

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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CONTENTS

| | | |
|-----------|---|-----------|
| 1. | INTRODUCTION | 3 |
| 2. | RELATED REPORTS | 4 |
| 3. | CONSTRUCTION WORKS | 5 |
| 3.1 | Plant..... | 5 |
| 3.2 | Construction Programme | 6 |
| 3.2.1 | Enabling Earthworks (March to November 2017)..... | 6 |
| 3.2.2 | Bulk Earthworks (June 2019 to April 2022) | 6 |
| 3.2.3 | Civil Works (May 2022 to May 2023)..... | 7 |
| 4. | QUALITY ASSURANCE AND CONTROLS | 8 |
| 4.1 | Construction Observations..... | 8 |
| 4.2 | Earth Fill Quality Control Criteria | 8 |
| 5. | PROJECT EVALUATION | 9 |
| 5.1 | Stability Evaluation..... | 9 |
| 5.1.1 | General | 9 |
| 5.1.2 | Shear Key SK1 | 9 |
| 5.2 | Retaining Walls | 10 |
| 5.2.1 | Existing Retaining Walls | 10 |
| 5.2.2 | Future Retaining Walls on the Private Lots | 11 |
| 5.3 | Fill Induced Settlement | 11 |
| 5.4 | Subsoil Drainage..... | 11 |
| 5.4.1 | Underfill Drains | 12 |
| 5.4.2 | Flushing of Subsoil Drains | 12 |
| 5.5 | Shared Timber Boardwalk Within Lot 6000 | 12 |
| 5.6 | Bearing Capacity..... | 12 |
| 5.7 | Expansive Soils..... | 13 |
| 5.8 | Stormwater Controls | 13 |
| 5.9 | Service Trenches | 13 |
| 5.10 | Topsoil..... | 14 |
| 5.11 | Public Road and JOAL Subgrades | 14 |
| 5.12 | Contractors Work | 14 |
| 5.13 | Incomplete Works | 14 |
| 6. | STATEMENT OF PROFESSIONAL OPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT | 15 |

7. **LIMITATIONS**17

LIST OF TABLES

Table 1: Schedule of Precinct 6 - Stage 1C Subdivision As-Built Plans3
Table 2: Summary of Appended Reference Drawings3
Table 3: Summary of Segmental Block Retaining Wall Construction Details10
Table 4: Summary of Retaining Wall Design Parameters11
Table 5: Pile Design Parameters15
Table 6: Suitability Statement Summary18

APPENDICES

APPENDIX A: WOODS AS-BUILT DRAWINGS

APPENDIX B: REFERENCE DRAWINGS

APPENDIX C: CLASSIFICATION TESTS

APPENDIX D: EARTHWORKS FIELD DENSITY SUMMARY SHEETS

APPENDIX E: MONITORING RESULTS

APPENDIX F: PRODUCER STATEMENT – CONSTRUCTION REVIEWS (PS4)

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 | 08/06/2023 |
| 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 May 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-AKLGE2066369-AN Rev.2, dated 13 May 2020 – Geotechnical Monitoring Protocol;

- 773-AKLGE206639-BH, dated 16 June 2022 – Producer Statement – PS4 (Construction Review) for Retaining Walls 311 and 312.
- 773-AKLGE206639-BN, dated 29 November 2022 – Producer Statement – PS4 (Construction Review) for Retaining Wall 700; and
- 773-AKLGE206639-BQ, dated 18 April 2023 – Producer Statement – PS4 (Construction Review) for Timber Boardwalk – BCO10349216

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 May 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.

Tetra Tech Coffey observed ground conditions exposed within the pile holes and confirmed the pile hole specifications during construction, and tested the compaction of hardfill placed to form the boardwalk abutments.

The bridge was completed in May 2024 following installation of the abutment pedestrian balustrades.

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 700 and 701 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 700 and 701¹;
- 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.

¹ See section 5.13 for more details.

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 Segmental Block (Mass Bloc) retaining walls 700 and 701, and the Timber Boardwalk abutment 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 is 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

A 63m long timber pedestrian boardwalk has been constructed to link Stage 1C with Godfrey Drive north of the stage boundary.

The bridge abutments encompass Retaining Wall 701 (southern abutment) and the existing MSE retaining wall located in previously completed subdivision Stage Precinct 5 (northern abutment).

The walls were designed to accommodate the anticipated bridge loadings and geogrids were placed at depths to ensure they weren't damaged during installation of the reinforced concrete sill beams which support the bridge deck.

During construction, ground conditions within pile hole excavations were observed daily by Tetra Tech Coffey to confirm accordance with the assumptions stated in the Novare Shared Path Boardwalk Structural Design Report referenced 3200/41 Rev. B, dated 14/03/2022, and the recommendations of CMW Geosciences Geotechnical Investigation Report referenced AKL2018-0161AB Rev.0 dated 28 November 2018.

The boardwalk was constructed under Building Consent BCO10349216.

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.

5.13 INCOMPLETE WORKS

At the time of writing of this report, the following items were incomplete:

- Installation of the pedestrian barrier fence above Retaining Wall 701, for the portion of wall located outside of Stage 1C. This will be installed during a subsequent civil stage, upon which CCC will be applied for to close out the retaining wall Building Consent. This will be documented in the future Geotechnical Completion for Stage 2B.

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
PEngGeol / CMEngNZ

Authorised By:



Chris Armstrong

Principal Geotechnical Engineer
CPEng / CMEngNZ

Reviewed By:



Peter Marchant

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

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. CONTOURS ARE AT 0.25m INTERVALS.
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

- 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 |
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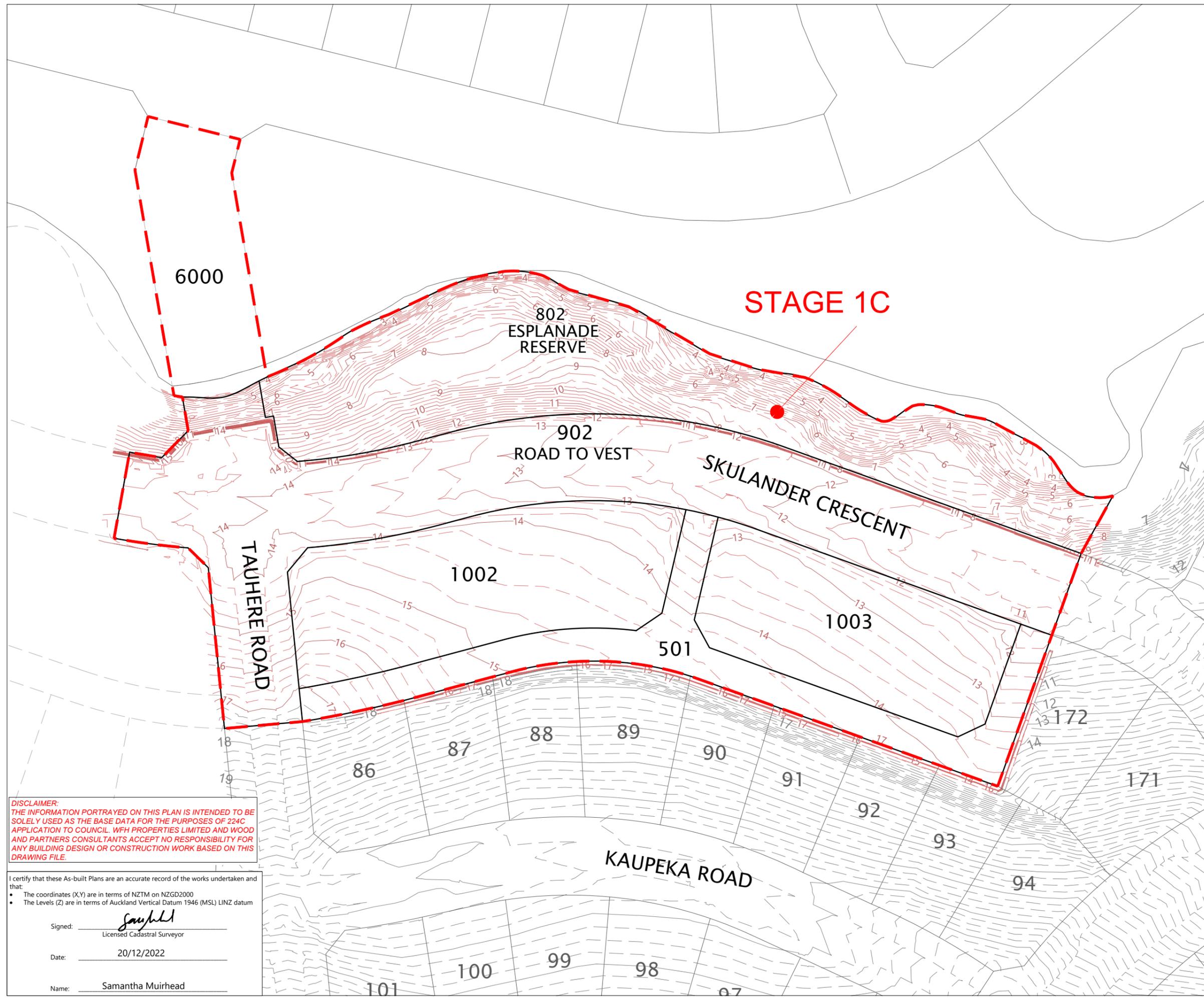
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| DESIGNED | WOODS | |
| DRAWN | MD | |
| CHECKED | JM | |
| APPROVED | SM | |

N

**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.

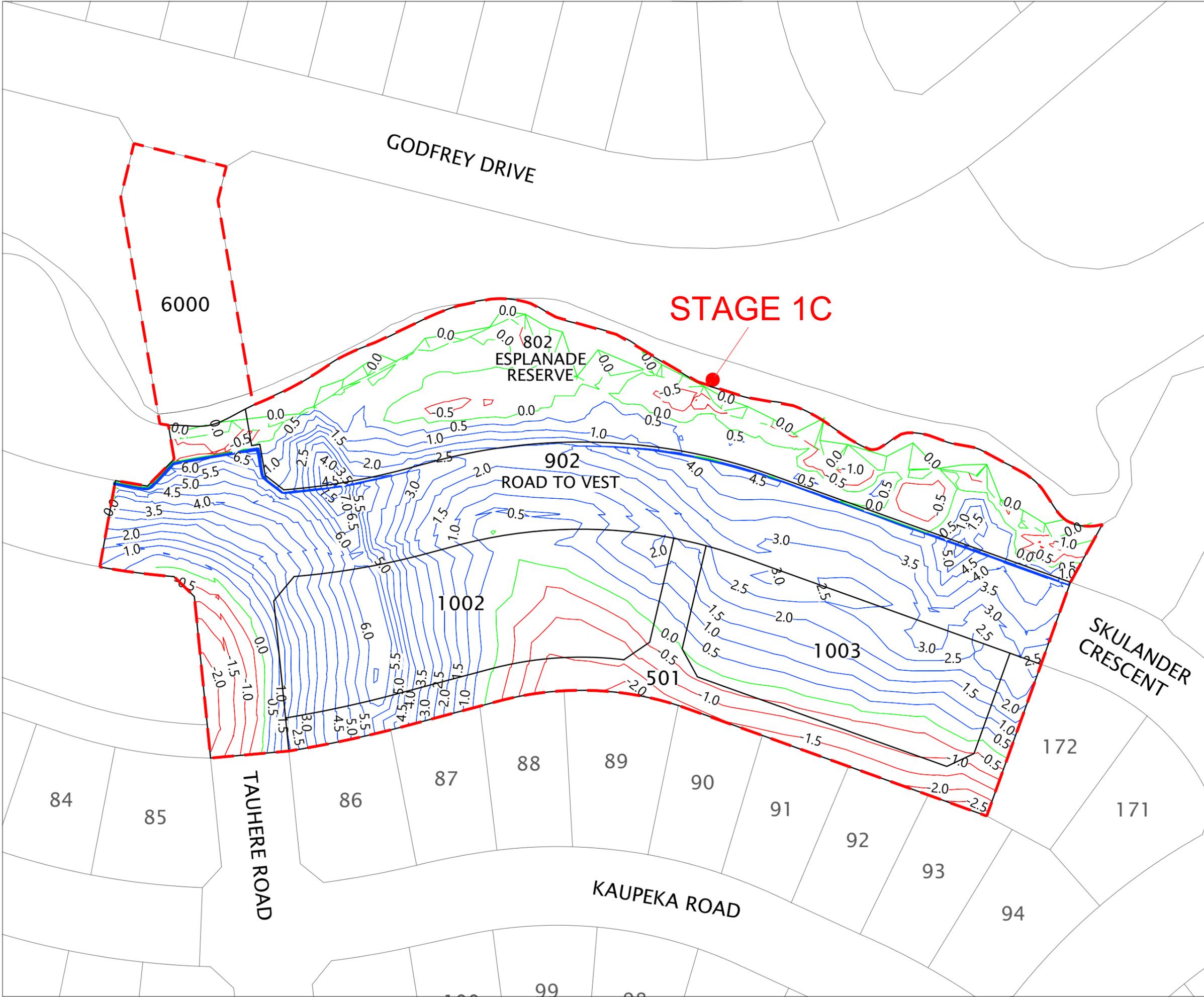
I certify that these As-built Plans are an accurate record of the works undertaken and that:

- 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: *Smyth*
Licensed Cadastral Surveyor

Date: 20/12/2022

Name: Samantha Muirhead



- NOTES**
- COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
 - 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

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

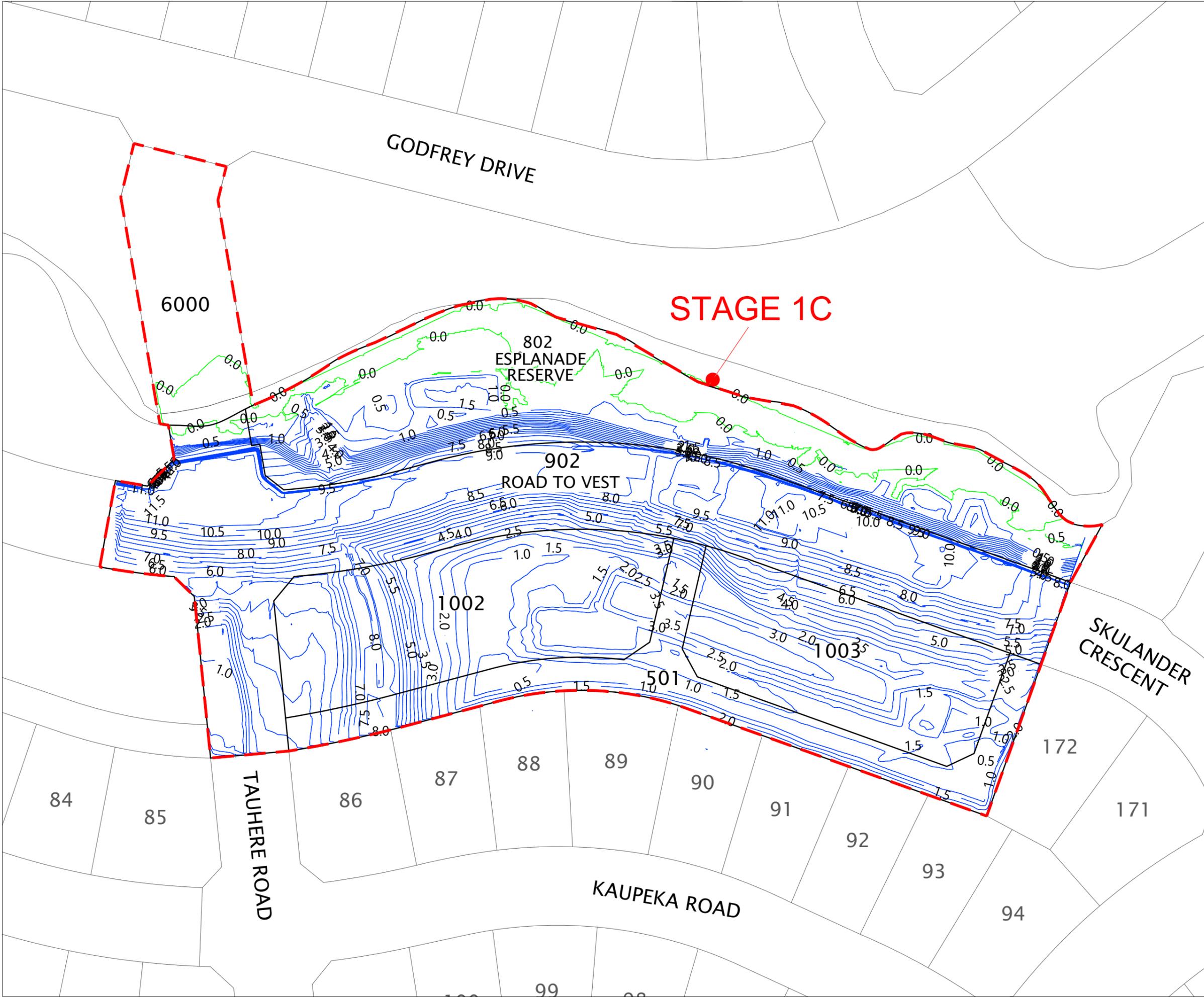
DISCLAIMER:
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| REVISION DETAILS | BY | DATE |
|--------------------------|----|----------|
| 1 ISSUED FOR INFORMATION | MD | 20/12/22 |

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

**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**
- COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
 - 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

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

DISCLAIMER:
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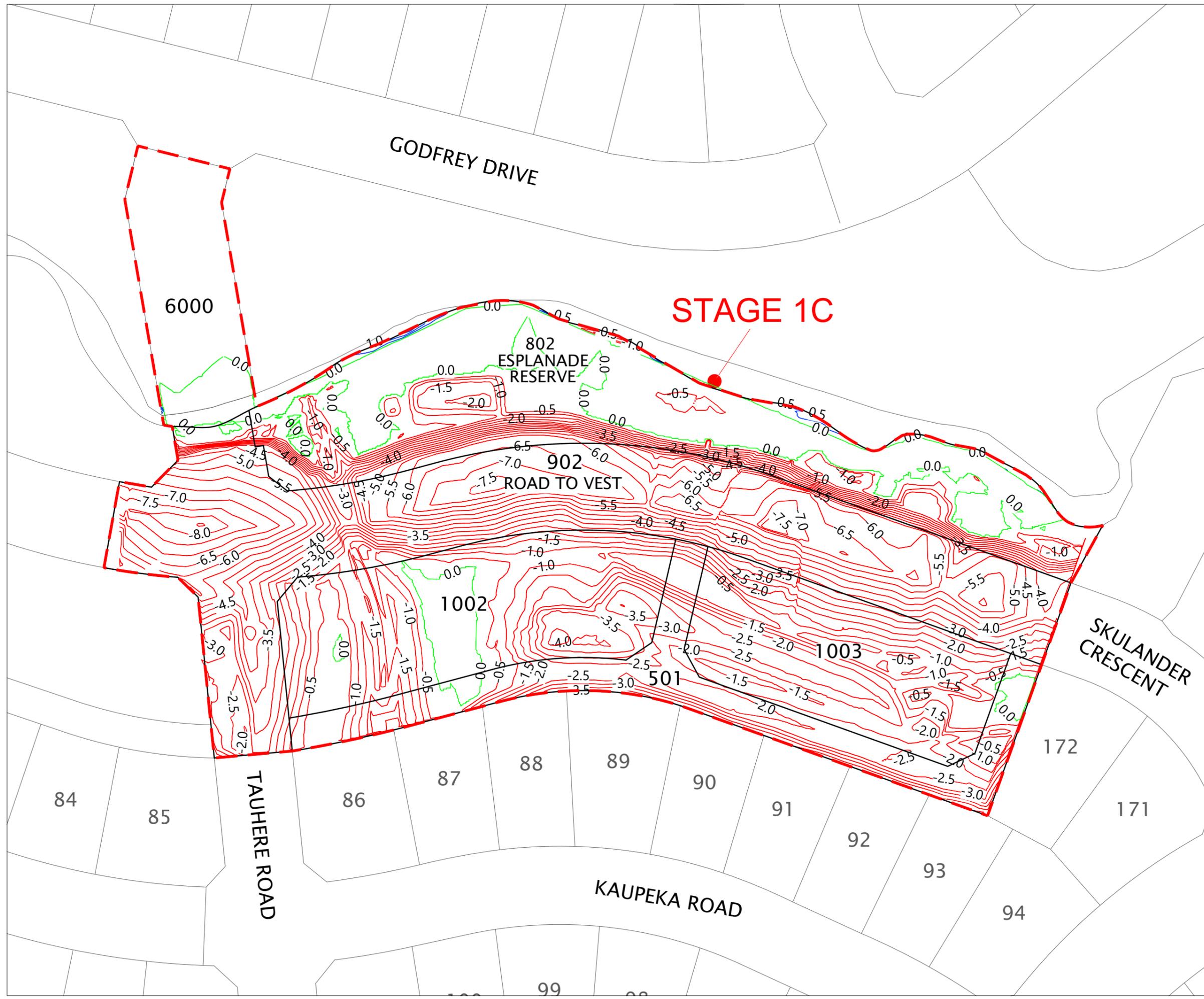
| REVISION DETAILS | BY | DATE |
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| 1 ISSUED FOR INFORMATION | MD | 20/12/22 |
| | | |
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| | | |
|----------|-------|--|
| SURVEYED | WOODS | BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023 |
| 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**
- COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
 - 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

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

DISCLAIMER:
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| REVISION DETAILS | | BY | DATE |
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| 1 | ISSUED FOR INFORMATION | MD | 20/12/22 |
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| | | |
|----------|-------|--|
| SURVEYED | WOODS | BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023 WOODS.CO.NZ |
| DESIGNED | WOODS | |
| DRAWN | MD | |
| CHECKED | JM | |
| APPROVED | SM | |

N

**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 | |

DISCLAIMER:
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DISCLAIMER:
SUBSOIL DRAINS ARE INDICATIVE 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 |
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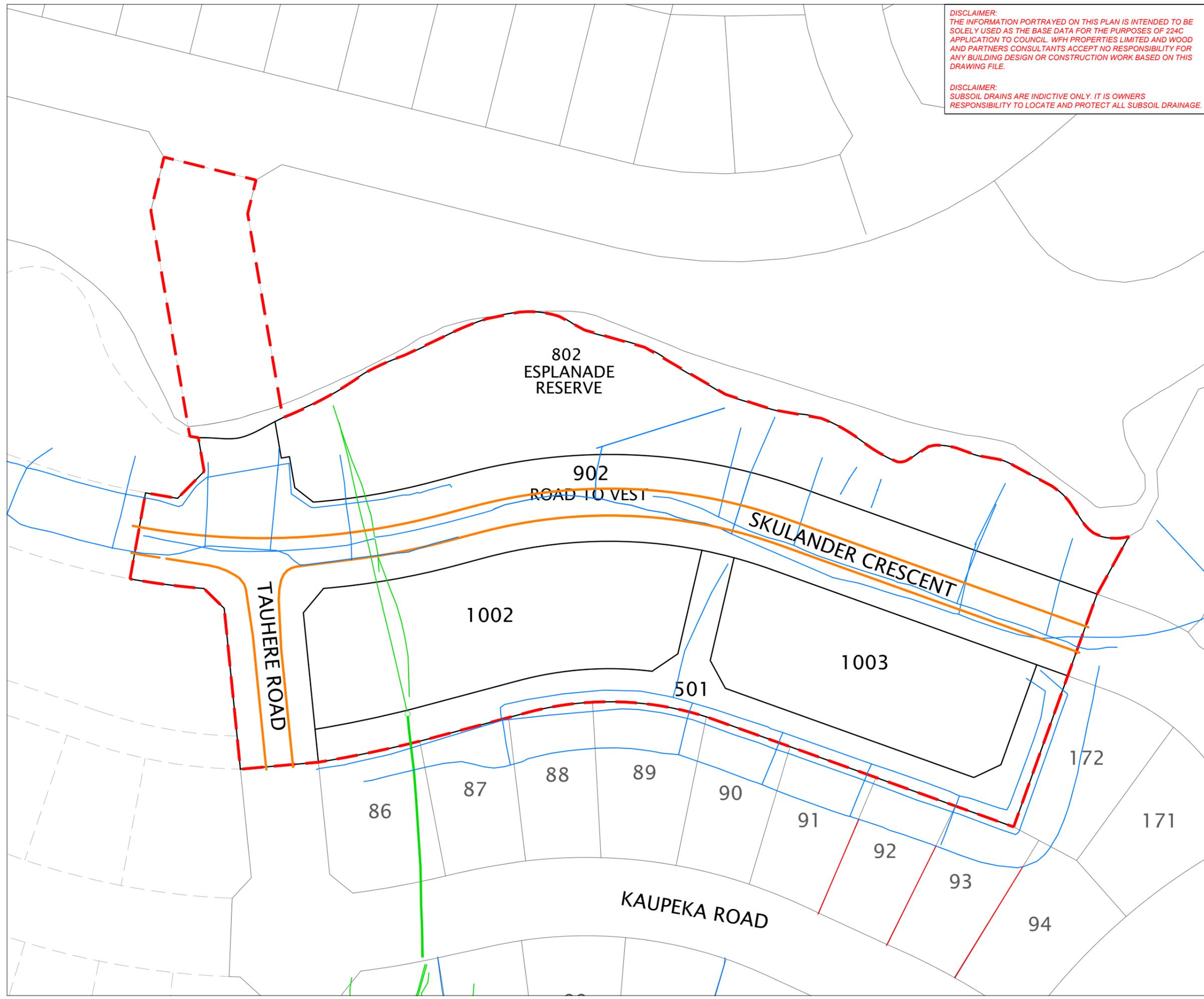
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|----------|-------|--|
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| DESIGNED | WOODS | |
| DRAWN | EY | |
| CHECKED | JM | |
| APPROVED | SM | |

N

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

SUBSOIL DRAINAGE ASBUILT PLAN

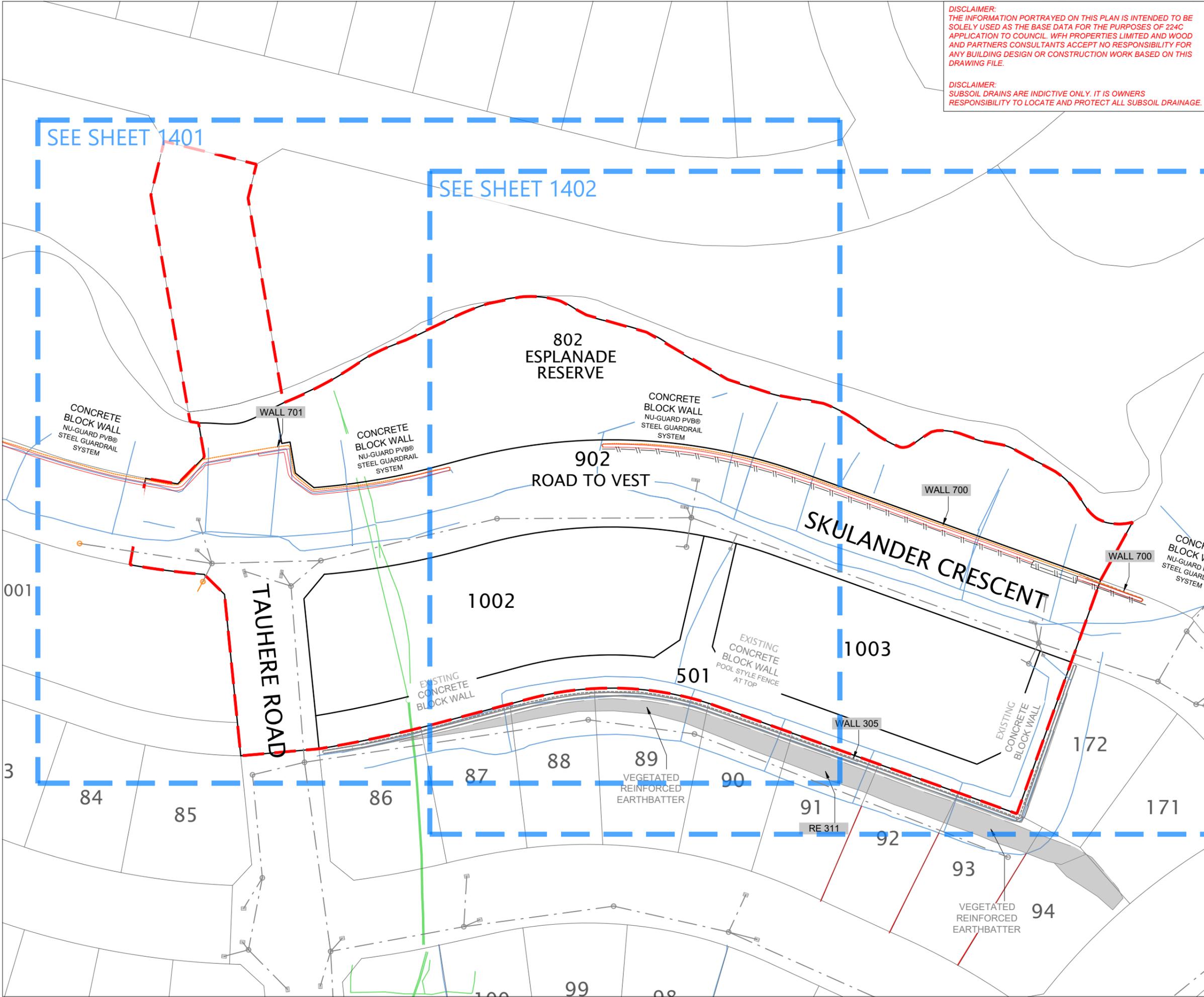
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| STATUS | AS-BUILT | REV |
| SCALE | 1:750 @ A3 | 1 |
| COUNCIL | AUCKLAND COUNCIL | |
| DWG NO | P22-006-00-1200-AB | |



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



SEE SHEET 1401

SEE SHEET 1402

LEGEND:

- BOTTOM FACE OF WALL
- TOP FACE OF WALL
- RE SLOPE / RETAINING WALL DRAINAGE
- UNDERFILL DRAINS
- FENCE
- TOP OF BANK
- BOTTOM OF BANK
- BOUNDARY
- 0.10m 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 |
| DESIGNED | WOODS | |
| DRAWN | MD | |
| CHECKED | JM | |
| APPROVED | SM | |

N

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

RETAINING WALL ASBUILT PLAN
LAYOUT SHEET
SHEET 1 OF 3

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

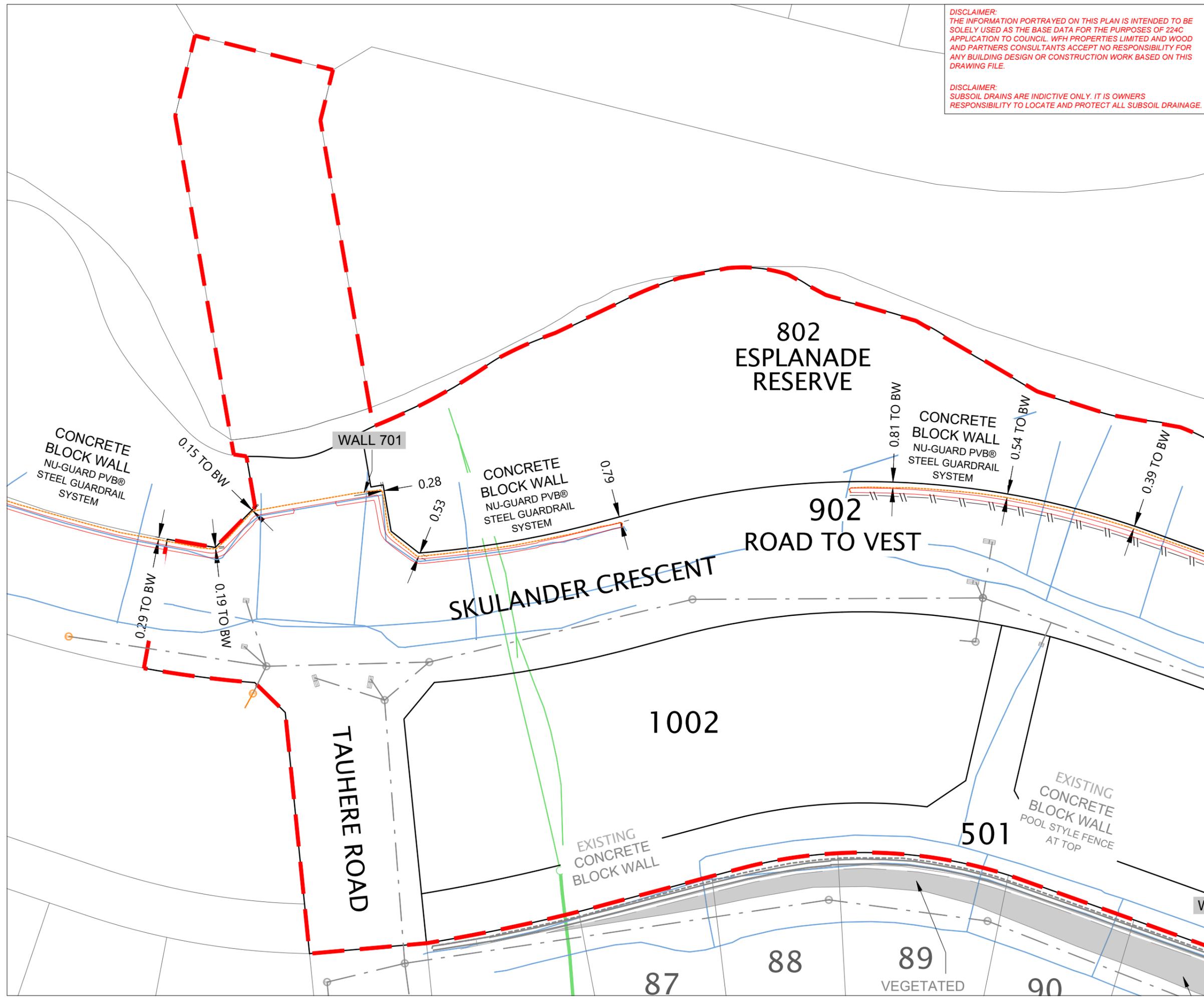
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DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN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

DISCLAIMER:
SUBSOIL DRAINS ARE INDICATIVE ONLY. IT IS OWNERS 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
- 0.10m 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

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

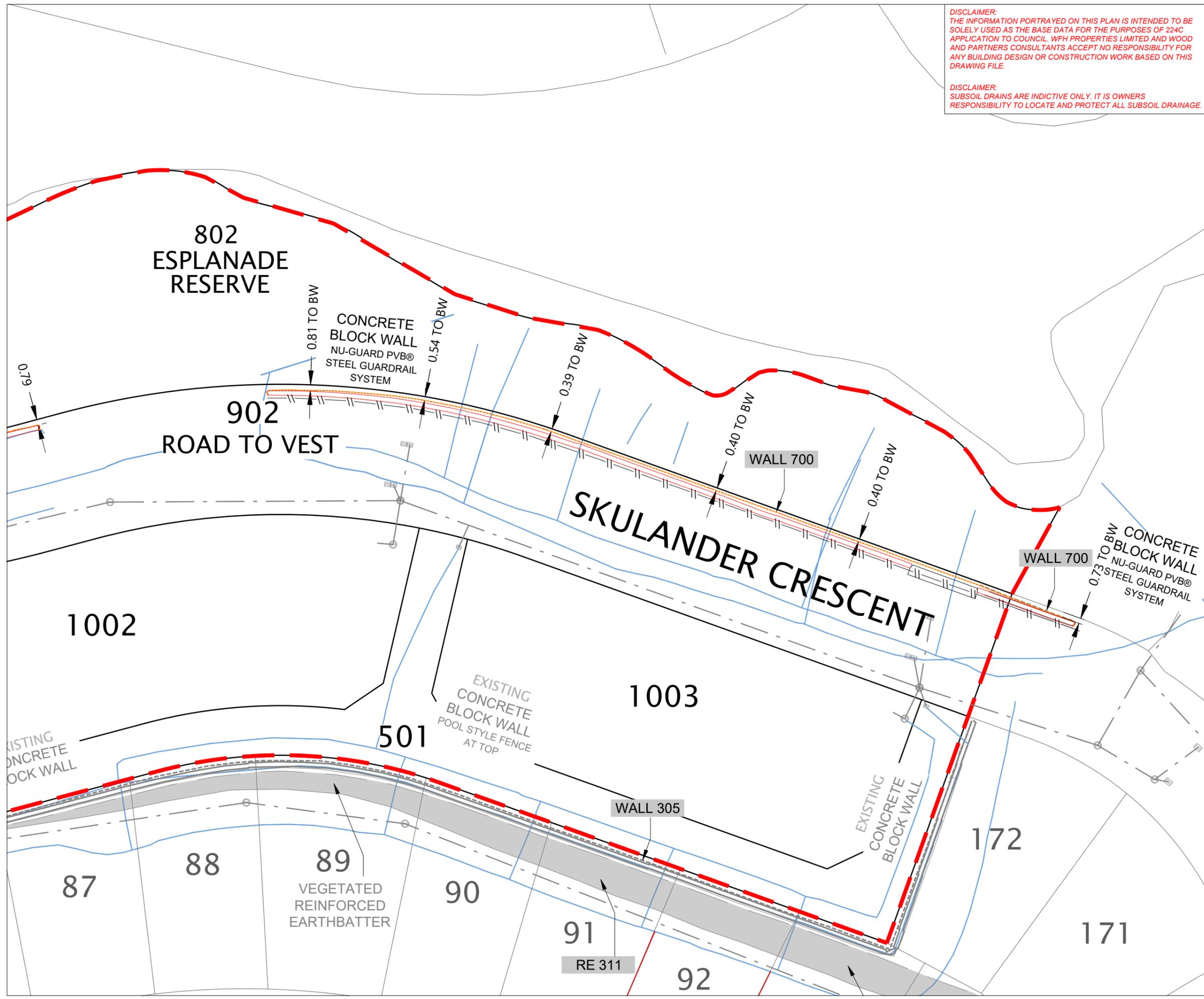
RETAINING WALL ASBUILT PLAN
SHEET 2 OF 3

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

Plot Date: 12:56:44 pm, 21 December 2022, SAMANTHAM
File: C:\125\ENERGY\DATA\WP-PEN-APP-01\P22-006 - ARRAN HILL P6 STAGE 1C_20922\CAD\SURV\BYP22-006-00-1400-AB WALLS.DWG

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.

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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
- 0.10m 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 |
| DESIGNED | WOODS | |
| DRAWN | MD | |
| CHECKED | JM | |
| APPROVED | SM | |

N

**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 | |

Plot Date: 12:56:44 pm, 21 December 2022, SAMANTHAM
File: C:\125\ENERGY\DATA\WP-PEN-APP-01\P22-006 - ARRAN HILL P6 STAGE 1C_2022\CAD\SURV\BYP22-006-00-1402-AB WALLS.DWG

| 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: *Samantha Muirhead*
 Licensed Cadastral Surveyor

Date: 08/06/23

Name: SAMANTHA MUIRHEAD

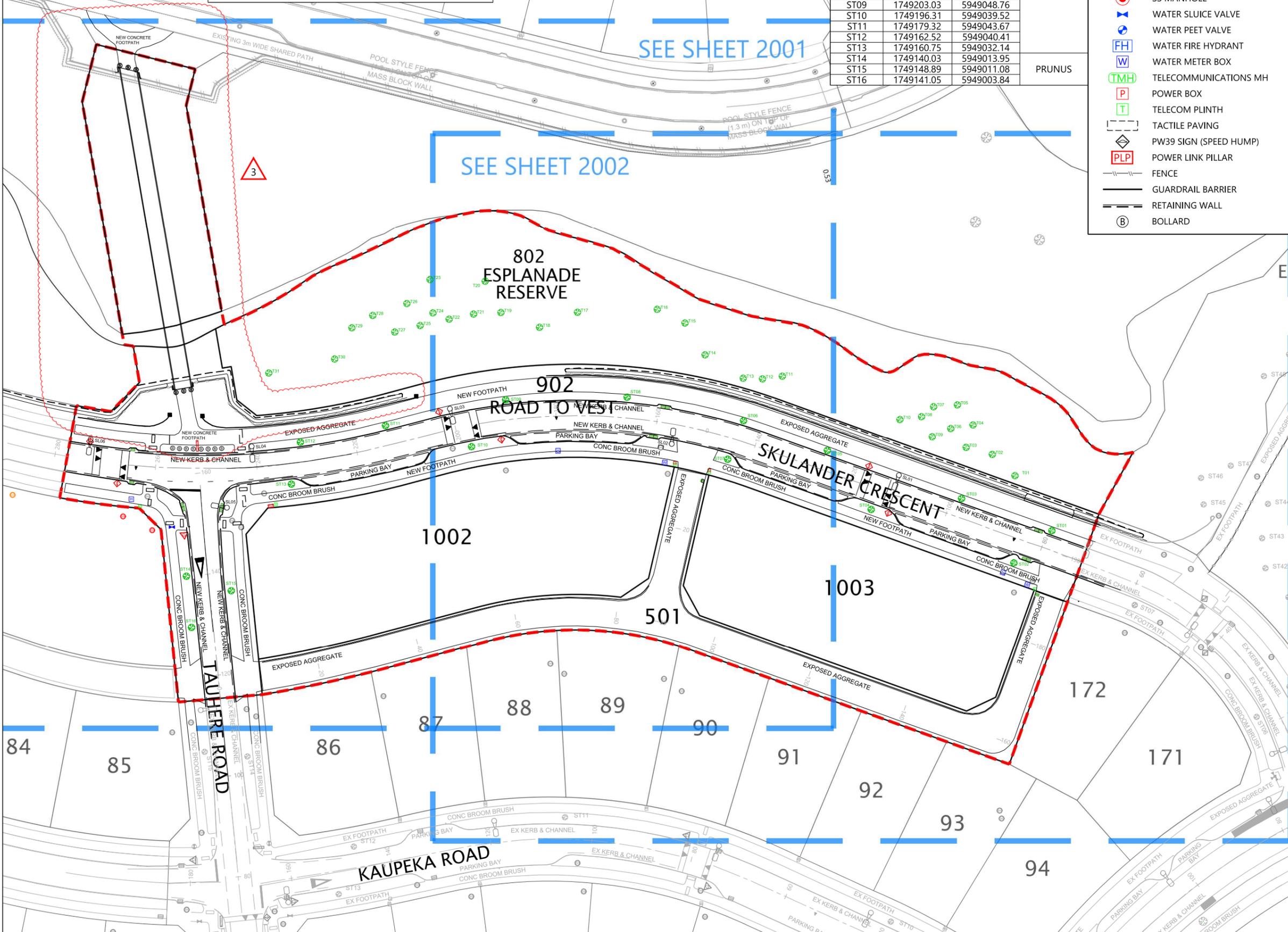
| SCHEDULE OF COORDINATES | | | |
|-------------------------|------------|------------|---------|
| ID | EASTING | NORTHING | SPECIES |
| STREET TREES | | | |
| ST01 | 1749310.82 | 5949022.95 | PRYUS |
| ST02 | 1749303.33 | 5949016.59 | |
| ST03 | 1749292.99 | 5949029.28 | |
| ST04 | 1749275.16 | 5949027.12 | |
| 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 | PRUNUS |
| ST12 | 1749162.52 | 5949040.41 | |
| ST13 | 1749160.75 | 5949032.14 | |
| ST14 | 1749140.03 | 5949013.95 | |
| ST15 | 1749148.89 | 5949011.08 | |
| ST16 | 1749141.05 | 5949003.84 | |

| 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 METER BOX |
| | TELECOMMUNICATIONS MH |
| | POWER BOX |
| | TELECOM PLINTH |
| | TACTILE PAVING |
| | PW39 SIGN (SPEED HUMP) |
| | POWER LINK PILLAR |
| | FENCE |
| | GUARDRAIL BARRIER |
| | RETAINING WALL |
| | BOLLARD |

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.

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.



| REVISION DETAILS | | |
|------------------|----|----------|
| | BY | DATE |
| 1 | SM | 20/12/22 |
| 2 | SM | 16/01/23 |
| 3 | SM | 08/06/23 |

| | | |
|----------|-------|--|
| SURVEYED | WOODS | BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023 |
| 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 | 3 |
| COUNCIL | AUCKLAND COUNCIL | |
| DWG NO | P22-006-00-2000-AB | |

Plot Date: 4:28:43 pm, 8 June 2023, SAMANTHAM



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: 08/06/23

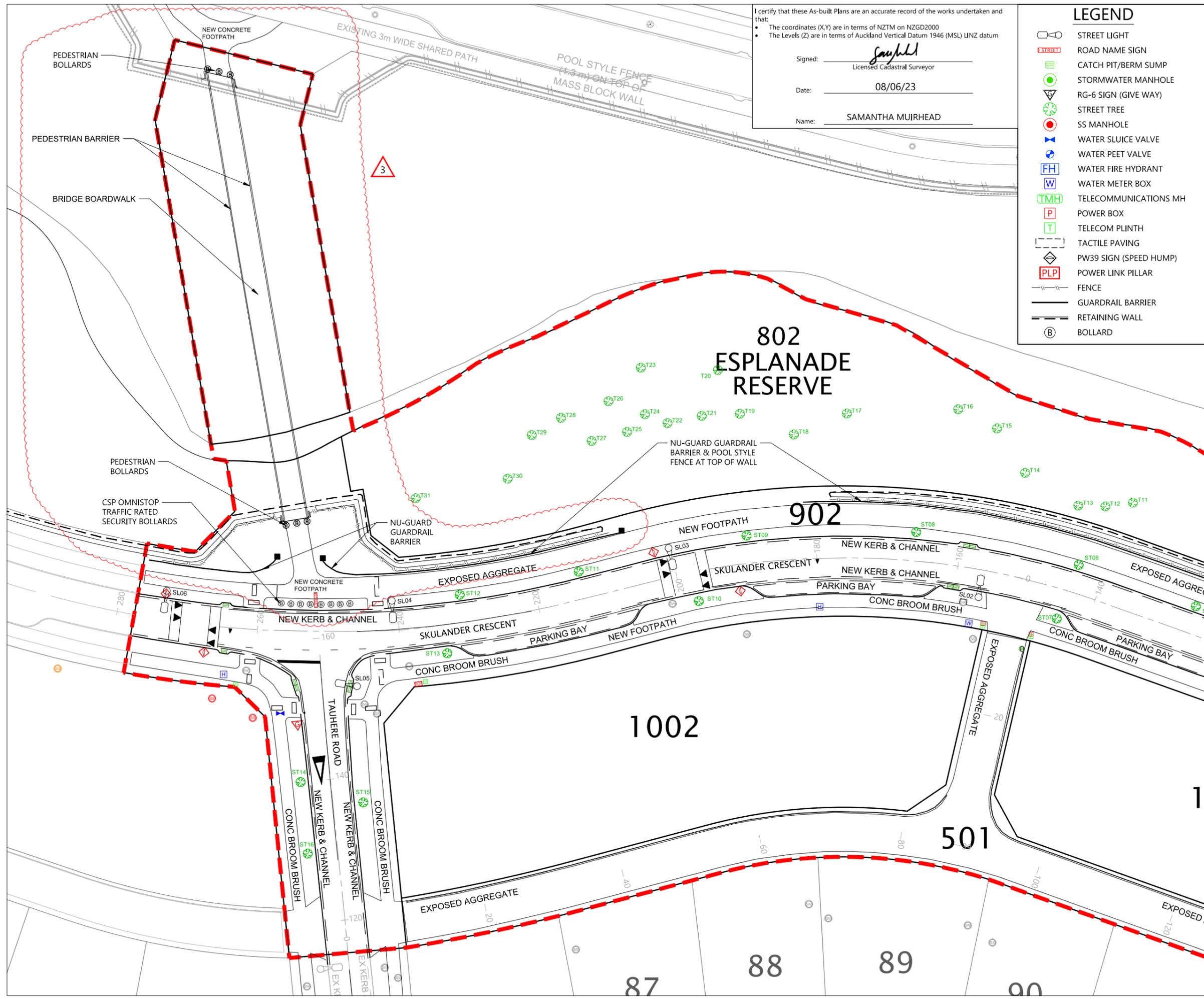
Name: SAMANTHA MUIRHEAD

| 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 METER BOX |
| | TELECOMMUNICATIONS MH |
| | POWER BOX |
| | TELECOM PLINTH |
| | TACTILE PAVING |
| | PW39 SIGN (SPEED HUMP) |
| | POWER LINK PILLAR |
| | FENCE |
| | GUARDRAIL BARRIER |
| | RETAINING WALL |
| | BOLLARD |

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.

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 |
| 3 | BRIDGE CONSTRUCTED | | SM | 08/06/23 |

| | | |
|----------|-------|--|
| 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 2 OF 3

| | | |
|---------|--------------------|-----|
| STATUS | AS-BUILT | REV |
| SCALE | 1:500 @ A3 | 3 |
| COUNCIL | AUCKLAND COUNCIL | |
| DWG NO | P22-006-00-2001-AB | |

Plot Date: 4:28:44 pm, 8 June 2023, SAMANTHAM
 File: C:\1205\ENERGY\DATA\WP-PEN-APP-01\P22-006-ARRAN HILL P6 STAGE 1C_2022\CAD\SURV\BYP22-006-00-2001-AB ROADING.DWG



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: 08/06/23

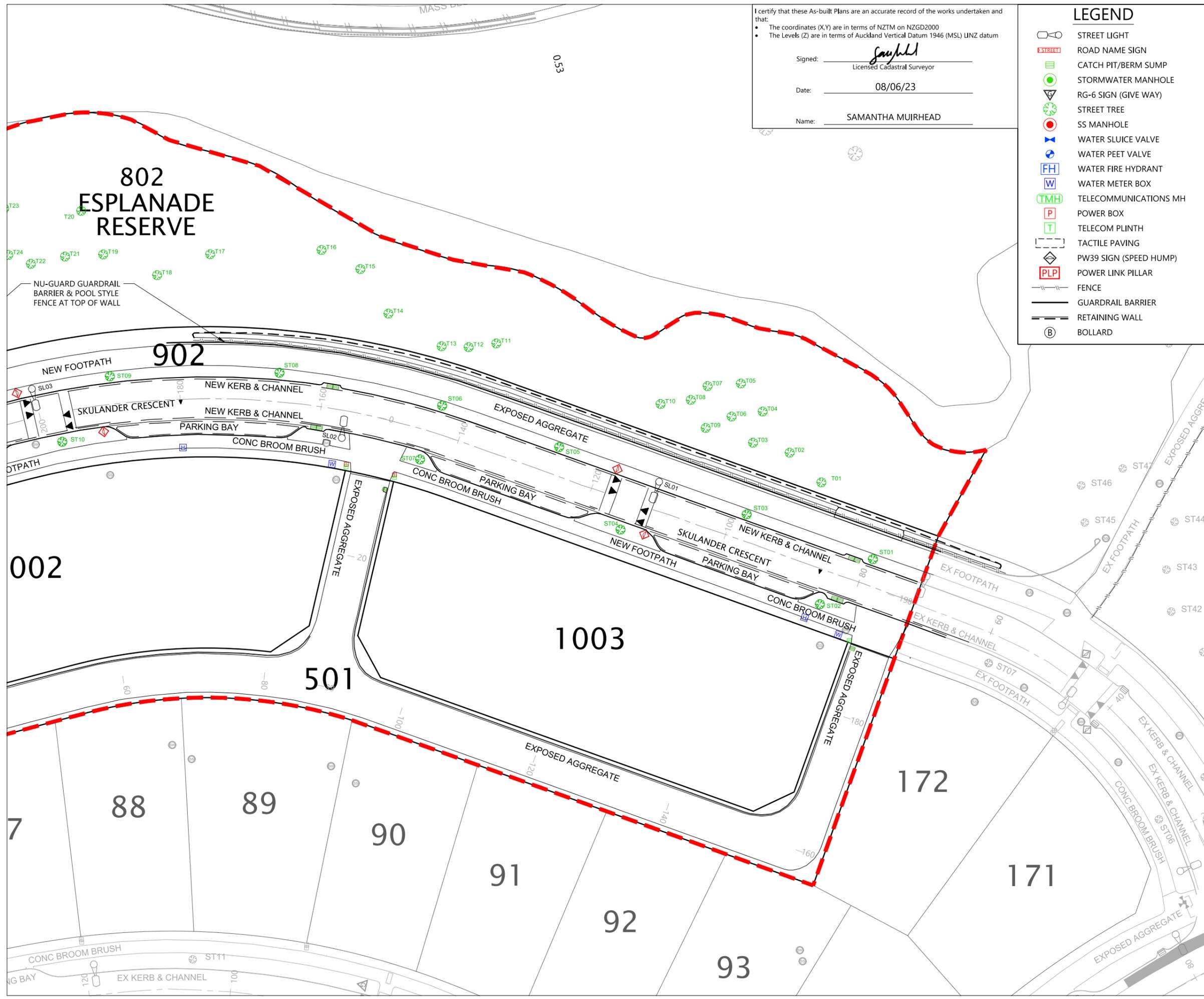
Name: SAMANTHA MUIRHEAD

| 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 METER BOX |
| | TELECOMMUNICATIONS MH |
| | POWER BOX |
| | TELECOM PLINTH |
| | TACTILE PAVING |
| | PW39 SIGN (SPEED HUMP) |
| | POWER LINK PILLAR |
| | FENCE |
| | GUARDRAIL BARRIER |
| | RETAINING WALL |
| | BOLLARD |

NOTES

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- BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.

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 |
| 3 | BRIDGE CONSTRUCTED | SM | 08/06/23 |

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



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

**ROADING ASBUILT PLAN
 SHEET 3 OF 3**

| | | |
|---------|--------------------|-----|
| STATUS | AS-BUILT | REV |
| SCALE | 1:500 @ A3 | 3 |
| COUNCIL | AUCKLAND COUNCIL | |
| DWG NO | P22-006-00-2002-AB | |

Plot Date: 4:28:44 pm, 8 June 2023, SAMANTHAM
 File: C:\1205\ENERGY\DATA\WP-PEN-APP-01\P22-006 - ARRAN HILL P6 STAGE 1C_2022\CAD\SURV\B\P22-006-00-2002-AB\ROADING.DWG



| 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

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.
 - 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 |

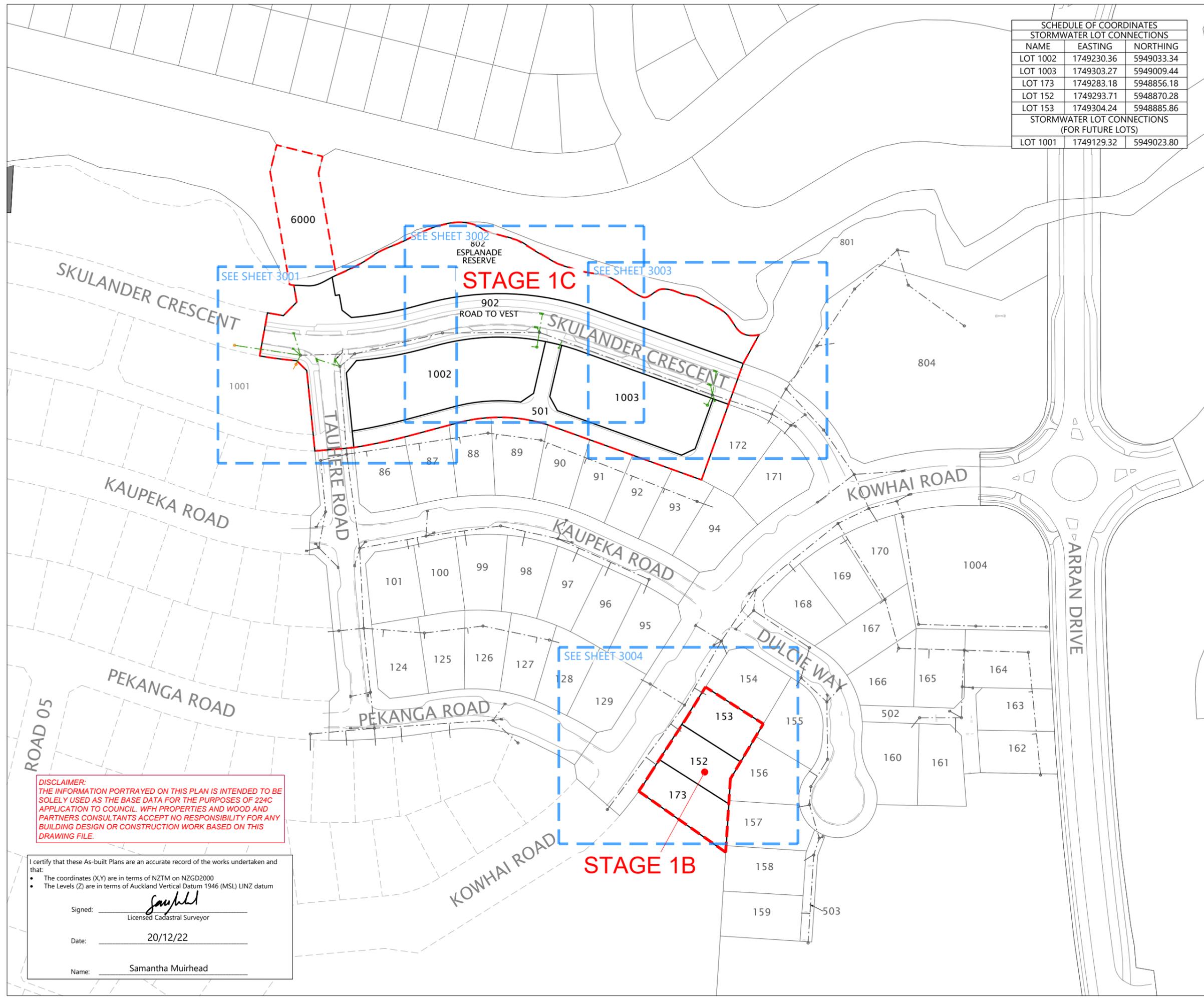
| | | |
|----------|-------|--|
| SURVEYED | WOODS | BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023 |
| DESIGNED | WOODS | |
| DRAWN | MD | |
| CHECKED | JM | |
| APPROVED | SM | |

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 | |



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

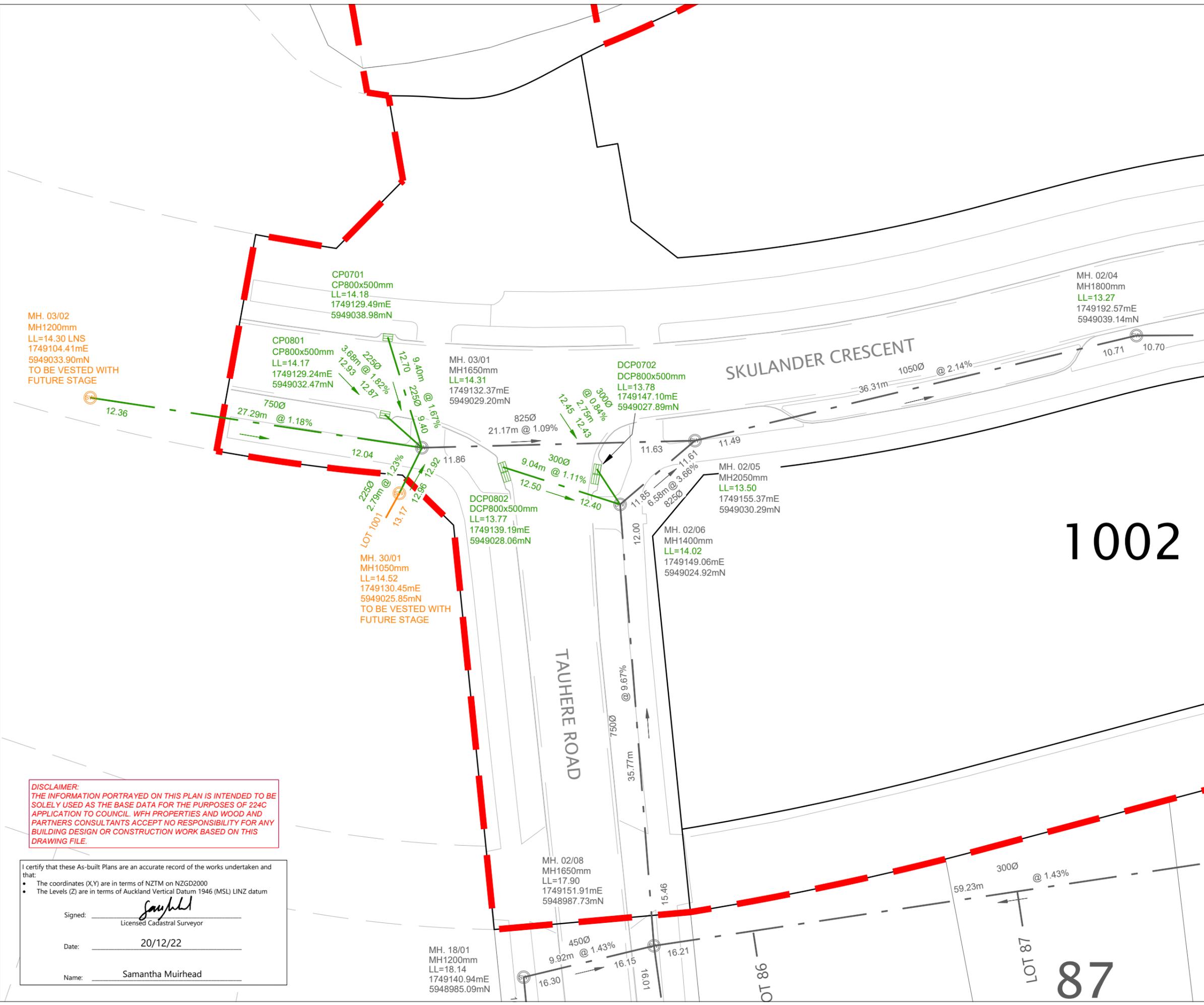
- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: Licensed Cadastral Surveyor

Date: 20/12/22

Name: Samantha Muirhead

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



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.
 - 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 | |

N

**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

LOT 1002
MH. 29/01
MH1050mm
LL=13.60
1749232.58mE
5949033.15mN

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

1002

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

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

Signed: Licensed Cadastral Surveyor
Date: 20/12/22
Name: Samantha Muirhead

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

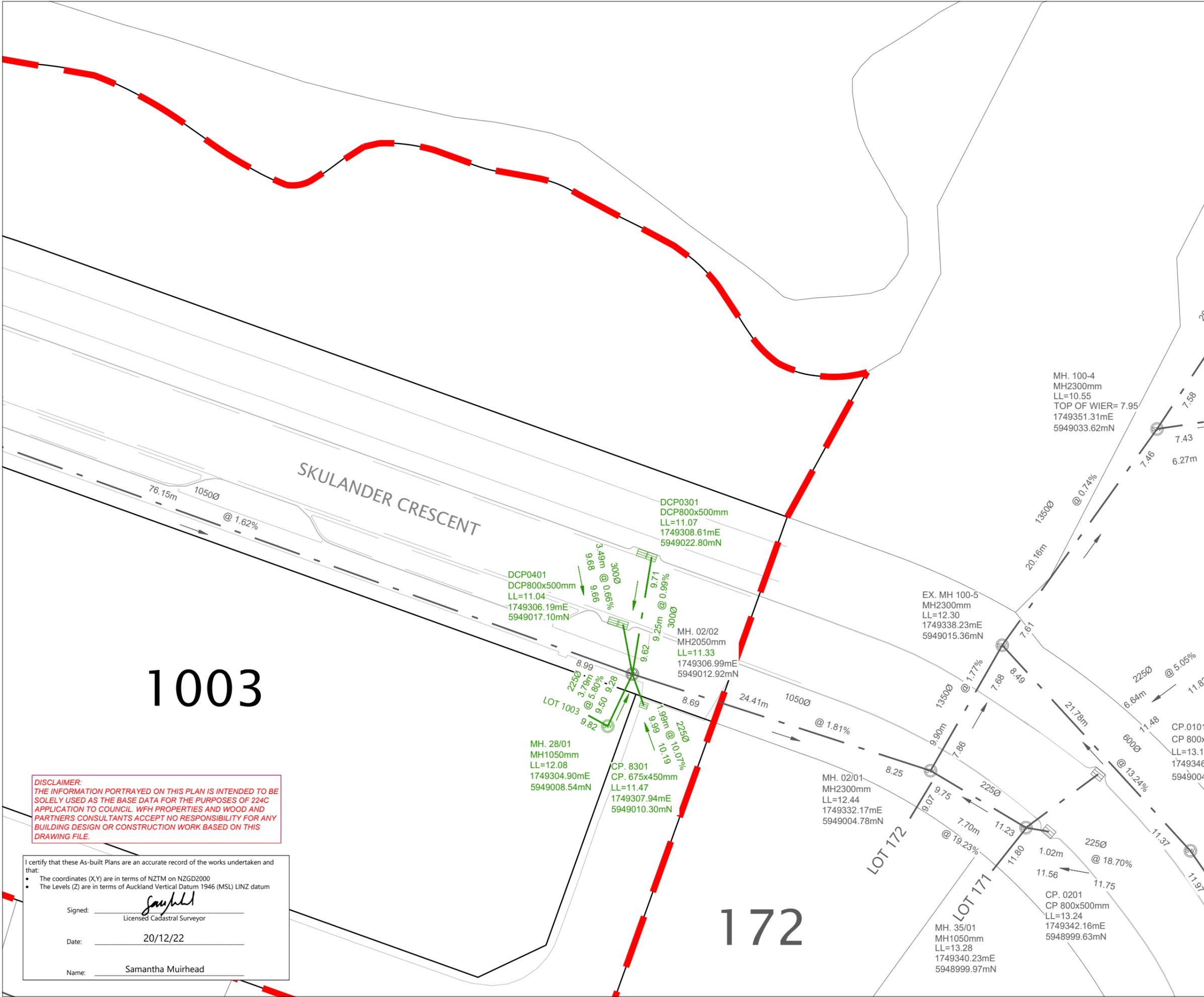
| REVISION DETAILS | | BY | DATE |
|------------------|-----------------|----|----------|
| 1 | ISSUED FOR 224C | SM | 20/12/22 |

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

**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 | |



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**
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 | |

N

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

**STORMWATER ASBUILT PLAN
SHEET 4 OF 5**

| | | |
|---------|--------------------|-----|
| STATUS | AS-BUILT | REV |
| SCALE | 1:300 @ A3 | 1 |
| COUNCIL | AUCKLAND COUNCIL | |
| DWG NO | P22-006-00-3003-AB | |

1003

172

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

Date: 20/12/22

Name: Samantha Muirhead

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:

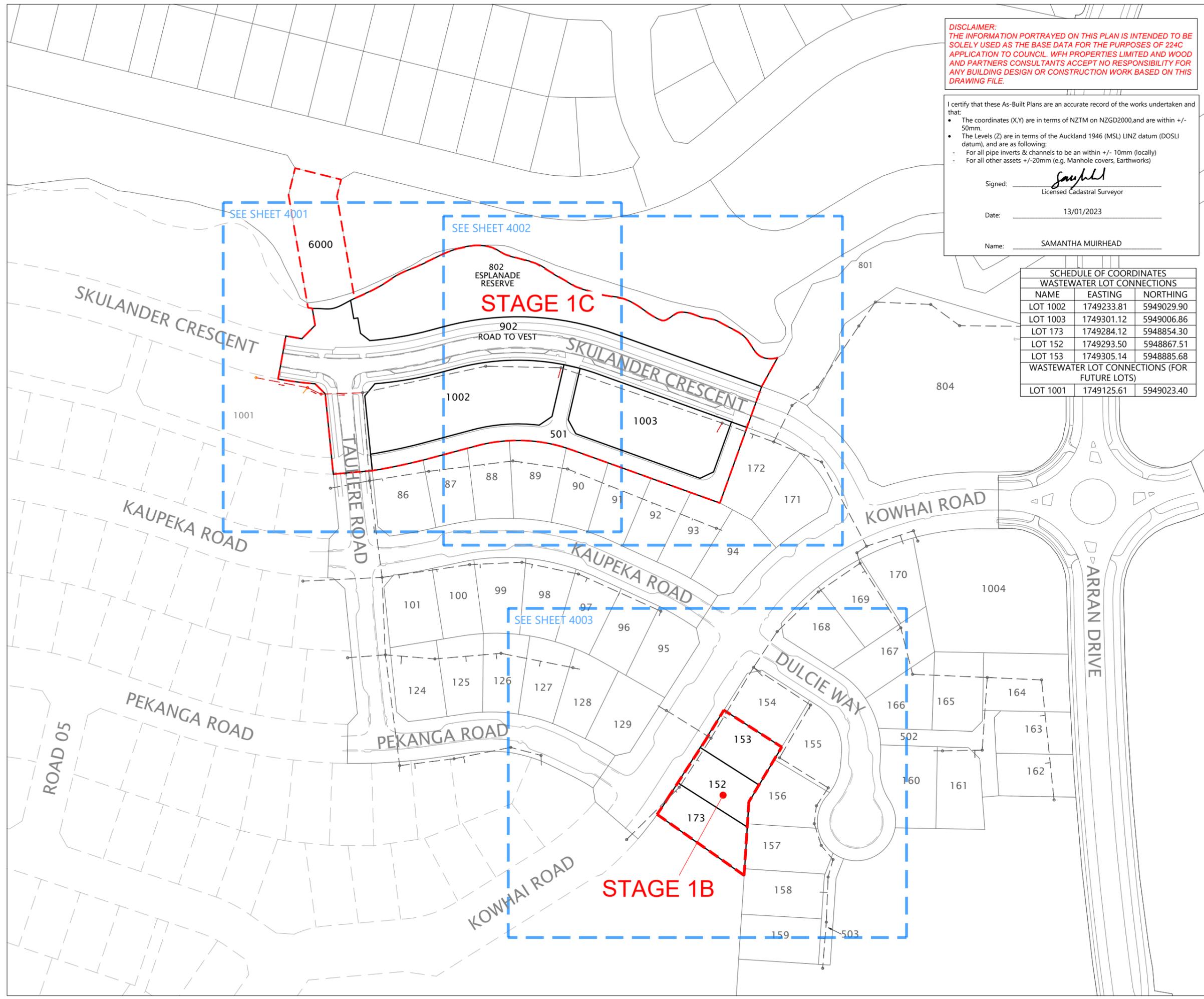
- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSU datum), and are as following:
 - For all pipe inverts & channels to be within +/- 10mm (locally)
 - For all other assets +/- 20mm (e.g. Manhole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

Signed: Licensed Cadastral Surveyor

Date: 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 |

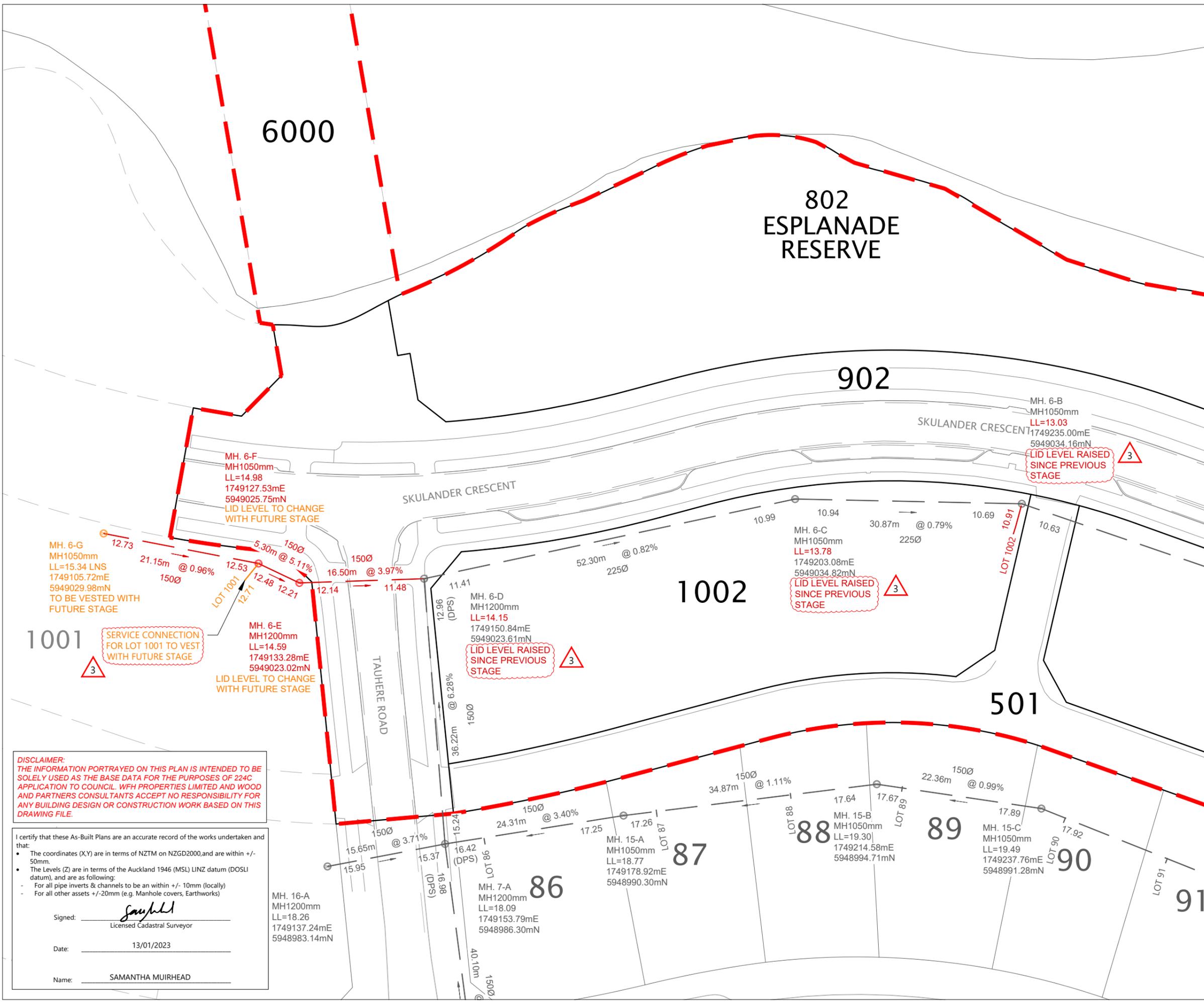
| SURVEYED | WOODS | BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023 |
|----------|-------|--|
| DESIGNED | WOODS | |
| DRAWN | MD | |
| CHECKED | JM | |
| APPROVED | SM | |



**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 ---
- EXISTING SANITARY SEWER ---
- FUTURE SANITARY SEWER ---
- LOT BOUNDARY ---
- FUTURE BOUNDARY ---
- STAGE BOUNDARY - - - - -
- DROP-PROTECTION STRUCTURE (DPS) (DPS)

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

- NOTES**
1. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 2. ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS SPECIFIED OTHERWISE.
 3. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.
 4. 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 |
|----------|-------|---------------------|
| DESIGNED | WOODS | 8 NUGENT STREET |
| DRAWN | MD | GRAFTON |
| CHECKED | JM | AUCKLAND 1023 |
| APPROVED | SM | WOODS.CO.NZ |

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 | |

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:

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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

MH. 16-A
MH1200mm
LL=18.26
1749137.24mE
5948983.14mN

MH. 7-A
MH1200mm
LL=18.09
1749153.79mE
5948986.30mN

MH. 15-A
MH1050mm
LL=18.77
1749178.92mE
5948990.30mN

MH. 15-B
MH1050mm
LL=19.30
1749214.58mE
5948994.71mN

MH. 15-C
MH1050mm
LL=19.49
1749237.76mE
5948991.28mN

MH. 6-B
MH1050mm
LL=13.03
1749235.00mE
5949034.16mN

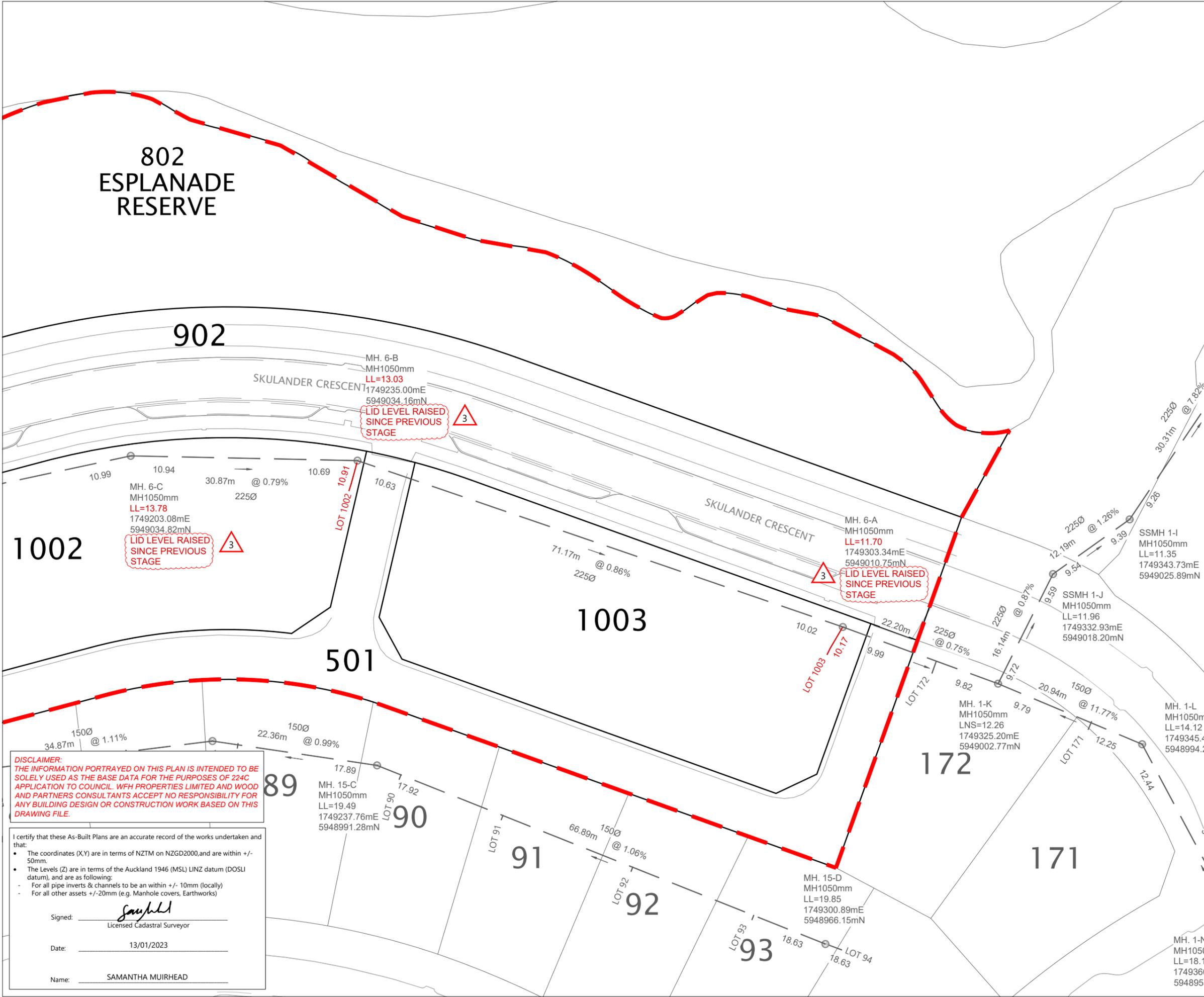
MH. 6-C
MH1050mm
LL=13.78
1749203.08mE
5949034.82mN

MH. 6-D
MH1200mm
LL=14.15
1749150.84mE
5949023.61mN

MH. 6-E
MH1200mm
LL=14.59
1749133.28mE
5949023.02mN

MH. 6-F
MH1050mm
LL=14.98
1749127.53mE
5949025.75mN

MH. 6-G
MH1050mm
LL=15.34 LNS
1749105.72mE
5949029.98mN



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 | |



**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 | |

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

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

Signed: *Saughell*
Licensed Cadastral Surveyor

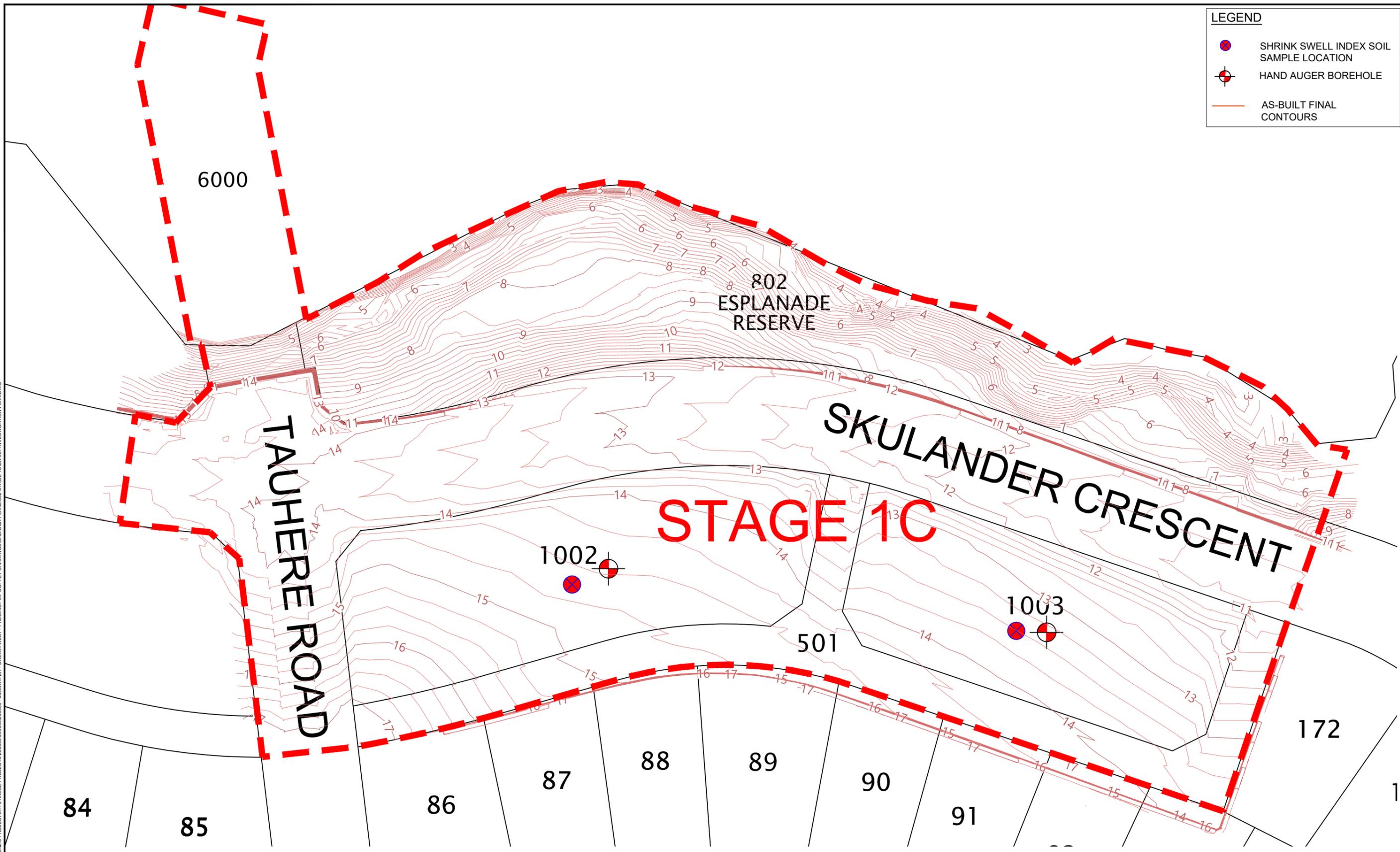
Date: 13/01/2023

Name: SAMANTHA MUIRHEAD

APPENDIX B: REFERENCE DRAWINGS

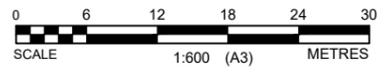
LEGEND

-  SHRINK SWELL INDEX SOIL SAMPLE LOCATION
-  HAND AUGER BOREHOLE
-  AS-BUILT FINAL CONTOURS



PLOT DATE: 12/01/2023 3:16:30 pm DWG FILE: F:\F\GENZ\9 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\COFFEY DRAWINGS\CAD\GR PLANS\02 STAGE 1C\BK-001 INVESTIGATION PLAN.DWG

| no. | description | drawn | approved | date |
|-----|---|-------|----------|------------|
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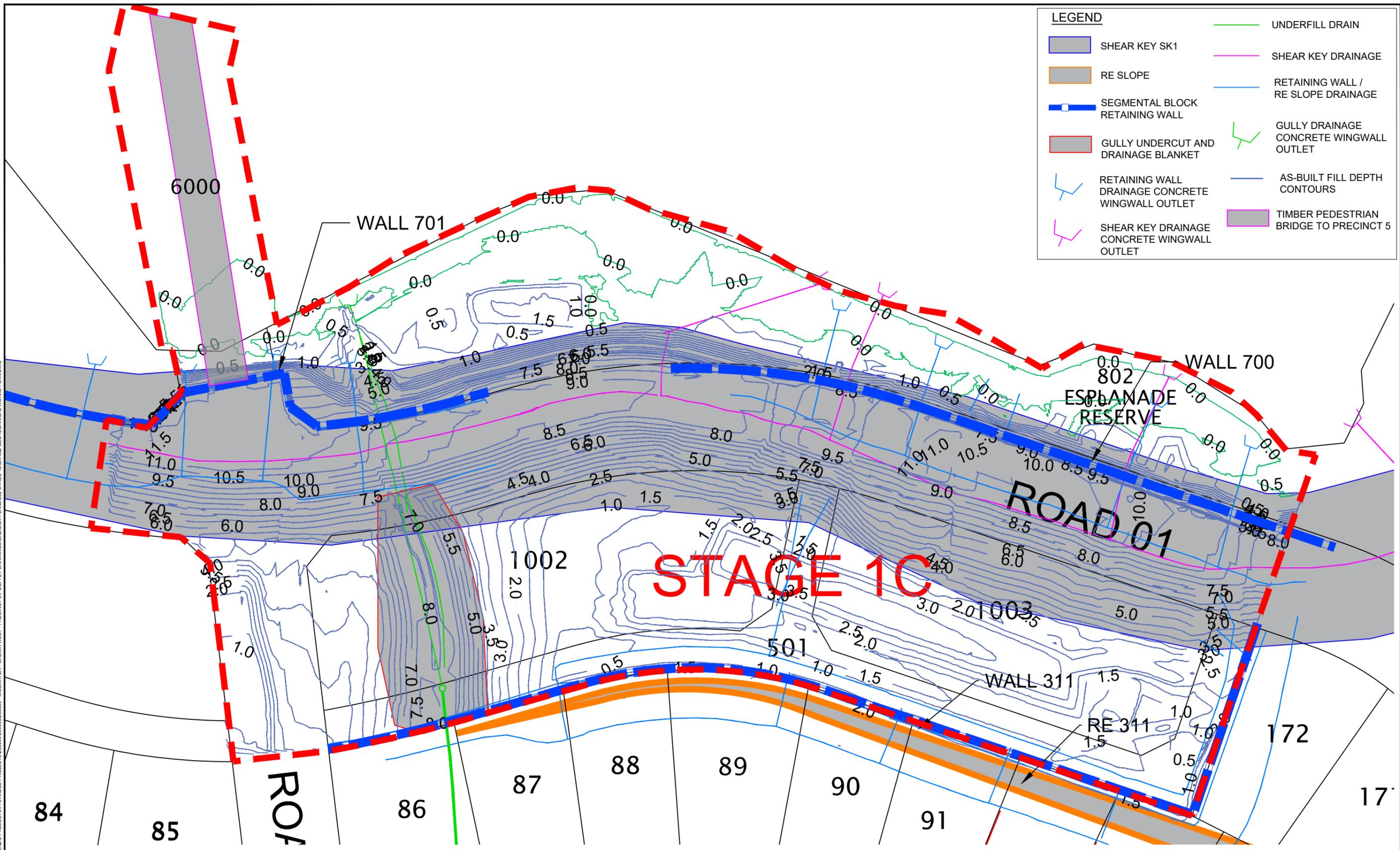


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| drawn | SP |
| approved | SP |
| date | 11/01/2023 |
| scale | AS SHOWN |
| original size | A3 |



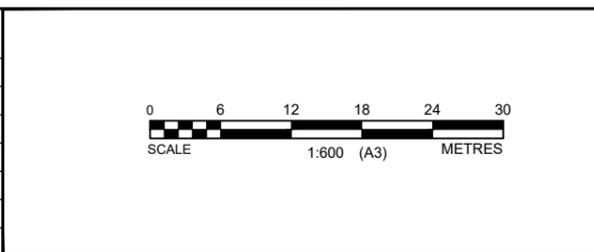
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| project: | MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 1C | | |
| title: | GEOTECHNICAL INVESTIGATION PLAN | | |
| project no: | 773-AKLGE206639 | figure no: | BK/001 |
| rev: | A | | |

PLOT DATE: 12/01/2023 3:18:35 pm DWG FILE: F:\PROJECTS\773-AKLGE\PROJECTS\773-AKLGE\DRAWINGS\CAD\GCR PLANS\002 STAGE 1C\BK-002 GEOTECHNICAL WORKS PLAN.DWG



| LEGEND | |
|--------|--|
| | SHEAR KEY SK1 |
| | RE SLOPE |
| | SEGMENTAL BLOCK RETAINING WALL |
| | GULLY UNDERCUT AND DRAINAGE BLANKET |
| | RETAINING WALL DRAINAGE CONCRETE WINGWALL OUTLET |
| | SHEAR KEY DRAINAGE CONCRETE WINGWALL OUTLET |
| | UNDERFILL DRAIN |
| | SHEAR KEY DRAINAGE |
| | RETAINING WALL / RE SLOPE DRAINAGE |
| | GULLY DRAINAGE CONCRETE WINGWALL OUTLET |
| | AS-BUILT FILL DEPTH CONTOURS |
| | TIMBER PEDESTRIAN BRIDGE TO PRECINCT 5 |

| no. | description | drawn | approved | date |
|-----|---|-------|----------|------------|
| A | FOR STAGE 1C GEOTECHNICAL COMPLETION REPORT | SP | SP | 11/01/2023 |
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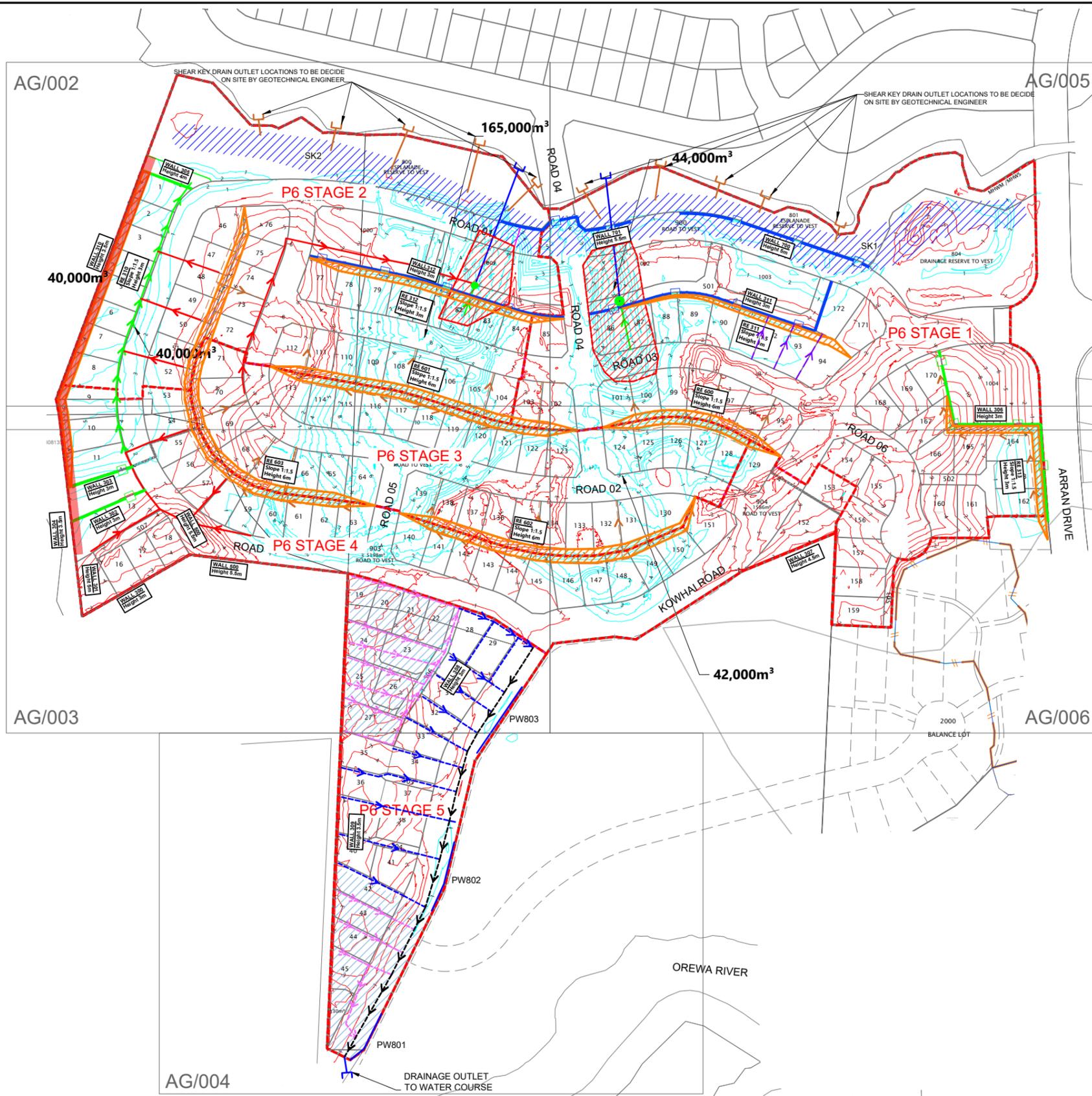


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|---------------|------------|
| drawn | SP |
| approved | SP |
| date | 11/01/2023 |
| scale | AS SHOWN |
| original size | A3 |



| | | | |
|-------------|--|------------|--------|
| client: | WFH PROPERTIES LTD | | |
| project: | MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 1C | | |
| title: | GEOTECHNICAL WORKS PLAN | | |
| project no: | 773-AKLGE206639 | figure no: | BK/002 |
| rev: | A | | |

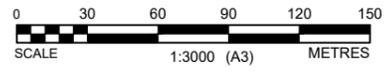
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| EARTHWORKS VOLUMES | | |
|--------------------|-----------------------|----------------------|
| STAGE | CUT | FILL |
| STAGE 1 | 109,000m ³ | 50,000m ³ |
| STAGE 2 | 45,000m ³ | 94,000m ³ |
| STAGE 3 | 26,000m ³ | 93,000m ³ |
| STAGE 4 | 21,000m ³ | 60,400m ³ |
| STAGE 5 | 39,000m ³ | - |

| 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 |

| no. | description | drawn | approved | date |
|-----|-----------------------------|-------|----------|------------|
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| B | UPDATE TO CF DRAIN LAYOUT | RZ | SP | 20/07/2020 |

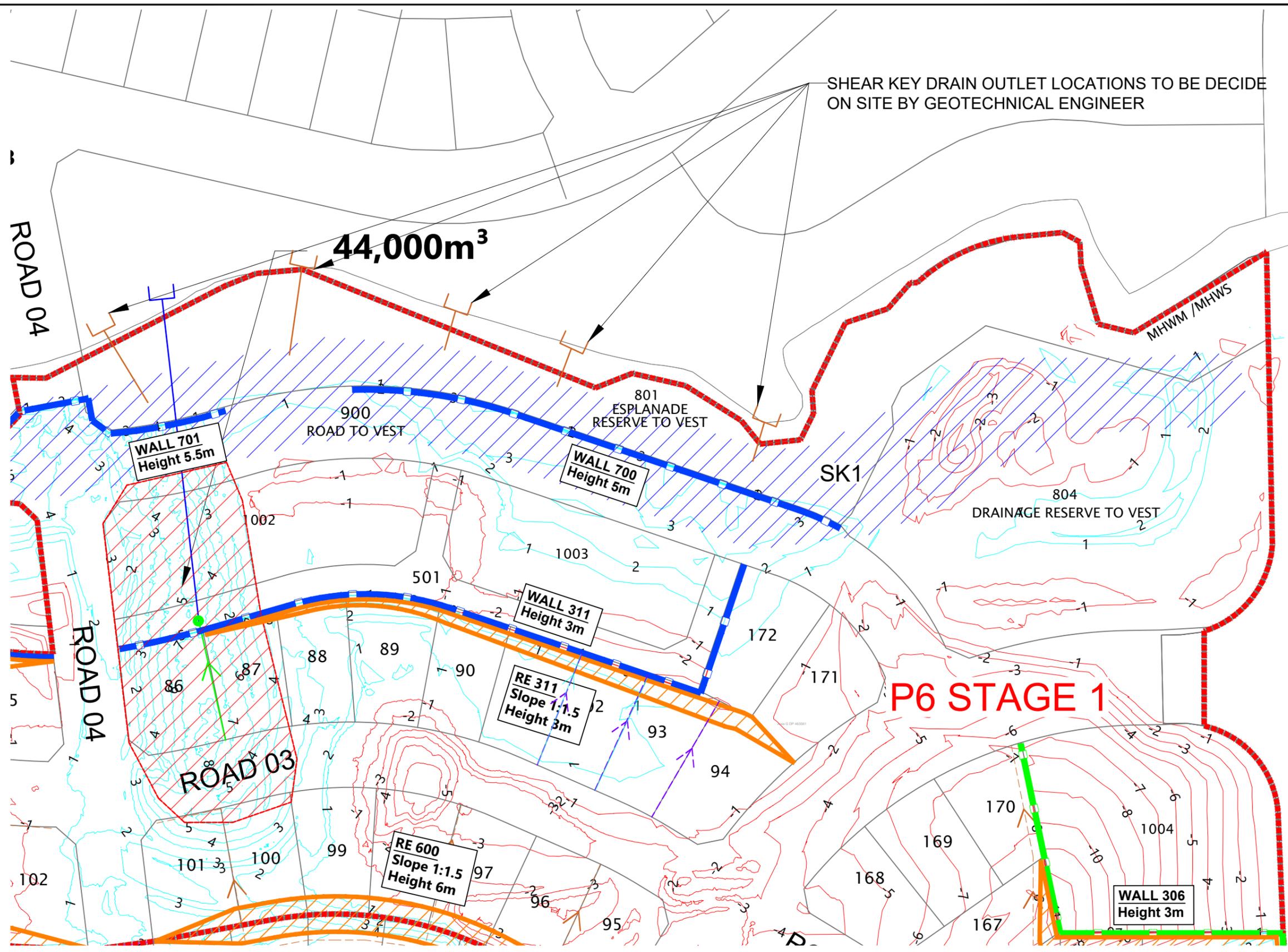


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| drawn | RZ |
| approved | SP |
| date | 20/07/2020 |
| scale | AS SHOWN |
| original size | A3 |



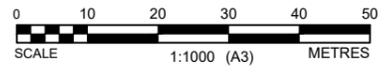
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| client: | WFH PROPERTIES LTD | | |
| project: | MILLWATER - OREWA WEST - PRECINCT 6 | | |
| title: | GEOTECHNICAL REMEDIATION PLAN | | |
| project no: | 773-AKLGE206639 | figure no: | AG/001 |
| rev: | B | | |

PLOT DATE: 20/07/2020 4:08:35 PM DWG FILE: \\NTS0808F\525808\GEN219\PROJECTS\73-AKLGE\PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\COFFEY DRAWINGS\STEPHEN73-AKLGE206639-AG.DWG



| LEGEND | |
|--------|--------------------------------------|
| | PROPOSED CUT CONTOURS (1m INTERVAL) |
| | PROPOSED FILL CONTOURS (1m INTERVAL) |
| | REINFORCED EARTH WALL |
| | RETAINING WALL - TIMBER |
| | RETAINING WALL - KEYSTONE |
| | RETAINING WALL - MASS BLOCK |
| | BOUNDARY |
| | STAGE BOUNDARY |
| | WICK DRAINS |
| | DSM COLUMNS |
| | SHEAR KEY EXCAVATION |
| | 2.5M NOMINAL UNDERCUTS |
| | UNSATURABLE 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 |

| 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 |
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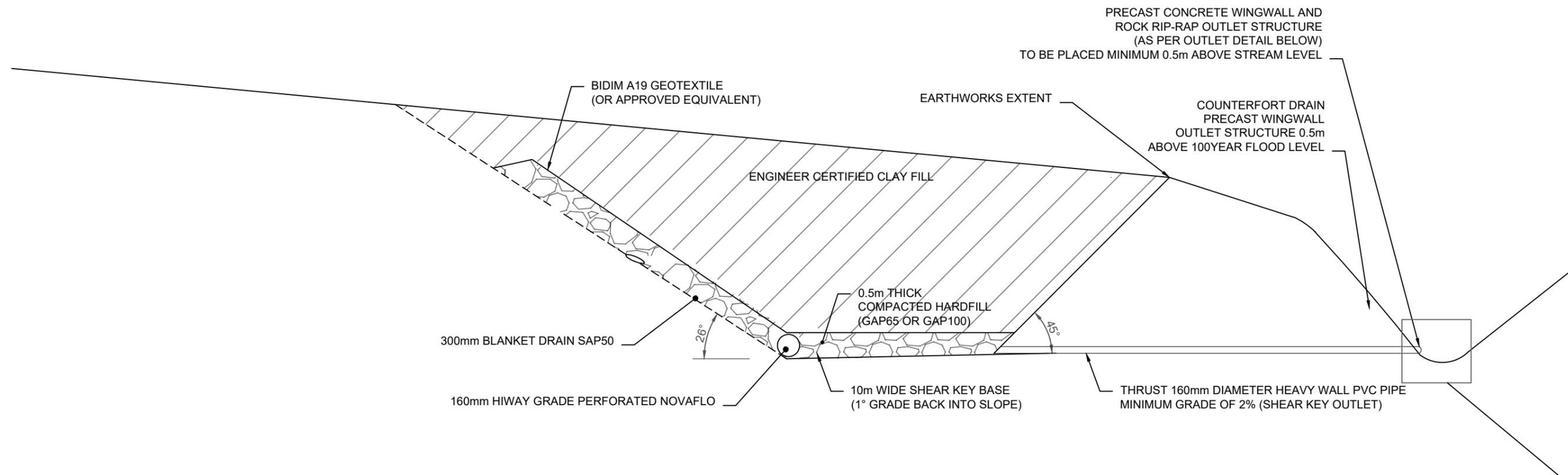


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| drawn | RZ |
| approved | SP |
| date | 20/07/2020 |
| scale | AS SHOWN |
| original size | A3 |



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

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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)

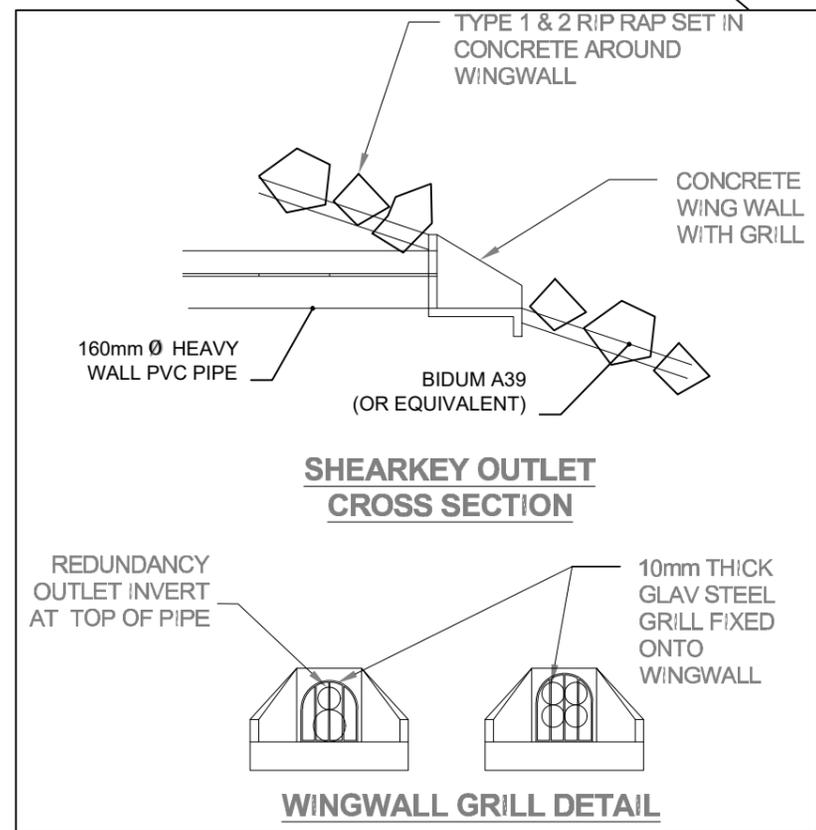
ASBUILT:

ACCURATE ASBUILT INFORMATION WILL BE REQUIRED WHICH SHOULD INCLUDE:

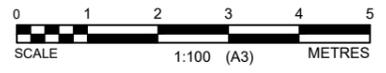
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

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.



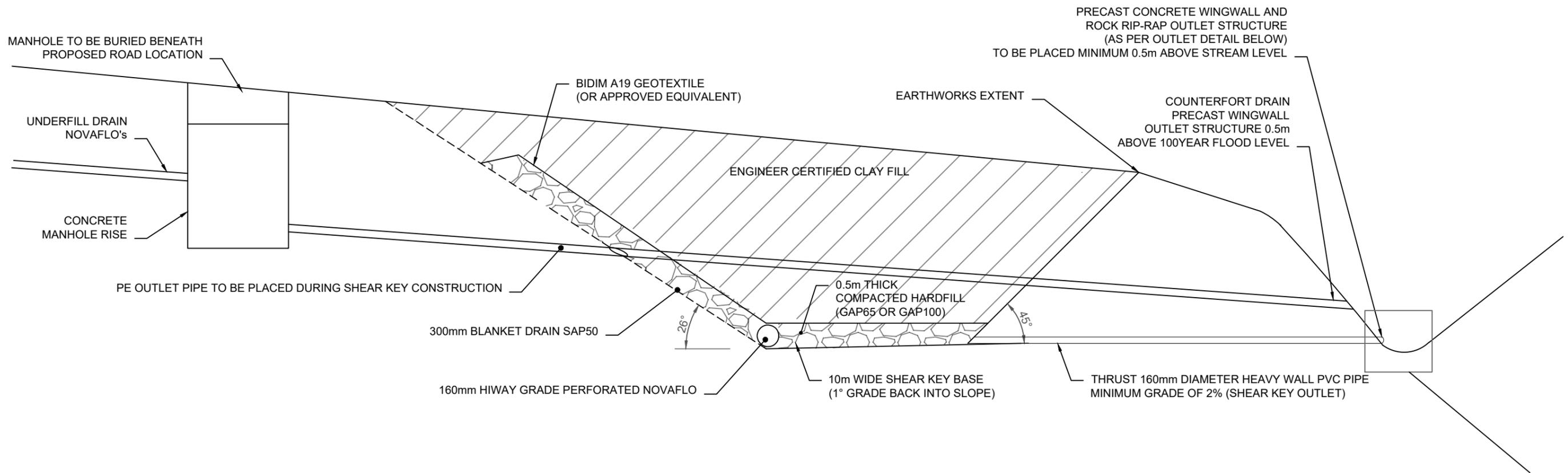
| no. | description | drawn | approved | date |
|-----|----------------|-------|----------|------------|
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| | | | | |
| | | | | |
| | | | | |



| | |
|---------------|------------|
| 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 1B/C DETAIL (CH70 - CH200) | | |
| project no: | 773-AKLGE206639 | figure no: | AB/006 |
| rev: | A | | |



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)

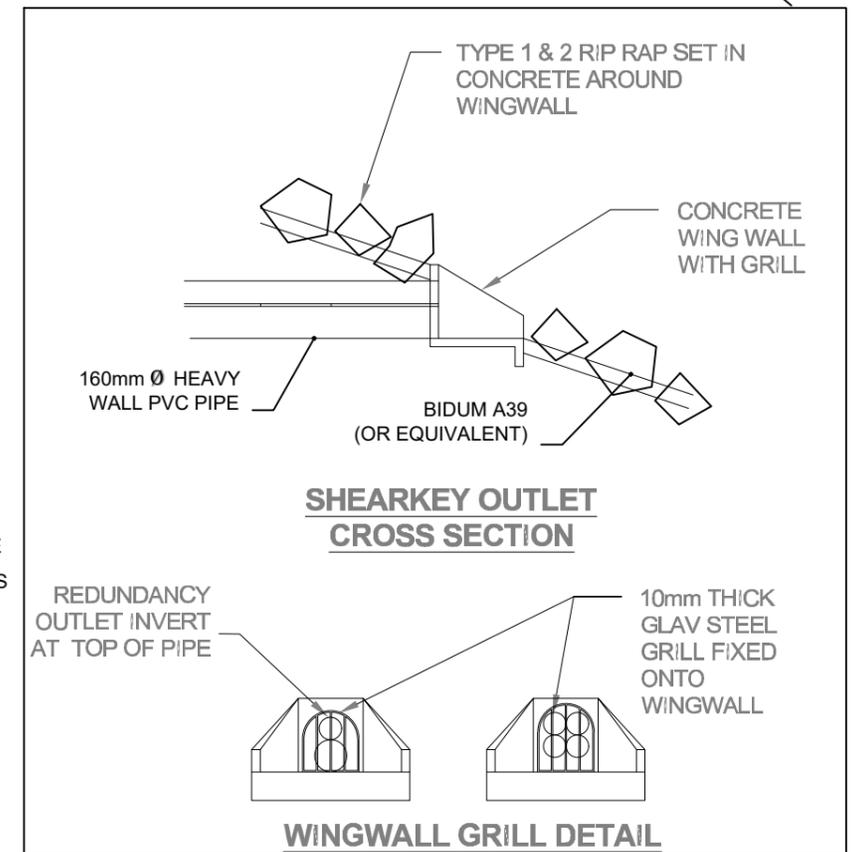
ASBUILT:

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.

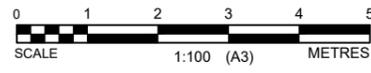
NOTES:

1. SHEAR KEY BASE TO BE EXCAVATED A MINIMUM DEPTH OF 1m INTO COMPETENT IDENTIFIED WAITEMATA GROUP N>50 BEDROCK, (LIKELY TO BE RL 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 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.



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

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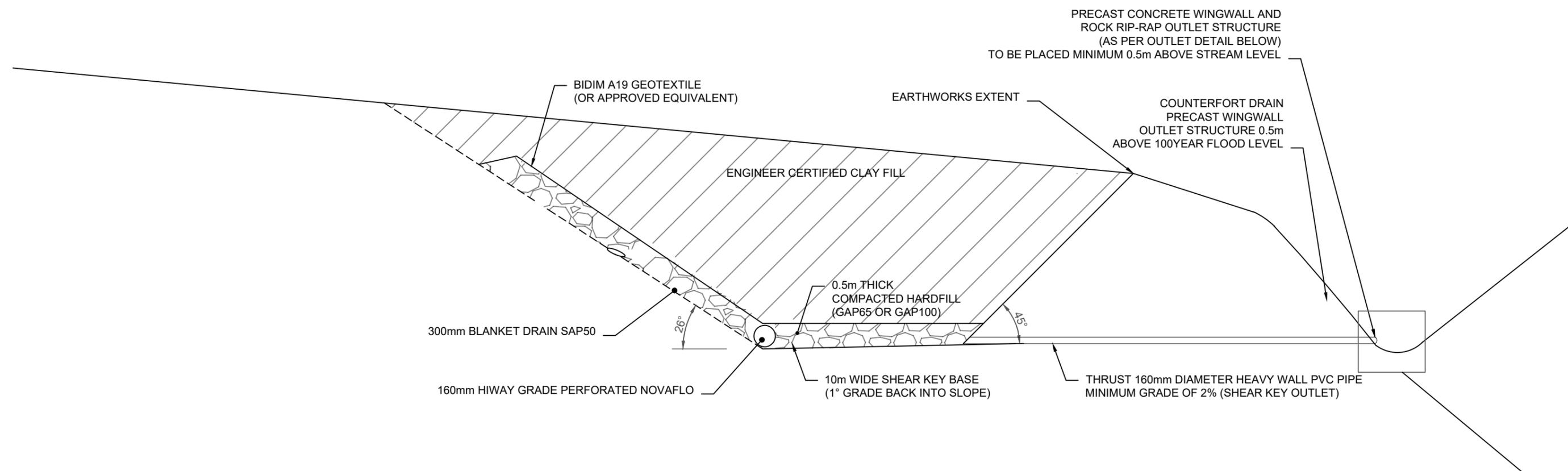


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| drawn | RZ |
| approved | SP |
| date | 06/09/2019 |
| scale | 1:100 |
| original size | A3 |



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|-------------|-------------------------------------|------------|----|
| 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 12:37:36 PM DWG FILE: \\TFSR08\F2\808\GENC\9 PROJECTS\73-AKLGE PROJECT\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)

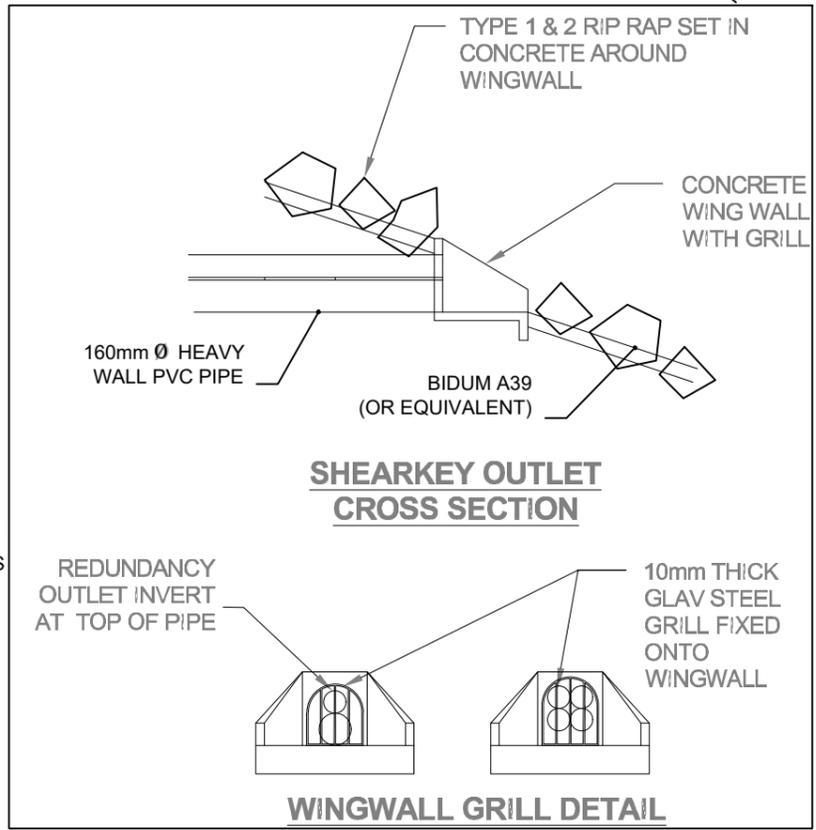
ASBUILT:

ACCURATE ASBUILT INFORMATION WILL BE REQUIRED WHICH SHOULD INCLUDE:

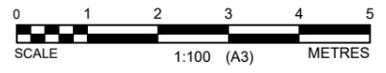
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

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 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 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.



| no. | description | drawn | approved | date |
|-----|----------------|-------|----------|------------|
| A | ORIGINAL ISSUE | RZ | JF | 06/09/2019 |
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| 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 1E DETAIL (CH280 - CH310) | | |
| project no: | 773-AKLGE206639 | figure no: | 08 |
| rev: | A | | |

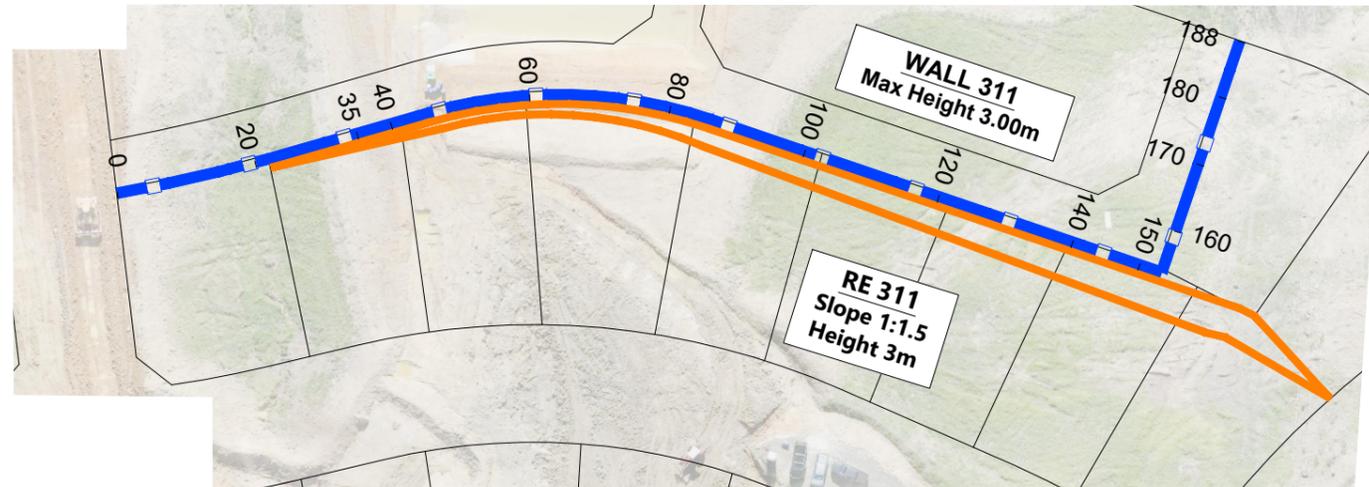
LEGEND

—— TOP OF RETAINING WALL

—— BOTTOM OF RETAINING WALL

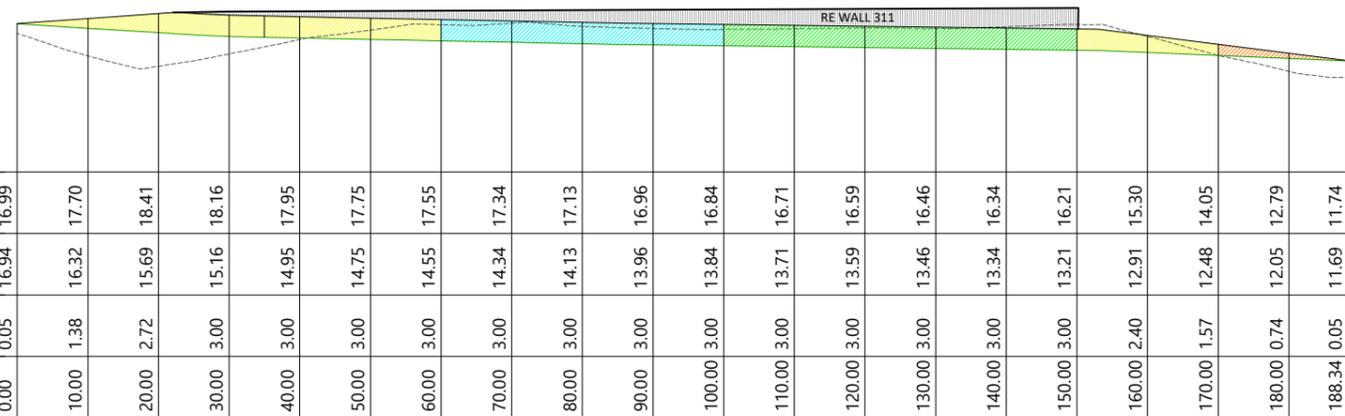
----- EXISTING GROUND LEVEL

- WALL DESIGN AS PER WALL 11 - DETAIL 1
- WALL DESIGN AS PER WALL 11 - DETAIL 2
- WALL DESIGN AS PER WALL 11 - DETAIL 3
- WALL DESIGN AS PER WALL 11 - DETAIL 4



MASS BLOCK RETAINING WALL 311 PLAN
SCALE 1:1000

- NOTES**
- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 - ALL CONCRETE TO BE 17.5MPa 28 DAY CONCRETE STRENGTH.
 - CONTRACTOR IS TO CONFIRM LOCATION AND HEIGHT OF EXISTING SERVICES TO ENGINEER PRIOR TO WORKS COMMENCING.
 - CONTRACTOR TO CONFIRM HEIGHT OF RETAINING WALL PRIOR TO ORDERING OF MATERIALS.
 - WALL SUBSOIL DRAIN TO FEED INTO CESSPITS OR KERB & CHANNEL AS APPROVED BY THE ENGINEER.
 - 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.
 - ALL UNSUITABLE MATERIAL AS DEFINED IN THE SPECIFICATION IS TO BE REMOVED AND THE STRIPPED AREAS INSPECTED BY THE ENGINEER BEFORE COMMENCEMENT.
 - EARTHWORKS ARE NOT TO BE EXTENDED INTO ADJOINING SITES UNLESS THE ENGINEER HAS ISSUED SPECIFIC INSTRUCTIONS.
 - ANY MODIFICATIONS TO THE CONSENTED EROSION AND SEDIMENT CONTROL MEASURES MUST BE APPROVED BY THE ENGINEER PRIOR TO THE CONSTRUCTION.
 - THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.
 - 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.
 - CONTRACTOR TO ENSURE HE HAS ALL APPROVALS FROM LOCAL AUTHORITIES PRIOR TO COMMENCING WORKS.
 - SEDIMENT AND EROSION CONTROL ARE TO BE IN ACCORDANCE WITH ARC TP90 AND ARE TO BE IN PLACE PRIOR TO EARTHWORKS COMMENCING.
 - ALL WORKS ARE TO BE IN ACCORDANCE WITH THE GEOTECHNICAL SPECIFICATION
 - RETAINING WALLS TO BE CLEAR OF BOUNDARIES.



DATUM R.L. = -4.00

| | 0.00 | 10.00 | 20.00 | 30.00 | 40.00 | 50.00 | 60.00 | 70.00 | 80.00 | 90.00 | 100.00 | 110.00 | 120.00 | 130.00 | 140.00 | 150.00 | 160.00 | 170.00 | 180.00 | 188.34 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| TOP OF RETAINING | 16.99 | 17.70 | 18.41 | 18.16 | 17.95 | 17.75 | 17.55 | 17.34 | 17.13 | 16.96 | 16.84 | 16.71 | 16.59 | 16.46 | 16.34 | 16.21 | 15.30 | 14.05 | 12.79 | 11.74 |
| BOTTOM OF RETAINING | 16.94 | 16.32 | 15.69 | 15.16 | 14.95 | 14.75 | 14.55 | 14.34 | 14.13 | 13.96 | 13.84 | 13.71 | 13.59 | 13.46 | 13.34 | 13.21 | 12.91 | 12.48 | 12.05 | 11.69 |
| RETAINED HEIGHT | 0.05 | 1.38 | 2.72 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 2.40 | 1.57 | 0.74 | 0.05 |
| CHAINAGE | 0.00 | 10.00 | 20.00 | 30.00 | 40.00 | 50.00 | 60.00 | 70.00 | 80.00 | 90.00 | 100.00 | 110.00 | 120.00 | 130.00 | 140.00 | 150.00 | 160.00 | 170.00 | 180.00 | 188.34 |

RETAINING WALL 311 LONGITUDINAL SECTION



| REVISION DETAILS | INT | DATE | SURVEYED | |
|------------------------------|-----|-----------|----------|-----|
| 1 ISSUED FOR CONSENT | RV | JULY 2017 | DESIGNED | NSC |
| 2 ISSUED FOR INFORMATION | NSC | 21/06/19 | DRAWN | NSC |
| 3 WALL DETAIL HATCHING ADDED | NSC | 08/08/19 | CHECKED | |
| 4 WALL HATCHING UPDATED | NSC | 11/09/19 | APPROVED | |

ARRAN DRIVE
OREWA
AUCKLAND

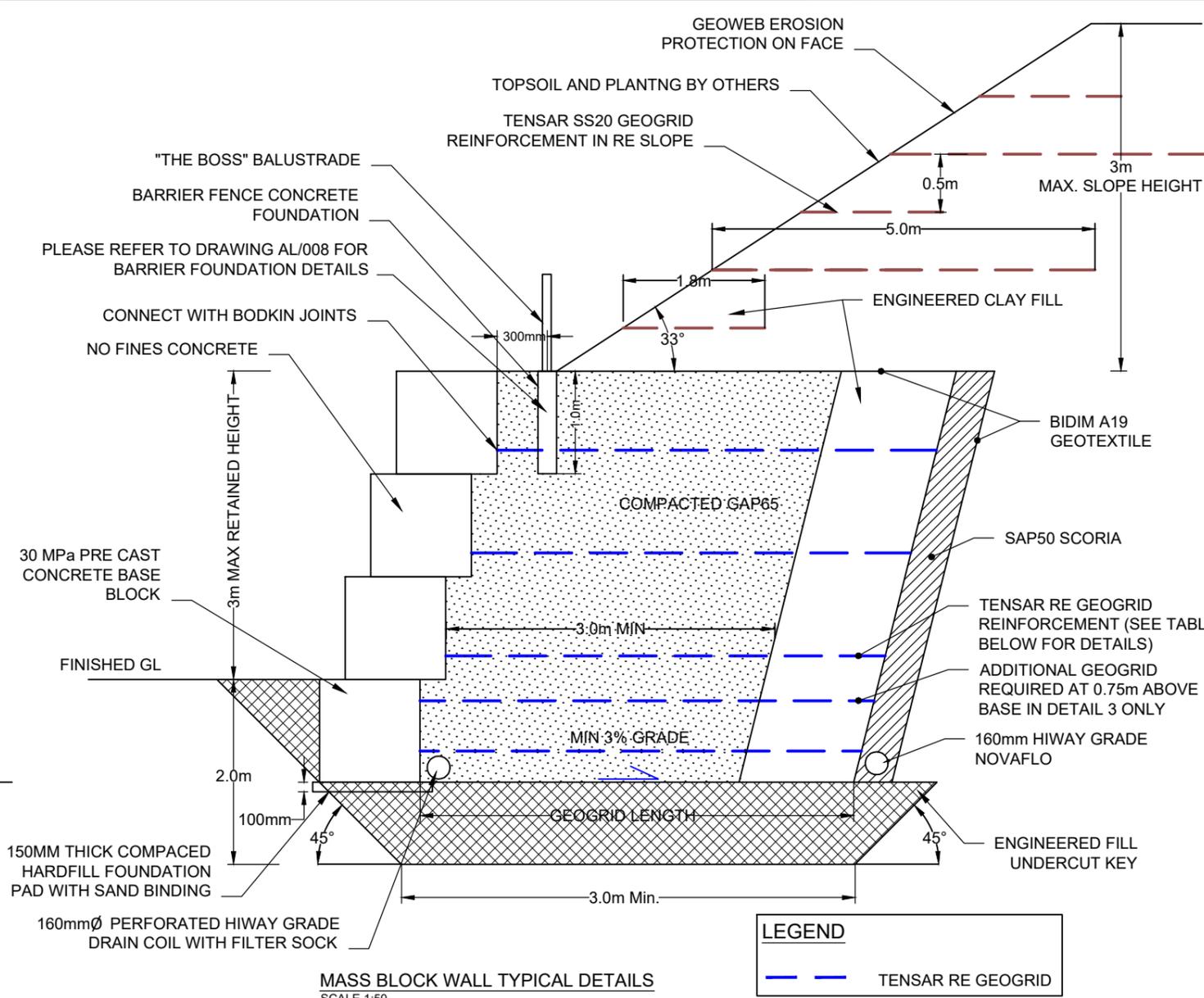


MILLWATER - PRECINCT 6
OREWA WEST
RETAINING WALL PLAN & LONG SECTION



| STATUS | ISSUED FOR INFORMATION | REV |
|---------|--------------------------|-----|
| SCALE | H 1:1000 @A3 V 1:500 @A3 | 4 |
| COUNCIL | AUCKLAND COUNCIL | |
| DWG NO | 37600-01-159-EW | |

PLOT DATE: 18/06/2020 3:44:24 PM DWG FILE: \\NTS\B08\GEN2\908\GEN2\908\PROJECTS\73\AKLGE206639 - MILLWATER - OREWA WEST - PRECINCT 6\PROJECTS\73\AKLGE206639-AL04.DWG



MASS BLOCK WALL TYPICAL DETAILS
SCALE 1:50

| LEGEND | |
|--------|-------------------|
| | TENSAR RE GEOGRID |

| Chainage Interval (m) | Wall Detail # | Max Retained Height (m) | Total Wall Height Including Embedment (m) (Max.) | Max Surcharge Slope | | Max Toe Slope Angle | Geogrid | | | Type | Additional Notes |
|-----------------------|---------------|-------------------------|--|---------------------|------------|---------------------|---------|------------------------------------|--|-------|---|
| | | | | Angle (°) | Height (m) | | Length | No. of Reinforcement layers (Max.) | Vertical Spacing of Geogrid layers (m) | | |
| 0 - 60 & 150-170 | 1 | 3.0 | 4.0 | 33 | 1.0 | 1 in 10 | 3.90 | 4 | 1.0 | RE580 | NO UNDERCUT KEY Between CH0 - 35 2m Deep Undercut Key at Toe Between CH35 - 60 & 150 - 170 |
| 60 - 100 | 2 | 3.0 | 4.0 | 33 | 1.0 | 1 in 10 | 4.70 | 4 | 1.0 | RE580 | 2m Deep Undercut Key at Toe |
| 100 - 150 | 3 | 3.0 | 4.0 | 33 | 3.0 | 1 in 10 | 5.80 | 5 | 0.5/1.0 | RE580 | 2m Deep Undercut Key at Toe |
| 170 - 188 | 4 | 1.5 | 2.0 | 0 | 0 | 1 in 10 | 2.40 | 2 | 1.0 | RE560 | No Undercut Key Required |

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 RECENT GEOTECHNICAL DESIGN REPORT AND DESIGN DRAWINGS. ALTERNATIVE PRODUCTS SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE DESIGN ENGINEER. GEOGRID HANDLING, TENSIONING, SECURING, AND PLACEMENT MUST BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS. IN PARTICULAR, THE CORRECT ORIENTATION OF UNIAXIAL TYPE GRIDS IS CRITICAL.
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.

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

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

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

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

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

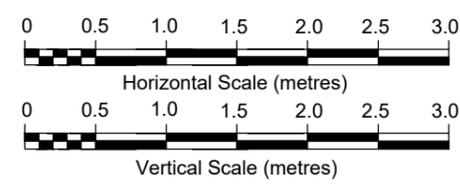
- MASS BLOCK WALL FOUNDATION EXCAVATIONS, STRENGTH AND BENCHING;
- FOUNDATION HARDFILL PLACEMENT (FOOTING AND SERVICE CROSSING);
- DRAINAGE AND GEOTEXTILE PLACED AT REAR OF WALL;
- HARDFILL, GEOGRID PLACEMENT AND COMPACTION TESTING;
- DRAINAGE OUTLET CONSTRUCTION;
- BARRIER POST FOUNDATION (SPIRAL SLEEVES),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

REINFORCED EARTH SLOPES

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

FOR CONSTRUCTION

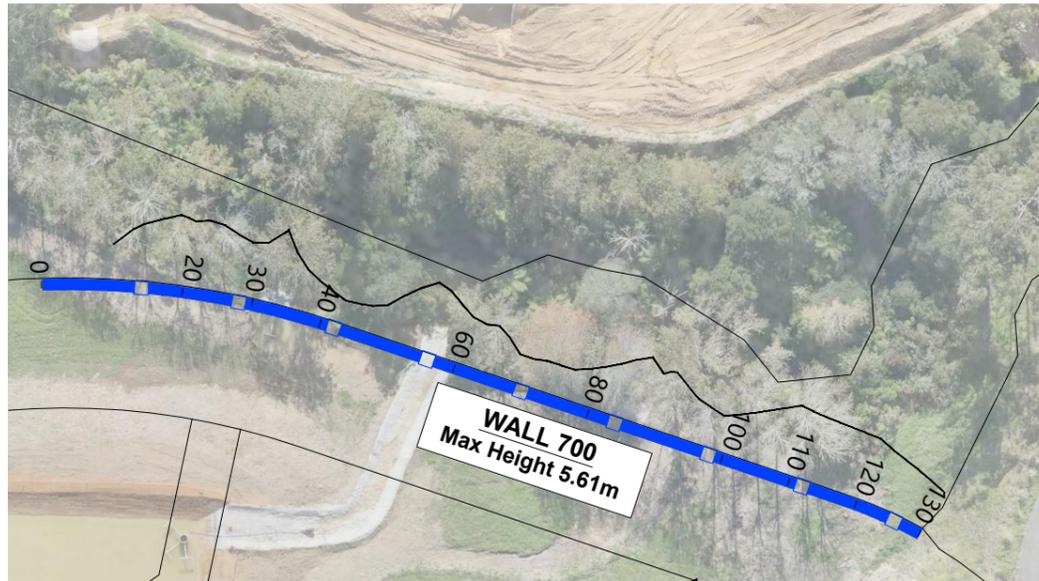
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|-----|-----------------------------------|-------|----------|------------|
| A | ORIGINAL ISSUE | RZ | AC | 27/11/2019 |
| B | UPDATE AFTER AMENDMENTS TO DESIGN | RZ | AC | 26/02/2020 |
| C | DRAINAGE DETAIL ADDED | RZ | AC | 21/05/2020 |
| D | WITH BARRIER DETAIL | RZ | SP | 18/06/2020 |



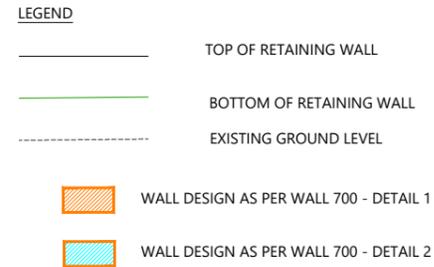
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| drawn | RZ |
| approved | AC |
| date | 18/06/2020 |
| scale | NTS |
| original size | A3 |



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|-------------|---------------------------------------|------------|--------|
| client: | WFH PROPERTIES LTD | | |
| project: | MILLWATER - OREWA WEST - PRECINCT 6 | | |
| title: | WALL 311 / RE SLOPE 311 DESIGN DETAIL | | |
| project no: | 773-AKLGE206639 | figure no: | AL/004 |
| rev: | D | | |

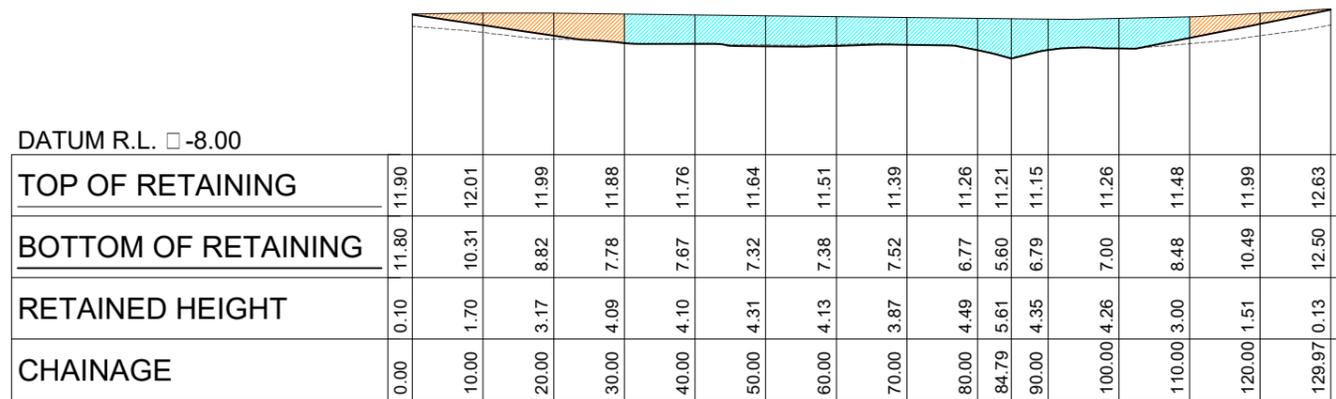


**MASSBLOCK RETAINING WALL 700
PLAN**
SCALE 1:1000

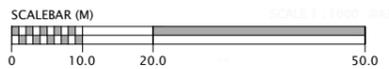


NOTES

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 | DESIGNED | DRAWN | CHECKED | APPROVED |
|------------------------------|-----|-----------|----------|----------|-------|---------|----------|
| 1 ISSUED FOR CONSENT | RV | JULY 2017 | DESIGNED | RV | | | |
| 2 ISSUED FOR INFORMATION | NSC | 21/06/19 | DRAWN | NSC | | | |
| 3 WALL DETAIL HATCHING ADDED | NSC | 08/08/19 | CHECKED | | | | |
| | | | APPROVED | | | | |

ARRAN DRIVE
OREWA
AUCKLAND

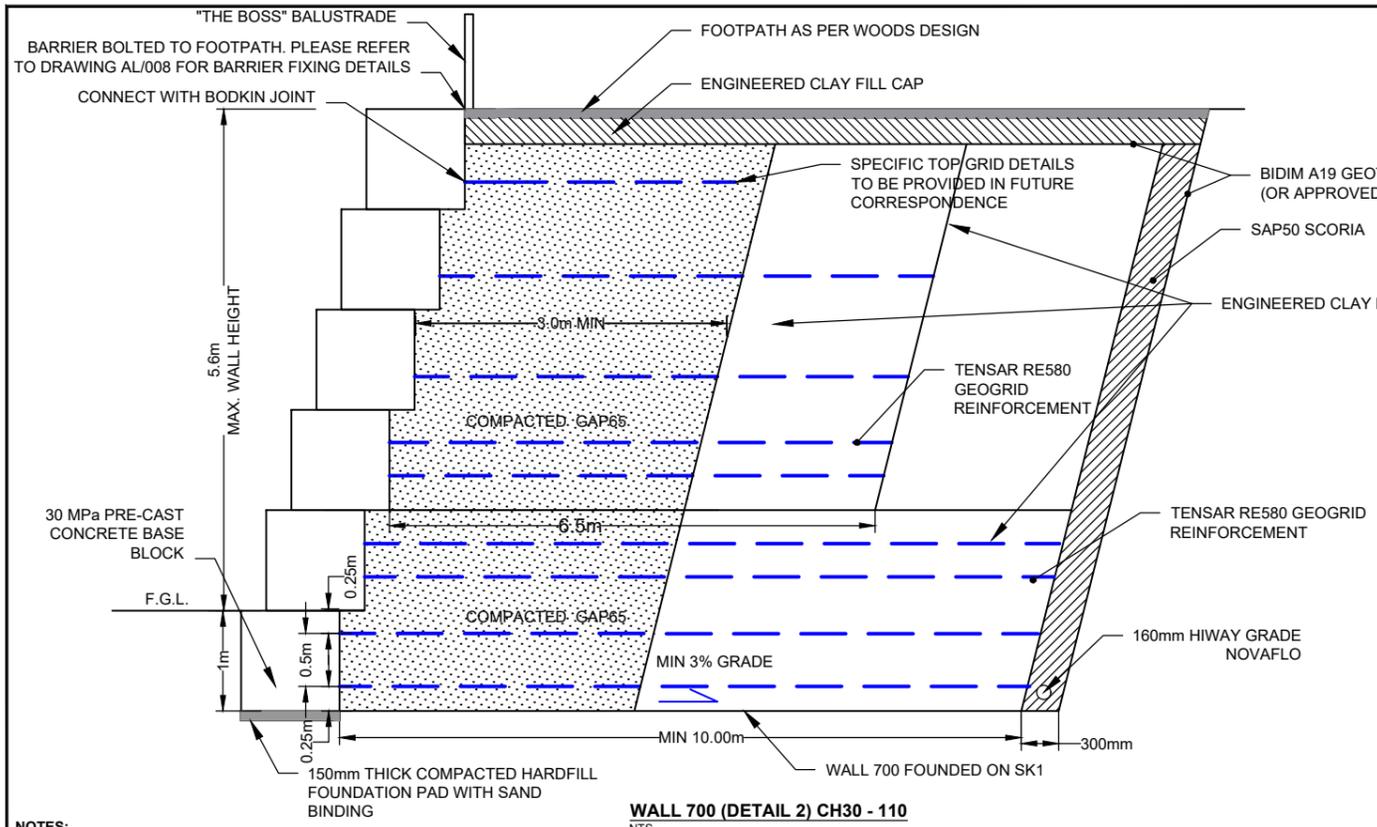


WOODS.CO.NZ

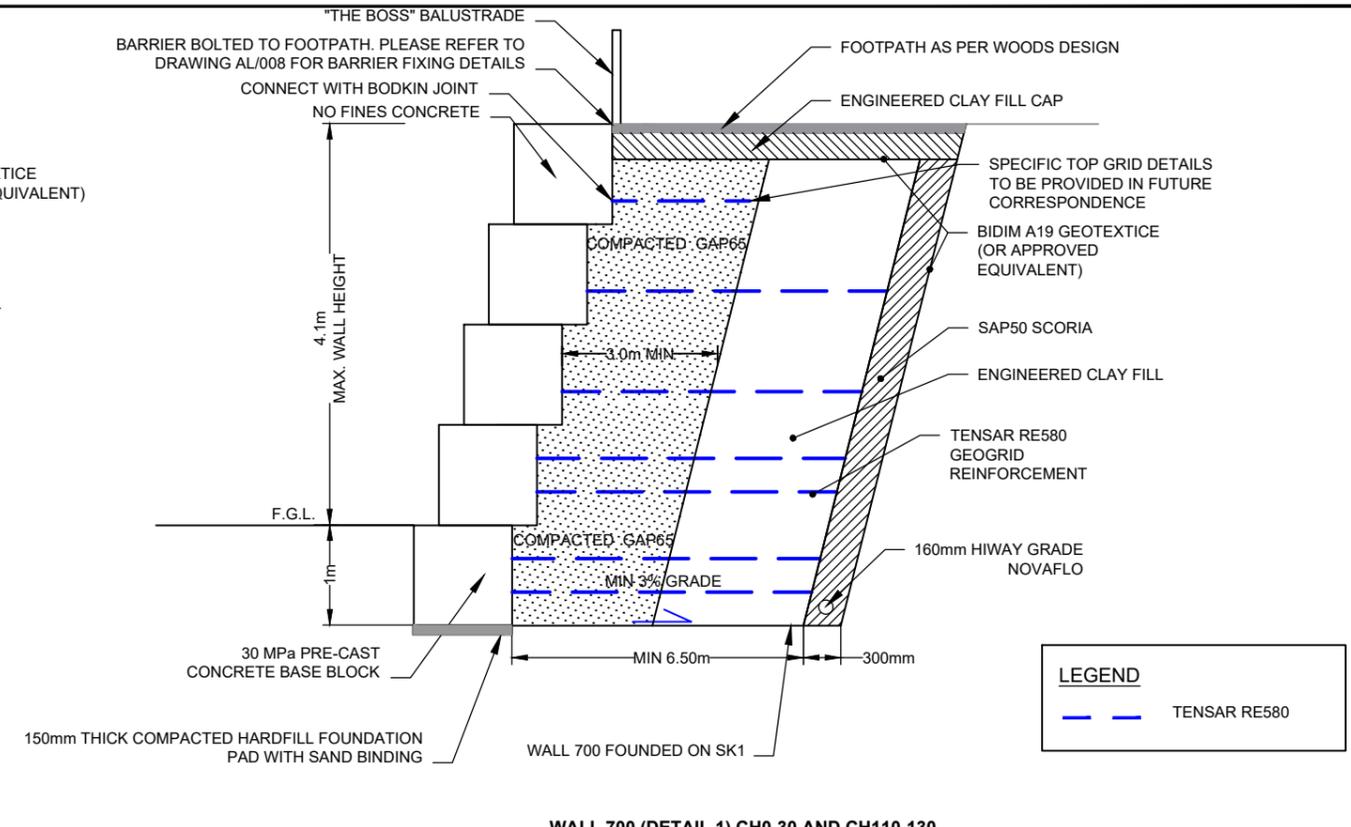
MILLWATER - PRECINCT 6
OREWA WEST
RETAINING WALL PLAN & LONG SECTION



| | | |
|---------|--------------------------|-----|
| STATUS | ISSUED FOR INFORMATION | REV |
| SCALE | H 1:1000 @A3 V 1:500 @A3 | 3 |
| COUNCIL | AUCKLAND COUNCIL | |
| DWG NO | 37600-01-173-EW | |



WALL 700 (DETAIL 2) CH30 - 110
NTS



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

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 EMBEDDED 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 RECENT GEOTECHNICAL DESIGN REPORT AND DESIGN DRAWINGS. ALTERNATIVE PRODUCTS SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE DESIGN ENGINEER. GEOGRID HANDLING, TENSIONING, SECURING, AND PLACEMENT MUST BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS. IN PARTICULAR, THE CORRECT ORIENTATION OF UNIAXIAL TYPE GRIDS IS CRITICAL.
 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 | | | Geogrid | | | | Additional notes |
|-----------------------|---------------|-------------------------|---|---------------------|------------|---------------------|------------|------------------------------------|---------------------------------|-------|---|
| | | | | Angle (°) | Height (m) | Max Toe Slope Angle | 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 | |

FOR CONSTRUCTION

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

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

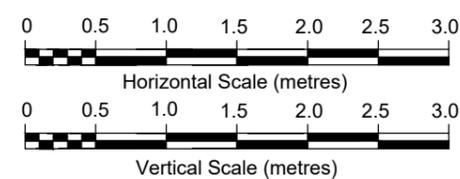
BARRIER / FALL PREVENTION AND BARRIER POST FOUNDATION
WALLS OVER 1.0 METRE IN HEIGHT SHALL HAVE A HANDRAIL / FALL PREVENTION IN ACCORDANCE WITH THE NEW ZEALAND BUILDING CODE CLAUSE F4. BARRIER POST FOUNDATION TO BE EITHER MOWING STRIP DESIGNED BY OTHERS OR 400Ø BY 1.0M DEEP SPIRAL TUBE.

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

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

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

| no. | description | drawn | approved | date |
|-----|--|-------|----------|------------|
| A | ORIGINAL ISSUE | RZ | AC | 15/08/2019 |
| B | DESIGN AS OF 20.02.2020 (NOT APPROVED) | LM | AC | 20/02/2020 |
| C | UPDATE AFTER AMENDMENTS TO DESIGN | RZ | AC | 26/02/2020 |
| D | FOR CONSTRUCTION | RZ | AC | 01/05/2020 |
| E | WITH BARRIER DETAIL 18/06/2020 | RZ | SP | 18/06/2020 |
| F | UPDATE TO BARRIER DETAIL | RZ | SP | 13/07/2020 |

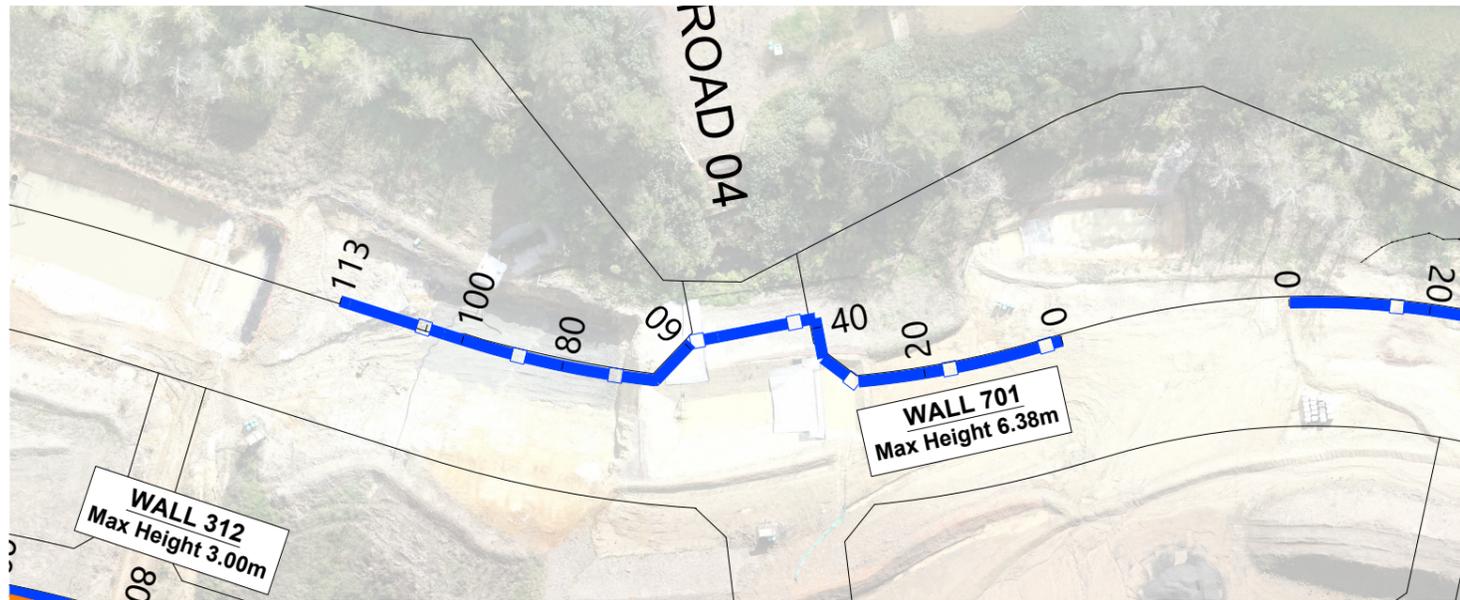


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|---------------|------------|
| drawn | RZ |
| approved | AC |
| date | 13/07/2020 |
| scale | NTS |
| original size | A3 |



| | | | |
|-------------|-------------------------------------|------------|--------|
| client: | WFH PROPERTIES LTD | | |
| project: | MILLWATER - OREWA WEST - PRECINCT 6 | | |
| title: | WALL 700 DESIGN DETAIL | | |
| project no: | 773-AKLGE206639 | figure no: | AL/006 |
| rev: | F | | |

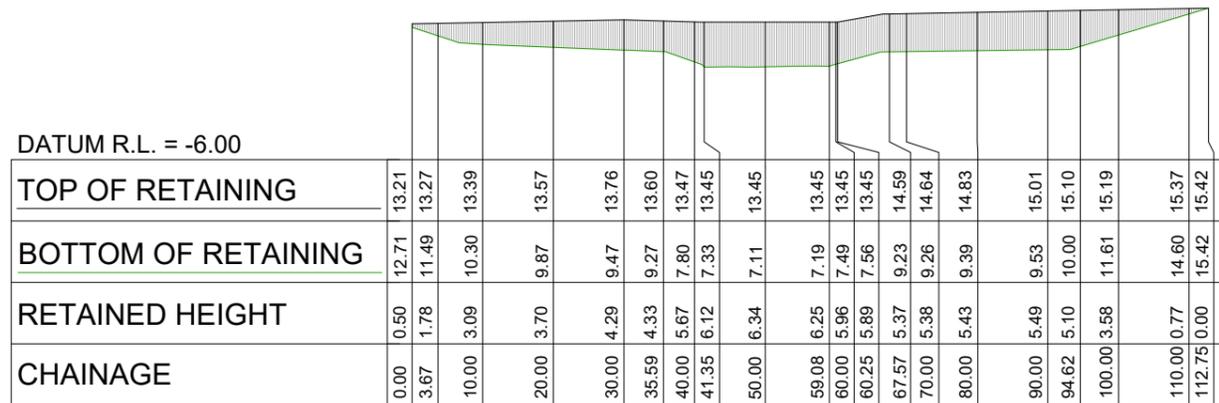
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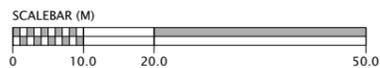
LEGEND

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

MASSBLOCK RETAINING WALL 701
PLAN
SCALE 1:1000

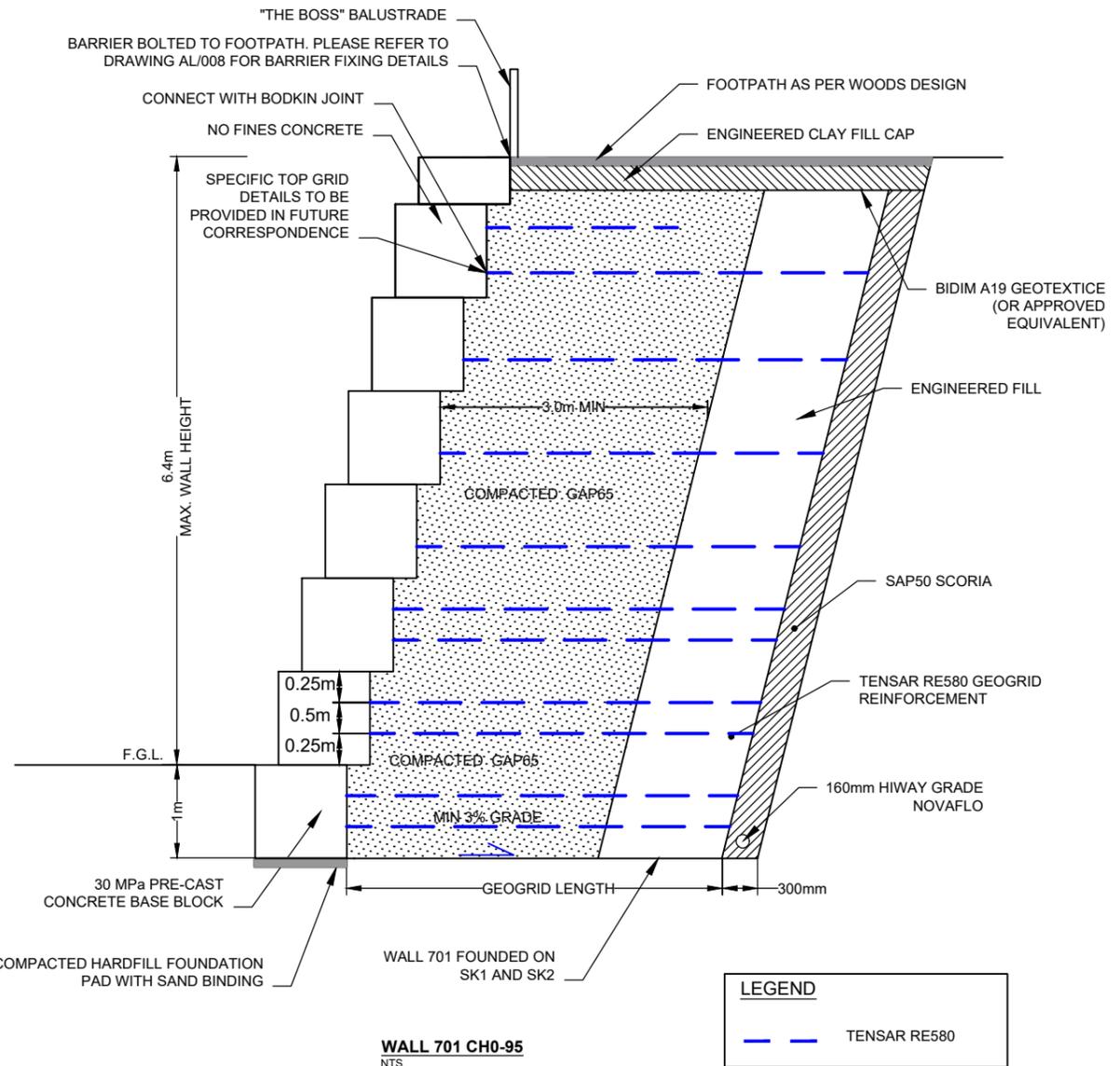


RETAINING WALL 701 LONGITUDINAL SECTION



| | | | | | | | | | | | | |
|------------------|------------------------------------|-----|----------|----------|----|----------------------------------|--|--|--|---------|---------------------------|-----|
| REVISION DETAILS | | INT | DATE | SURVEYED | | ARRAN DRIVE OREWA AUCKLAND | | 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: \\TTSB08F5248\B08\GEN29\PROJECTS\773-AKLGE\DRAWINGS\CAD\DWG\773-AKLGE\206639-AL07.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:

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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.

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

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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.

DRAINAGE

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

SETTING OUT

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

BARRIER / FALL PREVENTION AND BARRIER POST FOUNDATION

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

WASTE MATERIAL

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

MASS BLOCK RETAINING WALL INSPECTION

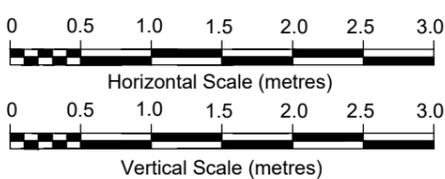
INSPECTION OF ALL ASPECTS OF MASS BLOCK RETAINING WALL ARE REQUIRED BY COFFEY TO CONFIRM THAT THE DESIGN REQUIREMENTS ARE SATISFIED AND TO ENABLE CERTIFICATION OF THE COMPLETED WORKS. THIS LEVEL OF CONSTRUCTION MONITORING IS CONSISTENT WITH ENGNZ MONITORING LEVEL CM4. THESE INCLUDE, BUT MAY NOT BE LIMITED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

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

| Chainage Interval (m) | Wall detail # | Max Retained Height (m) | Total Wall Height Including Embedment (m) | Max Surcharge Slope | | | Geogrid | | | | Additional notes |
|-----------------------|---------------|-------------------------|---|---------------------|------------|---------------------|------------|------------------------------------|---------------------------------|-------|--|
| | | | | Angle (°) | Height (m) | Max Toe Slope Angle | 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

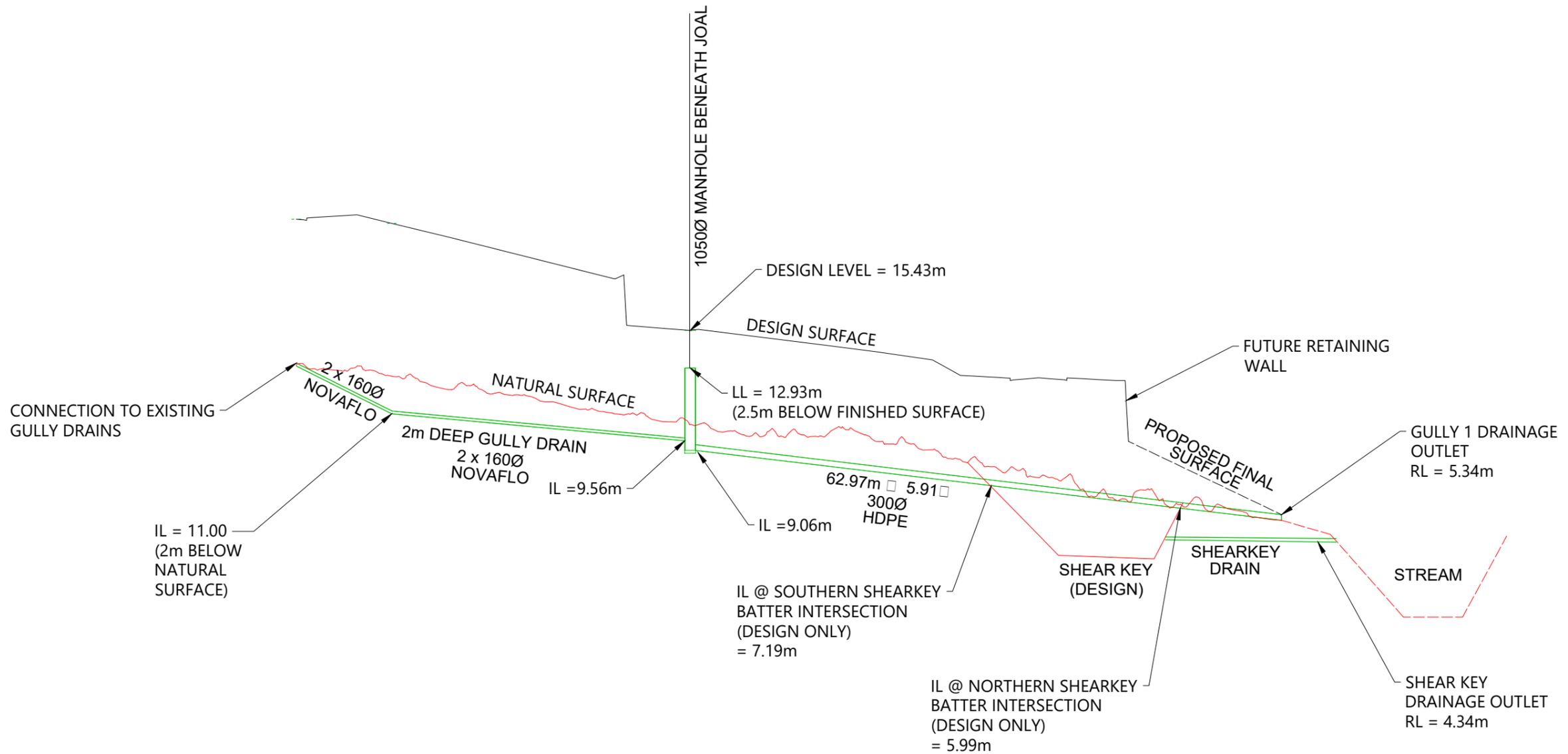
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|-----|--|-------|----------|------------|
| A | ORIGINAL ISSUE | RZ | AC | 27/11/2019 |
| B | UPDATE AFTER AMENDMENTS TO DESIGN | RZ | AC | 26/02/2020 |
| C | UPDATE TO BARRIER DETAIL | RZ | SP | 13/07/2020 |
| D | UPDATE AFTER AMENDMENTS TO WALL LENGTH & RETAINED HEIGHT | RZ | AC | 31/03/2021 |



| | |
|---------------|-----------|
| drawn | RZ |
| approved | AC |
| date | 1/04/2021 |
| scale | NTS |
| original size | A3 |



| | | | |
|-------------|-------------------------------------|------------|--------|
| client: | WFH PROPERTIES LTD | | |
| project: | MILLWATER - OREWA WEST - PRECINCT 6 | | |
| title: | WALL 701 DESIGN DETAIL | | |
| project no: | 773-AKLGE206639 | figure no: | AL/007 |
| rev: | D | | |



| REVISION DETAILS | | INT | DATE | SURVEYED | |
|------------------|-------------------------|-----|------------|----------|----|
| A | ISSUED FOR CONSTRUCTION | NC | 30/09/2019 | DESIGNED | NC |
| | | | | DRAWN | NC |
| | | | | CHECKED | |
| | | | | APPROVED | |

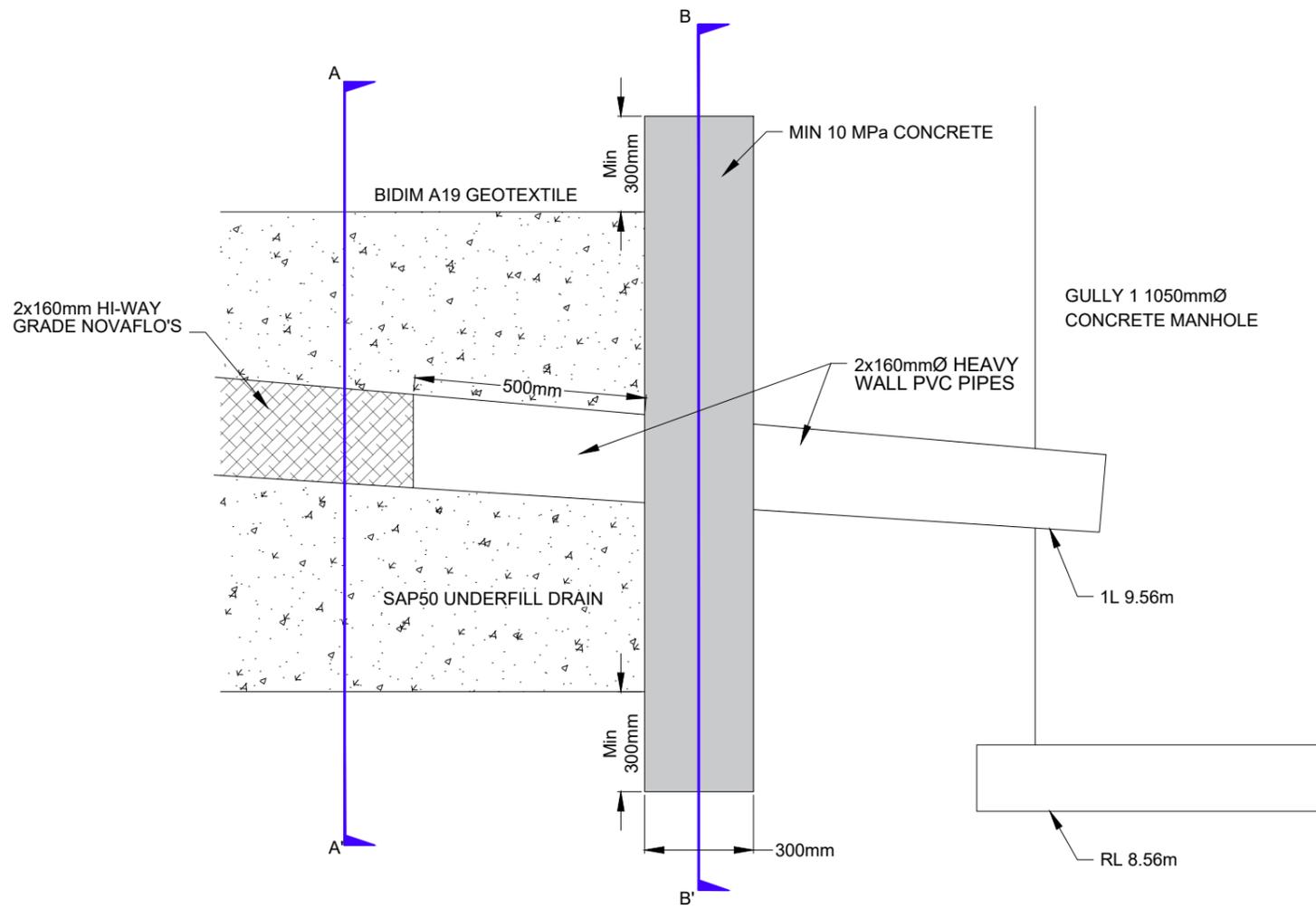
ARRAN DRIVE
OREWA
AUCKLAND



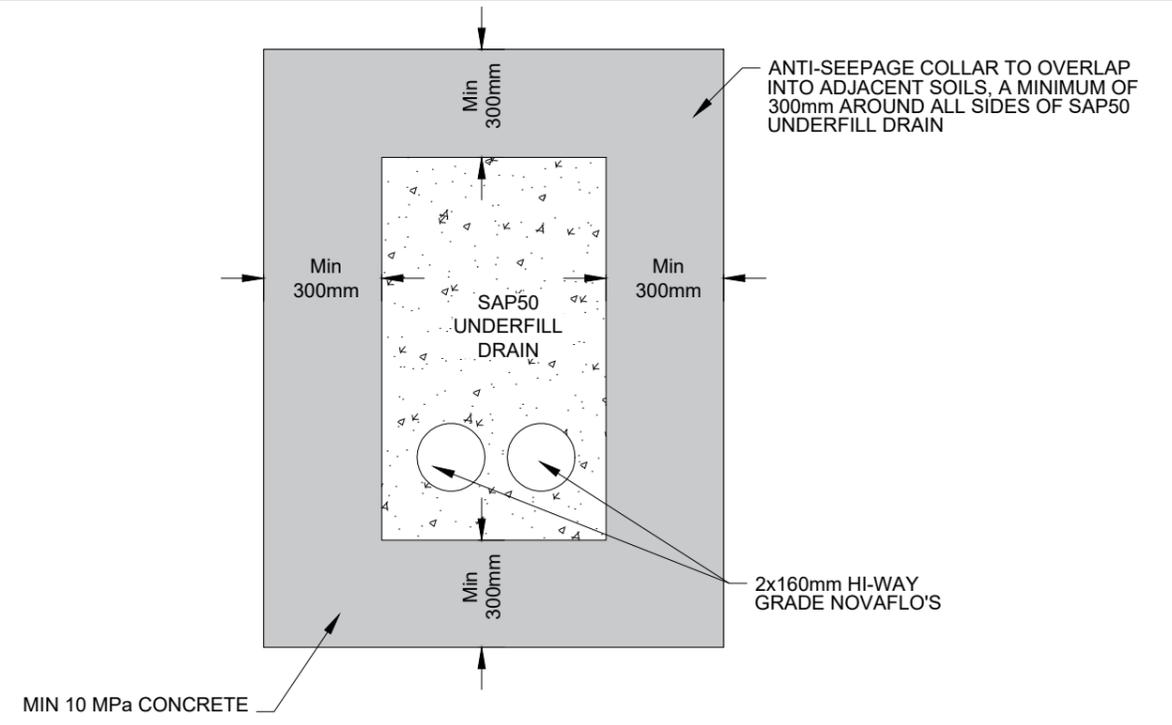
MILLWATER - PRECINCT 6
OREWA WEST
GULLY 1 DRAINAGE LONGSECTION

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

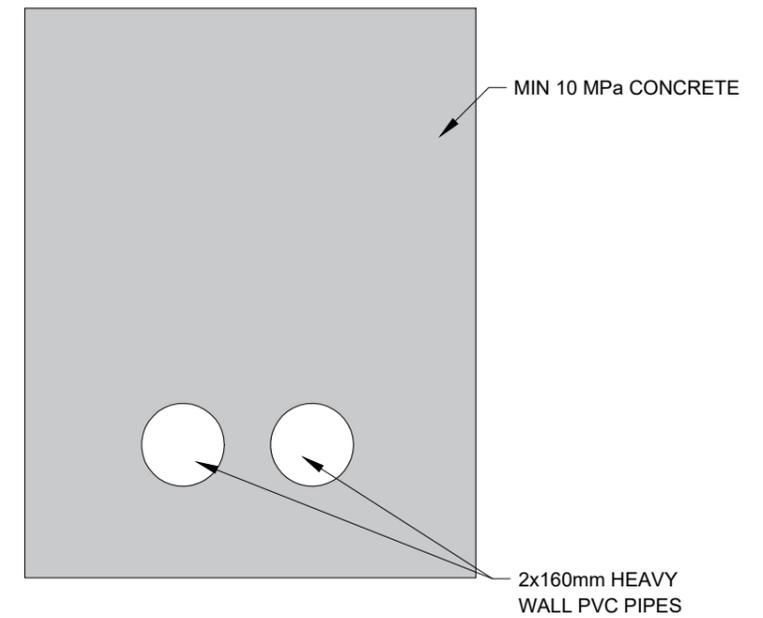
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GULLY 1 MANHOLE / ANTI-SEEPAGE COLLAR CROSS SECTION
SCALE: 1:20



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



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

| no. | description | drawn | approved | date |
|-----|-----------------------------|-------|----------|------------|
| A | ORIGINAL ISSUE (FOR EW GDR) | RZ | SP | 04/12/2019 |
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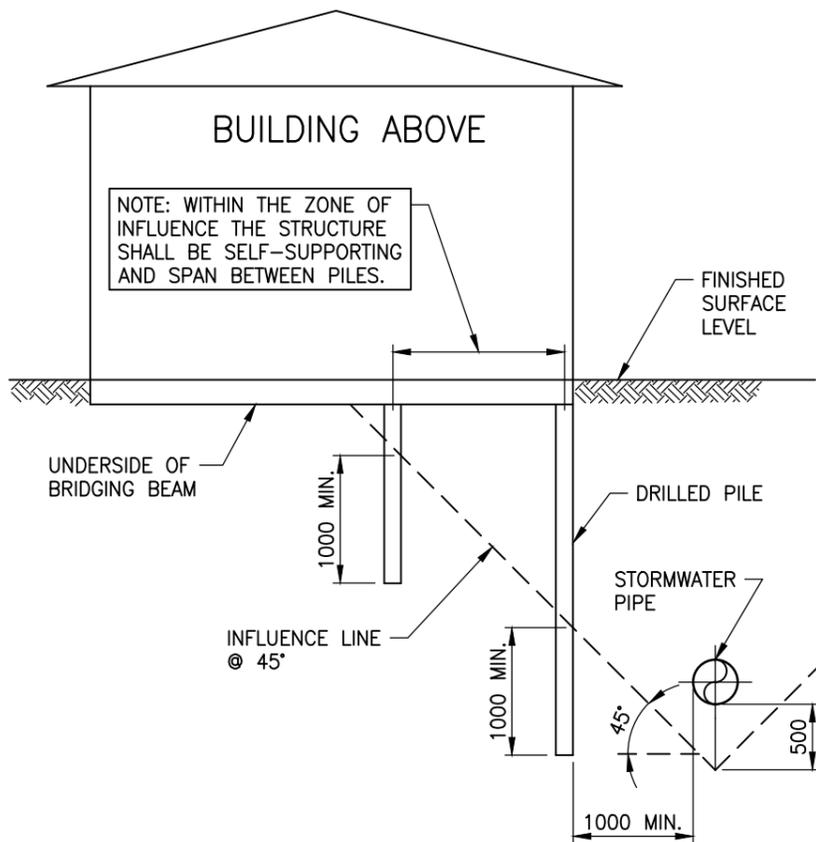
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| drawn | RZ |
| approved | SP |
| date | 04/12/2019 |
| scale | AS SHOWN |
| original size | A3 |



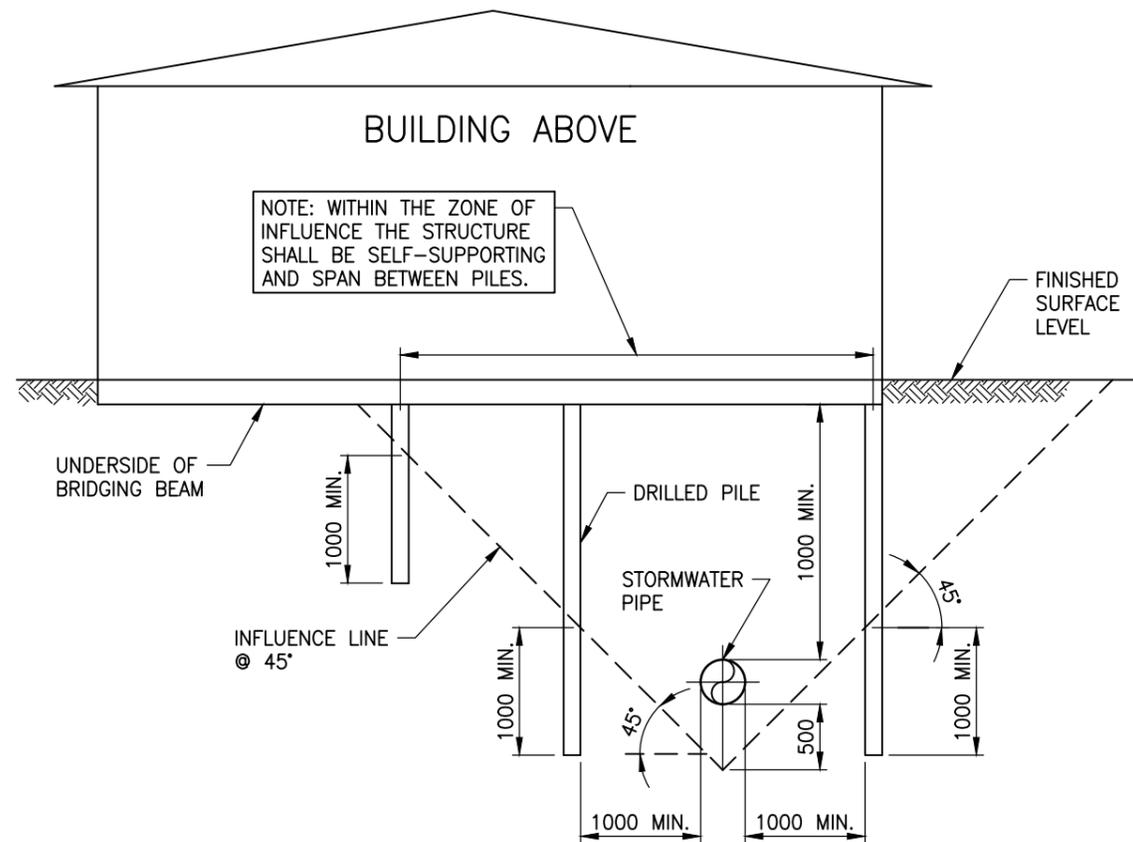
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| client: | WFH PROPERTIES LTD | | |
| project: | MILLWATER - AHP6 | | |
| title: | GULLY 1 MANHOLE / ANTI-SEEPAGE COLLAR DETAILS | | |
| project no: | 773-AKLGE206639 - NTE08 | figure no: | NTE08/002 |
| rev: | A | | |

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.



BUILD CLOSE



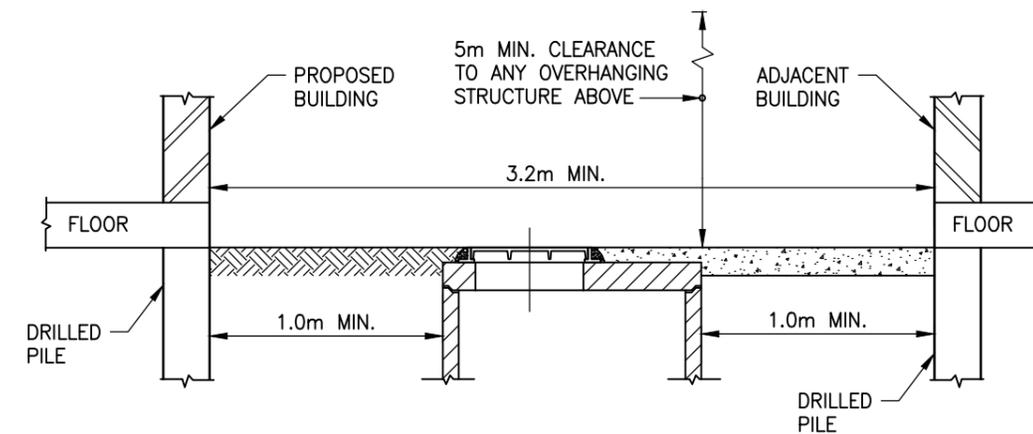
BUILD OVER

"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" 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.



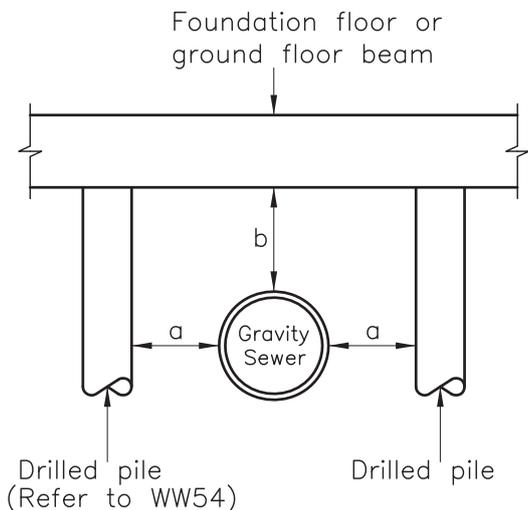
MANHOLE CONSTRUCTION CLEARANCE

PLOT DATE 12/8/2015 11:54 AM I:\AENVA\Projects\AED04840 AC CoP Ch1\04 Deliverables\Drawings\AC-STD-SW22.dwg

STORMWATER CODE OF PRACTICE
STANDARD DETAILS
REVISION: 2
REV DATE: 1 NOVEMBER 2015
CAD FILENAME: AC-STD-SW22.DWG

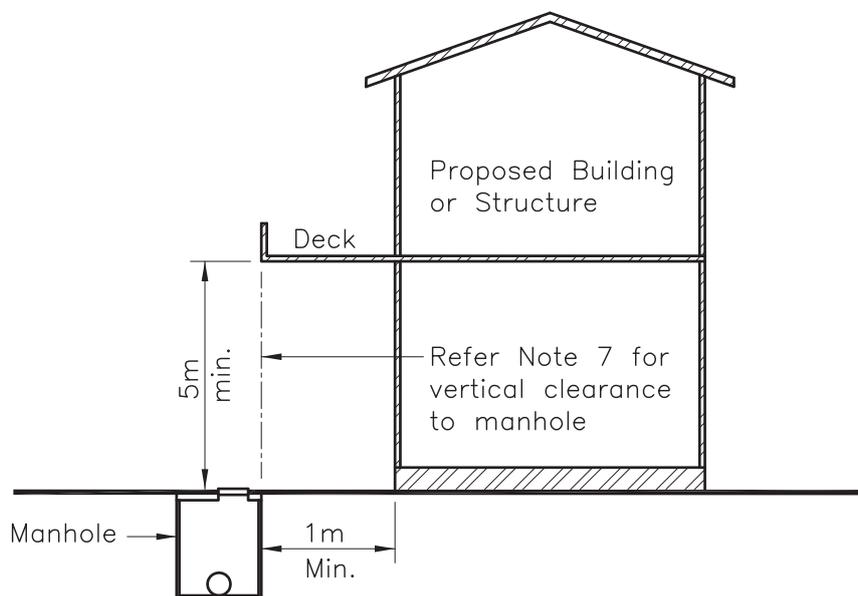
AUCKLAND COUNCIL
STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS
MANHOLES NEAR BUILDINGS AND BUILDING CLOSE OVER PIPES

| | | |
|---|---------------------------------|-----------------|
| ENVIRONMENTAL-SW | ORIGINAL SCALE SCALE: N.T.S. | A3 |
|  | DRAWING SET SWCoP | SHEET 1 OF 1 |
| | DRAWING No. SW22 | REV 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.

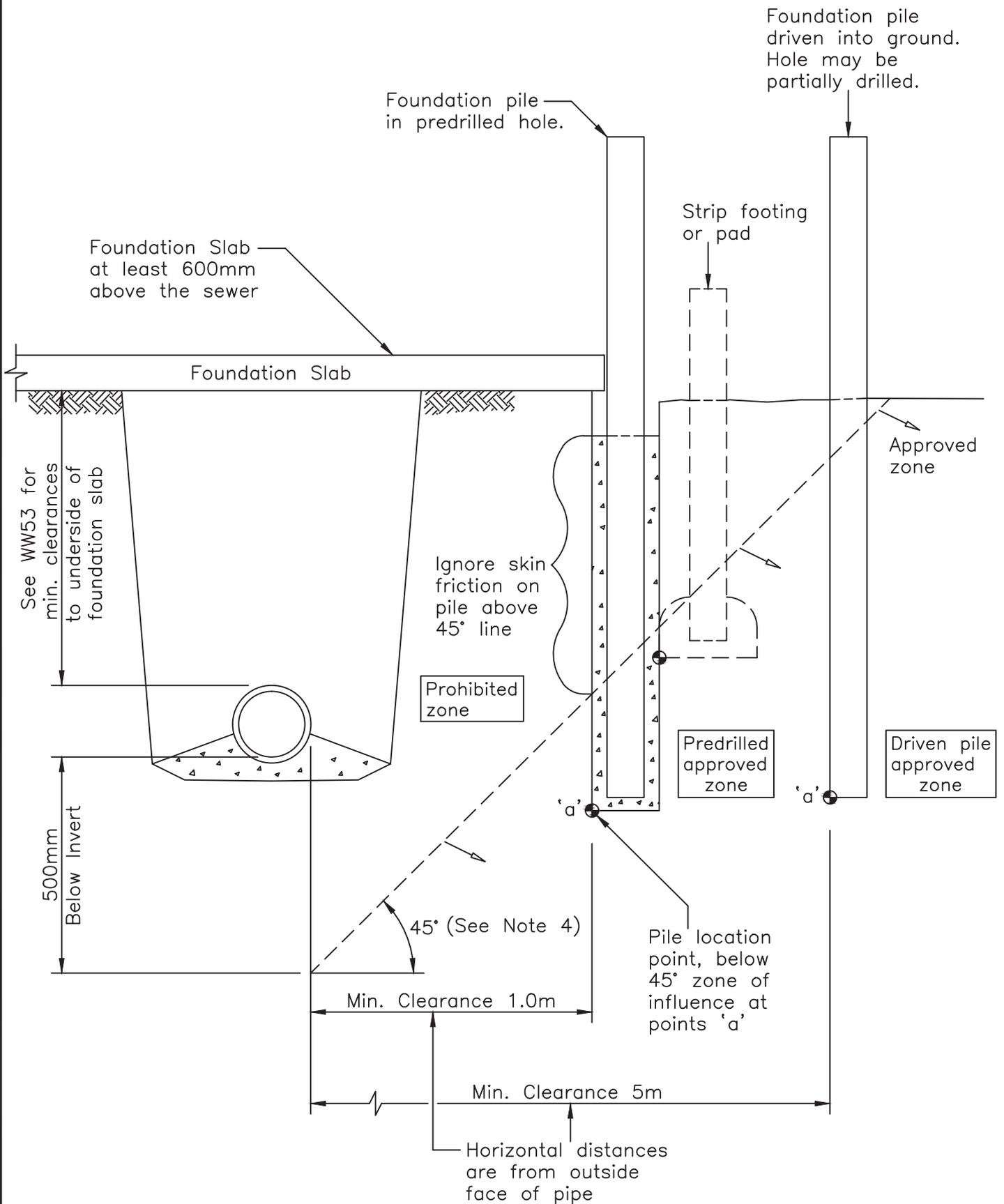
L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.044B .DWG



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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

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 | Sampling Method: Unknown (Not IANZ Endorsed) |
| Date Sampled: 21/08/2022 | Material: Undisturbed Soil |
| Date Submitted: 25/08/2022 | Source: Unknown (Sampled by Client) |
| Date Tested: 25/08/2022 | |
| Project Location: 117 Kowhai Road, Orewa | |
| Sample Location: Lot 1002 | |
| Borehole Number: Lot 1002 | |
| Borehole Depth (m): - | |

Swell Test

AS 1289.7.1.1

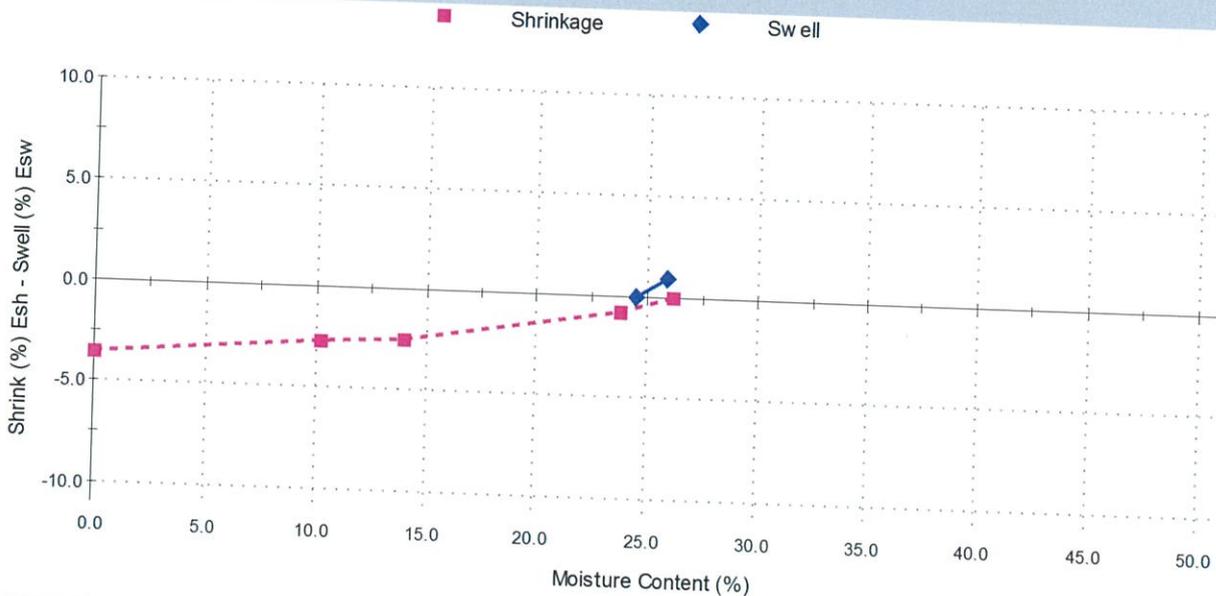
| | |
|--|------|
| Swell on Saturation (%): | 0.9 |
| Moisture Content before (%): | 24.4 |
| Moisture Content after (%): | 25.9 |
| Est. Unc. Comp. Strength before (kPa): | 450 |
| Est. Unc. Comp. Strength after (kPa): | 250 |

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.)



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

Sample Details

| | |
|---|---|
| Sample ID: ETAM22S-07710 | Sampling Method: Unknown (Not IANZ Endorsed) |
| Date Sampled: 21/08/2022 | Material: Undisturbed Soil |
| Date Submitted: 25/08/2022 | Source: Unknown (Sampled by Client) |
| Date Tested: 25/08/2022 | |
| Project Location: 117 Kowhai Road, Orewa | |
| Sample Location: Lot 1003 | |
| Borehole Number: Lot 1003 | |
| Borehole Depth (m): - | |

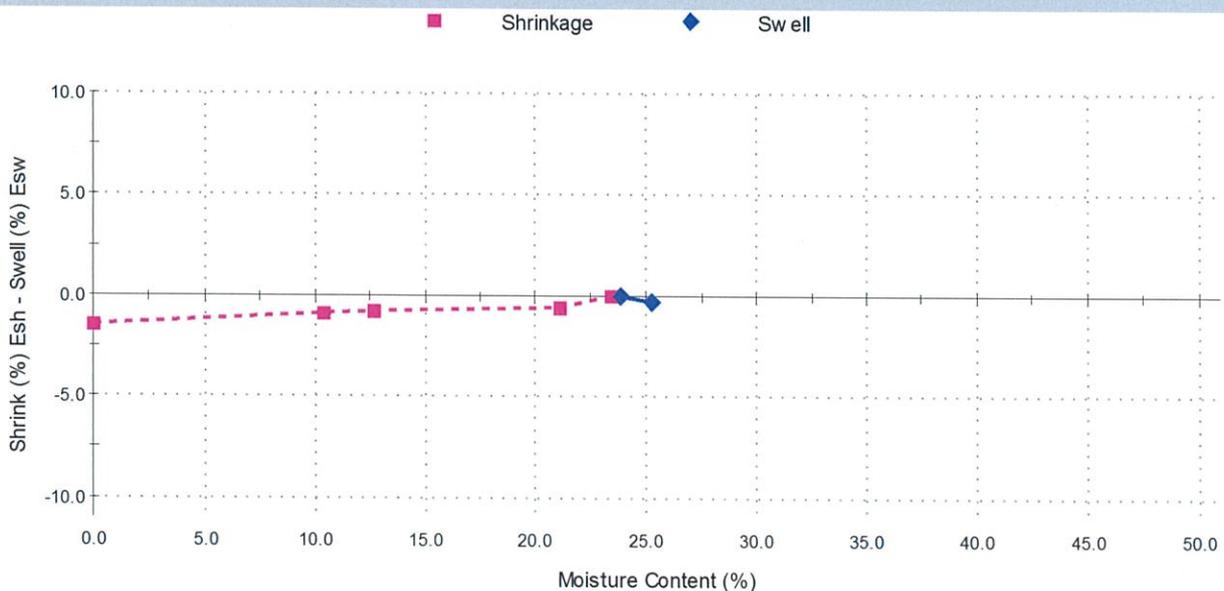
Swell Test AS 1289.7.1.1

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

| | |
|---|---|
| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <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: 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 | | | | Wet Density (T/m ³) | Oven Water Content (%) | Dry Density (T/m ³) | Solid Density (T/m ³) Assumed | Air Voids (%) |
|-----------|---------------------------|-----------|----------|-------|-----------------|----------|---------|----------|-------|-----------------------|-------------------------|-----------------------------|-----|-----|-----|---------------------------------|------------------------|---------------------------------|--|---------------|
| | | | | | | | | | | | | UTP | UTP | UTP | UTP | | | | | |
| 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



| | |
|---|---|
| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; align-items: center;">  <p style="font-size: small;">All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right; margin-top: 20px;"> <p><i>[Signature]</i></p> <p>Approved Signatory: Cesar Pura</p> <p>Issue date: 15/01/2020</p> </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 | | | | 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 | | | | | | | | |
| 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; justify-content: space-between; align-items: center;"> <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;">  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 | | | | 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 | | | | | | | | |
| 14/01/2020 | 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



| | |
|---|---|
| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <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: 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 | | | | 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 | | | | | | | | |
| 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) | PROJECT CODE: 773-ETAM00991AA |
| Address: PO Box 8261, Symonds Street, Auckland 1150 | Page: 1 of 2 |
| Attention: Stephen Parkes |  All tests reported herein have been performed in accordance with the laboratory's scope of accreditation |
| c.c.: - | |
| Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 | Issue date: 22/01/2020 |
| 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 | UTP | UTP | UTP | | | | | |
| 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



| | |
|---|---|
| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <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: 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 | | | | 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 | | | | | | | | |
| 21/01/2020 | 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; justify-content: space-between; align-items: center;"> <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: 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 | | | | 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 | | | | | | | | |
| 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



| | |
|---|---|
| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <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: 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 | | | | 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 | | | | | | | | |
| 23/01/2020 | 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



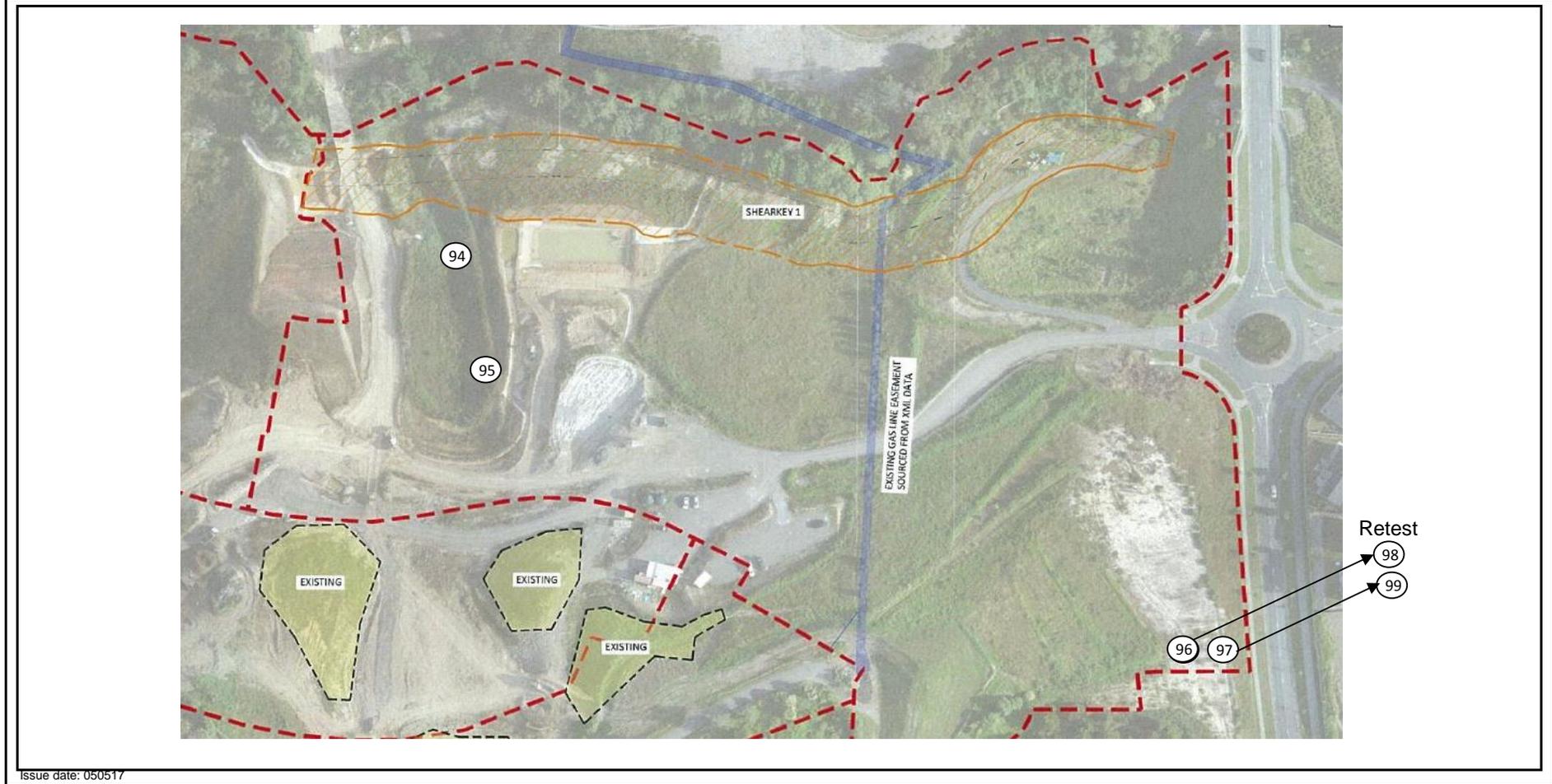
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|--|--|
| Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa | PROJECT CODE: 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 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: 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 | | | | 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 | | | | | | | | |
| 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 |

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| SITE PLAN | Project No: 773-ETAM00991AA |
| NOT TO SCALE | Work Order No: ETAM20W00128 |
| | Page No: 2 of 2 |

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|---|--------------------------------|
| Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6 | Tested by: TR |
| Location: As below | Date tested: 24/01/2020 |



| | |
|---|---|
| <p>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</p> | <p>PROJECT CODE: 773-ETAM00991AA Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <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: 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 | | | | 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 | | | | | | | | |
| 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



| | |
|---|--|
| <p>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</p> | <p>PROJECT CODE: 773-ETAM00991AA Page: 1 of 2</p> |
|  <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> | |
| <p>Approved Signatory: Cesar Pura Issue date: 4/02/2020</p> | |

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 | | | | | | | | |
| 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) | PROJECT CODE: 773-ETAM00991AA |
| Address: PO Box 8261, Symonds Street, Auckland 1150 | Page: 1 of 2 |
| Attention: Stephen Parkes |  All tests reported herein have been performed in accordance with the laboratory's scope of accreditation |
| 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 | | | | | | | | |
| 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

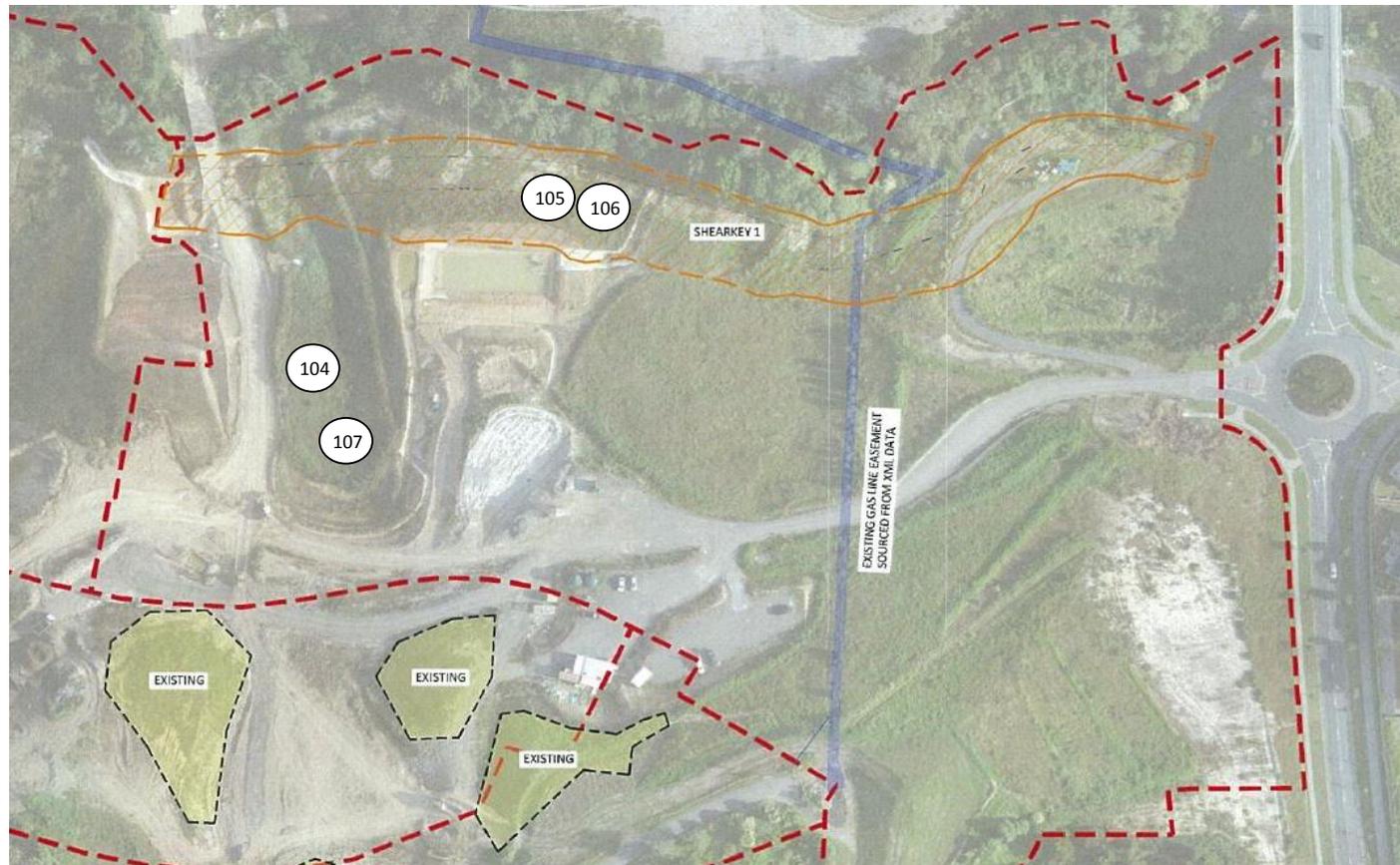
Location: As below

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; justify-content: space-between; align-items: center;"> <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: 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 | | | | 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 | | | | | | | | |
| 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

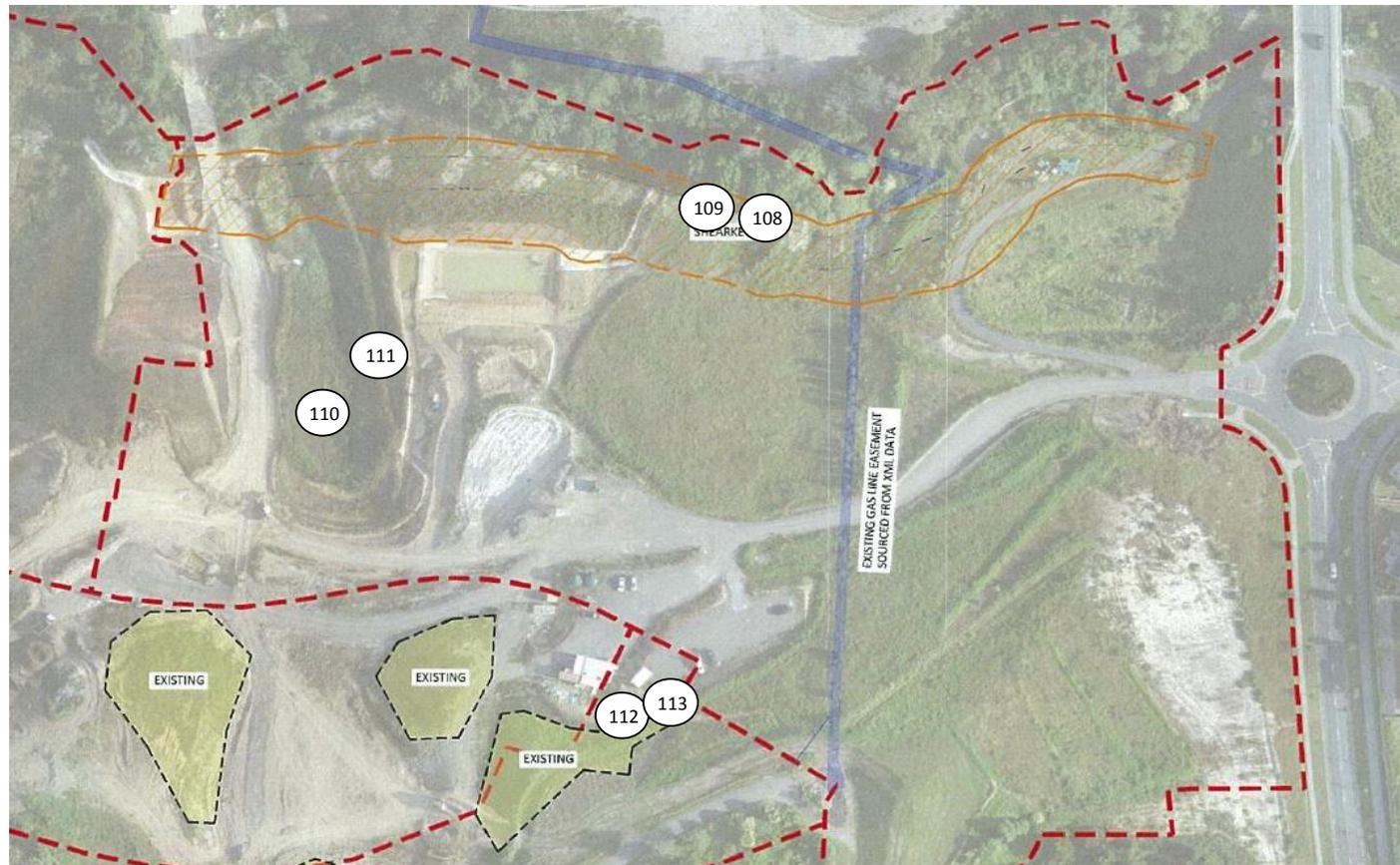
Location: As below

Tested by:

MP

Date tested:

31/01/2020



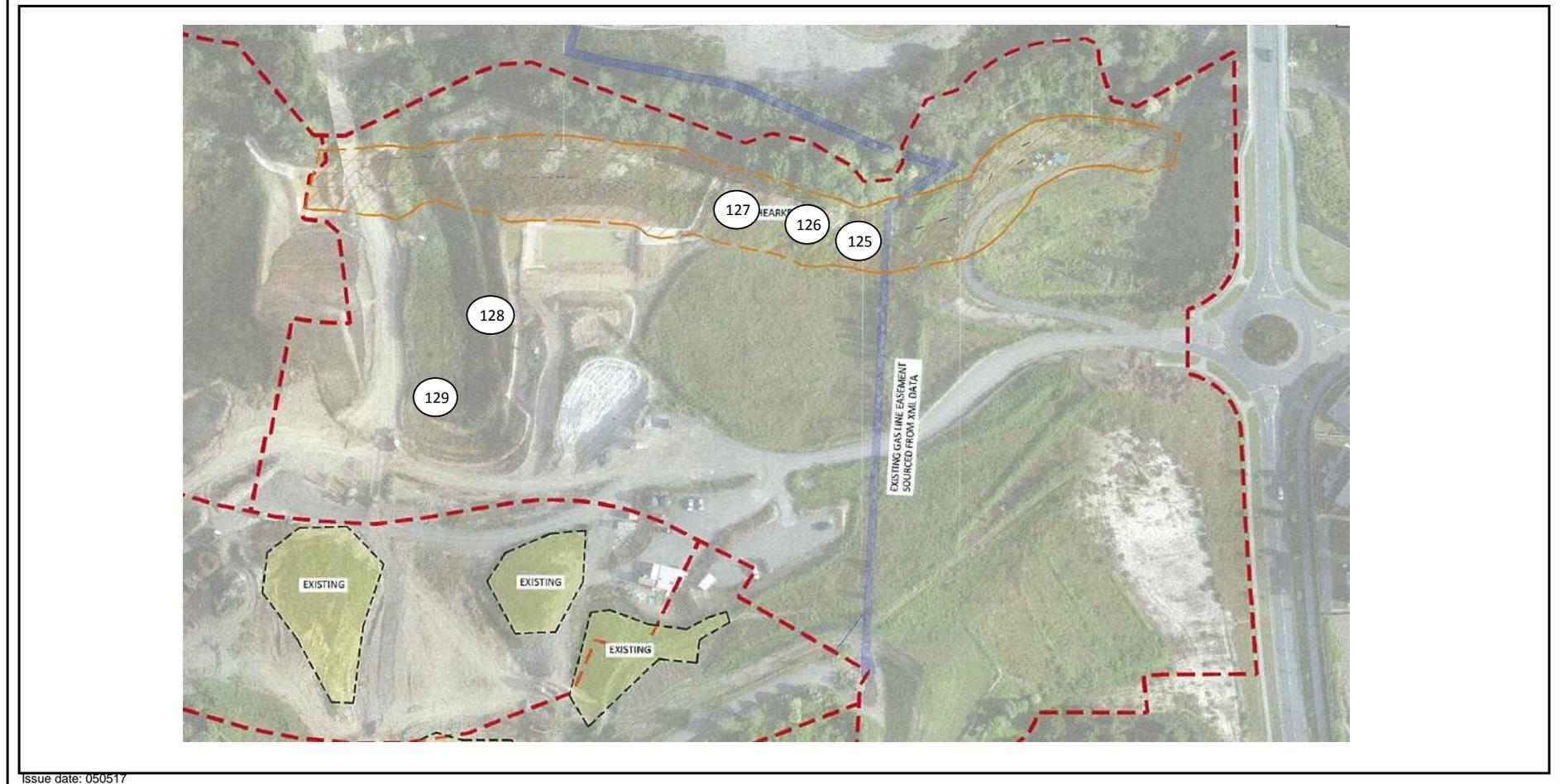
| | |
|--|--|
| Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa | PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="font-size: small;"> <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 | | | | 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 | | | | | | | | |
| 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 |

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| SITE PLAN | Project No: 773-ETAM00991AA |
| NOT TO SCALE | Work Order No: ETAM20W00286 |
| | Page No: 2 of 2 |

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|---|-------------------------------|
| Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6 | Tested by: MA |
| Location: As below | Date tested: 8/02/2020 |



| | |
|---|--|
| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="font-size: small;"> <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 | | | | Wet Density (T/m ³) | Oven Water Content (%) | Dry Density (T/m ³) | Solid Density (T/m ³) Assumed | Air Voids (%) |
|------------|---------------------------|-----------|----------|-------|-----------------|----------|---------|----------|-------|-----------------------|----------|-----------------------------|------|------|------|---------------------------------|------------------------|---------------------------------|--|---------------|
| | | | | | | | | | | | | 1 | 2 | 3 | 4 | | | | | |
| 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

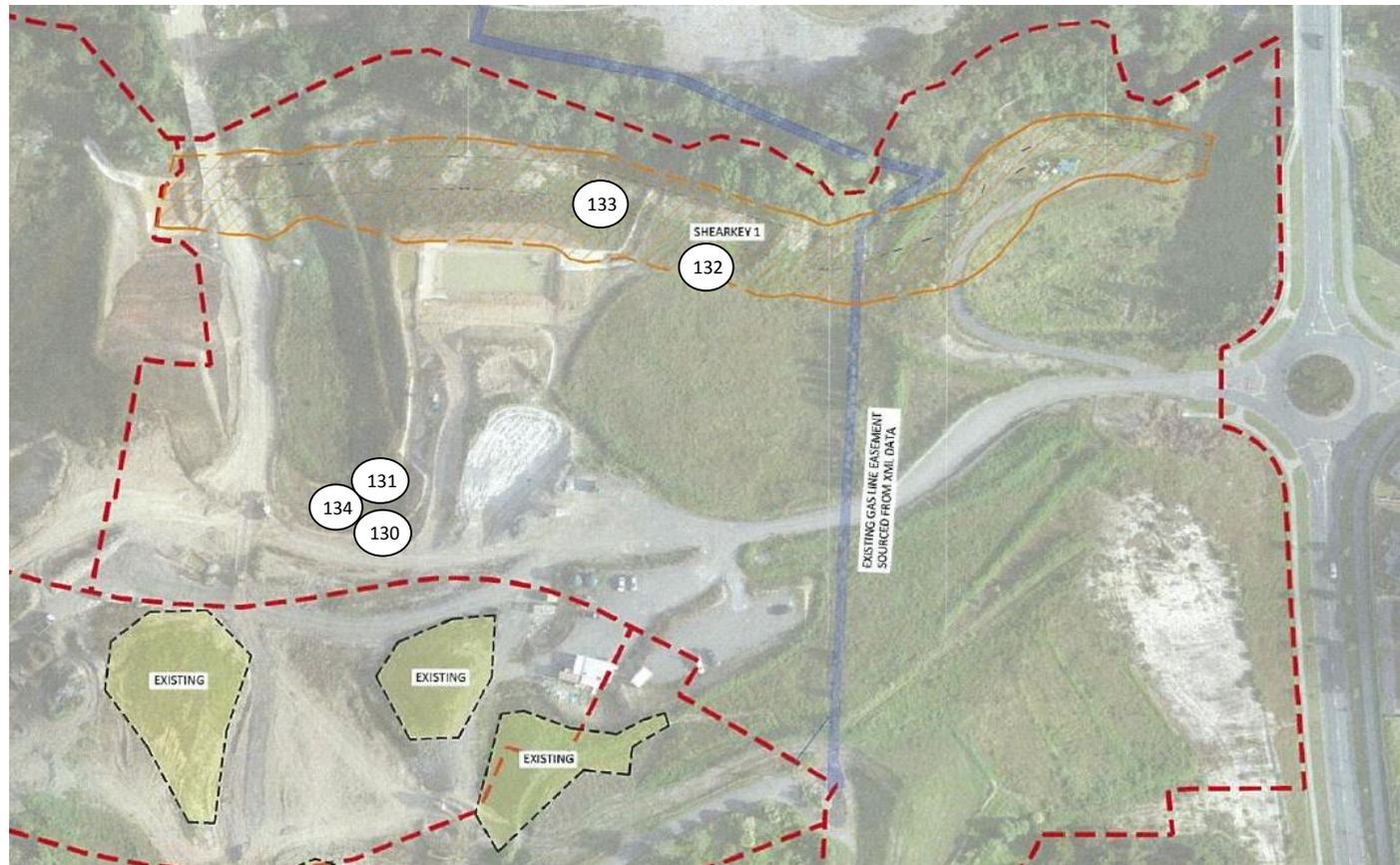
Location: As below

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 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="font-size: small;"> <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.

| 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 | | | | | | | | |
| 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



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|--|--|
| 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 style="font-size: small;"> <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.

| 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 |

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



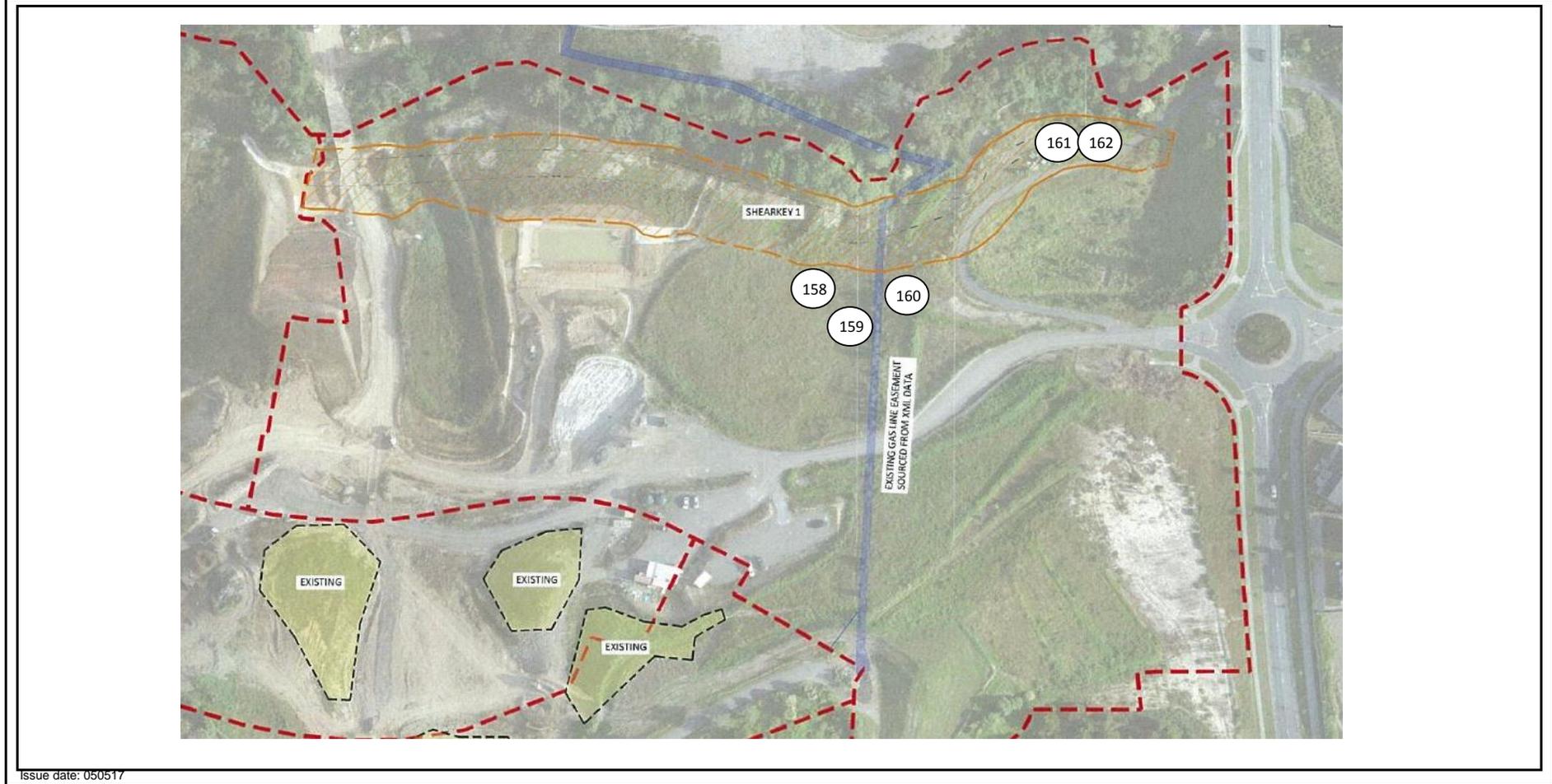
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|--|--|
| Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa | PROJECT CODE: 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 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: 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 | | | | 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 | | | | | | | | |
| 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 |

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| SITE PLAN | Project No: 773-ETAM00991AA |
| NOT TO SCALE | Work Order No: ETAM20W00350 |
| | Page No: 2 of 2 |

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| Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6 | Tested by: TR |
| Location: As below | Date tested: 18/02/2020 |



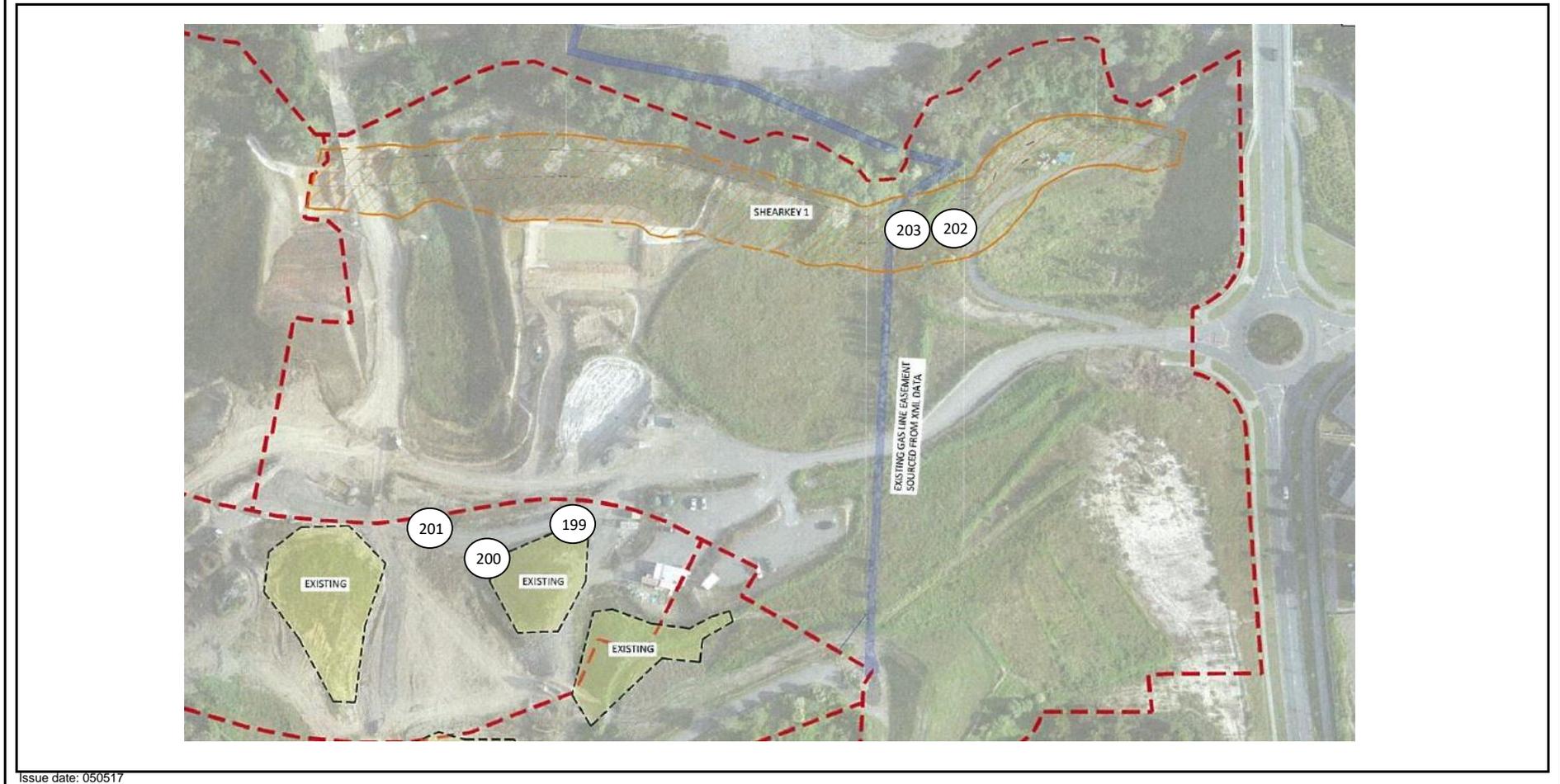
| | |
|--|--|
| Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa | PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> <p style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </p> |
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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 | | | | Wet Density (T/m ³) | Oven Water Content (%) | Dry Density (T/m ³) | Solid Density (T/m ³) Assumed | Air Voids (%) |
|-----------|---------------------------|-----------|----------|-------|-----------------|------------|---------|----------|-------|-----------------------|----------|-----------------------------|------|------|-----|---------------------------------|------------------------|---------------------------------|---|---------------|
| | | | | | | | | | | | | 181+ | 181+ | 181+ | 142 | | | | | |
| 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 |

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| SITE PLAN NOT TO SCALE | Project No: 773-ETAM00991AA Work Order No: ETAM20W00471 Page No: 2 of 2 |
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|---|-------------------------------|
| Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6 | Tested by: TR |
| Location: As below | Date tested: 3/03/2020 |



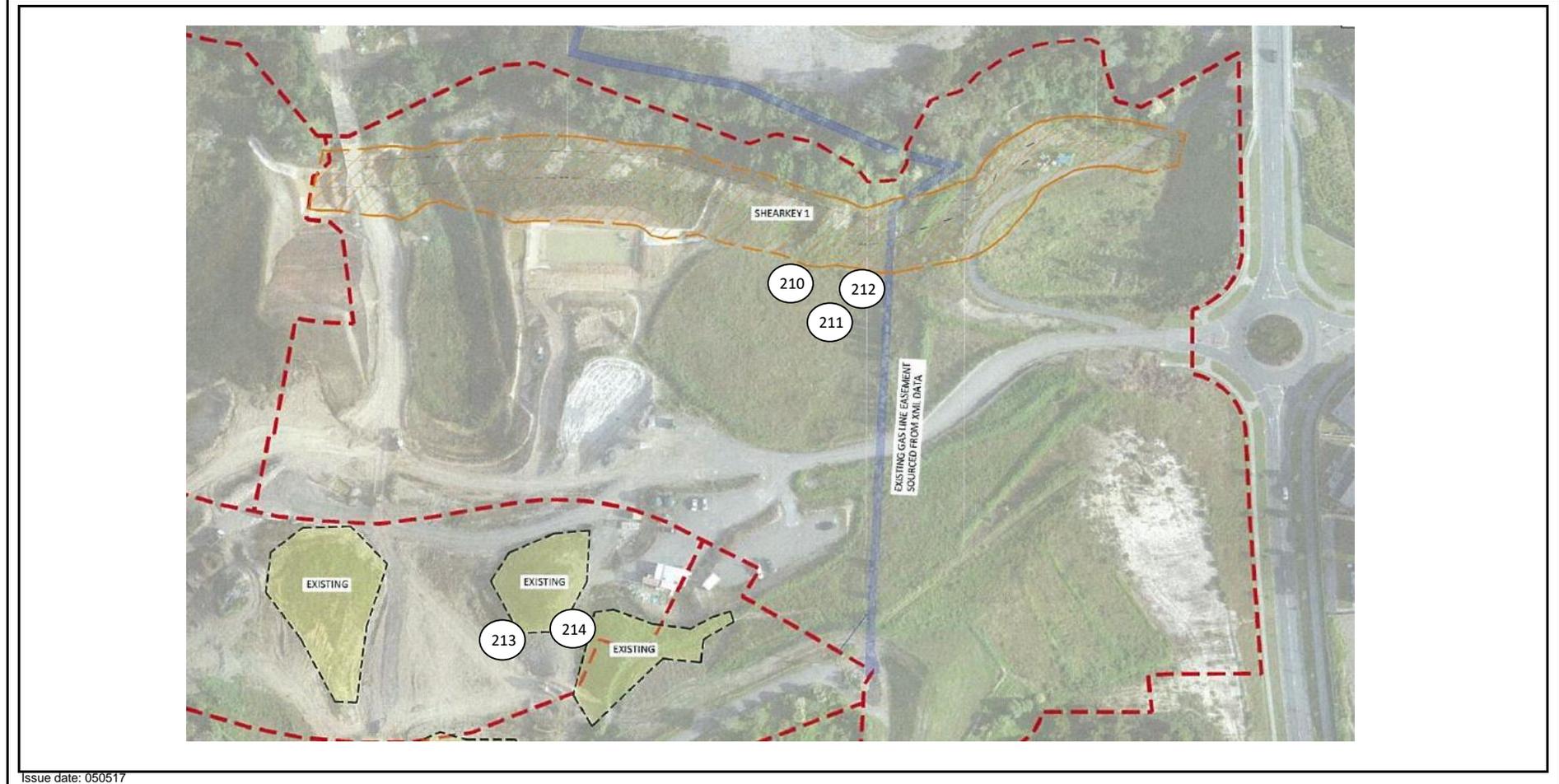
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|--|--|
| Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa | PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 20/03/2020 </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 | | | | Wet Density (T/m ³) | Oven Water Content (%) | Dry Density (T/m ³) | Solid Density (T/m ³) Assumed | Air Voids (%) |
|-----------|---------------------------|-----------|----------|-------|-----------------|-----------------|---------|----------|-------|-----------------------|----------|-----------------------------|-----|-----|-----|---------------------------------|------------------------|---------------------------------|---|---------------|
| | | | | | | | | | | | | UTP | UTP | UTP | UTP | | | | | |
| 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 |

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| SITE PLAN NOT TO SCALE | Project No: 773-ETAM00991AA Work Order No: ETAM20W00496 Page No: 2 of 2 |
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| Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6 | Tested by: LW |
| Location: As below | Date tested: 6/03/2020 |



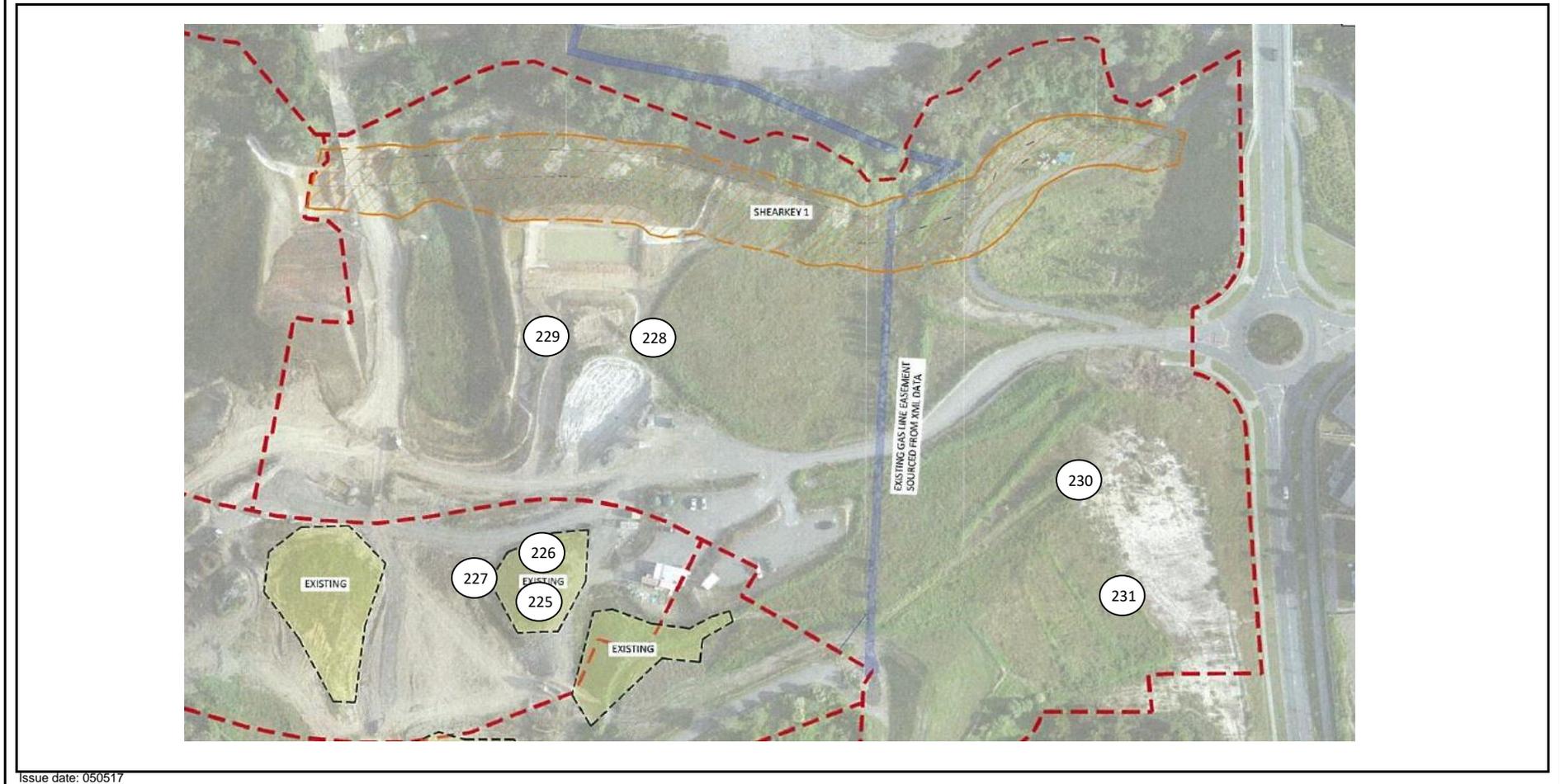
| | |
|---|---|
| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <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: 23/03/2020</p> </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 | | | | Wet Density (T/m ³) | Oven Water Content (%) | Dry Density (T/m ³) | Solid Density (T/m ³) Assumed | Air Voids (%) |
|------------|---------------------------|-----------|----------|-------|-----------------|------------|---------|----------|-------|-----------------------|----------|-----------------------------|------|------|------|---------------------------------|------------------------|---------------------------------|---|---------------|
| | | | | | | | | | | | | 181+ | 181+ | 169 | 155 | | | | | |
| 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 |

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| SITE PLAN | Project No: 773-ETAM00991AA |
| NOT TO SCALE | Work Order No: ETAM20W00562 |
| | Page No: 2 of 2 |

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|---|--------------------------------|
| Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6 | Tested by: TR |
| Location: As below | Date tested: 12/03/2020 |



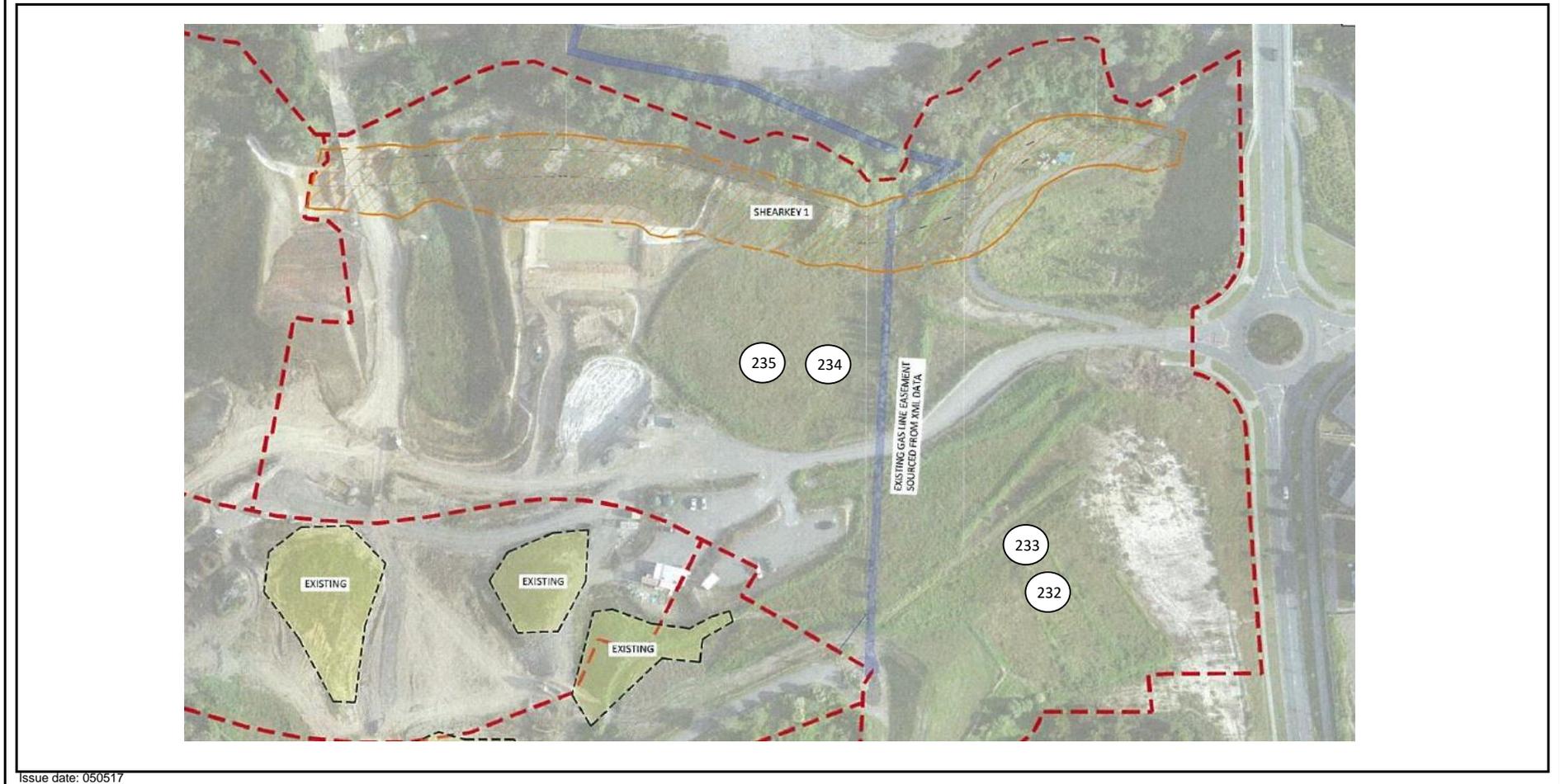
| | |
|---|---|
| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <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: 23/03/2020</p> </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 | | | | Wet Density (T/m ³) | Oven Water Content (%) | Dry Density (T/m ³) | Solid Density (T/m ³) Assumed | Air Voids (%) |
|------------|---------------------------|-----------|----------|-------|-----------------|------------|---------|----------|-------|-----------------------|----------|-----------------------------|-----|-----|-----|---------------------------------|------------------------|---------------------------------|---|---------------|
| | | | | | | | | | | | | 157 | UTP | 120 | 171 | | | | | |
| 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 |

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| SITE PLAN NOT TO SCALE | Project No: 773-ETAM00991AA |
| | Work Order No: ETAM20W00570 |
| | Page No: 2 of 2 |

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| Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6 | Tested by: MP |
| Location: As below | Date tested: 13/03/2020 |



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| 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; justify-content: space-between; align-items: center;"> <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: Joanna Jones Issue date: 26/05/2020</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 | Chainage (m) | Offset (m) | 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 | | | | | | | | |
| 21/05/2020 | 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



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| <p>Client: Coffey Services NZ Ltd (Auckland)</p> <p>Address: PO Box 8261, Symonds Street, Auckland 1150</p> <p>Attention: Stephen Parkes</p> <p>c.c.: -</p> <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: Access off Arran Drive, Orewa</p> | <p>PROJECT CODE: 773-ETAM00991AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <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: 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.

| 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 | | | | | | | | |
| 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) 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: Cesar Pura Issue date: 23/11/2020 </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 | | | | 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 | | | | | | | | |
| 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



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|--|--|
| 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: Cesar Pura Issue date: 25/11/2020 </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 | | | | 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

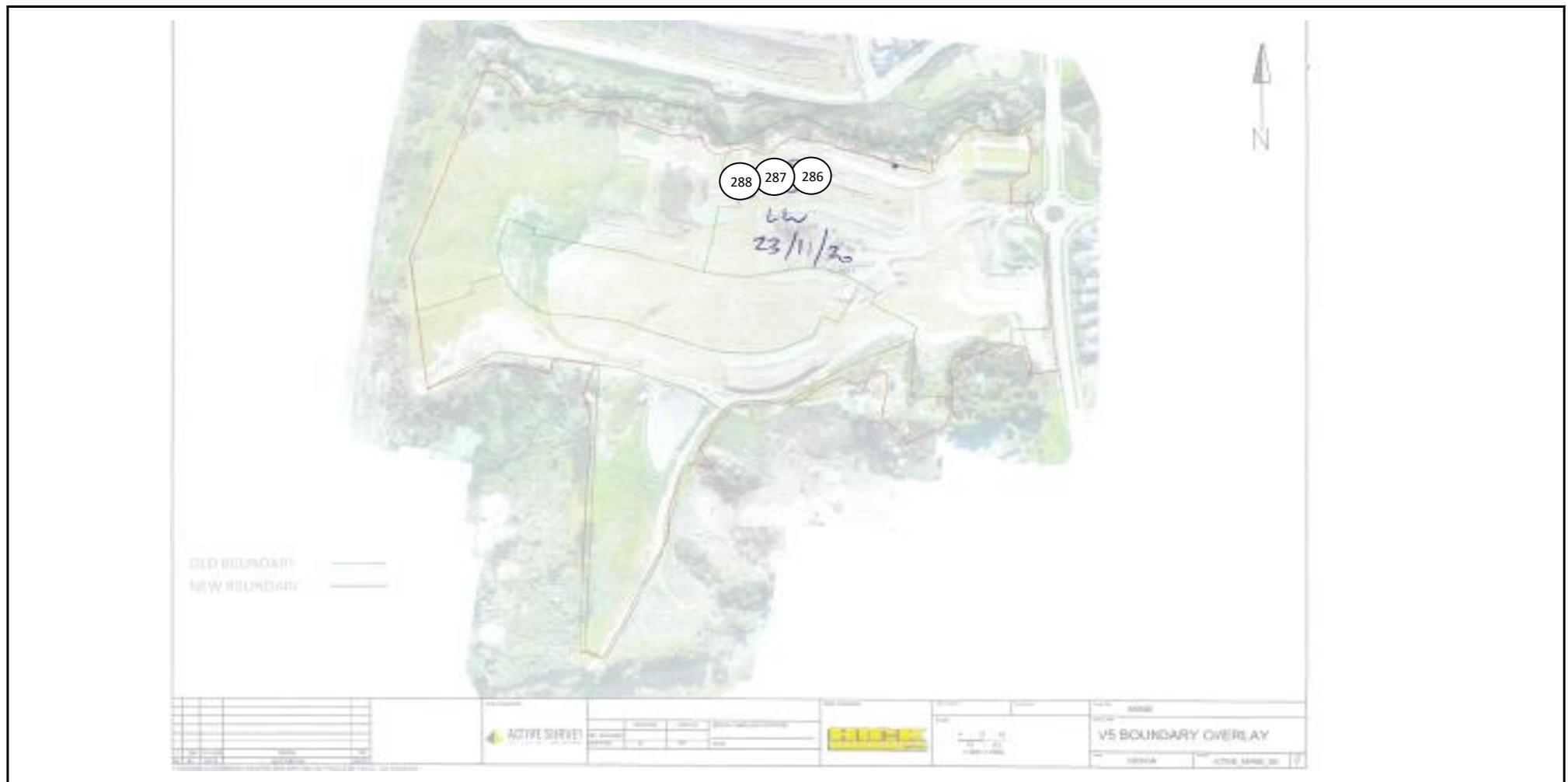
Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 23/11/2020



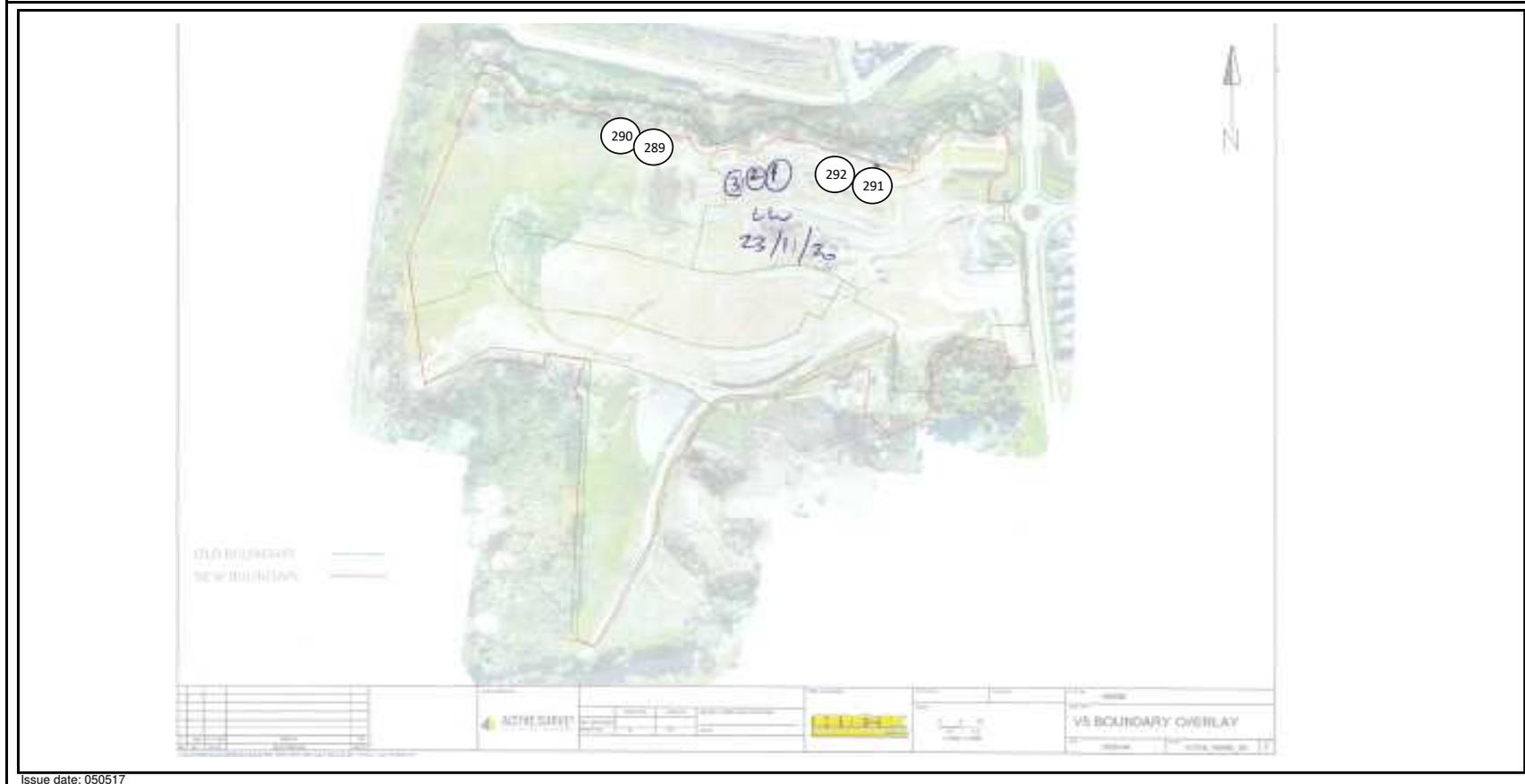
| | |
|--|--|
| Client: Coffey Services (NZ) Limited (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa | PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;">  <p style="font-size: small;">All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right; margin-top: 20px;">  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 | | | | 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 | | | | | | | | |
| 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 |

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM20W01858</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 2/12/2020</p> |
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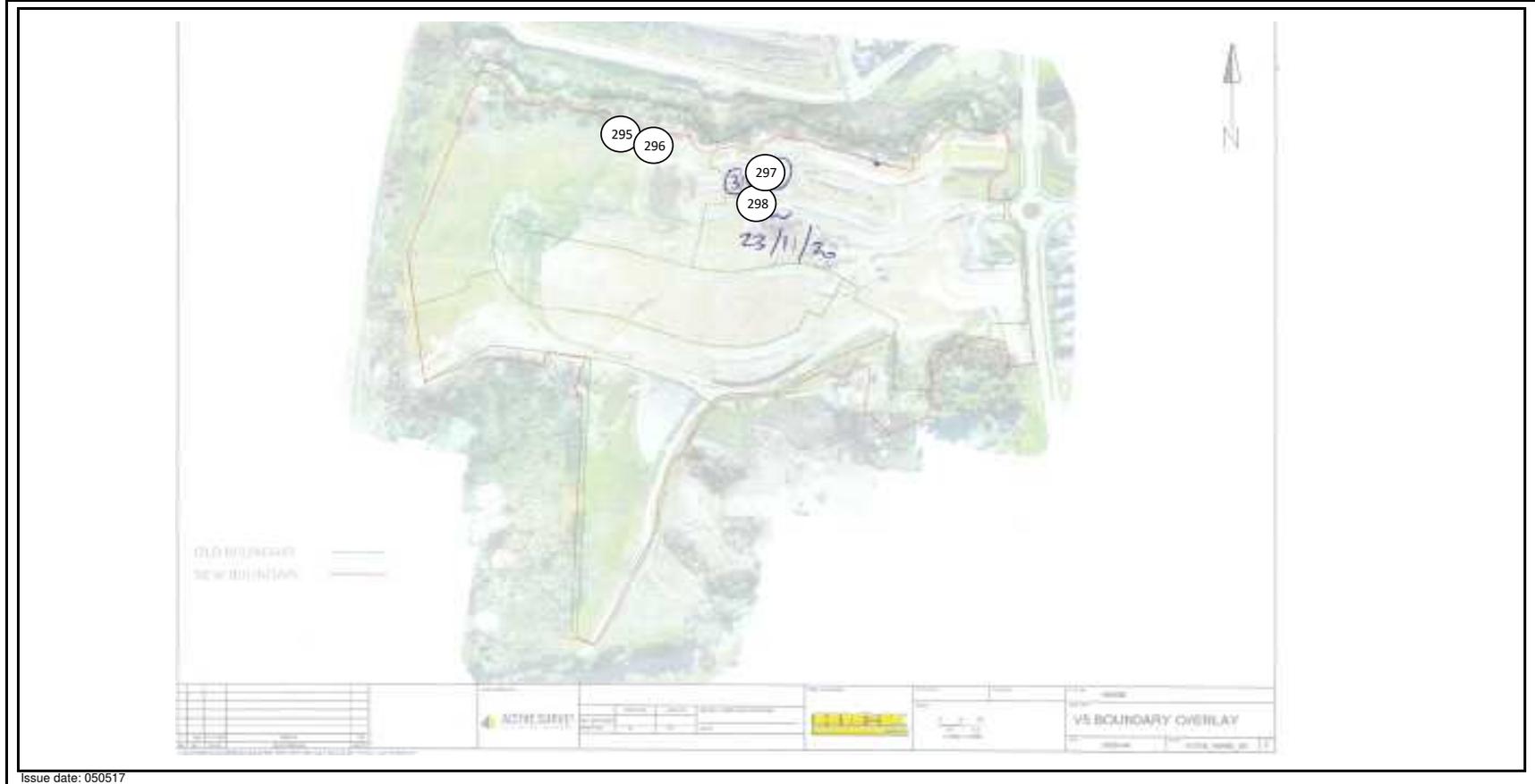
| | |
|--|---|
| Client: Coffey Services (NZ) Limited (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa | PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>Accredited IANZ LABORATORY No: 105</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: James McKelvey Issue date: 7/12/2020</p> </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 | | | | 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 |

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM20W01867</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: SC</p> <p>Date tested: 4/12/2020</p> |
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|--|---|
| 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: Cesar Pura Issue date: 14/12/2020 </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 | | | | 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



Earthworks Fill Report

Report No: EFIL:ETAM20W01960

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM20W01960

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



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

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)

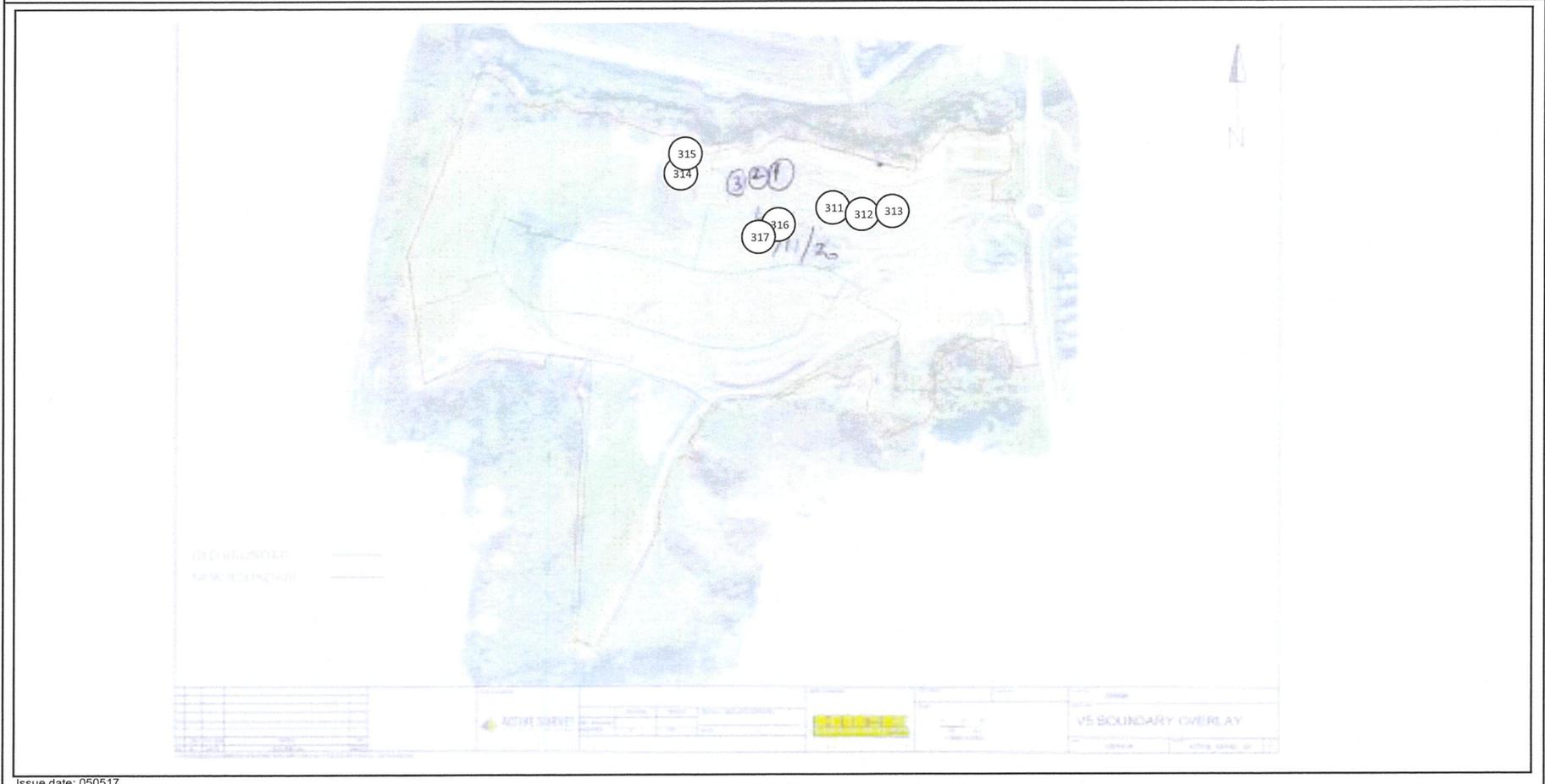
| Date Sampled | Work Order | Tested By | Test No. | Wet Density t/m ³ | Oven Water Content % | Dry Density t/m ³ | Solid Density t/m ³ | Air Voids % | Field Shear Strength (UTP = Unable to penetrate) kPa | | | | Test Location | Easting | Northing | RL | Material Tested | Comments |
|--------------|--------------|-----------|----------|--------------------------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

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM20W01960</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 14/12/2020</p> |
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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.
 (This document may not be altered or reproduced except in full. This report relates only to the positions tested.)



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

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|---------------|---------|----------|-----------|-----------------|-------------------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 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)

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM20W01962</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 15/12/2020</p> |
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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.
 (This document may not be altered or reproduced except in full. This report relates only to the positions tested.)



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

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|---------------|---------|----------|-----------|-----------------|---------------------------|
| | | | | | | | | | 158+ | 158+ | 158+ | 158+ | | | | | | |
| 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)

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

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM20W01963</p> <p>Page No: 2 of 2</p> |
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|--|---|
| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 16/12/2020</p> |
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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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | 140 | 154 | 158 | 158 | | | | | | |
| 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)

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM20W01998</p> <p>Page No: 2 of 2</p> |
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|--|---|
| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 21/12/2020</p> |
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Earthworks Fill Report

Report No: EFIL:ETAM21W00030
Issue No: 1
This report replaces all previous issues of report no. EFIL:ETAM21W00030



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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 11/01/2021

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) | | | | Test Location | Easting | Northing | RL (m) | Material Tested | Comments |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|---|------|------|------|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 7/01/2021 | ETAM21W00030 | LW | 340 | 2.01 | 22.6 | 1.64 | 2.70 | 2 | UTP | UTP | UTP | UTP | Shear Key | 1749065 | 5949057 | 10.00 | Clayey SILT | |
| 7/01/2021 | ETAM21W00030 | LW | 341 | 1.90 | 37.0 | 1.39 | 2.70 | 0 | 158+ | 158+ | 158+ | 158+ | Gully 2 | 1749079 | 5949003 | 10.50 | Clayey SILT | |
| 7/01/2021 | ETAM21W00030 | LW | 342 | 1.90 | 31.2 | 1.45 | 2.70 | 1 | UTP | UTP | UTP | UTP | Retaining Wall 700 | 1749247 | 5949039 | 10.75 | Clayey SILT | |
| 7/01/2021 | ETAM21W00030 | LW | 343 | 1.88 | 31.7 | 1.43 | 2.70 | 2 | UTP | UTP | UTP | UTP | Retaining Wall 700 | 1749295 | 5949026 | 10.70 | 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)

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00030</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 7/01/2021</p> |
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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) | | | | Test Location | Easting | Northing | RL (m) | Material Tested | Comments |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|---|-----|------|------|----------------------|---------|----------|-----------|-----------------|---------------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 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)

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00038</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 11/01/2021</p> |
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Earthworks Fill Report

Report No: EFIL:ETAM21W00049
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00049

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: 18/01/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|------|------|---------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | 158+ | 158+ | | | | | | |
| 13/01/2021 | ETAM21W00049 | LW | 350 | 1.87 | 30.3 | 1.44 | 2.70 | 3 | UTP | UTP | 158+ | 158+ | Gully 2 | 1749075 | 5949003 | 14.15 | Clayey SILT | |
| 13/01/2021 | ETAM21W00049 | LW | 351 | 1.98 | 29.5 | 1.53 | 2.70 | 0 | UTP | UTP | UTP | UTP | Gully 2 | 1749056 | 5949000 | 14.90 | Clayey SILT | |

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

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

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00049</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 13/01/2021</p> |
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Earthworks Fill Report

Report No: EFIL:ETAM21W00050
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00050

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 18/01/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|---------------|---------|----------|-----------|-----------------|----------|
| 14/01/2021 | ETAM21W00050 | LW | 352 | 1.90 | 35.7 | 1.40 | 2.70 | 0 | UTP | UTP | UTP | UTP | Gully 2 | 1749071 | 5949004 | 16.80 | Clayey SILT | |
| 14/01/2021 | ETAM21W00050 | LW | 353 | 1.97 | 25.4 | 1.57 | 2.70 | 2 | UTP | UTP | UTP | UTP | Gully 2 | 1749052 | 5948993 | 16.00 | Clayey SILT | |

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

Form Number: R03 IN Issue Date: 20/09/2018

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00050</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 14/01/2021</p> |
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Report No: EFIL:ETAM21W00136
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00136

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



All tests reported herein have been performed in accordance with the 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: 27/01/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|---------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 26/01/2021 | ETAM21W00136 | LW | 367 | 2.00 | 27.4 | 1.57 | 2.70 | 0 | UTP | UTP | UTP | UTP | Shear Key | 1749011 | 5949085 | 7.50 | Clayey SILT | |
| 26/01/2021 | ETAM21W00136 | LW | 368 | 1.98 | 26.2 | 1.57 | 2.70 | 1 | UTP | UTP | UTP | UTP | Shear Key | 1749035 | 5949073 | 7.80 | Clayey SILT | |
| 26/01/2021 | ETAM21W00136 | LW | 369 | 1.90 | 38.6 | 1.37 | 2.70 | 0 | 158+ | 158+ | 158+ | 158+ | Shear Key | 1749068 | 5949010 | 16.32 | Clayey SILT | |
| 26/01/2021 | ETAM21W00136 | LW | 370 | 1.88 | 36.2 | 1.38 | 2.70 | 0 | UTP | UTP | UTP | UTP | Shear Key | 1749073 | 5948972 | 18.93 | Clayey SILT | |

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

Form Number: R03 IN Issue Date: 20/09/2018

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00136</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 26/01/2021</p> |
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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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|-----|---------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 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)

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00160</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 29/01/2021</p> |
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Earthworks Fill Report

Report No: EFIL:ETAM21W00169
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00169

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: 3/02/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 2/02/2021 | ETAM21W00169 | LW | 381 | 1.91 | 26.4 | 1.51 | 2.70 | 4 | UTP | UTP | UTP | UTP | Retaining Wall 700 | 1749244 | 5949042 | 11.30 | Clayey SILT | |
| 2/02/2021 | ETAM21W00169 | LW | 382 | 1.95 | 26.4 | 1.55 | 2.70 | 2 | UTP | UTP | UTP | UTP | Retaining Wall 700 | 1749280 | 5949031 | 11.20 | Clayey SILT | |
| 2/02/2021 | ETAM21W00169 | LW | 383 | 1.94 | 27.9 | 1.51 | 2.70 | 2 | UTP | UTP | UTP | UTP | Shear Key | 1749022 | 5949066 | 10.00 | Clayey SILT | |
| 2/02/2021 | ETAM21W00169 | LW | 384 | 1.94 | 26.1 | 1.54 | 2.70 | 3 | UTP | UTP | UTP | UTP | Shear Key | 1749038 | 5949076 | 10.30 | Clayey SILT | |
| 2/02/2021 | ETAM21W00169 | LW | 385 | 1.94 | 26.2 | 1.54 | 2.70 | 3 | UTP | UTP | UTP | UTP | Gully 2 | 1749066 | 5949016 | - | Clayey SILT | |
| 2/02/2021 | ETAM21W00169 | LW | 386 | 1.95 | 26.6 | 1.54 | 2.70 | 2 | UTP | UTP | UTP | UTP | Gully 2 | 1749078 | 5949003 | - | 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)

| | |
|---|---|
| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00169</p> <p>Page No: 2 of 2</p> |
|---|---|

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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 2/02/2021</p> |
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Report No: EFIL:ETAM21W00195
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00195

Earthworks Fill Report



All tests reported herein have been performed in accordance with the 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

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|------|------|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | 140 | 140 | 158 | 154 | | | | | | |
| 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)

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

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00195</p> <p>Page No: 2 of 2</p> |
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|--|--|
| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 5/02/2021</p> |
|--|--|



Earthworks Fill Report

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

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: 24/02/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|-----|-----|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 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)

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

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:ETAM21W00273
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00273

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

ACCREDITED

 TESTING LABORATORY

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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 26/02/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|-----|---------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 25/02/2021 | ETAM21W00273 | LW | 418 | 1.96 | 32.5 | 1.48 | 2.70 | 0 | UTP | UTP | UTP | UTP | Gully 2 | 1749044 | 5949055 | 14.06 | Clayey SILT | |
| 25/02/2021 | ETAM21W00273 | LW | 419 | 1.92 | 32.4 | 1.45 | 2.70 | 0 | UTP | UTP | UTP | UTP | Gully 2 | 1749065 | 5949059 | 14.98 | Clayey SILT | |
| 25/02/2021 | ETAM21W00273 | LW | 420 | 1.92 | 34.0 | 1.43 | 2.70 | 0 | 158+ | 158+ | 158+ | UTP | Gully 2 | 1749106 | 5949020 | 16.10 | 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)

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|---|---|
| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00273</p> <p>Page No: 2 of 2</p> |
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|--|---|
| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 25/02/2021</p> |
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Earthworks Fill Report

Report No: EFIL:ETAM21W00292
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00292

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

ACCREDITED

 TESTING LABORATORY

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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 2/03/2021

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):

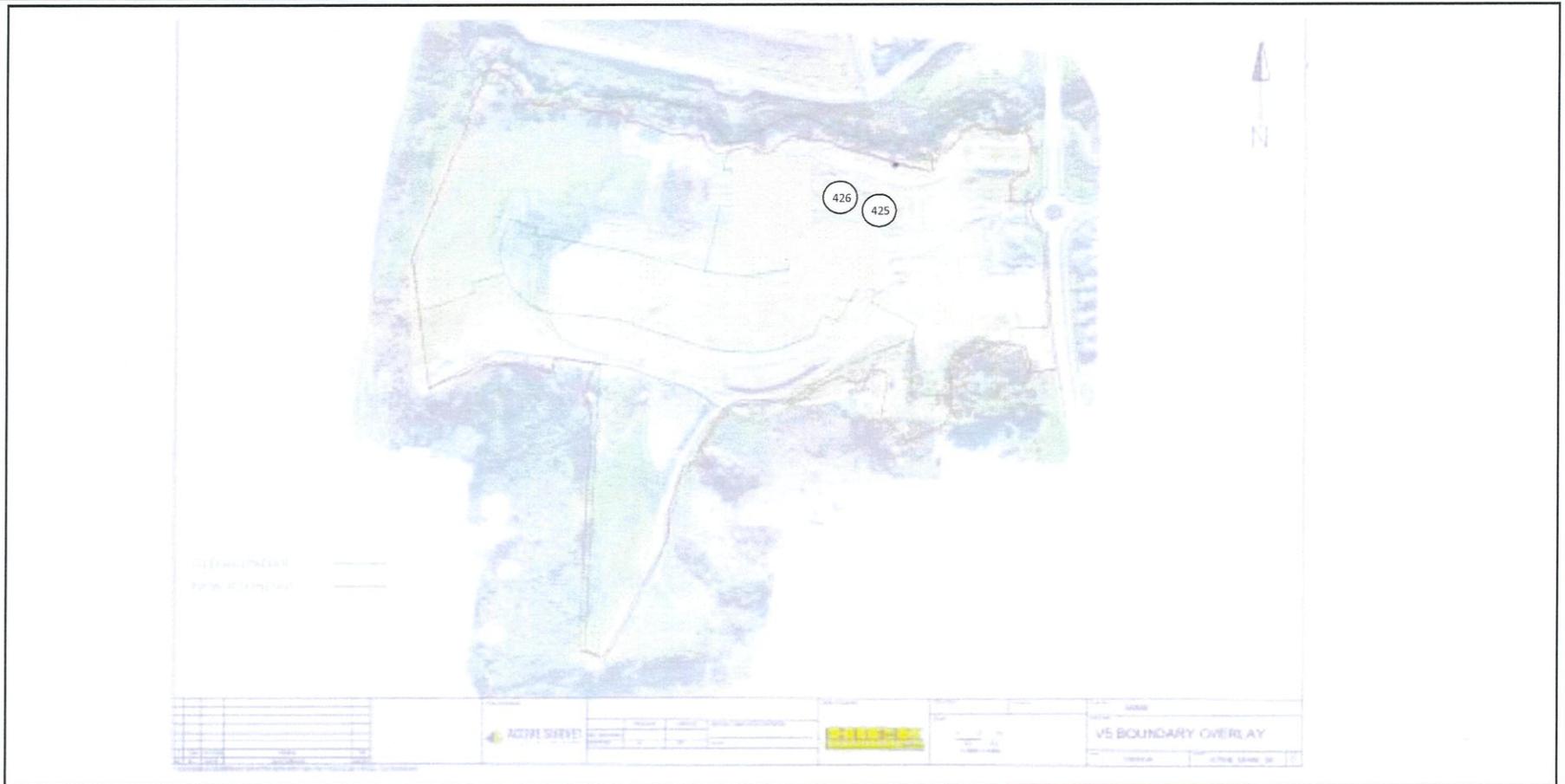
| Date Sampled | Work Order | Tested By | Test No. | Wet Density t/m ³ | Oven Water Content % | Dry Density t/m ³ | Solid Density t/m ³ | Air Voids % | Field Shear Strength (UTP = Unable to penetrate) kPa | | | | Test Location | Easting | Northing | RL (m) | Material Tested | Comments |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|-----|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | 140 | 158 | 144 | 154 | | | | | | |
| 1/03/2021 | ETAM21W00292 | LW | 425 | 1.82 | 37.4 | 1.33 | 2.70 | 1 | 140 | 158 | 144 | 154 | Retaining Wall 311 | 1749294 | 5948975 | 16.50 | Clayey SILT | |
| 1/03/2021 | ETAM21W00292 | LW | 426 | 1.82 | 40.9 | 1.29 | 2.70 | 0 | 158+ | 158+ | 158+ | 144 | Retaining Wall 311 | 1749222 | 5948996 | 16.40 | Clayey SILT | |

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

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

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00292</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 1/03/2021</p> |
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Earthworks Fill Report

Report No: EFIL:ETAM21W00327
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00327

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

ACCREDITED

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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 12/03/2021

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 (m) | Material Tested | Comments |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|---------------|---------|----------|-----------|-----------------|----------|
| 10/03/2021 | ETAM21W00327 | LW | 435 | 1.97 | 29.3 | 1.53 | 2.70 | 0 | UTP | UTP | UTP | UTP | Gully 2 | 1749088 | 5949040 | 12.80 | Clayey SILT | |
| 10/03/2021 | ETAM21W00327 | LW | 436 | 1.90 | 28.5 | 1.48 | 2.70 | 3 | UTP | UTP | UTP | UTP | Gully 2 | 1749108 | 5949033 | 13.20 | Clayey SILT | |

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

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

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00327</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 10/03/2021</p> |
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Earthworks Fill Report

Report No: EFIL:ETAM21W00354
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00354

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: 17/03/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|-----|--------------------|---------|----------|----|-----------------|---------------------------|
| | | | | | | | | | 158+ | 158+ | 158+ | 154 | | | | | | |
| 16/03/2021 | ETAM21W00354 | LW | 437 | 1.85 | 43.9 | 1.29 | 2.70 | 0 | 158+ | 158+ | 158+ | 154 | Gully 2 | 1749076 | 5948989 | - | Silty CLAY | 0.8m below finished level |
| 16/03/2021 | ETAM21W00354 | LW | 438 | 1.84 | 43.3 | 1.28 | 2.70 | 0 | UTP | UTP | 158+ | 144 | Gully 2 | 1749058 | 5949000 | - | Silty CLAY | 0.8m below finished level |
| 16/03/2021 | ETAM21W00354 | LW | 439 | 1.83 | 38.1 | 1.33 | 2.70 | 1 | 158+ | 158+ | 158+ | UTP | North side of Pond | 1749077 | 5949041 | - | Silty CLAY | 0.5m below finished level |
| 16/03/2021 | ETAM21W00354 | LW | 440 | 1.93 | 34.5 | 1.43 | 2.70 | 0 | UTP | UTP | UTP | UTP | North side of Pond | 1749093 | 5949033 | - | Silty CLAY | 0.5m 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)

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| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00354</p> <p>Page No: 2 of 2</p> |
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| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 16/03/2021</p> |
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Earthworks Fill Report

Report No: EFIL:ETAM21W00393
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00393

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: 24/03/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|-----|------------------|---------|----------|----|-----------------|---------------------------|
| | | | | | | | | | 140 | 149 | 158+ | 140 | | | | | | |
| 19/03/2021 | ETAM21W00393 | LW | 445 | 1.84 | 34.1 | 1.37 | 2.70 | 2 | 140 | 149 | 158+ | 140 | Gully 2 | 1749062 | 5948988 | - | Clayey SILT | 0.4m below finished level |
| 19/03/2021 | ETAM21W00393 | LW | 446 | 1.89 | 30.6 | 1.45 | 2.70 | 2 | 136 | 144 | 154 | 154 | Gully 2 | 1749085 | 5948989 | - | Clayey SILT | 0.4m below finished level |
| 19/03/2021 | ETAM21W00393 | LW | 447 | 1.75 | 42.8 | 1.23 | 2.70 | 2 | 158+ | 158+ | 140 | 144 | North Gully Fill | 1749137 | 5949026 | - | Silty CLAY | 5.0m below finished level |
| 19/03/2021 | ETAM21W00393 | LW | 448 | 1.77 | 40.4 | 1.26 | 2.70 | 3 | 158+ | 158+ | 158+ | 144 | North Gully Fill | 1749150 | 5949031 | - | Silty CLAY | 5.0m 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)

| | |
|---|---|
| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00393</p> <p>Page No: 2 of 2</p> |
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|--|---|
| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 19/03/2021</p> |
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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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|-----------------|---------|----------|----|-----------------|---------------------------|
| | | | | | | | | | 158+ | 158+ | 158+ | 158+ | | | | | | |
| 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:ETAM21W00413
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00413

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: 26/03/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|-----|------|-----------------|---------|----------|----|-----------------|---------------------------|
| | | | | | | | | | 158+ | 140 | 154 | 144 | | | | | | |
| 23/03/2021 | ETAM21W00413 | LW | 453 | 1.87 | 37.4 | 1.36 | 2.70 | 0 | 158+ | 140 | 154 | 144 | Gully 1 | 1749251 | 5948969 | - | Silty CLAY | 2.5m below finished level |
| 23/03/2021 | ETAM21W00413 | LW | 454 | 1.88 | 36.7 | 1.37 | 2.70 | 0 | 158+ | 158+ | 144 | 154 | Gully 1 | 1749270 | 5948956 | - | Silty CLAY | 2.5m below finished level |
| 23/03/2021 | ETAM21W00413 | LW | 455 | 1.82 | 36.5 | 1.33 | 2.70 | 2 | 140 | 158+ | 144 | 140 | North fill area | 1749150 | 5949025 | - | Silty CLAY | 2.0m below finished level |
| 23/03/2021 | ETAM21W00413 | LW | 456 | 1.82 | 36.3 | 1.34 | 2.70 | 2 | 140 | 136 | 144 | 158+ | North fill area | 1749180 | 5949037 | - | Silty CLAY | 3.5m 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)

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.}

[Signature]

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|---------------|---------|----------|----|-----------------|---------------------------|
| | | | | | | | | | 146 | 160 | 149 | 135 | | | | | | |
| 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)

Form Number: R03 IN Issue Date: 20/09/2018

| | |
|---|---|
| <p>SITE PLAN</p> <p>NOT TO SCALE</p> | <p>Project No: 773-ETAM00991AA</p> <p>Work Order No: ETAM21W00486</p> <p>Page No: 2 of 2</p> |
|---|---|

| | |
|--|--|
| <p>Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6</p> <p>Location: As below</p> | <p>Tested by: LW</p> <p>Date tested: 7/04/2021</p> |
|--|--|





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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|-----|--------------------|---------|----------|-------|--------------------|----------|
| | | | | | | | | | 179+ | 179+ | 143 | 133 | | | | | | |
| 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

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.)



James McKelvey

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) | | | | Test Location | Easting | Northing | RL | Material Tested | Comments |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|---|-----|-----|-----|--------------------|---------|----------|----|-----------------|----------|
| | | | | | | | | | kPa | | | | | | | | | |
| 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

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

James McKelvey

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

| | |
|--------------------------|---|
| 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 |





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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|----------------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | 180 | 180 | 153 | 153 | | | | | | |
| 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)

Form Number: R03 IN Issue Date: 20/09/2018

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: AKLGE206639 - Millwater Precinct 6k, Orewa

Project Location: 117 Kowhai Road, Orewa



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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 12/11/2021

Test Results

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

| Date Sampled | Work Order | Tested By | Test No. | Wet Density t/m 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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|---------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 11/11/2021 | ETAM21W01358 | LW | 546 | 1.92 | 29.2 | 1.49 | 2.70 | 2 | UTP | UTP | UTP | UTP | RW 701 | 1749137 | 5949044 | 8.00 | Clayey SILT | |
| 11/11/2021 | ETAM21W01358 | LW | 547 | 1.92 | 26.2 | 1.52 | 2.70 | 4 | UTP | UTP | UTP | UTP | RW 701 | 1749148 | 5949049 | 8.05 | Clayey SILT | |
| 11/11/2021 | ETAM21W01358 | LW | 548 | 1.87 | 34.1 | 1.40 | 2.70 | 1 | 175 | 143 | 149 | 145 | Gully | 1748972 | 5948879 | 31.75 | Clayey SILT | |
| 11/11/2021 | ETAM21W01358 | LW | 549 | 1.87 | 35.4 | 1.38 | 2.70 | 0 | 168 | 164 | 140 | 149 | Gully | 1749003 | 5948873 | 31.65 | Clayey SILT | |

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

Earthworks Fill Report

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

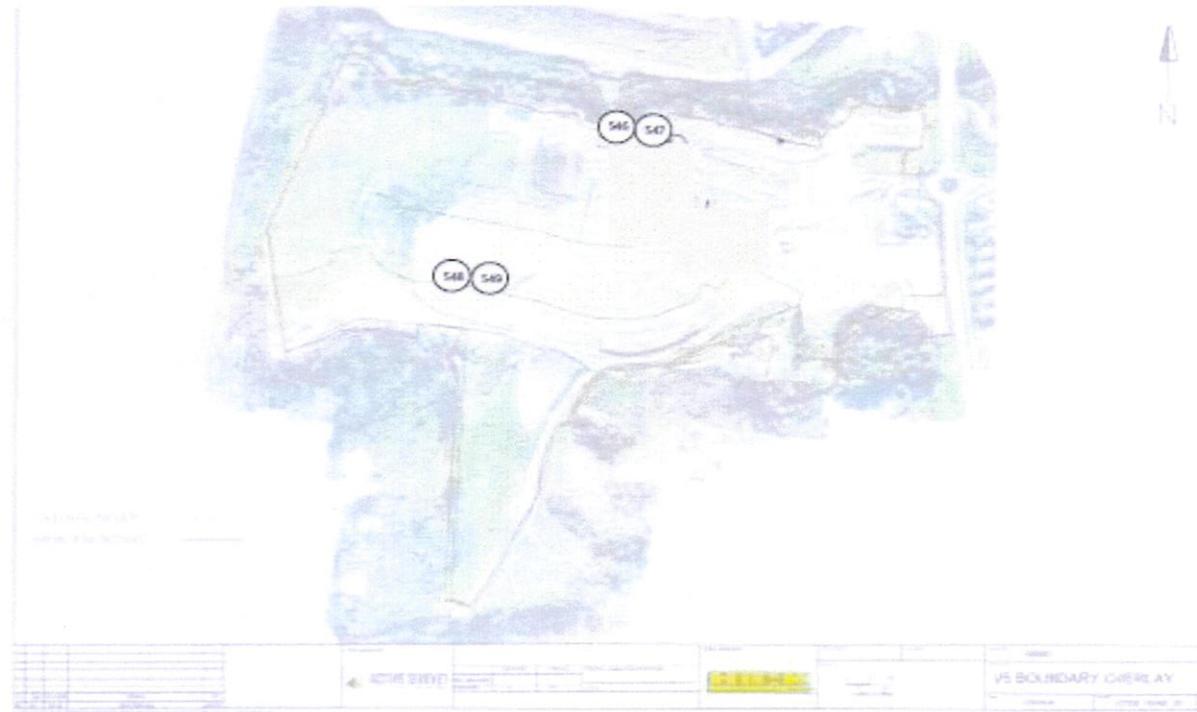
| | |
|--------------------------|--|
| Client: | Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023 |
| Principal: | Stephen Parkes |
| cc to: | - |
| Project No.: | 773-ETAM01553 |
| Project Name.: | AKLGE206639 - Millwater Precinct 6k, Orewa |
| Project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



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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 12/11/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W01367
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01367

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: AKLGE206639 - Millwater Precinct 6k, Orewa

Project Location: 117 Kowhai Road, Orewa

ACCREDITED
IANZ
TESTING LABORATORY

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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 15/11/2021

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|---------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | 146 | 140 | 160 | 179 | | | | | | |
| 12/11/2021 | ETAM21W01367 | LW | 550 | 1.84 | 32.8 | 1.38 | 2.70 | 3 | 146 | 140 | 160 | 179 | RW701 | 1749133 | 5949043 | 8.60 | Clayey SILT | |
| 12/11/2021 | ETAM21W01367 | LW | 551 | 1.81 | 30.9 | 1.38 | 2.70 | 6 | 156 | 164 | 149 | 152 | RW701 | 1749143 | 5949046 | 8.65 | 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)

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01367
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01367

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

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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 15/11/2021



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

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

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



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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 24/11/2021

Test Results

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

| Date Sampled | Work Order | Tested By | Test No. | Wet Density t/m 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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|-----|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 22/11/2021 | ETAM21W01415 | LW | 556 | 1.94 | 29.2 | 1.50 | 2.70 | 0 | UTP | UTP | UTP | UTP | Retaining Wall 701 | 1749132 | 5949026 | 8.60 | Clayey SILT | |
| 22/11/2021 | ETAM21W01415 | LW | 557 | 1.95 | 29.0 | 1.51 | 2.70 | 0 | UTP | UTP | UTP | UTP | Retaining Wall 702 | 1749142 | 5949029 | 8.80 | Clayey SILT | |
| 22/11/2021 | ETAM21W01415 | LW | 558 | 1.92 | 35.9 | 1.41 | 2.70 | 0 | 179+ | 179+ | 179+ | 164 | Gully | 1748968 | 5948880 | 32.40 | Clayey SILT | |
| 22/11/2021 | ETAM21W01415 | LW | 559 | 1.93 | 35.5 | 1.42 | 2.70 | 0 | 179+ | 179+ | 156 | 168 | Gully | 1748986 | 5948894 | 29.60 | Clayey SILT | |
| 22/11/2021 | ETAM21W01415 | LW | 560 | 1.91 | 36.6 | 1.40 | 2.70 | 0 | 164 | 149 | 140 | 179 | Gully | 1749006 | 5948904 | 28.50 | Clayey SILT | |
| 22/11/2021 | ETAM21W01415 | LW | 561 | 1.94 | 34.7 | 1.44 | 2.70 | 0 | 179+ | 146 | 156 | 164 | Gully | 1749018 | 5948919 | 27.10 | Clayey SILT | |

Comments:

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

Earthworks Fill Report

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

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

ACCREDITED

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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 24/11/2021



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



All tests reported herein have been performed in accordance with the 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

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

| 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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|---------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | 149 | 172 | 175+ | 175+ | | | | | | |
| 3/12/2021 | ETAM21W01476 | LW | 572 | 1.88 | 32.8 | 1.41 | 2.70 | 1 | 149 | 172 | 175+ | 175+ | Shear Key | 1748998 | 5949081 | 8.10 | Clayey SILT | |
| 3/12/2021 | ETAM21W01476 | LW | 573 | 1.89 | 33.3 | 1.42 | 2.70 | 0 | 175+ | 175+ | 175+ | 164 | Shear Key | 1748991 | 5949076 | 9.30 | Clayey SILT | |
| 3/12/2021 | ETAM21W01476 | LW | 574 | 1.87 | 31.4 | 1.42 | 2.70 | 3 | 137 | 175+ | 175+ | 153 | Gully | 1748976 | 5948881 | 31.95 | Clayey SILT | |
| 3/12/2021 | ETAM21W01476 | LW | 575 | 1.84 | 34.1 | 1.37 | 2.70 | 2 | 149 | 160 | 156 | 153 | Gully | 1748995 | 5948918 | 29.55 | Clayey SILT | |
| 3/12/2021 | ETAM21W01476 | LW | 576 | 1.93 | 27.6 | 1.51 | 2.70 | 2 | UTP | UTP | 175+ | 175+ | Gully | 1749072 | 5948958 | 26.90 | Clayey SILT | |
| 3/12/2021 | ETAM21W01476 | LW | 577 | 1.91 | 26.7 | 1.51 | 2.70 | 4 | UTP | UTP | UTP | 175+ | Gully | 1749105 | 5948969 | 27.10 | Clayey SILT | |

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

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

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|-----|------------------|---------|----------|-----------|-----------------|-----------------|
| | | | | | | | | | 175+ | 175+ | 175+ | UTP | | | | | | |
| 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

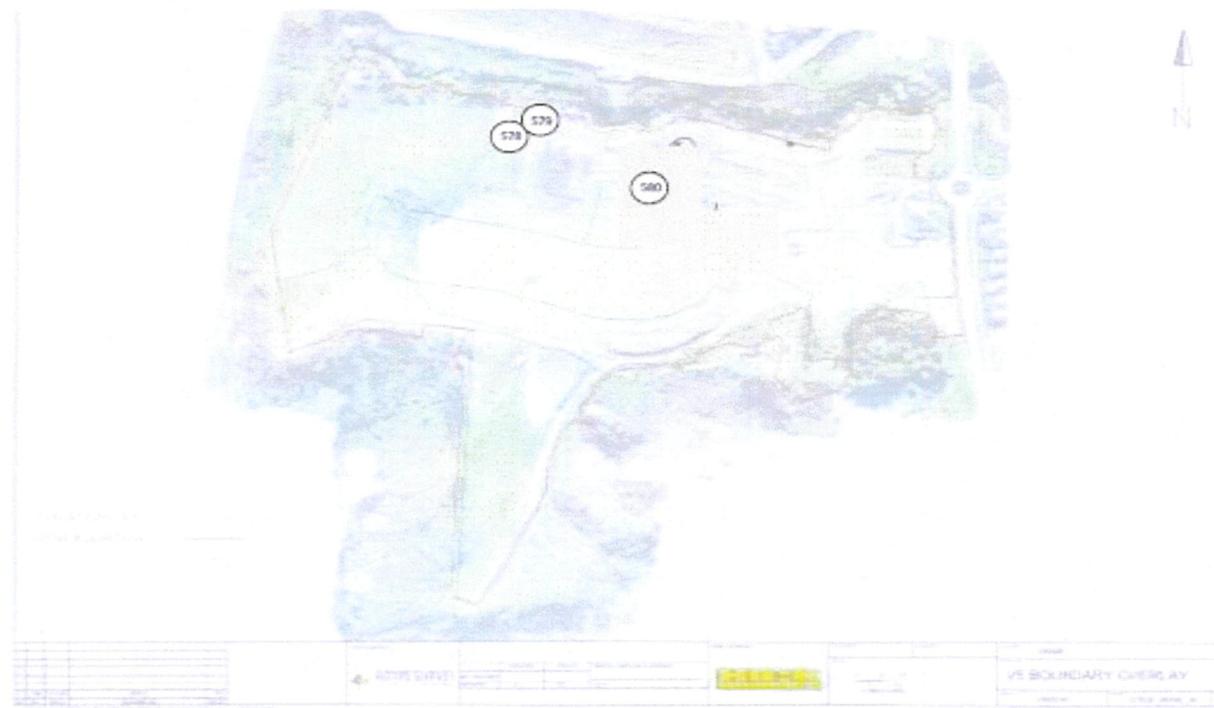
Project Location: 117 Kowhai Road, Orewa



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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|---------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | 149 | 164 | 175+ | 175+ | | | | | | |
| 7/12/2021 | ETAM21W01492 | LW | 581 | 1.90 | 30.9 | 1.45 | 2.70 | 1 | 149 | 164 | 175+ | 175+ | Gully | 1748965 | 5948906 | 31.60 | Clayey SILT | |
| 7/12/2021 | ETAM21W01492 | LW | 582 | 1.98 | 27.9 | 1.55 | 2.70 | 0 | UTP | UTP | UTP | UTP | Gully | 1749002 | 5948937 | 30.20 | Clayey SILT | |
| 7/12/2021 | ETAM21W01492 | LW | 583 | 1.92 | 33.2 | 1.44 | 2.70 | 0 | UTP | UTP | 175+ | 175+ | Gully | 1749063 | 5948944 | 27.60 | Clayey SILT | |
| 7/12/2021 | ETAM21W01492 | LW | 584 | 1.87 | 30.5 | 1.43 | 2.70 | 3 | 175+ | 175+ | 175+ | 172 | Gully | 1749084 | 5948969 | 27.40 | Clayey SILT | |
| 7/12/2021 | ETAM21W01492 | LW | 585 | 1.90 | 33.9 | 1.42 | 2.70 | 0 | 175+ | 175+ | 164 | 153 | Shear Key | 1748989 | 5949067 | 13.00 | Clayey SILT | |
| 7/12/2021 | ETAM21W01492 | LW | 586 | 1.89 | 36.9 | 1.38 | 2.70 | 0 | 175+ | 160 | 149 | 164 | Shear Key | 1748977 | 5949066 | 11.60 | Clayey SILT | |

Comments:

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

Earthworks Fill Report

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

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



SITE PLAN (NOT TO SCALE)

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



All tests reported herein have been performed in accordance with the 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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|------|------|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 10/12/2021 | ETAM21W01514 | LW | 589 | 1.96 | 31.8 | 1.49 | 2.70 | 0 | UTP | UTP | UTP | UTP | Retaining Wall 701 | 1749114 | 5949038 | 8.60 | Clayey SILT | |
| 10/12/2021 | ETAM21W01514 | LW | 590 | 1.93 | 33.8 | 1.44 | 2.70 | 0 | UTP | UTP | UTP | UTP | Retaining Wall 701 | 1749129 | 5949037 | 8.50 | Clayey SILT | |
| 10/12/2021 | ETAM21W01514 | LW | 591 | 1.90 | 31.1 | 1.45 | 2.70 | 1 | UTP | UTP | 175+ | 175+ | Gully | 1749063 | 5948926 | 29.00 | Clayey SILT | |
| 10/12/2021 | ETAM21W01514 | LW | 592 | 1.94 | 31.2 | 1.48 | 2.70 | 0 | UTP | UTP | 175+ | 175+ | Gully | 1749080 | 5948964 | 27.60 | Clayey SILT | |

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

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

Earthworks Fill Report

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

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



ACCREDITED
IANZ
TESTING LABORATORY

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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 13/12/2021



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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|--------------------|---------|----------|-----------|-----------------|----------|
| | | | | | | | | | 1 | 2 | 3 | 4 | | | | | | |
| 22/12/2021 | ETAM21W01557 | LW | 597 | 1.88 | 32.4 | 1.42 | 2.70 | 1 | 175+ | 175+ | 175+ | 160 | Shear Key | 1748950 | 5949089 | 8.30 | Clayey SILT | |
| 22/12/2021 | ETAM21W01557 | LW | 598 | 1.91 | 29.9 | 1.47 | 2.70 | 2 | 175+ | 175+ | 175+ | 175+ | Shear Key | 1748974 | 5949084 | 9.00 | Clayey SILT | |
| 22/12/2021 | ETAM21W01557 | LW | 599 | 1.85 | 37.5 | 1.35 | 2.70 | 0 | 175+ | 175+ | 175+ | 175+ | Gully | 1749022 | 5948881 | 29.60 | Clayey SILT | |
| 22/12/2021 | ETAM21W01557 | LW | 600 | 1.86 | 31.8 | 1.41 | 2.70 | 3 | 175+ | 175+ | 175+ | 175+ | Gully | 1749046 | 5948916 | 29.20 | Clayey SILT | |
| 22/12/2021 | ETAM21W01557 | LW | 601 | 1.98 | 31.8 | 1.50 | 2.70 | 0 | UTP | UTP | UTP | UTP | Gully | 1749098 | 5948940 | 28.00 | Clayey SILT | |
| 22/12/2021 | ETAM21W01557 | LW | 602 | 1.96 | 31.8 | 1.49 | 2.70 | 0 | UTP | UTP | UTP | UTP | Gully | 1749080 | 5948970 | 27.80 | Clayey SILT | |
| 22/12/2021 | ETAM21W01557 | LW | 603 | 1.94 | 30.1 | 1.49 | 2.70 | 0 | UTP | UTP | UTP | UTP | Retaining Wall 701 | 1749110 | 5949033 | 8.80 | Clayey SILT | |
| 22/12/2021 | ETAM21W01557 | LW | 604 | 1.97 | 29.2 | 1.52 | 2.70 | 0 | UTP | UTP | UTP | UTP | Retaining Wall 701 | 1749119 | 5949035 | 9.00 | Clayey SILT | |

Comments:

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

Report No: EFIL:ETAM21W01557

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W01557

All tests reported herein have been performed in accordance with the 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

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



SITE PLAN (NOT TO SCALE)

Report No: EFIL:ETAM22W00017

Issue No:1

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

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|---------------|---------|----------|------|-----------------|----------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 11/01/2022 | ETAM22W00017 | LW | 611 | 1.98 | 27.2 | 1.55 | 2.70 | 0.1 | UTP | UTP | UTP | UTP | Gully | 1748966 | 5948916 | - | Clayey silt | - |
| 11/01/2022 | ETAM22W00017 | LW | 612 | 1.96 | 31.1 | 1.50 | 2.70 | 0.0 | UTP | UTP | UTP | UTP | Gully | 1748998 | 5948902 | - | Clayey silt | - |
| 11/01/2022 | ETAM22W00017 | LW | 613 | 1.95 | 29.5 | 1.51 | 2.70 | 0.0 | UTP | UTP | UTP | UTP | Gully | 1749052 | 5948933 | - | Clayey silt | - |
| 11/01/2022 | ETAM22W00017 | LW | 614 | 1.97 | 30.5 | 1.51 | 2.70 | 0.0 | UTP | UTP | UTP | UTP | Gully | 1749085 | 5948972 | - | Clayey silt | - |
| 11/01/2022 | ETAM22W00017 | LW | 615 | 1.97 | 16.7 | 1.69 | 2.70 | 9.4 | UTP | UTP | UTP | UTP | RW701 | 1749126 | 5949032 | 11.0 | Clayey silt | - |
| 11/01/2022 | ETAM22W00017 | LW | 616 | 1.96 | 21.8 | 1.61 | 2.70 | 5.5 | UTP | UTP | UTP | UTP | RW701 | 1749087 | 5949036 | 11.2 | Clayey silt | - |

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00017

Issue No:1

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

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



Report No: EFIL:ETAM22W00039

Issue No:1

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

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

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



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

Test Results

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

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

| Date Sampled | Work Order | Tested By | Test No. | Wet Density t/m 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 | 175 | 175 | | | | | | |
| 14/01/2022 | ETAM22W00039 | LW | 625 | 1.96 | 27.1 | 1.54 | 2.70 | 1.1 | UTP | UTP | 175 | 175 | Undercut Area | 1749018 | 5949021 | 3.0 | Clayey Silt | To Finish Level |
| 14/01/2022 | ETAM22W00039 | LW | 626 | 1.95 | 25.7 | 1.55 | 2.70 | 2.6 | UTP | UTP | UTP | UTP | Gully | 1749053 | 5948923 | 29 | Clayey Silt | - |
| 14/01/2022 | ETAM22W00039 | LW | 627 | 1.97 | 26.8 | 1.55 | 2.70 | 1.0 | UTP | UTP | UTP | UTP | Gully | 1749018 | 5948903 | 29.3 | Clayey Silt | - |

Comments:

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

Report No: EFIL:ETAM22W00039

Issue No:1

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

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

Report No: EFIL: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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|---------------|---------|----------|-------|-----------------|----------|
| | | | | | | | | | 175 | 175 | 175 | 175 | | | | | | |
| 19/01/2022 | ETAM22W00072 | LW | 636 | 1.84 | 31.9 | 1.40 | 2.70 | 3.7 | 175 | 175 | 175 | 175 | Gully | 1749057 | 5948921 | 27.05 | Silty Clay | - |
| 19/01/2022 | ETAM22W00072 | LW | 637 | 1.87 | 32.3 | 1.42 | 2.70 | 1.8 | 175 | 175 | 175 | 175 | Gully | 1749048 | 5948902 | 28.00 | Silty Clay | - |
| 19/01/2022 | ETAM22W00072 | LW | 638 | 1.83 | 31.9 | 1.39 | 2.70 | 4.4 | 175 | 175 | 175 | 175 | Gully | 1749012 | 5948897 | 28.15 | Silty Clay | - |
| 19/01/2022 | ETAM22W00072 | LW | 639 | 1.85 | 32.3 | 1.40 | 2.70 | 3.2 | 175 | 175 | 175 | 175 | Gully | 1748899 | 5948888 | 28.60 | Silty Clay | - |
| 19/01/2022 | ETAM22W00072 | LW | 640 | 1.86 | 29.0 | 1.44 | 2.70 | 4.7 | 175 | 175 | 175 | 175 | RW 701 | 1749119 | 5949040 | 11.00 | Silty Clay | - |
| 19/01/2022 | ETAM22W00072 | LW | 641 | 1.85 | 28.7 | 1.44 | 2.70 | 5.3 | 175 | 175 | 175 | 175 | RW 701 | 1749100 | 5949042 | 10.8 | Silty Clay | - |
| 19/01/2022 | ETAM22W00072 | LW | 642 | 1.88 | 24.0 | 1.52 | 2.70 | 7.5 | 175 | 175 | 175 | 175 | RE Wall 604 A | 1749090 | 5949062 | 8.05 | Silty Clay | - |
| 19/01/2022 | ETAM22W00072 | LW | 643 | 1.89 | 24.7 | 1.51 | 2.70 | 6.5 | 175 | 175 | 175 | 175 | RE Wall 604 A | 1749085 | 5949067 | 7.95 | Silty Clay | - |

Comments:

Earthworks Fill Report

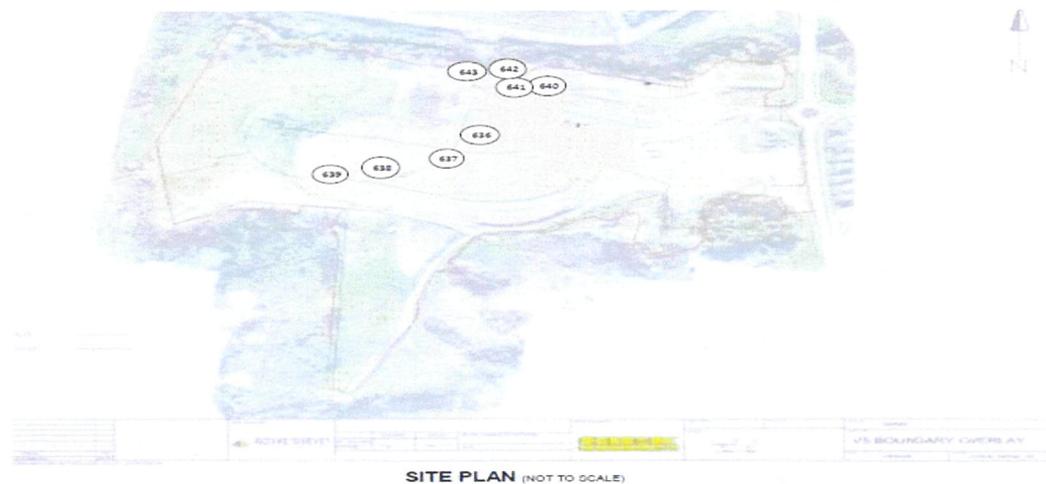
Report No: EFIL:ETAM22W00072
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00072

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

ACCREDITED

 All tests reported herein have been performed in accordance with the 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



Report No: EFIL:ETAM22W00113

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00113

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-AKLG206639 - 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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|---------------|---------|----------|-------|-----------------|----------|
| | | | | | | | | | 175 | 175 | 149 | 160 | | | | | | |
| 20/01/2022 | ETAM22W00113 | LW | 644 | 1.85 | 40.1 | 1.32 | 2.70 | 0.0 | 175 | 175 | 149 | 160 | Gully | 1749034 | 5948927 | 28.95 | Silty CLAY | - |
| 20/01/2022 | ETAM22W00113 | LW | 645 | 1.87 | 42.5 | 1.31 | 2.70 | 0.0 | 146 | 140 | 172 | 175 | Gully | 1748977 | 5948921 | 29.1 | Silty CLAY | - |
| 20/01/2022 | ETAM22W00113 | LW | 646 | 1.84 | 42.0 | 1.30 | 2.70 | 0.0 | 175 | 175 | 175 | 137 | Gully | 1749009 | 5948886 | 29.55 | Silty CLAY | - |
| 20/01/2022 | ETAM22W00113 | LW | 647 | 1.85 | 44.7 | 1.28 | 2.70 | 0.0 | 149 | 164 | 175 | 146 | Gully | 1748991 | 5948873 | 30.15 | Silty CLAY | - |
| 20/01/2022 | ETAM22W00113 | LW | 648 | 1.95 | 26.4 | 1.54 | 2.70 | 2.2 | UTP | UTP | UTP | 175 | RE Wall 604A | 1749076 | 5949073 | 8.85 | Silty CLAY | - |
| 20/01/2022 | ETAM22W00113 | LW | 649 | 1.89 | 25.5 | 1.51 | 2.70 | 5.9 | 175 | 175 | 175 | UTP | RE Wall 604A | 1749077 | 5949061 | 8.75 | Silty CLAY | - |

Comments:

Earthworks Fill Report

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



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

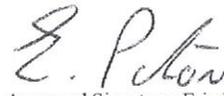
Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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


 Approved Signatory: Eric Paton
 Director-Testing
 IANZ Site Number: 105
 Date of Issue: 8/02/2022

Test Results

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

| Date Sampled | Work Order | Tested By | Test No. | Wet Density t/m ³ | Oven Water Content % | Dry Density t/m ³ | Solid Density t/m ³ | Air Voids % | Field Shear Strength (UTP = Unable to penetrate) kPa | | | | Test Location | Easting | Northing | RL | Material Tested | Comments |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|---------------|---------|----------|-------|-----------------|----------|
| | | | | | | | | | 1 | 2 | 3 | 4 | | | | | | |
| 4/02/2022 | ETAM22W00179 | LW | 667 | 1.86 | 32.6 | 1.41 | 2.70 | 2.1 | 149 | 160 | 175 | 175 | RE Wall 604A | 1749068 | 5949063 | 9.7 | Silty Clay | - |
| 4/02/2022 | ETAM22W00179 | LW | 668 | 1.89 | 32.4 | 1.43 | 2.70 | 0.7 | 175 | 175 | 175 | 175 | RE Wall 604A | 1749075 | 5949054 | 9.8 | Silty Clay | - |
| 4/02/2022 | ETAM22W00179 | LW | 669 | 1.90 | 33.3 | 1.43 | 2.70 | 0.0 | 175 | 175 | 175 | 175 | RW 701 | 1749100 | 5949041 | 11.3 | Silty Clay | - |
| 4/02/2022 | ETAM22W00179 | LW | 670 | 1.88 | 34.8 | 1.39 | 2.70 | 0.1 | 172 | 140 | 149 | 156 | RW 701 | 1749116 | 5949042 | 11.35 | Silty Clay | - |
| 4/02/2022 | ETAM22W00179 | LW | 671 | 1.92 | 30.8 | 1.47 | 2.70 | 0.3 | 146 | 143 | 153 | 140 | Gully | 1748980 | 5948855 | 31.3 | Silty Clay | - |
| 4/02/2022 | ETAM22W00179 | LW | 672 | 1.89 | 29.7 | 1.46 | 2.70 | 2.7 | 160 | 175 | 175 | 160 | Gully | 1748990 | 5948900 | 29.85 | Silty Clay | - |
| 4/02/2022 | ETAM22W00179 | LW | 673 | 1.95 | 29.6 | 1.50 | 2.70 | 0.0 | 175 | 175 | 175 | 175 | Gully | 1749009 | 5948909 | 28.15 | Silty Clay | - |
| 4/02/2022 | ETAM22W00179 | LW | 674 | 1.85 | 29.4 | 1.43 | 2.70 | 4.8 | 153 | 156 | 140 | 146 | Gully | 1749026 | 5948921 | 28.05 | Silty Clay | - |

Comments:

Earthworks Fill Report

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

| | |
|--------------------------|--|
| Client: | Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 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: 8/02/2022





Auckland Laboratory

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

Report No: EFIL:ETAM22W00242

Issue No:1

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

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

Approved Signatory: Eric Paton
 Director-Testing
 IANZ Site Number: 105
 Date of Issue: 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 4402:2015 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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|-----------------|---------|----------|----|-----------------|-----------------|
| | | | | | | | | | 188 | 168 | 176 | 184 | | | | | | |
| 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:

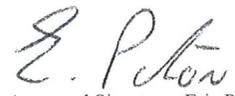
Earthworks Fill Report

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.)


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



SITE PLAN (NOT TO SCALE)



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.}



E. Paton

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|-----|-----|-----|-------------------|---------|----------|----|-----------------|----------|
| | | | | | | | | | 188 | 188 | 168 | 168 | | | | | | |
| 22/02/2022 | ETAM22W00261 | SC | 694 | 1.87 | 28.4 | 1.45 | 2.70 | 5.0 | 188 | 188 | 168 | 168 | Siltpond Backfill | 1749016 | 5948957 | - | Silty Clay | - |
| 22/02/2022 | ETAM22W00261 | SC | 695 | 1.83 | 33.2 | 1.37 | 2.70 | 3.5 | 168 | 168 | 168 | 168 | Gully | 1749076 | 5948939 | - | Silty Clay | - |
| 22/02/2022 | ETAM22W00261 | SC | 696 | 1.89 | 27.5 | 1.48 | 2.70 | 4.3 | 168 | 168 | 188 | 188 | Main Gully | 1749025 | 5948902 | - | Silty Clay | - |

Comments:

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



Earthworks Fill Report

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





Earthworks Fill Report

Report No: EFIL:ETAM22W00276

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00276



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



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

Client: Tetra Tech Coffey (NZ) Limited- Auckland
 Coffey House, Level 4, Teed Street
 New Market Auckland 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 | 168 | 168 | | | | | | |
| 24/02/2022 | ETAM22W00276 | SC | 700 | 1.87 | 30.0 | 1.44 | 2.70 | 3.8 | UTP | UTP | 168 | 168 | Refer to Plan | 1749096 | 5948920 | - | Silty CLAY | RL unavailable |
| 24/02/2022 | ETAM22W00276 | SC | 701 | 1.76 | 37.6 | 1.28 | 2.70 | 4.5 | 146 | 155 | 168 | 146 | Silt Pond | 1749017 | 5948946 | - | Silty CLAY | RL unavailable |
| 24/02/2022 | ETAM22W00276 | SC | 702 | 1.79 | 32.2 | 1.35 | 2.70 | 6.5 | 146 | 155 | 146 | 155 | Silt Pond | 1749009 | 5948975 | - | Silty CLAY | RL unavailable |
| 24/02/2022 | ETAM22W00276 | SC | 703 | 1.87 | 31.1 | 1.43 | 2.70 | 2.7 | 168 | 168 | 180 | 180 | Gully | 1748994 | 5948873 | - | Silty CLAY | RL unavailable |
| 24/02/2022 | ETAM22W00276 | SC | 704 | 1.87 | 31.2 | 1.43 | 2.70 | 2.6 | 160 | 168 | 155 | 160 | Gully | 1749001 | 5948917 | - | Silty CLAY | RL unavailable |

Comments:

Form Number: R03 IN Issue Date: 20/09/2018



Earthworks Fill Report

| | |
|---|---|
| Report No: EFIL:ETAM22W00276 | |
| Issue No:1 | |
| <i>This report replaces all previous issues of report no. EFIL:ETAM22W00276</i> | |
|  | All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. {This document may not be altered or reproduced except in full. This report relates only to the positions tested.} |
| |  Approved Signatory: Liam Walker Assistant Manager IANZ Site Number: 105 Date of Issue: 25/02/2022 |

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



Liam Walker

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 |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|--|------|------|------|---------------|---------|----------|----|-----------------|-------------------|
| | | | | | | | | | 208+ | 208+ | 208+ | UTP | | | | | | |
| 7/03/2022 | ETAM22W00341 | SC | 723 | 1.90 | 28.3 | 1.48 | 2.70 | 3.2 | 208+ | 208+ | 208+ | UTP | Gully 2 | 1748981 | 5948889 | - | Silty CLAY | RL unavailable |
| 7/03/2022 | ETAM22W00341 | SC | 724 | 1.87 | 29.3 | 1.45 | 2.70 | 4.1 | 208+ | 208+ | UTP | UTP | Gully 2 | 1749004 | 5948916 | - | Silty CLAY | RL unavailable |
| 7/03/2022 | ETAM22W00341 | SC | 725 | 1.90 | 31.9 | 1.44 | 2.70 | 1.0 | 188 | 188 | 208+ | 208+ | Gully 2 | 1749060 | 5948901 | - | Silty CLAY | RL unavailable |
| 7/03/2022 | ETAM22W00341 | SC | 726 | 1.83 | 29.5 | 1.42 | 2.70 | 5.8 | 200 | 200 | UTP | UTP | Silt Pond | 1749004 | 5948988 | - | Silty CLAY | RL unavailable |
| 7/03/2022 | ETAM22W00341 | SC | 727 | 1.74 | 23.0 | 1.41 | 2.70 | 15.3 | UTP | UTP | UTP | UTP | A7-A15 | 1749168 | 5948985 | - | Silty CLAY | At finished level |
| 7/03/2022 | ETAM22W00341 | SC | 728 | 1.69 | 25.0 | 1.35 | 2.70 | 16.1 | UTP | UTP | UTP | UTP | A15-15B | 1749200 | 5948998 | - | Silty CLAY | At finished level |
| 7/03/2022 | ETAM22W00341 | SC | 729 | 1.68 | 25.6 | 1.34 | 2.70 | 16.1 | UTP | UTP | UTP | UTP | 15B-15C | 1749220 | 5948990 | - | Silty CLAY | At finished level |
| 7/03/2022 | ETAM22W00341 | SC | 730 | 1.84 | 29.5 | 1.42 | 2.70 | 5.5 | UTP | UTP | UTP | UTP | 15C-15D | 1749248 | 5948982 | - | Silty CLAY | At finished level |
| 7/03/2022 | ETAM22W00341 | SC | 731 | 1.73 | 23.4 | 1.40 | 2.70 | 15.3 | UTP | UTP | UTP | UTP | 15-15D | 1749275 | 5948977 | - | Silty CLAY | At finished level |

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00341
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00341

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

ACCREDITED
IANZ
 TESTING LABORATORY

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

L Walker

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





Earthworks Fill Report

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.}

E. Paton

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

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) | | | | Test Location | Easting | Northing | RL | Material Tested | Comments |
|--------------|--------------|-----------|----------|---------------------------------|-------------------------|---------------------------------|-----------------------------------|----------------|---|-----|-----|-----|-------------------|---------|----------|----|-----------------|----------------|
| | | | | | | | | | UTP | UTP | UTP | UTP | | | | | | |
| 10/03/2022 | ETAM22W00363 | SC | 737 | 1.82 | 25.2 | 1.45 | 2.70 | 9.7 | UTP | UTP | UTP | UTP | A 7 - A 15 Retest | 1749168 | 5948985 | - | Silty Clay | Finished Level |
| 10/03/2022 | ETAM22W00363 | SC | 738 | 1.84 | 24.8 | 1.47 | 2.70 | 9.0 | UTP | UTP | UTP | UTP | 15 A - 15 B | 1749200 | 5948998 | - | Silty Clay | Finished Level |
| 10/03/2022 | ETAM22W00363 | SC | 739 | 1.89 | 25.5 | 1.51 | 2.70 | 5.9 | UTP | UTP | UTP | UTP | 15 B - 15 C | 1749220 | 5948996 | - | Silty Clay | Finished Level |
| 10/03/2022 | ETAM22W00363 | SC | 740 | 1.93 | 26.3 | 1.53 | 2.70 | 3.1 | UTP | UTP | UTP | UTP | 15 C - 15 D | 1749275 | 5948977 | - | Silty Clay | Finished Level |
| 10/03/2022 | ETAM22W00363 | SC | 741 | 1.95 | 25.3 | 1.56 | 2.70 | 3.1 | UTP | UTP | UTP | UTP | Main Gully Fill | 1748979 | 5948877 | - | Silty Clay | Finished Level |
| 10/03/2022 | ETAM22W00363 | SC | 742 | 1.89 | 29.3 | 1.46 | 2.70 | 2.9 | UTP | UTP | UTP | UTP | Main Gully Fill | 1748992 | 5948915 | - | Silty Clay | Finished Level |
| 10/03/2022 | ETAM22W00363 | SC | 743 | 1.85 | 29.8 | 1.43 | 2.70 | 4.7 | 168 | 168 | 160 | 160 | Main Gully Fill | 1749052 | 5948941 | - | Silty Clay | Finished Level |
| 10/03/2022 | ETAM22W00363 | SC | 744 | 1.84 | 33.0 | 1.38 | 2.70 | 3.3 | 146 | 146 | 160 | 160 | Silt Pond | 1749012 | 5948961 | - | Silty Clay | Finished Level |

Comments:

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:ETAM22W00363

Issue No:1

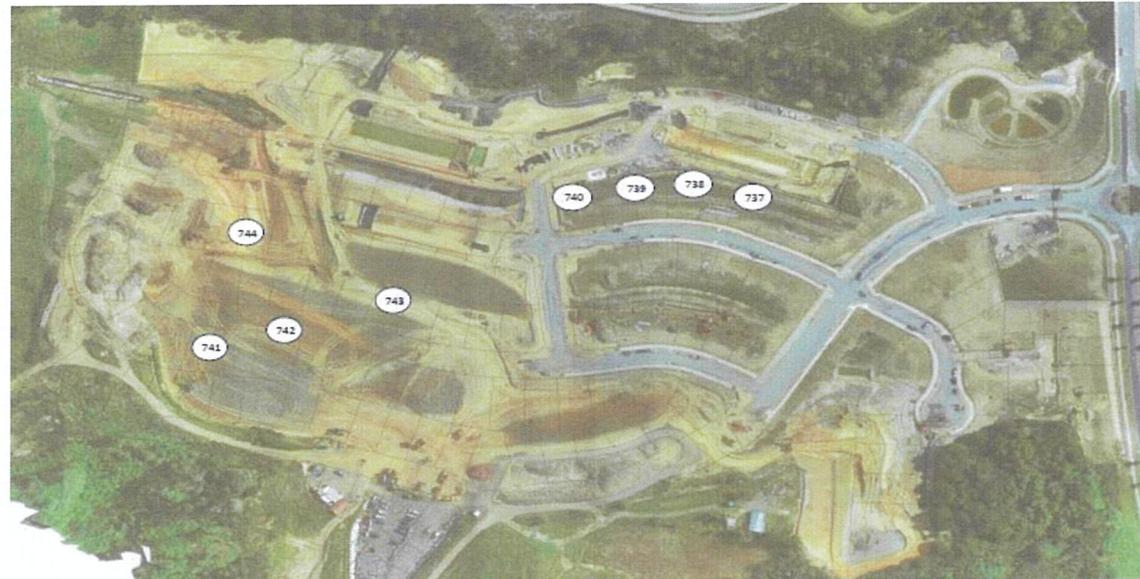
This report replaces all previous issues of report no. EFIL:ETAM22W00363

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



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

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





Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM21W01331

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: AKLGE206639 - Millwater Precinct 6k, Orewa

Lot No.: - TRN: -

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



Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 9/11/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage

Tested By: Liam Walker

Date Tested: 5/11/2021

Time Tested: 07:30

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-----------------|-----------|--------------|---------------------------------|---------------------------------|-------------------------|
| 60 | 0.5 | Face of R. Wall | 1st Layer | 5.8 | 2.20 | 2.08 | 98 |
| 50 | 0.5 | Face of R. Wall | 1st Layer | 4.6 | 2.11 | 2.01 | 95 |
| 40 | 0.5 | Face of R. Wall | 1st Layer | 4.8 | 2.17 | 2.07 | 98 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01411

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - TRN: -



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

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/11/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage

Tested By: Liam Walker

Date Tested: 19/11/2021

Time Tested: 13:45

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-----------------|-----------|--------------|---------------------------------|---------------------------------|-------------------------|
| 35 | 1.0 | Face of R. Wall | 4th Layer | 8.8 | 2.32 | 2.14 | 101 |
| 45 | 1.0 | Face of R. Wall | 4th Layer | 9.0 | 2.28 | 2.09 | 99 |
| 55 | 1.0 | Face of R. Wall | 4th Layer | 8.7 | 2.36 | 2.17 | 103 |
| 65 | 1.0 | Face of R. Wall | 4th Layer | 8.4 | 2.36 | 2.18 | 103 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01416

Issue No: 1

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

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

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



[Signature]

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/11/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage
Tested By: Liam Walker
Date Tested: 22/11/2021
Time Tested: 09:00
Material: GAP 65
Start Route Position:
Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External
MDD Method: ~
Max. Dry Density: 2.12 t/m³ @ 6 %
Min. Dry Density (t/m³): 2.01
Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-----------------|-----------|--------------|---------------------------------|---------------------------------|-------------------------|
| 45 | 1.0 | Face of R. Wall | 5th Layer | 7.0 | 2.17 | 2.03 | 96 |
| 55 | 1.5 | Face of R. Wall | 5th Layer | 7.2 | 2.23 | 2.08 | 98 |
| 65 | 1.0 | Face of R. Wall | 5th Layer | 6.7 | 2.26 | 2.11 | 100 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01435

Issue No: 1

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

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

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



[Signature]

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/11/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage
Tested By: Liam Walker
Date Tested: 25/11/2021
Time Tested: 08:45
Material: GAP 65
Start Route Position:
Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External
MDD Method: ~
Max. Dry Density: 2.12 t/m³ @ 6 %
Min. Dry Density (t/m³): 2.01
Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-----------------|-----------|--------------|---------------------------------|---------------------------------|-------------------------|
| 35 | 0.5 | Face of R. Wall | 1st Layer | 8.1 | 2.21 | 2.04 | 96 |
| 30 | 0.5 | Face of R. Wall | 1st Layer | 8.5 | 2.21 | 2.04 | 96 |
| 25 | 0.5 | Face of R. Wall | 1st Layer | 8.8 | 2.26 | 2.08 | 98 |
| 20 | 0.5 | Face of R. Wall | 1st Layer | 8.9 | 2.25 | 2.07 | 98 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01450

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - TRN: -



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

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/11/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage

Tested By: Liam Walker

Date Tested: 29/11/2021

Time Tested: 14:30

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 65 | 1.0 | Wall face | 7.9 | 2.28 | 2.11 | 100 |
| 55 | 1.5 | Wall face | 7.9 | 2.30 | 2.13 | 101 |
| 45 | 1.0 | Wall face | 11.1 | 2.32 | 2.09 | 99 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01478

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - TRN: -



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

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 6/12/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage

Tested By: Liam Walker

Date Tested: 3/12/2021

Time Tested: 08:30

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 95 | 1.0 | Wall face | Base Layer | 8.1 | 2.19 | 2.02 | 96 |
| 80 | 1.0 | Wall face | Base Layer | 7.3 | 2.22 | 2.07 | 98 |
| 65 | 1.0 | Wall face | Base Layer | 7.6 | 2.25 | 2.09 | 99 |
| 50 | 1.0 | Wall face | 6th Layer | 8.2 | 2.25 | 2.08 | 98 |
| 35 | 1.0 | Wall face | 6th Layer | 7.8 | 2.24 | 2.08 | 98 |
| 20 | 1.0 | Wall face | 6th Layer | 9.4 | 2.28 | 2.08 | 98 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01496

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - TRN: -

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



[Signature]

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 8/12/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage

Tested By: Liam Walker

Date Tested: 7/12/2021

Time Tested: 14:30

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|-----------|--------------|---------------------------------|---------------------------------|-------------------------|
| 50 | 1.0 | Wall face | 7th Layer | 7.9 | 2.22 | 2.06 | 97 |
| 35 | 1.0 | Wall face | 7th Layer | 8.5 | 2.23 | 2.05 | 97 |
| 20 | 1.0 | Wall face | 7th Layer | 9.1 | 2.27 | 2.08 | 98 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01507

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - TRN: -

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

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



[Signature]

Approved Signatory: Cesar Pura
(Senior Technician)

IANZ Accredited Laboratory Number:105
Date of Issue: 9/12/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage

Tested By: Liam Walker

Date Tested: 8/12/2021

Time Tested: 09:30

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|-----------|--------------|---------------------------------|---------------------------------|-------------------------|
| 65 | 1.0 | Wall face | 3rd Layer | 10.2 | 2.30 | 2.08 | 98 |
| 80 | 1.0 | Wall face | 3rd Layer | 9.3 | 2.26 | 2.06 | 97 |
| 95 | 1.0 | Wall face | 3rd Layer | 9.9 | 2.27 | 2.07 | 97 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01525

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - TRN: -



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

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 14/12/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage

Tested By: Liam Walker

Date Tested: 13/12/2021

Time Tested: 08:00

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 15 | 1.0 | Wall face | Base Layer | 10.5 | 2.31 | 2.09 | 99 |
| 20 | 1.0 | Wall face | 8th Layer | 9.6 | 2.34 | 2.13 | 101 |
| 35 | 1.0 | Wall face | 8th Layer | 10.1 | 2.35 | 2.13 | 101 |
| 50 | 1.0 | Wall face | 8th Layer | 11.4 | 2.26 | 2.03 | 96 |
| 65 | 1.0 | Wall face | 8th Layer | 9.6 | 2.28 | 2.08 | 98 |
| 80 | 1.0 | Wall face | 8th Layer | 10.4 | 2.32 | 2.10 | 99 |
| 95 | 1.0 | Wall face | 8th Layer | 9.8 | 2.35 | 2.14 | 101 |
| 100 | 1.0 | Wall face | Base Layer | 9.9 | 2.32 | 2.11 | 99 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Nuclear Density Report

Report No: ND:ETAM21W01570

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - TRN: -



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

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/12/2021

Testing Details

Site Tested: Retaining Wall 701, as per clients' chainage

Tested By: Liam Walker

Date Tested: 23/12/2021

Time Tested: 13:00

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 15 | 1.0 | Wall face | 8.3 | 2.22 | 2.05 | 97 |
| 30 | 1.0 | Wall face | 9.0 | 2.27 | 2.08 | 98 |
| 45 | 1.0 | Wall face | 7.8 | 2.23 | 2.06 | 97 |
| 60 | 1.0 | Wall face | 8.6 | 2.32 | 2.14 | 101 |
| 75 | 1.0 | Wall face | 8.2 | 2.28 | 2.10 | 99 |
| 90 | 1.0 | Wall face | 9.1 | 2.28 | 2.09 | 99 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00003

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:

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



E. Paton

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 10/01/2022

Testing Details

Site Tested: 117 Kowhai Road, Orewa-RW 701

Tested By: Liam Walker

Date Tested: 8/01/2022

Time Tested: 12:00

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 8.5 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|----------|--------------|---------------------------------|---------------------------------|-------------------------|
| 95 | 1 | Wall face | Layer 10 | 7.0 | 2.30 | 2.15 | 102 |
| 80 | 1 | Wall face | Layer 10 | 6.1 | 2.24 | 2.11 | 99 |
| 65 | 1 | Wall face | Layer 10 | 6.8 | 2.17 | 2.03 | 96 |
| 50 | 1 | Wall face | Layer 10 | 8.1 | 2.32 | 2.14 | 101 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00014

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:

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

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



Approved Signatory: Eric Paton
(Director-Testing)

IANZ Accredited Laboratory Number:105
Date of Issue: 14/01/2022

Testing Details

Site Tested: 117 Kowhai Road, Orewa-RW 701

Tested By: Liam Walker

Date Tested: 10/01/2022

Time Tested: 12:00

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 5.5 %

Min. Dry Density (t/m³): 2.04

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|-------|--------------|---------------------------------|---------------------------------|-------------------------|
| 35 | 1 | Wall face | 10 | 7.9 | 2.19 | 2.03 | 96 |
| 20 | 1 | Wall face | 10 | 8.6 | 2.26 | 2.08 | 98 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00024

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:

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



Approved Signatory: Eric Paton
(Director-Testing)

IANZ Accredited Laboratory Number:105
Date of Issue: 14/01/2022

Testing Details

Site Tested: 117 Kowhai Road, Orewa-RW701

Tested By: Liam Walker

Date Tested: 12/01/2022

Time Tested: 12:30

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 5.5 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 10 | 1 | Wall face | 8.9 | 2.20 | 2.02 | 95 |
| 25 | 1 | Wall face | 8.6 | 2.18 | 2.01 | 95 |
| 40 | 1 | Wall face | 7.9 | 2.23 | 2.06 | 97 |
| 55 | 1 | Wall face | 7.6 | 2.26 | 2.11 | 99 |
| 70 | 1 | Wall face | 8.8 | 2.24 | 2.06 | 97 |
| 85 | 1 | Wall face | 8.9 | 2.22 | 2.03 | 96 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00037

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:



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

Approved Signatory: Eric Paton
(Director-Testing)

IANZ Accredited Laboratory Number:105
Date of Issue: 18/01/2022

Testing Details

Site Tested: 117 Kowhai Road, Orewa

Tested By: Liam Walker

Date Tested: 17/01/2022

Time Tested: 13:15

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 5.5 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|-------|--------------|---------------------------------|---------------------------------|-------------------------|
| 15 | 1 | Wall face | 12 | 8.3 | 2.26 | 2.09 | 99 |
| 30 | 1 | Wall face | 12 | 8.5 | 2.28 | 2.10 | 99 |
| 45 | 1 | Wall face | 12 | 7.9 | 2.17 | 2.01 | 95 |
| 60 | 1 | Wall face | 12 | 8.2 | 2.22 | 2.05 | 97 |
| 75 | 1 | Wall face | 12 | 8.0 | 2.25 | 2.08 | 98 |
| 90 | 1 | Wall face | 12 | 8.7 | 2.23 | 2.05 | 97 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00114

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:

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



Approved Signatory: Eric Paton
(Director-Testing)

IANZ Accredited Laboratory Number:105
Date of Issue: 2/02/2022

Testing Details

Site Tested: 117 Kowhai Road, Orewa-RW 701

Tested By: Liam Walker

Date Tested: 20/01/2022

Time Tested: 13:30

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 5.5 %

Min. Dry Density (t/m³): 2.04

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|--------------|----------|--------------|---------------------------------|---------------------------------|-------------------------|
| 10 | 1 | Face of Wall | Layer 13 | 8.3 | 2.20 | 2.04 | 96 |
| 25 | 1 | Face of Wall | Layer 13 | 8.9 | 2.26 | 2.07 | 98 |
| 40 | 1 | Face of Wall | Layer 13 | 5.7 | 2.22 | 2.10 | 99 |
| 55 | 1 | Face of Wall | Layer 13 | 6.4 | 2.21 | 2.08 | 98 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00139

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:



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

Approved Signatory: Eric Paton
(Director-Testing)

IANZ Accredited Laboratory Number:105
Date of Issue: 3/02/2022

Testing Details

Site Tested: 117 Kowhai Road, Orewa- RW701 (APCC)

Tested By: Liam Walker

Date Tested: 1/02/2022

Time Tested: 13:00

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 5.5 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 10 | 1 | Wall face | 7.6 | 2.30 | 2.14 | 101 |
| 20 | 1 | Wall face | 8.0 | 2.21 | 2.05 | 97 |
| 80 | 1 | Wall face | 8.4 | 2.27 | 2.10 | 99 |
| 95 | 1 | Wall face | 7.8 | 2.25 | 2.08 | 98 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00256

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:

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



E. Paton

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

Testing Details

Site Tested: 117 Kowhai Road, Orewa-RW 701

Tested By: Salvindra Chandra

Date Tested: 21/02/2022

Time Tested: 12:30

Material: GAP 65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 5.5 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

| Test Results | | | | | | |
|--------------|------------|--------------|--------------|---------------------------------|---------------------------------|-------------------------|
| Chainage (m) | Offset (m) | Offset From | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
| 10 | 2 | Face of Wall | 10.2 | 2.22 | 2.01 | 95 |
| 20 | 2.5 | Face of Wall | 8.5 | 2.30 | 2.12 | 100 |
| 30 | 2 | Face of Wall | 8.0 | 2.22 | 2.05 | 97 |
| 40 | 3 | Face of Wall | 7.6 | 2.17 | 2.01 | 95 |
| 50 | 2.5 | Face of Wall | 9.0 | 2.18 | 2.00 | 95 |
| 60 | 3 | Face of Wall | 7.0 | 2.25 | 2.10 | 99 |
| 70 | 2.5 | Face of Wall | 8.5 | 2.24 | 2.07 | 98 |
| 80 | 2.5 | Face of Wall | 7.0 | 2.26 | 2.11 | 100 |
| 90 | 2.5 | Face of Wall | 8.1 | 2.21 | 2.04 | 96 |
| 100 | 2.5 | Face of Wall | 10.9 | 2.26 | 2.04 | 96 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00317

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: - TRN: -

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



Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 4/03/2022

Testing Details

Site Tested: RW701, as per clients chainages

Tested By: Salvindra Chandra

Date Tested: 2/03/2022

Time Tested: 13:00

Material: GAP65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.1 t/m³ @ 10.5 %

Min. Dry Density (t/m³): 1.99

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 10 | 2.0 | Wall face | 7.0 | 2.14 | 2.00 | 95 |
| 20 | 2.5 | Wall face | 7.2 | 2.15 | 2.01 | 96 |
| 30 | 2.0 | Wall face | 6.7 | 2.12 | 1.99 | 95 |
| 40 | 3.0 | Wall face | 8.2 | 2.25 | 2.08 | 99 |
| 50 | 2.5 | Wall face | 7.9 | 2.21 | 2.05 | 98 |
| 60 | 2.5 | Wall face | 8.6 | 2.22 | 2.04 | 97 |
| 70 | 2.5 | Wall face | 7.0 | 2.26 | 2.11 | 101 |
| 80 | 2.5 | Wall face | 7.7 | 2.15 | 1.99 | 95 |
| 90 | 2.5 | Wall face | 7.6 | 2.22 | 2.07 | 98 |
| 100 | 2.5 | Wall face | 7.6 | 2.15 | 2.00 | 95 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00406

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:

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



Approved Signatory: Eric Paton
(Director-Testing)

IANZ Accredited Laboratory Number:105
Date of Issue: 17/03/2022

Testing Details

Site Tested: RW 701
Tested By: Salvindra Chandra
Date Tested: 15/03/2022
Time Tested: 13:10
Material: GAP 65
Start Route Position:
Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External
MDD Method: ~
Max. Dry Density: 2.1 t/m³ @ 5.5 %
Min. Dry Density (t/m³): 2.00
Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|----------------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 30 | 2.5 | Retaining Wall, *RHS | 9.0 | 2.28 | 2.09 | 99 |
| 40 | 3 | Retaining Wall, *RHS | 8.9 | 2.21 | 2.03 | 97 |
| 50 | 2.5 | Retaining Wall, *RHS | 7.9 | 2.19 | 2.03 | 97 |
| 60 | 2 | Retaining Wall, *RHS | 7.5 | 2.20 | 2.05 | 98 |
| 70 | 2.5 | Retaining Wall, *RHS | 7.7 | 2.18 | 2.03 | 97 |
| 80 | 2 | Retaining Wall, *RHS | 8.3 | 2.25 | 2.08 | 99 |
| 90 | 2 | Retaining Wall, *RHS | 8.4 | 2.21 | 2.04 | 97 |
| 100 | 2 | Retaining Wall, *RHS | 10.6 | 2.20 | 1.99 | 95 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM22W00507

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

Lot No.: TRN:

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



Approved Signatory: Eric Paton
(Director-Testing)

IANZ Accredited Laboratory Number:105
Date of Issue: 30/03/2022

Testing Details

Site Tested: RW 701 (APCC)
Tested By: Liam Walker
Date Tested: 29/03/2022
Time Tested: 13:30
Material: GAP 65
Start Route Position:
Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External
MDD Method: ~
Max. Dry Density: 2.1 t/m³ @ 10.5 %
Min. Dry Density (t/m³): 2.00
Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|-------------|--------------|---------------------------------|---------------------------------|-------------------------|
| 25 | 1.5 | Wall face | 7.4 | 2.14 | 2.00 | 95 |
| 40 | 1.5 | Wall face | 8.1 | 2.19 | 2.02 | 96 |
| 55 | 1.5 | Wall face | 8.5 | 2.18 | 2.01 | 96 |
| 70 | 1.5 | Wall face | 7.8 | 2.18 | 2.02 | 96 |
| 85 | 1.5 | Wall face | 7.6 | 2.15 | 2.00 | 95 |
| 100 | 1.5 | Wall face | 7.2 | 2.14 | 1.99 | 95 |

Comments

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



Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM23W00495

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

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

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



Liam Walker

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number: 105
Date of Issue: 24/03/2023

Testing Details

Site Tested: Bridge Abutment, refer to plan

Tested By: Salvindra Chandra

Date Tested: 23/03/2023

Time Tested: 11:25

Material: ATAP65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.2 t/m³ @ 5.5 %

Min. Dry Density (t/m³): 2.09

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Lane | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|--------------------|------|---------|--------------|---------------------------------|---------------------------------|-------------------------|
| - | 0.5 | Centre of footpath | LHS | Subbase | 6.1 | 2.34 | 2.21 | 100 |
| - | 0.5 | Centre of footpath | RHS | Subbase | 6.0 | 2.31 | 2.18 | 99 |
| - | 0.5 | Centre of footpath | LHS | Subbase | 5.8 | 2.34 | 2.21 | 101 |
| - | 0.5 | Centre of footpath | RHS | Subbase | 6.2 | 2.36 | 2.22 | 101 |

Comments

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

Nuclear Density Report

Report No: ND:ETAM23W00495

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

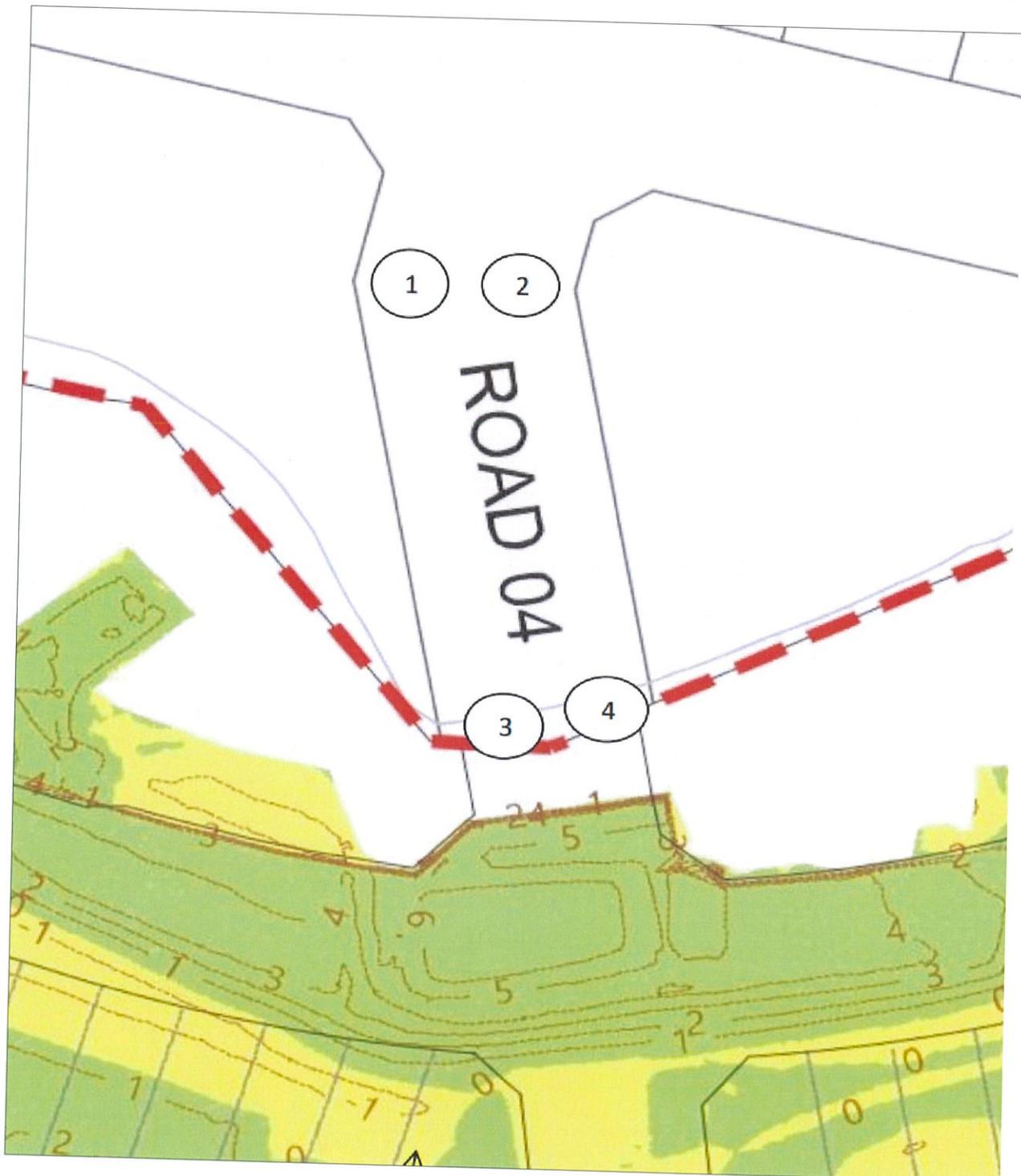
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

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



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

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/03/2023





Nuclear Density Report

Auckland Laboratory

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

Report No: ND:ETAM23W00487

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

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

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



Liam Walker

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/03/2023

Testing Details

Site Tested: Bridge Abutment, refer to plan

Tested By: Liam Walker

Date Tested: 22/03/2023

Time Tested: 14:40

Material: ATAP65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.2 t/m³ @ 5 %

Min. Dry Density (t/m³): 2.09

Solid Density Type: Assumed

Test Results

| Chainage (m) | Offset (m) | Offset From | Lane | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|--------------|------------|--------------------|------|---------|--------------|---------------------------------|---------------------------------|-------------------------|
| - | 0.5 | Centre of footpath | LHS | Subbase | 5.0 | 2.20 | 2.09 | 95 |
| - | 0.5 | Centre of footpath | RHS | Subbase | 4.8 | 2.08 | 1.98 | 90 |
| - | 0.5 | Centre of footpath | LHS | Subbase | 4.7 | 2.12 | 2.03 | 92 |
| - | 0.5 | Centre of footpath | RHS | Subbase | 4.6 | 2.07 | 1.98 | 90 |

Comments

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

Nuclear Density Report

Report No: ND:ETAM23W00487

Issue No: 1

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

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



Liam Walker

Approved Signatory: Liam Walker
 (Assistant Manager)
 IANZ Accredited Laboratory Number: 105
 Date of Issue: 24/03/2023



Nuclear Density Report

Report No: ND:ETAM23W00139

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

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



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

Walker

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 8/02/2023

Testing Details

Site Tested: Bridge Abutments

Tested By: Liam Walker

Date Tested: 3/02/2023

Time Tested: 10:00

Material: GAP65

Start Route Position:

Field Methods: NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID: External

MDD Method: ~

Max. Dry Density: 2.12 t/m³ @ 6 %

Min. Dry Density (t/m³): 2.01

Solid Density Type: Assumed

Test Results

| Site No | Chainage (m) | Offset (m) | Offset From | Lane | Layer | Moisture (%) | Wet Density (t/m ³) | Dry Density (t/m ³) | Relative Compaction (%) |
|---------|--------------|------------|--------------------|------|-------|--------------|---------------------------------|---------------------------------|-------------------------|
| 1 | 1 | 1 | Centre of footpath | LHS | FL | 6.4 | 2.18 | 2.05 | 96 |
| 2 | 1 | 2 | Centre of footpath | RHS | FL | 6.9 | 2.16 | 2.02 | 95 |
| 3 | 1 | 2 | Centre of footpath | LHS | FL | 6.2 | 2.29 | 2.15 | 102 |
| 4 | 1 | 1 | Centre of footpath | RHS | FL | 6.3 | 2.26 | 2.13 | 100 |

Comments

~ Test was conducted externally and is not accredited by this laboratory.
CH00 starts from wall edge
Tests 1-2 on south side, tests 3-4 on north side
Refer to photos on next pages

Nuclear Density Report

Report No: ND:ETAM23W00139

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

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

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

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number: 105
Date of Issue: 8/02/2023



Nuclear Density Report

Report No: ND:ETAM23W00139

Issue No: 1

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

Principal: Stephen Parkes

Project No.: 773-ETAM01553

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

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

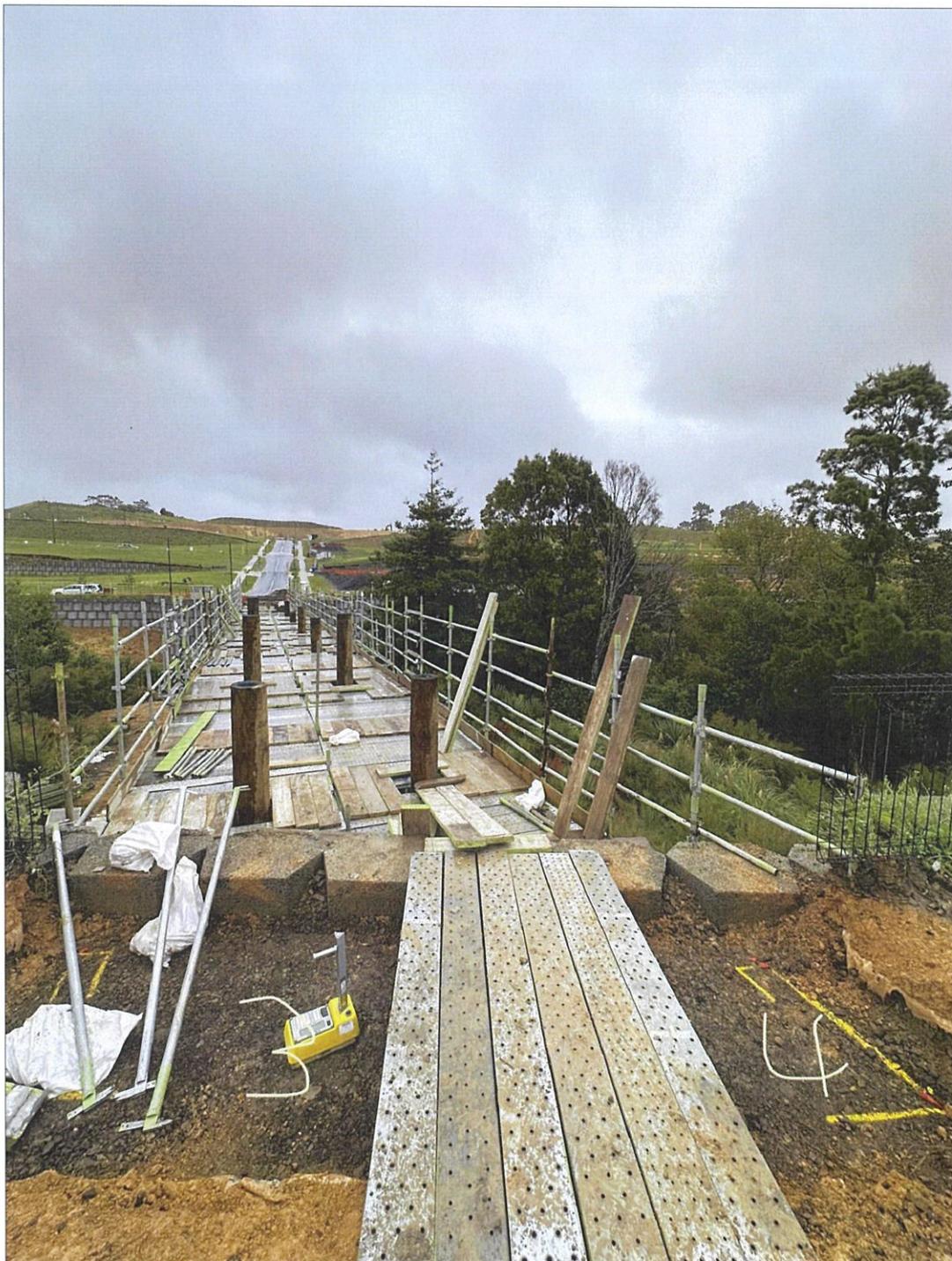
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)



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

Approved Signatory: Liam Walker
(Assistant Manager)

IANZ Accredited Laboratory Number: 105
Date of Issue: 8/02/2023



Earthworks Fill Report

Report No: EFIL:ETAM22W01845
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W01845

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



Approved Signatory: Eric Paton
 Director-Testing
 IANZ Site Number: 105
 Date of Issue: 18/10/2022

Test Results

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

| Date Sampled | Work Order | Tested By | Test No. | Wet Density t/m 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 | | | | | | |
| 10/10/2022 | ETAM22W01845 | MA | 926 | 1.72 | 27.5 | 1.35 | 2.65 | 12.1 | UTP | UTP | UTP | UTP | Gully 2 | 1749026 | 5948903 | 38.4 | Silty Clay | - |
| 10/10/2022 | ETAM22W01845 | MA | 927 | 1.86 | 30.7 | 1.42 | 2.65 | 2.9 | UTP | UTP | UTP | UTP | Gully 2 | 1748989 | 5948904 | 35.1 | Silty Clay | - |
| 10/10/2022 | ETAM22W01845 | MA | 928 | 1.87 | 30.5 | 1.43 | 2.65 | 2.5 | 111 | 140 | 163 | 124 | P6 1C Deb | 1749194 | 5949062 | 7.7 | Clay | - |

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W01845

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W01845

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

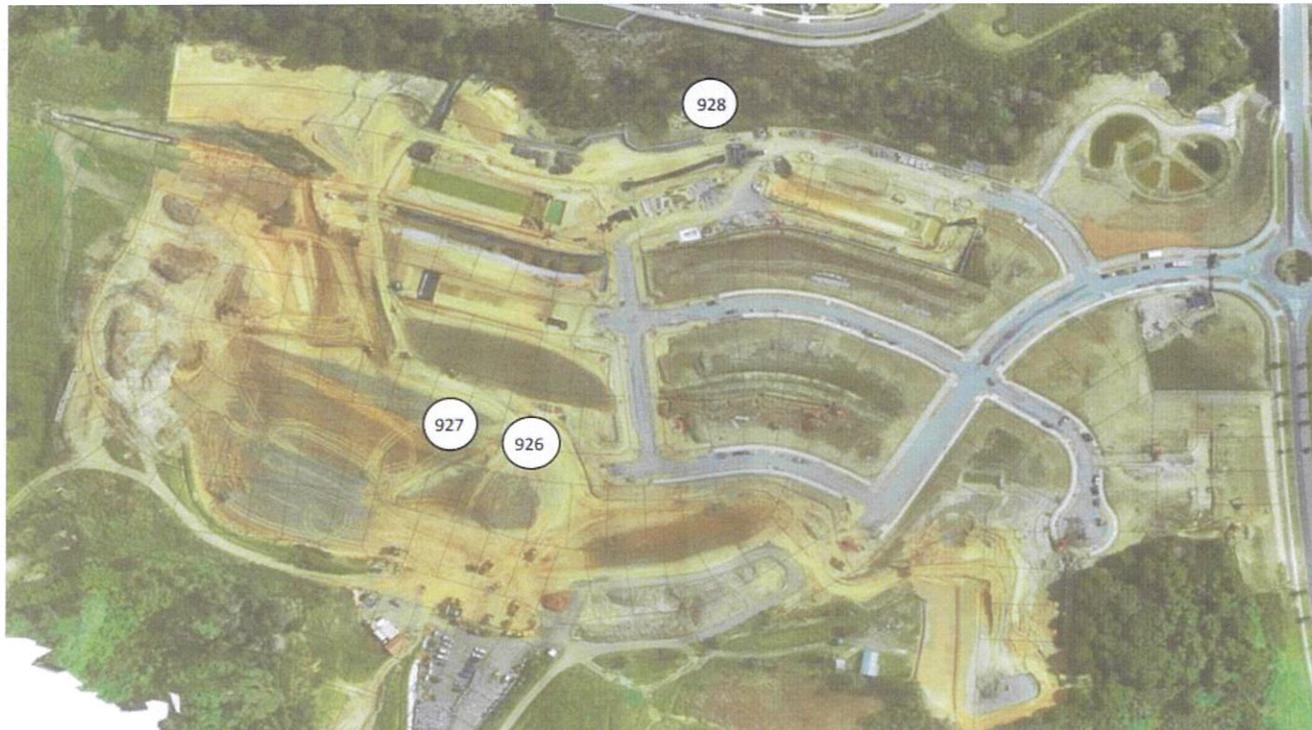
Project Location: 117 Kowhai Road, Orewa



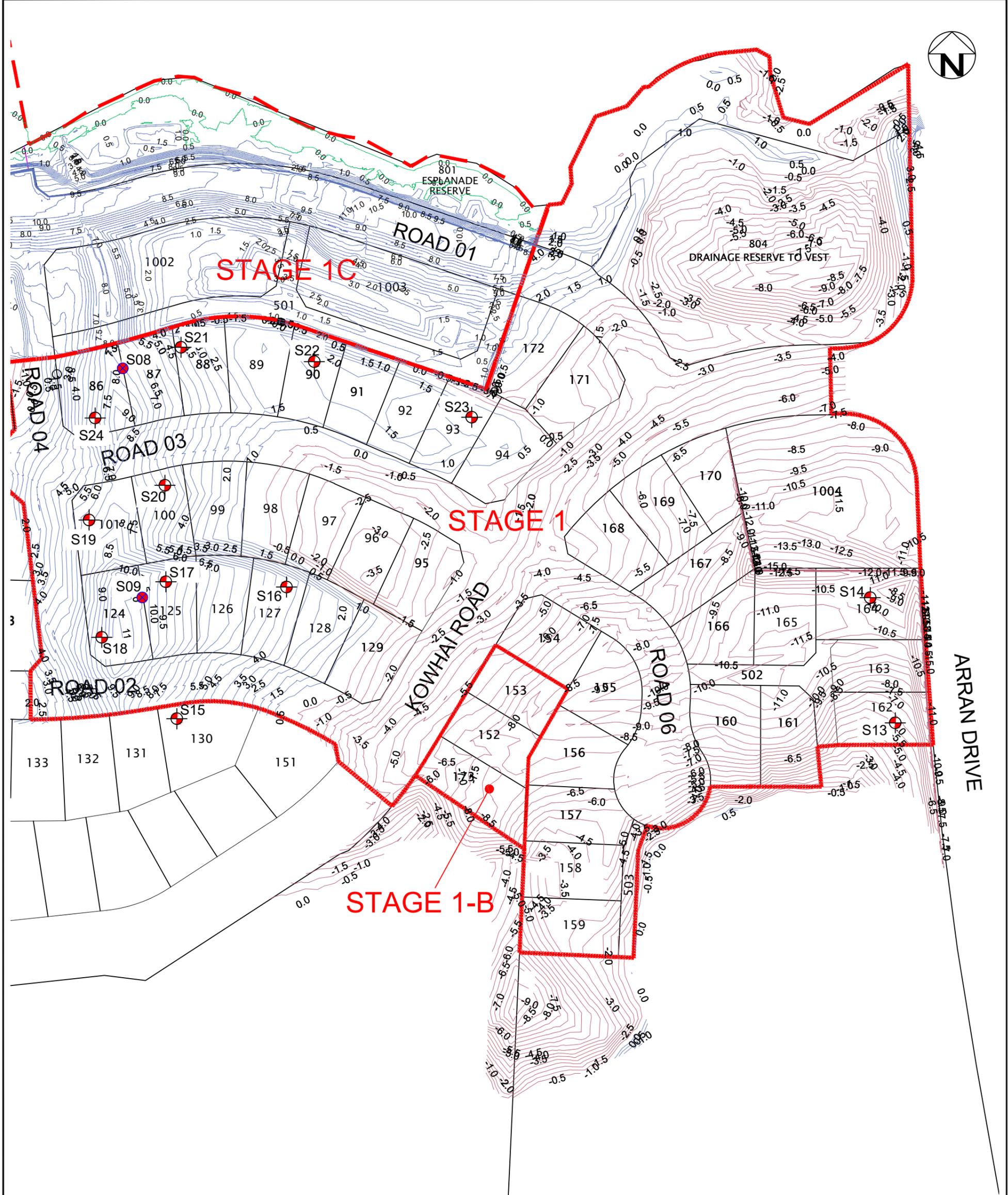
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)

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

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 18/10/2022



APPENDIX E: MONITORING RESULTS



| no. | description | drawn | approved | date |
|-----|----------------|-------|----------|------------|
| A | ORIGINAL ISSUE | RZ | SP | 31/01/2023 |
| | | | | |
| | | | | |
| | | | | |

LEGEND

- AS-BUILT CUT CONTOUR
- AS-BUILT FILL CONTOUR
- GROUND LEVEL SETTLEMENT MONITORING POINT
- SETTLEMENT BASE PLATES

revision

0 12.5 25 37.5 50 62.5
SCALE 1:1250 (A3) METRES

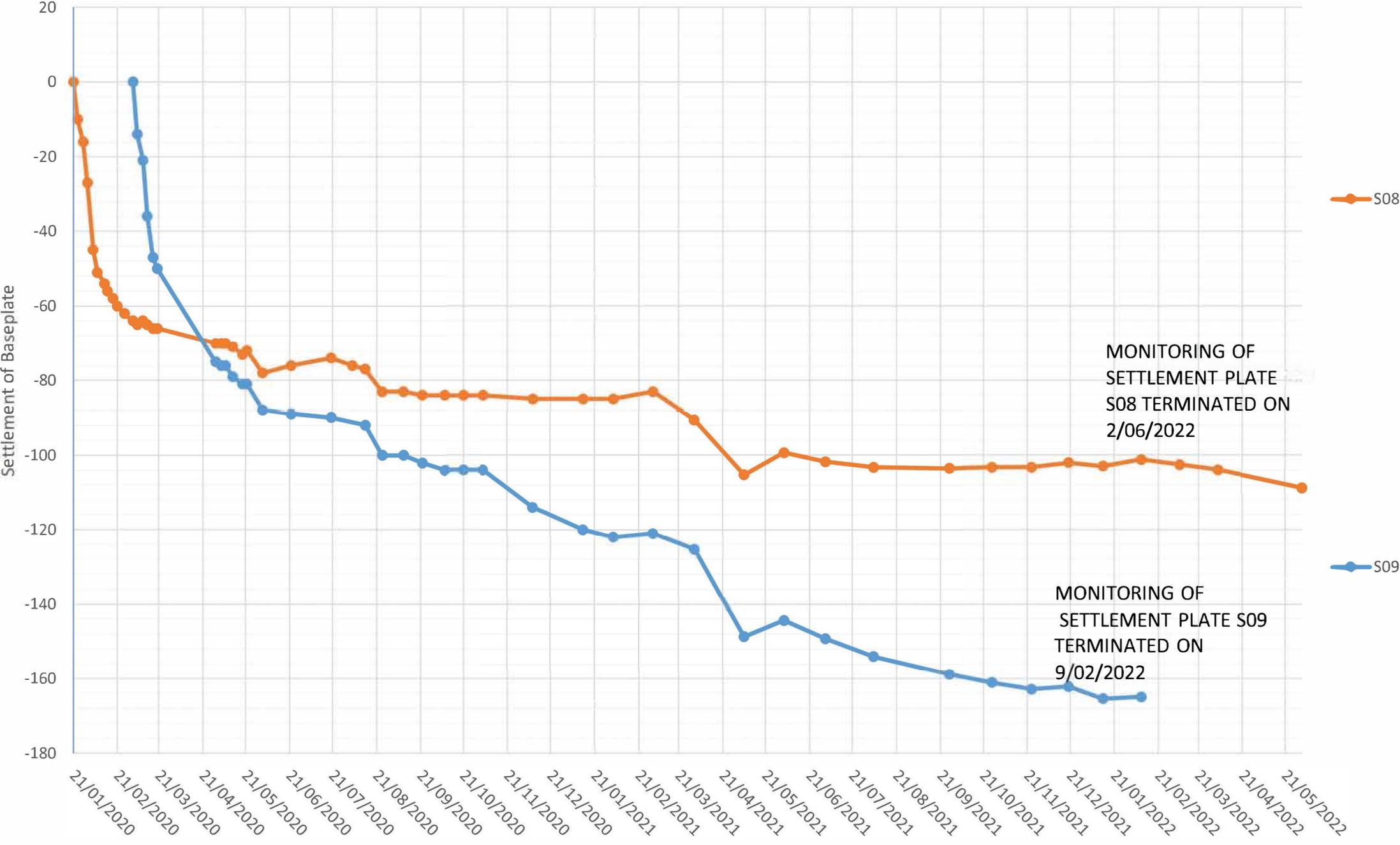
| | |
|---------------|------------|
| drawn | RZ |
| approved | SP |
| date | 31/01/2023 |
| scale | AS SHOWN |
| original size | A3 |

.Logo\tt.jpg

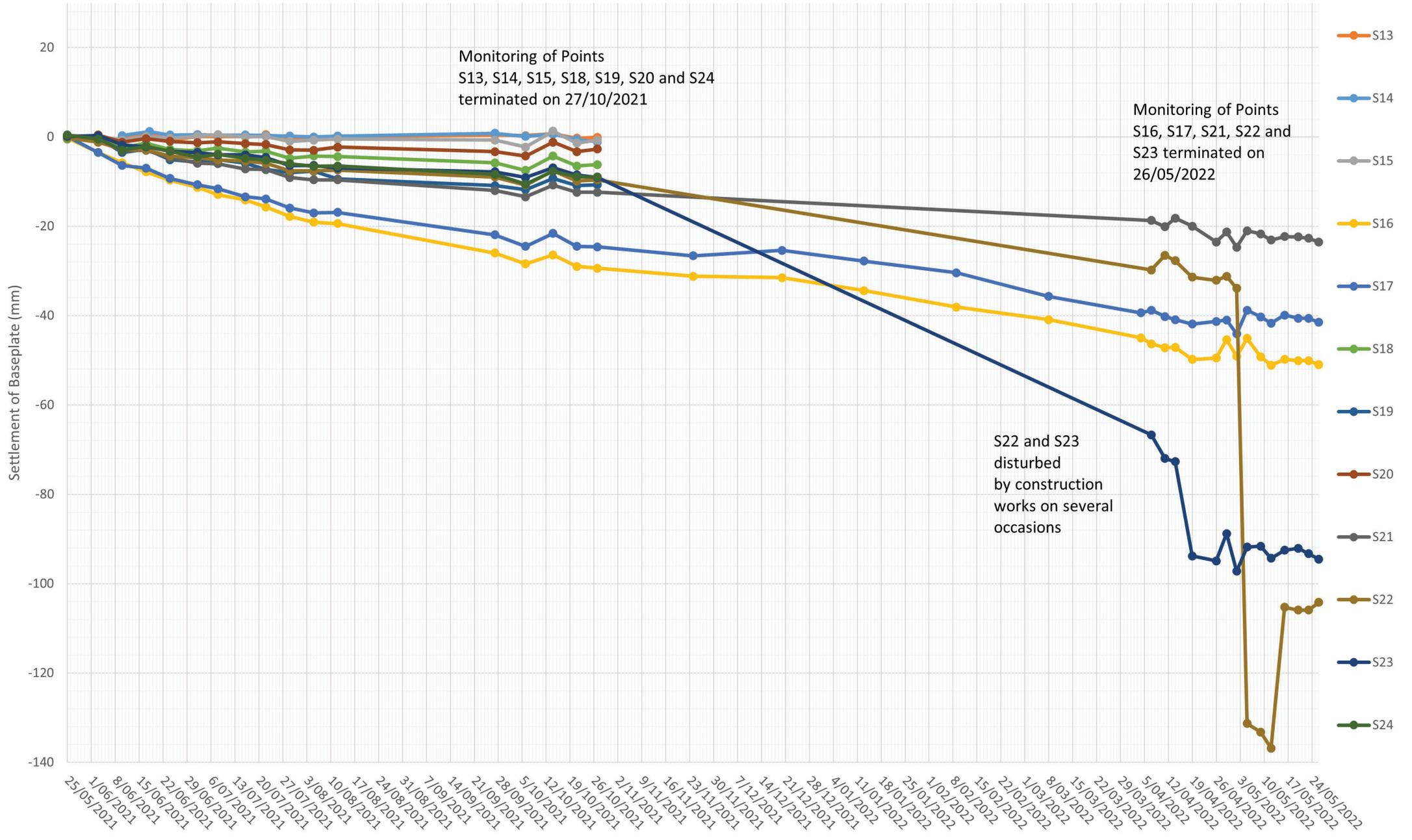
| | | | |
|-------------|--|------------|--------|
| client: | WFH PROPERTIES LIMITED | | |
| project: | MILLWATER PRECINCT 6 - SUBDIVISION STAGE 1 | | |
| title: | SETTLEMENT MONITORING LOCATION PLAN | | |
| project no: | 773-AKLGE206639 | figure no: | BK/003 |
| rev: | A | | |

PLOT DATE: 31/01/2023 3:22:23 pm DWG FILE: F:\F\GEN\9\PROJECTS\773-AKLGE\9\PROJECTS\773-AKLGE\CAD\CGR PLANS\02 STAGE 1C\BK-003 SETTLEMENT MONITORING PLAN.DWG

Arran Hill P6 - Settlement of Baseplates (mm)



Arran Hill P6 - Ground Settlement





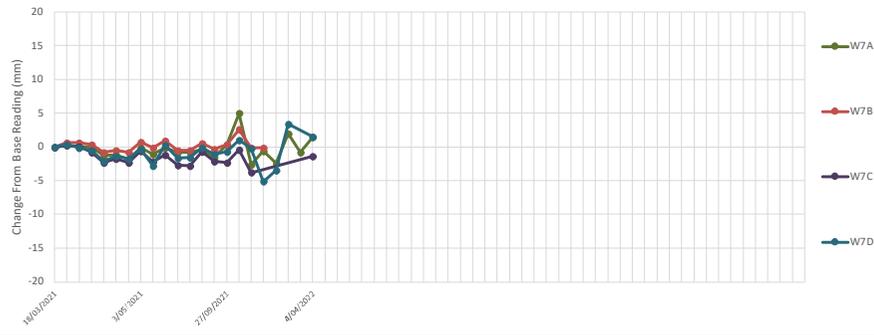
W7A

W7B

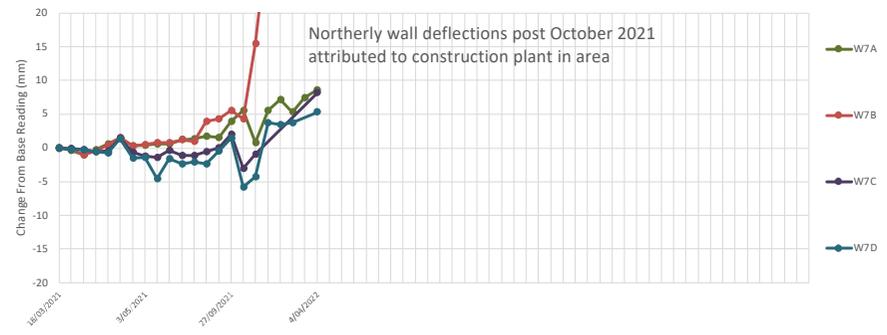
W7C

W7D

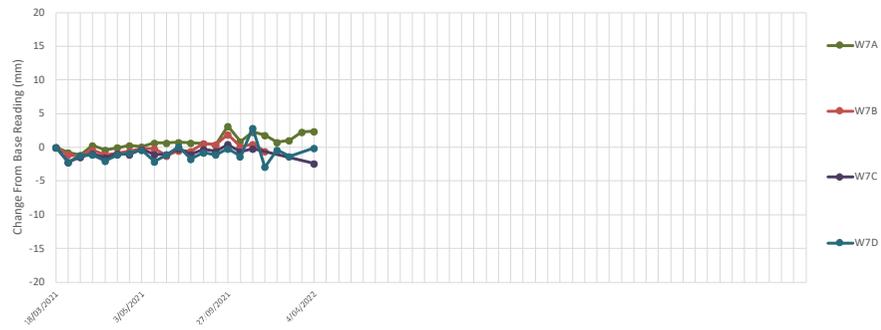
37610 - Arran Hill P6 - Wall 700 - Easting



37610 - Arran Hill P6 - Wall 700 - Northing

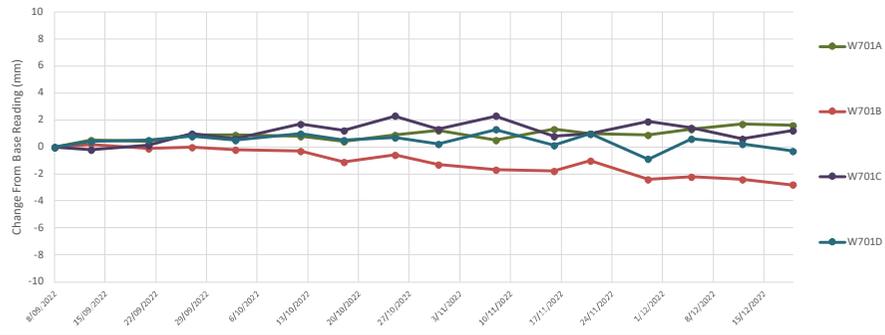


37610 - Arran Hill P6 - Wall 700 - Height

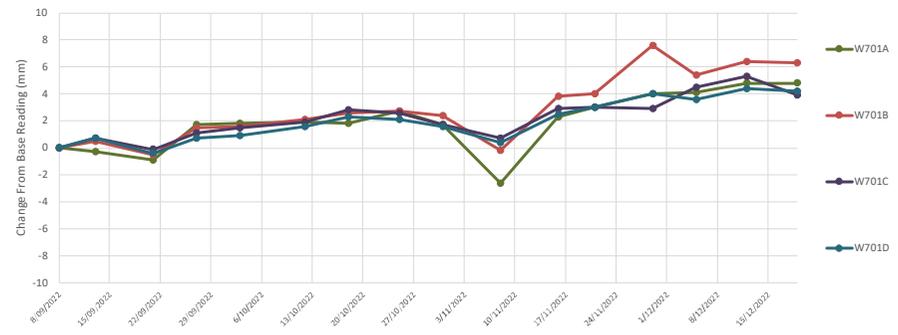




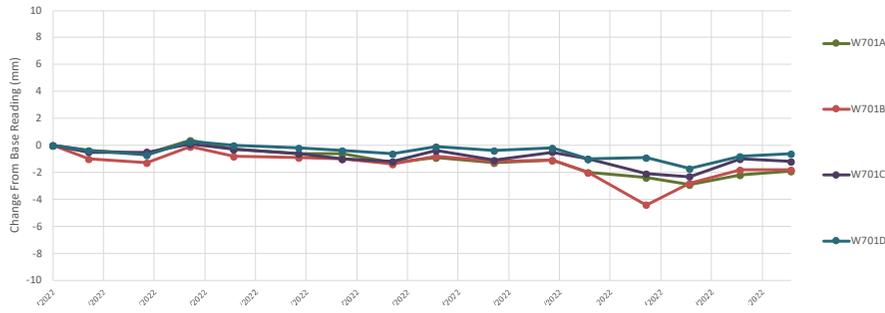
37610 - Arran Hill P6 - Wall 701 - Easting



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:

Reviewed and Authorised By:



Tasman Lambert Andrews
Graduate Engineering Geologist



Chris Armstrong
Principal Geotechnical Engineer
CMEngNZ, CPEng

Attachments – Producer Statement - Construction Review (PS4)



association of
consulting and
engineering

Building Code Clause(s).....

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:..... (Address) **LOT**..... **DP**..... **SO**.....

We (Construction Review Firm) have been engaged by

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

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www.engineeringnz.org



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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.

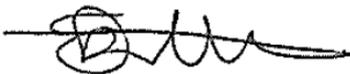
Mass Block Wall 700 extends over 130 linear metres with a maximum retained height of 5.0m, founded on an undercut within the engineered fill placed as part of shear key 1. Founding conditions were consistent with the specifications outlined in Tetra Tech Coffey's Geotechnical Design Report dated 15 April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



association of
consulting and
engineering

Building Code Clause(s).....

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:..... (Address) **LOT**..... **DP**..... **SO**.....

We (Construction Review Firm) have been engaged by

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.

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

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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:

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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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18 April 2023

Our ref: 773-AKLGE206639-BQ

WFH Properties Limited

Attention: WFH Properties

Geotechnical Observation of Timber Boardwalk construction at Millwater Precinct 6, Stage 1C, Orewa West (Building Consent No. BCO10349216)

This letter is to confirm that we visited the above site on numerous occasions between January and February 2023 to observe the construction of a Timber Boardwalk within Precinct 6 of the Millwater Subdivision development. This letter and accompanying PS4 cover the following items, which are required for compliance as specified in the approved Building Consent:

- Reinforced Concrete Abutments (partial);
- Piles (partial); and
- Geotechnical

During construction, regular site visits were undertaken to observe the ground conditions exposed within the boardwalk pile holes, including confirmation of the end bearing capacity of the soil and rock encountered, and to confirm the pile holes depth, diameter and lateral spacing. All observations were in accordance with the approved consented design documentation.

Additionally, we observed and carried out Nuclear Densometer compaction testing of hardfill placed to support the reinforced concrete abutment sills and confirmed that the integrity of the geogrid reinforcement comprising the underlying bridge abutments was not damaged or compromised by the boardwalk construction works. All Nuclear Densometer Testing of the GAP65 hardfill compaction achieved a minimum of 95% Maximum Dry Density.

On the basis of the construction observations and testing discussed above, we are satisfied the works were in accordance with the approved consent documentation.

For and on behalf of Tetra Tech Coffey

Prepared By:



Stephen Parkes
Associate 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

BUILDING CODE CLAUSE(S): [] JOB NUMBER: []

ISSUED BY: []
(Construction Monitoring Firm)

TO: []
(Owner/Developer)

TO BE SUPPLIED TO: []
(Building Consent Authority)

IN RESPECT OF: []
(Description of Building Work)

AT: []
(Address, Town/City)

LEGAL DESCRIPTION: [] N/A

We have been engaged by the owner/developer referred to above to provide **SELECT ONE level of construction monitoring relating to** the Clause(s) named above of the Building Code for the building work which is covered by PS1(s) issued by [] (Engineering Design Firm) and which is described in the documents relating to the Building Consent No. [] and those relating to Building Consent Amendment(s) No. [] issued during the course of the works, .

We have sighted these Building Consents and the conditions attached to them.
If any of the fields above are too small, please write "refer the Schedule".

Authorised instructions/variation(s) detailed/listed in the Schedule have been issued during the course of the works.

On the basis of these review(s) and information supplied by the contractor during the course of the works and **on behalf of the engineering firm** undertaking this Construction Monitoring, **I believe on reasonable grounds** that the building works covered by the above-mentioned PS1(s) have been completed in accordance with the relevant requirements of the Building Consent and Building Consent Amendments identified above or in the Schedule on page 2, 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, (Name of Construction Monitoring Professional) [], am:
• CPEng number []
• I hold the following qualifications []

The Construction Monitoring Firm holds a current policy of Professional Indemnity Insurance no less than \$200,000 The Construction Monitoring Firm Choose an item. a member of ACE New Zealand.

SIGNED BY (Name of Construction Monitoring Professional): []
(Signature below):

ON BEHALF OF (Construction Monitoring Firm): [] Date: []

Note: This statement has been prepared solely for the Building Consent Authority named above and shall not be relied upon by any other person or entity. Any liability in relation to this statement accrues to the Construction Monitoring Firm only. As a condition of reliance on this statement, the Building Consent Authority accepts that the total maximum amount of liability of any kind arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in tort or otherwise, is limited to the sum of \$200,000.

This form is to accompany **Forms 6 or 8 of the Building (Forms) 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

SCHEDULE to PS4

Please include an itemised list of all referenced documents, drawings, or other supporting materials in relation to this producer statement below: |

|

GUIDANCE ON USE OF PRODUCER STATEMENTS

Information on the use of Producer Statements and Construction Monitoring Guidelines can be found on the Engineering New Zealand website

<https://www.engineeringnz.org/engineer-tools/engineering-documents/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 (NZIA), Institution of Professional Engineers New Zealand (now Engineering New Zealand), Association of Consulting and Engineering New Zealand (ACE NZ) in consultation with the Building Officials Institute of New Zealand (BOINZ). The original suite of producer statements has been revised at the date of this form to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with part of the reasonable grounds necessary for the issue of a Building Consent or a Code Compliance Certificate, without necessarily having to duplicate review of design or construction monitoring undertaken by others.

PS1 DESIGN Intended for use by a suitably qualified independent engineering 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 engineering design review 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 engineering construction monitoring professional who either undertakes or supervises 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 Engineering Professional

This statement is made by an engineering 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 personnel.

The person signing the Producer Statement on behalf of the engineering firm will have a professional qualification and proven current competence through registration on a national competence-based register such as a Chartered Professional Engineer (CPEng).

Membership of a professional body, such as Engineering New Zealand provides additional assurance of the designer's standing within the profession. If the engineering firm is a member of 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 engineering 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 practice for the relationship between the BCA and the engineering firm.

Professional Services during Construction Phase

There are several levels of service that an engineering 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 engineering 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.

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/Engineering New Zealand 2004)
- ⁴ PN01 Guidelines on Producer Statements

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