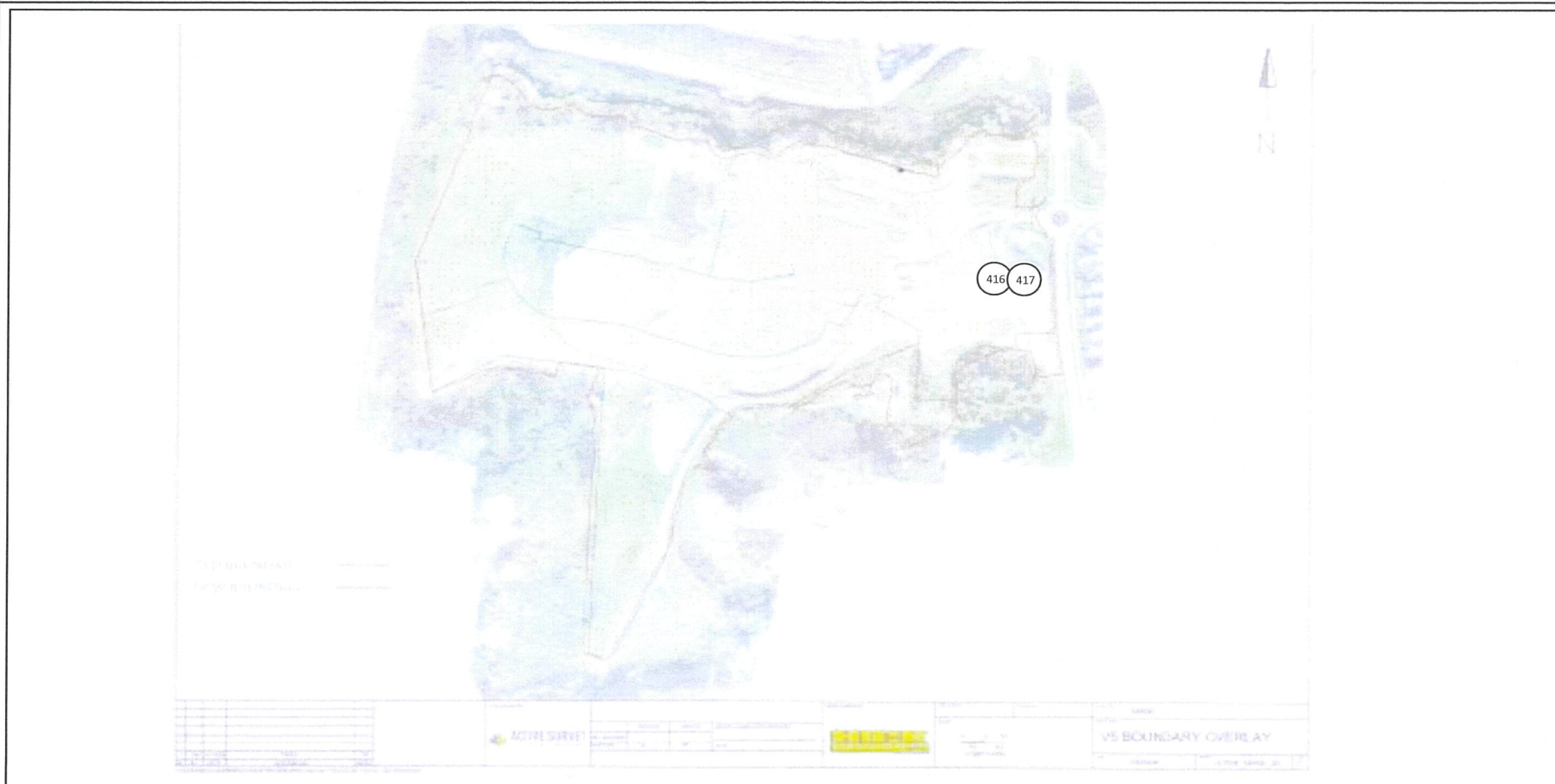
Location: As below

Tested by:

LW

Date tested:

24/02/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00301

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00301

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: 8/03/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
3/03/2021	ETAM21W00301	LW	427	1.91	31.5	1.46	2.70	0	140	144	158+	158+	Office Area	1749245	5948883	-	Silty CLAY	2.0m below finished level
3/03/2021	ETAM21W00301	LW	428	1.90	32.0	1.44	2.70	1	158+	158+	158+	140	Office Area	1749237	5948899	-	Silty CLAY	2.0m 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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00301

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 3/03/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00407

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00407

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: 25/03/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/03/2021	ETAM21W00407	LW	449	1.84	38.4	1.33	2.70	0	158+	158+	158+	158+	North Fill Area	1749146	5949019	-	Silty CLAY	2.5m below finished level
22/03/2021	ETAM21W00407	LW	450	1.79	36.0	1.32	2.70	4	140	144	140	158	North Fill Area	1749159	5949021	-	Silty CLAY	4.0m below finished level
22/03/2021	ETAM21W00407	LW	451	1.84	37.8	1.33	2.70	0	140	158+	158+	158+	Gully 1	1749255	5948962	-	Silty CLAY	3.0m below finished level
22/03/2021	ETAM21W00407	LW	452	1.88	34.3	1.40	2.70	0	140	144	144	154	Gully 1	1749286	5948950	-	Silty CLAY	3.0m 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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00407

Page No: 2 of 2

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

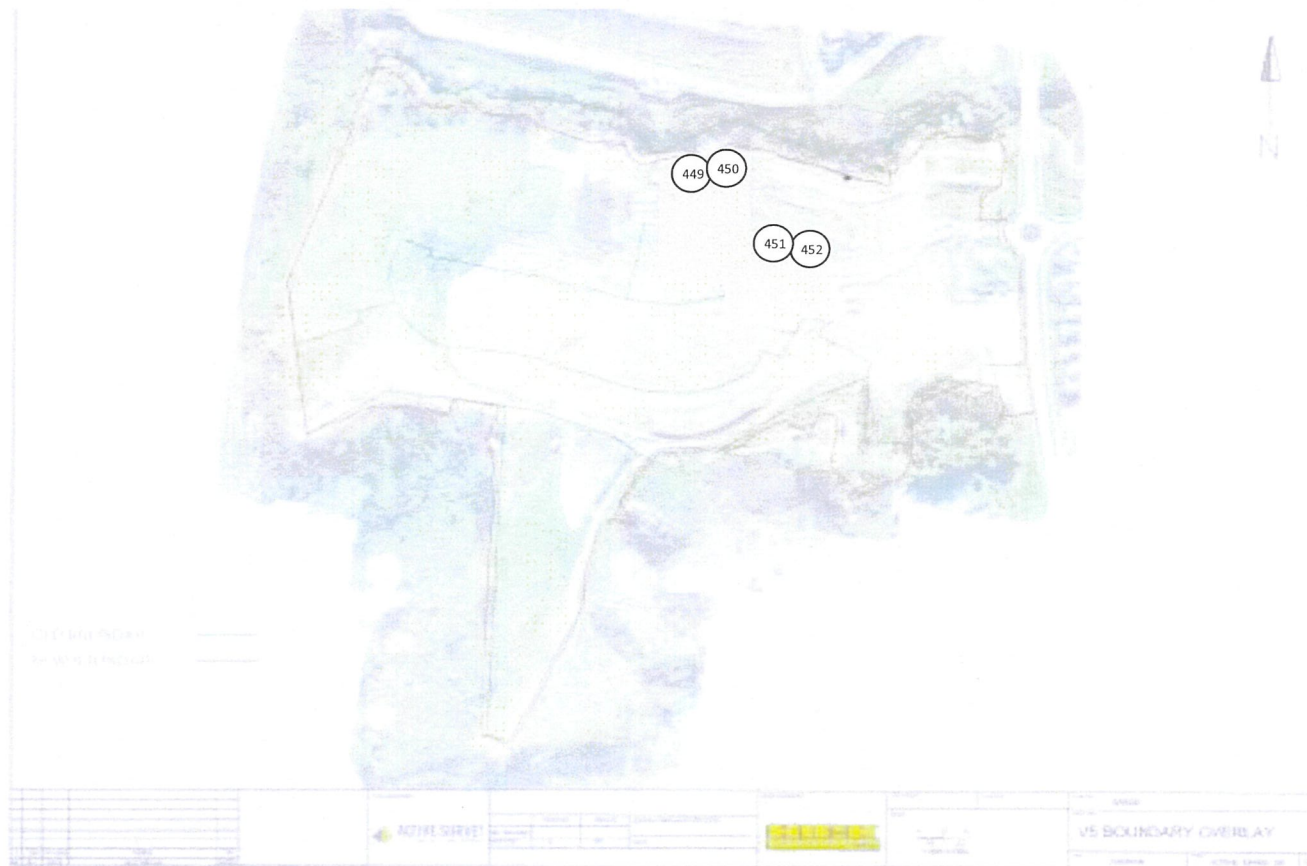
Location: As below

Tested by:

LW

Date tested:

22/03/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00456

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00456

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: 31/03/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
30/03/2021	ETAM21W00456	LW	463	1.84	30.0	1.42	2.70	5	UTP	UTP	179+	179+	Undercut Backfill Area	1749249	5948915	-	Silty CLAY	2.0m below finished level
30/03/2021	ETAM21W00456	LW	464	1.90	26.1	1.51	2.70	5	UTP	UTP	UTP	UTP	Undercut Backfill Area	1749264	5948903	-	Silty CLAY	1.5m below finished level
30/03/2021	ETAM21W00456	LW	465	1.88	33.9	1.40	2.70	1	179+	179+	179+	179+	Undercut Backfill Area	1749228	5948922	-	Silty CLAY	2.0m below finished level
30/03/2021	ETAM21W00456	LW	466	1.90	32.6	1.44	2.70	0	179+	179+	179+	179+	Undercut Backfill Area	1749216	5948920	-	Silty CLAY	2.5m 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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00456

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 30/03/2021



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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
1/04/2021	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)

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:ETAM21W00486
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00486

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: 9/04/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/04/2021	ETAM21W00486	LW	471	1.82	32.9	1.37	2.70	4	146	160	149	135	Gully 2	1749046	5948990	-	Silty CLAY	At finished level
7/04/2021	ETAM21W00486	LW	472	1.86	33.0	1.40	2.70	2	147	146	152	164	Gully 2	1749071	5948949	-	Silty CLAY	At finished level
7/04/2021	ETAM21W00486	LW	473	1.87	33.6	1.40	2.70	1	160	179	149	140	Gully 2	1749093	5948967	-	Silty CLAY	1.0m below finished level
7/04/2021	ETAM21W00486	LW	474	1.85	34.2	1.38	2.70	2	146	156	164	150	Gully 2	1749112	5948936	-	Silty CLAY	1.0m below finished level
7/04/2021	ETAM21W00486	LW	475	1.84	32.2	1.39	2.70	4	179+	179+	179+	179+	Pond Backfill	1749393	5949018	-	Silty CLAY	3.0m below finished level
7/04/2021	ETAM21W00486	LW	476	1.85	32.2	1.40	2.70	3	179+	179+	179+	179+	Pond Backfill	1749409	5949015	-	Silty CLAY	3.0m 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)

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00486

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 7/04/2021



**East Tamaki Laboratory**

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00627**Issue No:1***This report replaces all previous issues of report no. EFIL:ETAM21W00627*

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: James McKelvey
Senior Technician
IANZ Site Number: 105
Date of Issue: 13/05/2021

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):
Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/05/2021	ETAM21W00627	LW	00518	1.90	35.0	1.41	2.70	0.0	179+	179+	143	133	Retaining Wall 311	1749210	5948998	18.90	Fill - Clayey SILT	0
11/05/2021	ETAM21W00627	LW	00519	1.86	35.0	1.37	2.70	1.0	179+	179+	179+	146	Retaining Wall 311	1749243	5948991	19.50	Fill - Clayey SILT	0

Comments:

Form Number R031N Issue Date: 20/09/2018

Earthworks Fill Report

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

Report No: EFIL:ETAM21W00627

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00627



All tests reported herein have been performed in accordance with the 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: 13/05/2021

Site Plan - not to scale



Earthworks Fill Report

Report No: EFIL:ETAM21W00637

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00637

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: James McKelvey
Senior Technician
IANZ Site Number: 105
Date of Issue: 14/05/2021

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):
Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/05/2021	ETAM21W00637	AK	00520	1.80	32.4	1.36	2.70	5.4	134	168	141	143	Retaining Wall 311	1749332	5948947	-	Fill - CLAY	0
13/05/2021	ETAM21W00637	AK	00521	1.90	31.2	1.45	2.70	1.3	168	168	168	168	Retaining Wall 311	1749273	5948967	-	Fill - CLAY	0
13/05/2021	ETAM21W00637	AK	00522	1.85	31.9	1.40	2.70	3.5	179	179	149	149	Retaining Wall 311	1749207	5948984	-	Fill - CLAY	0

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM21W00637

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00637

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: James McKelvey
Senior Technician
IANZ Site Number: 105
Date of Issue: 14/05/2021

Site Plan - not to scale



Earthworks Fill Report

Report No: EFIL:ETAM21W00703

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00703

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: 25/05/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
24/05/2021	ETAM21W00703	AK	523	1.82	39.7	1.30	2.70	0	180	180	153	153	SWMH Drainage Line 103-105	1749345	5949023	10.09	Silty CLAY	
24/05/2021	ETAM21W00703	AK	524	1.96	31.6	1.49	2.70	0	153	153	170	170		1749349	5949028	9.73	Silty CLAY	
24/05/2021	ETAM21W00703	AK	525	1.72	34.3	1.28	2.70	9	153	153	145	178		1749354	5949041	9.12	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:ETAM21W00703

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00703

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: 25/05/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00711
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00711

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: 26/05/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
25/05/2021	ETAM21W00711	LW	526	1.87	32.1	1.42	2.70	2	134	171	131	143	SSMH 1-D 1-C	1749421	5949052	-	Clayey SILT	At finished level
25/05/2021	ETAM21W00711	LW	527	1.89	31.7	1.44	2.70	1	146	156	137	127	SSMH 1-C 1-B	1749384	5949060	-	Clayey SILT	At 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)

Earthworks Fill Report

Report No: EFIL:ETAM21W00711

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00711

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: 26/05/2021



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

Report No: EFIL:ETAM21W00729

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00729

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: 28/05/2021

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
27/05/2021	ETAM21W00729	LW	528	1.92	28.9	1.49	2.70	2	179+	179+	179+	179+	Slip Remedial Area	1749263	5948822	38.75	Clayey SILT	-
27/05/2021	ETAM21W00729	LW	529	1.86	28.8	1.44	2.70	5	179+	179+	179+	179+	MH 100/2 - 100/3 Drainline	1749354	5949044	-	Clayey SILT	At 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)

Earthworks Fill Report

Report No: EFIL:ETAM21W00729

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00729

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



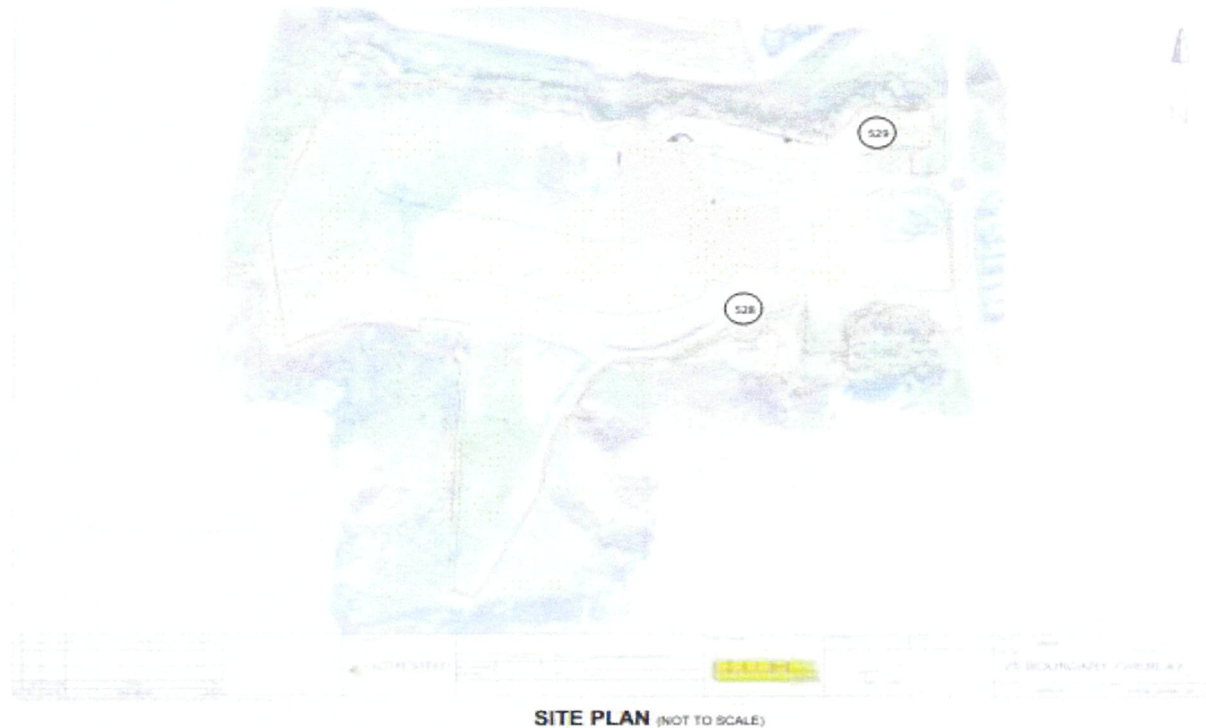
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

{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: 28/05/2021



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

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



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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
3/12/2021	ETAM21W01476	LW	572	1.88	32.8	1.41	2.70	1	149	172	175+	175+	Shear Key	1748998	5949081	8.10	Clayey SILT	
3/12/2021	ETAM21W01476	LW	573	1.89	33.3	1.42	2.70	0	175+	175+	175+	164	Shear Key	1748991	5949076	9.30	Clayey SILT	
3/12/2021	ETAM21W01476	LW	574	1.87	31.4	1.42	2.70	3	137	175+	175+	153	Gully	1748976	5948881	31.95	Clayey SILT	
3/12/2021	ETAM21W01476	LW	575	1.84	34.1	1.37	2.70	2	149	160	156	153	Gully	1748995	5948918	29.55	Clayey SILT	
3/12/2021	ETAM21W01476	LW	576	1.93	27.6	1.51	2.70	2	UTP	UTP	175+	175+	Gully	1749072	5948958	26.90	Clayey SILT	
3/12/2021	ETAM21W01476	LW	577	1.91	26.7	1.51	2.70	4	UTP	UTP	UTP	175+	Gully	1749105	5948969	27.10	Clayey SILT	

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01476

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W01476

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 6/12/2021



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

Report No: EFIL:ETAM21W01485
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01485

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 7/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
6/12/2021	ETAM21W01485	LW	578	1.85	28.5	1.44	2.70	6	175+	175+	175+	UTP	Shear Key	1748987	5949075	12.20	Silty CLAY	
6/12/2021	ETAM21W01485	LW	579	1.91	31.3	1.45	2.70	1	UTP	UTP	175+	UTP	Shear Key	1748994	5949082	10.50	Silty CLAY	
6/12/2021	ETAM21W01485	LW	580	1.88	30.6	1.44	2.70	3	UTP	175+	175+	UTP	Manhole Backfill	1749174	5949001	-	Silty CLAY	Base of manhole

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01485

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W01485

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 7/12/2021



SITE PLAN (NOT TO SCALE)

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
7/12/2021	ETAM21W01492	LW	581	1.90	30.9	1.45	2.70	1	149	164	175+	175+	Gully	1748965	5948906	31.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	582	1.98	27.9	1.55	2.70	0	UTP	UTP	UTP	UTP	Gully	1749002	5948937	30.20	Clayey SILT	
7/12/2021	ETAM21W01492	LW	583	1.92	33.2	1.44	2.70	0	UTP	UTP	175+	175+	Gully	1749063	5948944	27.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	584	1.87	30.5	1.43	2.70	3	175+	175+	175+	172	Gully	1749084	5948969	27.40	Clayey SILT	
7/12/2021	ETAM21W01492	LW	585	1.90	33.9	1.42	2.70	0	175+	175+	164	153	Shear Key	1748989	5949067	13.00	Clayey SILT	
7/12/2021	ETAM21W01492	LW	586	1.89	36.9	1.38	2.70	0	175+	160	149	164	Shear Key	1748977	5949066	11.60	Clayey SILT	

Comments:

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

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.)

[Signature]

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: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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
10/12/2021	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)

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



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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/12/2021	ETAM21W01557	LW	597	1.88	32.4	1.42	2.70	1	175+	175+	175+	160	Shear Key	1748950	5949089	8.30	Clayey SILT	
22/12/2021	ETAM21W01557	LW	598	1.91	29.9	1.47	2.70	2	175+	175+	175+	175+	Shear Key	1748974	5949084	9.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	599	1.85	37.5	1.35	2.70	0	175+	175+	175+	175+	Gully	1749022	5948881	29.60	Clayey SILT	
22/12/2021	ETAM21W01557	LW	600	1.86	31.8	1.41	2.70	3	175+	175+	175+	175+	Gully	1749046	5948916	29.20	Clayey SILT	
22/12/2021	ETAM21W01557	LW	601	1.98	31.8	1.50	2.70	0	UTP	UTP	UTP	UTP	Gully	1749098	5948940	28.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	602	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully	1749080	5948970	27.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	603	1.94	30.1	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749110	5949033	8.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	604	1.97	29.2	1.52	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749119	5949035	9.00	Clayey SILT	

Comments:

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

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

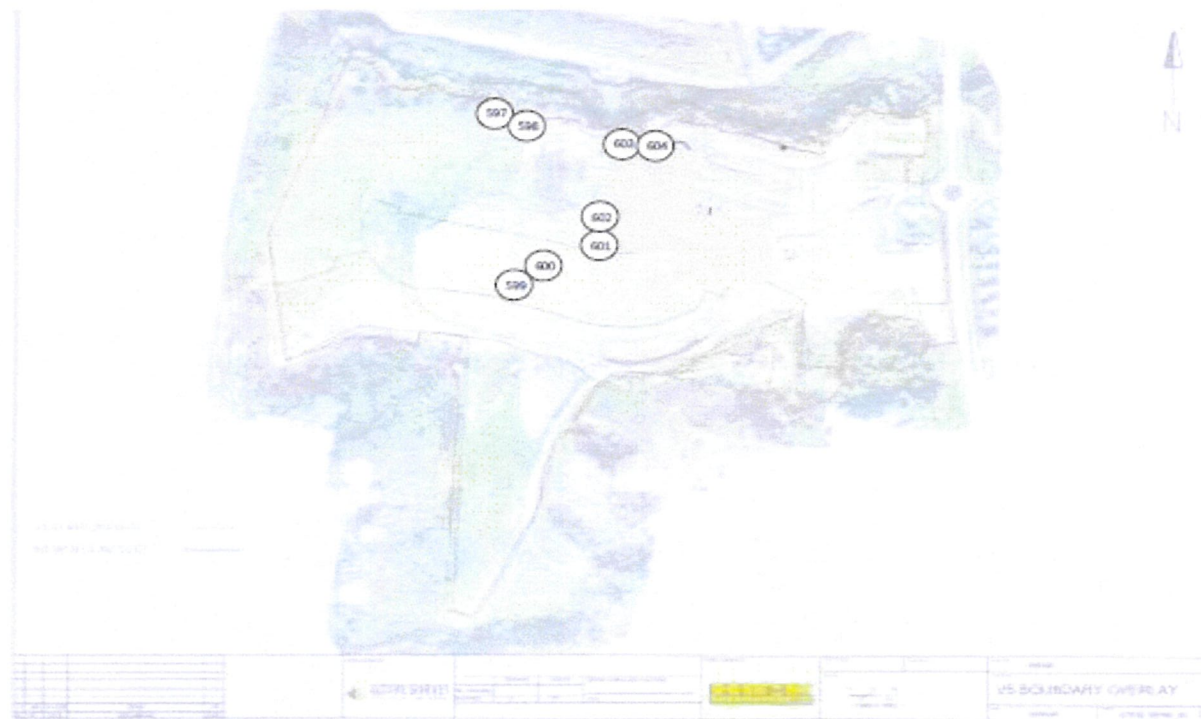
Project Location: 117 Kowhai Road, Orewa



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.}

[Signature]

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021



SITE PLAN (NOT TO SCALE)

Report No: EFIL:ETAM22W00017

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00017

All tests reported herein have been performed in accordance with the 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

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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/01/2022	ETAM22W00017	LW	611	1.98	27.2	1.55	2.70	0.1	UTP	UTP	UTP	UTP	Gully	1748966	5948916	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	612	1.96	31.1	1.50	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1748998	5948902	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	613	1.95	29.5	1.51	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749052	5948933	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	614	1.97	30.5	1.51	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749085	5948972	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	615	1.97	16.7	1.69	2.70	9.4	UTP	UTP	UTP	UTP	RW701	1749126	5949032	11.0	Clayey silt	-
11/01/2022	ETAM22W00017	LW	616	1.96	21.8	1.61	2.70	5.5	UTP	UTP	UTP	UTP	RW701	1749087	5949036	11.2	Clayey silt	-

Comments:

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



**Auckland Laboratory**

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

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.)

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

Test Results

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

Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
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

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





Auckland Laboratory

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

Report No: EFIL:ETAM22W00032

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00032



All tests reported herein have been performed in accordance with the 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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/01/2022	ETAM22W00032	LW	621	1.94	32.3	1.46	2.70	0.0	175	175	175	175	Gully	1749069	5948970	26.4	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	622	1.94	30.5	1.49	2.70	0.0	175	175	175	175	Gully	1749082	5948942	26.9	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	623	1.93	25.3	1.54	2.70	4.2	UTP	UTP	UTP	UTP	Gully	1749060	5948913	29.8	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	624	1.94	25.6	1.55	2.70	3.1	175	175	175	175	Gully	1749037	5948891	30.3	Clayey Silt	-

Comments:

Oven Moistures

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



Earthworks Fill Report

Auckland Laboratory

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

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





Auckland Laboratory

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

Report No: EFIL:ETAM22W00039

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00039



All tests reported herein have been performed in accordance with the 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

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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/01/2022	ETAM22W00039	LW	625	1.96	27.1	1.54	2.70	1.1	UTP	UTP	175	175	Undercut Area	1749018	5949021	3.0	Clayey Silt	To Finish Level
14/01/2022	ETAM22W00039	LW	626	1.95	25.7	1.55	2.70	2.6	UTP	UTP	UTP	UTP	Gully	1749053	5948923	29	Clayey Silt	-
14/01/2022	ETAM22W00039	LW	627	1.97	26.8	1.55	2.70	1.0	UTP	UTP	UTP	UTP	Gully	1749018	5948903	29.3	Clayey Silt	-

Comments:

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.}

E. Paton

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



SITE PLAN (NOT TO SCALE)



Auckland Laboratory

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

Report No: EFIL:ETAM22W00062

Issue No:1

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

All tests reported herein have been performed in accordance with the 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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									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	594888	28.7	Silty Clay	-

Comments:

Oven Moistures



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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00062

Issue No:1

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



All tests reported herein have been performed in accordance with the 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: 26/01/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00072

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00072

All tests reported herein have been performed in accordance with the 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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/01/2022	ETAM22W00072	LW	636	1.84	31.9	1.40	2.70	3.7	175	175	175	175	Gully	1749057	5948921	27.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	637	1.87	32.3	1.42	2.70	1.8	175	175	175	175	Gully	1749048	5948902	28.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	638	1.83	31.9	1.39	2.70	4.4	175	175	175	175	Gully	1749012	5948897	28.15	Silty Clay	-
19/01/2022	ETAM22W00072	LW	639	1.85	32.3	1.40	2.70	3.2	175	175	175	175	Gully	1748899	5948888	28.60	Silty Clay	-
19/01/2022	ETAM22W00072	LW	640	1.86	29.0	1.44	2.70	4.7	175	175	175	175	RW 701	1749119	5949040	11.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	641	1.85	28.7	1.44	2.70	5.3	175	175	175	175	RW 701	1749100	5949042	10.8	Silty Clay	-
19/01/2022	ETAM22W00072	LW	642	1.88	24.0	1.52	2.70	7.5	175	175	175	175	RE Wall 604 A	1749090	5949062	8.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	643	1.89	24.7	1.51	2.70	6.5	175	175	175	175	RE Wall 604 A	1749085	5949067	7.95	Silty Clay	-

Comments:



Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00072

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00072

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

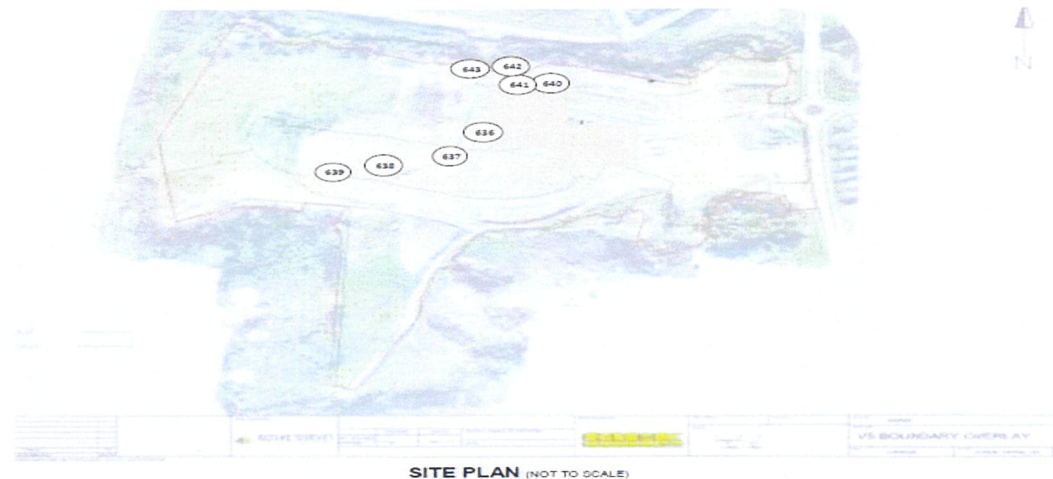
Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa



All tests reported herein have been performed in accordance with the 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: 26/01/2022





Auckland Laboratory

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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/01/2022	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

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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00117

Issue No:1

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



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

{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

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



SITE PLAN (NOT TO SCALE)



Auckland Laboratory

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

Report No: EFIL:ETAM22W00117

Issue No:1

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



All tests reported herein have been performed in accordance with the 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

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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/01/2022	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

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



**Auckland Laboratory**

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

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.}

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
16/02/2022	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:



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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00233

Issue No:1

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



All tests reported herein have been performed in accordance with the 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: 18/02/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00242

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



All tests reported herein have been performed in accordance with the 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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/02/2022	ETAM22W00242	SC	681	1.77	34.2	1.32	2.70	6.3	188	168	176	184	Ref to plan	1749816	5948951	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	682	1.79	36.2	1.32	2.70	3.7	168	188	188	184	Ref to plan	1749022	5948987	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	683	1.84	30.7	1.41	2.70	4.7	188	188	UTP	UTP	Gully	1748984	5948917	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	684	1.94	26.5	1.53	2.70	2.4	UTP	UTP	188	188	Gully	1749022	5948894	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	685	1.84	41.7	1.30	2.70	0.0	UTP	UTP	UTP	UTP	Silt Pond	1749065	5948937	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	686	1.93	26.5	1.52	2.70	3.2	UTP	UTP	UTP	UTP	Silt Pond	1749109	5948928	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	687	1.86	27.0	1.46	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749058	5949002	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	688	1.80	31.5	1.37	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749081	5948998	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	689	1.73	37.9	1.26	2.70	5.8	146	155	146	160	Stage 1 Rock	1749321	5948750	-	Silty Clay	250mm below F/L

Comments:

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



SITE PLAN (NOT TO SCALE)

**Auckland Laboratory**

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

Report No: EFIL:ETAM22W00261**Issue No:1***This report replaces all previous issues of report no. EFIL:ETAM22W00261*

All tests reported herein have been performed in accordance with the 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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/02/2022	ETAM22W00261	SC	694	1.87	28.4	1.45	2.70	5.0	188	188	168	168	Siltpond Backfill	1749016	5948957	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	695	1.83	33.2	1.37	2.70	3.5	168	168	168	168	Gully	1749076	5948939	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	696	1.89	27.5	1.48	2.70	4.3	168	168	188	188	Main Gully	1749025	5948902	-	Silty Clay	-

Comments:



Earthworks Fill Report

Auckland Laboratory

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

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



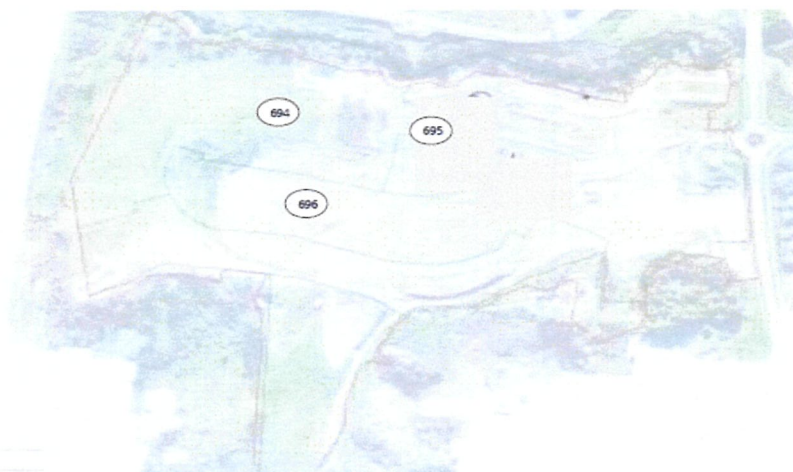
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
Director-Testing

IANZ Site Number: 105

Date of Issue: 23/02/2022



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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/03/2022	ETAM22W00341	SC	723	1.90	28.3	1.48	2.70	3.2	208+	208+	208+	UTP	Gully 2	1748981	5948889	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	724	1.87	29.3	1.45	2.70	4.1	208+	208+	UTP	UTP	Gully 2	1749004	5948916	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	725	1.90	31.9	1.44	2.70	1.0	188	188	208+	208+	Gully 2	1749060	5948901	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	726	1.83	29.5	1.42	2.70	5.8	200	200	UTP	UTP	Silt Pond	1749004	5948988	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	727	1.74	23.0	1.41	2.70	15.3	UTP	UTP	UTP	UTP	A7-A15	1749168	5948985	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	728	1.69	25.0	1.35	2.70	16.1	UTP	UTP	UTP	UTP	A15-15B	1749200	5948998	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	729	1.68	25.6	1.34	2.70	16.1	UTP	UTP	UTP	UTP	15B-15C	1749220	5948990	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	730	1.84	29.5	1.42	2.70	5.5	UTP	UTP	UTP	UTP	15C-15D	1749248	5948982	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	731	1.73	23.4	1.40	2.70	15.3	UTP	UTP	UTP	UTP	15-15D	1749275	5948977	-	Silty CLAY	At finished level

Comments:



Auckland Laboratory

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

Report No: EFIL:ETAM22W00341

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00341

All tests reported herein have been performed in accordance with the 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

Earthworks Fill Report

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

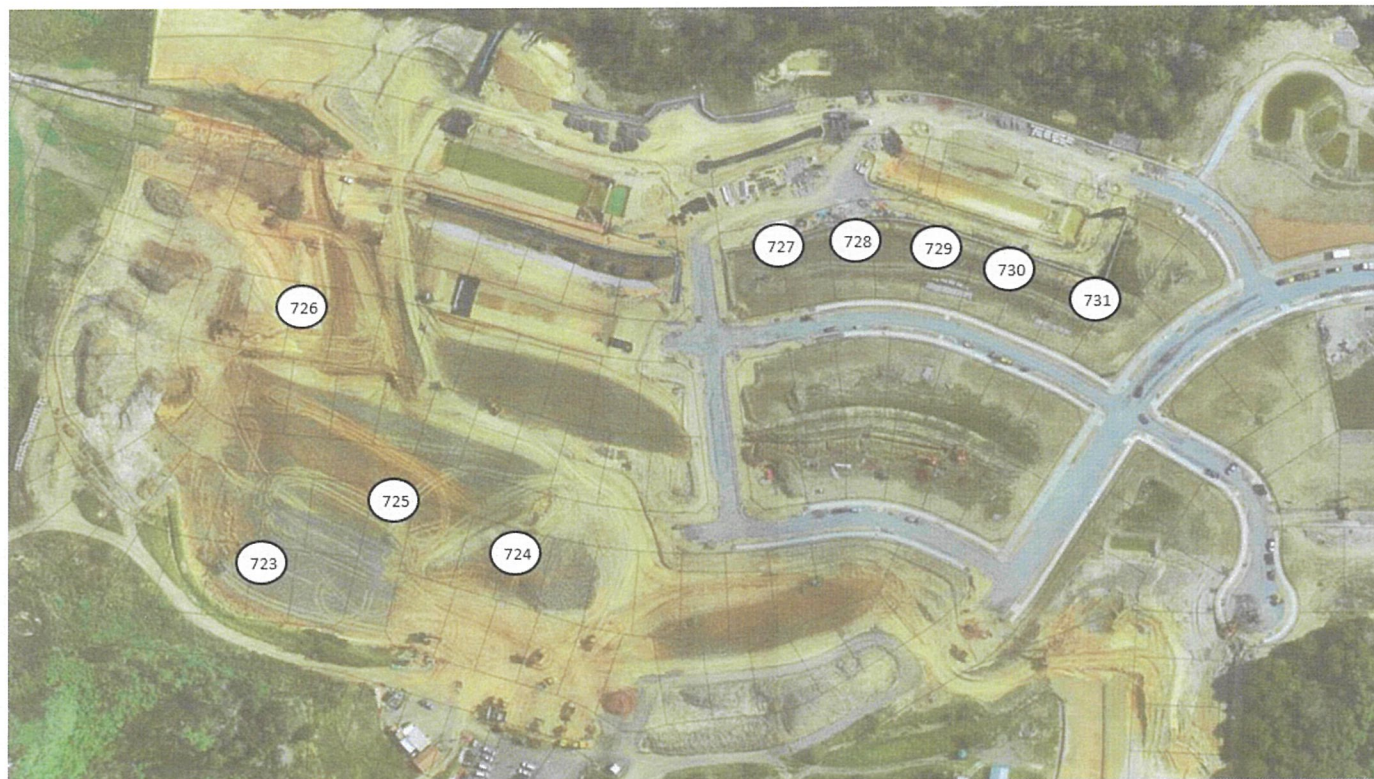
Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa





Auckland Laboratory

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

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.}

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
10/03/2022	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

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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00363

Issue No:1

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



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

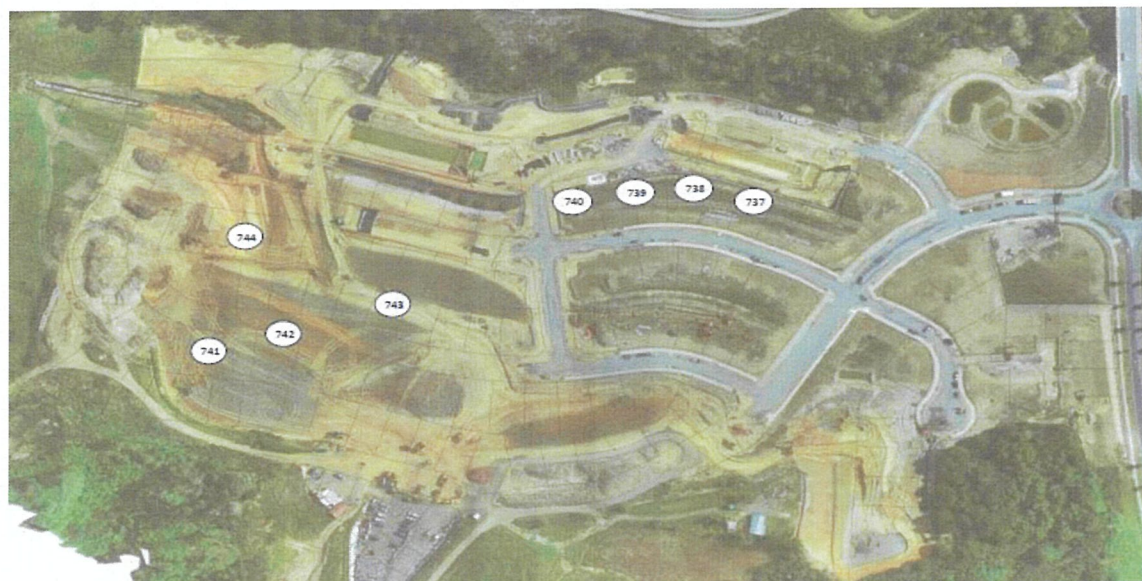
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 14/03/2022





Auckland Laboratory

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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
15/03/2022	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.)

E. Paton

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



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



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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/01/2022	ETAM22W00032	LW	621	1.94	32.3	1.46	2.70	0.0	175	175	175	175	Gully	1749069	5948970	26.4	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	622	1.94	30.5	1.49	2.70	0.0	175	175	175	175	Gully	1749082	5948942	26.9	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	623	1.93	25.3	1.54	2.70	4.2	UTP	UTP	UTP	UTP	Gully	1749060	5948913	29.8	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	624	1.94	25.6	1.55	2.70	3.1	175	175	175	175	Gully	1749037	5948891	30.3	Clayey Silt	-

Comments:

Oven Moistures



Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00032

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00032

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



All tests reported herein have been performed in accordance with the 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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/01/2022	ETAM22W00039	LW	625	1.96	27.1	1.54	2.70	1.1	UTP	UTP	175	175	Undercut Area	1749018	5949021	3.0	Clayey Silt	To Finish Level
14/01/2022	ETAM22W00039	LW	626	1.95	25.7	1.55	2.70	2.6	UTP	UTP	UTP	UTP	Gully	1749053	5948923	29	Clayey Silt	-
14/01/2022	ETAM22W00039	LW	627	1.97	26.8	1.55	2.70	1.0	UTP	UTP	UTP	UTP	Gully	1749018	5948903	29.3	Clayey Silt	-

Comments:



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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00039

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00039



All tests reported herein have been performed in accordance with the 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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/01/2022	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



Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00062	
Issue No:1	
<i>This report replaces all previous issues of report no. EFIL:ETAM22W00062</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: Eric Paton Director-Testing IANZ Site Number: 105 Date of Issue: 26/01/2022

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



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.}



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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/01/2022	ETAM22W00072	LW	636	1.84	31.9	1.40	2.70	3.7	175	175	175	175	Gully	1749057	5948921	27.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	637	1.87	32.3	1.42	2.70	1.8	175	175	175	175	Gully	1749048	5948902	28.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	638	1.83	31.9	1.39	2.70	4.4	175	175	175	175	Gully	1749012	5948897	28.15	Silty Clay	-
19/01/2022	ETAM22W00072	LW	639	1.85	32.3	1.40	2.70	3.2	175	175	175	175	Gully	1748899	5948888	28.60	Silty Clay	-
19/01/2022	ETAM22W00072	LW	640	1.86	29.0	1.44	2.70	4.7	175	175	175	175	RW 701	1749119	5949040	11.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	641	1.85	28.7	1.44	2.70	5.3	175	175	175	175	RW 701	1749100	5949042	10.8	Silty Clay	-
19/01/2022	ETAM22W00072	LW	642	1.88	24.0	1.52	2.70	7.5	175	175	175	175	RE Wall 604 A	1749090	5949062	8.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	643	1.89	24.7	1.51	2.70	6.5	175	175	175	175	RE Wall 604 A	1749085	5949067	7.95	Silty Clay	-

Comments:



Auckland Laboratory

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

Earthworks Fill Report

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

Report No: EFIL:ETAM22W00072

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00072



All tests reported herein have been performed in accordance with the 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: 26/01/2022



**Auckland Laboratory**

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

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.}

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 2/02/2022

Test Results

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

Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
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	
<i>This report replaces all previous issues of report no. EFIL:ETAM22W00117</i>	
<p>Client: Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023</p> <p>Principal: Stephen Parkes</p> <p>cc to: -</p> <p>Project No.: 773-ETAM01553</p> <p>Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA</p> <p>Project Location: 117 Kowhai Road, Orewa</p>	<p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. (This document may not be altered or reproduced except in full. This report relates only to the positions tested.)</p>
	<p>ACCREDITED IANZ TESTING LABORATORY</p>
	<p><i>E. Paton</i></p>
	<p>Approved Signatory: Eric Paton Director-Testing IANZ Site Number: 105</p>
	<p>Date of Issue: 2/02/2022</p>



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.}



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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
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

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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00117

Issue No:1

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



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

{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

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



SITE PLAN (NOT TO SCALE)



Auckland Laboratory

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

Report No: EFIL:ETAM22W00117

Issue No:1

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



All tests reported herein have been performed in accordance with the 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

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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/01/2022	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

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



**Auckland Laboratory**

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

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.}

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
16/02/2022	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:



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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00233

Issue No:1

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



All tests reported herein have been performed in accordance with the 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: 18/02/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00242

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



All tests reported herein have been performed in accordance with the 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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/02/2022	ETAM22W00242	SC	681	1.77	34.2	1.32	2.70	6.3	188	168	176	184	Ref to plan	1749816	5948951	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	682	1.79	36.2	1.32	2.70	3.7	168	188	188	184	Ref to plan	1749022	5948987	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	683	1.84	30.7	1.41	2.70	4.7	188	188	UTP	UTP	Gully	1748984	5948917	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	684	1.94	26.5	1.53	2.70	2.4	UTP	UTP	188	188	Gully	1749022	5948894	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	685	1.84	41.7	1.30	2.70	0.0	UTP	UTP	UTP	UTP	Silt Pond	1749065	5948937	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	686	1.93	26.5	1.52	2.70	3.2	UTP	UTP	UTP	UTP	Silt Pond	1749109	5948928	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	687	1.86	27.0	1.46	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749058	5949002	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	688	1.80	31.5	1.37	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749081	5948998	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	689	1.73	37.9	1.26	2.70	5.8	146	155	146	160	Stage 1 Rock	1749321	5948750	-	Silty Clay	250mm below F/L

Comments:

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



SITE PLAN (NOT TO SCALE)

**Auckland Laboratory**

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

Report No: EFIL:ETAM22W00261**Issue No:1***This report replaces all previous issues of report no. EFIL:ETAM22W00261*

All tests reported herein have been performed in accordance with the 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

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/02/2022	ETAM22W00261	SC	694	1.87	28.4	1.45	2.70	5.0	188	188	168	168	Siltpond Backfill	1749016	5948957	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	695	1.83	33.2	1.37	2.70	3.5	168	168	168	168	Gully	1749076	5948939	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	696	1.89	27.5	1.48	2.70	4.3	168	168	188	188	Main Gully	1749025	5948902	-	Silty Clay	-

Comments:



Earthworks Fill Report

Auckland Laboratory

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

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



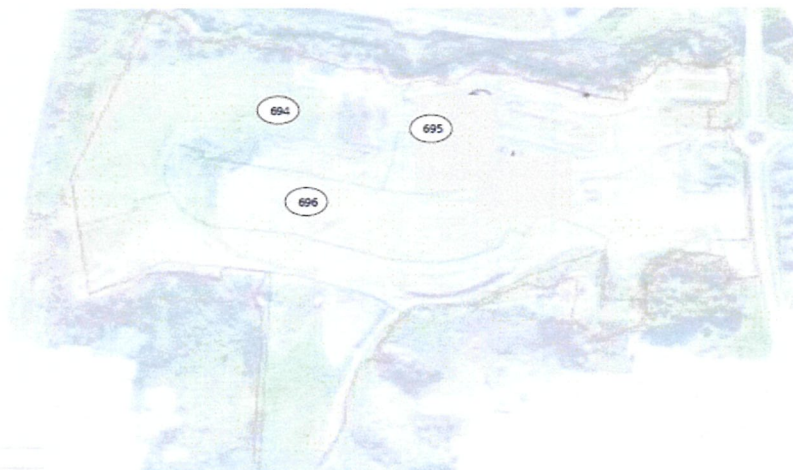
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
Director-Testing

IANZ Site Number: 105

Date of Issue: 23/02/2022



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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/03/2022	ETAM22W00341	SC	723	1.90	28.3	1.48	2.70	3.2	208+	208+	208+	UTP	Gully 2	1748981	5948889	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	724	1.87	29.3	1.45	2.70	4.1	208+	208+	UTP	UTP	Gully 2	1749004	5948916	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	725	1.90	31.9	1.44	2.70	1.0	188	188	208+	208+	Gully 2	1749060	5948901	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	726	1.83	29.5	1.42	2.70	5.8	200	200	UTP	UTP	Silt Pond	1749004	5948988	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	727	1.74	23.0	1.41	2.70	15.3	UTP	UTP	UTP	UTP	A7-A15	1749168	5948985	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	728	1.69	25.0	1.35	2.70	16.1	UTP	UTP	UTP	UTP	A15-15B	1749200	5948998	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	729	1.68	25.6	1.34	2.70	16.1	UTP	UTP	UTP	UTP	15B-15C	1749220	5948990	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	730	1.84	29.5	1.42	2.70	5.5	UTP	UTP	UTP	UTP	15C-15D	1749248	5948982	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	731	1.73	23.4	1.40	2.70	15.3	UTP	UTP	UTP	UTP	15-15D	1749275	5948977	-	Silty CLAY	At finished level

Comments:



Auckland Laboratory

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

Report No: EFIL:ETAM22W00341

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00341

All tests reported herein have been performed in accordance with the 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

Earthworks Fill Report

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

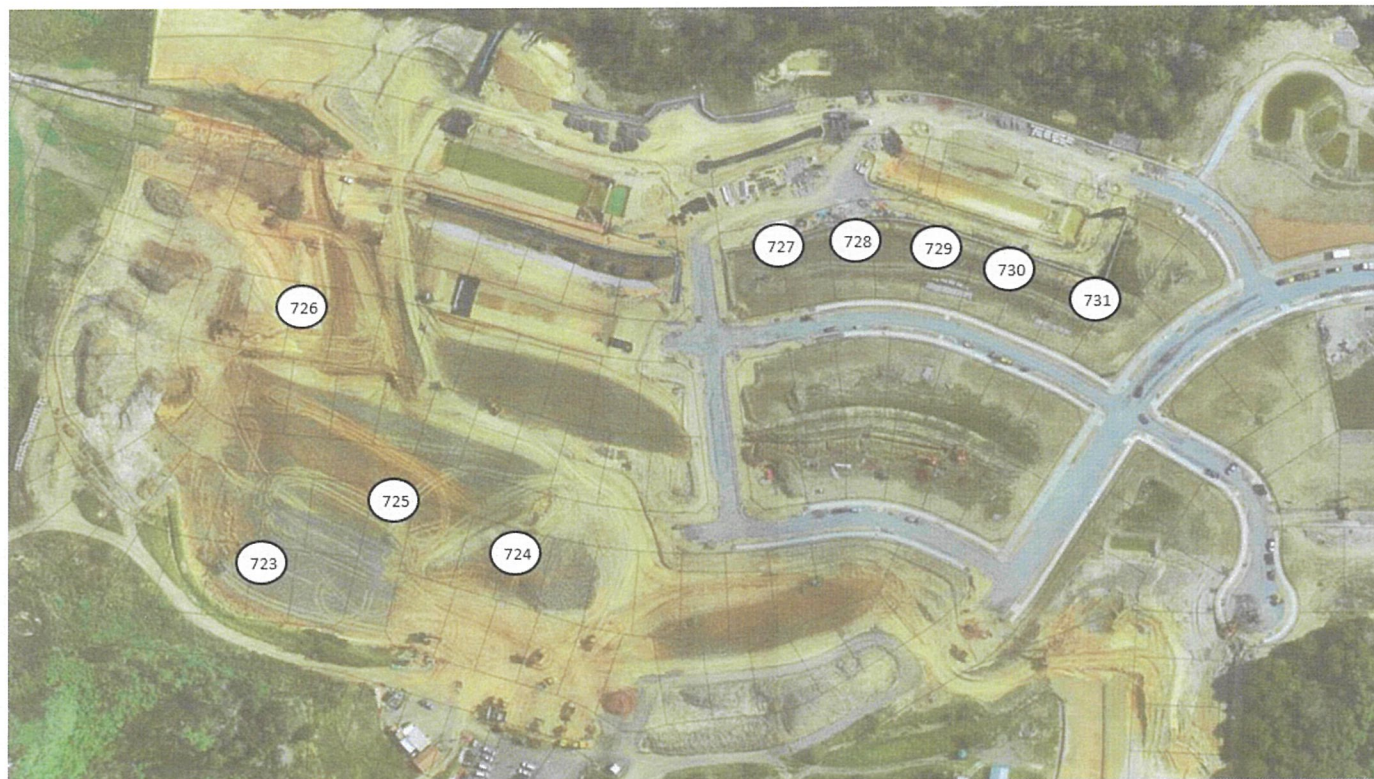
Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa





Auckland Laboratory

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

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.}

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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
10/03/2022	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

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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00363

Issue No:1

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



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

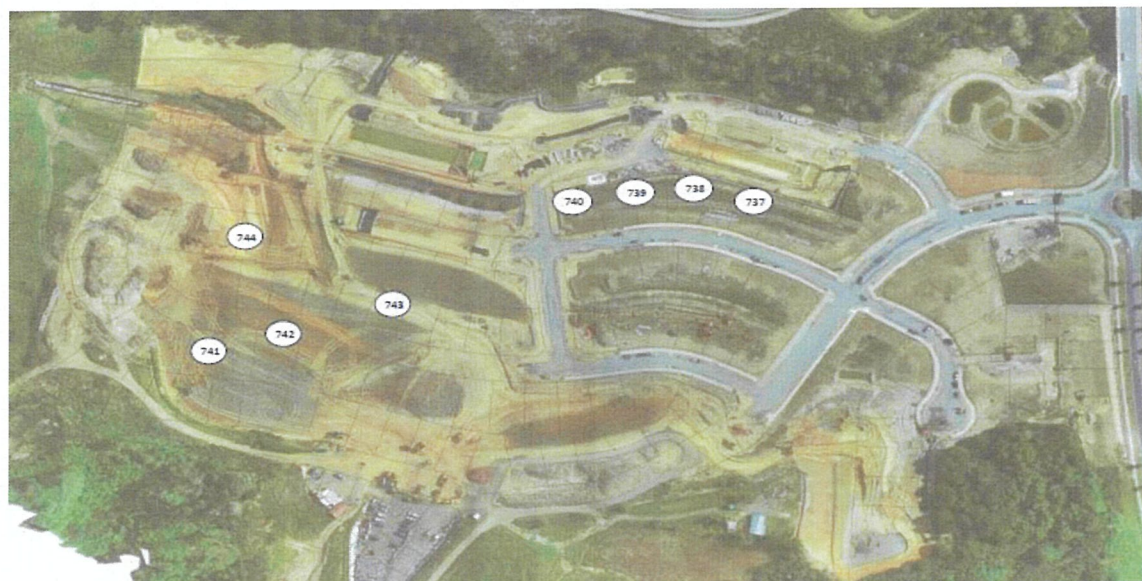
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 14/03/2022





Auckland Laboratory

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

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



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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 ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
15/03/2022	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



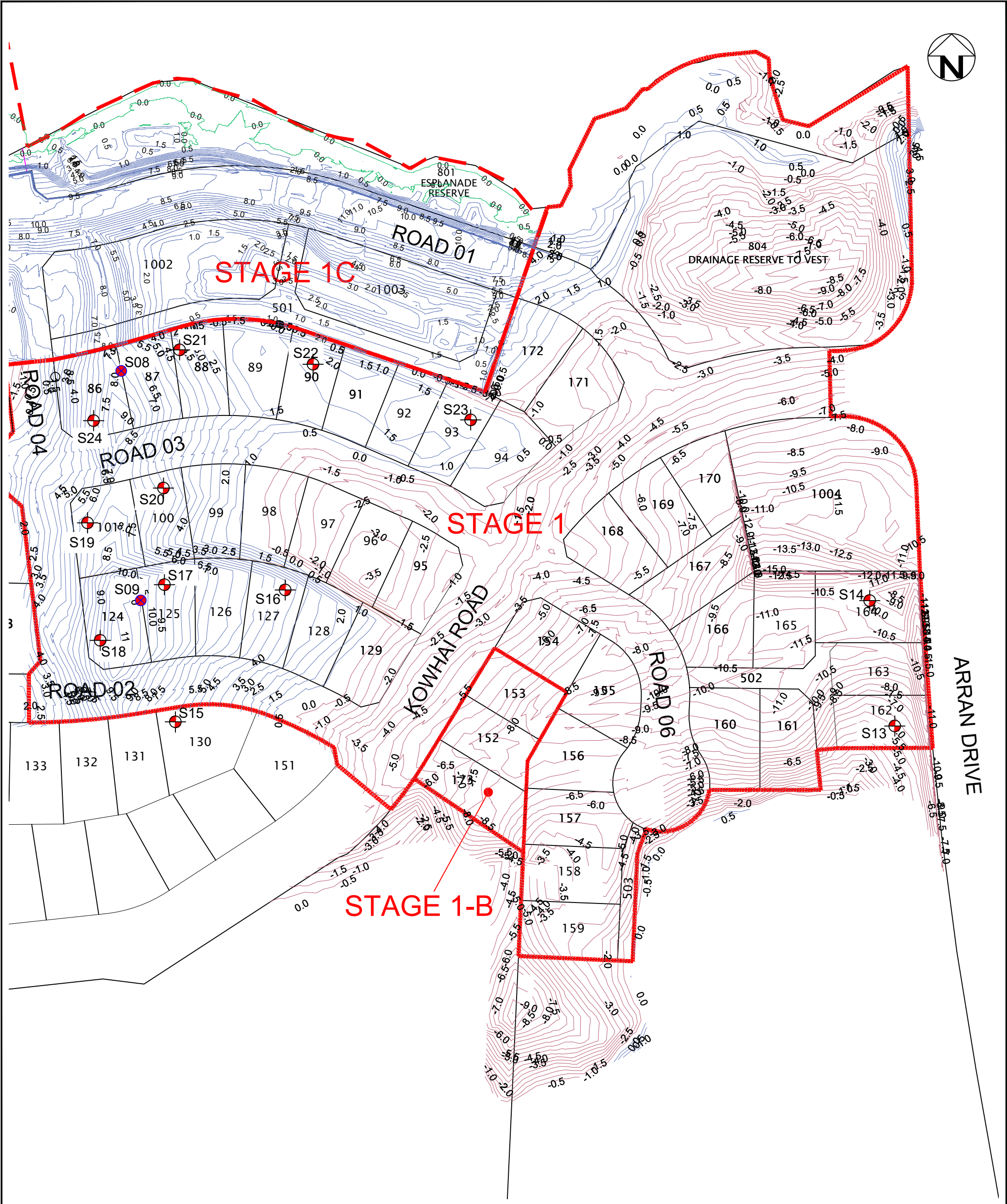
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(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)

E. Paton

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



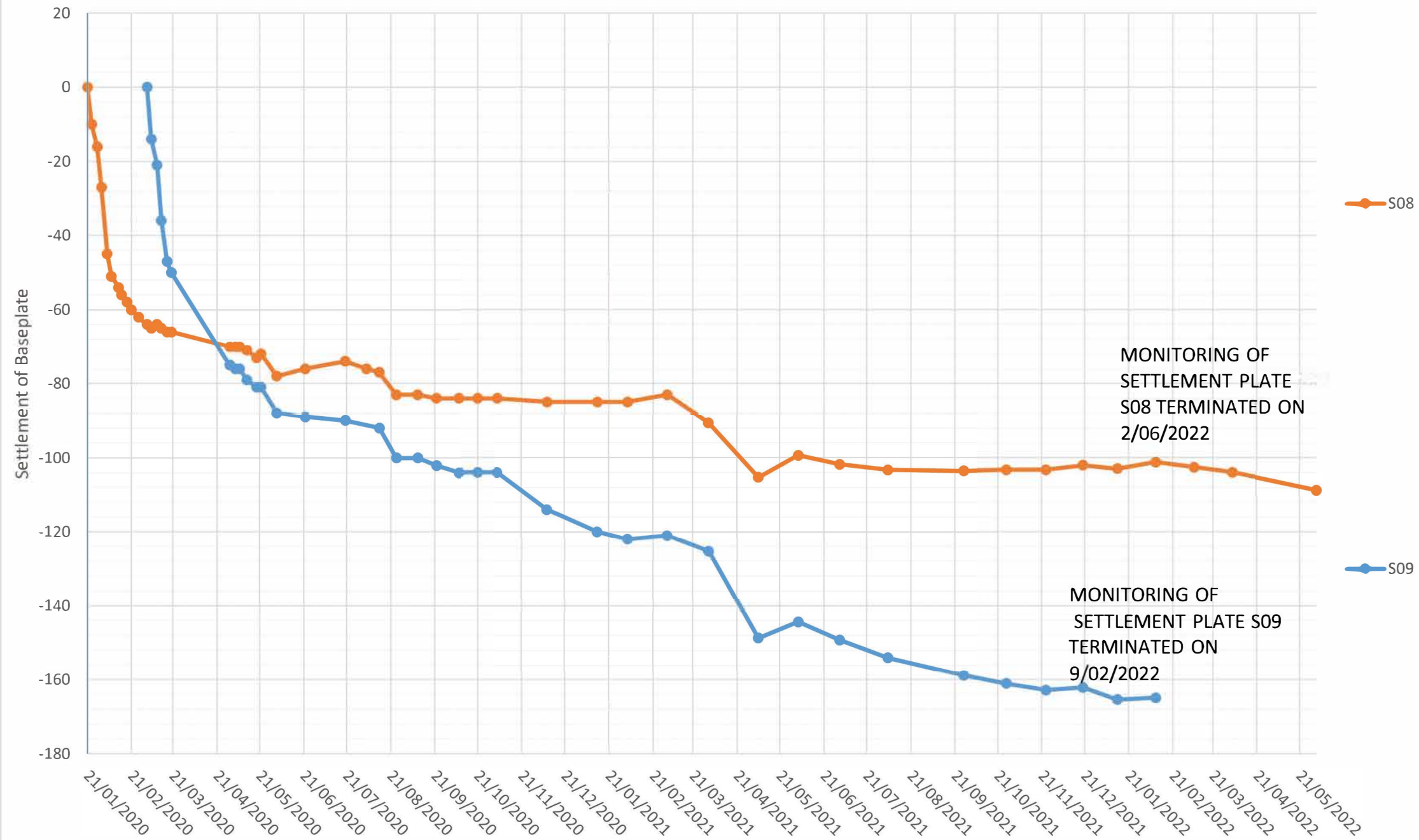
APPENDIX E: MONITORING RESULTS



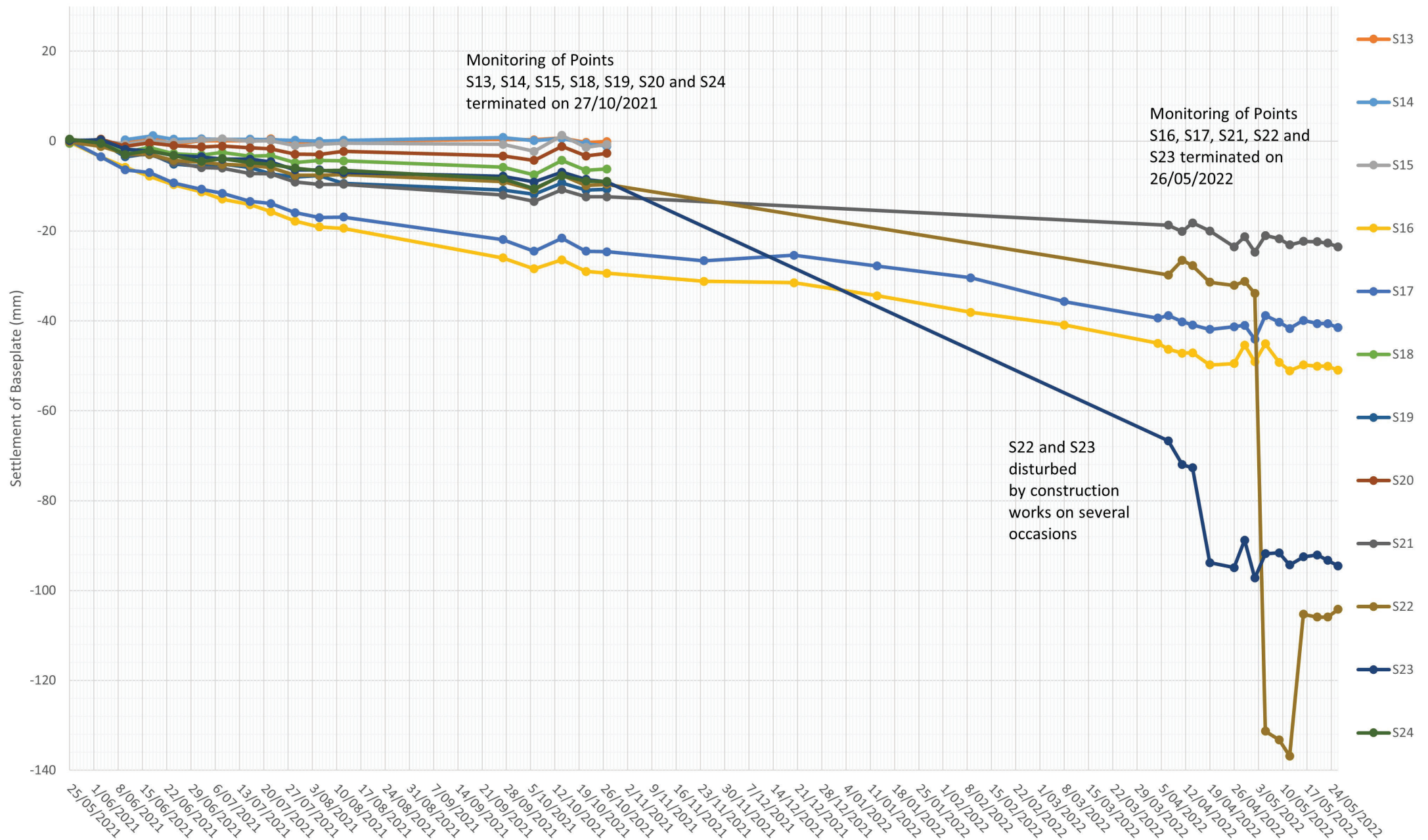
revision	no.	description	drawn	approved	date	<div>LEGEND</div> <div><div><div></div>AS-BUILT CUT CONTOUR</div><div><div></div>AS-BUILT FILL CONTOUR</div><div><div><div></div>GROUND LEVEL SETTLEMENT MONITORING POINT</div><div><div></div>SETTLEMENT BASE PLATES</div></div></div>				
	A	ORIGINAL ISSUE	RZ	SP	31/01/2023					

<div><div><div>012.52537.55062.5</div><div>SCALE1:1250 (A3)METRES</div></div></div>		drawn	RZ	<div>.\Logo\tt.jpg</div>	client:WFH PROPERTIES LIMITED			
		approved	SP		project:MILLWATER PRECINCT 6 - SUBDIVISION STAGE 1			
		date	31/01/2023		title:SETTLEMENT MONITORING LOCATION PLAN			
		scale	AS SHOWN		project no:773-AKLGE206639		figure no:BK/003	rev:A
		original size	A3					

Arran Hill P6 - Settlement of Baseplates (mm)

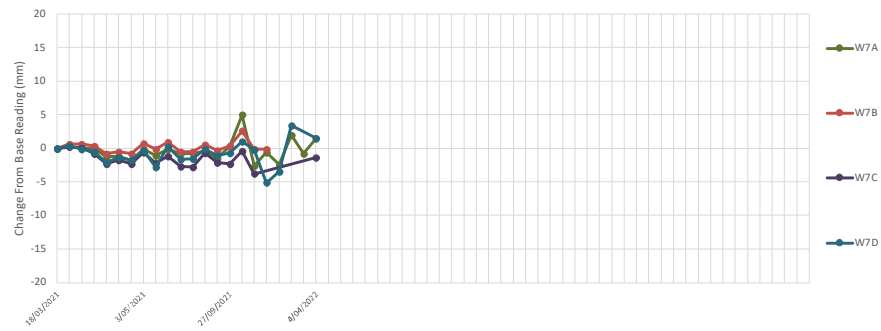


Arran Hill P6 - Ground Settlement

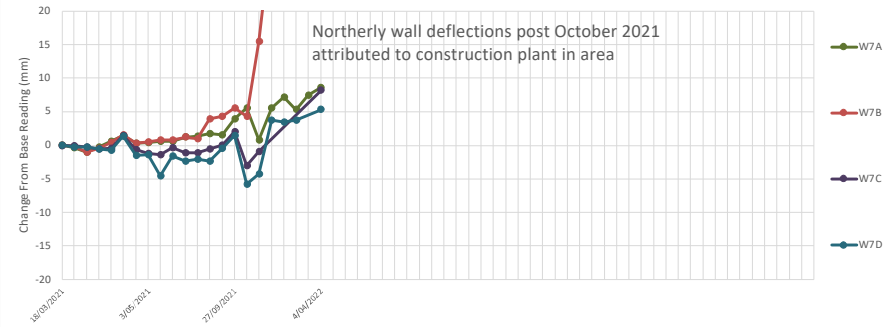




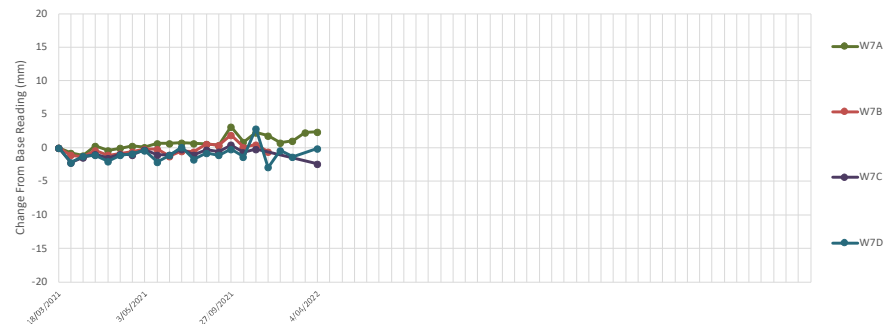
37610 - Arran Hill P6 - Wall 700 - Easting

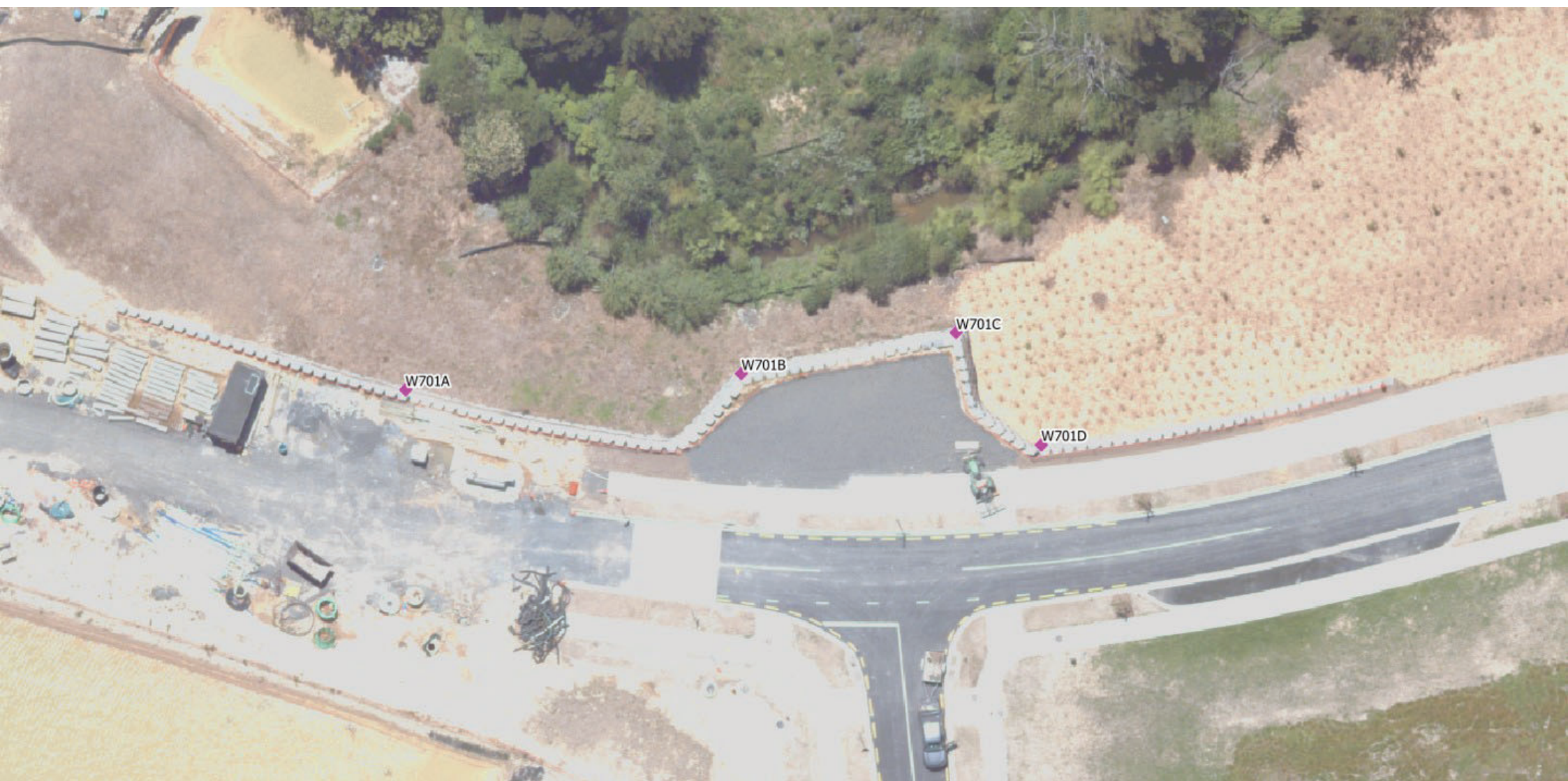


37610 - Arran Hill P6 - Wall 700 - Northing

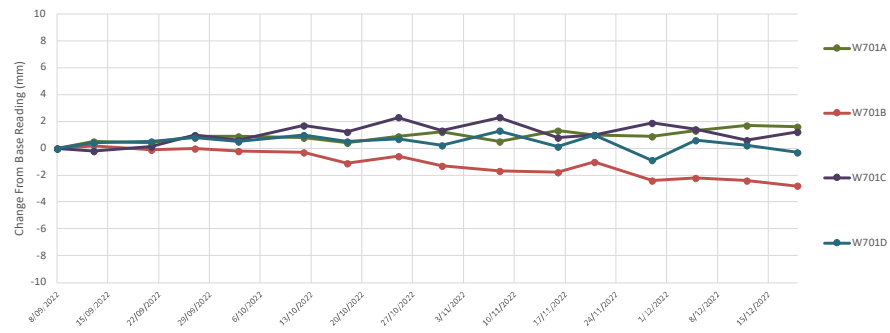


37610 - Arran Hill P6 - Wall 700 - Height

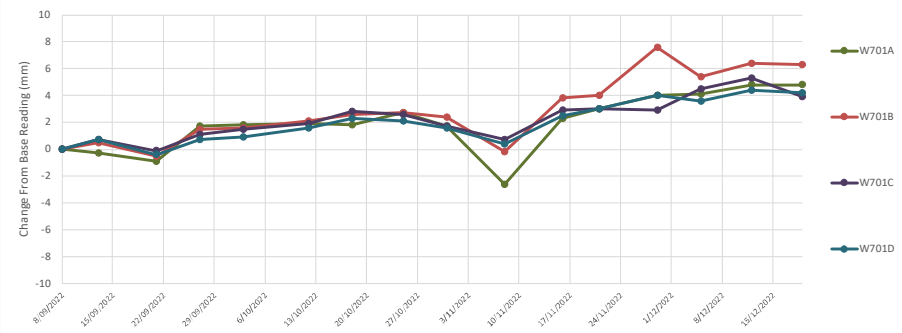




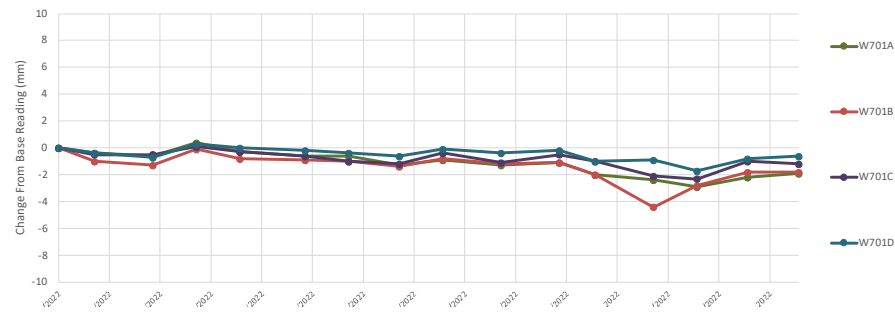
37610 - Arran Hill P6 - Wall 701 - Easting



37610 - Arran Hill P6 - Wall 701 - Northing



37610 - Arran Hill P6 - Wall 701 - Height



APPENDIX F: PRODUCER STATEMENT – CONSTRUCTION REVIEWS (PS4)

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:



Tasman Lambert Andrews
Graduate Engineering Geologist

Reviewed and Authorised By:



Chris Armstrong
Principal Geotechnical Engineer
CMEngNZ, CPEng

Attachments – Producer Statement - Construction Review (PS4)

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

ISSUED BY:.....
(Construction Review Firm)

TO:.....
(Owner/Developer)

TO BE SUPPLIED TO:.....
(Building Consent Authority)

IN RESPECT OF:.....
(Description of Building Work)

AT:.....
(Address)

Town/City:..... LOT..... DP..... SO.....
(Address)

We have been engaged by
(Construction Review Firm)

To provide ☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with
owner/developer.....

or ☐ other services
(Extent of Engagement)

in respect of clause(s) of the Building Code for the building work described in

documents relating to Building Consent No. and those relating to

Building Consent Amendment(s) Nos. issued during the
course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions/variation(s) No. (copies attached)
or by the attached Schedule ☐ have been issued during the course of the works.

On the basis of ☐ this review ☐ these review(s) and information supplied by the contractor during the course of the works
and **on behalf of the firm** undertaking this Construction Review, **I believe on reasonable grounds** that
☐ All or ☐ Part only of the building works have been completed in accordance with the relevant requirements of the

Building Consent and Building Consent Amendments identified above, with respect to Clause(s).....
of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have
the necessary competency to do so.

I, am: ☐ CPEng.#
(Name of Construction Review Professional)

I am a member of: ☐ Engineering New Zealand and hold the following qualifications

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than
\$200,000*.

The Construction Review Firm is a member of ACE New Zealand: ☐

SIGNED BY.....(Signature).....
(Name of Construction Review Professional)

ON BEHALF OF Date.....
(Construction Review Firm)

*Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the
Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building
Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000*.*

This form is to accompany **Forms 6 or 8 of the Building (Form) Regulations 2004** for the issue of a Code Compliance
Certificate.

THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACE NEW ZEALAND AND ENGINEERING NEW ZEALAND

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 2011²

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 Engineers³). The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design firm's engagement.

Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

Refer Also:

- 1 Conditions of Contract for Building & Civil Engineering Construction
NZS 3910: 2013
- 2 NZIA Standard Conditions of Contract SCC 2011
- 3 Guideline on the Briefing & Engagement for Consulting Engineering Services
(ACE New Zealand/IPENZ 2004)
- 4 PN Guidelines on Producer Statements

www.acenz.org.nz
www.engineeringnz.org



association of
consulting and
engineering



29 November 2022

Our ref: 773-AKLGE206639-BN

WFH Properties Limited

Attention: WFH Properties

Geotechnical Observation of Retaining Wall 700 construction at Millwater Precinct 6, Stage 1, Orewa West (Building Consent No. BCO10301029-2)

This letter is to confirm that we visited the above site on numerous occasions between November 2020 and November 2022 to observe the construction of a Mass Block retaining wall within Precinct 6 of the Millwater Subdivision development. This letter and accompanying PS4 covers Mass Block Wall 700.

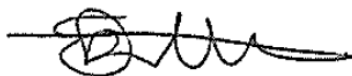
Mass Block Wall 700 extends over 130 linear metres with a maximum retained height of 5.0m, founded on an undercut within the engineered fill placed as part of shear key 1. Founding conditions were consistent with the specifications outlined in Tetra Tech Coffey's Geotechnical Design Report dated 15 April 2021 (Ref: AKLGE206639-AL Rev.2).

During construction, regular site visits were undertaken to observe and test the undrained shear strength of the wall foundation soils, monitor hardfill and clay fill placement and compaction, observe geogrid and geotextile placement, wall drainage construction, facing block placement and pedestrian barrier installation. The aforementioned items were completed in accordance with Tetra Tech Coffey's Geotechnical Design Report dated 15 April 2021 (Ref: AKLGE206639-AL Rev.2).

On the basis of our construction observations, in-situ soil testing, and backfill testing, we are satisfied that the site works undertaken to construct Mass Block Retaining Wall 700 were generally in accordance with our Geotechnical Design Report dated 15 April 2021 (Ref: AKLGE206639-AL Rev.2).

For and on behalf of Tetra Tech Coffey

Prepared By:

**Ethan Potter**
Engineering Geologist

Reviewed and Authorised By:

**Chris Armstrong**
Principal Geotechnical Engineer
CMEng.NZ, CPEng

Attachments – Producer Statement - Construction Review (PS4)

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

ISSUED BY:.....
(Construction Review Firm)

TO:.....
(Owner/Developer)

TO BE SUPPLIED TO:.....
(Building Consent Authority)

IN RESPECT OF:.....
(Description of Building Work)

AT:.....
(Address)

Town/City:..... LOT..... DP..... SO.....
(Address)

We have been engaged by
(Construction Review Firm)

To provide ☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with
owner/developer.....

or ☐ other services
(Extent of Engagement)

in respect of clause(s) of the Building Code for the building work described in

documents relating to Building Consent No. and those relating to

Building Consent Amendment(s) Nos. issued during the
course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions/variation(s) No. (copies attached)
or by the attached Schedule ☐ have been issued during the course of the works.

On the basis of ☐ this review ☐ these review(s) and information supplied by the contractor during the course of the works
and **on behalf of the firm** undertaking this Construction Review, **I believe on reasonable grounds** that
☐ All or ☐ Part only of the building works have been completed in accordance with the relevant requirements of the

Building Consent and Building Consent Amendments identified above, with respect to Clause(s).....
of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have
the necessary competency to do so.

I, am: ☐ CPEng.#
(Name of Construction Review Professional)

I am a member of: ☐ Engineering New Zealand and hold the following qualifications

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than
\$200,000*.

The Construction Review Firm is a member of ACE New Zealand: ☐

SIGNED BY.....(Signature).....
(Name of Construction Review Professional)

ON BEHALF OF Date.....
(Construction Review Firm)

*Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the
Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building
Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000*.*

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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 2011²

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.

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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

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