

Millwater Arran Hills Residential Subdivision Precinct 6 Stage 1 and Stage 1-B

Geotechnical Completion Report

WFH Properties Limited



Reference: 773-AKLGE206639-AT

25 May 2022

MILLWATER ARRAN HILLS RESIDENTIAL SUBDIVISION, PRECINCT 6, STAGE 1 AND STAGE 1-B

Geotechnical Completion Report

Report reference number: 773-AKLGE206639-AT

25 May 2022

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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 1 and Stage 1-B 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

Senior Engineering Geologist

QUALITY INFORMATION

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1. INTRODUCTION

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

It contains Tetra Tech Coffey's Suitability Statement, relevant test data, and the Woods Limited as-built plan set relating to Stage 1 and Stage 1-B (collectively referred to herein as Stage 1) 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 1 Subdivision As-Built Plans

Title	Reference No.	Date
Reserves As-built Plan	37611-01-300-AB	05/07/2022
Final Surface As-built Plans	37611-01-1000 to 1003-AB	05/07/2022
Cut and Fill As-built Plan – Original Surface to Final Surface	37611-01-1100-AB	05/07/2022
Cut and Fill As-built Plan – Lowest Surface to Final Surface	37611-01-1101-AB	05/07/2022
Cut and Fill As-built Plan – Original Surface to Lowest Surface	37611-01-1102-AB	05/07/2022
Subsoil Drainage As-built Plans	37611-01-1200 to 1204-AB	05/07/2022
Palisade Wall As-built Plans	37611-P6-01-1300 & 1301-AB	05/07/2022
Retaining Wall As-built Plans	37611-01-1400 to 1405-AB	05/07/2022
Slope Gradient As-built Plan	37611-01-1500-AB	05/07/2022
Roading As-built Plans	37611-01-2000-AB to 2004-AB	05/07/2022
Stormwater As-builts	37611-01-3000-AB to 3006-AB	05/07/2022
Wastewater As-builts	37611-01-4000-AB to 4006-AB	05/07/2022
Watermain As-builts	37611-01-6000-AB to 6002-AB	05/07/2022

The following Tetra Tech Coffey (formerly Coffey) and Woods Limited (Woods) Precinct 6 construction drawings, Woods Limited North South Link as-built drawings, Tonkin and Taylor North South Link construction drawings, and Auckland Council Standard Details are presented in Appendix B for reference.

Table 2: Summary of Appended Reference Drawings

Title	Reference No.	Date
Tetra Tech Coffey Geotechnical Building Limitation Zone Plan	BE01	09/03/2022
Tetra Tech Coffey Geotechnical Works Plan ⁽¹⁾	AT/001	06/06/2022
Tetra Tech Coffey Geotechnical Investigation Plan ⁽²⁾	AT/002	06/06/2022
Coffey Geotechnical Remediation Design Drawings	AG/001, AG/005 and AG/006	20/07/2020
Coffey Subsoil Drainage Standard Details	AG/007	20/07/2020
Coffey Shear Key 1 Geotechnical Treatment Layout Plan	Figure 3	19/06/2019
Coffey Shear Key 1A and 1B Detail – Design Drawings	AB/005 and AB/006	06/09/2019

Woods Retaining Wall 306 Longitudinal Section	37600-03-160-EW	14/01/2020
Coffey Wall 306 Design Detail Drawing	AM/005	20/05/2020
Woods Retaining Wall 311 Longitudinal Section	37600-01-159-EW	11/09/2019
Coffey Wall 311 / RE Slope 311 Design Detail Drawing	AL/004	19/06/2020
Woods Reinforced Earth Wall 600 Longitudinal Section	37600-01-169-EW	22/07/2019
Coffey Reinforced Earth Slope Fill Batter Design Detail	AF/001	18/06/2020
Coffey Reinforced Earth Slope – Cut Batter Design Detail	AF/002	18/06/2020
Coffey Southeast Corner – Geotechnical Remediation Plan	AU/003	09/03/2021
PW804 Geotechnical Design Drawing	AU/004	09/03/2021
Tonkin and Taylor Millwater North South Link North Bridge Overall Geotechnical Works Plans	21854.012-45 and 47	Dec 13
Woods Limited North South Link Shear Key and Undercut Contours Plans	31108-B-AB-120 and 122	Sept 2013
Tonkin and Taylor Millwater North Bridge Southern Abutment RE Slope Typical Grid Layout Design Drawings	21854.012-04.5 and .6	Feb 2012
Tonkin and Taylor Millwater North Bridge Southern Abutment Typical Reinforced Earth Slope Zone A Design Drawing	21854.012-05.1	Dec 09
Tonkin and Taylor Millwater North Bridge Southern Abutment Typical Reinforced Earth Slope Zone C Design Drawing	21854.012-05.3	Dec 09
Auckland Council Stormwater Pipe and Manhole Construction Clearance Requirements	AC-STS-SW22	November 2015

Notes (relating to Table 2)

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

This GCR covers the construction period April 2019 to June 2022 and is intended to be used for certification purposes for the following lots associated with subdivision consent SUB60305557:

- 44 residential lots numbered Lots 86 to 101 (inclusive), Lots 124 to 129 (inclusive) and Lots 152 to 173 (inclusive);
- 1 commercial lot numbered Lot 1004;
- 2 Jointly Owned Access Lots (JOALs) numbered Lots 502 and 503;
- 1 stormwater wetland numbered Drainage Reserve 804 (to vest);
- 1 partial esplanade reserve numbered Lot 801; and
- 6 new public roads named Pekanga Road (formerly Road 2), Tuahere Road (formerly Road 4) Kaupeka Road (formerly Road 3), Dulcie Way (formerly Road 6), Skulander Crescent (formerly Road 1) and Kowhai Road (extension of the existing Kowhai Road)

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

Stage 1 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, Arran Drive is to the east, and steeply sloping privately owned reserve land is to the south.

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-AF Rev.2, dated 12 April 2022 – Geotechnical Design Report for RE600 to RE603, dated 11 May 2022;
- 773-AKLGE206639-AG Rev. 1, dated 25 August 2020 – General Earthworks Design Report
- 773-AKLGE206639-AI, dated 9, December 2019 – Settlement Assessment Report;
- 773-AKLGE206639-NTE08 Rev. 1, dated 3 December 2019 – Gully 1 Geotechnical Works;
- 773-AKLGE206639-AL Rev. 2, dated 15 April 2021 – Geotechnical Design Report for Mass Block Walls;
- 773-AKLGE206639-AM Rev.1, dated 6 April 2020 – Geotechnical Design Report for Allan Block Walls;
- 773-AKLGE2066369-AN Rev.2, dated 13 May 2020 – Geotechnical Monitoring Protocol;
- 773-AKLGE2066639-NTE25, dated 5 November 2020 – Counterfort Drain Detail 4 – Construction Methodology;
- 773-AKLGE206639-AU Rev.1, dated 9 March 2021 – Geotechnical Design Report for Palisade Wall 804;
- 773-AKLGE206639-AV, dated 20 July 2020 – Update to Stage 1 Geotechnical Remediation;
- 773-AKLGE206639-BF, dated 7 March 2022 – Producer Statement – PS4 (Construction Review) for Palisade Wall 804;
- 773-AKLGE206639-BG, dated 29 April 2022 – Producer Statement – PS4 (Construction Review) for Retaining Wall 306; and
- 773-AKLGE206639-BH, dated 16 June 2022 – Producer Statement – PS4 (Construction Review) for Retaining Walls 311 and 312.

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

- 21854.0034/AHP6EW.v1, dated June 2019 – Millwater Precinct 6 Enabling Works Geotechnical Completion Report
- 21854.012, dated December 2013 – Geotechnical Completion Report for Millwater North South Link

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 1, J G Civil Limited, were:

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

3.2 CONSTRUCTION PROGRAMME

3.2.1 Arran Drive Northern Bridge Construction Works (January 2011 to November 2012)

As part of the construction of Arran Drive to the east of the subdivision, a bridge was constructed across the northern tributary of the Orewa River that bounds Stage 1 to the north.

The construction of the southern bridge abutment involving the installation of a shear key and RE Slope having slope gradients of 1V:1H to 1V:1.8H extending into Stage 1 at the location shown on the Geotechnical Works Plan in Appendix B.

The RE Slope comprised Engineered clay fill with primary geogrid reinforcement lengths ranging from 9m to 16m placed at 1.5m vertical centres.

The works were designed, monitored and certified by T&T. The works are detailed in the T&T GCR reference 21854.012, dated December 2013.

3.2.2 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 in Stage 1 involved:

- Stripping of vegetation and organic material;
- Installation of subsoil drains;
- Earthworks involving fill placement to depths of up to 9m; and
- Construction of 1 no. undercut in the base of the natural gully beneath the main fill area to provide suitable global stability factors of safety.

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

3.2.3 Bulk Earthworks (April 2019 to March 2022)

Stage 1 bulk earthworks commenced in April 2019 with the construction of the eastern portion of Shear Key SK1, which was identified as being required following the initial geotechnical site investigation, to achieve the required minimum factors of safety for global stability of the subdivision. The shear key construction works involved the undercutting of natural soils down to 1m into bedrock, at the specifications prescribed in the approved geotechnical design (Design Report referenced in Section 2), and replacement with subsoil drainage and Engineered clay backfill. Construction of the shear key progressed through the following earthworks season, with the entire 310m length of shear key reaching completion in March 2020. The extent of SK1 is shown on the Geotechnical Works Plan in Appendix B.

General cut to fill earthworks across the broader Stage 1 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.

The bulk of the Stage 1 cut was located in the eastern portion of the subdivision. This reached finished subgrade level in Lot 1004 in December 2019, which allowed for the commencement of construction of segmental block retaining wall 306 in February 2020. Construction of this wall involved first excavating a 2m deep undercut key, replaced with Engineered clay fill, beneath the wall to provide suitable bearing capacity and global stability conditions. The wall drainage, comprising a 300mm wide SAP50 drainage blanket wrapped in geotextile, with outlets extending beneath the wall at a frequency of approximately one outlet every 50 lineal metres of wall, was installed prior to placement of Allan blocks. The wall construction involved placement of varying lengths of Miragrid GX40/40 biaxial geogrid at 400mm vertical centres, embedded within compacted GAP65 hardfill backfill behind the Allan block facing. The wall structure was completed in July 2020.

General earthworks progressed throughout the 2019-2020 earthworks season until the land adjoining the northern boundary of Stage 1 reached finished subgrade level in April 2020. This allowed 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. Wall 700 was completed in February 2021 and Wall 311 was completed in April 2021.

Highly saturated natural soils were observed during the earthworks operation through the area of future Lots 91 to 94. Counterfort drainage was subsequently constructed in November 2020, aligned with the proposed future lot boundaries to reduce pore water pressures within the clay soils. The drains comprised 3 no. trench excavations approximately 20m in length and up to 7m in depth, with the base of the trench cut on a grade to allow drainage from south to north. The excavations were filled with SAP50 scoria and were designed to drain into the future retaining wall drainage for Wall 311.

Earthworks continued through the 2020-2021 earthworks season. The majority of the fill to be placed in Stage 1 had been completed the previous season, so the bulk of the earthworks in this season involved the

completion of the Stage 1 cut, across the southern and eastern portions of the site. This material was transported to adjoining subdivision stages to be placed as Engineered fill.

RE Slope 600 (RE600) was constructed between March and May 2021. This initially involved the excavation of a 2m deep, 6m wide undercut key at the locations where the slope extended into natural foundation soils. The undercut was backfilled with Engineered clay fill. The RE slope comprised alternating layers of 2m or 5m long Tensar SS20 geogrid reinforcement, placed at 0.5m vertical centres within the slope. The slope was constructed from Engineered clay fill, and included a 300mm wide SAP50 drainage blanket behind the extent of the geogrids.

Trimming to form the Stormwater Wetland in the northern portion of Stage 1 was shaped and topsoiled in April 2021. This was followed by the installation of the stormwater drainage lines, and inlets and outlets adjacent to the wetland. The wetland was completed, planted and mulched in December.

The initial geotechnical investigation and stability analysis identified significant instability to be present within the reserve land adjoining the south-eastern boundary of Stage 1. In order to prevent regression of the unstable land back into the subdivision within the subdivision design life, an inground pile (Palisade) wall (PW804) was installed around the reserve boundary. This comprised steel reinforced concrete piles, fully embedded into the ground to depths of up to 9.5m. The palisade wall was constructed in several sections, eventually reaching completion in February 2022.

RE311 and RE313, the reinforced earth slopes above Segmental Block Retaining Walls 311 and 306 respectively, were constructed between January and May 2021.

Earthworks operations in Stage 1 continued into the 2021-2022 earthworks season, with the continuation of the cut within the southern portion of the subdivision area, which reached finished levels in February 2022. Bedrock was encountered at finished ground level through future Lots 157 to 159. This was undercut to 1mbgl and backfilled up to finished level with Engineered clay fill. This completed the earthworks in March 2022.

3.2.4 Civil Works (July 2021 to June 2022)

Stage 1 civil construction works commenced in July 2021 with the gulleting of Roads 2, 4 and Kowhai Road.

Construction of the public stormwater network commenced with the construction of Line 2 in July, followed by Lines 1 and 26 in August.

Kowhai Road was trimmed to design subgrade level in September and then lime stabilised. Stabilising of subgrade on Roads 1, 2, 3, 4 and 6 followed in October.

Wastewater drainage construction commenced on Line 1 in October, and progressed along Kowhai Road and Line 7 for the remainder of the year.

Geoweb erosion protection and topsoiling of RE313, the RE slope constructed above Segmental Block Wall 306, was carried out in October. The geoweb was fixed in position via anchoring behind the slope crest with duckbill anchors.

Construction of the underchannel drains, installation of services and kerbing commenced in November, and progressed into the New Year.

The concrete accessway and pedestrian barriers in the wetland were installed in November and December.

Basecourse metal was placed on Roads 3 and 6 in December and was completed across all roads by February 2022.

Stormwater drainage was completed in Lot 1004 in March, which included a connection of the Retaining Wall 306 drainage outlets into the stormwater manholes.

Kerbing and service installation was completed in March 2022.

By April 2022, all stormwater and wastewater drainage was completed, and all roads were sealed with asphalt.

The pedestrian barrier fence above Retaining Wall 306 was installed, and Geoweb erosion protection and topsoil was placed across the face of RE311.

By the middle of May all footpaths and road marking were completed, and road signage was installed.

The pedestrian and crash barriers above the section of Retaining Wall 700 in Stage 1 were installed in mid-May.

All batters were planted and landscaping works were completed by the end of May 2022.

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 and placement and construction of drainage outlets;
- Topsoil stripping and benching of slopes prior to the placement of earth fills;
- Placement of geogrid reinforcement and drainage for reinforced earth (RE) slopes, including connection of drainage to the sealed public stormwater network;
- Ground conditions exposed in pile hole excavations for inground pile (Palisade) wall PW804;
- Excavation and construction of segmental block (Allan Block and Mass Block) retaining walls including foundation preparation, geogrid placement and lateral extent, drainage placement and backfill compaction;
- Ground conditions and founding material exposed in undercuts beneath retaining walls and RE slopes;
- Construction of pedestrian barriers along the crests of retaining walls;
- Observations of the removal of soft alluvial and organic natural soils and placement of underfill drainage in natural Gully 1 beneath the main fill area, prior to fill placement;
- Construction of counterfort drains;
- Flush testing of the underfill and counterfort drains upon completion; and
- Rock undercuts within residential lots where rock was exposed within 1m of finished ground level.

Test measurements undertaken during site inspections included:

- Compaction Testing of clay fill in accordance with the Tetra Tech Coffey Geotechnical Works Specification;
- Compaction Testing of hardfill for the segmental block (Allan Block & Mass Block) retaining wall backfill;
- Penetration 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 1 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 the hazards described in Section 106 of the Resource Management Act 1991 and Section 71(3) of the Building Act 2004.

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

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

Notwithstanding our confidence in the aforementioned stability analysis results, the Tetra Tech Coffey Geotechnical Building Limitation Zones Plan, reference BE01, presented in Appendix B, shows the extent of a series of zones which are intended to, among other things, maintain long term factors of safety against instability. The Building Limitation Zones include:

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

Full descriptions of the limitations associated with each of these zones are presented in the Suitability Statement below. Additional comments and cautions 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 and beneath the stormwater wetland (location shown on the appended Geotechnical Works Plan referenced AT/001).

The shear key was excavated into competent bedrock and installed with subsoil drainage which outlets 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.

5.1.3 Inground Pile (Palisade) Wall PW804

Global stability in the southern portion of the site has been enhanced by the construction of inground pile (Palisade) Wall PW804 at the location shown on Woods Limited as-built drawings referenced 37611-P6-01-1300 and 1301-AB.

The wall comprises three different pile details, as shown below in Table 3. The wall design drawings are presented below in Appendix B.

Table 3: PW804 Design Details

Wall Chainage Interval (m)	Pile Diameter (mm)	Pile Spacing c-c (m)	Steel Section	Depth of Piles (mbgl)	Minimum Concrete Strength (MPa)	Design Surcharge Load Upslope of Piles (kPa)	Design Soil Evacuation Depth (m) *
0-55	500	1.5	310 UB 40.4	8.0	32	12	2**
55 to 105 and 120 to 159	500	1.5	310 UB 40.4	6.0	32	12	2**
105 to 120	500	1.5	310 UB 40.4	9.0	32	12	2**

*Maximum soil depth allowed for in the wall design that can be removed downslope of the piles due to landsliding, without compromising the function of the wall.

**With 26° toe slope

PW804 was constructed under Building Consent BCO10301029-6. The Producer Statement – Construction Review (PS4) and accompanying geotechnical review letter are provided in Appendix F.

Building within a 5m wide zone upslope of PW804 (as shown on the Tetra Tech Coffey Geotechnical Building Limitation Zone Plan BE01) should be subject to Specific Engineering Design. Details regarding the specific design requirements within this zone are discussed below in Section 5.4.3.

The piles are designed to accommodate an evacuation of soil downslope equal to the depth indicated above in Table 3. In the event of a landslide occurring within the reserve land downslope of PW804, which regresses upslope to expose a section of the piles which is equal to or greater than the design soil evacuation depth stated in Table 3, engineering guidance should be sought immediately from a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report, for advice on remedial actions.

5.2 RETAINING WALLS

5.2.1 Existing Retaining Walls

Two segmental block retaining walls, namely Walls 306 and 311, have been constructed in Precinct 6 Stage 1. The walls were constructed under Building Consent numbers BCO10301029-1 and 10301029-3 respectively. The Producer Statement – Construction Review (PS4s) for these walls are provided in Appendix F.

Table 4 below summarises the retaining wall construction details.

Table 4: 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)
306	208	Allan Block	GAP65 Hardfill	Miragrid GX40/40	6.0	12
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

The retaining walls were constructed with subsoil drainage, with regular outlet connections into the sealed public stormwater drainage network at the locations shown on the Woods Retaining Wall as-built drawings reference 37611-01-1400 to 1405-AB. If any of the retaining wall drains are intercepted by future construction works, they should be reinstated under the supervision of a Chartered Professional Engineer, familiar with the contents of this report. The capacity of the retaining wall drains to function should not be reduced or compromised as blocked retaining wall drainage can in some circumstances, lead to failure of the retaining wall.

The retaining walls were designed to accommodate a 12kPa uniformly distributed surcharge load above the walls (or behind the crest of adjoining upslope RE Slopes) to take into account potential future fill placement or load from dwellings. Any greater loading will require specific design to transfer the load to a foundation system below the zone of influence of the wall. Details on the Specific Design Zone requirements on the residential lots adjoining the retaining walls is provided below in Section 5.4.4 and in the Suitability Statement (Section 6).

Survey monitoring of the retaining walls was carried out post-construction in accordance with the Tetra Tech Coffey Geotechnical Monitoring Protocol referenced above in Section 2, to confirm vertical and lateral movements were within design tolerances for the retaining walls. The majority of the deflections of the

monitoring points observed were accredited to earthworks plant operating in the area. As such, we are satisfied that any post-construction movements have now likely attenuated. The monitoring results are provided in Appendix E.

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

5.2.2 Future Retaining Walls on the Private Lots

Retaining walls to be constructed on the residential lots may be designed in accordance with the soil parameters provided in Table 5 below:

Table 5: 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)	Coefficient of Active Earth Pressure, K_a	Coefficient of Passive Earth Pressure, K_p
18	0	30	50	0.33	3

Retaining wall designs should give due regard to any sloping ground above or below the proposed wall locations, and make appropriate allowances for traffic and building surcharge loads.

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

5.3 REINFORCED EARTH SLOPES

The finished lot contours have generally been eased across the subdivision by the construction of several 1V:1.5H inter-lot RE slopes up to 6m high.

Table 5 below summarises the RE slope construction details.

Table 6: Summary of RE Slope Construction Details

RE Slope #	Vertical Slope Height (m)	Geogrid Type	Geogrid Embedment Lengths	Design Surcharge Load at Slope Crest (kPa)
311	3	Tensar SS20	Alternating 2m and 5m lengths at 0.5m vertical centres	12
313	3	Tensar SS20	Alternating 2m and 5m lengths at 0.5m vertical centres	12
600	6	Tensar SS20	Alternating 2m and 5m lengths at 0.5m vertical centres	12

The RE Slopes were constructed with subsoil drainage comprising a 300mm wide SAP50 scoria blanket drain behind the geogrid reinforced block, with regular outlet connections into the sealed public stormwater drainage network at the locations shown on the Woods Limited as-built drawings reference 37611-01-1400 to 1405-AB. If any of the RE Slope drains are intercepted by future construction works, they should be reinstated under the supervision of a Chartered Professional Engineer familiar with the contents of this report. The capacity of the subsoil drains to function should not be reduced or compromised as blocked RE Slope drainage can in some circumstances, lead to failure of the slope.

All of the RE Slopes have a Geoweb topsoil retention system on the faces to reduce the risk of scour and erosion on the slope face. The Geoweb is fixed into position via Duckbill anchors installed into the ground at approximately 2m lateral centres at the slope crest. It is important that no drainage or service trenches are excavated parallel to the slope crest on the residential lots as this may result in surficial slumping of the topsoil on the batter faces. Further details relating to building limitations on lots adjoining the RE slopes is provided below in Section 5.4 and in the Suitability Statement (section 6).

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

5.4 BUILDING LIMITATION ZONES

The steeper areas of filled and natural ground in Stage 1 and adjoining land parcels are more sensitive to future changes in geometry, groundwater and surface water than other less steep areas. Accordingly, the appended Suitability Statement and the following sub-sections contain details of building restrictions (No Build Zones) and Specific Design Zones pertaining to cutting near batter toes or filling/loading near batter crests (Specific Design Zone (Slope)) to maintain the long-term integrity of these areas.

In addition to this, Specific Design Zones have been applied to land adjoining several retaining, or inground pile (Palisade) walls constructed as part of Stage 1 to ensure the long-term integrity of these structures.

The Building Limitation Zones are shown on Tetra Tech Coffey drawing BE01 in Appendix B.

5.4.1 No Build Zone

It is not considered desirable from a geotechnical perspective to develop on land having slope gradients steeper than 1V:2H (50%), or on batters consisting of geogrid reinforcement which cannot be damaged or altered in order to maintain long term factors of safety against instability. For these reasons, several RE slopes have been designated as No Build Zones.

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

To reduce the potential for scour of the RE batters, topsoil has been placed on the batter faces and planted. These features should be able to remain in place long term without significant maintenance. Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted or replaced as soon as possible. Further, depths of mulch and topsoil applied to these areas should be limited to less than 150mm (combined) to reduce the risks of saturation leading to their localised slumping on batter faces. The contribution of appropriate vegetation cover to erosion control should not be underestimated. Weeds are permitted to be removed, but landscaped vegetation in the No Build Zones must be protected and preserved.

5.4.2 Specific Design Zone (Slope)

Specific Design Zone (Slope) has been applied to all sloping areas having gradients of between 1V:2H and 1V:4H (as shown on the Woods Limited Slope Gradient Plan referenced 37611-01-1500-AB) or land located immediately upslope or downslope of RE Slopes. Any future earthworks and any future building development within the Specific Design Zone (Slope) should be the subject of a specific engineering design carried out by a Chartered Professional Engineer experienced in geomechanics and who is familiar with the contents of this report. This will also require an assessment of natural hazards as detailed in Section 71(3) of the Building Act. The design engineer should consider the effects of filling behind batter crests or cutting at batter toes, on the stability of the adjacent batters.

Individual lot developers must take particular care when planning any unsupported cuts (e.g. for retaining walls or benched platforms), even of a temporary nature on or near these batters. Risk reduction methods that

should be employed include (but are not limited to) staging of excavation works along slope portions, covering excavations with polythene to prevent ingress of rain, installation of temporary retention piles prior to excavation works (i.e. top-down construction methodologies) and careful planning of works to avoid poor weather and to ensure that excavations are only left unsupported for short periods of time.

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

5.4.3 Specific Design Zone (Palisade Walls)

Application of excessive loads to inground pile (Palisade) Wall PW804 in excess of that allowed for in the wall design may compromise the function of the wall and result in a reduction in global stability. As such, Specific Design Zone (Palisade Walls) has been applied to all lot areas within 5m upslope of the Palisade Wall piles.

Any proposed building or earthworks within the Specific Design Zone (Palisade Walls) should be designed and certified by a Chartered Professional Engineer, experienced in geomechanics, familiar with the contents of this report, to ensure the wall design surcharge loading of 12kPa is not exceeded.

Furthermore, any retaining walls proposed in Lots 160 or 161 should not be constructed within 1m of the Palisade wall piles, and the proposed retaining wall retained heights should not exceed 3m from the top of PW804 pile level (i.e. finished base of wall level should not exceed 3m below the top of PW804 pile level), including to the base of any temporary excavations.

5.4.4 Specific Design Zone (Retaining Walls)

Specific Design Zone (Retaining Walls) has been applied to areas within the residential lots located immediately above or below Retaining Walls 306 and 311. Development within these zones should be designed and certified by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report, to ensure that:

1. The geogrid reinforcement and Engineered fill that form part of the segmental block walls is protected; and
2. The surcharge loads applied above the existing block walls do not exceed the loads assumed in the design; and
3. No excavations are made at the toe of Wall 306 which could potentially undermine the retaining wall.

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

5.5 FILL INDUCED SETTLEMENT

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

A series of settlement monitoring devices were installed across Stage 1 to measure induced settlements. The locations are shown on the Settlement Monitoring Location plan in Appendix E. Settlement plates were placed on the stripped natural ground level beneath fill areas prior to fill placement and brought up to ground level as filling progressed to monitor the consolidation of the underlying natural soils. In addition, settlement markers

were installed in the finished ground surface to monitor surface movements upon completion of the earthworks.

Each of the monitoring locations were selected to 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 are attenuating 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 by the Geotechnical Engineer that fill induced settlement had likely surpassed T_{90} .

5.6 SUBSOIL DRAINAGE

The following sub-sections contain a description of the underfill and counterfort drainage (collectively referred to as subsoil drainage) installed during bulk earthworks to control groundwater levels across Stage 1 and allow for the dissipation of generated pore water pressures. The drain locations are shown on the Woods Subsoil Drainage as-built plans referenced 37611-01-1200 to 1204-AB in Appendix A. The subsoil drain design details are shown on the Coffey Subsoil Drainage Standard Details drawing ref: AG/007 in Appendix B.

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

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

5.6.1 Underfill Drains

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

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

The locations of the underfill drains are shown on Woods drawings 37611-01-1202 and 1203-AB. These drains have been installed beneath the fill areas, which is in places is over 14m deep. As such, no engineering solution is required to bridge these drains where they pass beneath residential lots, and they are unlikely to be intercepted by future building works.

5.6.2 Counterfort Drains

During earthworks construction a series of counterfort drains were installed where directed by Tetra Tech Coffey, to assist in controlling local groundwater levels in areas where highly saturated soils with a history of instability were present. Typical trench excavation depths for the counterfort drains were up to 7m from the undercut ground level, with a typical trench width of between 600mm and 1000mm. Drainage aggregate backfill was SAP50 scoria.

These drains were connected into the sealed stormwater disposal system via adjacent retaining wall drainage.

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

5.6.3 Flushing of Subsoil Drains

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

5.7 BEARING CAPACITY

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

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

Where a geotechnical ultimate bearing capacity greater than 300 kPa is required, further site-specific investigation and design of foundations should be carried out prior to Building Consent application.

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

5.8 EXPANSIVE SOILS

Nine sets of Laboratory Expansive Soil Tests were carried out on soil samples retrieved from Lots 87, 92, 99, 129, 158, 161, 168, 171 and 1004 (as shown on Tetra Tech Coffey drawing AT/002 in Appendix B) and from within the zone of likely influence of shallow building foundations.

Testing to assess the Shrink Swell Index (I_{ss}) was carried out in accordance with AS1289 Test 7.1.1 and was used in conjunction with the advice in Acceptable Solution B1/AS1 of the New Zealand Building Code to calculate the characteristic surface movement (y_s) and expansive soil class.

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

Based on the results of laboratory testing, plus our visual and tactile assessment of the soils on site, we have assessed the AS2870 expansive site class as M (Moderately reactive) for all residential lots, with the exception of Lots 86, 87, 88, 157, 158, 159, 167, 168, 169 and 170 which have been designated as expansive site class H (Highly Expansive).

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

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

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

Thorough soaking (in the form of low flow sprinklers for an extended period rather than flooding of the surface with a hose once is recommended 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.

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

5.9 STORMWATER CONTROLS

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

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

5.10 SERVICE TRENCHES

As is normal on all subdivisions, construction of foundations within the 45-degree zone of influence from pipe inverts will require Engineering input. The Auckland Council drawing referenced SW22 provided in Appendix B extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision, Version 3.0, January 2022, depicts bridging requirements for stormwater pipes. Details for water and wastewater pipes are available in Watercare COP1 - General Requirements and Procedures.

A number of the lots are shown to have service trenches within their boundaries as shown on the Woods Stormwater and Wastewater as-built plans referenced 37611-01-3000-AB to 3006-AB and 37611-01-4000-AB to 4006-AB respectively (provided in Appendix A). The resulting limitations are discussed in the following Suitability Statement.

5.11 TOPSOIL

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

Depths of topsoil were found to range from 150 to 300mm, however, due to the nature of the method of investigation, variation in topsoil depths across the lots is expected.

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

5.12 PUBLIC ROAD AND JOAL SUBGRADES

Scala Penetration Resistance (Dynamic Cone Penetrometer) Tests were undertaken at regular intervals along the road and JOAL subgrades in Stage 1. The test results were subsequently forwarded to Woods for pavement design validation purposes. Areas demonstrating low equivalent CBR values were typically either reworked with lime/cement stabilisation treatment, or undercut and replaced with hardfill or Engineered clay fill.

5.13 STORMWATER WETLAND

A stormwater wetland (Drainage Reserve 804) has been constructed in the north-eastern portion of Stage 1 to treat intercepted stormwater prior to diversion back into the natural environment.

During construction, geotechnical observations and stability analyses were carried out to confirm the suitability of the wetland subgrade soils and the stability of the adjoining batters. As such, we consider these aspects have been appropriately addressed, and in these respects, the Wetland is suitable for its intended use.

Advice should be sought from a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report prior to building work of any kind being proposed within Drainage Reserve 804, as additional applied surcharge loads may compromise the stability of the landform and the integrity of the subsurface civil infrastructure.

Landscaped vegetation and planting should be protected and preserved, particularly on the adjacent reinforced earth slope and downslope batters adjoining northern tributary of the Orewa River. Landscaped vegetation and planting should be able to remain in place long term without significant maintenance.

Any vegetation cleared should be replanted or replaced as soon as possible. The contribution of appropriate vegetation cover to erosion control land slope stability should not be underestimated.

5.14 CONTRACTORS WORK

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

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

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

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

I, Peter Marchant 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 1, 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 1 construction and shown on the appended Woods Limited as-built plans, excluding fills placed during enabling earthworks, is certified herein.
4. In my professional opinion, not to be construed as a guarantee, I consider that:
 - (a) The completed earthworks give due regard to land, slope and foundation stability considerations within the residential lots, but as shown on the appended Woods Limited Land Gradient Plan referenced 37611-01-1500-AB, areas on some lots have gradients steeper than 1(v) in 4 (h) (and generally up to 1(v) in 1.5(h)), or are adjacent to land having such gradients. Furthermore, some lots are located adjacent to inground pile (Palisade) walls, which are designed to help maintain suitable long-term factors of safety against instability.

Accordingly, limitations incorporating **No Build Zone, Specific Design Zone (Slope) and Specific Design Zone (Palisade Walls)** have been applied as depicted on Tetra Tech Coffey Geotechnical Building Limitation Zone Plan BE01, dated 09/03/2022, and described as follows:

- i. **No Build Zone** has been applied to portions of land in Lots 88 to 101 (inclusive), and Lots 124 to 129 (inclusive) and Lots 162 to 167 (inclusive) and encompasses land comprising geogrid reinforced earth (RE) slopes of gradients of 1V:2H or steeper. No building or earthworks are permitted within these zones as development in these areas could have a detrimental effect on land stability.
- ii. **Specific Design Zone (Slope)** has been applied to portions of land in Lots 92 to 101 (inclusive), and Lots 124 to 129 (inclusive), and Lots 157 to 159 (inclusive), Lots 162 to 167 (inclusive) and Lots 171 to 173 (inclusive) and encompasses land having slope gradients of 1(v) in 4(h) to 1(v) in 2(h) or adjoining slopes having such gradients.

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

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

Foundations constructed within the Specific Design Zone (Slope) in Lots 92 to 94 (inclusive), and Lots 124 to 129 (inclusive) and Lots 162 to 167 (inclusive) should include the piling of leading (downslope) edge foundations and deck foundations. Suggested parameters for design of pile foundations are as follows:

Table 7: Pile Design Parameters

Effective Internal Angle of Frictional Resistance, ϕ' (degrees)	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.

- iii. **Specific Design Zone (Palisade Walls)** has been applied to portions of land within Lots 160, 161 and 503 and encompasses a 5m wide zone immediately upslope of inground pile (Palisade) wall PW804.

No building construction and no earthworks should take place within the designated Specific Design Zone (Palisade Walls) unless endorsed by design of all earthworks, foundations and retaining walls, and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics and who is familiar with the contents of this report as such operations may, in certain circumstances, have detrimental effects on site stability. The endorsing Engineer will need to either ensure the design loadings within the Specific Design Zone (Palisade Walls) do not exceed the 12kPa distributed surface load surcharge assumed in the design of the palisade wall (i.e. applied to current ground level), or provide an engineering solution to enable larger applied loads (e.g. piled foundations or construction involving cuts supported by specifically designed retaining walls). The endorsing Engineer should consider the implications to long term stability as a result of the applied surcharge loads to the top of the wall.

Any retaining wall constructed within the Specific Design Zone (Palisade Walls) in Lots 160 or 161 should be positioned so that any excavation or piling is offset a minimum of 1m from the northern edge of the PW804 piles, including to the extent of temporary excavations (i.e. a minimum 1m width of soil should remain in place at all times between any proposed wall or excavation and the edge of the PW804 piles). Retained heights for any proposed retaining walls within the Specific Design Zone (Palisade Walls) in Lots 160 or 161 should be limited to 3m below the top of PW804 pile elevation (i.e. a maximum of 3m of soil is permitted to be removed from the upslope side of PW804 to construct retaining walls). This includes the depth to the base of any temporary excavations within the Specific Design Zone (Palisade Walls) to construct services, drainage or foundations.

- (b) Two segmental block retaining walls (namely Walls 306 and 311) comprising geogrid reinforcement and drainage that extends back into several residential lots are present within the subdivision.

Accordingly, **Specific Design Zone (Retaining Walls)** have been applied as depicted on Tetra Tech Coffey Geotechnical Building Limitation Zone Plan BE01, dated 09/03/2022, and described as follows:

Specific Design Zone (Retaining Walls) has been applied to portions of land within Lots 86, 87, 170, 172 and 1004 to ensure the geogrid reinforcement and drainage comprising the adjacent retaining walls which extends into Lots 86, 87, 170 and 172 is not damaged and that surcharge loads applied within the Specific Design Zone (Retaining Walls) in Lots 86, 87, 170 and 172 do not exceed the design surcharge loads for the adjacent retaining walls, and to ensure excavations at the toe of Wall 306 inside Lot 1004 do not adversely affect the integrity of the retaining wall.

Fills to create building platforms within the Specific Design Zone (Retaining Walls) in Lots 86, 87, 170 and 172 are limited to a maximum depth of 500mm. Cuts of any depth to create building platforms within these zones in Lots 86, 87, 170 and 172 are not permitted.

Excavations within the Specific Design Zone (Retaining Walls) within Lot 1004, including temporary excavations, are limited to a maximum depth of 1m below current ground level.

- (c) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on all residential lots in Stage 1.

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

- (d) The function of the subsoil drains (including outlets), as depicted on the appended Woods Limited Subsoil Drainage as-built plans referenced 37611-01-1200 to 1204-AB, should not be compromised by any future building development or landscaping works. Any bored or driven piles should be positioned to avoid damaging the drains. **Where any subsoil drain is intercepted by building works, it must be reinstated under the direction of a Chartered Professional Engineer to ensure the long-term function and integrity of the subsoil drainage system is maintained.**

- (e) The backfilling and compaction of the stormwater and wastewater trenches on this subdivision has, where possible, been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.
- Nevertheless, no building development should take place within the 45-degree zone of influence of 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 37611-01-3000-AB to 3006-AB and 37611-01-4000-AB to 4006-AB should be referred to for the locations of public drainage lines on all lots. A copy of drawing SW22 extracted from Chapter 4 of Auckland Council Code of Practice of Land Development and Subdivision is provided in Appendix A for reference. Details for water and wastewater services are available in the Watercare CoP1 – General Requirements and Procedures.
- (f) On no account should stormwater be concentrated into pits (including stormwater detention or bio-retention treatment type pits) near sloping ground or batters or in areas of sandy soils or fractured rock unless endorsed by specific designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that appropriate permanent impervious lining of the pit is incorporated so that long term infiltration into the surrounding soils is not increased on account of its potentially adverse impact on local and global stability.
- (g) The assessed AS 2870 expansive site Class is M (Moderately reactive) for Lots 89 to 129 (inclusive), 152 to 156 (inclusive), 160 to 166 (inclusive), 171, 172, 173 and 1004. The expansive site Class for Lots 86, 87, 88, 157, 158, 159, 167, 168, 169 and 170 is Class H (Highly Expansive). It is recommended that site specific testing is carried out by individual lot owners to ascertain the expansive site Class on each individual lot.
- (h) The seismic site subsoil category on all residential lots is assessed to be Class C (shallow soil site) in accordance with NZS1170.5.
- (i) Subject to the geotechnical limitations, recommendations and expansive soil assessments associated with Section 6, Items 4(a), 4(b), 4(c), 4(d), 4(e), 4(f), 4(g) and 4(h) above:
- i. The cut, filled and undisturbed original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 (that incorporate specific foundation and associated structural design considering the expansive soils site class) and related documents.
 - ii. On all lots in Stage 1, shallow foundation design may be carried out in accordance with AS 2870 (Class M or H as indicated in 4(g) 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, dated 28 November 2019.

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

7. LIMITATIONS

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

Reviewed and Authorised By:



Peter Bosselmann
Senior Principal

Table 8: Suitability Statement Summary

Lot #	Comments	Tospoil Depth (mm)	Ultimate Bearing Capacity (kPa)	AS2870 Expansive Site Class
86	<p>Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>	250	300	H
87	<p>Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>	250	300	H
88	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>	200	300	H

89	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	150	300	M
90	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	150	300	M
91	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
92	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p>	250	300	M

	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>			
93	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	250	300	M
94	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
95	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p>	250	300	M

	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>			
96	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
97	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	250	300	M
98	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p>	200	300	M

	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>			
99	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	250	300	M
100	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
101	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p>	300	300	M

	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>			
124	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
125	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
126	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p>	150	300	M

	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>			
127	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	150	300	M
128	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M

129	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
152	<p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	300	300	M
153	<p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
154	<p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	250	300	M

155	<p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	250	300	M
156	<p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
157	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>	200	300	H
158	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>	250	300	H
159	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p>	200	300	H

	<p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>			
160	<p>Specific Design Zone (Palisade Walls) limitations apply (refer to Clause 6.4(a)(iii))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
161	<p>Specific Design Zone (Palisade Walls) limitations apply (refer to Clause 6.4(a)(iii))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	250	300	M
162	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	150	300	M
163	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p>	200	300	M

	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>			
164	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	200	300	M
165	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	250	300	M

166	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	300	300	M
167	<p>No Build Zone Limitations Apply (refer to clause 6.4(a)(i))</p> <p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>	200	300	H
168	<p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>	150	300	H
169	<p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p>	200	300	H

	<p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>			
170	<p>Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class H NZS 3604 type strip or pad foundations</p>	200	300	H
171	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations</p>	300	300	M
172	<p>Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))</p> <p>Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b))</p> <p>Protection of the function of subsoil drains required (refer to Clause (6.4(d))</p> <p>Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e))</p> <p>Care required with Stormwater disposal (refer to Clause 6.4 (f))</p> <p>The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h))</p> <p>Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to</p>	250	300	M

	section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations			
173	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e)) Care required with Stormwater disposal (refer to Clause 6.4 (f)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	300	300	M
1004	Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b)) Protection of the function of subsoil drains required (refer to Clause (6.4(d)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4 (e)) Care required with Stormwater disposal (refer to Clause 6.4 (f)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	300	300	M
502	-	-	-	-
503	Specific Design Zone (Palisade Walls) limitations apply (refer to Clause 6.4(a)(iii))	-	-	-
804	Any proposed earthworks or building work to be subject to a specific CPEng Design	-	-	-

APPENDIX A: WOODS AS-BUILT DRAWINGS

NOTES

- ALL FOOTPATHS ARE 100mm THICK BRUSHED CONCRETE OR EXPOSED AGGREGATE AS NOTED.
- ALL RAISED CROSSINGS ARE CONSTRUCTED FROM BROOM BRUSH CONCRETE.
- ALL PIPE CROSSINGS UNDER ROADS HAVE BEEN HARDFILL BACKFILLED.
- ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.
- CONTOURS ARE AT 0.25m INTERVALS
- BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.

LEGEND

- STREET LIGHT
 - ROAD NAME SIGN
 - CATCH PIT/BERM SUMP
 - STORMWATER MANHOLE
 - RG-6 SIGN (GIVE WAY)
 - STREET TREE
 - SS MANHOLE
 - WATER SLUICE VALVE
 - WATER PEET VALVE
 - WATER FIRE HYDRANT
 - WATER MANIFOLD BOX
 - TELECOMMUNICATIONS MH
 - POWER BOX
 - TELECOM PLINTH
 - TACTILE PAVING
 - PW39 SIGN (SPEED HUMP)
 - POWER LINK PILLAR
 - FENCE
- NOTE: ORANGE SYMBOLOGY = PENDING FINAL SURVEY



SCHEDULE OF COORDINATES

STREET TREES			
ID	EASTING	NORTHING	SPECIES
ST01	1749417.34	5948983.77	TOTARA
ST02	1749402.24	5948971.20	
ST03	1749383.44	5948980.79	
ST05	1749357.69	5948992.17	PRYUS
ST06	1749351.22	5948986.20	
ST07	1749327.17	5949008.26	
ST35	1749441.16	5949006.85	TOTARA
ST36	1749435.31	5949000.66	
ST37	1749428.28	5948997.60	
ST38	1749380.81	5949001.16	
ST39	1749372.64	5949000.67	
ST40	1749365.55	5949004.27	
ST41	1749357.5	5949009.82	
ST42	1749352.95	5949015.54	KAHIKATEA
ST43	1749352.29	5949021.46	
ST44	1749353.43	5949028.22	
ST45	1749340.75	5949028.12	KAHIKATEA
ST46	1749340.24	5949033.35	PURIRI
ST47	1749346.10	5949035.76	KAHIKATEA
ST48	1749352.65	5949053.43	PURIRI
ST49	1749357.62	5949057.73	
ST50	1749360.30	5949064.24	KAHIKATEA
ST51	1749372.77	5949073.44	PURIRI
ST52	1749379.76	5949071.68	
ST53	1749382.54	5949078.05	TOTARA
ST54	1749385.05	5949071.41	
ST55	1749389.08	5949067.24	PURIRI
ST56	1749397.10	5949062.64	
ST57	1749403.95	5949058.19	
ST58	1749445.24	5949050.61	KAHIKATEA
ST59	1749442.49	5949044.88	PURIRI
ST60	1749445.22	5949038.25	KAHIKATEA

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: Registered Professional Surveyor

Date: 06/07/22

Name: Kendall Reid

REVISION DETAILS		INT	DATE	SURVEYED	WOODS
1	ISSUED FOR 224C	MD	06/07/22	DESIGNED	MB
				DRAWN	MD
				CHECKED	KR
				APPROVED	KR

WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT ST, GRAFTON AUCKLAND 1023
WOODS.CO.NZ



ARRAN HILL PRECINCT 6 - STAGE 1

RESERVE AS-BUILT
LAYOUT SHEET - SHEET 1 OF 1



STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-300-AB	

DISCLAIMER:
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SEE SHEET 1001

SEE SHEET 1002

SEE SHEET 1003



NOTES

1. CONTOURS ARE AT 0.25m INTERVALS.
2. BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.

LEGEND

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

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

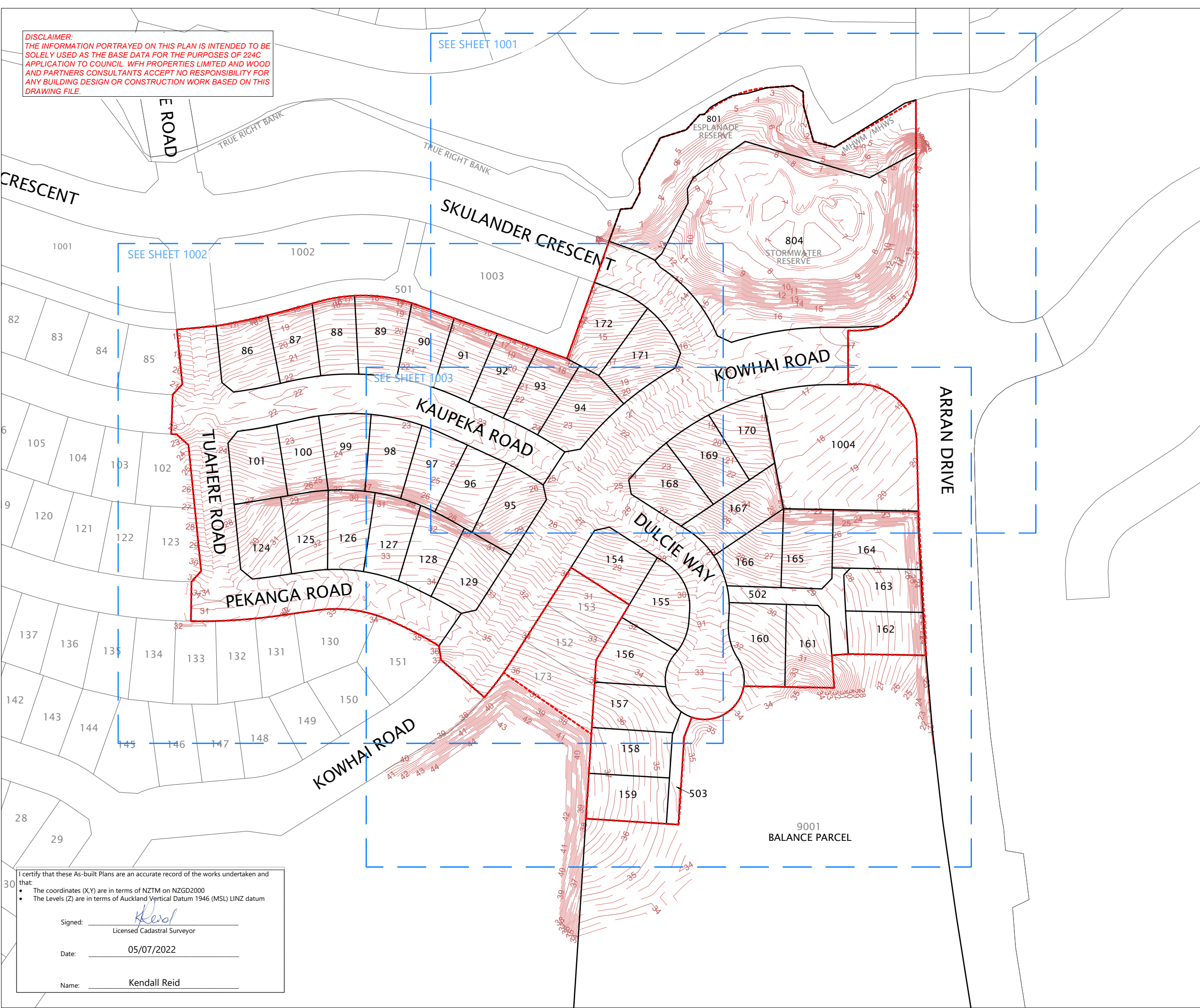
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL PRECINCT 6 - STAGE 1

FINAL SURFACE ASBUILT PLAN LAYOUT SHEET SHEET 1 OF 4

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1000-AB	



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

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

Signed: Kendall Reid
Licensed Cadastral Surveyor

Date: 05/07/2022

Name: Kendall Reid

C:\12SD\ENERGY\DATA\WP-PEN-APP-01\37611 - PRECINCT 6 STAGE 1_480\CAD\SURV\AB\37611_01_1000_AB_FINAL_SURFACE.DWG, 2022-Jul-05 08:16, PRINT AS PDF-FLAT PC3, MatdD

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: Kendall Reid
Licensed Cadastral Surveyor

Date: 05/07/2022

Name: Kendall Reid

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. WPH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.



NOTES

1. CONTOURS ARE AT 0.25m INTERVALS.
2. BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.

LEGEND

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

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1
FINAL SURFACE ASBUILT PLAN
SHEET 2 OF 4

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1001-AB	

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



NOTES

1. CONTOURS ARE AT 0.25m INTERVALS.
2. BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND
LINZ APPROVAL.

LEGEND

CONTOURS MAJOR

CONTOURS MINOR

STAGE BOUNDARIES

LOT BOUNDARIES

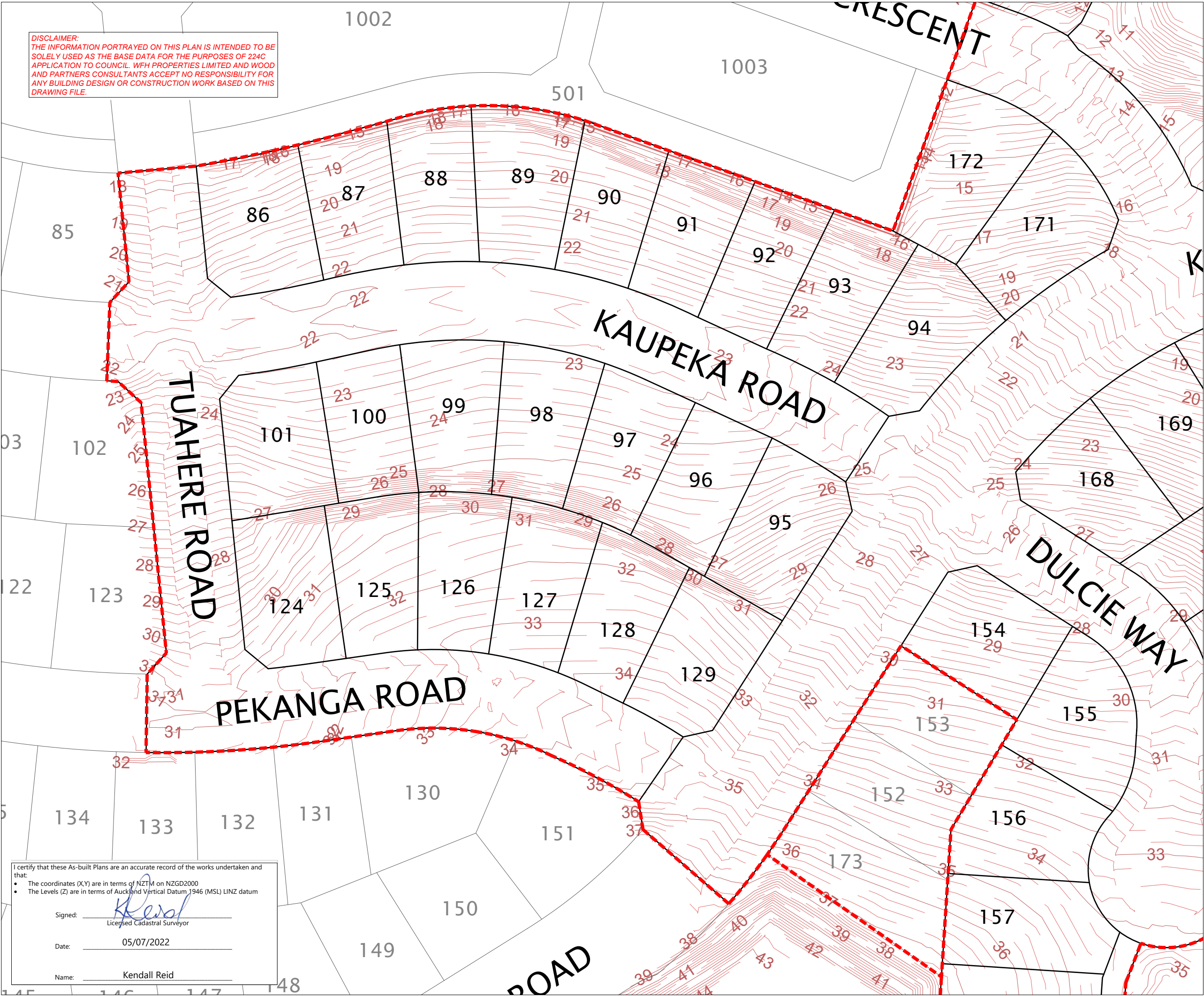
REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 - STAGE 1

FINAL SURFACE ASBUILT PLAN
SHEET 3 OF 4

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1002-AB	



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

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

Signed: Licensed Cadastral Surveyor

Date: 05/07/2022

Name: Kendall Reid

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PRINT AS PDF-FLAT PC3, MatdD



NOTES

1. CONTOURS ARE AT 0.25m INTERVALS.
2. BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.

LEGEND

CONTOURS MAJOR
CONTOURS MINOR
STAGE BOUNDARIES
LOT BOUNDARIES

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

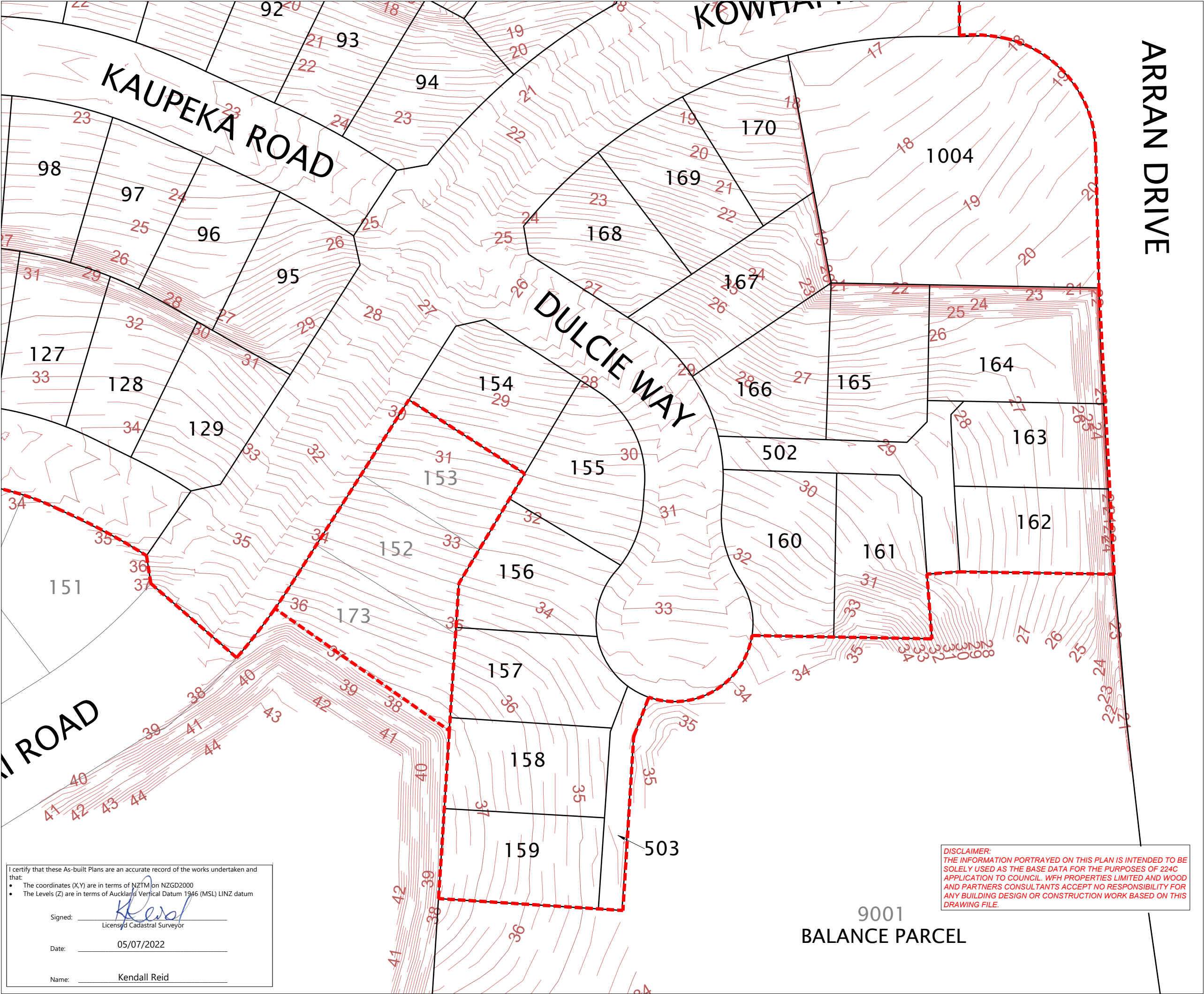
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DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

FINAL SURFACE ASBUILT PLAN
SHEET 4 OF 4

STATUS	AS-BUILT	REV
SCALE	1 : 750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1003-AB	



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- 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: Kendall Reid
Licensed Cadastral Surveyor

Date: 05/07/2022

Name: Kendall Reid

DISCLAIMER:
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9001
BALANCE PARCEL

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



NOTES

1. CONTOURS ARE AT 0.5 METRE INTERVALS

LEGEND

- ZERO CONTOUR
CUT CONTOUR
FILL CONTOUR
STAGE BOUNDARIES
LOT BOUNDARIES

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

CUT AND FILL ASBUILT
SHEET 1 OF 3
ORIGINAL SURFACE TO
FINAL SURFACE

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1100-AB	

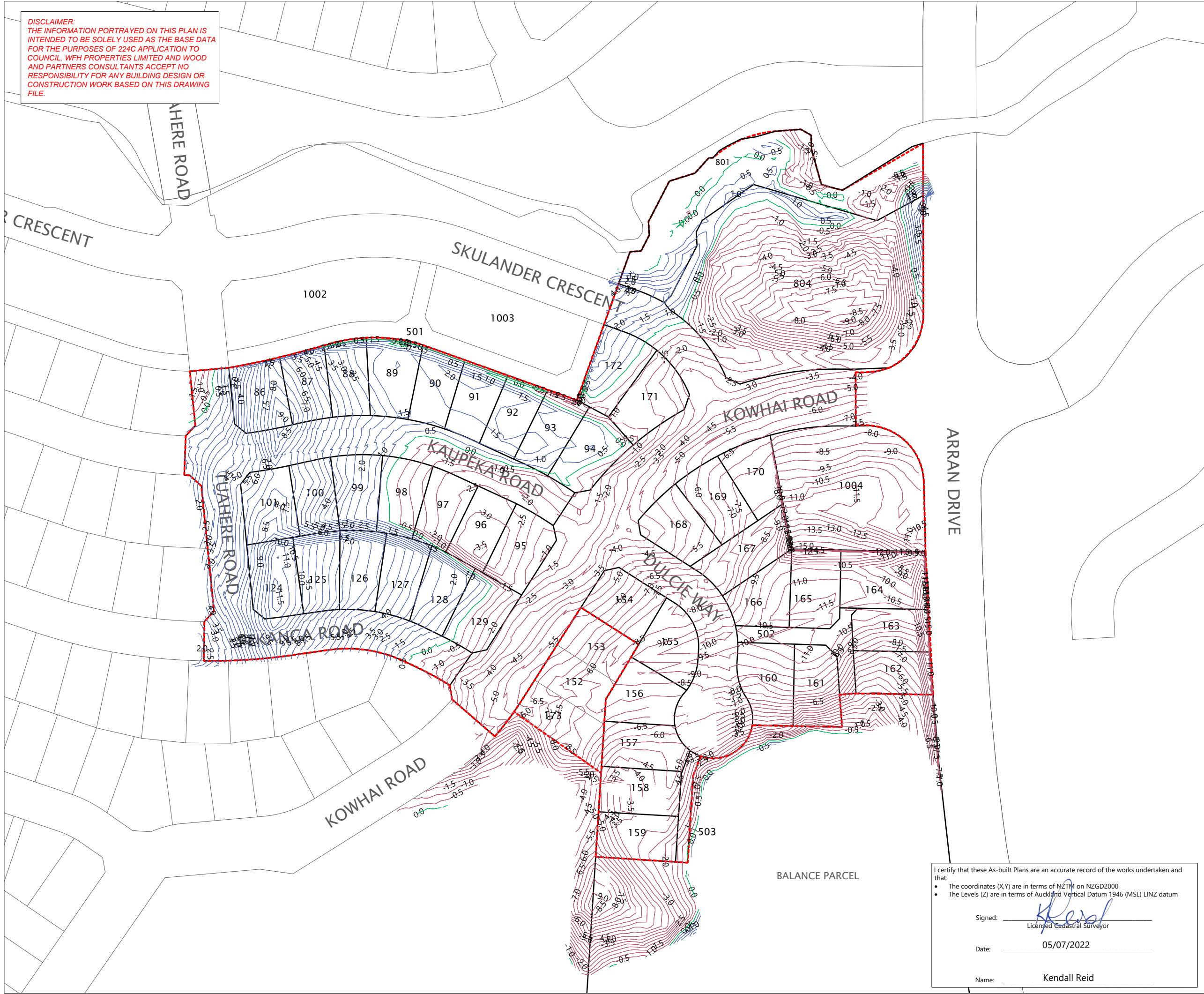
I certify that these As-built Plans are an accurate record of the works undertaken and that:

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

Signed: Kendall Reid
Licensed Cadastral Surveyor

Date: 05/07/2022

Name: Kendall Reid



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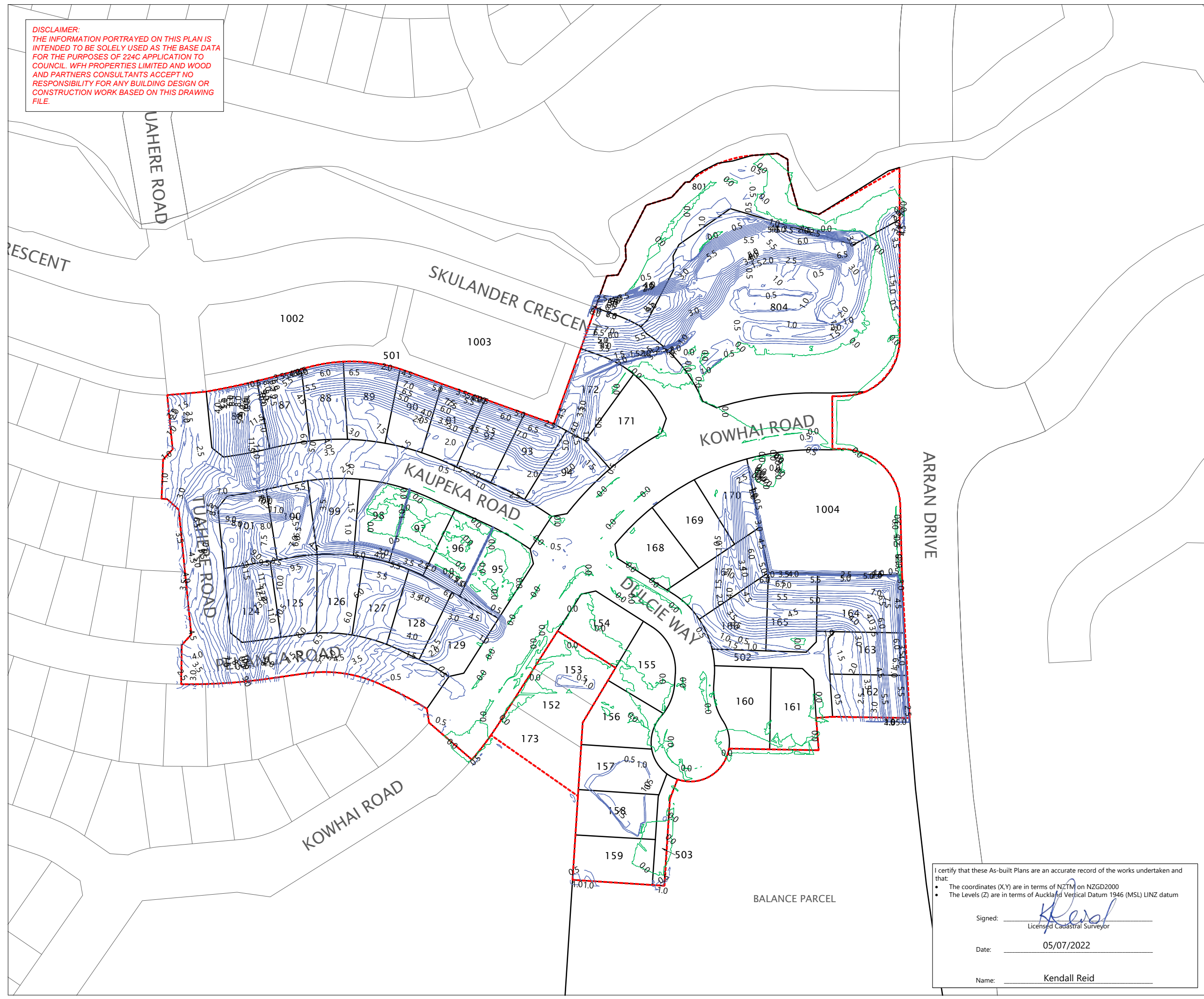
DISCLAIMER:
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INTENDED TO BE SOLELY USED AS THE BASE DATA
FOR THE PURPOSES OF 224C APPLICATION TO
COUNCIL. WFH PROPERTIES LIMITED AND WOOD
AND PARTNERS CONSULTANTS ACCEPT NO
RESPONSIBILITY FOR ANY BUILDING DESIGN OR
CONSTRUCTION WORK BASED ON THIS DRAWING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



NOTES
1. CONTOURS ARE AT 0.5 METRE INTERVALS

LEGEND

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



REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 - STAGE 1

CUT AND FILL ASBUILT
SHEET 2 OF 3
LOWEST SURFACE TO
FINAL SURFACE

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1101-AB	

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

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

Signed: Licensed Cadastral Surveyor

Date: 05/07/2022

Name: Kendall Reid

C:\22DS\ENERGY\DATA\WP-PEN-APP-01\37611 - PRECINCT 6 STAGE 1_484\CAD\SURV\AB\37611_01_1101_AB CUT FILL CONTOURS.DWG, 2022-Jul-05 08:11, DWG TO PDF - HIGH-RES PC3, MatHD

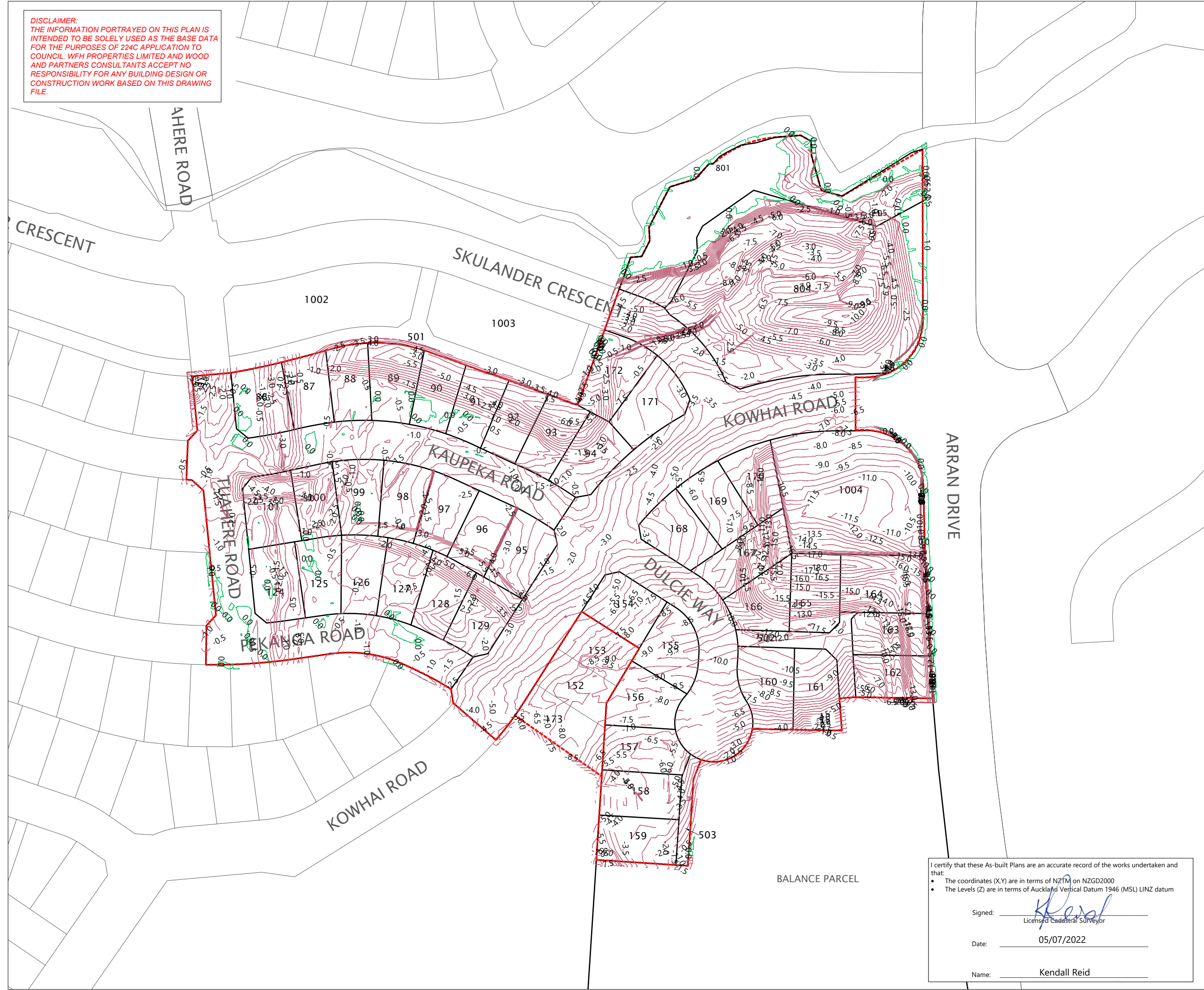
DISCLAIMER:
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INTENDED TO BE SOLELY USED AS THE BASE DATA
FOR THE PURPOSES OF 224C APPLICATION TO
COUNCIL. WFH PROPERTIES LIMITED AND WOOD
AND PARTNERS CONSULTANTS ACCEPT NO
RESPONSIBILITY FOR ANY BUILDING DESIGN OR
CONSTRUCTION WORK BASED ON THIS DRAWING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



NOTES
1. CONTOURS ARE AT 0.5 METRE INTERVALS

LEGEND

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



REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 - STAGE 1

CUT AND FILL ASBUILT
SHEET 3 OF 3
ORIGINAL SURFACE TO
LOWEST SURFACE

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: 05/07/2022

Name: Kendall Reid

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1102-AB	

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NOTES

1. SUBSOIL DRAINAGE DATA SUPPLIED BY CONTRACTOR.

LEGEND

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

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	JG CIVIL	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

SUBSOIL DRAINAGE ASBUILT PLAN
LAYOUT SHEET
SHEET 1 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1200-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: 05/07/22

Name: Kendall Reid

NOTES

1. SUBSOIL DRAINAGE DATA SUPPLIED BY CONTRACTOR.

LEGEND

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

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	JG CIVIL	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

SUBSOIL DRAINAGE ASBUILT PLAN
SHEET 2 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1201-AB	

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Signed: 
Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid

NOTES

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LEGEND

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

REVISION DETAILS		BY	DATE
1	ISSUED FOR DRAFT	MD	05/07/22

SURVEYED	JG CIVIL	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

SUBSOIL DRAINAGE ASBUILT PLAN
SHEET 3 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1202-AB	

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Signed: 
Licensed Cadastral Surveyor

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Name: Kendall Reid



NOTES

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LEGEND

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

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	JG CIVIL	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

SUBSOIL DRAINAGE ASBUILT PLAN
SHEET 4 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1203-AB	

DISCLAIMER:
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Signed: Kendall Reid
Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid

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NOTES

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LEGEND

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

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	JG CIVIL	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

SUBSOIL DRAINAGE ASBUILT PLAN
SHEET 5 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 750 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1204-AB	

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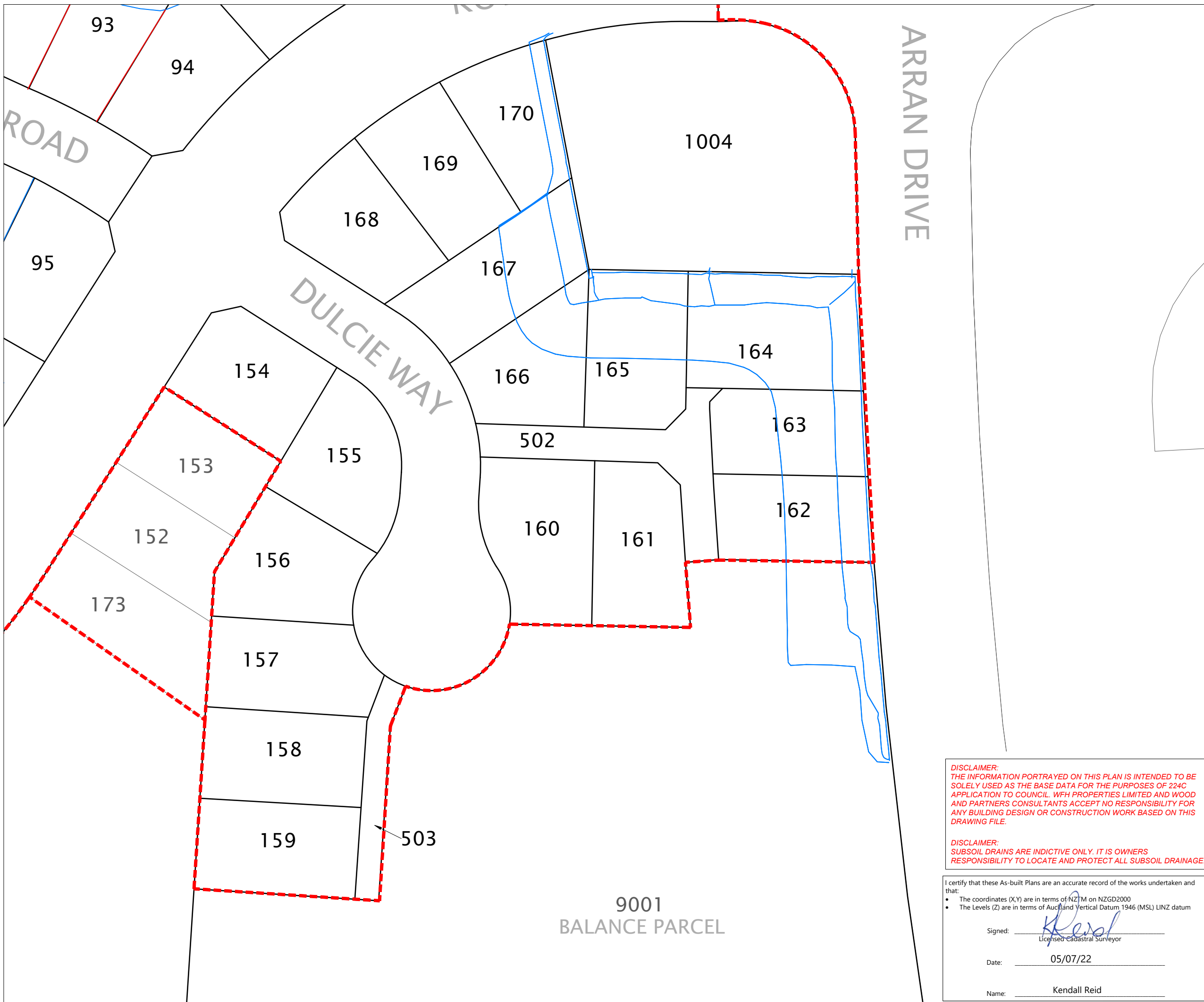
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Signed: Kendall Reid
Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid



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0806, PRINT AS PDF, PC3, Matd

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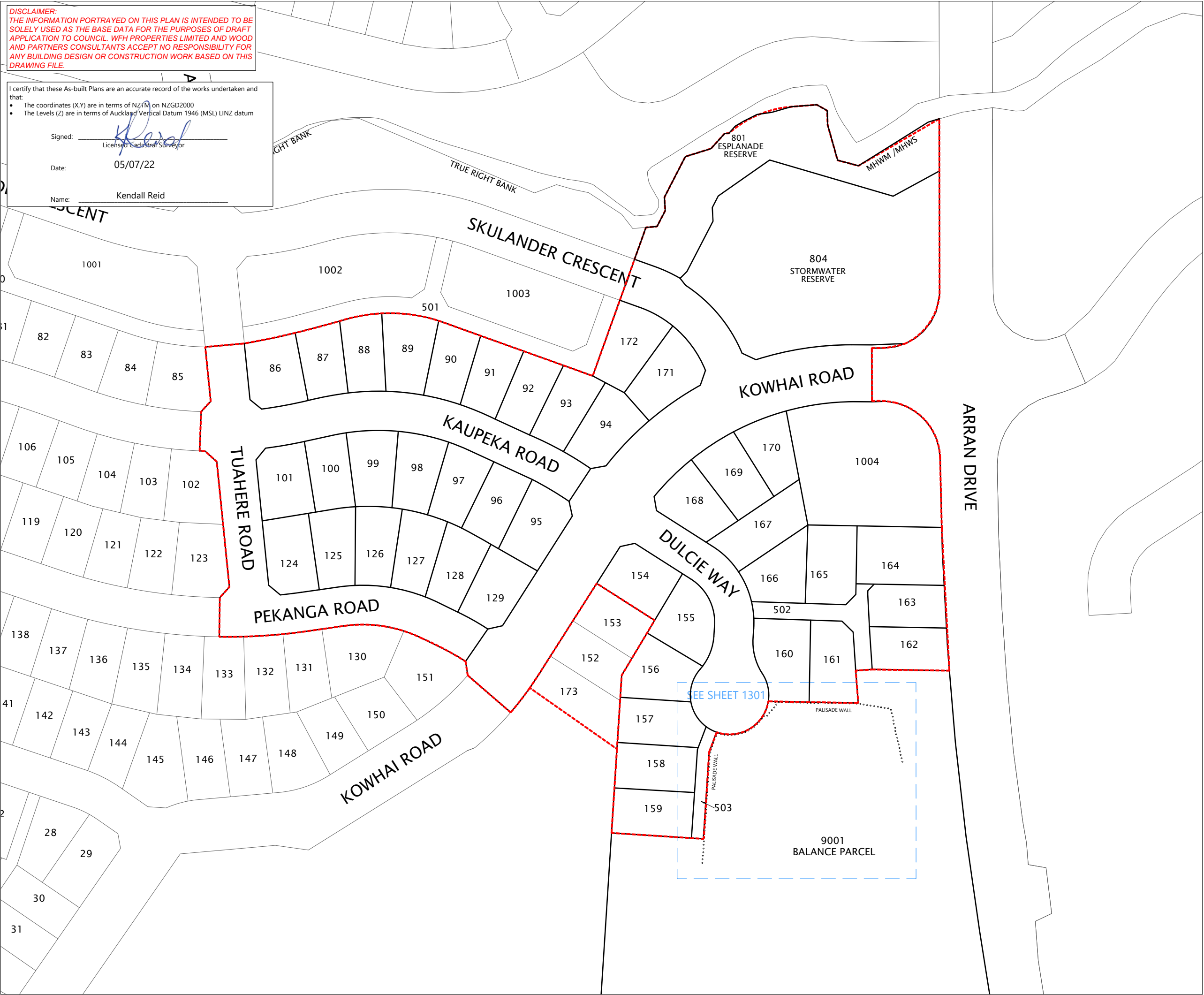
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- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum




Signed:  Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid



LEGEND:

-  STEEL REINFORCED CONCRETE PILE
-  LOT BOUNDARY
-  STAGE BOUNDARY

NOTES:

- PILES ARE 500mm IN DIAMETER
- PILES DATA SUPPLIED BY CONTRACTOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	KR	
APPROVED	KR	





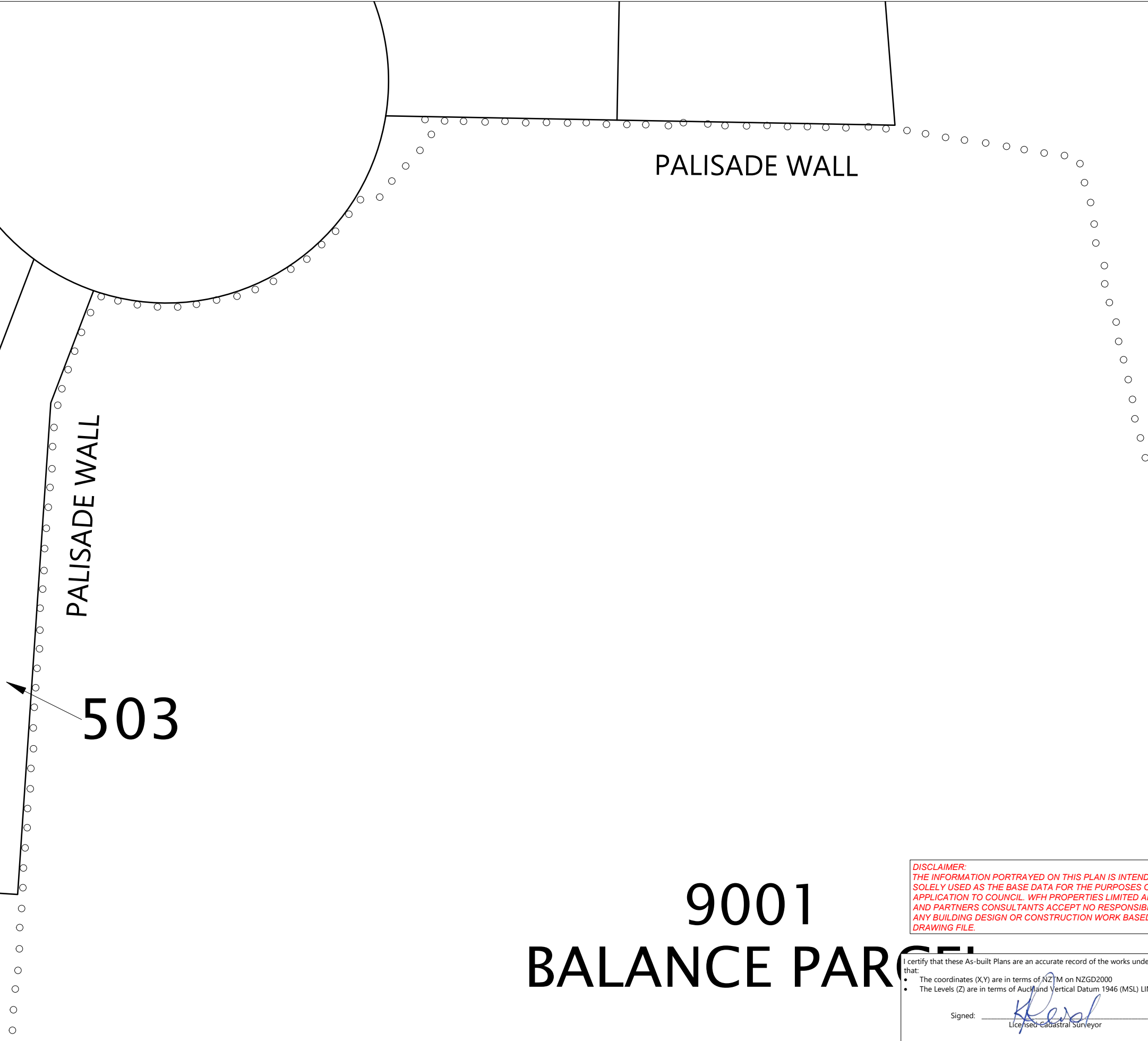
ARRAN HILL
PRECINCT 6 - STAGE 1

PALISADE WALL ASBUILT
LAYOUT PLAN
SHEET 1 OF 2

STATUS	ISSUED FOR 224C	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-P6-01-1300-AB	



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LEGEND:

○ STEEL REINFORCED CONCRETE PILE

— LOT BOUNDARY

— STAGE BOUNDARY

NOTES:

-PILES ARE 500mm IN DIAMETER

-PILES DATA SUPPLIED BY CONTRACTOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	KR	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 - STAGE 1

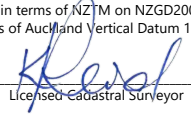
PALISADE WALL ASBUILT
SHEET 2 OF 2

STATUS	ISSUED FOR 224C	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-P6-01-1301-AB	

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Signed: 
Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid

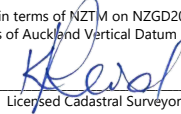
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DWG TO PDF - HIGH-RES.PC3, MatD

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Signed: 
Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid



- LEGEND:
- BOTTOM FACE OF WALL
 - TOP FACE OF WALL
 - RE SLOPE / RETAINING WALL DRAINAGE
 - FENCE
 - TOP OF BANK
 - BOTTOM OF BANK
 - BOUNDARY
 - 0.10m OFFSET TO BOUNDARY (FROM WALL)
 - STORMWATER LINE & MANHOLE
 - SLOPE STABILISATION DEVICE

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

RETAINING WALL ASBUILT
LAYOUT PLAN
SHEET 1 OF 6

STATUS	ISSUED FOR 224C	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1400-AB	

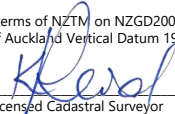
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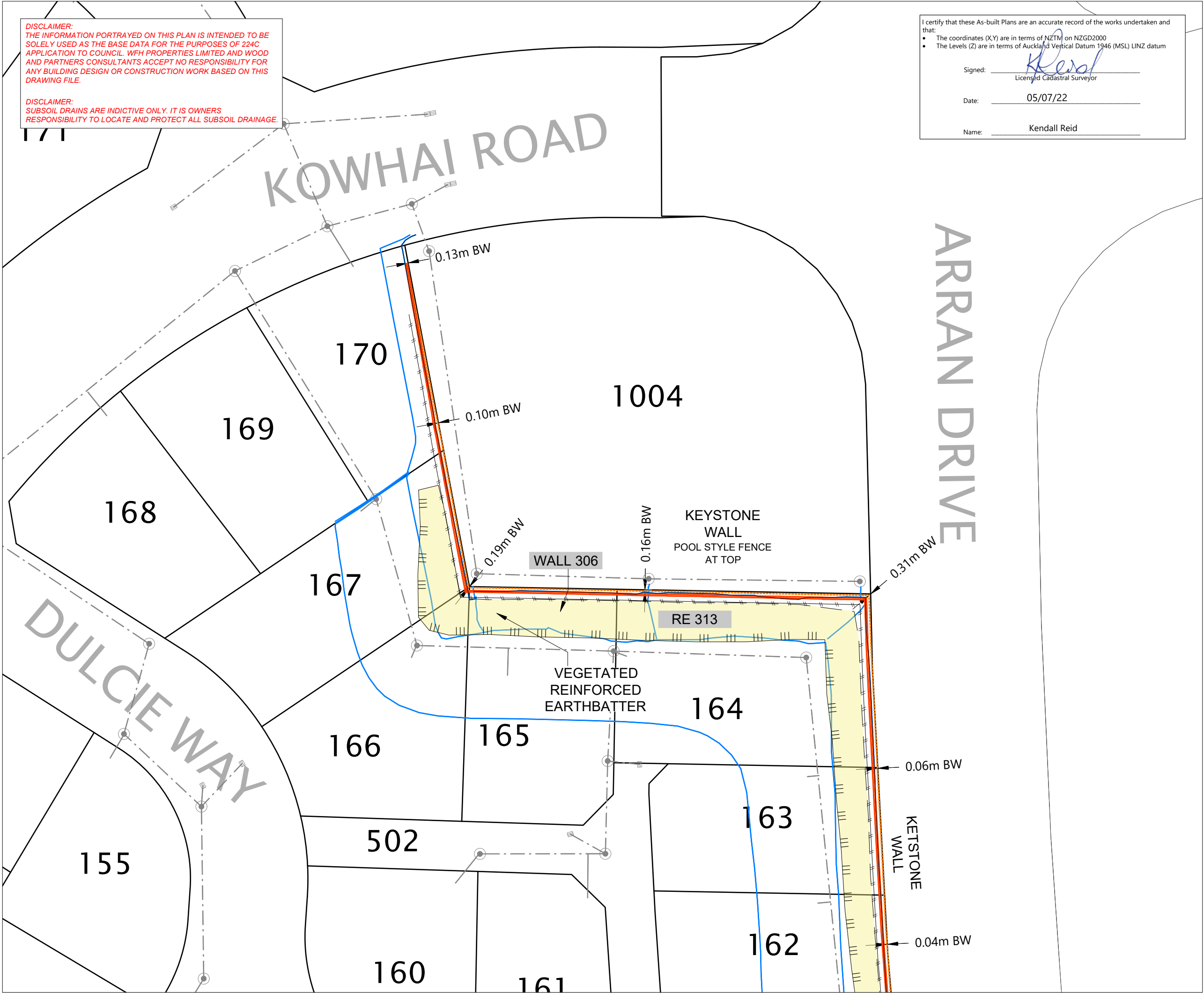
Date: 05/07/22

Name: Kendall Reid



LEGEND:

- BOTTOM FACE OF WALL
- TOP FACE OF WALL
- RE SLOPE / RETAINING WALL DRAINAGE
- FENCE
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- STORMWATER LINE & MANHOLE
- SLOPE STABILISATION DEVICE



REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	RV	
CHECKED	KR	
APPROVED	KR	



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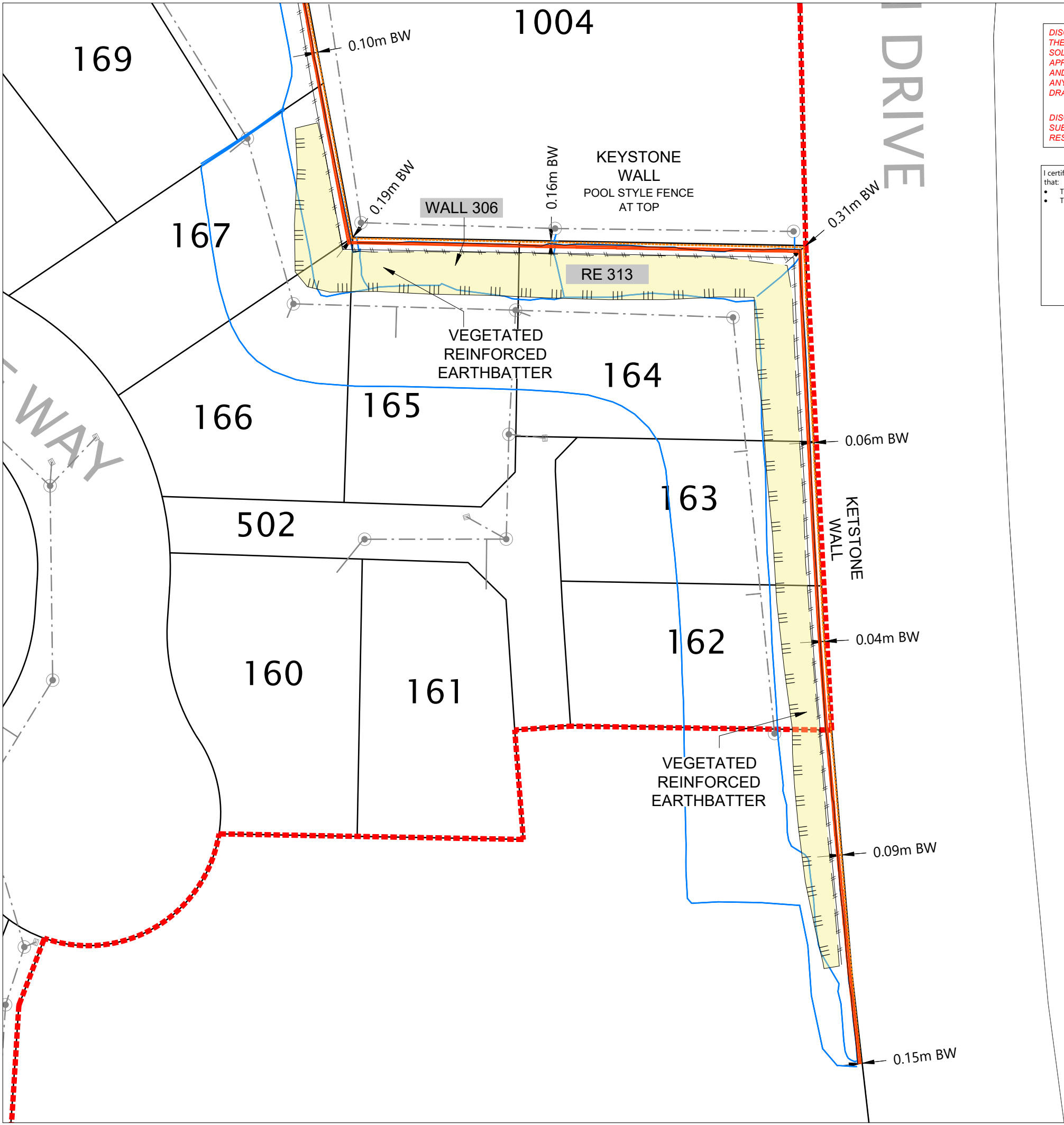


**ARRAN HILL
PRECINCT 6 - STAGE 1**

**RETAINING WALL ASBUILT
SHEET 2 OF 6**

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1401-AB	

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Signed: Kendall Reid
Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid

LEGEND:

- BOTTOM FACE OF WALL
- TOP FACE OF WALL
- RE SLOPE / RETAINING WALL DRAINAGE
- FENCE
- TOP OF BANK
- BOTTOM OF BANK
- BOUNDARY
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- STORMWATER LINE & MANHOLE
- SLOPE STABILISATION DEVICE

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

**ARRAN HILL
PRECINCT 6 - STAGE 1**

**RETAINING WALL ASBUILT
SHEET 3 OF 6**

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1402-AB	

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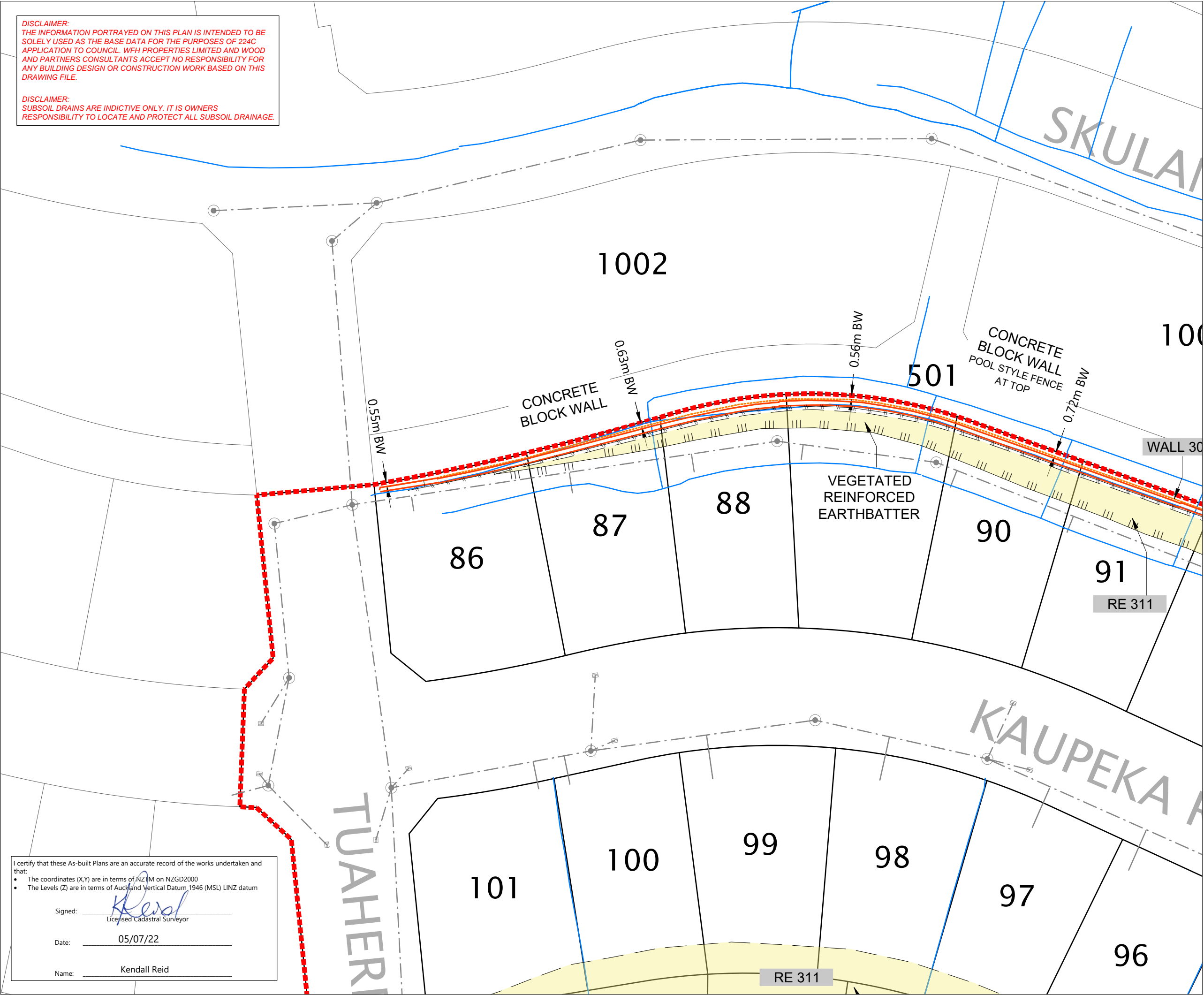
REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 - STAGE 1

RETAINING WALL ASBUILT
SHEET 4 OF 6

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1403-AB	



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Signed: Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid

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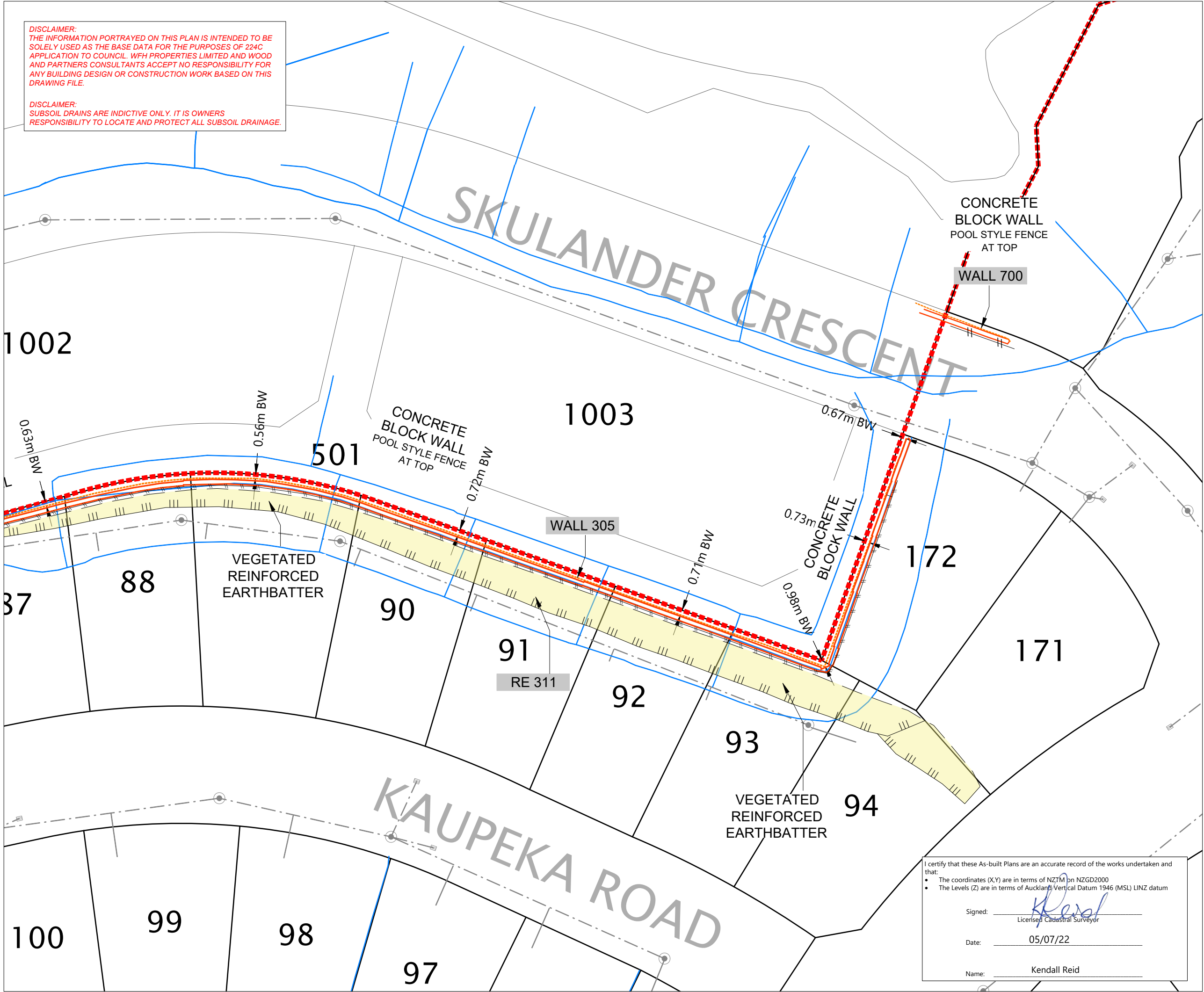
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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

**ARRAN HILL
PRECINCT 6 - STAGE 1**

**RETAINING WALL ASBUILT
SHEET 5 OF 6**

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1404-AB	

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

Signed: Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid

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DISCLAIMER:
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- RE SLOPE / RETAINING WALL DRAINAGE
- FENCE
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- STORMWATER LINE & MANHOLE
- SLOPE STABILISATION DEVICE

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

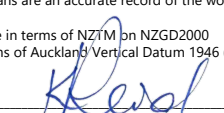
**ARRAN HILL
PRECINCT 6 - STAGE 1**

**RETAINING WALL ASBUILT
SHEET 6 OF 6**

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1405-AB	

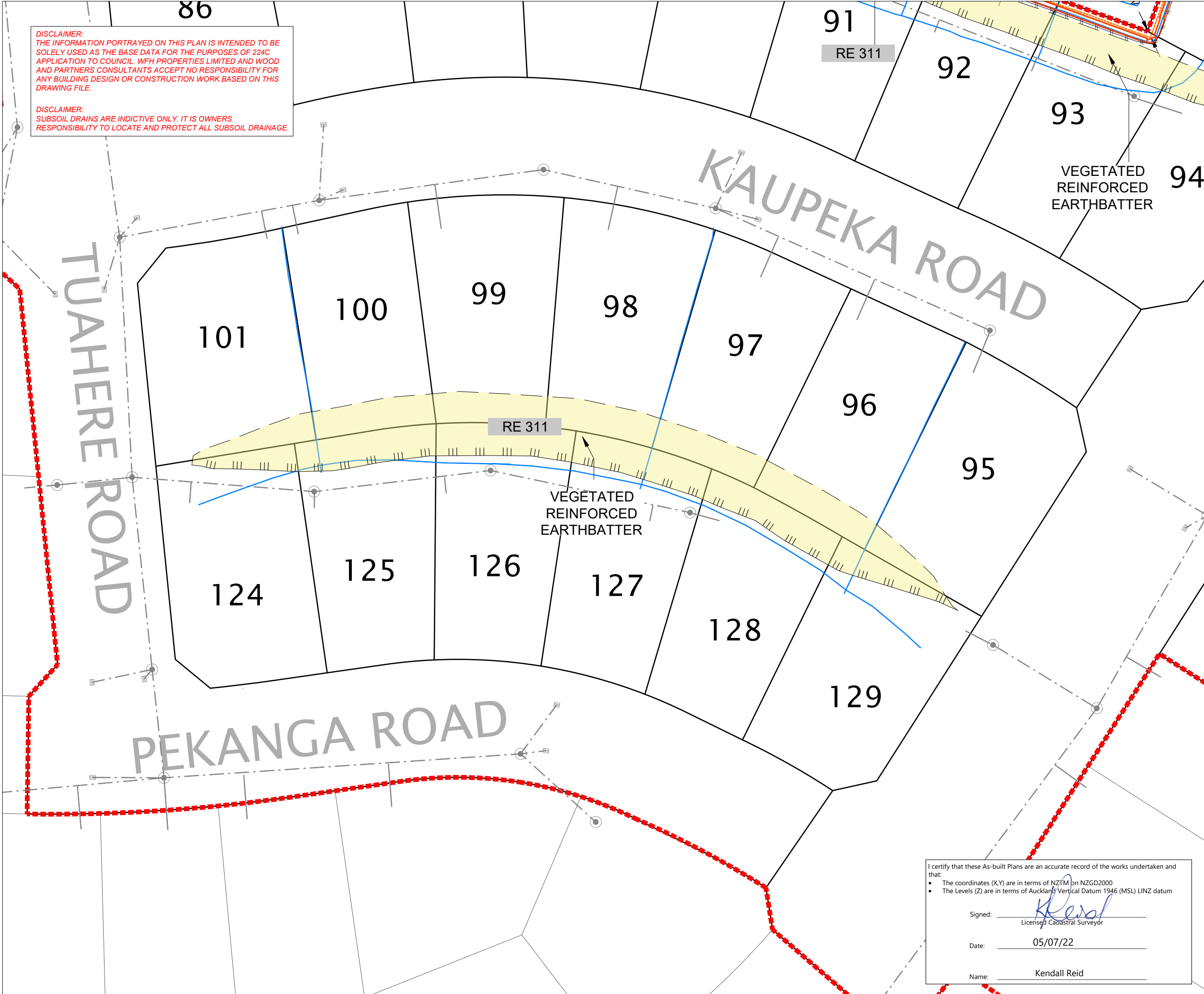
I certify that these As-built Plans are an accurate record of the works undertaken and that:

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

Signed: 
Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid



C:\12DSV\ENERGY\DATA\WP-PEN-APP-01\37611 - PRECINCT 6 STAGE 1_1400_A8 WALLS.DWG, 2022-Jul-04 16:50, DWG TO PDF - HIGH-RES PC3, Matt D



DISCLAIMER:
THE DRAFT 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: _____
Licensed Cadastral Surveyor

Date: 05/07/22

Name: Kendall Reid

LEGEND

BOUNDARY

STAGE BOUNDARY

SLOPE GRADIENT

LESS THAN 1V:4H

1V:3H - 1V:4H

1V:2H - 1V:3H

STEEPER THAN 1V:2H

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

N

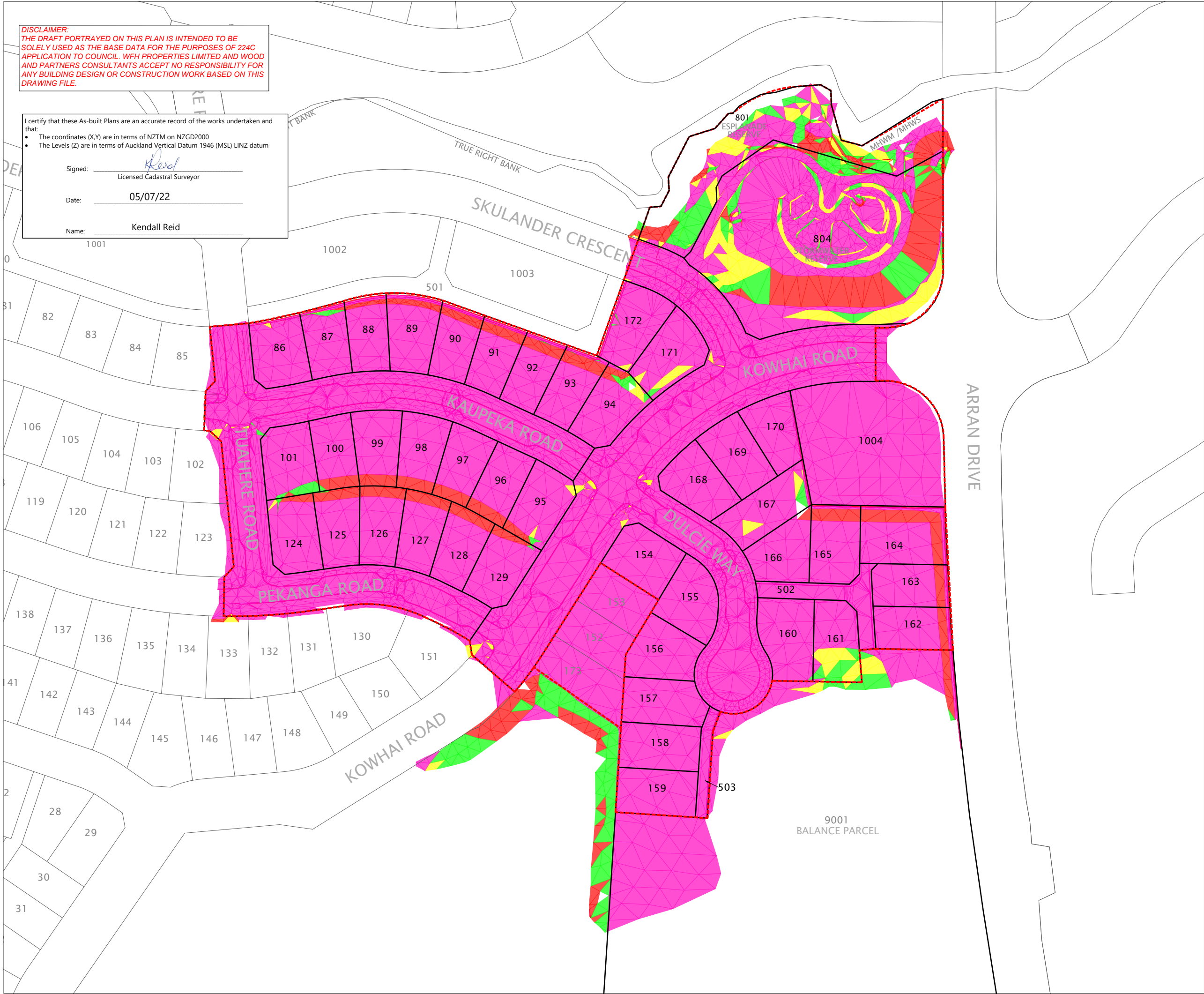
WFH

PROPERTIES

ARRAN HILL
PRECINCT 6 - STAGE 1

SLOPE GRADIENT ASBUILT PLAN

STATUS	ISSUED FOR 224C	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-1500-AB	



C:\12DS\WERNER\DATA\WP-PEN-APP-01\37611 - PRECINCT 6 STAGE 1_484\CAD\SURV\AB\37611_01_1500_AS SLOPE ANALYSIS.DWG, 2022-Jul-04 16:41, A1:1 PRINTER PC3_MahTT

STREET LIGHT

ROAD NAME SIGN

CATCH PIT/BERM SUMP

STORMWATER MANHOLE

RG-6 SIGN (GIVE WAY)

STREET TREE

SS MANHOLE

WATER SLUICE VALVE

WATER PEET VALVE

WATER FIRE HYDRANT

WATER MANIFOLD BOX

TELECOMMUNICATIONS MH

POWER BOX

TELECOM PLINTH

TACTILE PAVING

PW39 SIGN (SPEED HUMP)

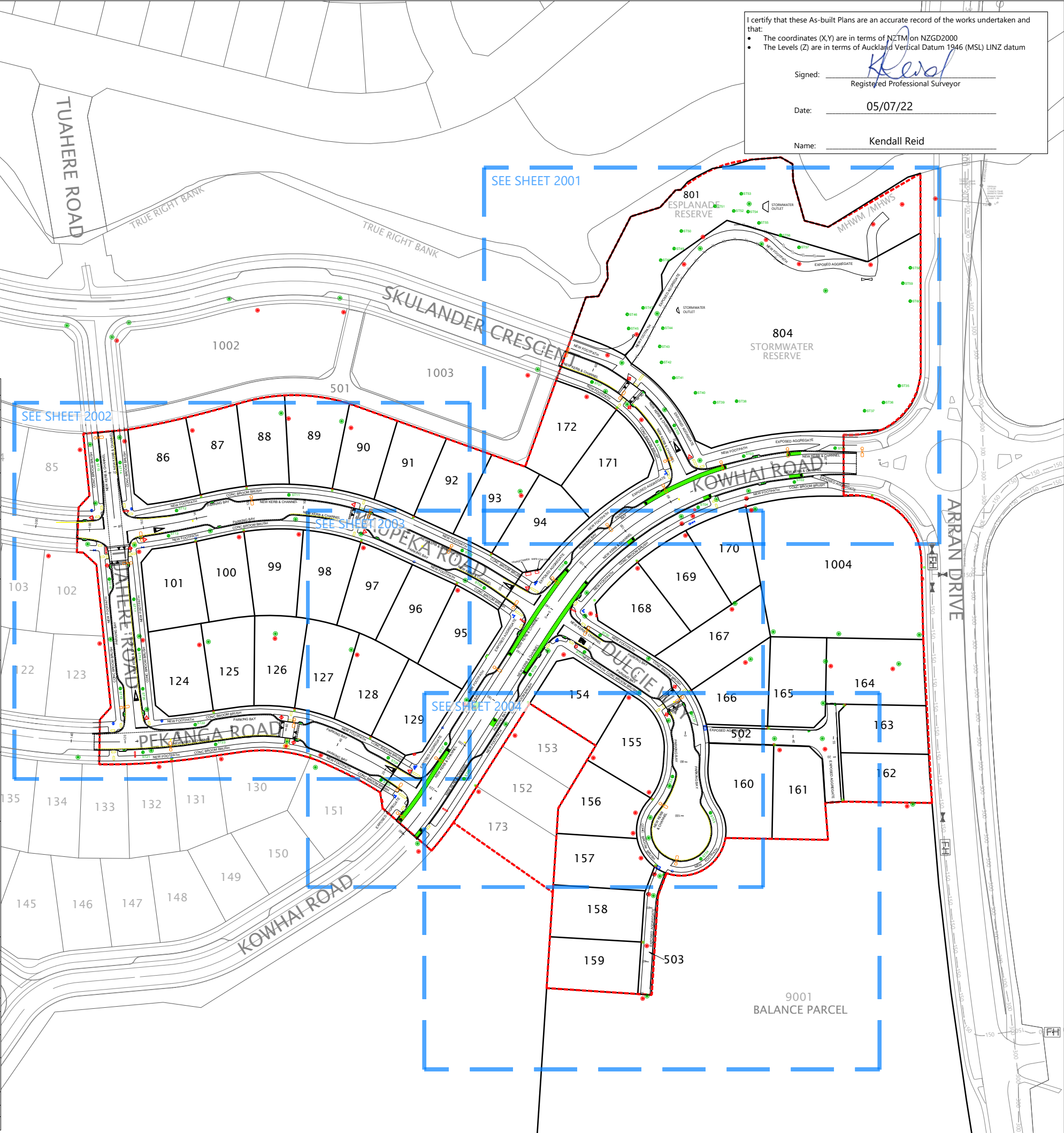
POWER LINK PILLAR

FENCE

NOTE: ORANGE SYMBOLOGY

= PENDING FINAL SURVEY

SCHEDULE OF COORDINATES			
STREET TREES			
ID	EASTING	NORTHING	SPECIES
ST01	1749417.34	5948983.77	TOTARA
ST02	1749402.24	5948971.20	
ST03	1749383.44	5948980.79	
ST04	1749366.54	5948961.86	PRYUS
ST05	1749357.69	5948992.17	
ST06	1749351.22	5948986.20	
ST07	1749327.17	5949008.26	TOTARA
ST08	1749317.42	5948941.29	
ST09	1749287.20	5948931.94	
ST10	1749279.02	5948945.83	LIQUIDAMBAR
ST11	1749214.73	5948966.41	
ST12	1749173.07	5948960.63	
ST13	1749170.09	5948951.25	PRYUS
ST14	1749152.07	5948978.41	
ST15	1749143.63	5948979.31	
ST16	1749148.13	5948935.20	LIQUIDAMBAR
ST17	1749157.22	5948927.74	
ST18	1749159.09	5948909.11	
ST19	1749152.20	5948894.66	TOTARA
ST20	1749160.55	5948894.55	
ST21	1749160.59	5948871.03	
ST22	1749179.99	5948881.24	PRYUS
ST23	1749187.56	5948873.95	
ST24	1749251.61	5948868.96	
ST25	1749248.91	5948860.73	TOTARA
ST26	1749279.70	5948861.21	
ST27	1749272.91	5948874.19	
ST28	1749304.20	5948899.82	PRYUS
ST29	1749324.39	5948908.20	
ST30	1749330.17	5948914.41	
ST31	1749364.00	5948885.58	TOTARA
ST32	1749357.02	5948862.02	
ST33	1749371.12	5948848.59	
ST34	1749367.55	5948831.52	PRYUS
ST35	1749441.16	5949006.85	
ST36	1749435.31	5949000.66	
ST37	1749428.28	5948997.60	TOTARA
ST38	1749380.81	5949001.16	
ST39	1749372.64	5949000.67	
ST40	1749365.55	5949004.27	KAHIKATEA
ST41	1749357.5	5949009.82	
ST42	1749352.95	5949015.54	
ST43	1749352.29	5949021.46	PURIRI
ST44	1749353.43	5949028.22	
ST45	1749340.75	5949028.12	
ST46	1749340.24	5949033.35	KAHIKATEA
ST47	1749346.10	5949035.76	
ST48	1749352.65	5949053.43	
ST49	1749357.62	5949057.73	PURIRI
ST50	1749360.30	5949064.24	
ST51	1749372.77	5949073.44	
ST52	1749379.76	5949071.68	TOTARA
ST53	1749382.54	5949078.05	
ST54	1749385.05	5949071.41	
ST55	1749389.08	5949067.24	PURIRI
ST56	1749397.10	5949062.64	
ST57	1749403.95	5949058.19	
ST58	1749445.24	5949050.61	KAHIKATEA
ST59	1749442.49	5949044.88	
ST60	1749445.22	5949038.25	



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:

Kendall Reid

Registered Professional Surveyor

Date: 05/07/22

Name: Kendall Reid

- NOTES
1. ALL WORKS AND MATERIALS COMPLY WITH LATEST AUCKLAND TRANSPORT DESIGN MANUAL.

2. ALL ROADS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH APPROVED ENGINEERING PLANS.

3. ALL FINISHED ROAD SURFACES ARE ASPHALT CONCRETE 30mm THICK.

4. ALL FOOTPATHS ARE 100mm THICK BRUSHED CONCRETE OR EXPOSED AGGREGATE AS NOTED.

5. ALL RAISED CROSSINGS ARE CONSTRUCTED FROM BROOM BRUSH CONCRETE.

6. ALL PIPE CROSSINGS UNDER ROADS HAVE BEEN HARDFILL BACKFILLED

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

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	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

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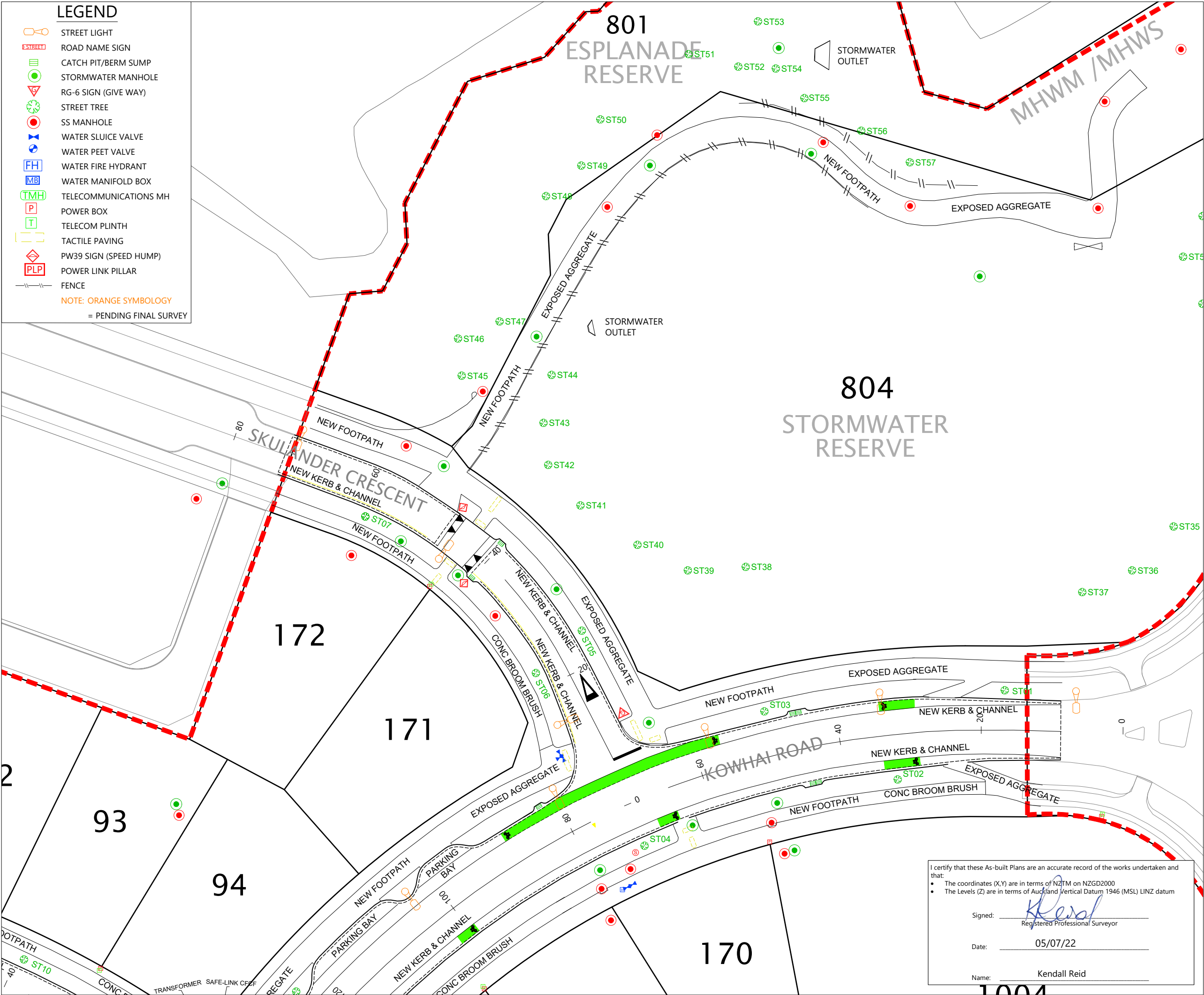
WFH
PROPERTIES

ARRAN HILL
PRECINCT 6 - STAGE 1

ROADING ASBUILT PLAN
OVERALL LAYOUT
SHEET 1 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-2000-AB	

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LEGEND

- STREET LIGHT
 - ROAD NAME SIGN
 - CATCH PIT/BERM SUMP
 - STORMWATER MANHOLE
 - RG-6 SIGN (GIVE WAY)
 - STREET TREE
 - SS MANHOLE
 - WATER SLUICE VALVE
 - WATER PEET VALVE
 - WATER FIRE HYDRANT
 - WATER MANIFOLD BOX
 - TELECOMMUNICATIONS MH
 - POWER BOX
 - TELECOM PLINTH
 - TACTILE PAVING
 - PW39 SIGN (SPEED HUMP)
 - POWER LINK PILLAR
 - FENCE
- NOTE: ORANGE SYMBOLOGY = PENDING FINAL SURVEY



NOTES

- ALL WORKS AND MATERIALS COMPLY WITH LATEST AUCKLAND TRANSPORT DESIGN MANUAL.
- ALL ROADS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH APPROVED ENGINEERING PLANS.
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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 - STAGE 1

ROADING ASBUILT PLAN
SHEET 2 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-2001-AB	

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

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

Signed: Registered Professional Surveyor

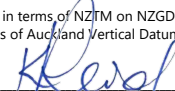
Date: 05/07/22

Name: Kendall Reid

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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: 
Registered Professional Surveyor

Date: 05/07/22

Name: Kendall Reid

- NOTES**
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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



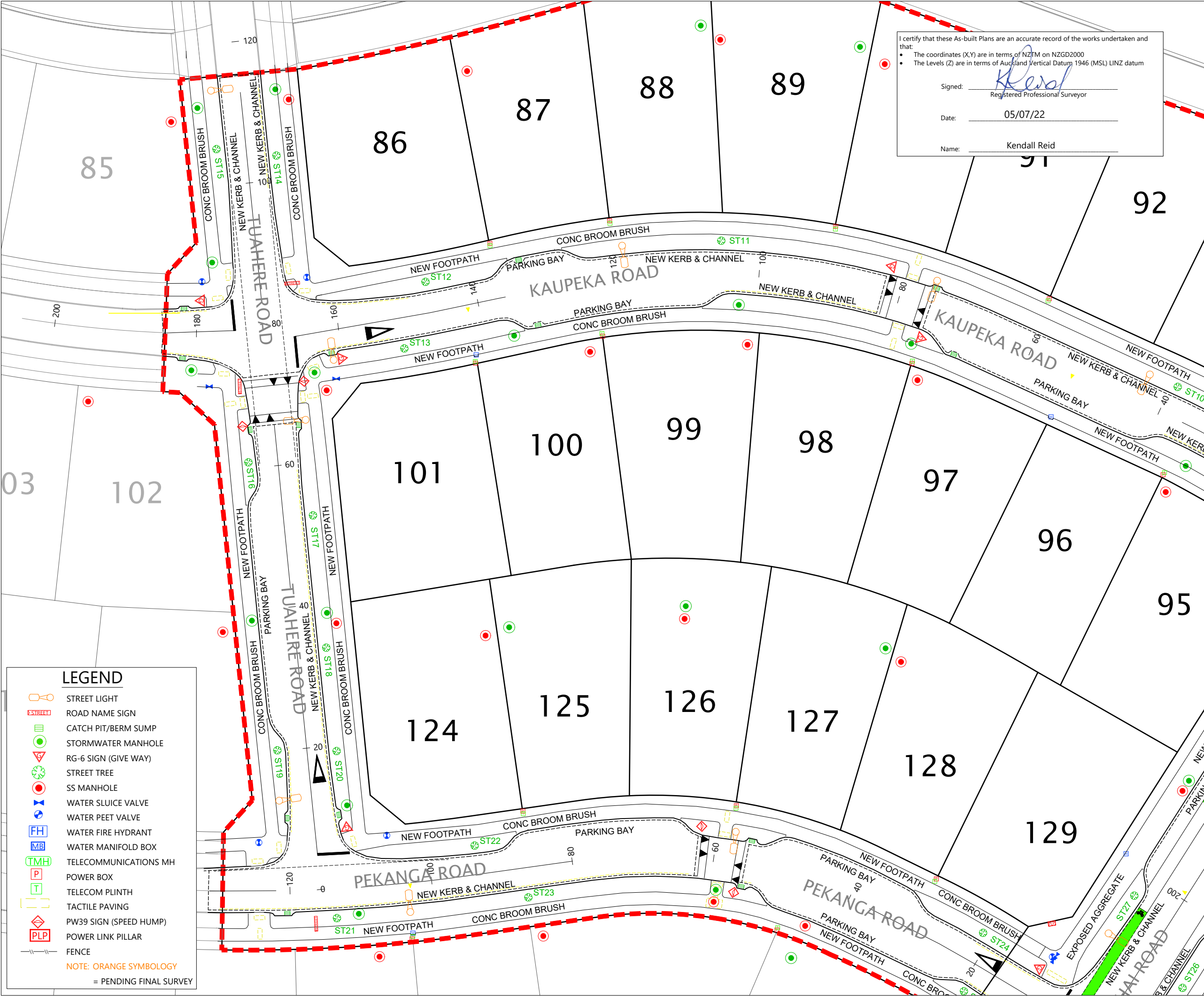
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**ARRAN HILL
PRECINCT 6 - STAGE 1**

**ROADING ASBUILT PLAN
SHEET 3 OF 5**

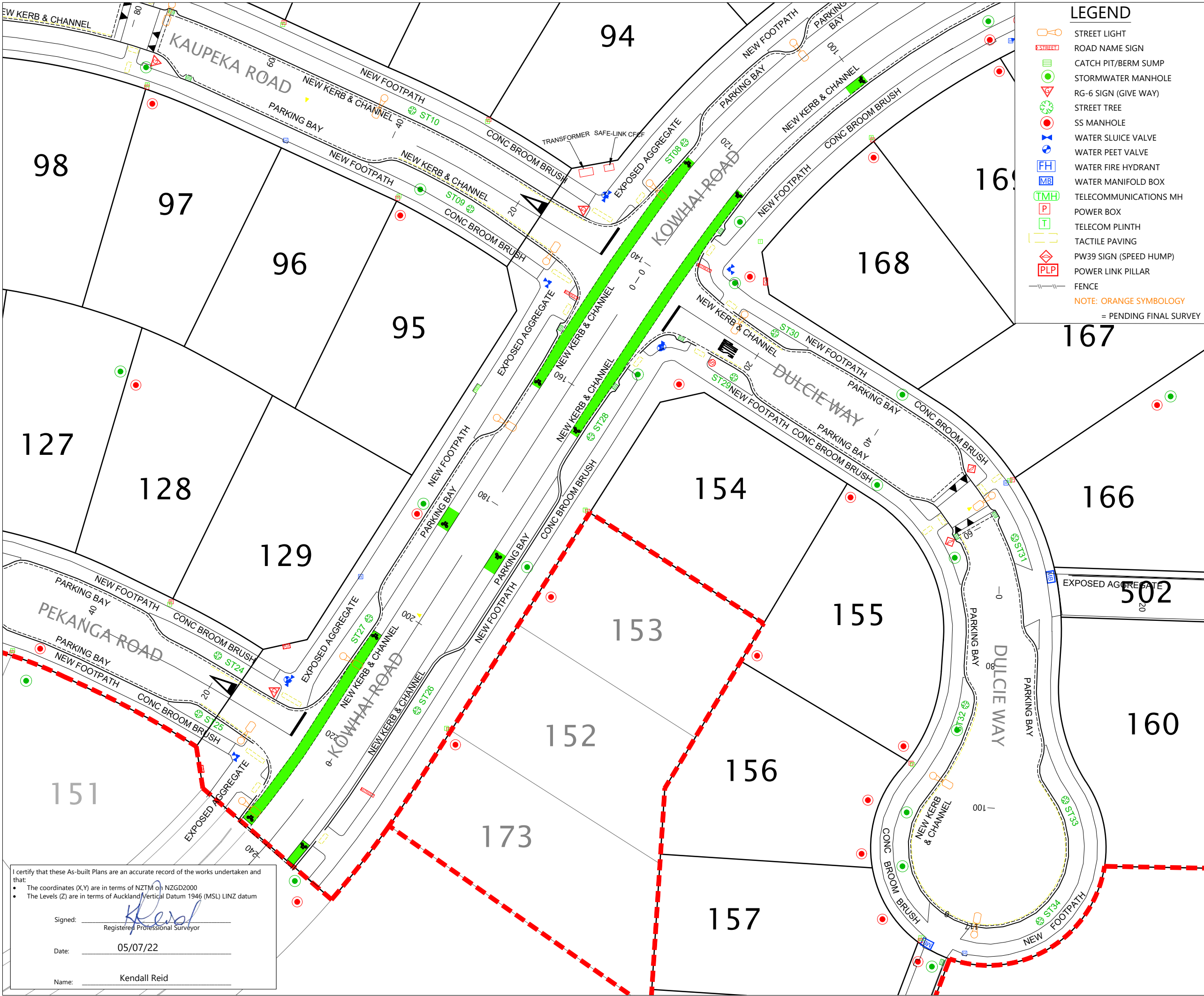
STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-2002-AB	



LEGEND

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

NOTE: ORANGE SYMBOLOGY
= PENDING FINAL SURVEY



LEGEND

- STREET LIGHT
 - ROAD NAME SIGN
 - CATCH PIT/BERM SUMP
 - STORMWATER MANHOLE
 - RG-6 SIGN (GIVE WAY)
 - STREET TREE
 - SS MANHOLE
 - WATER SLUICE VALVE
 - WATER PEET VALVE
 - WATER FIRE HYDRANT
 - WATER MANIFOLD BOX
 - TELECOMMUNICATIONS MH
 - POWER BOX
 - TELECOM PLINTH
 - TACTILE PAVING
 - PW39 SIGN (SPEED HUMP)
 - POWER LINK PILLAR
 - FENCE
- NOTE: ORANGE SYMBOLOGY
= PENDING FINAL SURVEY

NOTES

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- ALL FOOTPATHS ARE 100mm THICK BRUSHED CONCRETE OR EXPOSED AGGREGATE AS NOTED.
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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	09 308 9229
CHECKED	RV	
APPROVED	KR	WOODS.CO.NZ

ARRAN HILL
PRECINCT 6 - STAGE 1

ROADING ASBUILT PLAN
SHEET 4 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-2003-AB	

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

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

Signed:
Registered Professional Surveyor

Date: 05/07/22

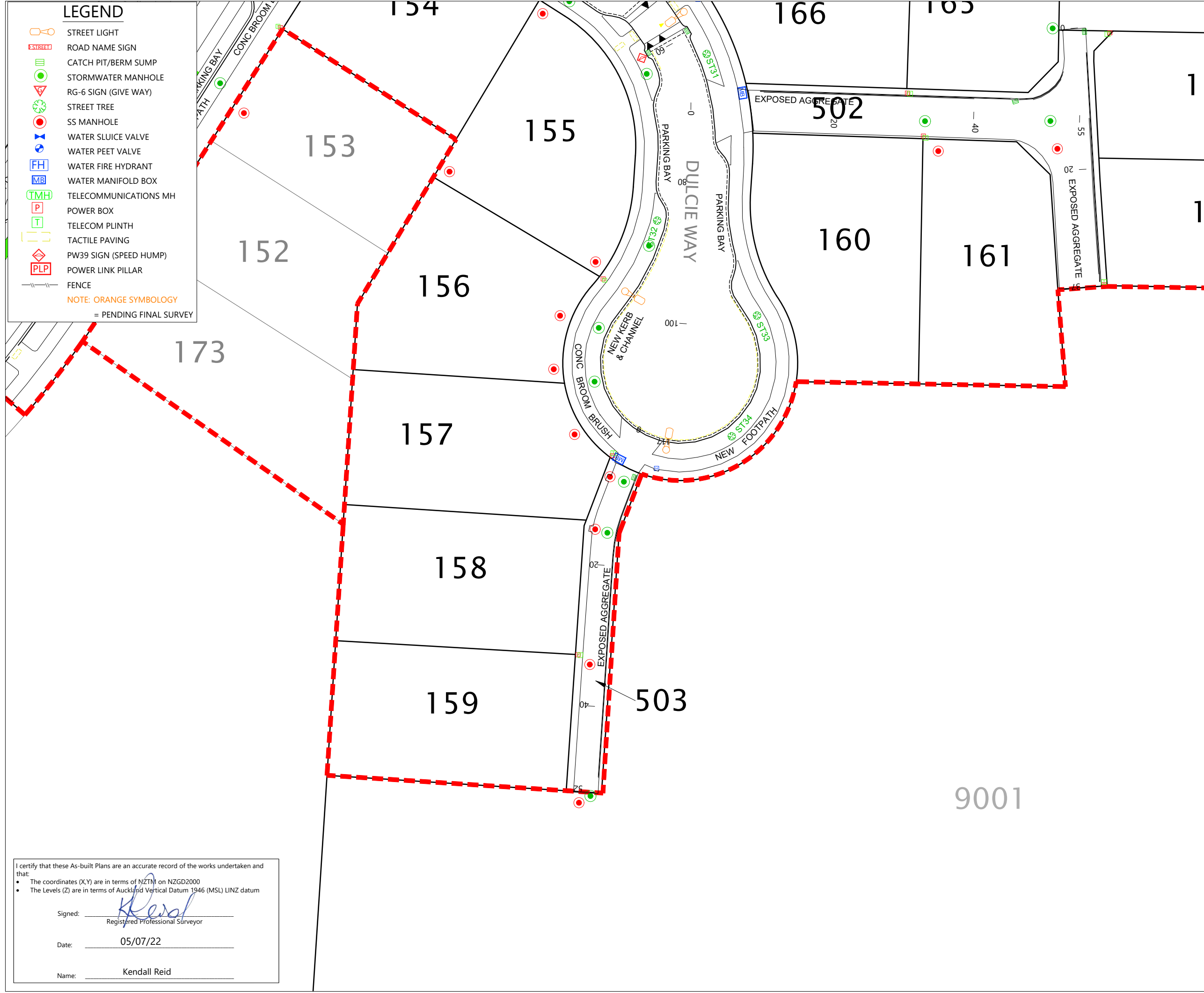
Name: Kendall Reid

C:\12DSYNERGY\DATA\WP-PEN-APP-01\37611 - PRECINCT 6 STAGE 1_48ACAD\SURVAB\37611_01_2000.AB ROAD.DWG, 2022-Jul-05 12:55, PRINT AS PDF.PC3, Mard



LEGEND

- STREET LIGHT
- ROAD NAME SIGN
- CATCH PIT/BERM SUMP
- STORMWATER MANHOLE
- RG-6 SIGN (GIVE WAY)
- STREET TREE
- SS MANHOLE
- WATER SLUICE VALVE
- WATER PEET VALVE
- WATER FIRE HYDRANT
- WATER MANIFOLD BOX
- TELECOMMUNICATIONS MH
- POWER BOX
- TELECOM PLINTH
- TACTILE PAVING
- PW39 SIGN (SPEED HUMP)
- POWER LINK PILLAR
- FENCE
- NOTE: ORANGE SYMBOLOGY = PENDING FINAL SURVEY



NOTES

1. ALL WORKS AND MATERIALS COMPLY WITH LATEST AUCKLAND TRANSPORT DESIGN MANUAL.
2. ALL ROADS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH APPROVED ENGINEERING PLANS.
3. ALL FINISHED ROAD SURFACES ARE ASPHALT CONCRETE 30mm THICK.
4. ALL FOOTPATHS ARE 100mm THICK BRUSHED CONCRETE OR EXPOSED AGGREGATE AS NOTED.
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6. ALL PIPE CROSSINGS UNDER ROADS HAVE BEEN HARDFILL BACKFILLED
7. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 - STAGE 1

ROADING ASBUILT PLAN
SHEET 5 OF 5

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-2004-AB	

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

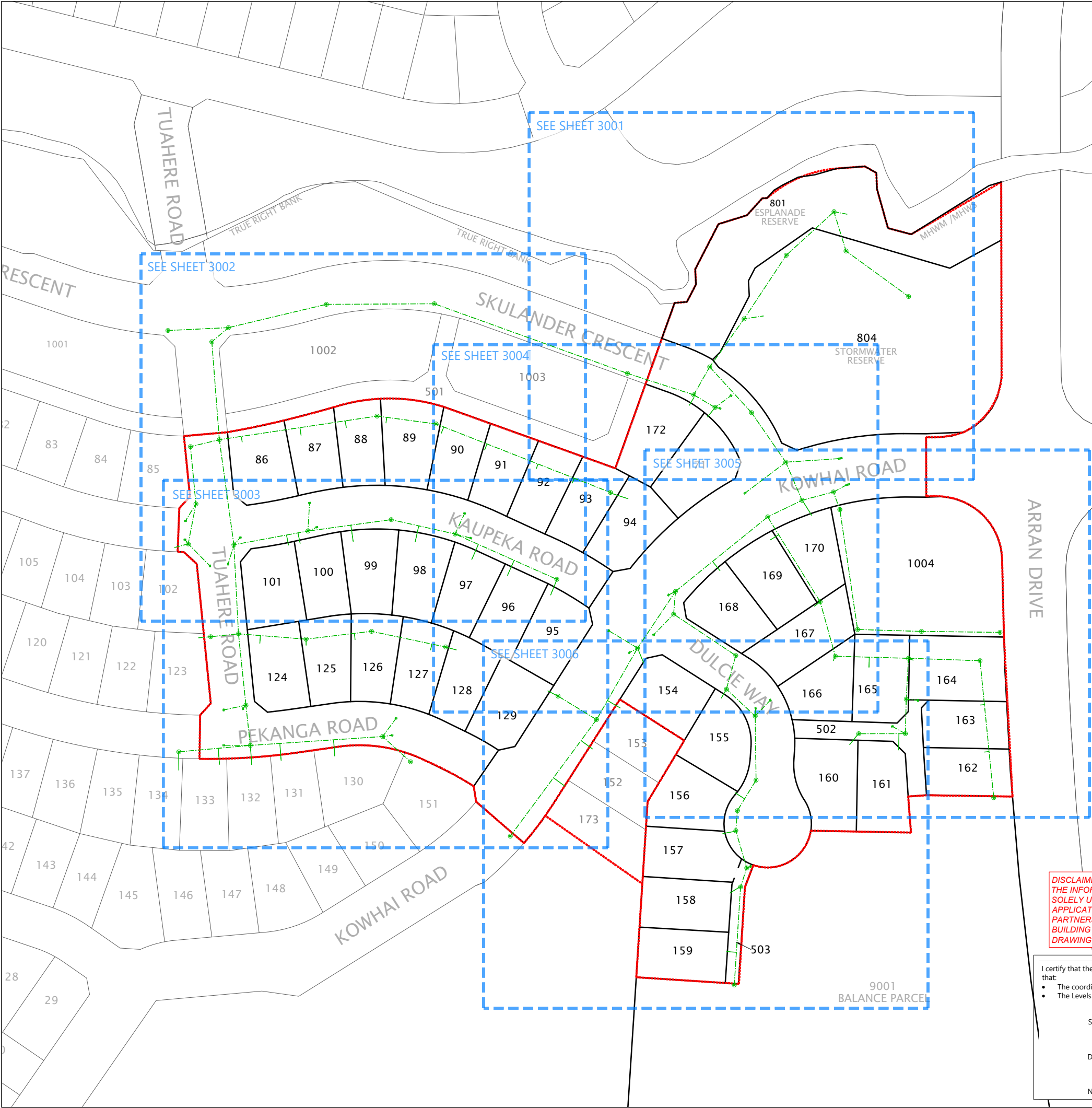
- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: Registered Professional Surveyor

Date: 05/07/22

Name: Kendall Reid

C:\12DSYNERGY\DATA\WP-PEN-APP-01\37611 - PRECINCT 6 STAGE 1_48ACAD\SURVAB\37611_01_2000.AB ROADING.DWG, 2022-Jul-05 12:55, PRINT AS PDF.PC3, Mattd



SCHEDULE OF COORDINATES		
STORMWATER LOT CONNECTIONS		
NAME	EASTING	NORTHING
Lot 86	1749160.60	5948986.84
Lot 87	1749182.97	5948989.39
Lot 88	1749200.15	5948992.35
Lot 89	1749215.23	5948994.04
Lot 90	1749236.26	5948990.19
Lot 91	1749252.72	5948983.83
Lot 92	1749272.34	5948976.75
Lot 93	1749286.03	5948971.27
Lot 94	1749307.23	5948965.31
Lot 95	1749277.79	5948928.74
Lot 96	1749261.40	5948936.21
Lot 97	1749247.82	5948942.23
Lot 98	1749226.33	5948948.91
Lot 99	1749202.77	5948949.09
Lot 100	1749182.62	5948948.31
Lot 101	1749178.21	5948947.67
Lot 124	1749167.30	5948910.40
Lot 125	1749184.88	5948909.67
Lot 126	1749203.48	5948911.77
Lot 127	1749232.18	5948907.87
Lot 128	1749241.98	5948907.90
Lot 129	1749276.71	5948892.36
Lot 130	1749195.79	5948867.57
Lot 131	1749175.40	5948865.85
Lot 132	1749164.22	5948864.31
Lot 133	1749151.99	5948864.42
Lot 134	1749136.51	5948862.22
Lot 152	1749293.71	5948870.28
Lot 153	1749304.24	5948885.86
Lot 154	1749313.11	5948903.02
Lot 155	1749342.62	5948889.59
Lot 156	1749347.95	5948853.64
Lot 157	1749343.20	5948838.15
Lot 158	1749345.91	5948815.56
Lot 159	1749344.64	5948793.33
Lot 160	1749391.40	5948871.93
Lot 161	1749410.08	5948869.84
Lot 162	1749442.58	5948869.12
Lot 163	1749441.09	5948886.99
Lot 164	1749415.59	5948904.00
Lot 165	1749398.76	5948901.30
Lot 166	1749385.19	5948903.79
Lot 167	1749378.04	5948924.49
Lot 168	1749342.17	5948937.96
Lot 169	1749361.27	5948949.69
Lot 170	1749376.99	5948959.02
Lot 171	1749337.41	5948996.35
Lot 172	1749330.44	5949000.75
Lot 173	1749283.18	5948856.18

LEGEND

STORMWATER MANHOLE

STORMWATER CESSPIT

NEW STORMWATER

EXISTING STORMWATER

STAGE BOUNDARY

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

- NOTES
1.

ALL WORKS AND MATERIALS COMPLY WITH AC STANDARDS FOR ENGINEERING DESIGN AND CONSTRUCTION.
2.

ALL PIPE BEDDING COMPLIES WITH AC STANDARDS
3.

ALL CESSPIT LEADS AND PIPES UNDER THE ROAD AND CARRIDGWAYS ARE REINFORCED CONCRETE PIPES CLASS 4 (Z) RRJ. ALL OTHER PIPELINES ARE REINFORCED CONCRETE CLASS 2 (X) RRJ UNLESS OTHERWISE NOTED.
4.

ALL PIPE CROSSINGS UNDER ROADS AND ACCESSWAYS HAVE BEEN HARDFILL BACKFILLED.
5.

ALL SW 100mm DIA. RAMPED RISERS HAVE BEEN EXTENDED AND CAPPED OFF 1.0m BELOW THE FINISHED GROUND SURFACE.
6.

ALL PRIVATE DRAINAGE CONNECTIONS ARE 100mmØ uPVC SN16.
7.

LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
8.

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	MD	06/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 STAGE 1

STORMWATER ASBUILT PLAN
OVERALL LAYOUT
SHEET 1 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-3000-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 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: 06/07/22

Name: Kendall Reid

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

Signed: 
Licensed Cadastral Surveyor

Date: 06/07/22

Name: Kendall Reid



LEGEND

- STORMWATER MANHOLE
- STORMWATER CESSPIT
- NEW STORMWATER
- EXISTING STORMWATER
- STAGE BOUNDARY
- NOTE: LNS= LID NOT SET AT FINAL LEVEL
LL= LID LEVEL

NOTES

- ALL WORKS AND MATERIALS COMPLY WITH AC STANDARDS FOR ENGINEERING DESIGN AND CONSTRUCTION.
- ALL PIPE BEDDING COMPLIES WITH AC STANDARDS
- ALL CESSPIT LEADS AND PIPES UNDER THE ROAD AND CARRIDGeways ARE REINFORCED CONCRETE PIPES CLASS 4 (Z) RRJ. ALL OTHER PIPELINES ARE REINFORCED CONCRETE CLASS 2 (X) RRJ UNLESS OTHERWISE NOTED.
- ALL PIPE CROSSINGS UNDER ROADS AND ACCESSWAYS HAVE BEEN HARDFILL BACKFILLED.
- ALL SW 100mm DIA. RAMPED RISERS HAVE BEEN EXTENDED AND CAPPED OFF 1.0m BELOW THE FINISHED GROUND SURFACE.
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- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
- 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	MD	06/07/22

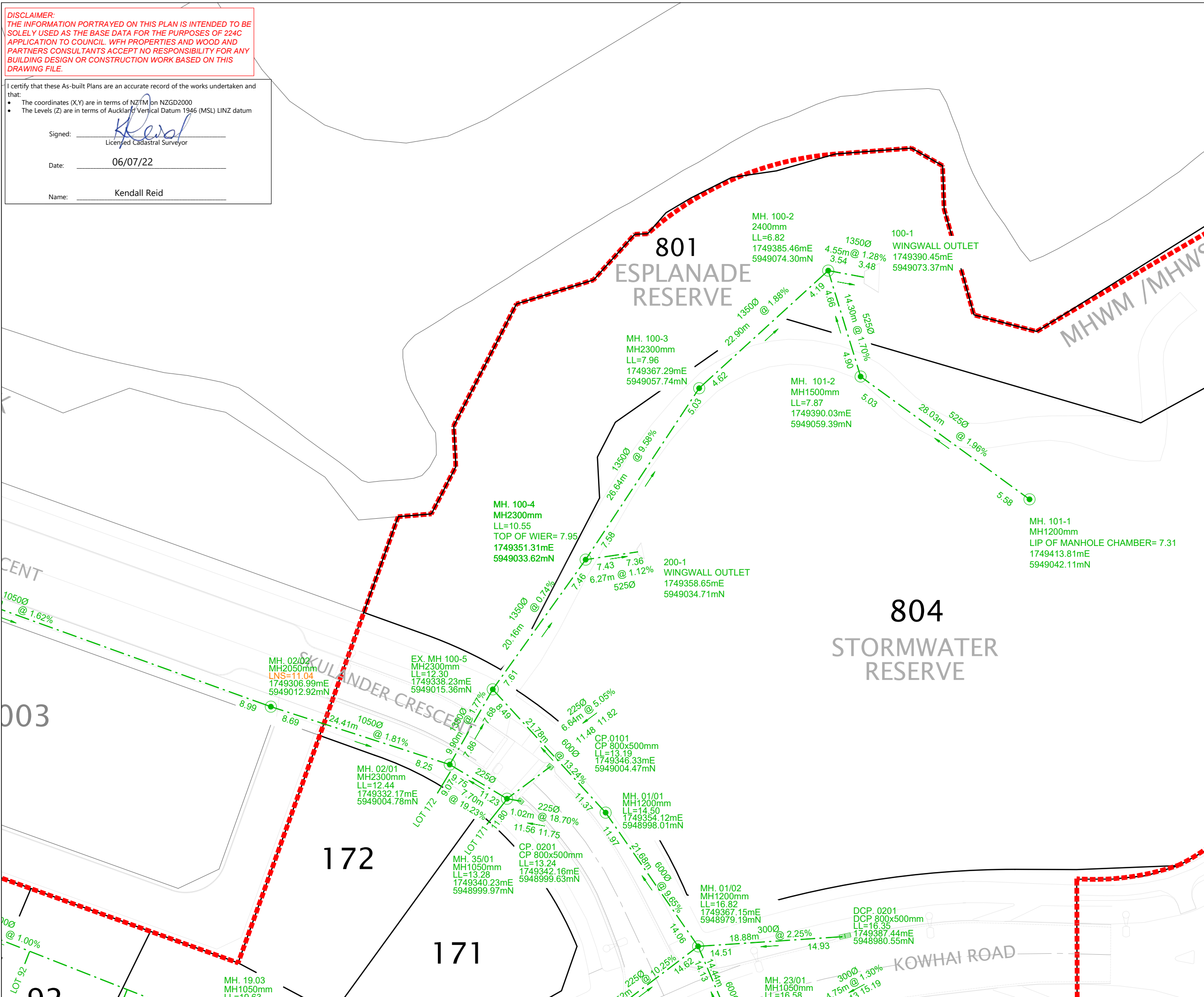
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	



ARRAN HILL PRECINCT 6 STAGE 1

STORMWATER ASBUILT PLAN SHEET 2 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-3001-AB	



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

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

Signed: _____
Licensed Cadastral Surveyor

Date: 06/07/22

Name: Kendall Reid

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.



LEGEND

STORMWATER MANHOLE

STORMWATER CESSPIT

NEW STORMWATER

EXISTING STORMWATER

STAGE BOUNDARY

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

- NOTES**
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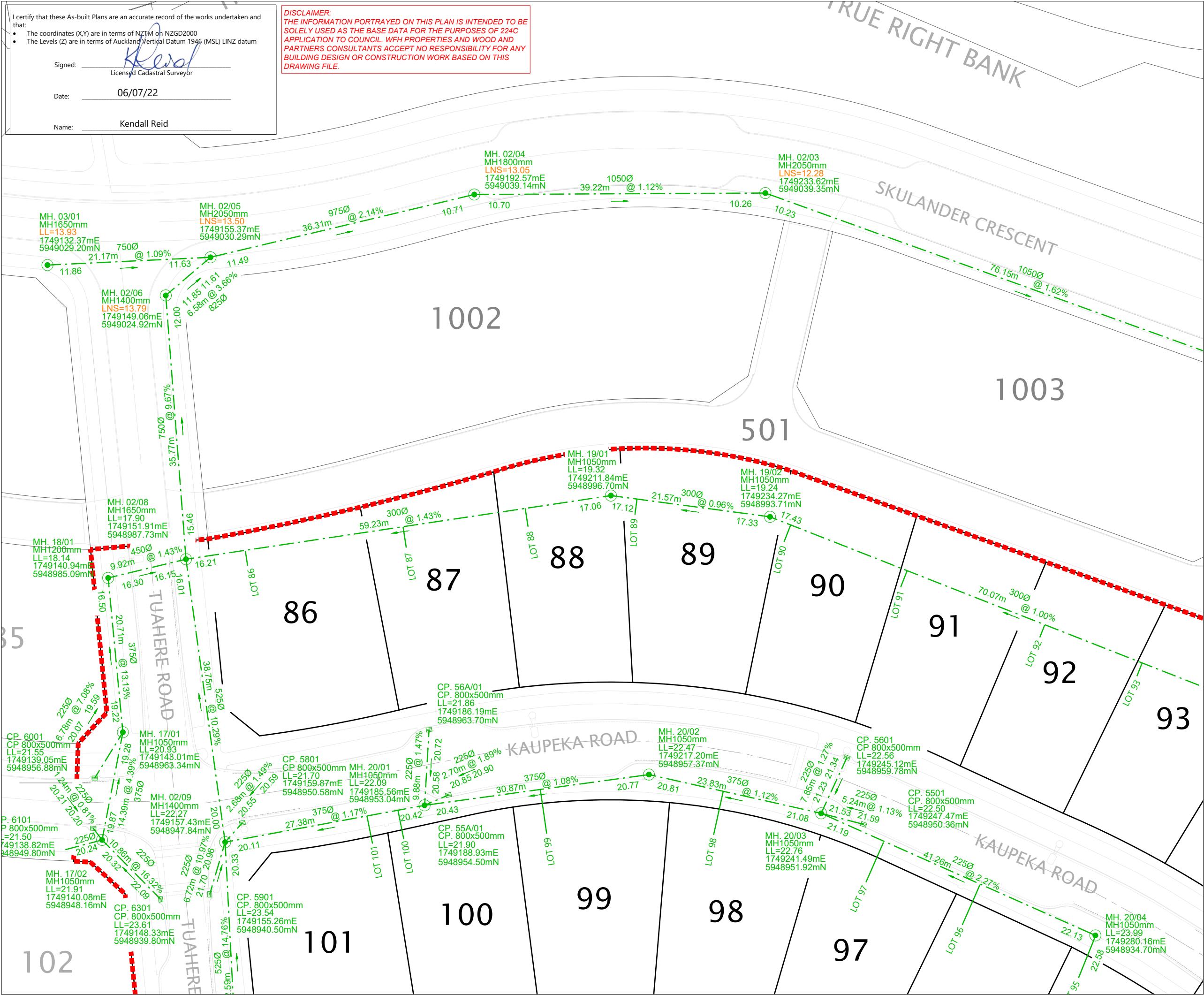
REVISION DETAILS		BY	DATE
1	ISSUED FOR DRAFT	MD	04/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	

**ARRAN HILL
PRECINCT 6 STAGE 1**

**STORMWATER ASBUILT PLAN
SHEET 3 OF 7**

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-3002-AB	



LEGEND

- STORMWATER MANHOLE
STORMWATER CESSPIT
NEW STORMWATER
EXISTING STORMWATER
STAGE BOUNDARY
NOTE: LNS= LID NOT SET AT FINAL LEVEL
LL= LID LEVEL

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	06/07/22

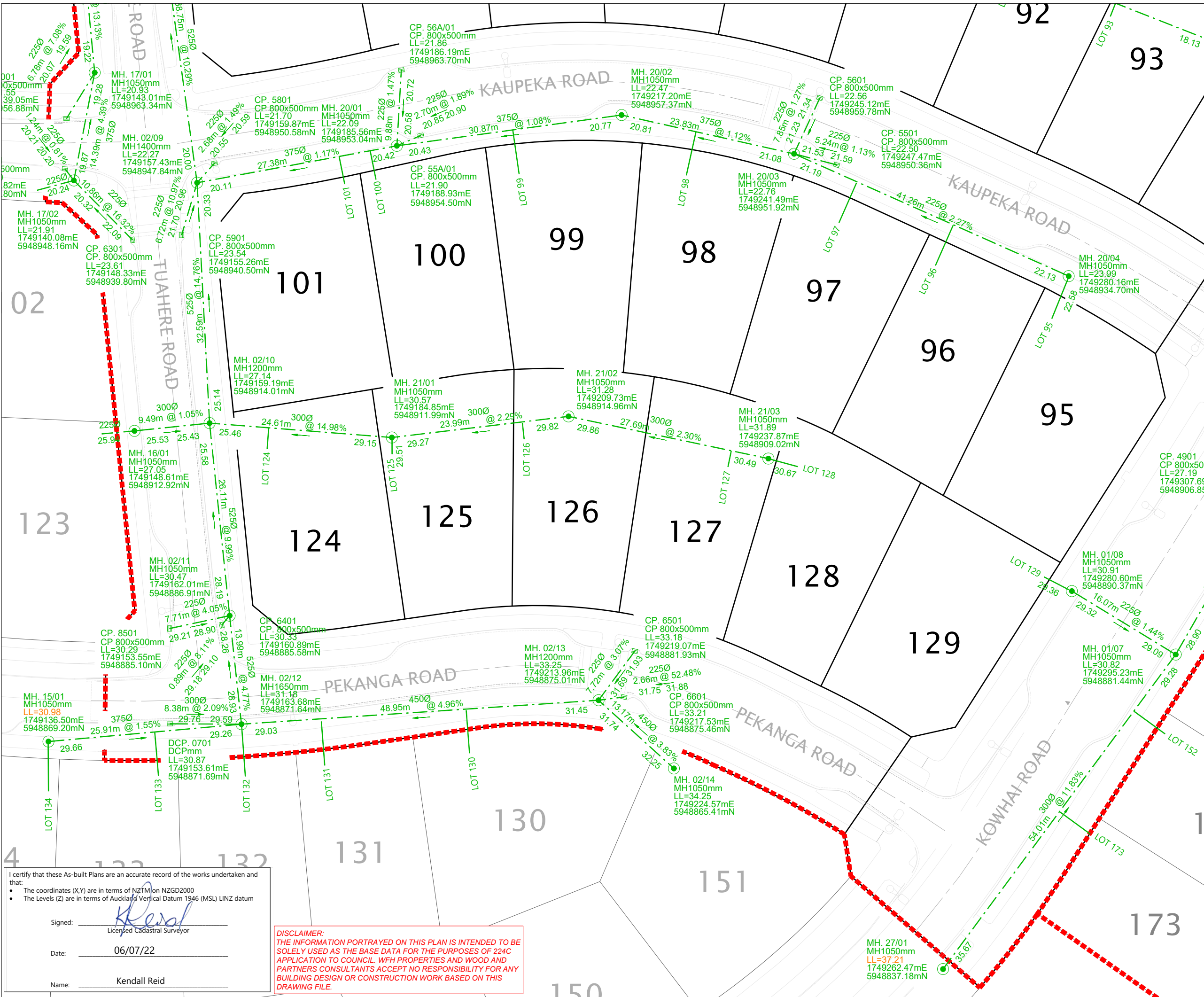
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 STAGE 1

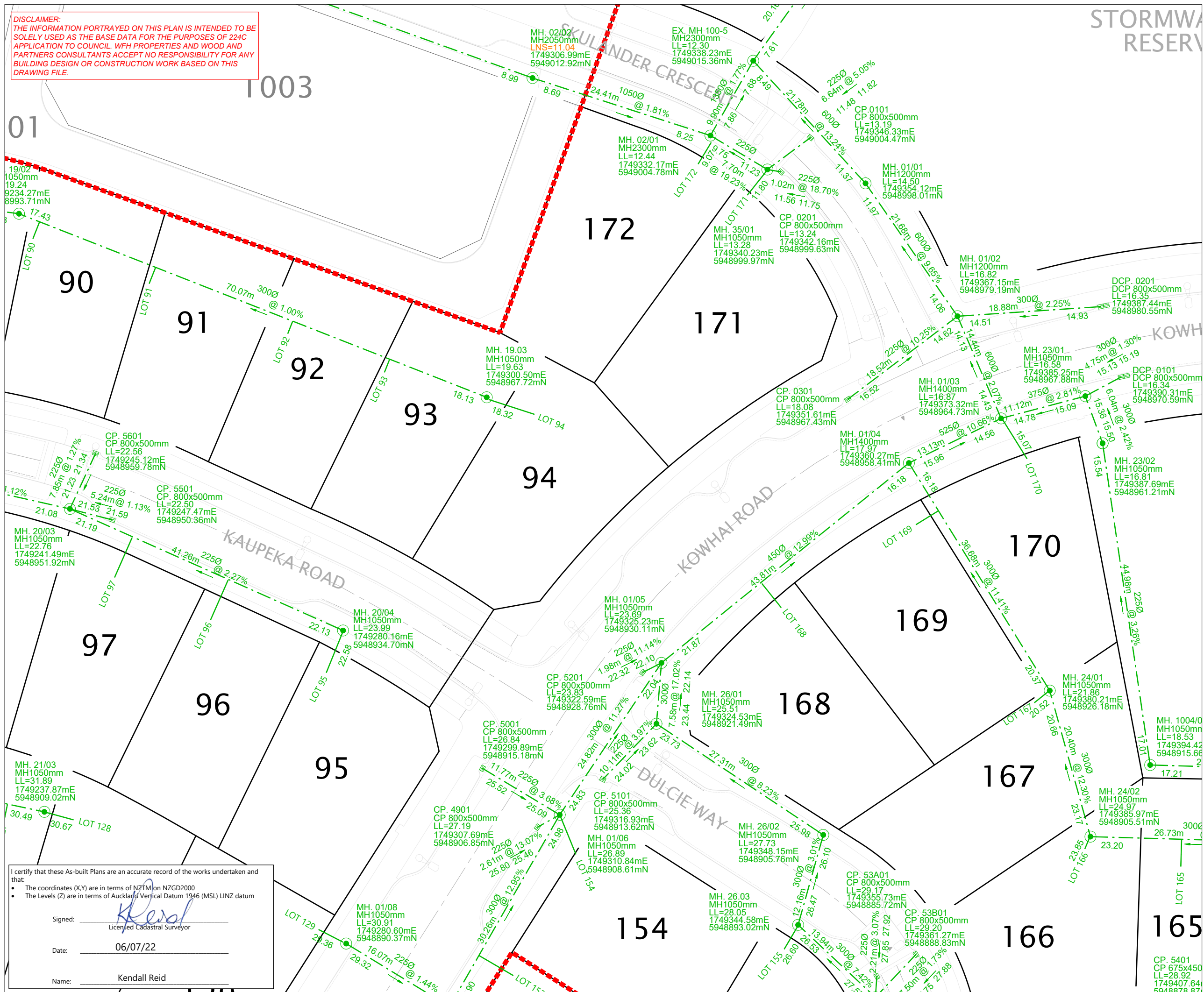
STORMWATER ASBUILT PLAN
SHEET 4 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-3003-AB	



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DISCLAIMER:
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LEGEND

- STORMWATER MANHOLE
STORMWATER CESSPIT
NEW STORMWATER
EXISTING STORMWATER
STAGE BOUNDARY
- NOTE: LNS= LID NOT SET AT FINAL LEVEL
LL= LID LEVEL

NOTES

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7. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
8. 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	MD	06/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING 8 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	



WFH
PROPERTIES

ARRAN HILL
PRECINCT 6 STAGE 1

STORMWATER ASBUILT PLAN
SHEET 5 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-3004-AB	

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

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

Signed: _____
Licensed Cadastral Surveyor

Date: 06/07/22

Name: Kendall Reid

DISCLAIMER:
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APPLICATION TO COUNCIL. WFH PROPERTIES AND WOOD AND
PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY
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Signed: 
Licensed Cadastral Surveyor

Date: 06/07/22

Name: Kendall Reid

LEGEND

- STORMWATER MANHOLE
- STORMWATER CESSPIT
- NEW STORMWATER
- EXISTING STORMWATER
- STAGE BOUNDARY
- NOTE: LNS= LID NOT SET AT FINAL LEVEL
LL= LID LEVEL

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	06/07/22

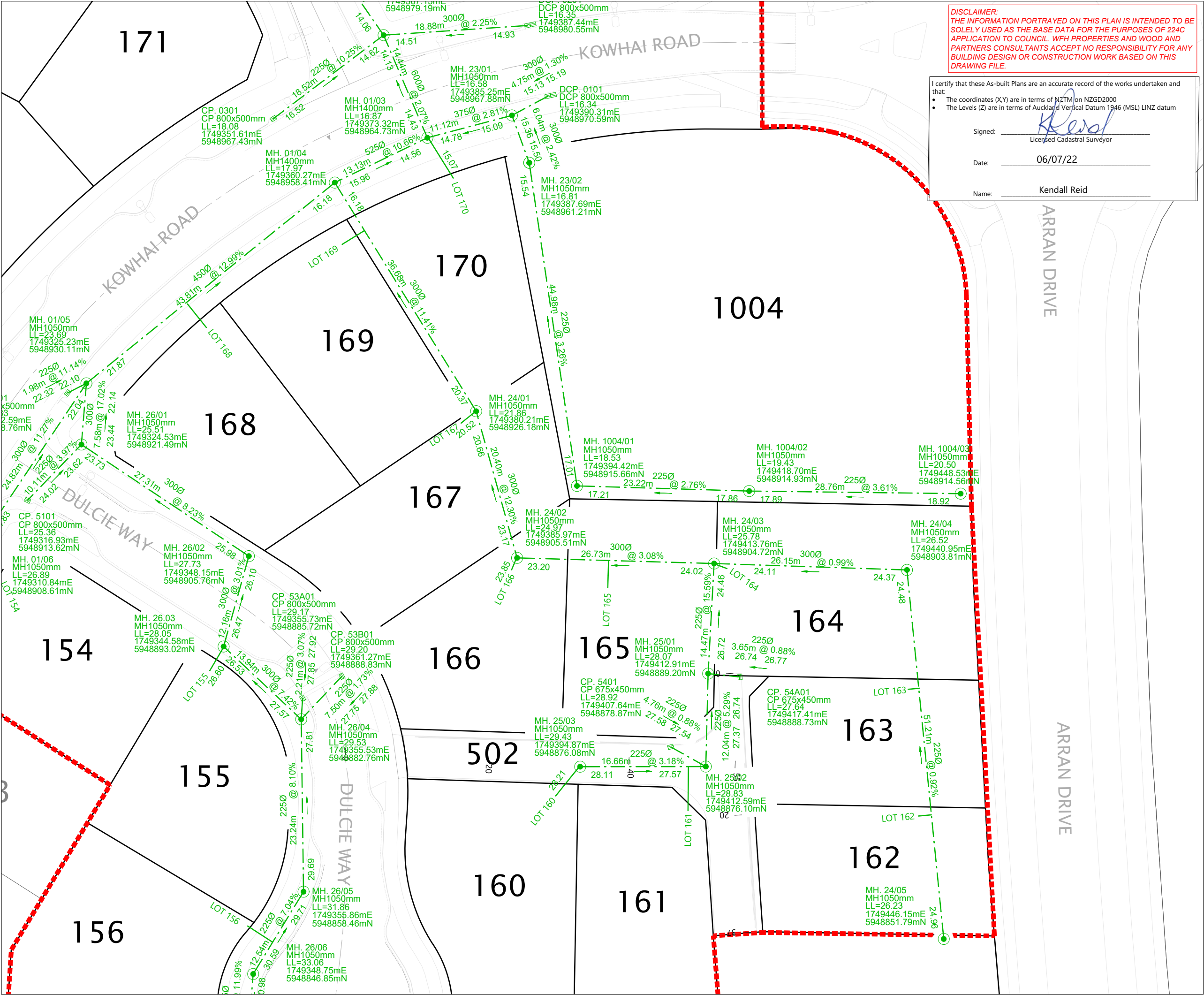
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 STAGE 1

STORMWATER ASBUILT PLAN
SHEET 6 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-3005-AB	



LEGEND

STORMWATER MANHOLE

STORMWATER CESSPIT

NEW STORMWATER

EXISTING STORMWATER

STAGE BOUNDARY

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

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	06/07/22

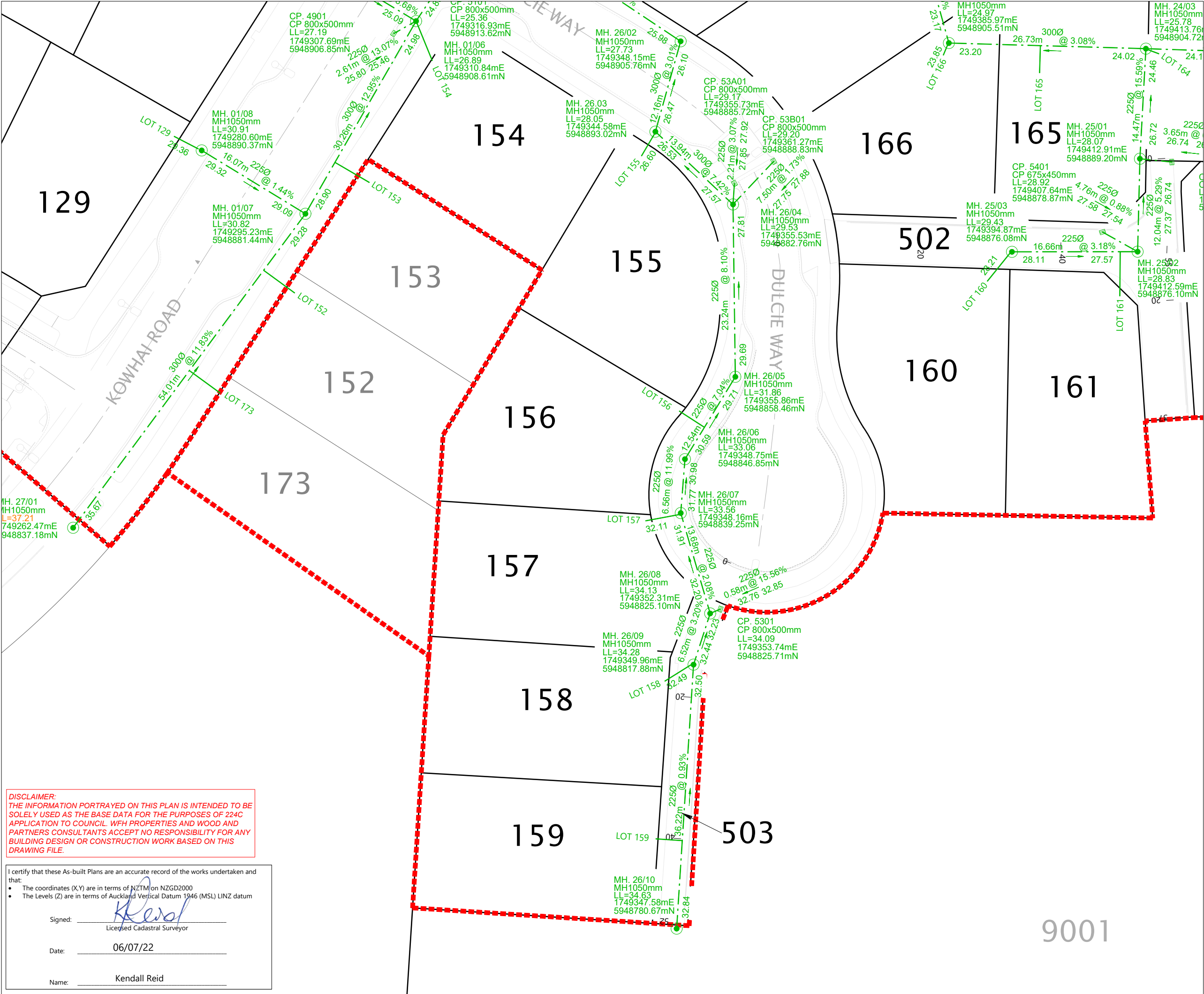
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

 **WFH** PROPERTIES 

**ARRAN HILL
PRECINCT 6 STAGE 1**

**STORMWATER ASBUILT PLAN
SHEET 7 OF 7**

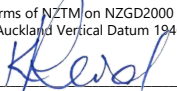
STATUS	ISSUED FOR 224C	REV
SCALE	1 : 500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-3006-AB	



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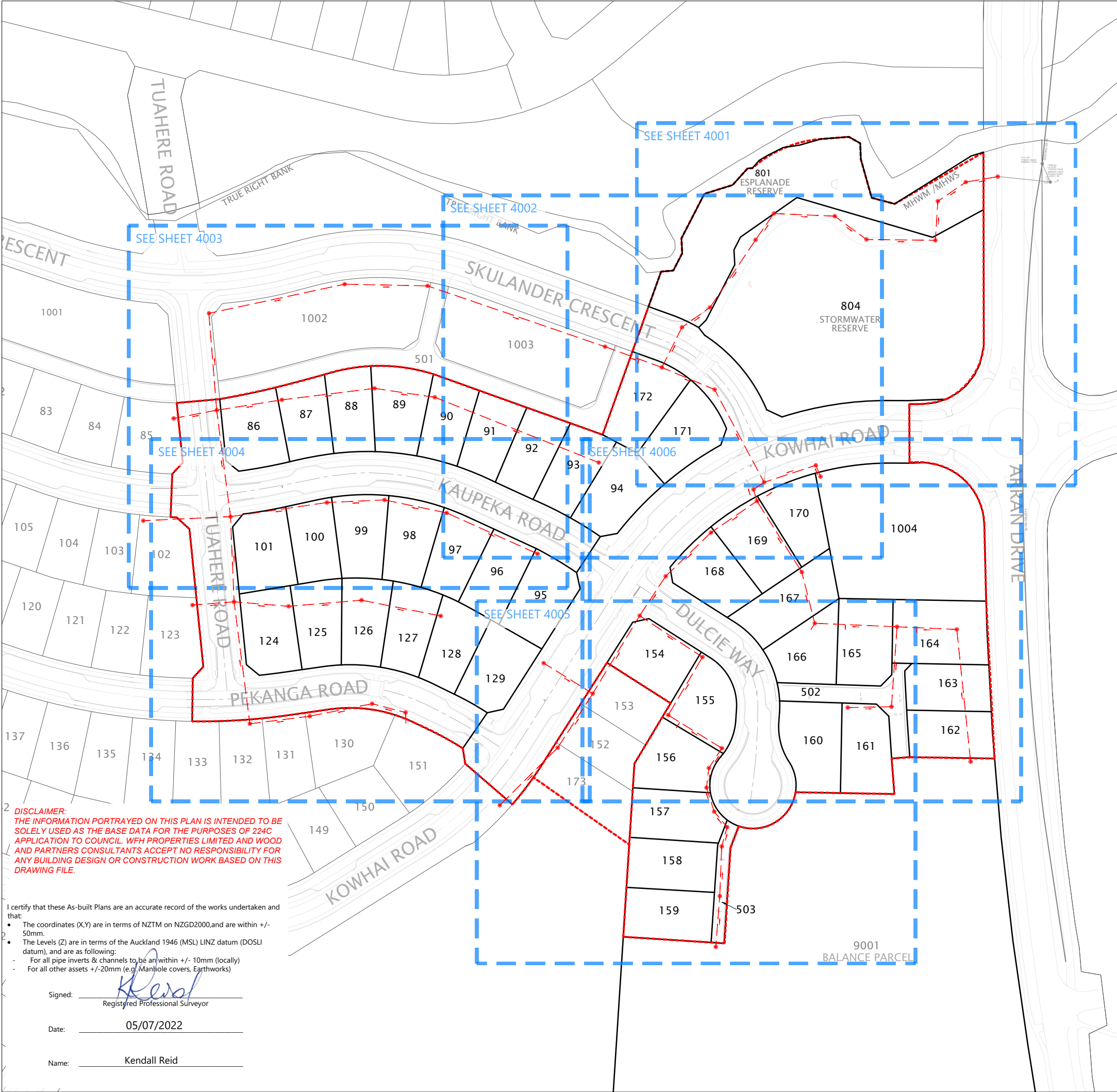
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- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: 
Licensed Cadastral Surveyor

Date: 06/07/22

Name: Kendall Reid



SCHEDULE OF COORDINATES		
SANITARY SEWER LOT CONNECTIONS		
NAME	EASTING	NORTHING
Lot 86	1749159.43	5948986.26
Lot 87	1749183.65	5948990.14
Lot 88	1749202.50	5948992.70
Lot 89	1749218.08	5948993.68
Lot 90	1749240.87	5948989.30
Lot 91	1749255.24	5948983.61
Lot 92	1749273.52	5948976.36
Lot 93	1749290.54	5948969.55
Lot 94	1749303.20	5948965.32
Lot 95	1749276.62	5948929.10
Lot 96	1749259.25	5948937.62
Lot 97	1749245.40	5948943.48
Lot 98	1749222.56	5948949.31
Lot 99	1749200.74	5948949.38
Lot 100	1749182.48	5948947.71
Lot 101	1749166.48	5948945.01
Lot 124	1749167.12	5948908.58
Lot 125	1749194.80	5948909.67
Lot 126	1749207.73	5948910.78
Lot 127	1749225.87	5948907.70
Lot 128	1749242.92	5948906.46
Lot 129	1749276.09	5948891.00
Lot 130	1749194.24	5948866.73
Lot 131	1749173.15	5948864.32
Lot 132	1749166.66	5948863.02
Lot 133	1749153.48	5948863.35
Lot 134	1749135.31	5948862.24
Lot 152	1749293.50	5948867.51
Lot 153	1749305.14	5948885.68
Lot 154	1749320.37	5948903.56
Lot 155	1749340.26	5948889.54
Lot 156	1749330.72	5948863.99
Lot 157	1749344.27	5948834.39
Lot 158	1749344.76	5948811.97
Lot 159	1749343.91	5948792.59
Lot 160	1749393.00	5948871.88
Lot 161	1749410.50	5948868.98
Lot 162	1749440.32	5948866.61
Lot 163	1749438.17	5948886.65
Lot 164	1749423.29	5948900.72
Lot 165	1749395.79	5948901.91
Lot 166	1749382.56	5948901.84
Lot 167	1749377.45	5948922.73
Lot 168	1749345.39	5948939.31
Lot 169	1749362.76	5948947.46
Lot 170	1749380.13	5948959.48
Lot 171	1749337.89	5948996.32
Lot 172	1749315.89	5949004.23
Lot 173	1749284.12	5948854.30

LEGEND

- NEW SANITARY SEWER MANHOLE
- NEW SANITARY SEWER
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER
- LOT BOUNDARIES
- STAGE BOUNDARY
- DROP-PROTECTION STRUCTURE (DPS)
- LNS= LID NOT SET AT FINAL LEVEL & TO BE SET IN FUTURE STAGE

NOTES

- ALL WORKS AND MATERIALS COMPLY WITH AUCKLAND COUNCIL & WATERCARE SERVICES LTD STANDARDS FOR ENGINEERING DESIGN AND CONSTRUCTION.
- ALL SANITARY SEWER LINES ARE 150mmØ uPVC CLASS SN16 UNLESS STATED OTHERWISE.
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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	

ARRAN HILL
PRECINCT 6 - STAGE 1

WASTEWATER ASBUILT PLAN
LAYOUT SHEET
SHEET 1 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-4000-AB	

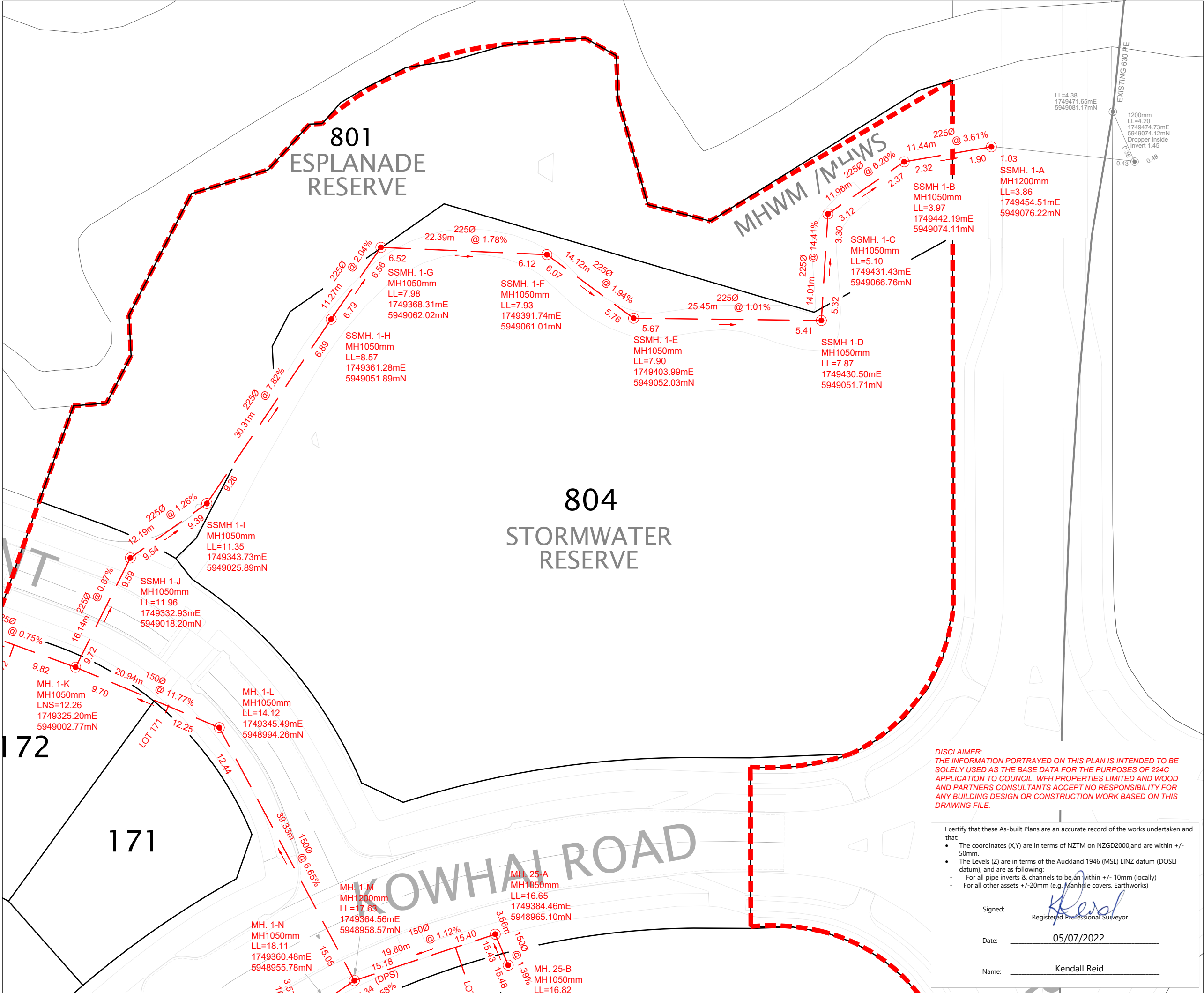
2 **DISCLAIMER:**
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2 I certify that these As-built Plans are an accurate record of the works undertaken and that:
• The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
• The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are as following:
- For all pipe inverts & channels to be an within +/- 10mm (locally)
- For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed:
Registered Professional Surveyor

Date: 05/07/2022

Name: Kendall Reid



LEGEND

NEW SANITARY SEWER MANHOLE

NEW SANITARY SEWER

EXISTING SANITARY SEWER MANHOLE

EXISTING SANITARY SEWER

LOT BOUNDARIES

STAGE BOUNDARY

DROP-PROTECTION STRUCTURE (DPS)

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

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING 8 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	09 308 9229
CHECKED	JM	
APPROVED	KR	WOODS.CO.NZ

**ARRAN HILL
PRECINCT 6 - STAGE 1**

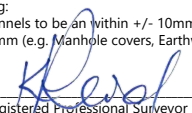
**WASTEWATER ASBUILT PLAN
SHEET 2 OF 7**

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-4001-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.

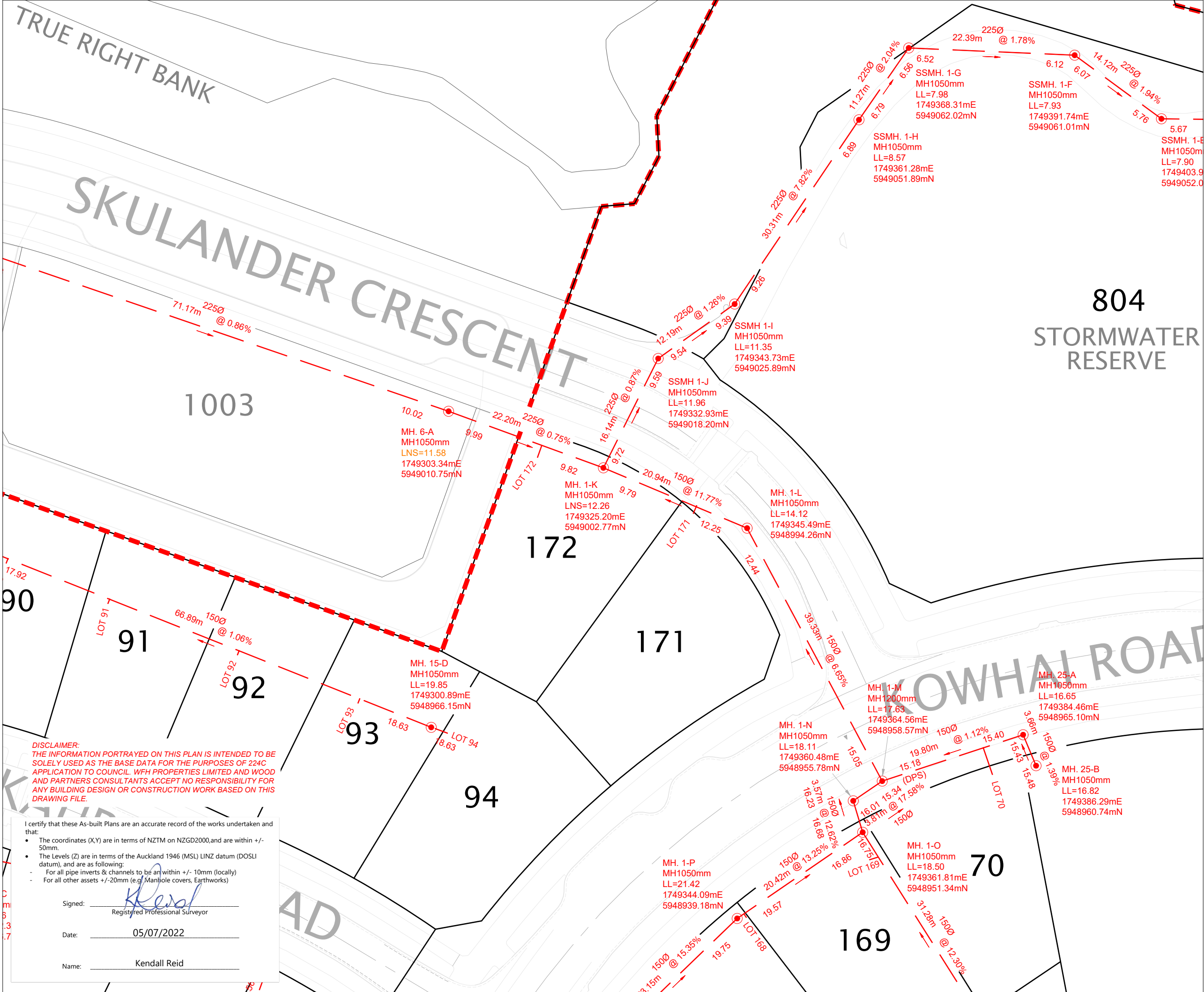
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- The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are as following:
 - For all pipe inverts & channels to be an within +/- 10mm (locally)
 - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: 
Registered Professional Surveyor

Date: 05/07/2022

Name: Kendall Reid



LEGEND

NEW SANITARY SEWER MANHOLE

NEW SANITARY SEWER

EXISTING SANITARY SEWER MANHOLE

EXISTING SANITARY SEWER

LOT BOUNDARIES

STAGE BOUNDARY

DROP-PROTECTION STRUCTURE (DPS)

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

- NOTES**
- ALL WORKS AND MATERIALS COMPLY WITH AUCKLAND COUNCIL & WATERCARE SERVICES LTD STANDARDS FOR ENGINEERING DESIGN AND CONSTRUCTION.
 - ALL SANITARY SEWER LINES ARE 150mmØ uPVC CLASS SN16 UNLESS STATED OTHERWISE.
 - ALL PIPE BEDDING COMPLIES WITH WATERCARE STANDARDS.
 - ALL PIPE CROSSINGS UNDER ROADS AND ACCESSWAYS HAVE BEEN HARDFILL BACKFILLED.
 - ALL PRIVATE LOT CONNECTIONS ARE 100mmØ uPVC CLASS SN16.
 - LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 - ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 - 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	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING 8 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	09 308 9229
CHECKED	JM	
APPROVED	KR	WOODS.CO.NZ

 **WFH** PROPERTIES 

**ARRAN HILL
PRECINCT 6 - STAGE 1**

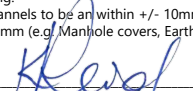
**WASTEWATER ASBUILT PLAN
SHEET 3 OF 7**

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-4002-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. WPH 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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 - For all other assets +/- 20mm (e.g. Manhole covers, Earthworks)

Signed: 
Registered Professional Surveyor

Date: 05/07/2022

Name: Kendall Reid



DISCLAIMER:
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 - For all other assets +/- 20mm (e.g. Manhole covers, Earthworks)

Signed: Kendall Reid
Registered Professional Surveyor

Date: 05/07/2022

Name: Kendall Reid

LEGEND

- NEW SANITARY SEWER MANHOLE
- NEW SANITARY SEWER
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER
- LOT BOUNDARIES
- STAGE BOUNDARY
- DROP-PROTECTION STRUCTURE (DPS)
- LNS= LID NOT SET AT FINAL LEVEL
& TO BE SET IN FUTURE STAGE

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

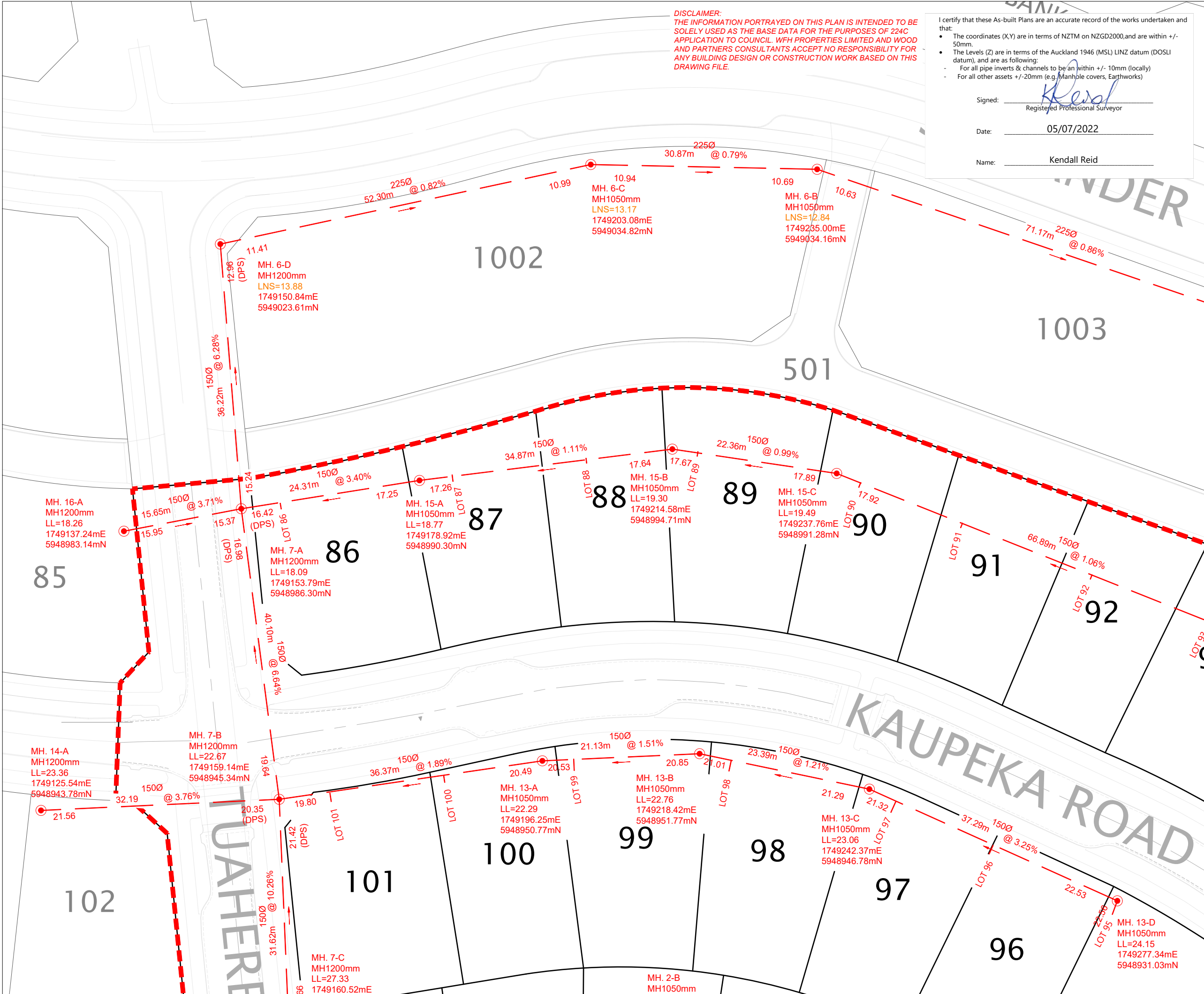
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	



ARRAN HILL PRECINCT 6 - STAGE 1

WASTEWATER ASBUILT PLAN SHEET 4 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-4003-AB	



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LEGEND

- NEW SANITARY SEWER MANHOLE
NEW SANITARY SEWER
EXISTING SANITARY SEWER MANHOLE
EXISTING SANITARY SEWER
LOT BOUNDARIES
STAGE BOUNDARY
DROP-PROTECTION STRUCTURE (DPS)
LNS= LID NOT SET AT FINAL LEVEL & TO BE SET IN FUTURE STAGE

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

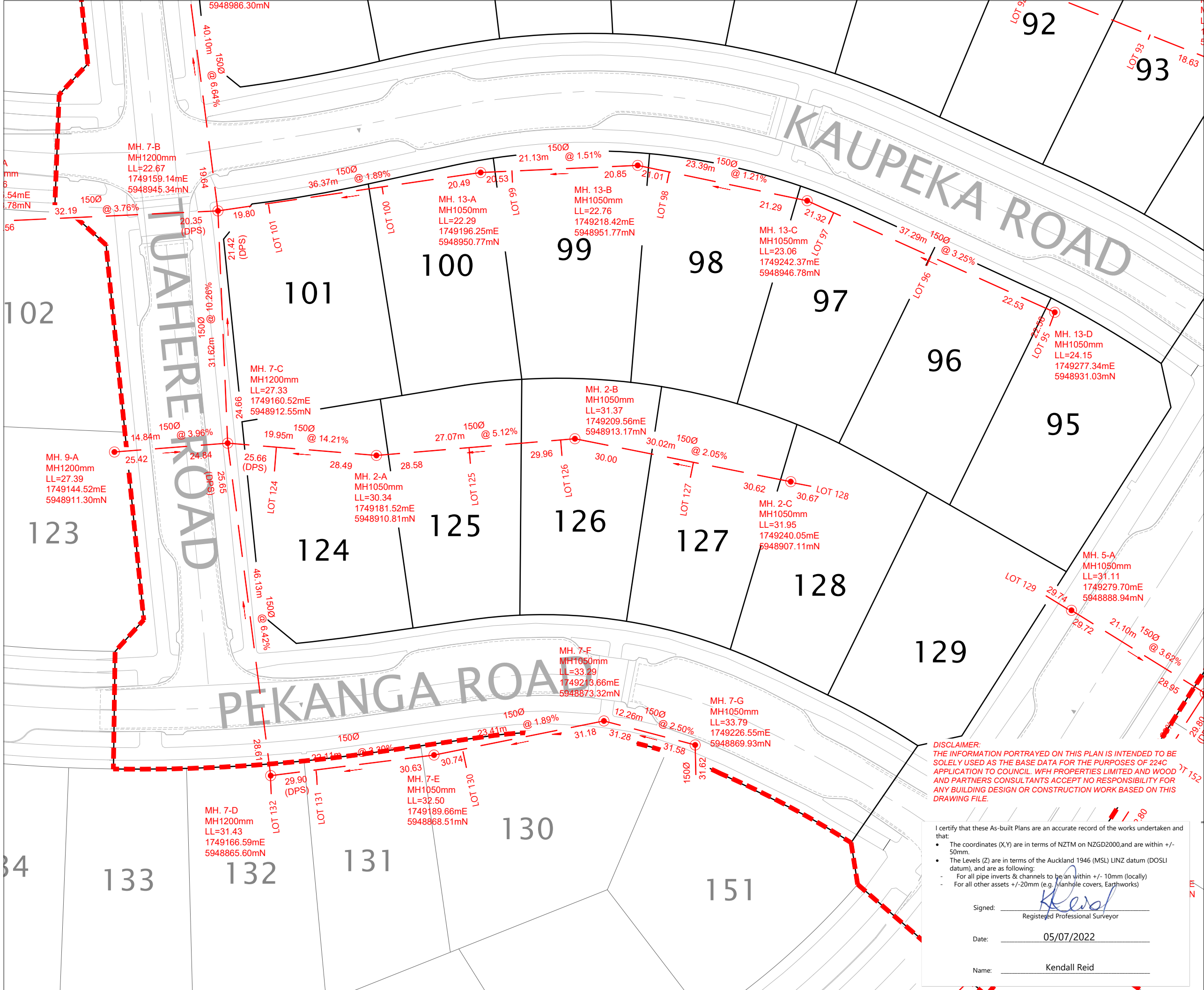
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

WASTEWATER ASBUILT PLAN
SHEET 5 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-4004-AB	



DISCLAIMER:
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- For all other assets +/- 20mm (e.g. Manhole covers, Earthworks)








Signed: *Kendall Reid*
Registered Professional Surveyor

Date: 05/07/2022

Name: Kendall Reid

C:\1205\ENERGY DATA\WP-BEN-APP-01\37611 - PRECINCT 6 STAGE 1_484\CAD\SURV\AB\37611_01_4004_AB WASTEWATER.DWG, 2022-Jul-05 11:37, PRINT AS PDF, PLT, PC3, NatD

LEGEND

- NEW SANITARY SEWER MANHOLE 
- NEW SANITARY SEWER 
- EXISTING SANITARY SEWER MANHOLE 
- EXISTING SANITARY SEWER 
- LOT BOUNDARIES 
- STAGE BOUNDARY 
- DROP-PROTECTION STRUCTURE (DPS) 

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

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	
APPROVED	KR	09 308 9229
		WOODS.CO.NZ

	
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ARRAN HILL PRECINCT 6 - STAGE 1

WASTEWATER ASBUILT PLAN SHEET 6 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-4005-AB	

DISCLAIMER:
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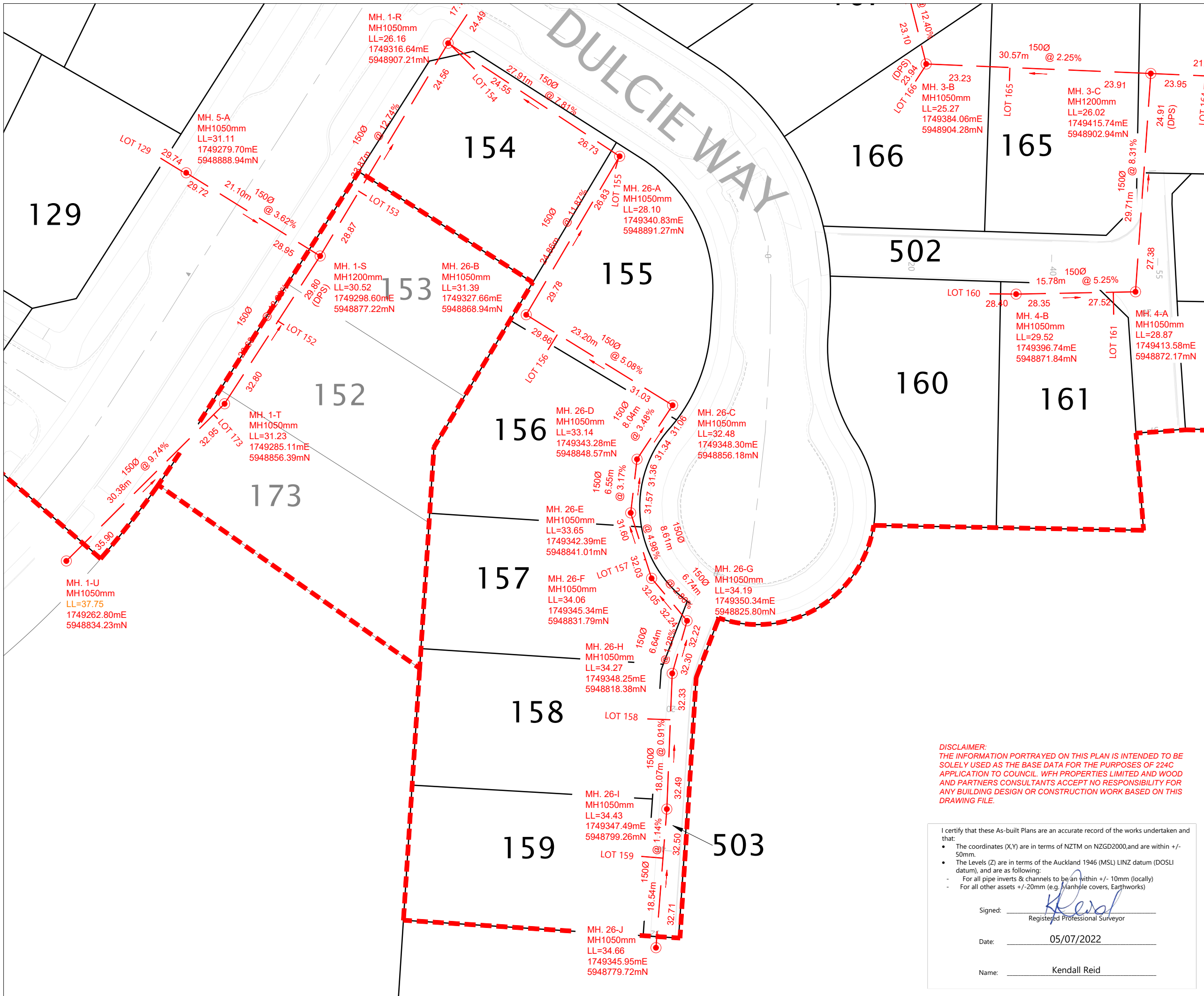
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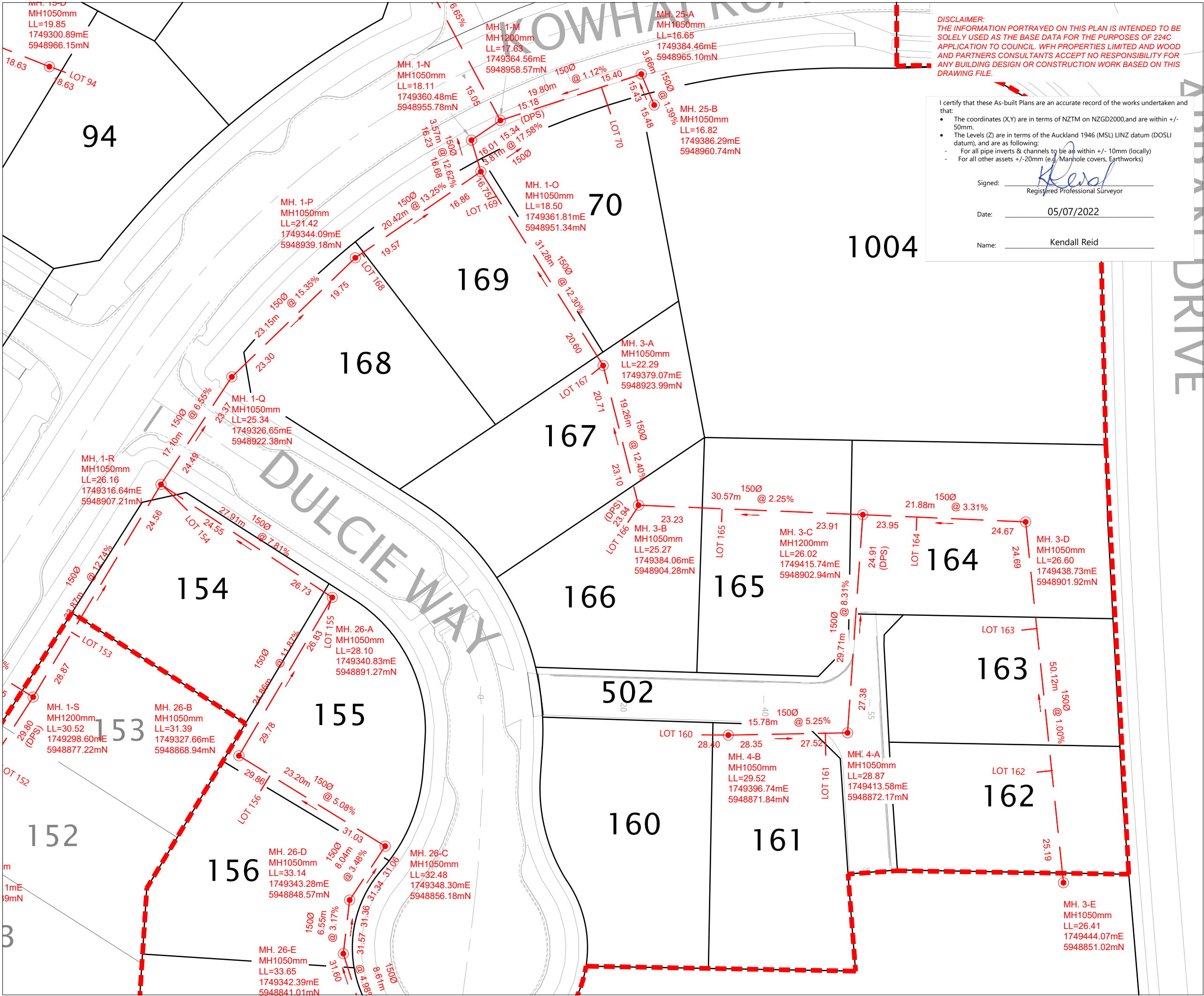
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Signed: 
Registered Professional Surveyor

Date: 05/07/2022

Name: Kendall Reid





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Signed: Kendall Reid
Registered Professional Surveyor

Date: 05/07/2022

Name: Kendall Reid

LEGEND

- NEW SANITARY SEWER MANHOLE
- NEW SANITARY SEWER
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER
- LOT BOUNDARIES
- STAGE BOUNDARY
- DROP-PROTECTION STRUCTURE (DPS)
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REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	JM	09 308 9229
APPROVED	KR	WOODS.CO.NZ

ARRAN HILL PRECINCT 6 - STAGE 1

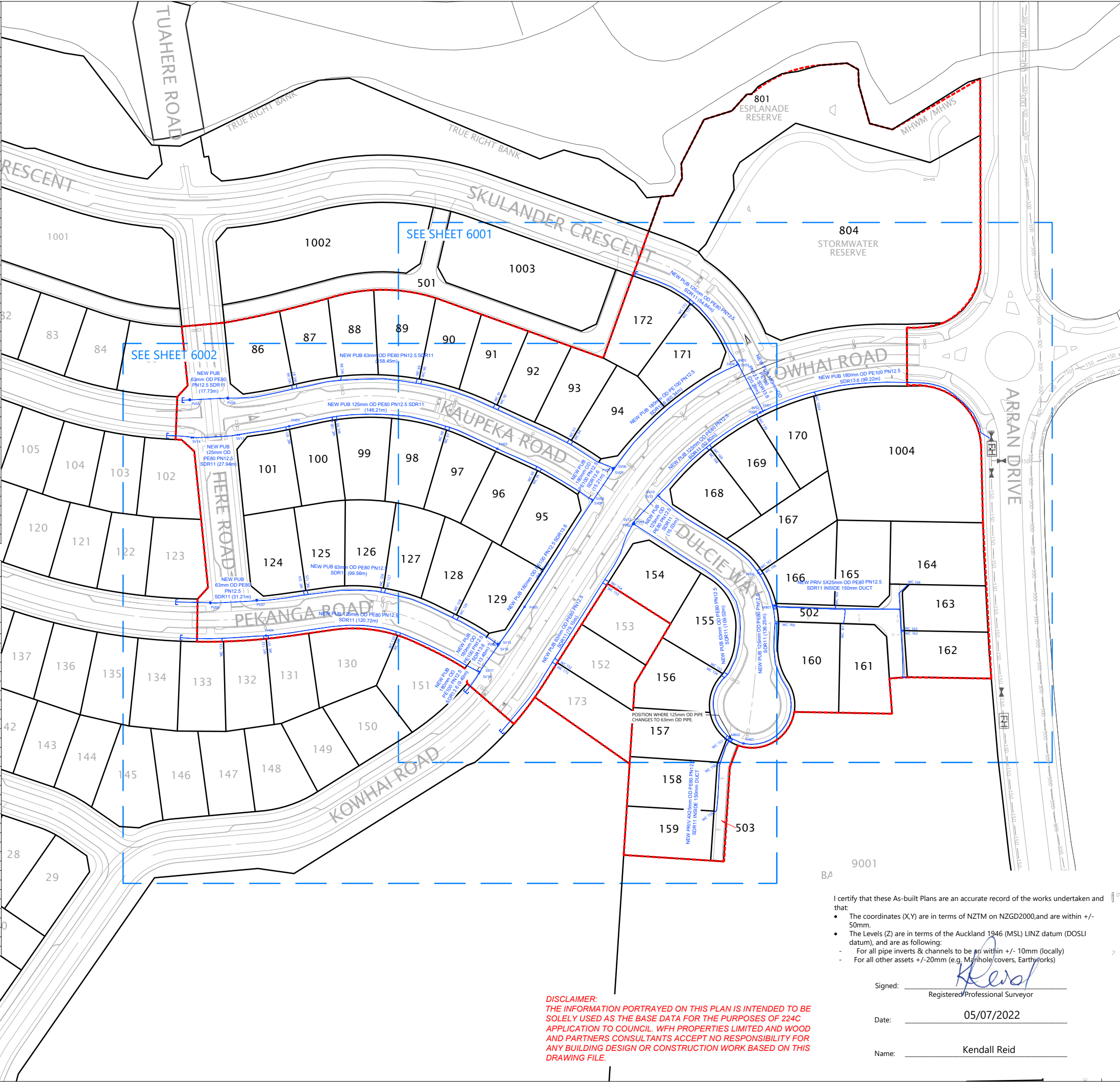
WASTEWATER ASBUILT PLAN SHEET 7 OF 7

STATUS	ISSUED FOR 224C	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-01-4006-AB	



SCHEDULE OF COORDINATES		
WATER RETICULATION LOT CONNECTIONS		
NAME	EASTING	NORTHING
WC 86	1749181.15	5948966.46
WC 87	1749182.90	5948966.97
WC 88	1749200.67	5948970.04
WC 89	1749230.09	5948969.13
WC 90	1749232.07	5948968.80
WC 91	1749260.29	5948959.16
WC 92	1749262.28	5948958.34
WC 93	1749289.25	5948945.40
WC 94	1749290.64	5948944.47
WC 95	1749277.54	5948932.53
WC 96	1749275.94	5948933.38
WC 97	1749242.12	5948948.40
WC 98	1749240.44	5948948.89
WC 99	1749198.76	5948952.24
WC 100	1749196.97	5948952.00
WC 101	1749179.23	5948948.55
WC 124	1749185.71	5948886.61
WC 125	1749187.13	5948886.67
WC 126	1749216.18	5948887.35
WC 127	1749217.77	5948887.14
WC 128	1749244.56	5948877.39
WC 129	1749246.37	5948876.55
WC 154	1749304.64	5948889.85
WC 155	1749349.12	5948854.73
WC 156	1749348.06	5948853.76
WC 157	1749349.45	5948828.49
WC 158	1749346.80	5948818.94
WC 159	1749345.42	5948800.12
WC 160	1749371.04	5948873.52
WC 161	1749395.53	5948873.35
WC 162	1749419.26	5948870.52
WC 163	1749419.18	5948871.04
WC 164	1749421.03	5948888.89
WC 165	1749392.85	5948880.71
WC 166	1749364.82	5948893.38
WC 167	1749363.52	5948895.11
WC 168	1749343.87	5948940.86
WC 169	1749344.76	5948941.54
WC 170	1749362.80	5948953.42
WC 171	1749336.40	5948997.21
WC 172	1749335.51	5948998.22
WC 1004	1749384.99	5948962.63
WATER RETICULATION LOT CONNECTIONS (FOR FUTURE LOTS)		
WC 130	1749221.69	5948869.27
WC 131	1749172.18	5948867.53
WC 132	1749170.46	5948867.53
WC 133	1749154.19	5948866.55
WC 151	1749223.21	5948868.78
WC 152	1749285.16	5948858.97
WC 153	1749303.86	5948888.63
WC 173	1749284.21	5948857.51

SCHEDULE OF COORDINATES		
WATER RETICULATION VALVES, HYDRANTS AND MANIFOLD BOXES		
NAME	EASTING	NORTHING
SV01	1749364.86	5948956.40
SV02	1749364.06	5948955.97
SV03	1749355.04	5948974.18
SV04	1749354.59	5948974.28
SV05	1749354.58	5948974.82
SV06	1749306.67	5948933.98
SV07	1749306.24	5948933.44
SV08	1749298.09	5948921.76
SV09	1749298.22	5948921.34
SV10	1749323.91	5948923.62
SV11	1749323.95	5948923.21
SV12	1749314.18	5948912.81
SV13	1749160.48	5948946.98
SV14	1749142.62	5948945.88
SV15	1749261.90	5948865.68
SV16	1749261.56	5948865.13
SV17	1749254.13	5948854.91
SV18	1749254.24	5948854.52
PV01	1749306.19	5948933.90
PV02	1749314.01	5948912.36
PV03	1749314.37	5948912.49
PV04	1749156.35	5948961.26
PV05	1749141.57	5948960.63
PV06	1749149.60	5948881.67
PV07	1749167.61	5948882.67
PV08	1749261.37	5948865.57
FH01	1749363.43	5948955.66
FH02	1749261.17	5948941.59
FH03	1749180.21	5948950.35
FH04	1749171.30	5948868.91
FH05	1749271.75	5948879.94
FH06	1749362.76	5948893.31
FH07	1749356.92	5948826.96
MB1	1749369.06	5948880.04
MB2	1749351.68	5948828.34



- NOTES
- ALL WORK AND MATERIALS COMPLIES WITH AC STANDARD FOR ENGINEERING DESIGN AND CONSTRUCTION.
 - PIPE BEDDING COMPLIES WITH AC STD DETAIL DRAWING 18000 SHEET 4.4 UNLESS OTHERWISE NOTED.
 - WATERMAINS ARE AN AVERAGE 0.6m BELOW GROUND IN BERMS AND 0.9m BELOW GROUND UNDER ROADS. HARDFILL BACKFILLED BENEATH ROAD CROSSINGS.
 - ALL PIPES ARE LAID 1.4m OFF THE ROAD RESERVE BOUNDARY IN THE COMMON SERVICE TRENCH.
 - PIPE SIZES SHOWN ARE EXTERNAL DIAMETER.
 - LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
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LEGEND

EXISTING WATERMAIN

HIGH PRESSURE WATERMAIN

SLUICE VALVE

PEET VALVE

FIRE HYDRANT

BLANK CAP

WATER METER BANK

STAGE BOUNDARY

LOT BOUNDARY

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	KR	04/04/22
2	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	MD	09 308 9229
CHECKED	RV	
APPROVED	KR	WOODS.CO.NZ

WFH PROPERTIES

ARRAN HILL
PRECINCT 6 STAGE 1
WATERMAIN ASBUILT PLAN
LAYOUT SHEET
SHEET 1 OF 3

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 1500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-P6-01-6000-AB	

DISCLAIMER:
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804
STORMWATER
RESERVE

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Signed: Kendall Reid
Registered Professional Surveyor

Date: 05/07/2022

Name: Kendall Reid

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LEGEND

- EXISTING WATERMAIN
- HIGH PESSURE WATERMAIN
- SLUICE VALVE
- PEET VALVE
- FIRE HYDRANT
- BLANK CAP
- WATER METER BANK
- STAGE BOUNDARY
- LOT BOUNDARY

REVISION DETAILS	BY	DATE
1 ISSUED FOR INFORMATION	KR	04/04/22
2 ISSUED FOR 224C	MD	05/07/22

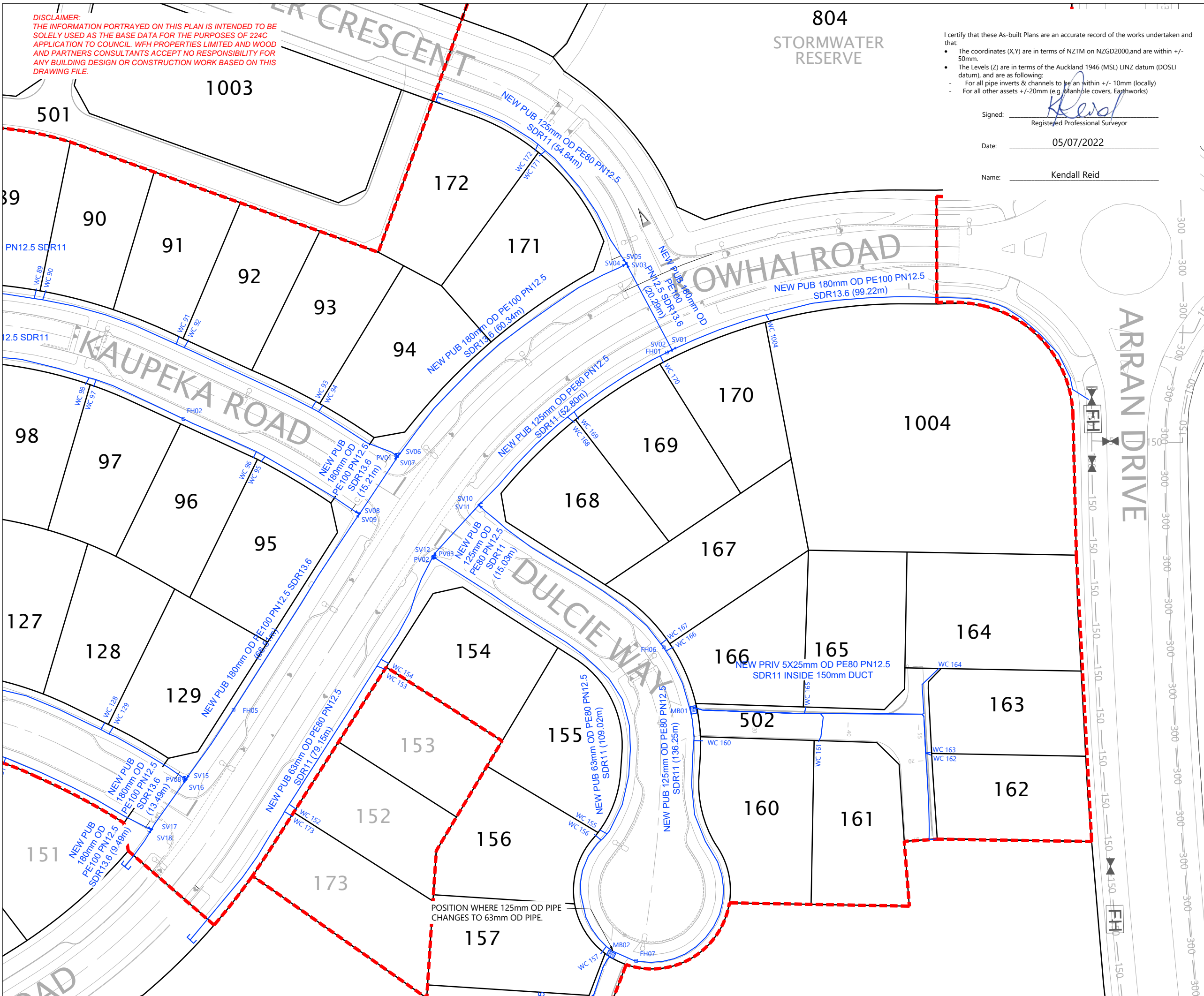
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	

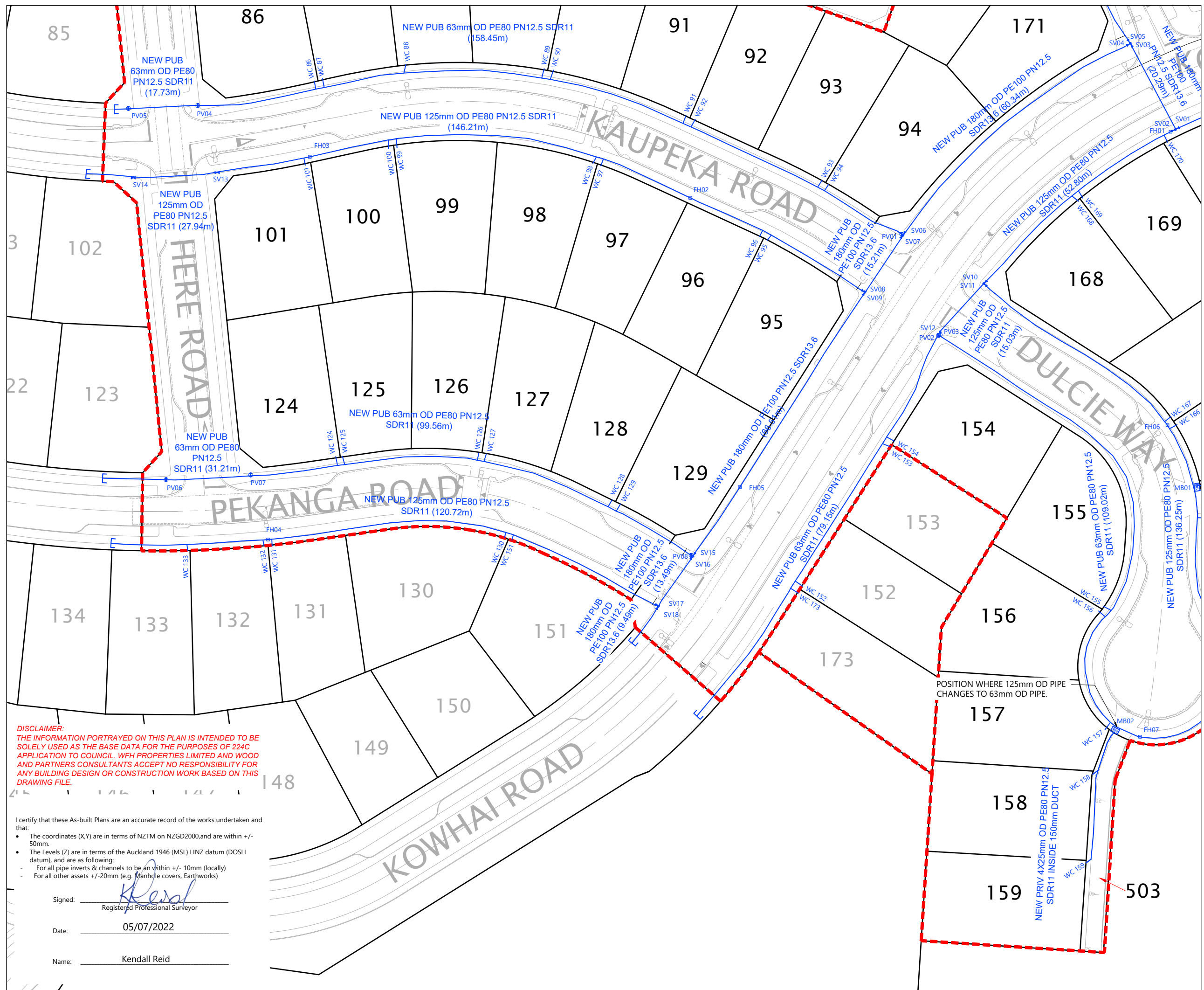


ARRAN HILL
PRECINCT 6 STAGE 1

WATERMAIN ASBUILT PLAN
SHEET 2 OF 3

STATUS	ISSUED FOR 224C	REV
SCALE	1 : 750 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-P6-01-6001-AB	





NOTES

1. ALL WORK AND MATERIALS COMPLIES WITH AC STANDARD FOR ENGINEERING DESIGN AND CONSTRUCTION.
2. PIPE BEDDING COMPLIES WITH AC STD DETAIL, DRAWING 18000 SHEET 4.4 UNLESS OTHERWISE NOTED.
3. WATERMAINS ARE AN AVERAGE 0.6m BELOW GROUND IN BERMS AND 0.9m BELOW GROUND UNDER ROADS, HARDFILL BACKFILLED BENEATH ROAD CROSSINGS.
4. ALL PIPES ARE LAID 1.4m OFF THE ROAD RESERVE BOUNDARY IN THE COMMON SERVICE TRENCH.
5. PIPE SIZES SHOWN ARE EXTERNAL DIAMETER.
6. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
7. ASBLT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.

LEGEND

EXISTING WATERMAIN



HIGH PRESSURE

SLUICE VALVE

PEET VALVE

FIRE HYDRANT

BLANK CAP

WATER METER BANK

STAGE BOUNDARY

LOT BOUNDARY

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	KR	04/04/22
2	ISSUED FOR 224C	MD	05/07/22

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING 8 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	MD	
CHECKED	RV	
APPROVED	KR	



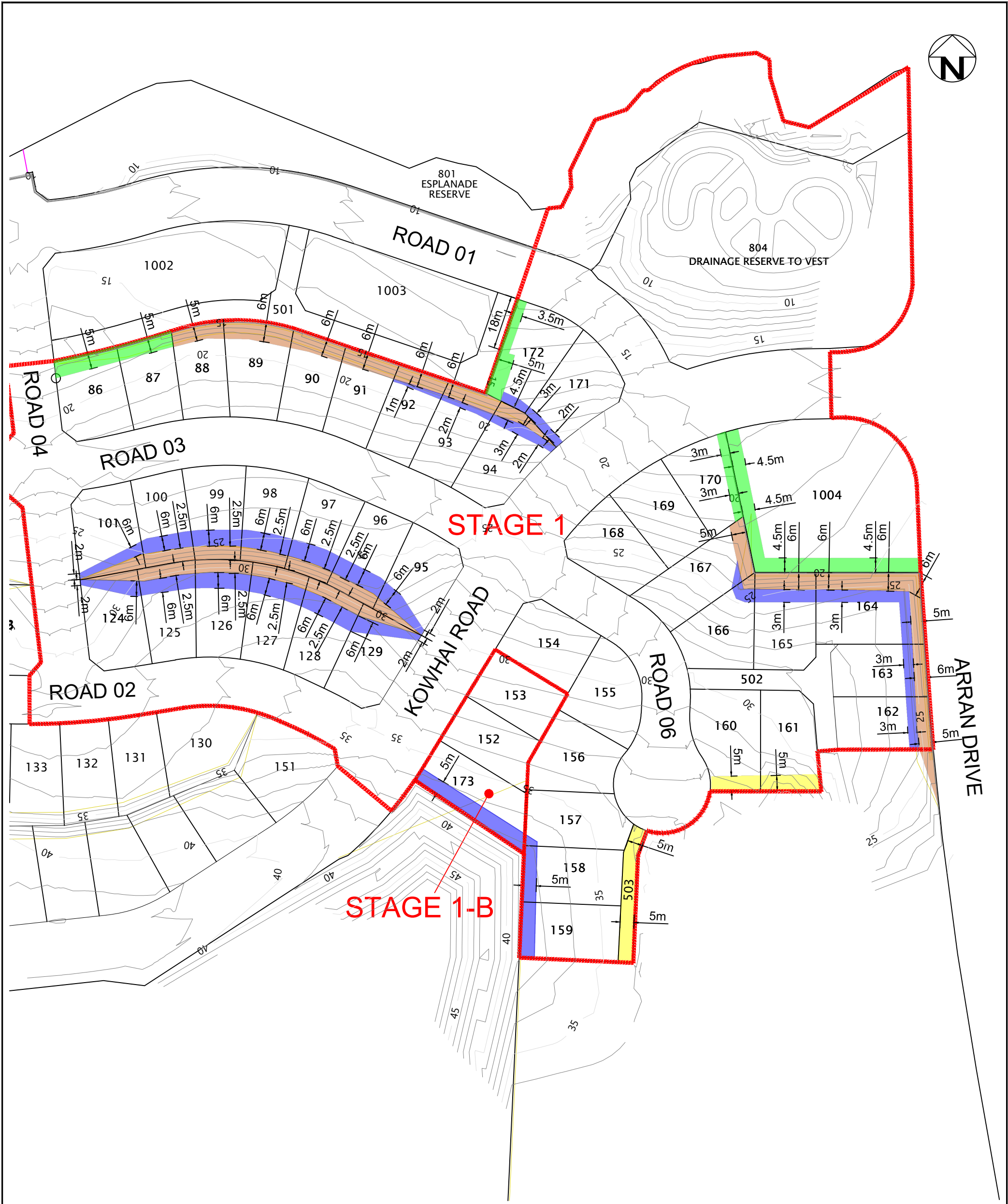
WFH
PROPERTIES

ARRAN HILL PRECINCT 6 STAGE 1

WATERMAIN ASBUILT PLAN
SHEET 3 OF 3

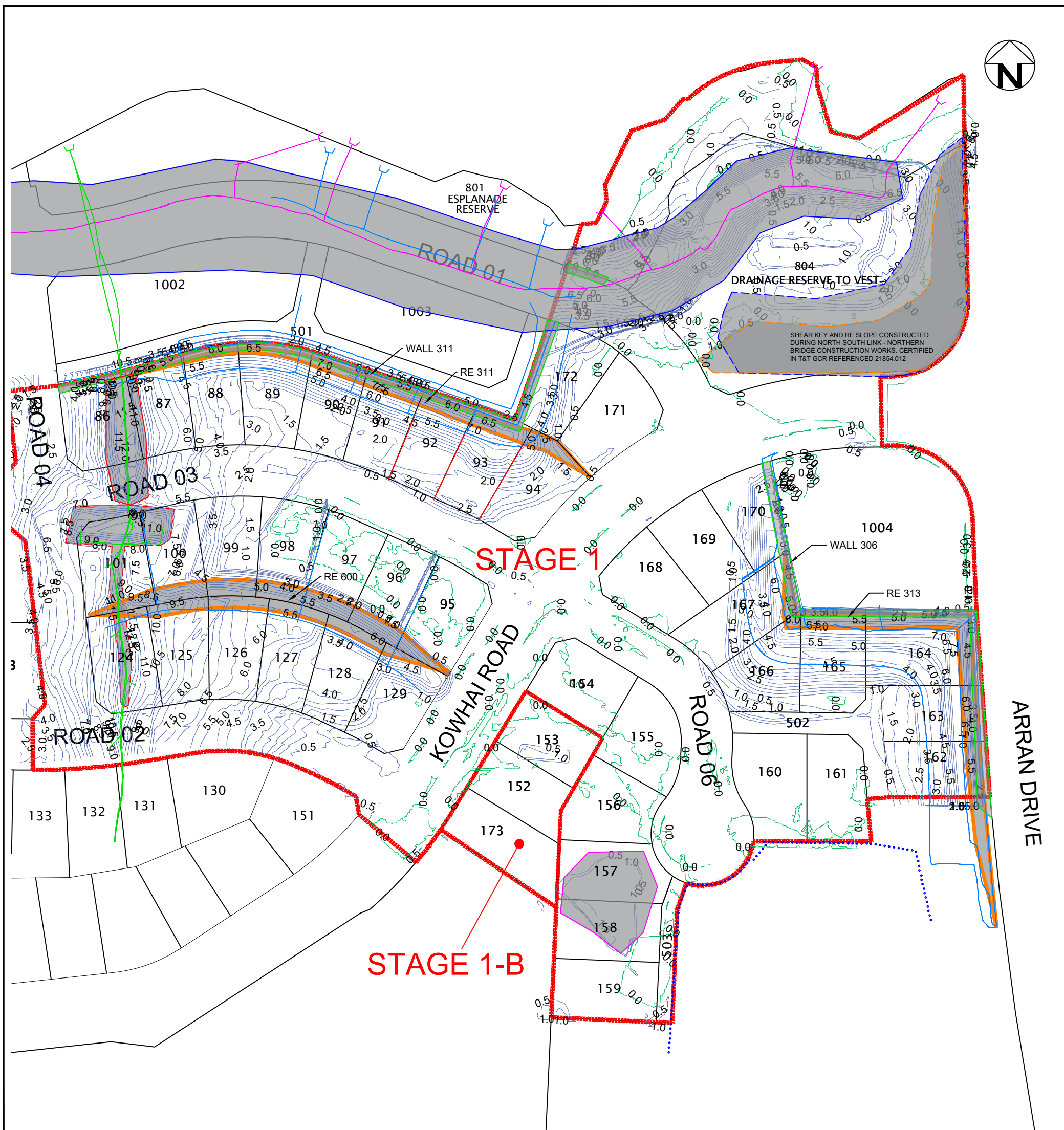
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SCALE	1 : 750 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-P6-01-6002-AB	

APPENDIX B: REFERENCE DRAWINGS



revision	no.	description	drawn	approved	date	<div>LEGEND</div> <div><div></div>NO BUILD ZONE</div> <div><div></div>SPECIFIC DESIGN ZONE (RETAINING WALLS)</div> <div><div></div>SPECIFIC DESIGN ZONE (SLOPE)</div> <div><div></div>SPECIFIC DESIGN ZONE (PALISADE WALLS)</div>			
	A	ORIGINAL ISSUE	RZ	SP	09/03/2022				

<div><div><div>012.52537.55062.5</div><div>SCALE1:1250 (A3)METRES</div></div></div>	drawn	RZ	<div><div><div>Tt</div><div>TETRA TECH</div><div>COFFEY</div></div></div>	client:WFH PROPERTIES LIMITED		
	approved	SP		project:MILLWATER PRECINCT 6 - SUBDIVISION STAGE 1		
	date	09/03/2022		title:GEOTECHNICAL BUILDING LIMITATION ZONES PLAN		
	scale	AS SHOWN		project no:773-AKLGE206639		
	original size	A3		figure no:BE01		rev:A



	no.	description	drawn	approved	date
A	ORIGINAL ISSUE		SP	SP	06/06/2022

revision

LEGEND

SHEAR KEY SK1

RE SLOPE

SEGMENTAL BLOCK RETAINING WALL

GULLY UNDERCUT

ROCK UNDERCUT

COUNTERFORT DRAIN

UNDERFILL DRAIN

SHEAR KEY DRAINAGE

RETAINING WALL / RE SLOPE DRAINAGE

PALISADE WALL PW804

RETAINING WALL DRAINAGE CONCRETE WINGWALL OUTLET

SHEAR KEY DRAINAGE CONCRETE WINGWALL OUTLET

GULLY DRAINAGE CONCRETE WINGWALL OUTLET

AS-BUILT FILL DEPTH CONTOURS

EXISTING RE SLOPE

EXISTING SHEAR KEY

GULLY UNDERCUT AND UNDERFILL DRAINAGE CONSTRUCTED DURING ENABLING WORKS PACKAGE (CERTIFIED IN T&T GCR 21854.0034/AHP6EW.v1)

SCALE

METRES

TtTETRA TECHCOFFEY

client:

WFH PROPERTIES LIMITED

project:

MILLWATER PRECINCT 6 - SUBDIVISION STAGE 1

title:

GEOTECHNICAL WORKS PLAN

project no:

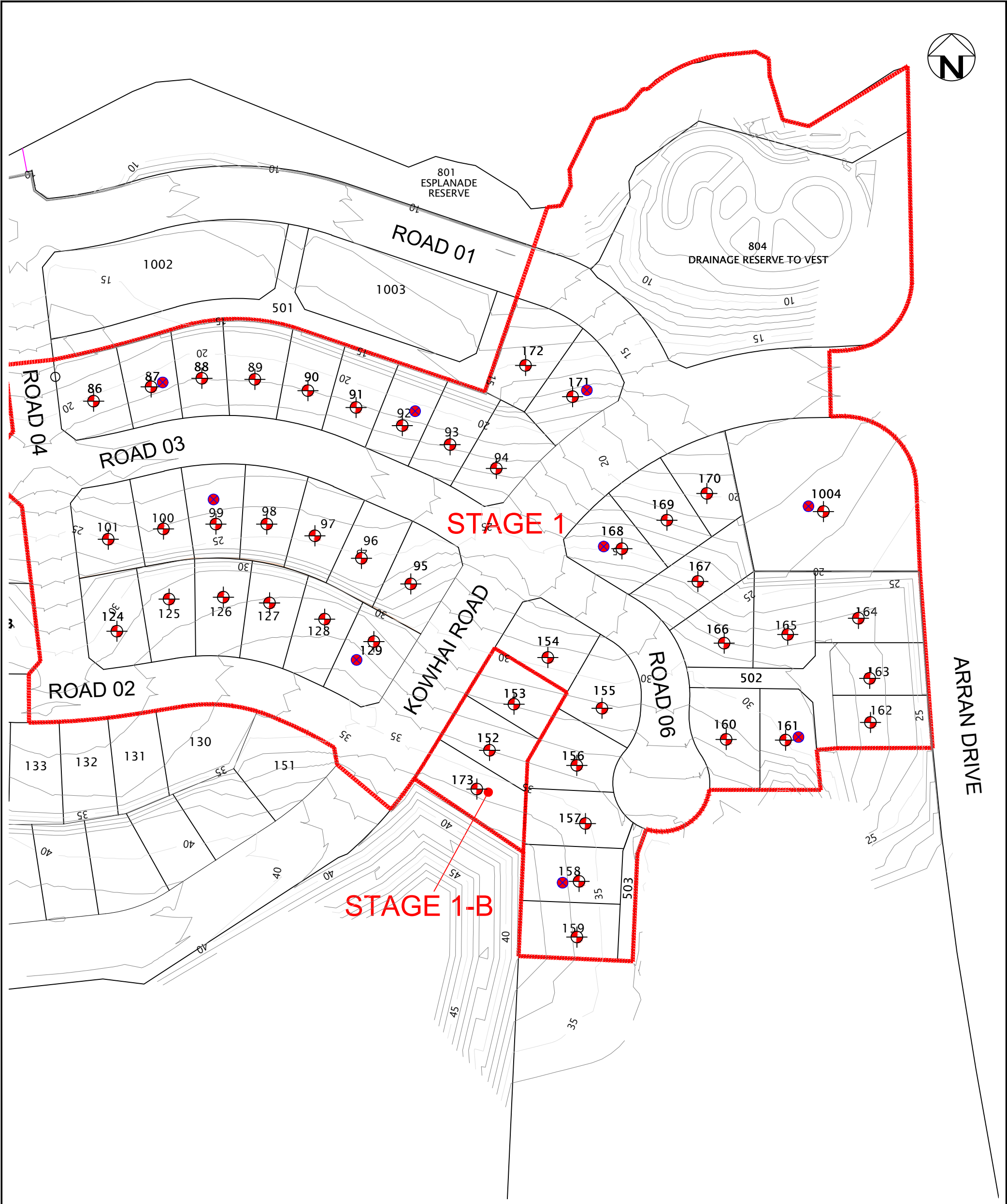
773-AKLGE206639

figure no:

AT/001

rev:

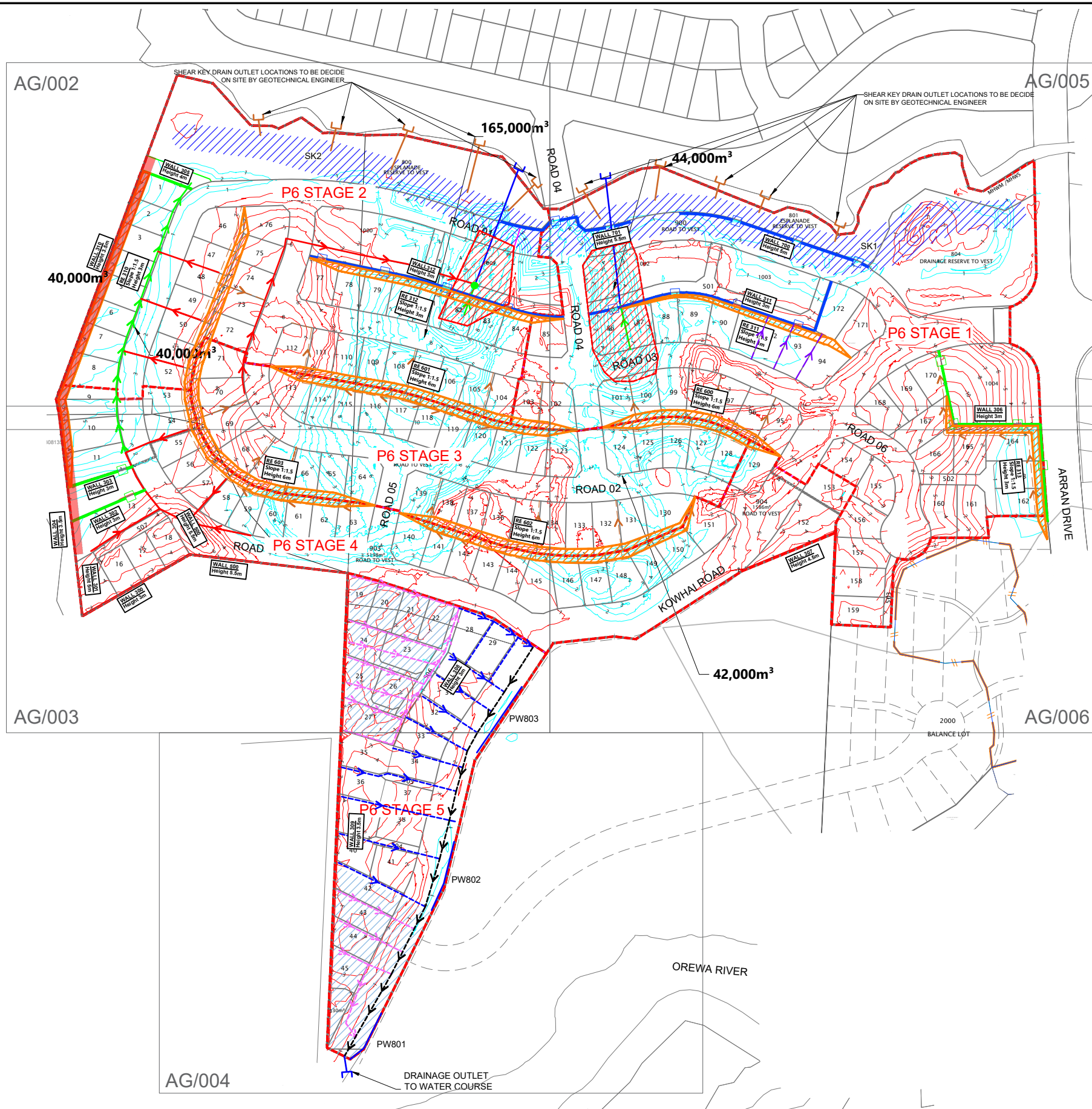
A



revision	no.	description		drawn	approved	date		<div>LEGEND</div> <div><div><div></div></div><div>HAND AUGER BOREHOLE</div></div> <div><div></div></div> <div>EXPANSIVE SOIL TESTS</div>				
	A	ORIGINAL ISSUE		RZ	SP	06/06/2022						
<div><div><div>012.52537.55062.5</div><div>SCALE1:1250 (A3)METRES</div></div></div>				drawn	RZ		<div><div><div>Tt</div><div>TETRA TECH</div><div>COFFEY</div></div></div>			client: <div>WFH PROPERTIES LIMITED</div>		
				approved	SP					project: <div>MILLWATER PRECINCT 6 - SUBDIVISION STAGE 1</div>		
				date	06/06/2022					title: <div>GEOTECHNICAL INVESTIGATION PLAN</div>		
				scale	AS SHOWN					project no: <div>773-AKLGE206639</div>		
				original size	A3		figure no: <div>AT/002</div>					
						rev: <div>A</div>						

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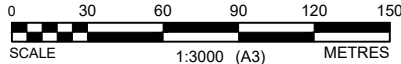
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EARTHWORKS VOLUMES		
STAGE	CUT	FILL
STAGE 1	109,000m3	50,000m3
STAGE 2	45,000m3	94,000m3
STAGE 3	26,000m3	93,000m3
STAGE 4	21,000m3	60,400m3
STAGE 5	39,000m3	-

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

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



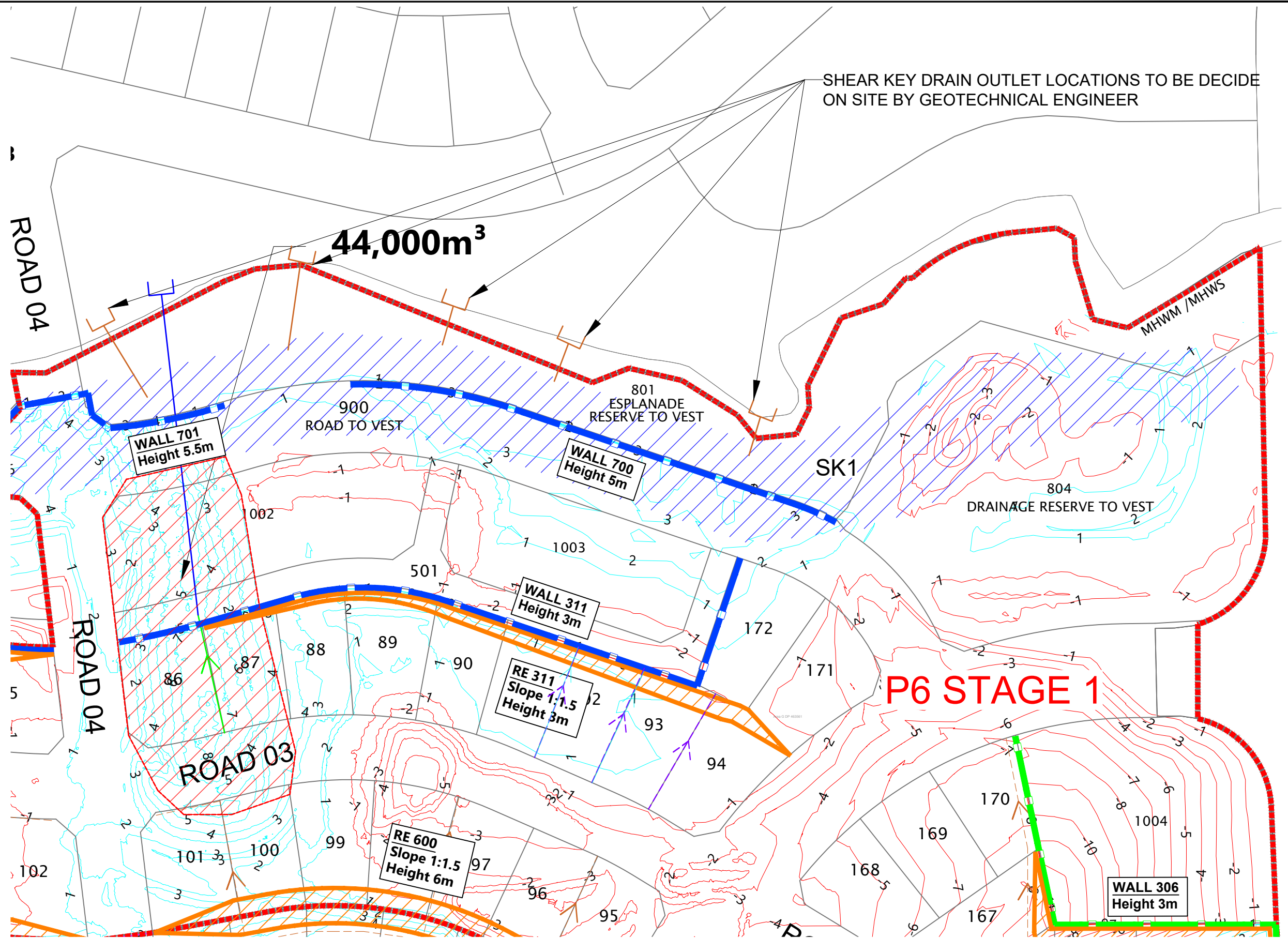
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original size	A3



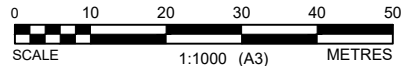
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project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	GEOTECHNICAL REMEDIATION PLAN		
project no:	773-AKLGE206639	figure no:	AG/001
		rev:	B

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



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

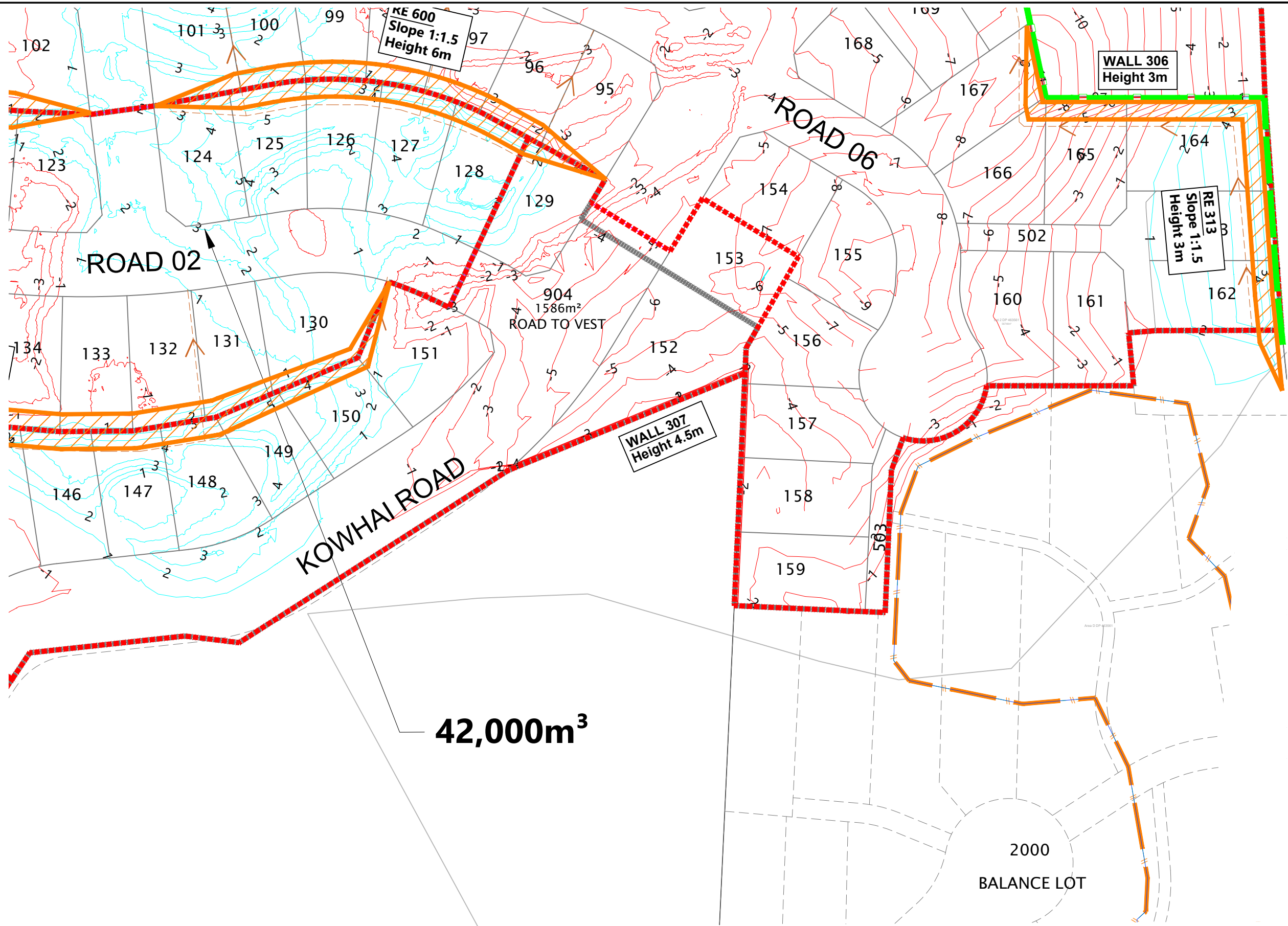


drawn	RZ
approved	SP
date	20/07/2020
scale	AS SHOWN
original size	A3



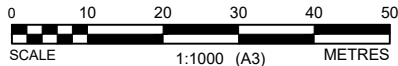
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title:	GEOTECHNICAL REMEDIATION PLAN		
project no:	773-AKLGE206639	figure no:	AG/005
		rev:	B

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- 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

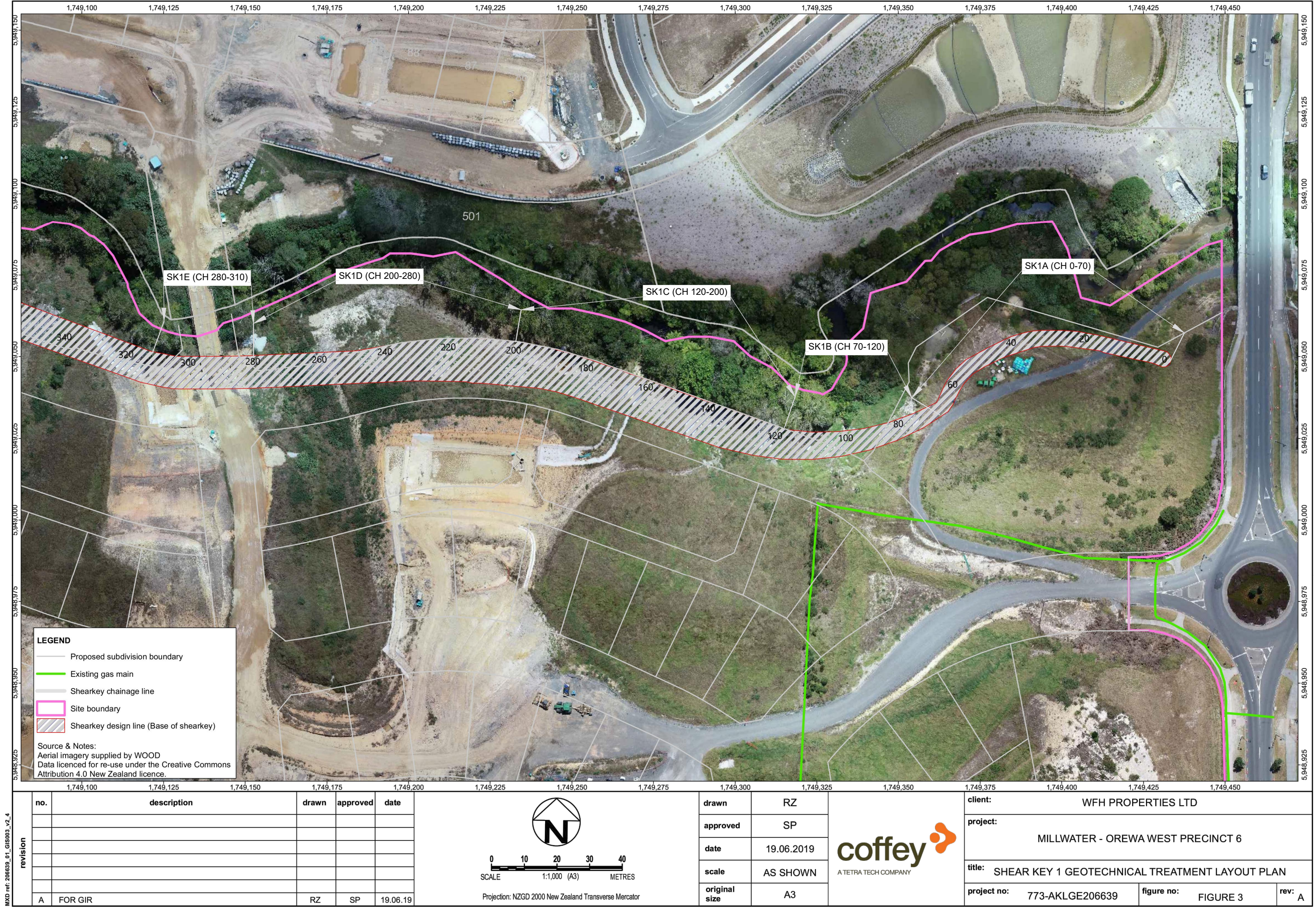
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	B	UPDATE TO CF DRAIN LAYOUT	RZ	SP	20/07/2020



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



client:	WFH PROPERTIES LTD		
project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	GEOTECHNICAL REMEDIATION PLAN		
project no:	773-AKLGE206639	figure no:	AG/006
		rev:	B

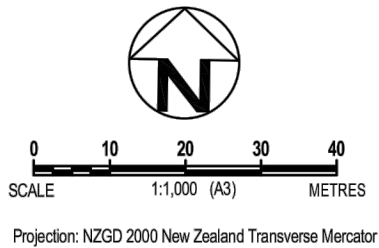


LEGEND


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

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



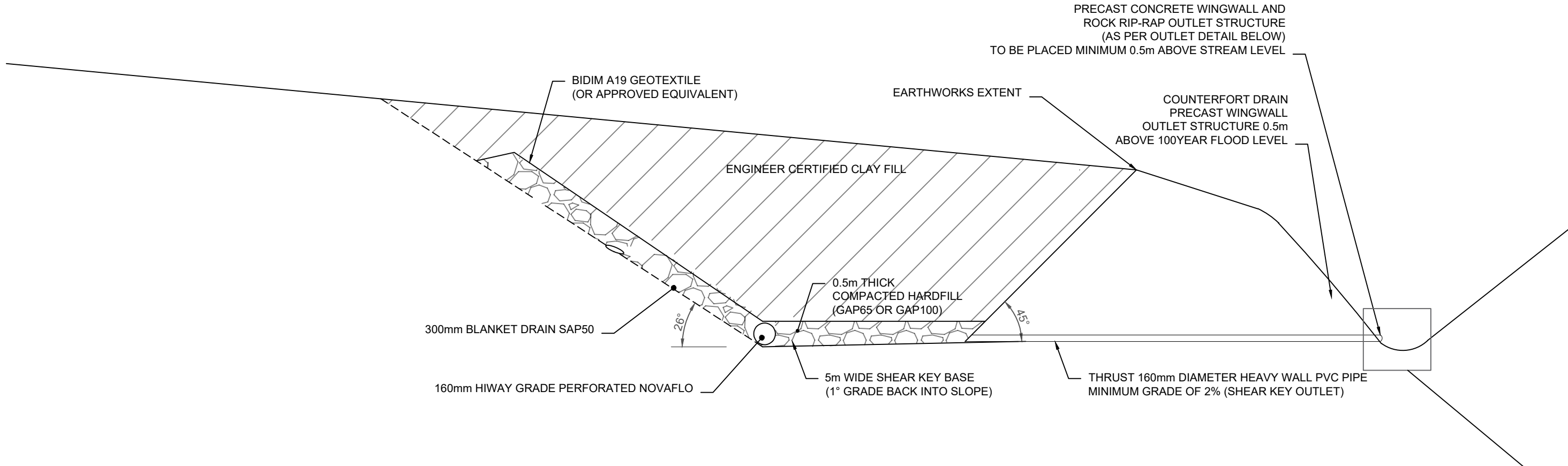
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approved	SP
date	19.06.2019
scale	AS SHOWN
original size	A3



A TETRA TECH COMPANY

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

PLOT DATE: 22/10/2019 12:34:50 PM DWG FILE: \\TTSR08FS2\808\GEN2\9 PROJECT\73\AKLGE PROJECT\9206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\LONG SECTION.DWG



HOLD POINTS:

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

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

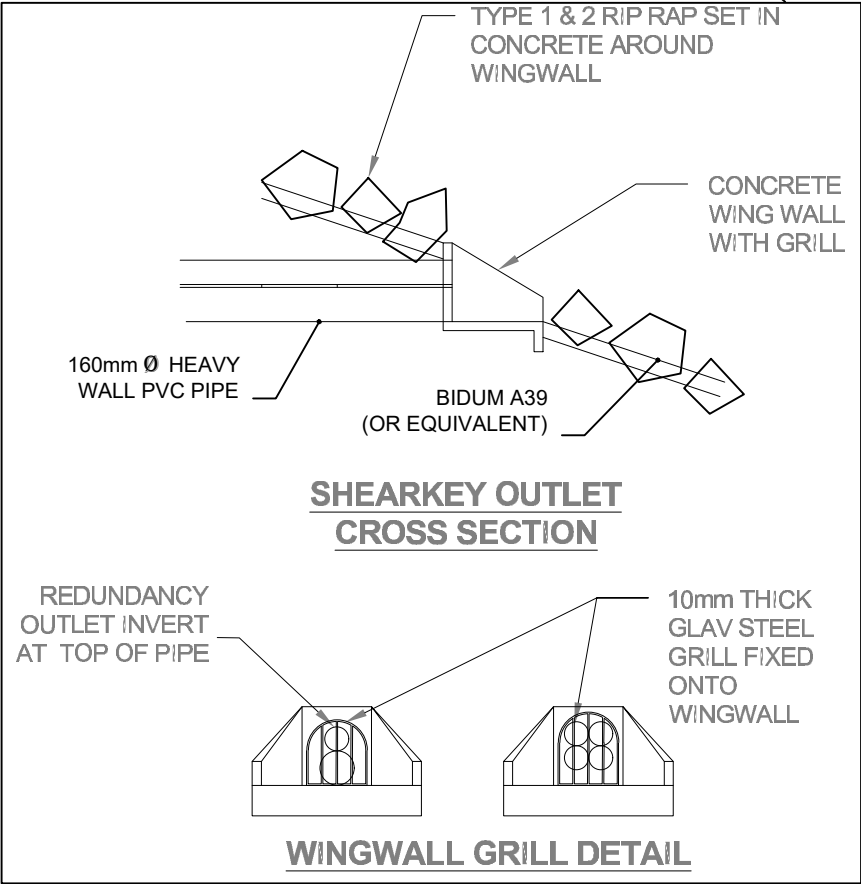
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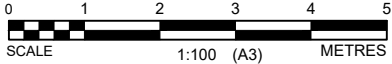
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

NOTES:

1. SHEAR KEY BASE TO BE EXCAVATED A MINIMUM DEPTH OF 1m INTO COMPETENT IDENTIFIED WAITEMATA GROUP N>50 BEDROCK, (LIKELY TO BE 2m RL BETWEEN CH00AND CH70, BUT MAY REQUIRE FURTHER EXCAVATION TO 1mRL BETWEEN CH50-CH70);
2. SHEAR KEY BASAL DRAINAGE SHOULD CONSIST OF 160mm HIWAY NOVAFLO DRAINS PLACED WITHIN THE COMPACTED HARDFILL AND WILL BE CONFIRMED DURING CONSTRUCTION;
3. FILL COMPACTION TESTING ON SHEAR KEY CLAY FILL IS REQUIRED EVERY 0.5m VERTICAL LIFT;
4. COHESIVE FILL TO ACHIEVE AN AVERAGE UNDRAINED SHEAR STRENGTH of >140 KPa (MINIMUM SINGLE VALUE OF 110KPa). AVERAGE AIR VOIDS TO BE LESS THAN 10% (MAXIMUM SINGLE TEST OF 12%). BASAL HARDFILL TO ACVHIEVE A MINIMUM CLEGG IMPACT VALUE OF 25;
5. THRUST SHEAR KEY OUTLETS REQUIRED APPROXIMATELY EVERY 25m. FINAL POSITIONS TO BE CONFIRMED BY COFFEY ONSITE TO ENSURE LOW POINTS ARE DRAINED AND ADEQUATE FALL IS ACHIEVED.



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



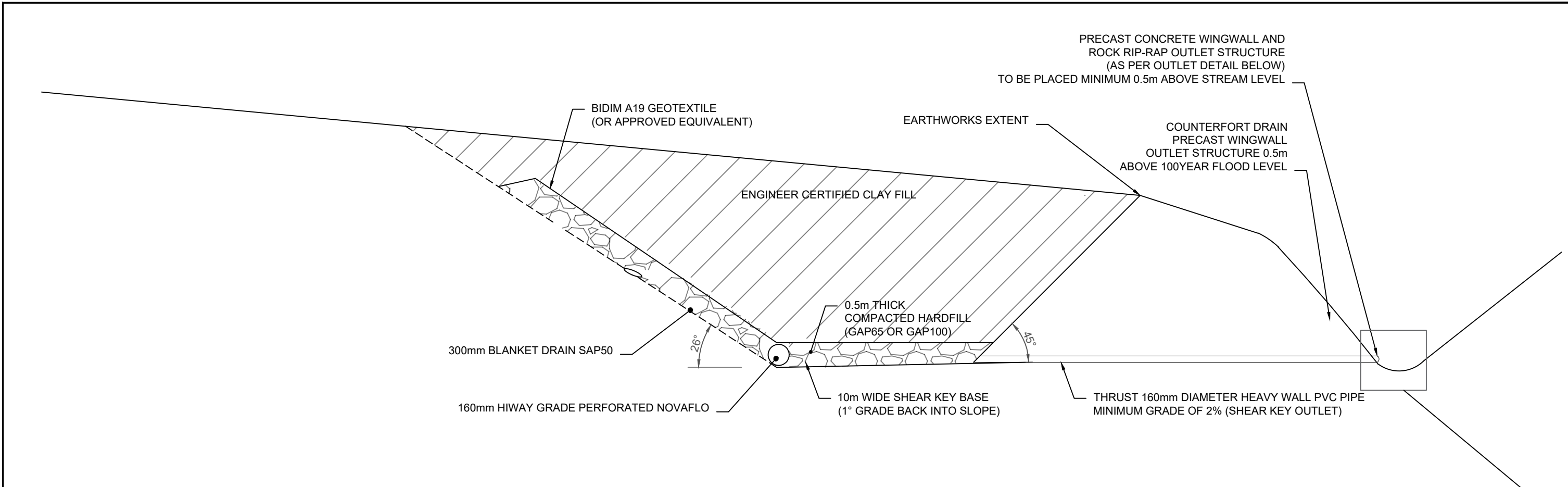
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approved	AC
date	06/09/2019
scale	NTS
original size	A3



A TETRA TECH COMPANY

client: WFH PROPERTIES LTD		
project: MILLWATER PRECINCT 6		
title: SHEAR KEY 1A DETAIL (CH00 - CH70)		
project no: 773-AKLGE206639	figure no: AB/005	rev: A

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



HOLD POINTS:

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

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

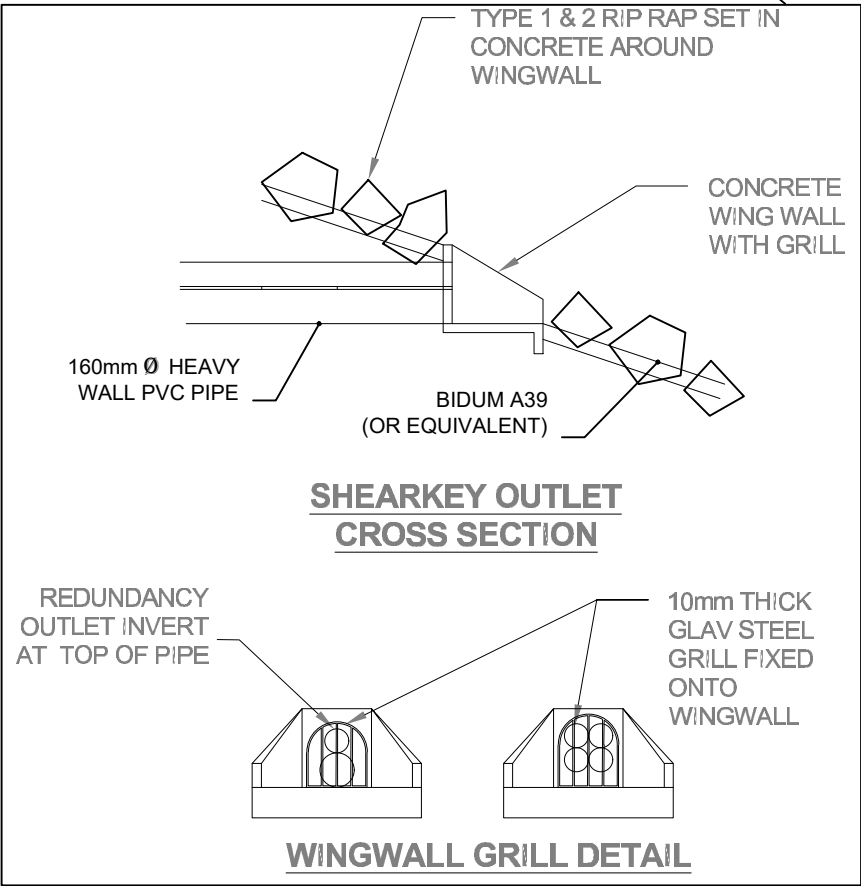
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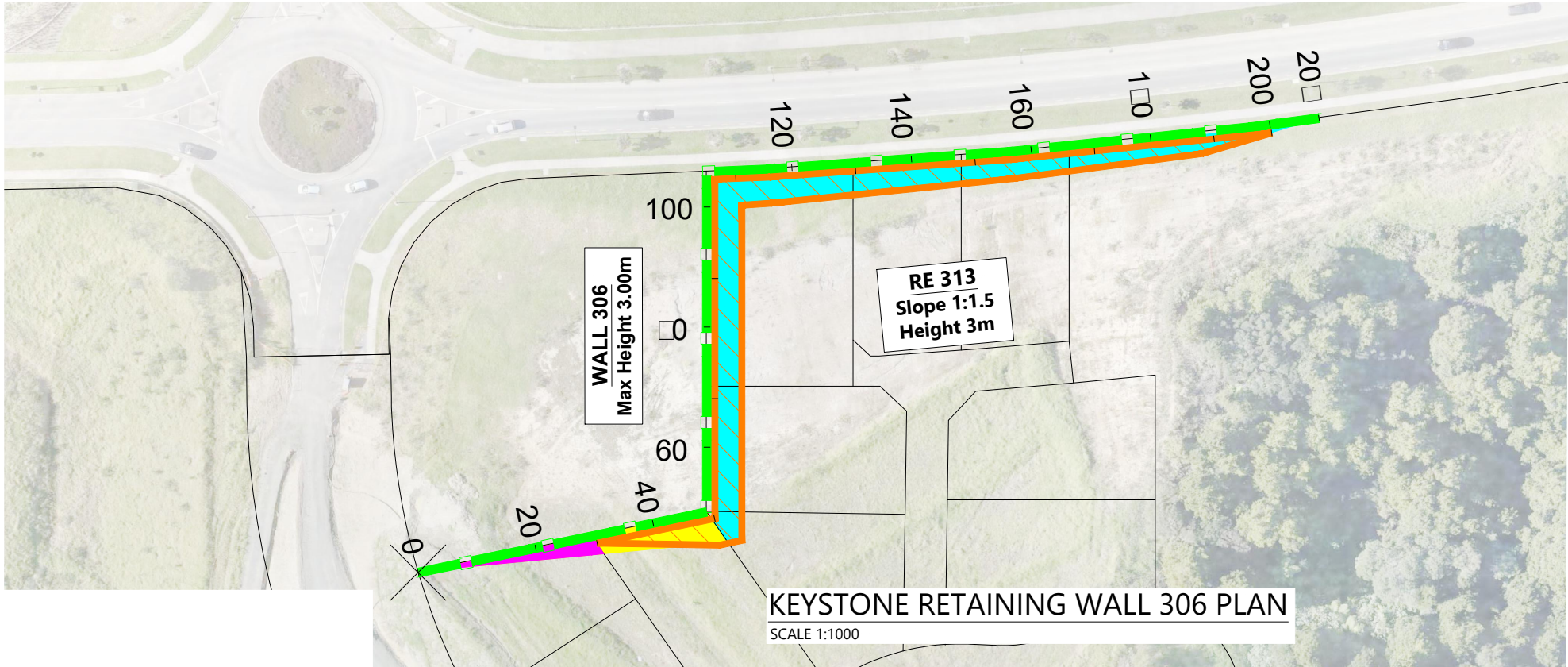
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

NOTES:

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



revision	no.	description		drawn	approved	date	<div>012345 SCALE1:100 (A3)METRES</div>		drawn	RZ	<div>coffeyA TETRA TECH COMPANY</div>		client: WFH PROPERTIES LTD		
	A	ORIGINAL ISSUE		RZ	SP	06/09/2019			approved	SP			project: MILLWATER PRECINCT 6		
									date	06/09/2019			title: SHEAR KEY 1B/C DETAIL (CH70 - CH200)		
									scale	1:100			project no: 773-AKLGE206639		
									original size	A3			figure no: AB/006		
													rev: A		



LEGEND

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

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 GD05 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.

COLOUR CODE

- WALL DESIGN AS PER WALL 306 - DETAIL 1 (REFER TO COFFEY DRAWING AM/005)
- WALL DESIGN AS PER WALL 306 - DETAIL 2 (REFER TO COFFEY DRAWING AM/005)
- WALL DESIGN AS PER WALL 306 - DETAIL 3 (REFER TO COFFEY DRAWING AM/005)

DATUM R.L. 4.00

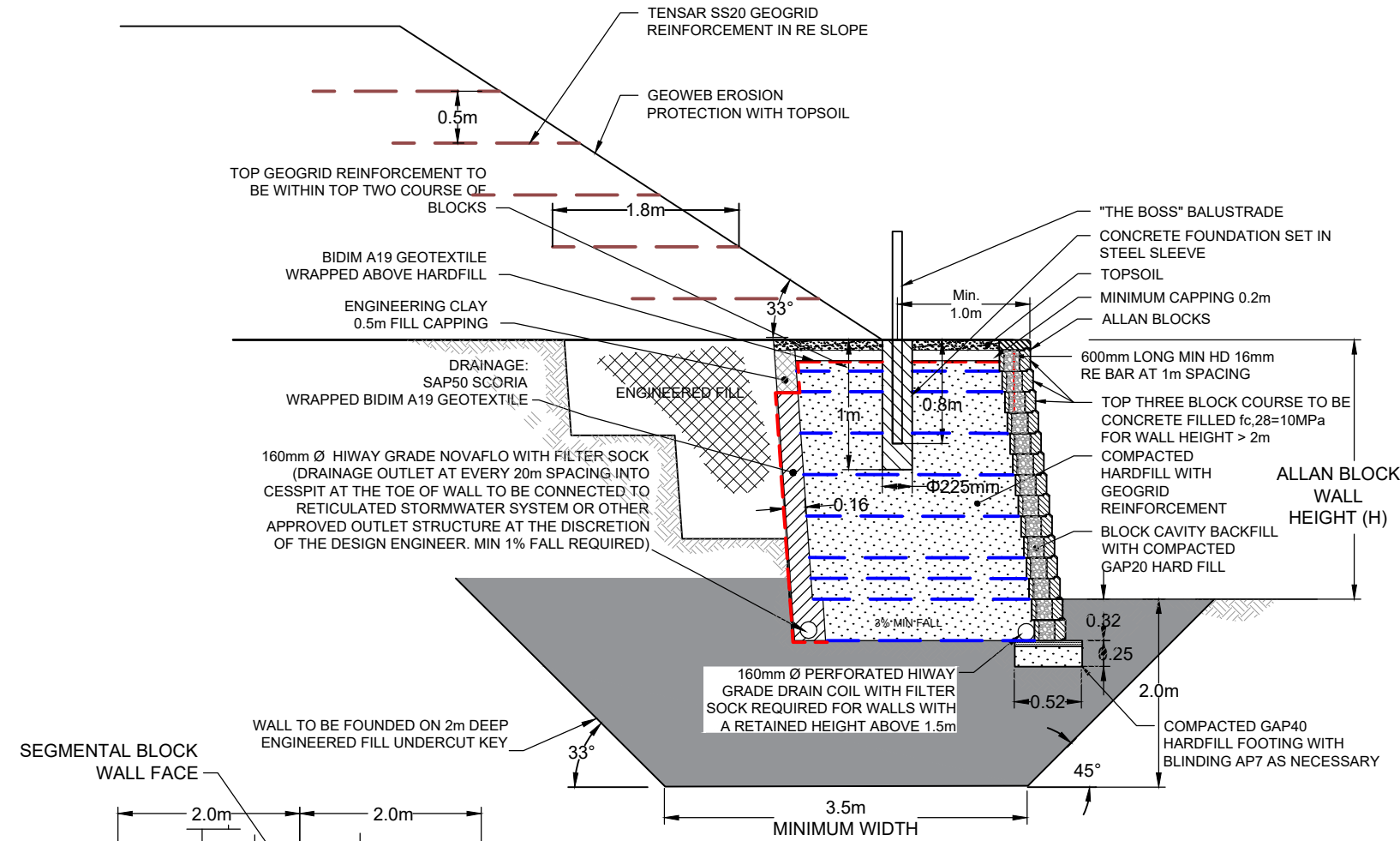
TOP OF RETAINING	16.97	16.31	19.65	20.92	21.26	21.61	21.96	22.30	22.65	23.01	23.36	23.63	23.93	23.99	24.02	24.05	23.73	22.79	21.6	20.92	20.17
BOTTOM OF RETAINING	16.17	17.22	17.57	17.92	18.27	18.60	18.95	19.30	19.65	20.00	20.35	20.63	20.93	20.99	21.02	21.05	20.97	20.2	20.61	20.32	20.06
RETAINED HEIGHT	0.10	1.09	2.0	3.00	3.00	3.01	3.01	3.00	3.00	3.00	3.01	3.00	3.00	3.00	3.00	3.00	2.76	1.9	1.25	0.60	0.10
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	190.00	200.00

RETAINING WALL 306 LONGITUDINAL SECTION



REVISION DETAILS		INT	DATE	SURVEYED		<div>WFHPROPERTIES</div>	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 1:500 @A3	C
B	UPDATED FOR WALL EXTENSION	NC	11/12/19	DRAWN	NC				COUNCIL	AUCKLAND COUNCIL	
C	COLOUR HATCHING ADDED	NC	14/01/20	CHECKED					DWG NO	37600-03-160-EW	
				APPROVED					WOODS.CO.NZ		

PLOT DATE: 20/05/2020 3:29:40 PM DWG FILE: \\NTS008\F52\808\GEN99 PROJECTS\73\AKLGE PROJECTS\20639 - MILLWATER - OREWA WEST - PRECINCT 6\73\AKLGE20639-AM05.DWG



CONSTRUCTION NOTES:
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE COFFEY DESIGN REPORT FOR REFERENCES AND SPECIFICATIONS AKLGE206639-AM 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.

BASE
FOOTING TRENCH TO COMPRISE COMPACTED GAP40 HARDFILL WITH BLINDING AP7 AS NECESSARY

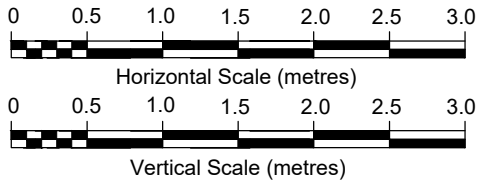
EXCAVATION
WITH ANY EXCAVATION THERE IS A RISK OF BATTER COLLAPSE ESPECIALLY ADJACENT TO BOUNDARIES, STRUCTURES AND SERVICES. THE CONTRACTOR IS RESPONSIBLE AT ALL TIMES FOR ENSURING THE TEMPORARY STABILITY OF THE WORKS. CUT BATTERS SHOULD NOT BE LEFT UNSUPPORTED FOR MORE THAN A FEW DAYS AND NEVER DURING 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.

ALLAN BLOCK WALL 306 SERVICE CROSSING DETAIL - CH195
SCALE 1:50

WALL 306 - Segmental Block Wall Design - Allan Block System										
WALL DETAIL #	CHAINAGE INTERVAL (m)	Max Retained Height (m) H	Total Wall Height including Embedment(m)	Max Surcharge Slope Angle	Max Toe Slope Angle	Reinforcement Length R (m) (FROM FRONT OF WALL)	Reinforcement Type	Number of Reinforcement Layers (MAX)	Spacing of Layers (mm) G	Height of base Reinforcement from Base (mm) F
1	0-30	3.0 ⁽¹⁾	3.40	6°	1 in 10	3.00	MIRAGRID GX40/40	10	200 / 400 ⁽²⁾	0
2	30-50	3.0 ⁽¹⁾	3.40	1 in 1.5 (2m slope height)	1 in 10	5.00		10	200 / 400 ⁽²⁾	0
3	50-180	3.0 ⁽¹⁾	3.40	1 in 1.5 (3m slope height)	1 in 10	6.00		10	200 / 400 ⁽²⁾	0
4	180-192	2.0 ⁽¹⁾	2.40	1 in 1.5 (1.6m slope height)	1 in 10	3.50		6	400	200
5	192-208	1.0 ⁽¹⁾	1.40	1 in 1.5 (0.6m slope height)	1 in 10	1.40		3	400	200

- NOTES:**
1. EXCLUDES CAPPING BLOCK.
2. LAYER SPACING 400mm WITH ONE EXTRA LAYER AT 600mm ABOVE BASE.

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	SP	15/08/2019
	B	UPDATED GRID LENGTHS	RZ	AC	19/02/2020
	C	UPDATED DETAIL 4	RZ	AC	19/05/2020
	D	UPDATED DETAIL 5	RZ	AC	20/05/2020



drawn	RZ
approved	SP
date	20/05/2020
scale	1:50
original size	A3



client:	WFH PROPERTIES LTD		
project:	MILLWATER - OREWA WEST - PRECINCT 6		
title:	WALL 306 DESIGN DETAIL		
project no:	773-AKLGE206639	figure no:	AM/005
rev:	D		

SEGMENTAL BLOCK COURSE
WORKING UP ANY SLOPE,ENSURE BLOCKS ARE LEVEL. PLACE BLOCKS SO THAT THERE ARE NO GAPS GREATER THAN 3MM BETWEEN EDGES OF ADJACENT BLOCK. IN STRAIGHT WALLS BLOCKS SHOULD TOUCH. SWEEP PREVIOUS COURSE CLEAN PRIOR TO PLACING THE NEXT COURSE. THE NEXT BLOCK SHOULD BE FLUSH AGAINST THE LIP OF THE BLOCK COURSE BELOW.

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

- GEOGRID & BACKFILL MATERIAL**
- THE GEOGRID PRODUCT MUST MATCH THAT SPECIFIED IN THE RECENTGEOTECHNICAL DESIGN REPORT AND DESIGN DRAWINGS. ALTERNATIVE PRODUCTS SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE DESIGN ENGINEER. GEOGRID HANDLING, TENSIONING, SECURING, AND PLACEMENT MUST BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS. IN PARTICULAR, THE CORRECT ORIENTATION OF UNIAXIAL TYPE GRIDS IS CRITICAL.
 - GEOGRID SPECIFICATIONS ARE SHOWN IN THE SEGMENTAL BLOCK WALL TABLE BELOW. BACKFILL TO BE GAP65 AND GAP20 FOR WALL ROCK OR SIMILAR APPROVED.
 - BACKFILL MATERIAL SHOULD BE PLACED AND COMPACTED IN LAYERS TO 95% OF THE MAXIMUM DRY DENSITY (MDD), AND IN ACCORDANCE WITH THE COFFEY GEOTECHNICAL WORKS SPECIFICATION CONTAINED WITH THE REPORT REFERENCED ABOVE.
 - GEOGRID TO BE PLACED LEVEL OR WITH A 1% FALL TO REAR OF THE WALL. GRID SHOULD BE FREE OF WRINKLES AND LIGHTLY TENSIONED/PULLED TAUT PRIOR TO AND DURING BACKFILLING.
 - CONTRACTOR TO ENSURE GRIDS ARE ORIENTATED CORRECTLY. GRIDS SHOULD BE ROLLED OUT PERPENDICULAR TO THE WALL.
 - GRID LAYERS ARE TO BE CONTINUOUS OVER THE DESIGN REINFORCEMENT DEPTH. NO JOINTS ARE PERMITTED PARALLEL TO THE FACE.
 - TOP GEOGRID LAYER TO BE WITHIN THE TOP 2 COURSES OF SEGMENTAL BLOCK.
 - UPPER GEOGRID LAYER TO INCLUDE LOCAL CUT TO ALLOW FOR SPIRAL TUBE FOR THE BARRIER POST. SPIRAL TUBE TO BE PLACED PRIOR TO BACKFILLING. EXCAVATION INTO THE SEGMENTAL BLOCK WALL BACKFILL TO RETROFIT THE SPIRAL TUBE IS NOT ACCEPTABLE.
 - THE GEOGRID LAYER EXTENTS AND POSITION ARE TO BE SURVEYED. AS BUILT DATA SHOULD BE SUPPLIED TO COFFEY UPON WALL COMPLETION FOR COA.

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

SETTING OUT & CONSTRUCTION TOLERANCES
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. ACCEPTABLE CONSTRUCTION TOLERANCES ARE AS FOLLOWS:

Element	Vertical Position	Horizontal Position	Vertical Alignment	Horizontal Alignment
Soil Surface	± 100mm	Not Applicable	Not Applicable	Not Applicable
Facings and Wall structures	± 5mm	± 5mm	± 20mm in 3m	± 20mm in 3m
Footings or supports	± 5mm	± 5mm	± 20mm in 3m	± 20mm in 3m

FACIA TYPE
THE FACIA TYPE MUST MATCH THAT SPECIFIED IN THE RELEVANT GEOTECHNICAL DESIGN REPORT AND DESIGN DRAWINGS. ANY CHANGES TO THE SPECIFIED FACIA WILL REQUIRE FURTHER ANALYSIS AND COULD INFLUENCE THE SPACING OF REINFORCEMENT TO ENSURE THE REQUIRED FACTORS OF SAFETY ARE ACHIEVED.

SERVICES/ SERVICE CROSSINGS
WHERE SERVICE LINES ARE TO PASS BENEATH A RETAINING WALL OF HEIGHT > 0.5M, A SPECIALLY DESIGNED PIPE BRIDGE DETAIL MUST BE ADOPTED AS SHOWN ON THE ALLAN BLOCK WALL SERVICE CROSSING DETAIL. WHERE SERVICE TRENCHES RUN BENEATH OR PARALLEL TO THE RETAINING WALL OR SERVICES ARE LOCATED WITHIN A HORIZONTAL DISTANCE OF 1.5 TIMES THE HEIGHT OF THE WALL, THEY MUST BE BACKFILLED WITH HARDFILL OR ENGINEERED CLAY FILLING AND TESTED FOR COMPACTION. THE LOCATION OF ANY EXISTING SERVICES SHOULD BE CONFIRMED PRIOR TO CONSTRUCTION.

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.

TOP OF WALL
LAY CAPPING ALONG THE TOP OF THE WALL USING MASONARY ADHESIVE TO SECURE IN PLACE

BARRIER / FALL PREVENTION AND BARRIER POST FOUNDATION
WALLS SHALL HAVE A HANDRAIL / FALL PREVENTION IN ACCORDANCE WITH THE NEW ZEALAND BUILDING CODE CLAUSE F4. BARRIER POST FOUNDATION TO COMPRISE OF CONCRETE SET IN UPPER HARDFILL LAYER.

- ALLAN BLOCK SEGMENTAL BLOCK RETAINING WALL INSPECTION**
INSPECTION OF ALL ASPECTS OF SEGMENTAL 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**:
- SEGMENTAL 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;
 - BLOCK AND GEOGRID CONSTRUCTION CONNECTION;
 - DRAINAGE OUTLET CONSTRUCTION;
 - BARRIER POST FOUNDATION (SPIRAL SLEEVES);
 - TOP GEOGRID CONNECTION WITHIN THE TOP TWO BLOCK COURSES; AND
 - REINFORCING BAR AND CONCRETE PLACEMENT FOR TOP THREE BLOCK COURSES.

FOR CONSTRUCTION

LEGEND

TOP OF RETAINING WALL

BOTTOM OF RETAINING WALL

- 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

- 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.

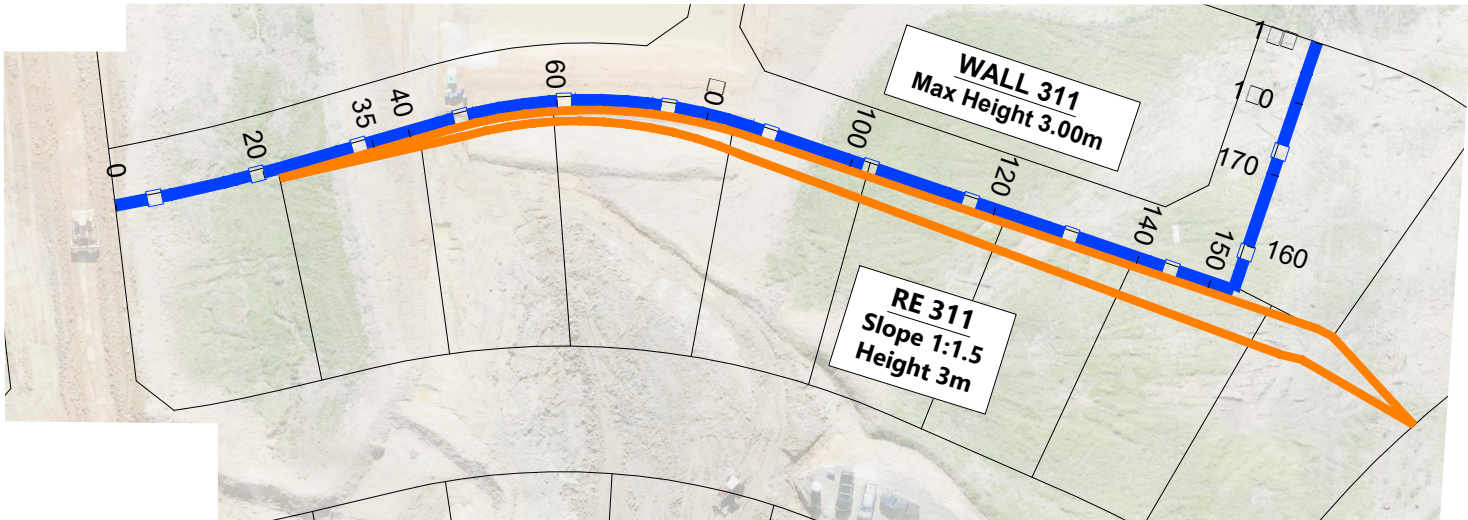
11. THE CONTRACTOR SHALL CLARIFY THE AREAS AND EXTENT OF CLEARING WITH THE ENGINEER BEFORE COMMENCEMENT AND CONFIRM THAT ALL NECESSARY CONSENTS ARE IN PLACE AND ENSURE THAT THEY HAVE A COPY OF THE RESOURCE CONSENT FROM THE ENGINEER.

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.

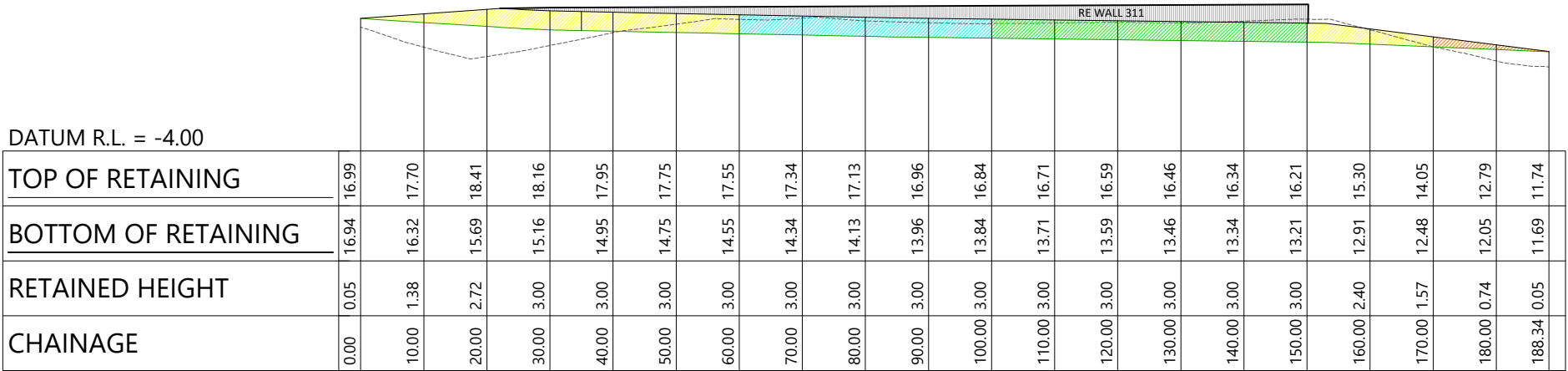
8. ALL WORKS ARE TO BE IN ACCORDANCE WITH THE GEOTECHNICAL SPECIFICATION

9. RETAINING WALLS TO BE CLEAR OF BOUNDARIES.



MASS BLOCK RETAINING WALL 311 PLAN

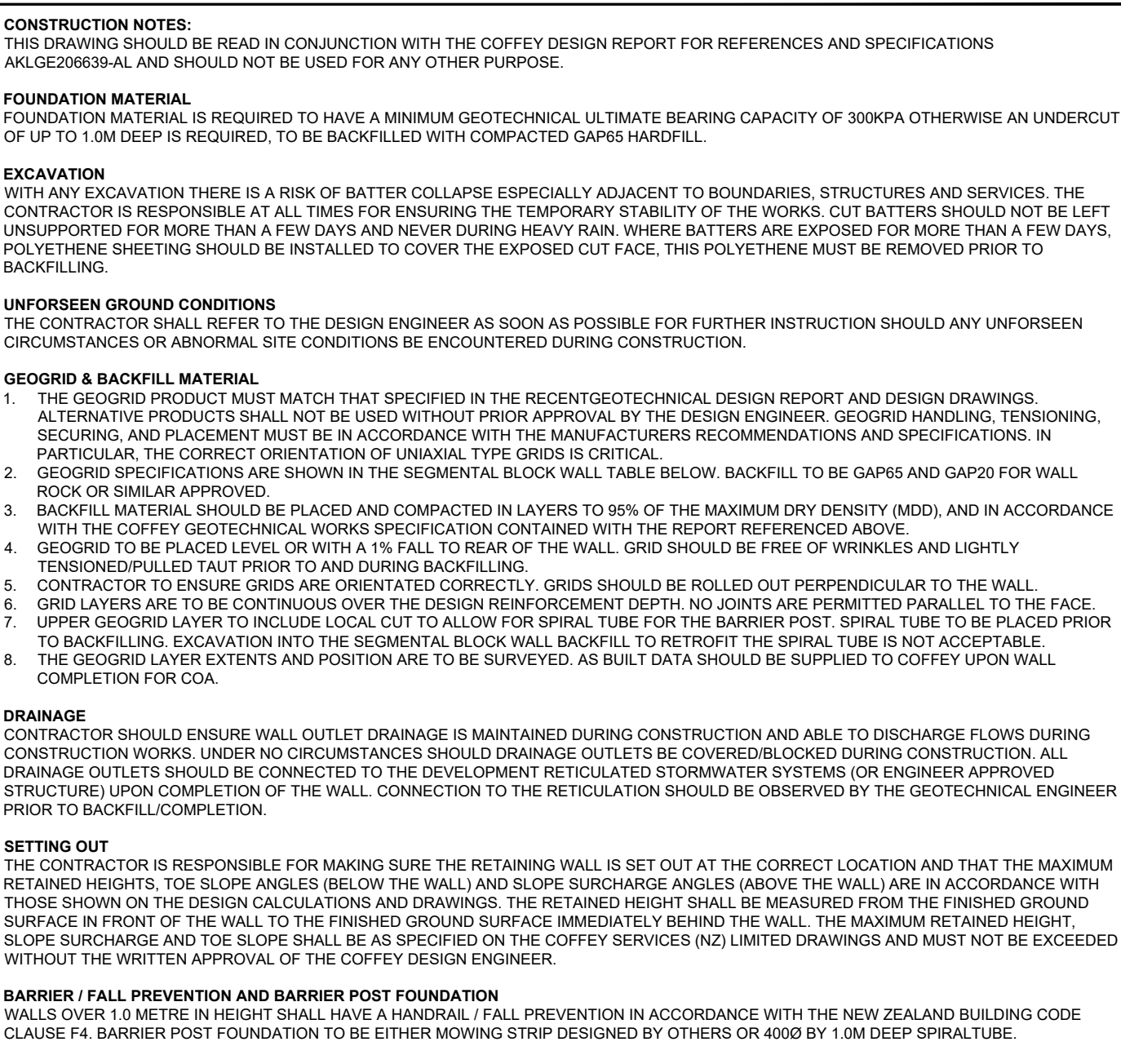
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RETAINING WALL 311 LONGITUDINAL SECTION



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



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

MASS BLOCK RETAINING WALL INSPECTION

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

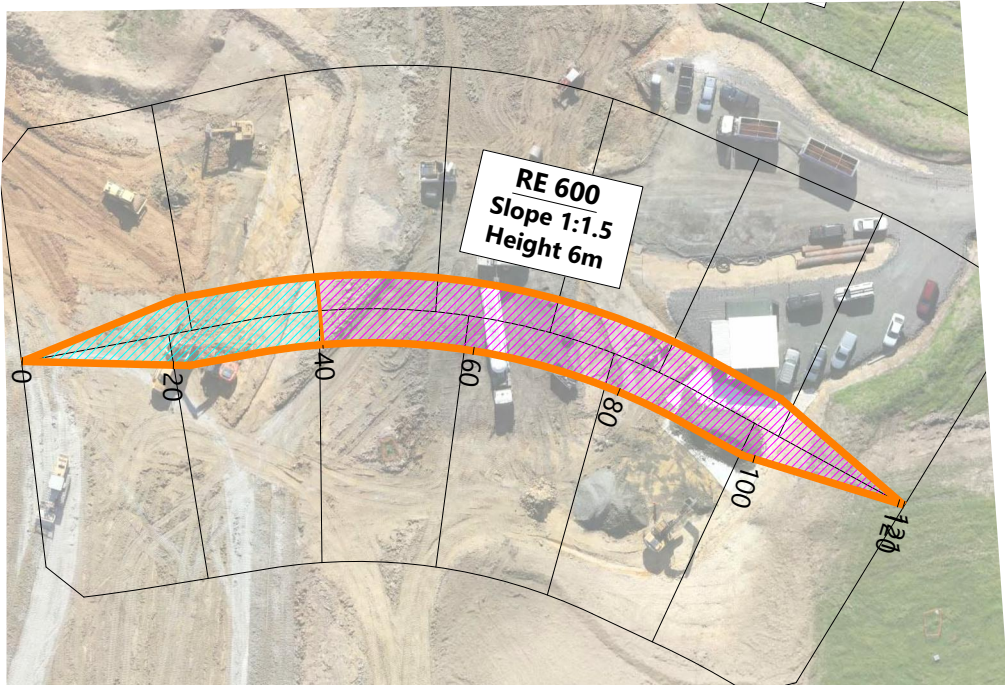
- MASS BLOCK WALL FOUNDATION EXCAVATIONS, STRENGTH AND BENCHING;
- FOUNDATION HARDFILL PLACEMENT (FOOTING AND SERVICE CROSSING);
- DRAINAGE AND GEOTEXTILE PLACED AT REAR OF WALL;
- HARDFILL, GEOGRID PLACEMENT AND COMPACTION TESTING;
- DRAINAGE OUTLET CONSTRUCTION;
- BARRIER POST FOUNDATION (SPIRAL SLEEVES),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

REINFORCED EARTH SLOPES

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

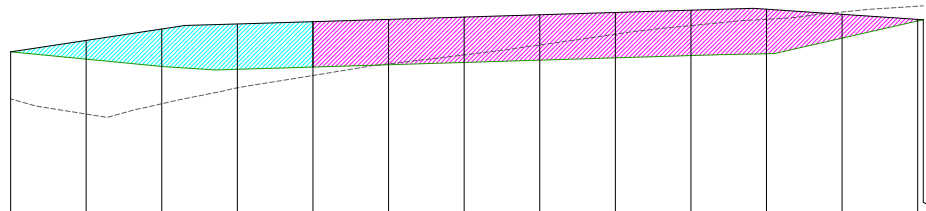
FOR CONSTRUCTION

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



REINFORCED EARTH WALL 600 PLAN

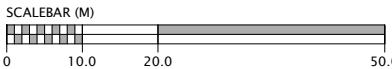
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DATUM R.L. = 4.00

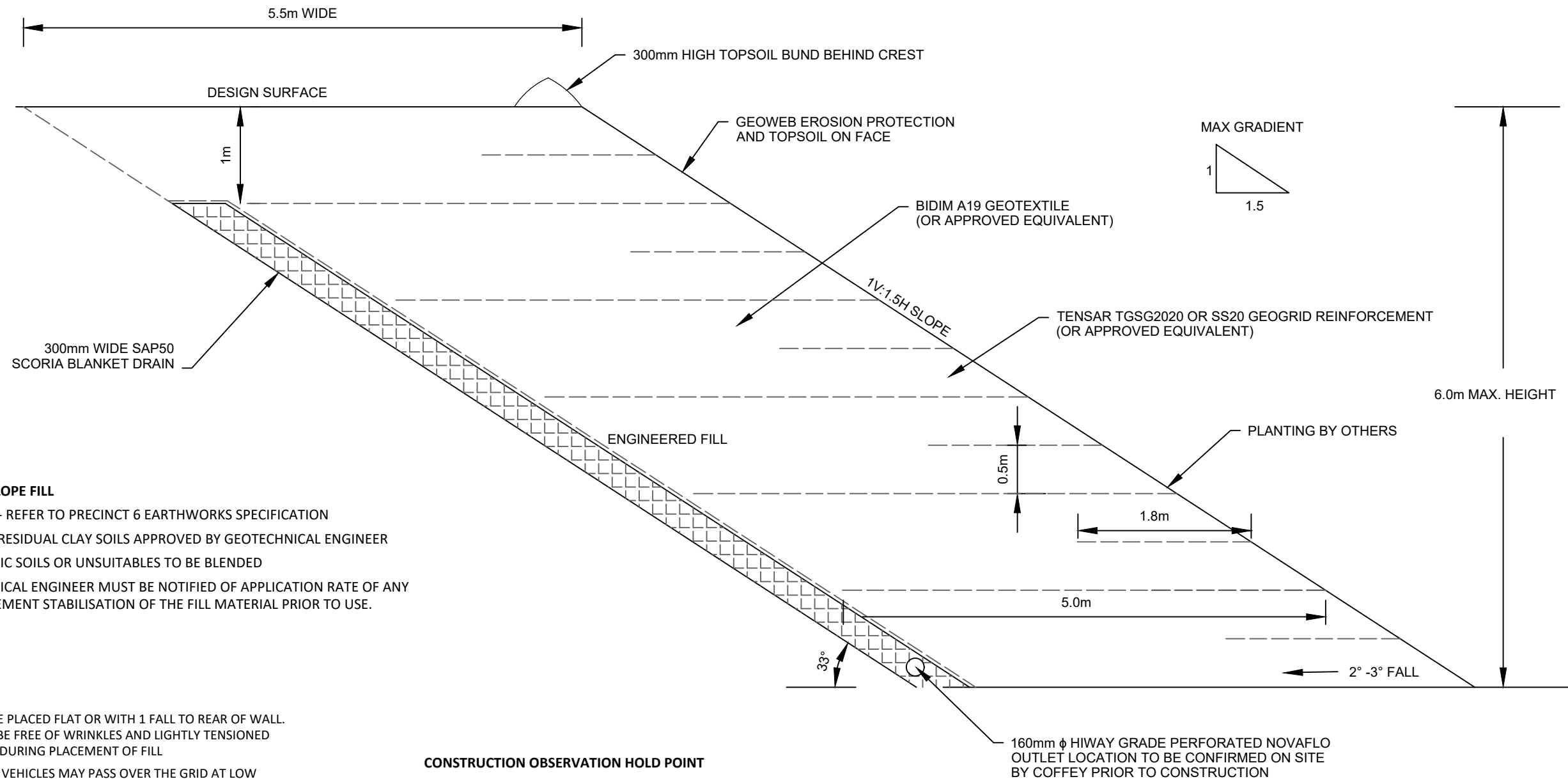
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REINFORCED EARTH WALL 600 LONGITUDINAL SECTION



REVISION DETAILS		INT	DATE	SURVEYED	.	ARRAN DRIVE OREWA AUCKLAND 	MILLWATER - PRECINCT 6 OREWA WEST RETAINING WALL PLAN & LONG SECTION		STATUS	ISSUED FOR INFORMATION	REV
1	ISSUED FOR CONSENT	RV	JULY 2017	DESIGNED	RV				SCALE	H 1:1000 @A3 V 1:500 @A3	3
2	ISSUED FOR INFORMATION	NSC	21/06/19	DRAWN	NSC				COUNCIL	AUCKLAND COUNCIL	
3	CUT/FILL BATTER HATCH ADDED	NSC	22/07/19	CHECKED	.				DWG NO	37600-01-169-EW	
				APPROVED	.				WOODS.CO.NZ		

PLOT DATE: 18/06/2020 4:00:45 PM DWG FILE: \\NTS808F52\\S808\\GEN219 PROJECTS\\734\\KLGE PROJECTS\\206639 - MILLWATER - OREWA WEST - PRECINCT 6\\COFFEY DRAWINGS\\CAD\\TONY\\AF73-AKLGE206639-AP01.DWG



ENGINEERED SLOPE FILL

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

GENERAL NOTES:

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

CONSTRUCTION OBSERVATION HOLD POINT

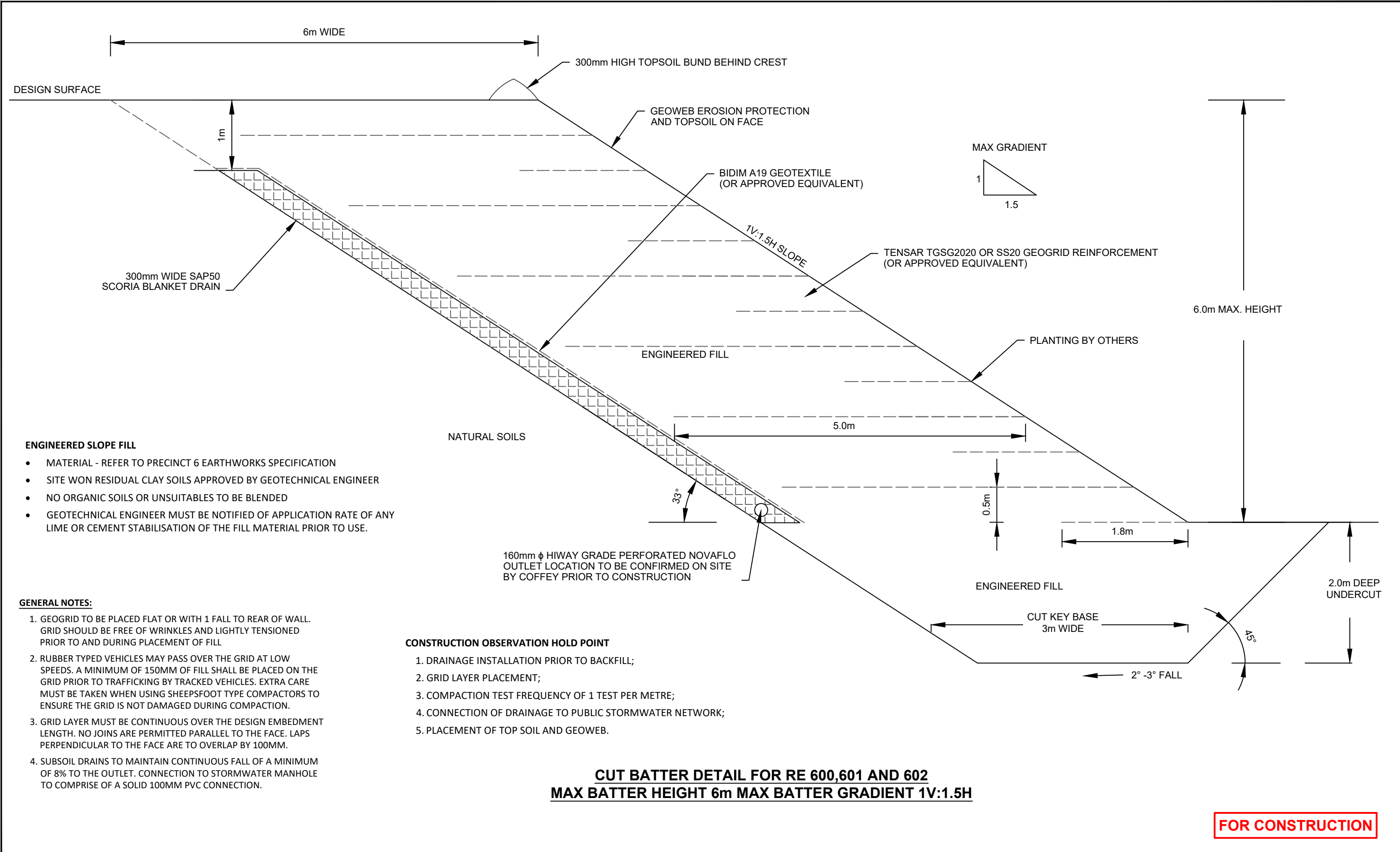
- DRAINAGE INSTALLATION PRIOR TO BACKFILL;
- GRID LAYER PLACEMENT;
- COMPACTION TEST FREQUENCY OF 1 TEST PER METRE;
- CONNECTION OF DRAINAGE TO PUBLIC STORMWATER NETWORK;
- PLACEMENT OF TOP SOIL AND GEOWEB.

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

FOR CONSTRUCTION

revision	no.	description			drawn	approved	date	<div>00.51.25</div> <div>SCALE1:50 (A3)METRES</div>	drawn	RZ	<div>coffey</div> <div>A TETRA TECH COMPANY</div>	client: WFH PROPERTY LTD.		
	A	ORIGINAL ISSUE			RZ	SP	18/07/2019		approved	SP		project: MILLWATER PRECINCT 6		
	B	UPDATED AFTER AMENDMENTS TO DESIGN			RZ	AC	26/02/2020		date	18/06/2020		title: REINFORCED EARTH SLOPE - FILL BATTER DETAIL		
	C	FOR CONSTRUCTION			RZ	SP	18/06/2020		scale	AS SHOWN		project no: 773-AKLGE206639 figure no: AF/001 rev: C		
									original size	A3				

PLOT DATE: 22/06/2020 10:05:47 AM DWG FILE: \\TTSR08\F52\808\GEN\2\9 PROJECT\573\AKLGE PROJECT\5206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\T\ON\AF773\AKLGE206639-AF02.DWG



revision	no.	description			drawn	approved	date	<div>00.512.5METRES1:50 (A3)SCALE</div>	drawn	RZ	<div>coffeyA TETRA TECH COMPANY</div>	client: WFH PROPERTY LTD.		
	A	ORIGINAL ISSUE			RZ	SP	18/07/2019		approved	SP		project: MILLWATER PRECINCT 6		
	B	UPDATED AFTER AMENDMENTS TO DESIGN			RZ	AC	26/02/2020		date	18/06/2020		title: REINFORCED EARTH SLOPE - CUT BATTER DETAIL		
	C	FOR CONSTRUCTION			RZ	SP	18/06/2020		scale	AS SHOWN		project no: 773-AKLGE206639 figure no: AF/002 rev: C		
									original size	A3				

IN-GROUND PILE WALL CONSTRUCTION OBSERVATIONS AND MONITORING

OBSERVATIONS OF ALL ASPECTS OF THE RETAINING WALL CONSTRUCTION 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 OBSERVATIONS AT THE FOLLOWING **HOLD POINTS**:

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

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

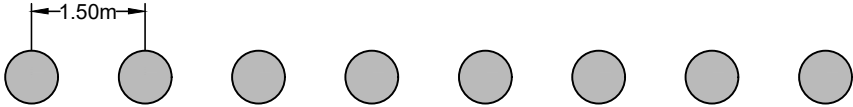
CONSTRUCTION NOTES:

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

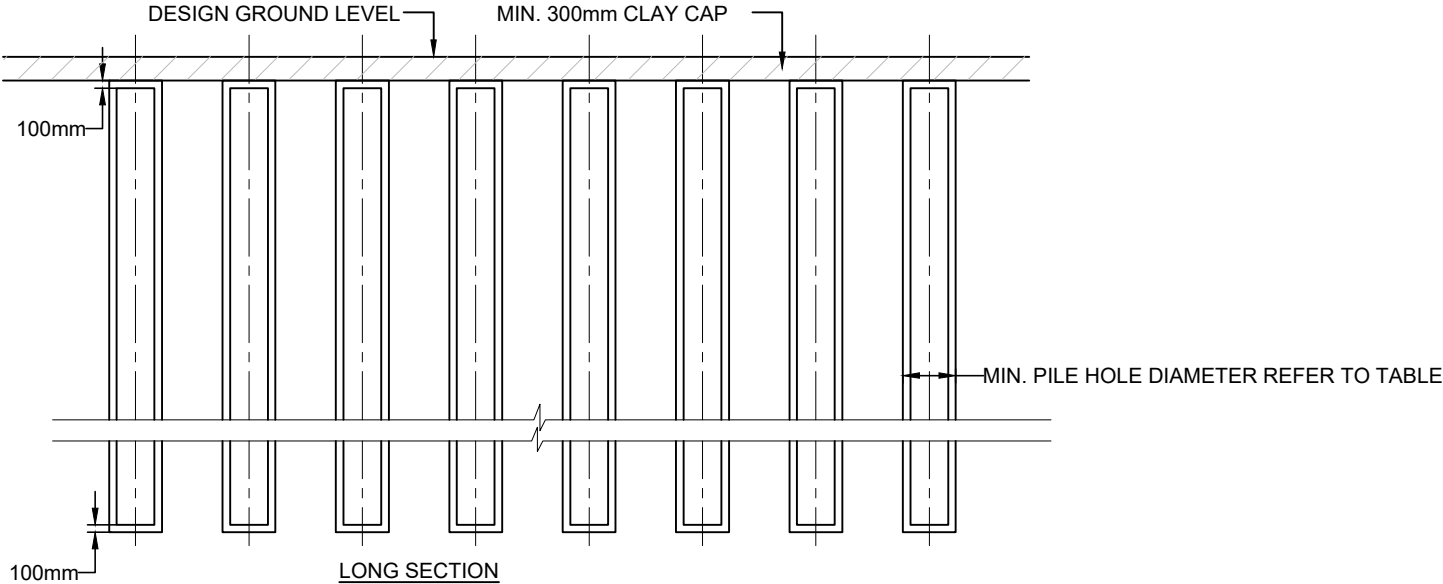
1. ALL EXISTING AND PROPOSED SERVICES SHOULD BE LOCATED AND PROTECTED DURING CONSTRUCTION WORKS BY THE CONTRACTOR.
2. CONSTRUCTION OF IN-GROUND PILE WALLS SHALL BE IN ACCORDANCE WITH THESE DRAWINGS AND RELEVANT RETAINING WALL DESIGN REPORT UNLESS OTHERWISE APPROVED BY COFFEY.
3. REFER TO SITE PLAN FOR THE GENERAL LOCATION AND EXTENT OF IN-GROUND PILE WALL. SET OUT LOCATIONS TO BE PROVIDED BY OTHERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. LOCATIONS SHALL BE CONFIRMED BY COFFEY PRIOR TO DRILLING.
4. ALL STEEL PILES SHALL BE CONCRETE ENCASED WITH A MINIMUM OF 75mm SIDE COVER AND MINIMUM 100MM BASE AND TOP COVER.
5. THE CHARACTERISTIC COMPRESSIVE STRENGTH OF CONCRETE SHALL BE F'C = 32 MPA UNLESS OTHERWISE NOTED.
6. THE CONCRETE ENCASEMENT SHALL BE ADEQUATELY VIBRATED WITH A PENCIL VIBRATOR TO AVOID "HONEY COMBING".

7. FOUNDATION SPOIL SHALL BE REMOVE BY AUGERING TO THE DIMENSIONS DETAILED WITH ALL SURPLUS MATERIAL BEING DISPOSED OF AWAY FROM THE WALL LOCATIONS. ALLOWANCE SHALL BE MADE IN POSITIONING AUGERED HOLES FOR CONCRETE SURROUND TO POLES. DRIVING OF PILES IS NOT ACCEPTABLE AS AN ALTERNATIVE TO AUGERING. THE CONTRACTOR SHALL VERIFY THE POSITION OF ALL UNDERGROUND SERVICES AND CONFIRM THAT THERE ARE NO CLASHES PRIOR TO CONSTRUCTION.
8. IF SIGNIFICANT OVERLAND FLOW IS PRESENT ABOVE WALL SURFACE CUT-OFF DRAINAGE MUST BE INSTALLED.
9. THE CONTRACTOR SHALL REFER TO THE COFFEY DESIGN ENGINEER AS SOON AS POSSIBLE FOR FURTHER INSTRUCTION SHOULD ANY UNFORESEEN CIRCUMSTANCE OR ABNORMAL SITE CONDITION BE ENCOUNTERED DURING CONSTRUCTION.
10. THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES FOR ENSURING THE TEMPORARY STABILITY OF THE WORKS.
11. IF THERE IS POTENTIAL FOR HOLE COLLAPSE E.G. DUE TO WEAK GROUND CONDITIONS OR GROUND WATER INGRESS IT IS RECOMMENDED THAT ALTERNATE HOLES BE DRILLED INITIALLY INCLUDING PILING AND CONCRETE POURING PRIOR TO THE DRILLING OF THE REMAINING HOLES. TEMPORARY CASING MAY BE REQUIRED.
12. IN-GROUND PILE WALL IS TO CAPPED TO THE FINISHED DESIGN LEVEL WITH A MINIMUM THICKNESS 300MM CLAY CAP OF MINIMUM UNDRAINED SHEAR STRENGTH 100 KPa UNLESS OTHERWISE SPECIFIED.
13. PILE WALL TO EXTEND AS SHOWN ON CIVIL DRAWING. THE LOCATION AND EXTENT ARE TO BE CONFIRMED ON SITE BY COFFEY DESIGN ENGINEER.

Chainage (m)	Wall Length (m)	Pile Diameter (mm)	Pile Spacings c-c (m)	Steel Member	Depth of Piles (m)	Minimum Concrete Strength (MPa)
0-55	55	500	1.50	310 UB 40.4	8.0	32
55-105 and 120-159	89	500	1.50	310 UB 40.4	6.0	32
105-120	15	500	1.50	310 UB 40.4	9.0	32



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

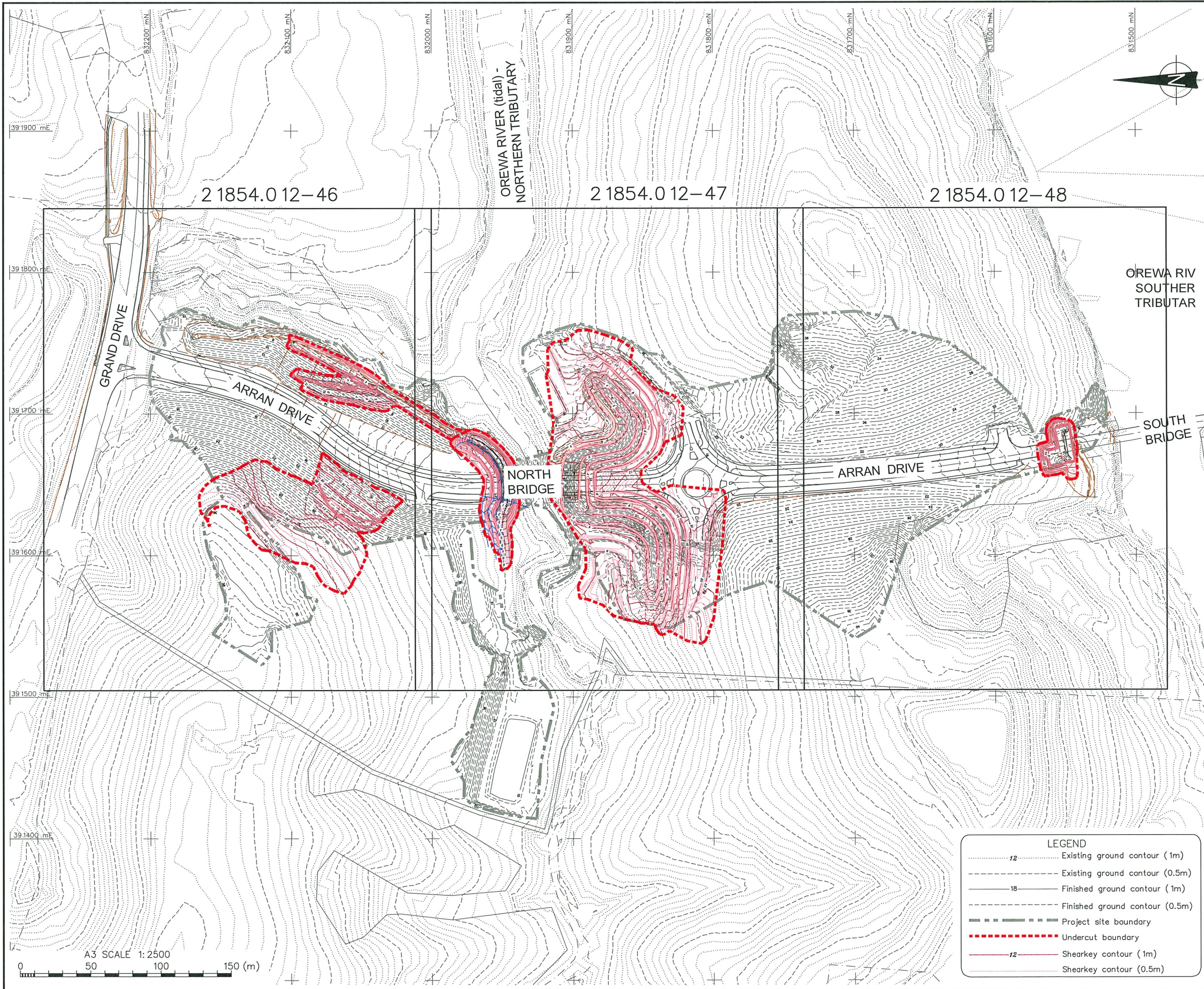


LONG SECTION
1:100 (A3)
(SHOWING GENERAL ARRANGEMENT ALONG PILE WALL ALIGNMENT)



revision	no.	description	drawn	approved	date		drawn	RZ		client: WFH PROPERTIES LTD.		
	A	FOR BUILDING CONSENT	RZ	AC	08/06/2020		approved	AC		project: MILLWATER PRECINCT 6 STAGE 1		
	B	AMENDMENT	RZ	SP	02/09/2020		date	09/03/2021				
	C	UPDATED DESIGN AFTER PEER REVIEW	RZ	AC	09/08/2021		scale	1:100		title: PW804 GEOTECHNICAL DESIGN DRAWING		
	D	FOR CONSTRUCTION	RZ	SP	09/03/2021		original size	A3		project no: 773-AKLGE206639	drawing no: AU/004	rev: D

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NOTES :

1. All dimensions are in millimetres unless noted otherwise.
2. Original contours from Woods (Ref. "Existing Contour.dwg", dated 2007).
3. Finished Contours from Woods (Ref. "31108-NSL-B-100-FINAL Contours. dwg", dated March 2013).
4. Shear key contours from Woods (Ref. "31108-NSL-B-120-UNDERCUT Contours. dwg", dated Septembder 2013)

REVISION	DESCRIPTION	BY	DATE
0	First Issue		

DESIGNED :	AJL	Dec. 13
DRAWN :	AGI	Dec. 13
DESIGN CHECKED :		
DRAFTING CHECKED :		

REFERENCE :

CADFILE : \\21854.012-45.dwg

APPROVED :

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MILLWATER
NORTH SOUTH LINK
PART B

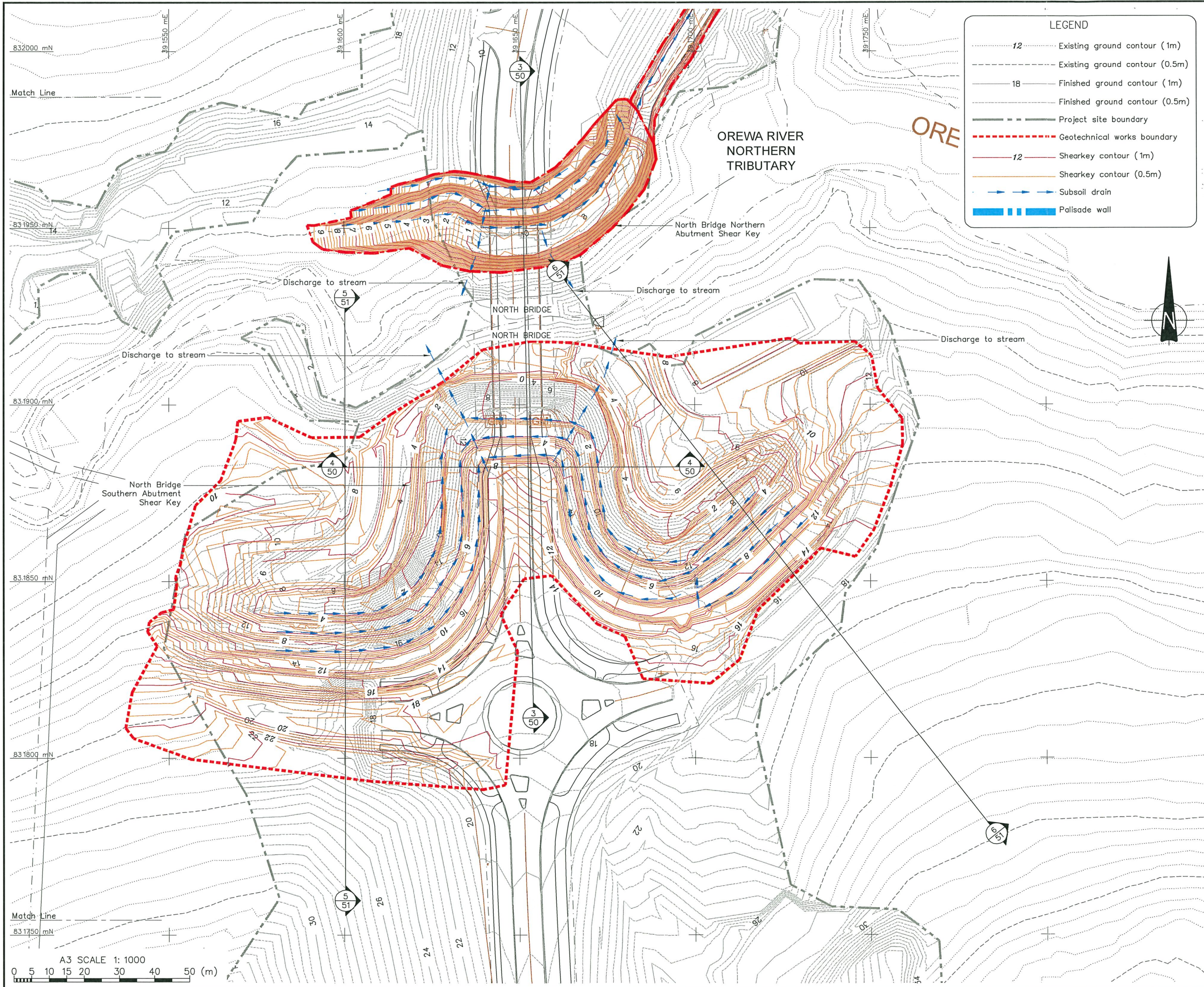
GEOTECHNICAL
COMPLETION REPORT

Overall Geotechnical Works
Plan

SCALES (AT A3 SIZE)
1:2,500

DWG. No.	REV.
2 1854.0 12-45	0

L:\21854\21854.012 - North Bridge\WorkingMaterial\CAD\21854.012-46_48.dwg, 47, 6/12/2013 3:56:15 p.m., agj, 1:1



NOTES :

- All dimensions are in millimetres unless noted otherwise.
- Original contours from Woods (Ref. "Existing Contour.dwg", dated 2007).
- Finished Contours from Woods (Ref. "31108-NSL-B-100-FINAL Contours. dwg", dated March 2013).
- Shear key contours from Woods (Ref. "31108-NSL-B-120-UNDERCUT Contours. dwg, dated Septembder 2013)

REVISION DESCRIPTION	BY	DATE
0 First Issue		
DESIGNED :	AJL	Dec.13
DRAWN :	AGI	Dec.13
DESIGN CHECKED :		
DRAFTING CHECKED :		
REFERENCE :		

CADFILE : \\21854.012-46_48.dwg

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MILLWATER
NORTH SOUTH LINK
PART B

GEOTECHNICAL
COMPLETION REPORT

Geotechnical Works Plan
(2 of 3)

SCALES (AT A3 SIZE)
1: 1000

DWG. No. 21854.012-47

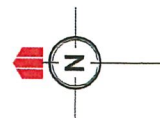
REV. 0

NOTES

1. CONTOURS ARE AT 0.25 METRE INTERVALS

LEGEND

MAJOR CONTOURS (1.0m INTERVAL)
SUBSOIL DRAINS



GRAND DRIVE

ESPLANADE RESERVE
LOT 808

LOT 807
ESPLANADE RESERVE

LOT 806

ARRAN DRIVE

LOT 805

SHEET 121

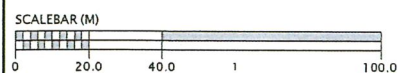
SHEET 122

SHEET 123

LOT 1

LOT 2

ARRAN DRIVE



REVISION DETAILS	NAME	DATE	CLIENT:
1. ISSUED FOR 224c	TX	20/11/13	



NORTH SOUTH LINK - PART B

SHEARKEY AND UNDERCUT CONTOURS

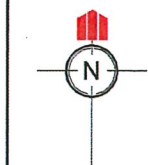
AUCKLAND COUNCIL



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 1948 (MSL) LINZ datum

Signed:
Chartered Professional Engineer
Date: 27/11/13
Name: TIM JAMES

DESIGNED: WOODS	AS BUILT
CHECKED:	DRAWN: BY
APPROVED:	SURVEYED:
JOB NUMBER: 31108	SCALE: 1:2000 @ A3
ISSUED: SEPT 2013	
DWG. NO. 31108-B-AB-120	REV. 1



LOT 805

ESPLANADE
RESERVE

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: [Signature]
Chartered Professional Engineer

Date: 27/11/13

Name: Tim James

REVISION DETAILS	NAME	DATE
1. ISSUED FOR 224C	TX	20/11/13

NOTES

1. CONTOURS ARE AT 1 METRE INTERVALS

LEGEND

- MAJOR CONTOURS (1.0m INTERVAL)
- SUBSOIL DRAINS

CLIENT:



NORTH SOUTH LINK
PART B

SHEARKEY AND UNDERCUT
CONTOURS

AUCKLAND COUNCIL

DESIGNED: WOODS	AS BUILT
CHECKED:	DRAWN:
APPROVED:	SURVEYED: WOODS
JOB NUMBER: 31108	SCALE: 1:750 @ A3
ISSUED: SEPT 2013	
DWG. NO. 31108-B-AB-122	REV. 1

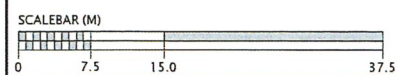
SHEAR KEY 5

CULVERT 11.20m
450mm dia

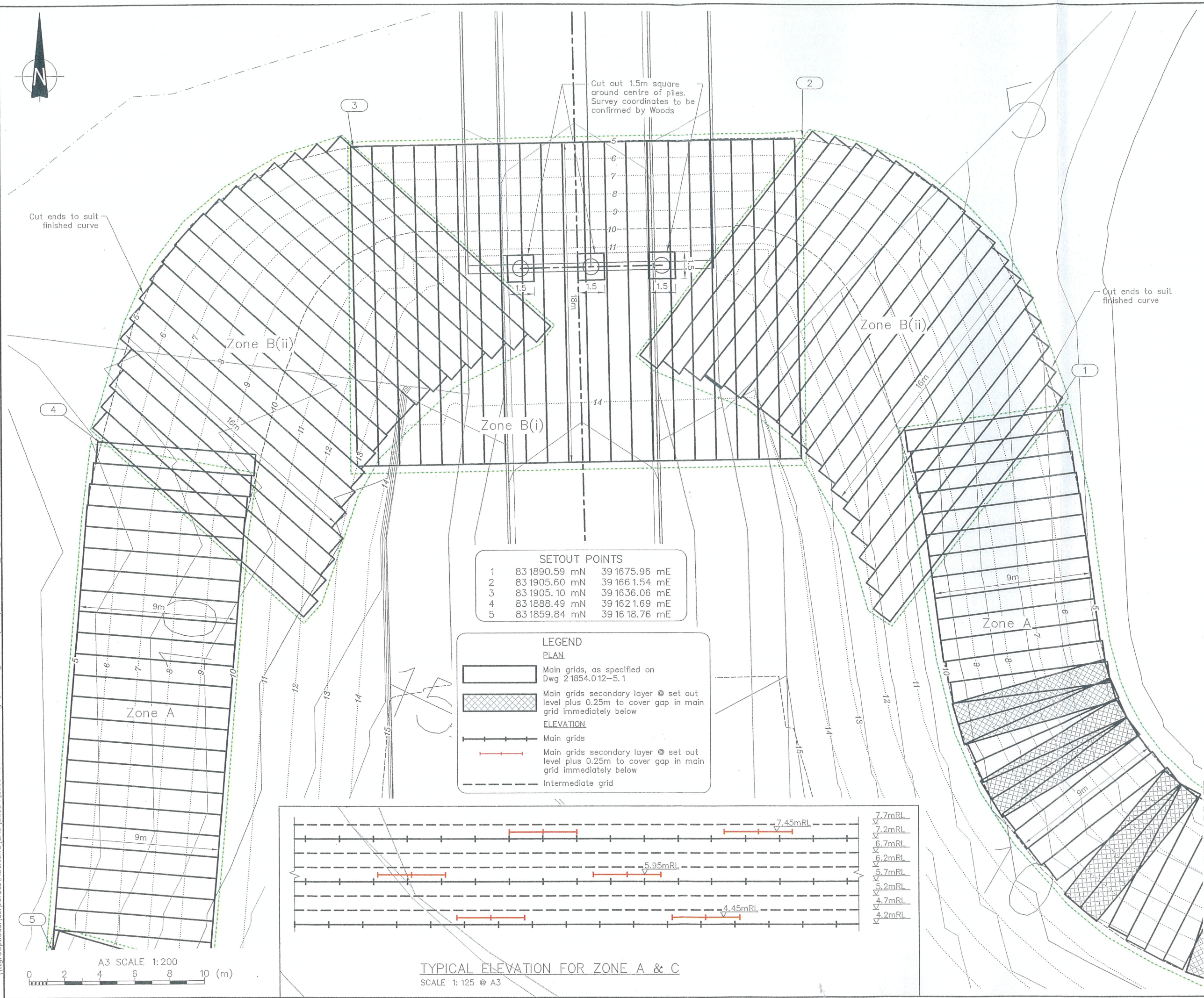
ARRAN DRIVE

LOT 1

LOT 2



\\ttgroup.local\corporate\Auckland\CAD\21854\21854.012 - North Bridge\WorkingMaterial\CAD\21854.012-04_4.4_4.6.dwg, 4.5, 6/12/2013 10:33:09 a.m., amm, 1:1



SETOUT POINTS			
1	83 1890.59 mN	39 1675.96 mE	
2	83 1905.60 mN	39 166 1.54 mE	
3	83 1905.10 mN	39 1636.06 mE	
4	83 1888.49 mN	39 162 1.69 mE	
5	83 1859.84 mN	39 16 18.76 mE	

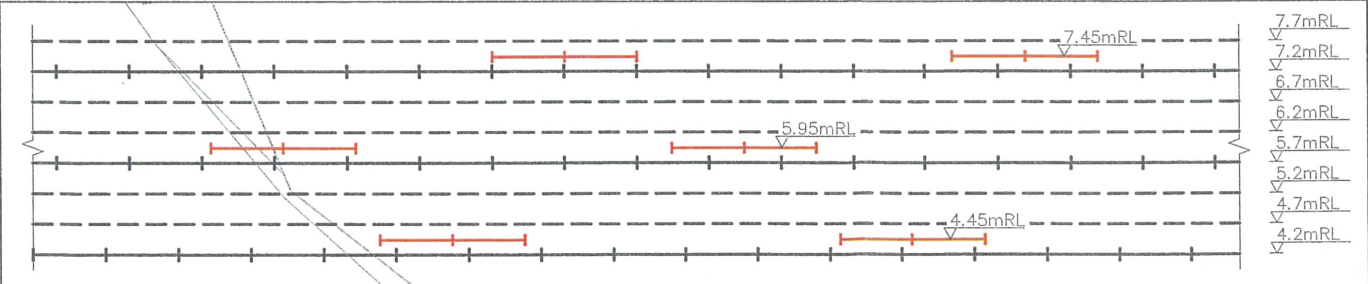
LEGEND

PLAN

- Main grids, as specified on Dwg 21854.012-5.1
- Main grids secondary layer @ set out level plus 0.25m to cover gap in main grid immediately below

ELEVATION

- Main grids
- Main grids secondary layer @ set out level plus 0.25m to cover gap in main grid immediately below
- Intermediate grid



TYPICAL ELEVATION FOR ZONE A & C
SCALE 1: 125 @ A3

- NOTES :
1. All dimensions are in metres unless noted otherwise.
 2. This drawing shows typical layout of base layer of grid. See Dwg 21854.012-5.1 to 5.3 for typical cross sections.

0	First Issue		
REVISION	DESCRIPTION	BY	DATE
DESIGNED :		AJL	Feb. 12
DRAWN :		LJD	Feb. 12
DESIGN CHECKED :			
DRAFTING CHECKED :			
REFERENCE :			

CADFILE : \\21854.012-04_4.4_4.6.dwg
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MILLWATER
NORTH BRIDGE
SOUTHERN ABUTMENT

Geotechnical Works
RE Slopes
Typical Grid Layout

SCALES (AT A3 SIZE) 1: 200	REV. 0
DWG. No. 21854.012-04.5	

DRAWING STATUS: PRELIMINARY DRAFT



7.7mRL
▽
7.2mRL
▽
6.7mRL
▽
6.2mRL
▽
5.7mRL
▽
5.2mRL
▽
4.7mRL
▽
4.2mRL
▽

PLAN

ELEVATION

- Main grids

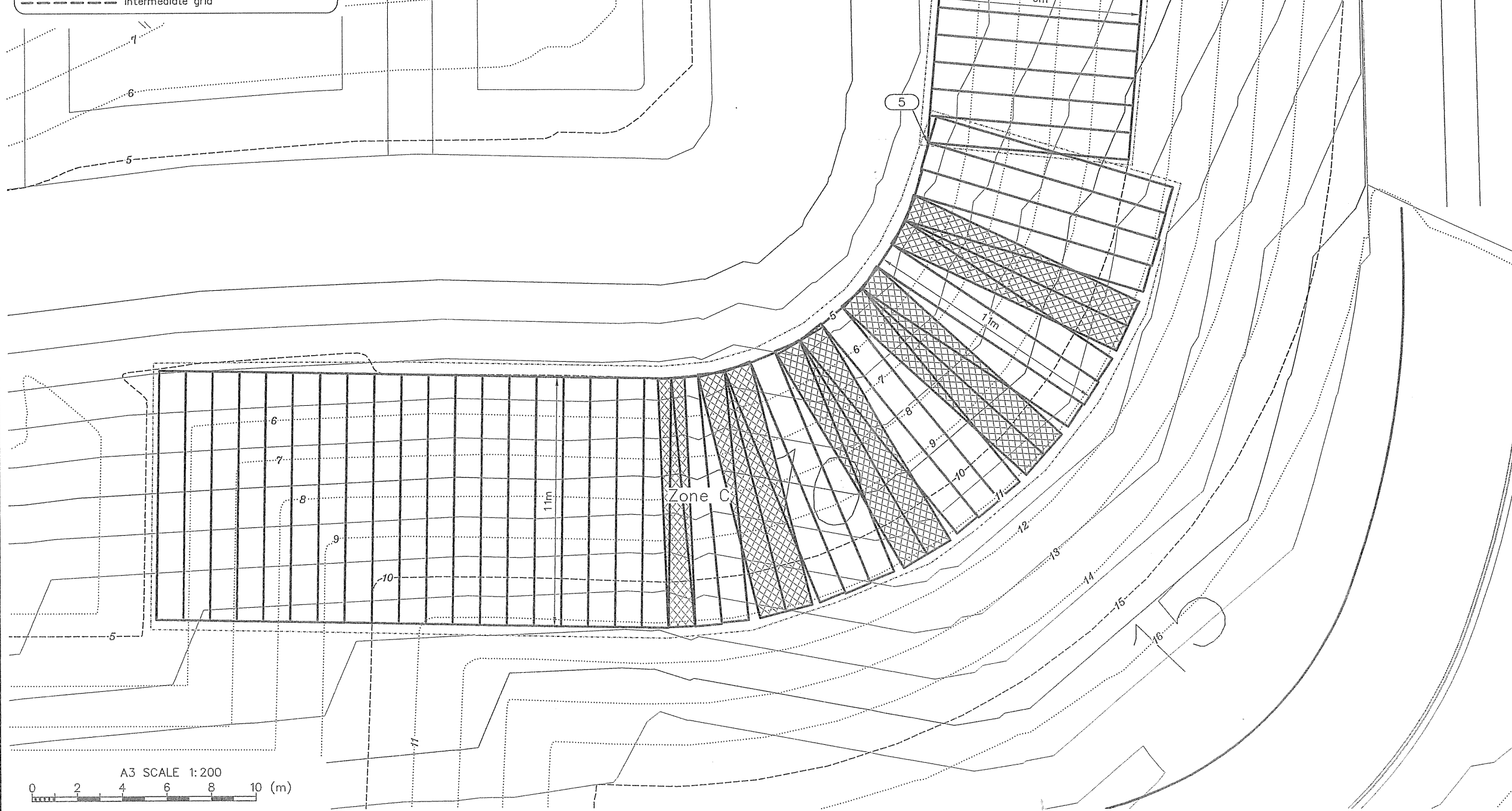
Main grids

level plus 0.25m to cover gap in main
grid immediately below

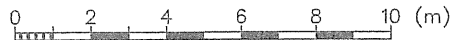
- Intermediate grid

SETOUT POINTS

1	83 1890.59 mN	39 1675.96 mE
2	83 1905.60 mN	39 166 1.54 mE
3	83 1905. 10 mN	39 1636.06 mE
4	83 1888.49 mN	39 162 1.69 mE
5	83 1859.84 mN	39 16 18.76 mE



A3 SCALE 1:200



NOTES :

1. All dimensions are in metres unless noted otherwise.
2. This drawing shows typical layout of base layer of grid. See Dwg 21854.012-5.1 to 5.3 for typical cross sections.

0	First Issue		
REVISION DESCRIPTION		BY	DATE
DESIGNED :		AJL	Feb. 12
DRAWN :		LJD	Feb. 12
DESIGN CHECKED :			
DRAFTING CHECKED :			
REFERENCE :			

CADFILE : \\21854.012-04_4.4_4.6.dwg

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MILLWATER
NORTH BRIDGE
SOUTHERN ABUTMENT

Geotechnical Works
RE Slopes
Typical Grid Layout

WING

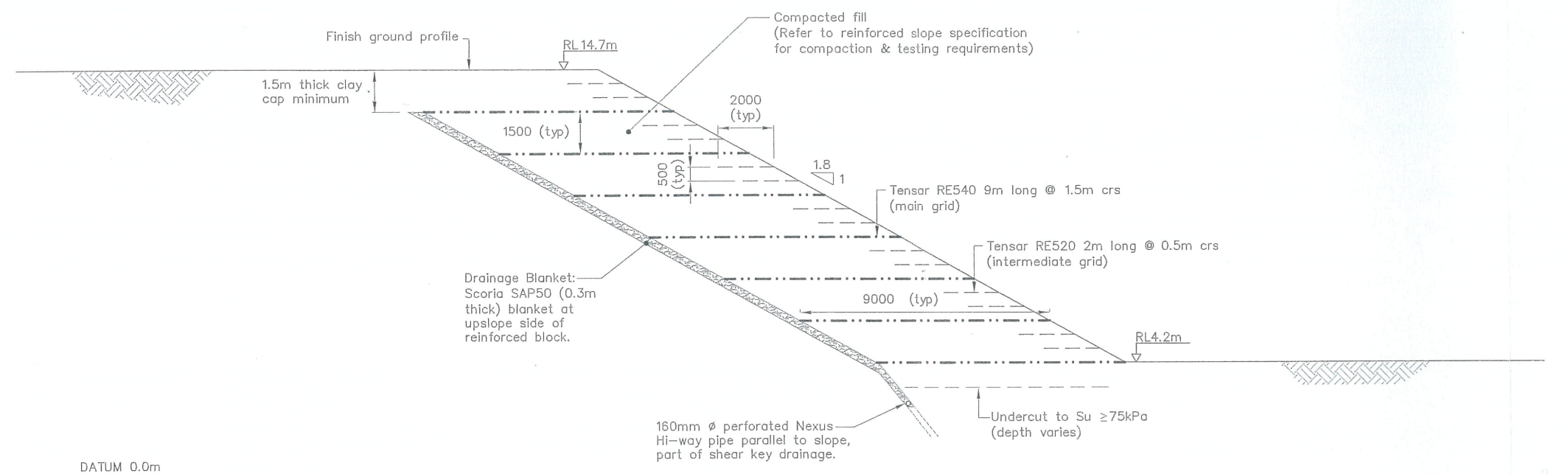
SCALES (AT A3 SIZE)
1:200

DWG. No. 21854.012-04.6

REV	0
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DRAWING STATUS: PRELIMINARY DRAFT

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SECTION 1 RE SLOPE ZONE A
SCALE 1:200 05



- NOTES :
1. All dimensions are in metres unless noted otherwise.
 2. Geogrid to be installed in accordance with manufacturers instructions.
 3. All geogrid to be lapped at joints in accordance with manufacturers recommendations. No longitudinal joints are permitted.
 4. Compacted fill to be placed a minimum of 0.5 metre beyond face of finished profile and then trimmed back to final slope batter.
 5. Geogrid to terminate maximum of 0.2 metre from final face.
 6. Undercut foundation to expose subsoil with undrained shear strength of at least 75kPa or to Engineers approval.
 7. 100mm of topsoil to be placed on trimmed final face.
 8. Biomac CJ450 to be installed over topsoil and pinned in accordance with manufacturers recommendations at 1.5 metre grid.
 9. No RE520 geogrid to be installed within 0.5m (vertically) of the slope crest.
 10. No RE540 geogrid to be installed within 1.0 metre (vertically) of the slope crest.
 11. Primary geogrid to be installed within 0.5 metre above and 0.5 metre below toe level.
 12. Maximum vertical spacing of 1.5 metre for RE540 and 0.5 metre for RE520.
 13. Compacted engineered fill to be tested in accordance with the reinforced slope specification.
 14. Engineer to inspect all of the geogrid prior to fill placement.

A	Construction Issue		
0	First Issue		
REVISION DESCRIPTION	BY	DATE	
DESIGNED :	AJL	Dec. 09	
DRAWN :	AJL	Dec. 09	
DESIGN CHECKED :			
DRAFTING CHECKED :			

REFERENCE :

CADFILE : L:\21854\21854.012-05.1_05.3

APPROVED :

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DRAWING STATUS: CONSTRUCTION ISSUE

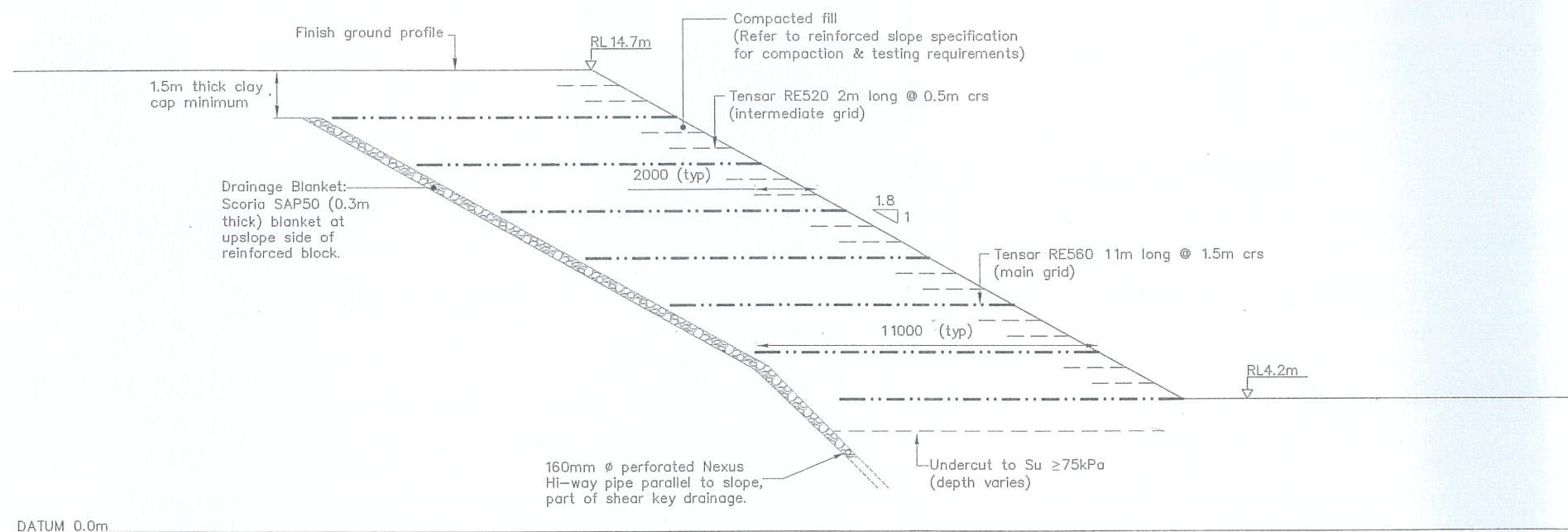
**WFH
PROPERTIES LTD**

MILLWATER
NORTH BRIDGE
SOUTHERN ABUTMENT

Typical Reinforced
Earth Slope
Zone A

SCALES (AT A3 SIZE)	DWG. No.	REV.
1:200	21854.012-05.1	A

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SECTION 4 RE SLOPE ZONE C
SCALE 1:200



- NOTES :
1. All dimensions are in metres unless noted otherwise.
 2. Geogrid to be installed in accordance with manufacturers instructions.
 3. All geogrid to be lapped at joints in accordance with manufacturers recommendations. No longitudinal joints are permitted.
 4. Compacted fill to be placed a minimum of 0.5 metre beyond face of finished profile and then trimmed back to final slope batter.
 5. Geogrid to terminate maximum of 0.2 metre from final face.
 6. Undercut foundation to expose subsoil with undrained shear strength of at least 75kPa or to Engineers approval.
 7. 100mm of topsoil to be placed on trimmed final face.
 8. Biomac CJ450 to be installed over topsoil and pinned in accordance with manufacturers recommendations at 1.5 metre grid.
 9. No RE520 geogrid to be installed within 0.5m (vertically) of the slope crest.
 10. No RE540 geogrid to be installed within 1.0 metre (vertically) of the slope crest.
 11. Primary geogrid to be installed within 0.5 metre above and 0.5 metre below toe level.
 12. Maximum vertical spacing of 1.5 metre for RE540 and 0.5 metre for RE520.
 13. Compacted engineered fill to be tested in accordance with the reinforced slope specification.
 14. Engineer to inspect all of the geogrid prior to fill placement.

A	Construction Issue		
0	First Issue		
REVISION DESCRIPTION		BY	DATE
DESIGNED :		AJL	Dec. 09
DRAWN :		AJL	Dec. 09
DESIGN CHECKED :			
DRAFTING CHECKED :			
REFERENCE :			
CADFILE : L:\21854\21854.012-05.1_05.3			
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MILLWATER
NORTH BRIDGE

SOUTHERN ABUTMENT

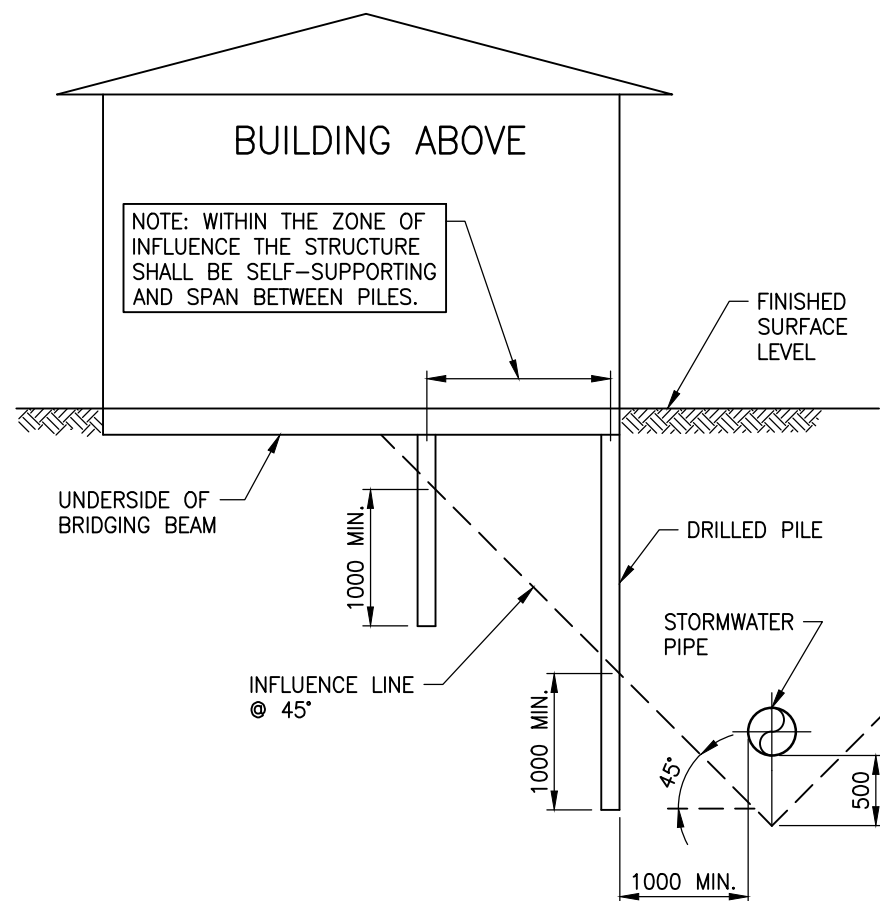
Typical Reinforced
Earth Slope
Zone C

SCALES (AT A3 SIZE)
1:200

DWG. No. 21854.012-05.3 REV. A

DRAWING STATUS: CONSTRUCTION ISSUE

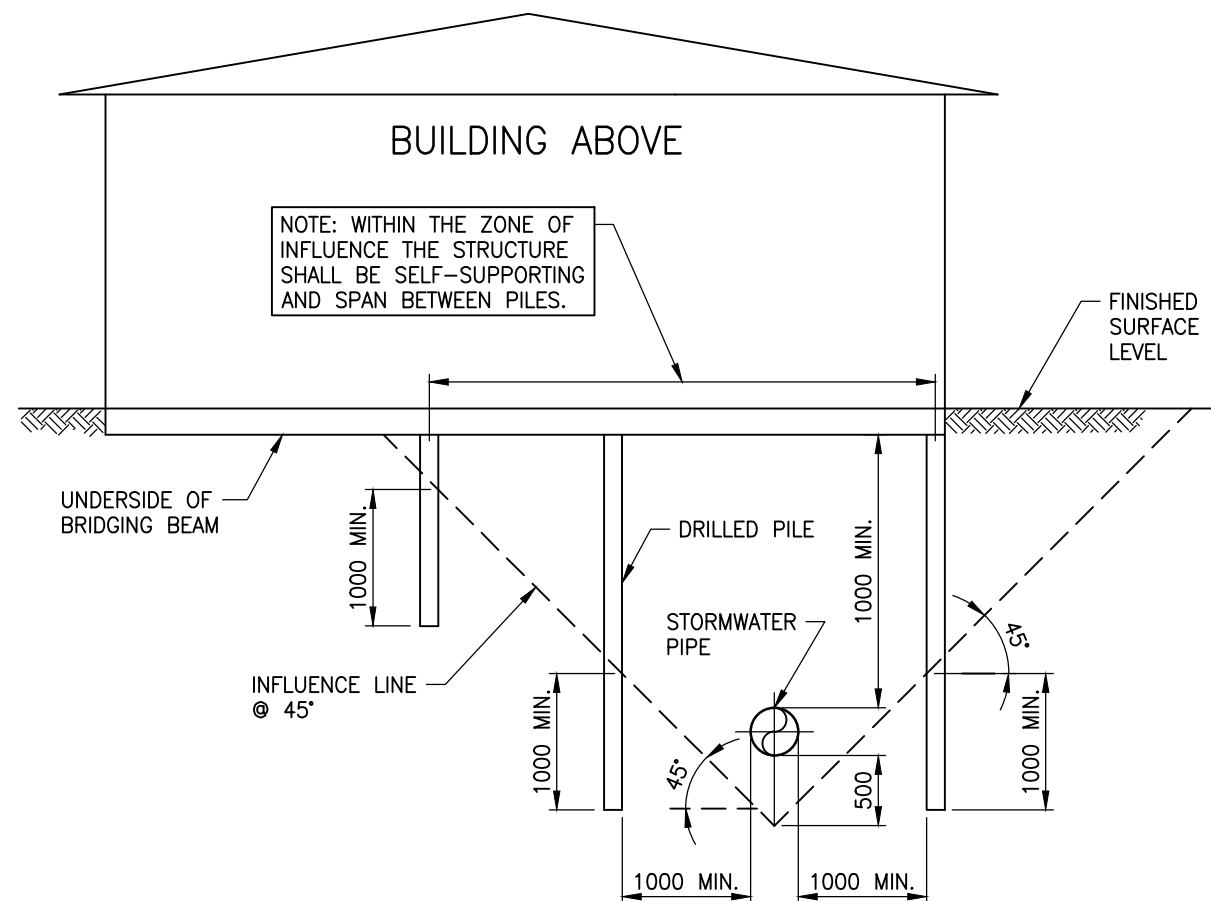
PLOT DATE 12/8/2015 11:54 AM I:\AENVA\Projects\AED4840 AC CoP Ch1\04 Deliverables\Drawings\AC-STD-SW22.dwg



BUILD CLOSE

"BUILD CLOSE" NOTES:

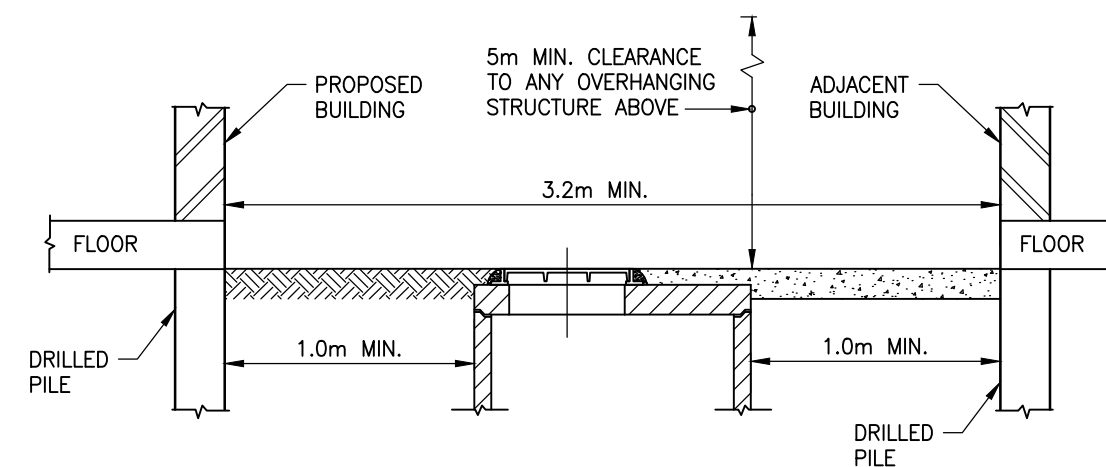
1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL IF BUILDING IS ADJACENT TO PIPES LARGER THAN 375mm INTERNAL DIAMETER, OR GREATER THAN 2.0m DEEP.
3. BUILDING SHALL GENERALLY BE OUTSIDE ALL OVERLAND FLOW PATHS AND FLOODPLAINS. SEE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



BUILD OVER

"BUILD OVER" NOTES:

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



MANHOLE CONSTRUCTION CLEARANCE

GENERAL NOTES:

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

STORMWATER CODE OF PRACTICE
STANDARD DETAILS

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

AUCKLAND COUNCIL

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

ENVIRONMENTAL-SW



ORIGINAL SCALE A3
SCALE: N.T.S.

DRAWING SET SHEET

SWCoP 1 OF 1

DRAWING No. REV
SW22 2

APPENDIX C: CLASSIFICATION TESTS



Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05230

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.)



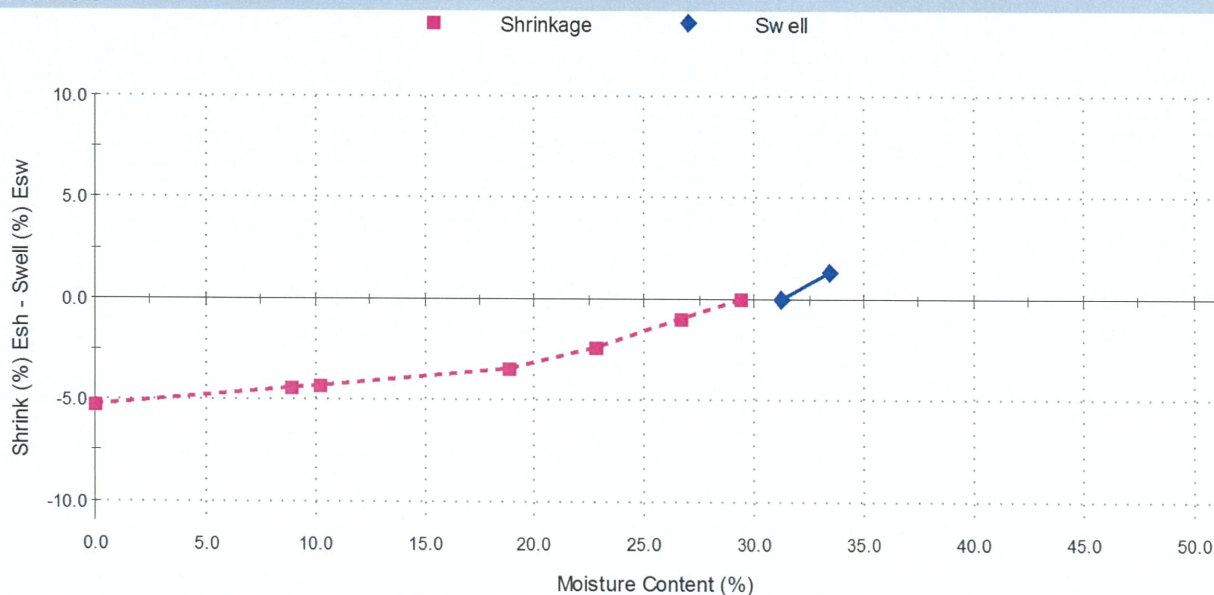
Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 7/06/2022

Sample Details

Sample ID:	ETAM22S-05230	Sampling Method:	Unknown (Not IANZ Endorsed)
Date Sampled:	16/05/2022	Material:	Undisturbed Soil
Date Submitted:	18/05/2022	Source:	Unknown (Sampled by Client)
Date Tested:	24/05/2022		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 87, 0.4 - 0.7 m		
Borehole Number:	Lot 87		
Borehole Depth (m):	0.4 - 0.7		

Swell Test		Shrink Test	
AS 1289.7.1.1		AS 1289.7.1.1	
Swell on Saturation (%):	1.3	Shrink on drying (%):	5.3
Moisture Content before (%):	31.2	Shrinkage Moisture Content (%):	29.4
Moisture Content after (%):	33.4	Est. inert material (%):	8%
Est. Unc. Comp. Strength before (kPa):	275	Crumbling during shrinkage:	1%
Est. Unc. Comp. Strength after (kPa):	225	Cracking during shrinkage:	2%

Shrink Swell



Shrink Swell Index - Iss (%): 3.3

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM22W01006
Tested By: JM



Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05231

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: 7/06/2022

Sample Details

Sample ID:	ETAM22S-05231	Sampling Method:	Unknown (Not IANZ Endorsed)
Date Sampled:	16/05/2022	Material:	Undisturbed Soil
Date Submitted:	18/05/2022	Source:	Unknown (Sampled by Client)
Date Tested:	24/05/2022		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 92, 0.4 - 0.7 m		
Borehole Number:	Lot 92		
Borehole Depth (m):	0.4 - 0.7		

Swell Test

AS 1289.7.1.1

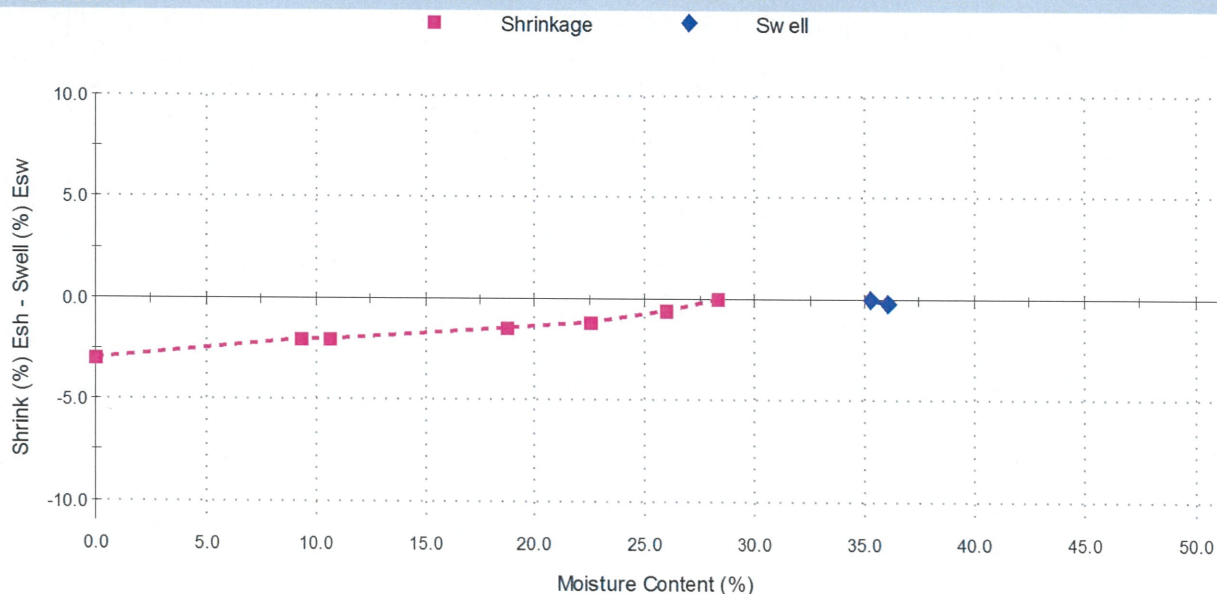
Swell on Saturation (%):	-0.2
Moisture Content before (%):	35.3
Moisture Content after (%):	36.1
Est. Unc. Comp. Strength before (kPa):	200
Est. Unc. Comp. Strength after (kPa):	125

Shrink Test

AS 1289.7.1.1

Shrink on drying (%):	3.0
Shrinkage Moisture Content (%):	28.3
Est. inert material (%):	25%
Crumbling during shrinkage:	5%
Cracking during shrinkage:	1%

Shrink Swell



Shrink Swell Index - Iss (%): 1.7

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM22W01006
Tested By: JM

Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05232

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.)



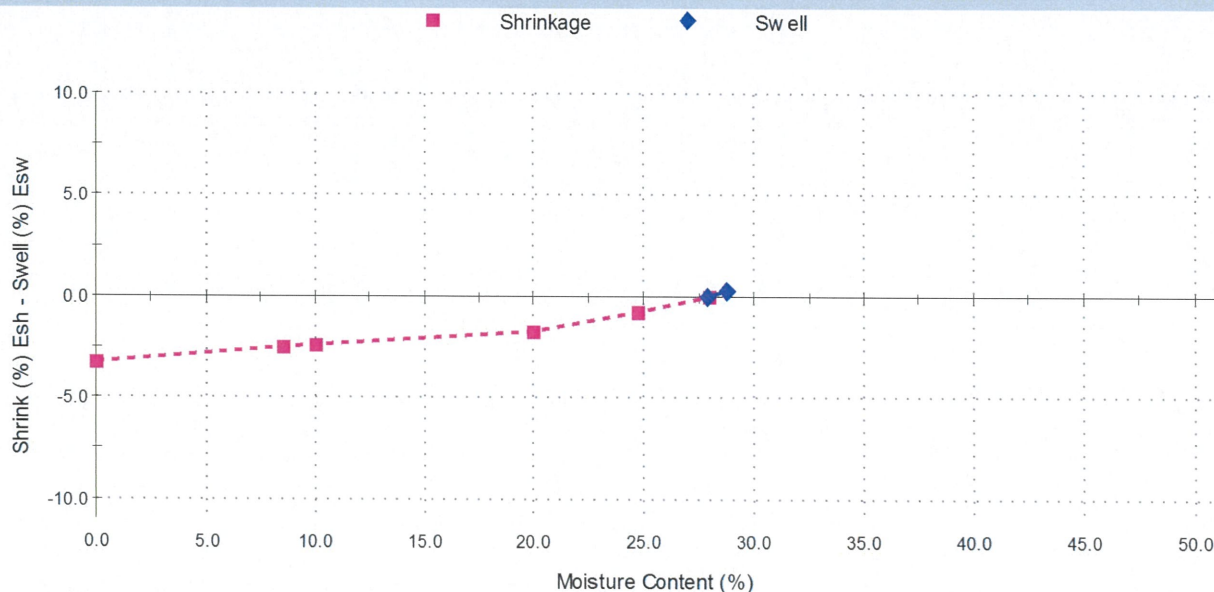
Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 7/06/2022

Sample Details

Sample ID: ETAM22S-05232	Sampling Method: Unknown (Not IANZ Endorsed)
Date Sampled: 16/05/2022	Material: Undisturbed Soil
Date Submitted: 18/05/2022	Source: Unknown (Sampled by Client)
Date Tested: 25/05/2022	
Project Location: 117 Kowhai Road, Orewa	
Sample Location: Lot 99, 0.4 - 0.7 m	
Borehole Number: Lot 99	
Borehole Depth (m): 0.4 - 0.7	

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	0.3	Shrink on drying (%):	3.3
Moisture Content before (%):	27.9	Shrinkage Moisture Content (%):	28.0
Moisture Content after (%):	28.7	Est. inert material (%):	3%
Est. Unc. Comp. Strength before (kPa):	300	Crumbling during shrinkage:	0.5%
Est. Unc. Comp. Strength after (kPa):	400	Cracking during shrinkage:	2.5%

Shrink Swell



Shrink Swell Index - Iss (%): 1.9

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM22W01006
Tested By: JM



Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05233

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: 7/06/2022

Sample Details

Sample ID: ETAM22S-05233

Date Sampled: 16/05/2022

Date Submitted: 18/05/2022

Date Tested: 25/05/2022

Project Location: 117 Kowhai Road, Orewa

Sample Location: Lot 129, 0.4 - 0.7 m

Borehole Number: Lot 129

Borehole Depth (m): 0.4 - 0.7

Sampling Method: Unknown (Not IANZ Endorsed)

Material: Undisturbed Soil

Source: Unknown (Sampled by Client)

Swell Test

AS 1289.7.1.1

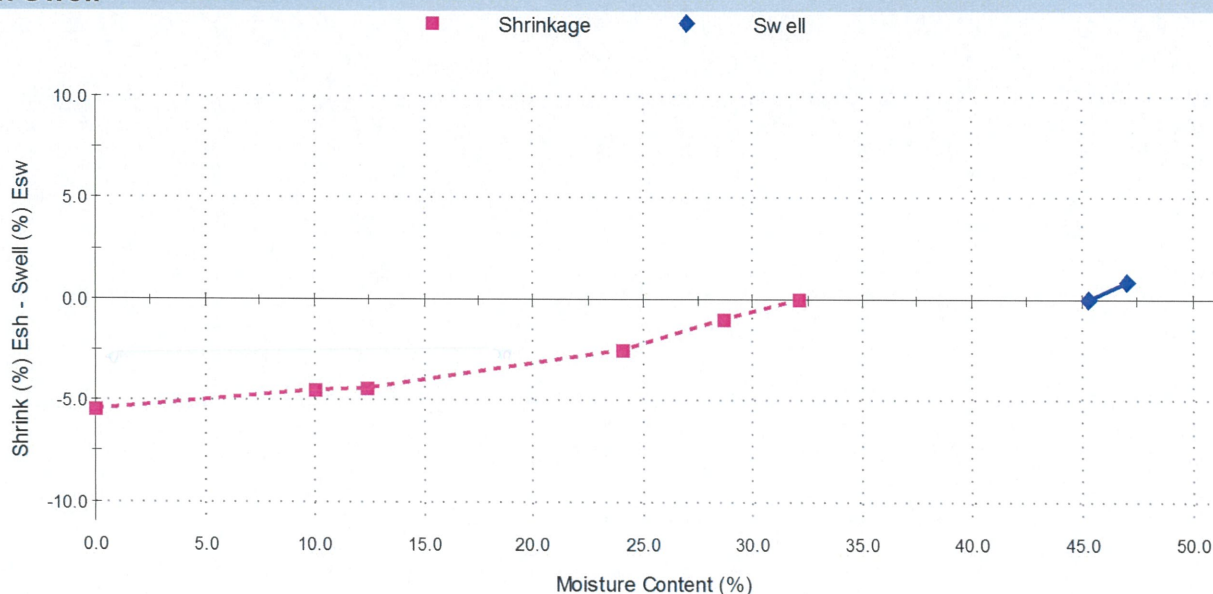
Swell on Saturation (%): 0.9
Moisture Content before (%): 45.3
Moisture Content after (%): 47.0
Est. Unc. Comp. Strength before (kPa): 150
Est. Unc. Comp. Strength after (kPa): 150

Shrink Test

AS 1289.7.1.1

Shrink on drying (%): 5.5
Shrinkage Moisture Content (%): 32.1
Est. inert material (%): 2%
Crumbling during shrinkage: 0%
Cracking during shrinkage: 2%

Shrink Swell



Shrink Swell Index - Iss (%): 3.3

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM22W01006
Tested By: JM



Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05234

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.)

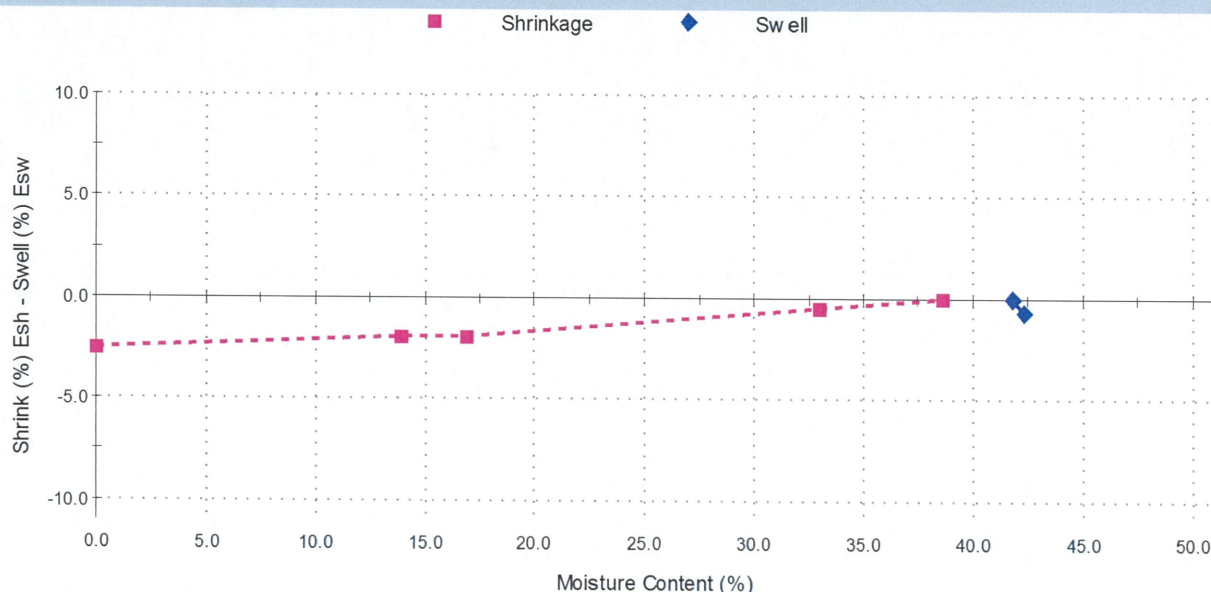
Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 7/06/2022

Sample Details

Sample ID:	ETAM22S-05234	Sampling Method:	Unknown (Not IANZ Endorsed)
Date Sampled:	16/05/2022	Material:	Undisturbed Soil
Date Submitted:	18/05/2022	Source:	Unknown (Sampled by Client)
Date Tested:	26/05/2022		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	Lot 161, 0.4 - 0.7 m		
Borehole Number:	Lot 161		
Borehole Depth (m):	0.4 - 0.7		

Swell Test		Shrink Test	
AS 1289.7.1.1		AS 1289.7.1.1	
Swell on Saturation (%):	-0.7	Shrink on drying (%):	2.5
Moisture Content before (%):	41.8	Shrinkage Moisture Content (%):	38.6
Moisture Content after (%):	42.3	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	250	Crumbling during shrinkage:	5%
Est. Unc. Comp. Strength after (kPa):	225	Cracking during shrinkage:	2%

Shrink Swell



Shrink Swell Index - Iss (%): 1.4

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM22W01006
Tested By: JM

Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05235

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.)



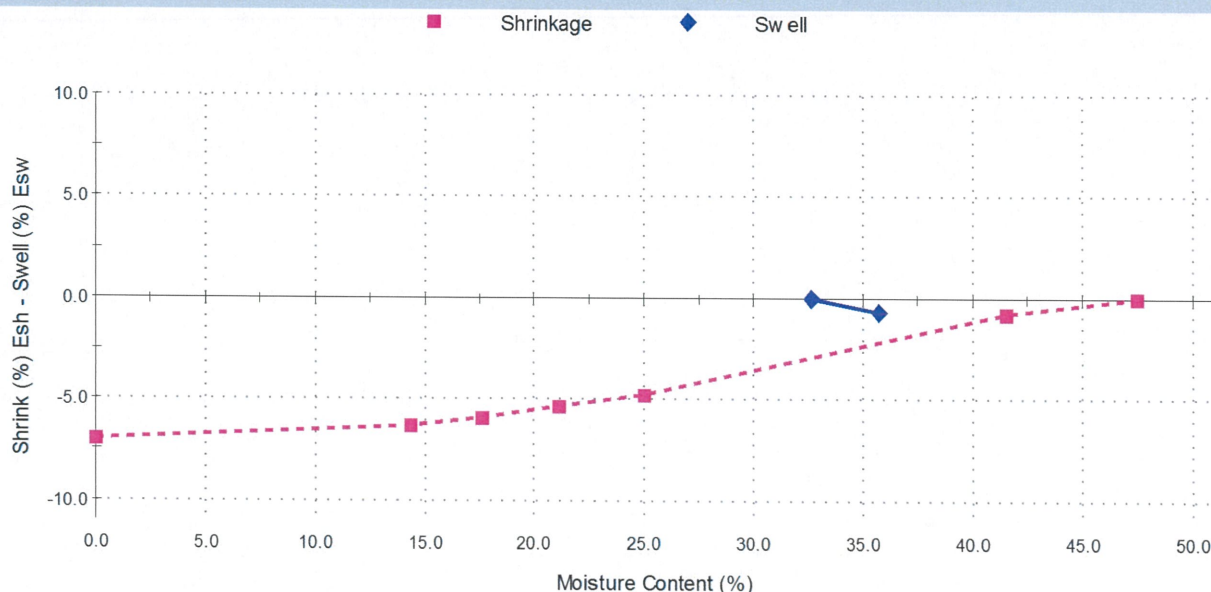
Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 7/06/2022

Sample Details

Sample ID: ETAM22S-05235	Sampling Method: Unknown (Not IANZ Endorsed)
Date Sampled: 16/05/2022	Material: Undisturbed Soil
Date Submitted: 18/05/2022	Source: Unknown (Sampled by Client)
Date Tested: 26/05/2022	
Project Location: 117 Kowhai Road, Orewa	
Sample Location: Lot 168, 0.4 - 0.7 m	
Borehole Number: Lot 168	
Borehole Depth (m): 0.4 - 0.7	

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.7	Shrink on drying (%):	7.0
Moisture Content before (%):	32.6	Shrinkage Moisture Content (%):	47.5
Moisture Content after (%):	35.7	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	175	Crumbling during shrinkage:	40%
Est. Unc. Comp. Strength after (kPa):	275	Cracking during shrinkage:	2%

Shrink Swell



Shrink Swell Index - Iss (%): 3.9

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM22W01006
Tested By: JM



Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05236

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: 7/06/2022

Sample Details

Sample ID: ETAM22S-05236

Date Sampled: 16/05/2022

Date Submitted: 18/05/2022

Date Tested: 27/05/2022

Project Location: 117 Kowhai Road, Orewa

Sample Location: Lot 158, 0.4 - 0.7 m

Borehole Number: Lot 158

Borehole Depth (m): 0.4 - 0.7

Sampling Method: Unknown (Not IANZ Endorsed)

Material: Undisturbed Soil

Source: Unknown (Sampled by Client)

Swell Test

AS 1289.7.1.1

Swell on Saturation (%): 0.2

Moisture Content before (%): 28.7

Moisture Content after (%): 29.5

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

Est. Unc. Comp. Strength after (kPa): 275

Shrink Test

AS 1289.7.1.1

Shrink on drying (%): 6.9

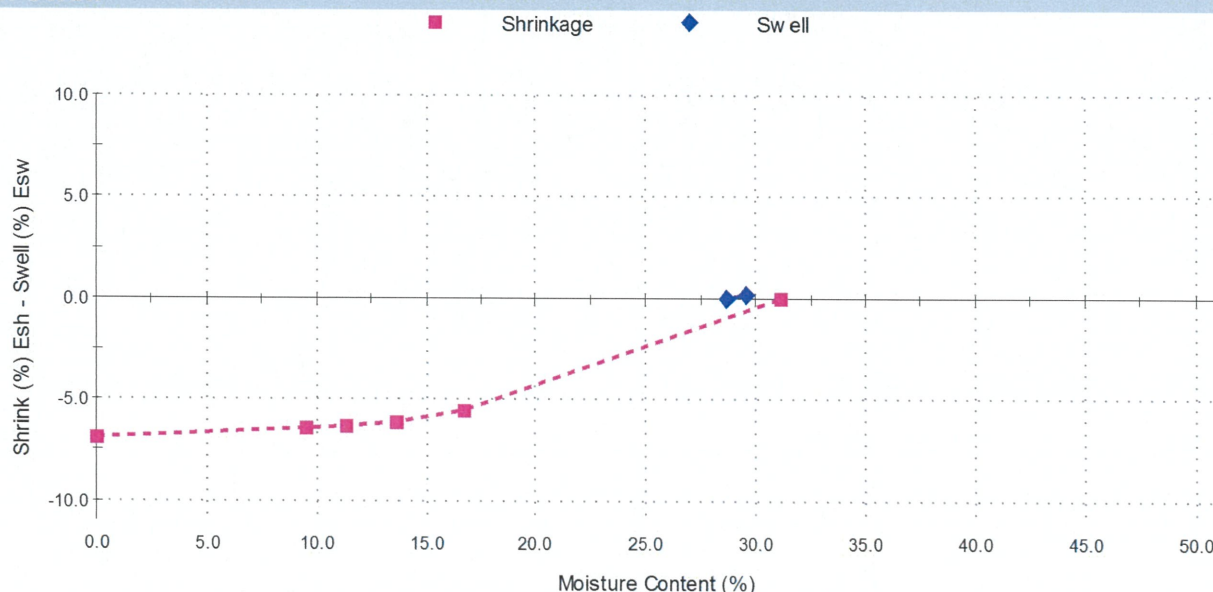
Shrinkage Moisture Content (%): 31.1

Est. inert material (%): 4%

Crumbling during shrinkage: 0%

Cracking during shrinkage: 0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 3.9

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM22W01006
Tested By: JM



Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05237

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: 7/06/2022

Sample Details

Sample ID: ETAM22S-05237

Date Sampled: 16/05/2022

Date Submitted: 18/05/2022

Date Tested: 27/05/2022

Project Location: 117 Kowhai Road, Orewa

Sample Location: Lot 171, 0.4 - 0.7 m

Borehole Number: Lot 171

Borehole Depth (m): 0.4 - 0.7

Sampling Method: Unknown (Not IANZ Endorsed)

Material: Undisturbed Soil

Source: Unknown (Sampled by Client)

Swell Test

AS 1289.7.1.1

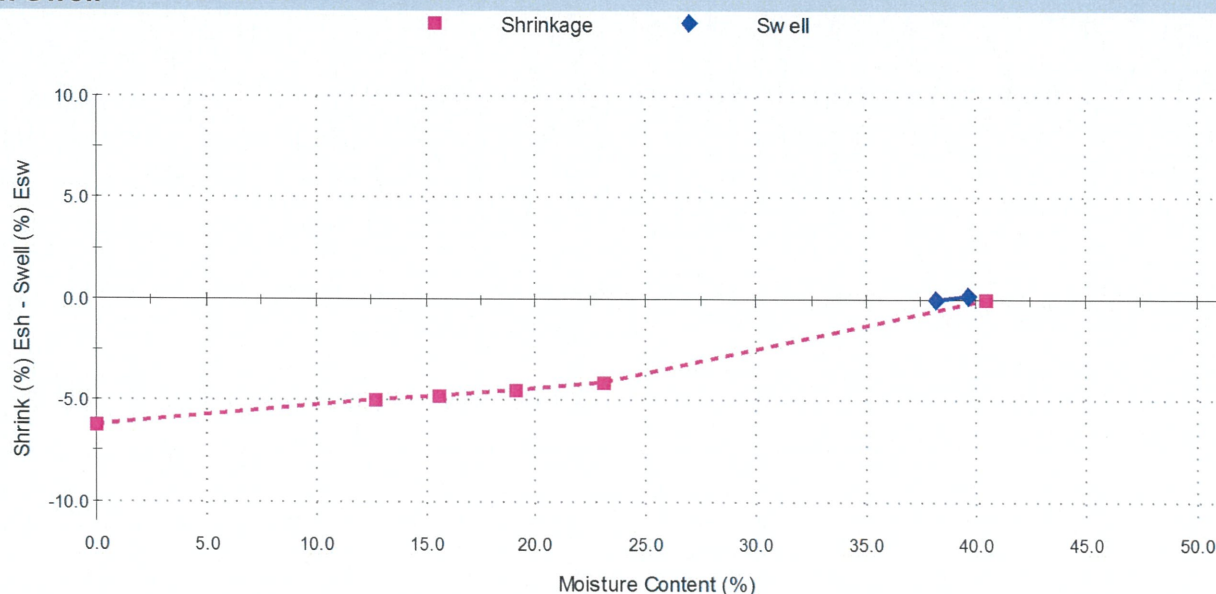
Swell on Saturation (%): 0.2
Moisture Content before (%): 38.2
Moisture Content after (%): 39.7
Est. Unc. Comp. Strength before (kPa): 450
Est. Unc. Comp. Strength after (kPa): 275

Shrink Test

AS 1289.7.1.1

Shrink on drying (%): 6.2
Shrinkage Moisture Content (%): 40.5
Est. inert material (%): 1%
Crumbling during shrinkage: 0.5%
Cracking during shrinkage: 1%

Shrink Swell



Shrink Swell Index - Iss (%): 3.5

Comments

Not accredited

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

Work Order No : ETAM22W01006

Tested By: JM



Shrink Swell Index Report

Auckland Laboratory

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

Report No: SSI:ETAM22S-05238

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: 7/06/2022

Sample Details

Sample ID: ETAM22S-05238

Date Sampled: 16/05/2022

Date Submitted: 18/05/2022

Date Tested: 27/05/2022

Project Location: 117 Kowhai Road, Orewa

Sample Location: Lot 1004, 0.4 - 0.7 m

Borehole Number: Lot 1004

Borehole Depth (m): 0.4 - 0.7

Sampling Method: Unknown (Not IANZ Endorsed)

Material: Undisturbed Soil

Source: Unknown (Sampled by Client)

Swell Test

AS 1289.7.1.1

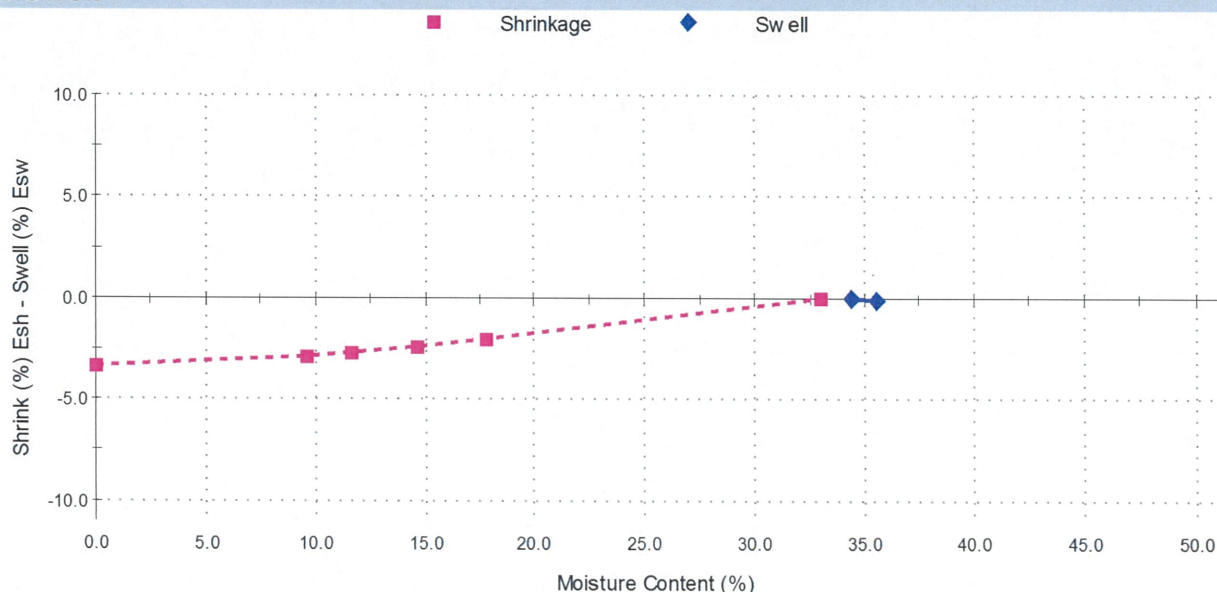
Swell on Saturation (%): -0.1
Moisture Content before (%): 34.4
Moisture Content after (%): 35.5
Est. Unc. Comp. Strength before (kPa): 450+
Est. Unc. Comp. Strength after (kPa): 350

Shrink Test

AS 1289.7.1.1

Shrink on drying (%): 3.4
Shrinkage Moisture Content (%): 33.0
Est. inert material (%): 1%
Crumbling during shrinkage: 0.5%
Cracking during shrinkage: 2%

Shrink Swell



Shrink Swell Index - Iss (%): 1.9

Comments



Not accredited

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

Work Order No : ETAM22W01006

Tested By: JM

APPENDIX D: EARTHWORKS FIELD DENSITY SUMMARY SHEETS

Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Joshua Fisher c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between; padding-top: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 23/04/2019</p> </div> </div>									
Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
17/04/2019	19W01518	TR	1	Fill	Silty CLAY	Shear Key	1749405	5949050	-	150	~2.3m to Finished Level	UTP	UTP	UTP	UTP	1.92	27.2	1.51	2.70	3
17/04/2019	19W01518	TR	2	Fill	Gravelly CLAY	Shear Key	1749417	5949056	-	150	~2.4m to Finished Level	UTP	UTP	UTP	UTP	1.88	26.2	1.49	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01518

Page No: 2 of 2

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

Location: As below



Tested by:

TR

Date tested:

17/04/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Joshua Fisher c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 6/05/2019 </div> </div>																																																																																					
Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																																																																																						
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #d9e1f2;"> <th rowspan="2">Date</th> <th rowspan="2">Work Order No: ETAM...</th> <th rowspan="2">Tested by</th> <th rowspan="2">Test No.</th> <th rowspan="2">Layer</th> <th rowspan="2">Material tested</th> <th rowspan="2">Location</th> <th rowspan="2">Easting</th> <th rowspan="2">Northing</th> <th rowspan="2">RL(m)</th> <th rowspan="2">Probe Test Depth (mm)</th> <th rowspan="2">Comments</th> <th colspan="4">Field Shear Strength in kPa</th> <th rowspan="2">Wet Density (T/m³)</th> <th rowspan="2">Oven Water Content (%)</th> <th rowspan="2">Dry Density (T/m³)</th> <th rowspan="2">Solid Density (T/m³) Assumed</th> <th rowspan="2">Air Voids (%)</th> </tr> <tr style="background-color: #d9e1f2;"> <th colspan="4">UTP = Unable to penetrate</th> </tr> </thead> <tbody> <tr> <td>3/05/2019</td> <td>19W01662</td> <td>TR</td> <td>5</td> <td>Fill</td> <td>Sandy CLAY</td> <td>Shear Key 1</td> <td>1749397</td> <td>5949055</td> <td>-</td> <td>150</td> <td>~ 6.0m from base</td> <td>193</td> <td>193</td> <td>224</td> <td>200</td> <td>1.81</td> <td>34.0</td> <td>1.35</td> <td>2.70</td> <td>4</td> </tr> <tr> <td>3/05/2019</td> <td>19W01662</td> <td>TR</td> <td>6</td> <td>Fill</td> <td>Sandy CLAY</td> <td>Shear Key 1</td> <td>1749405</td> <td>5949051</td> <td>-</td> <td>150</td> <td>~ 6.0m from base</td> <td>175</td> <td>175</td> <td>224</td> <td>238</td> <td>1.87</td> <td>33.2</td> <td>1.41</td> <td>2.70</td> <td>1</td> </tr> </tbody> </table>																				Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	UTP = Unable to penetrate				3/05/2019	19W01662	TR	5	Fill	Sandy CLAY	Shear Key 1	1749397	5949055	-	150	~ 6.0m from base	193	193	224	200	1.81	34.0	1.35	2.70	4	3/05/2019	19W01662	TR	6	Fill	Sandy CLAY	Shear Key 1	1749405	5949051	-	150	~ 6.0m from base	175	175	224	238	1.87	33.2	1.41	2.70	1
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed													Air Voids (%)																																																						
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3/05/2019	19W01662	TR	5	Fill	Sandy CLAY	Shear Key 1	1749397	5949055	-	150	~ 6.0m from base	193	193	224	200	1.81	34.0	1.35	2.70	4																																																																		
3/05/2019	19W01662	TR	6	Fill	Sandy CLAY	Shear Key 1	1749405	5949051	-	150	~ 6.0m from base	175	175	224	238	1.87	33.2	1.41	2.70	1																																																																		

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01662

Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 3/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Joshua Fisher c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div> Tests indicated as not accredited are outside the scope of the laboratory's accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 14/05/2019 </div> </div>
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Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01760



Page No: 2 of 2

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

Location: As below

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



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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01847

Page No: 2 of 2


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

Location: As below

Tested by: TR

Date tested: 17/05/2019



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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01872

Page No: 2 of 2

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

Location: As below



Tested by:

TR

Date tested:

20/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: . <div style="display: flex; align-items: center; justify-content: space-between; padding-top: 10px;"> <div style="text-align: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 24/05/2019 </div> </div>									
Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
21/05/2019	19W01934	TR	14	Fill	Sandy CLAY	Pond	1749395	5949020	-	150	~ 6.8m from base	238	234	234	193	1.84	33.4	1.38	2.70	3
21/05/2019	19W01934	TR	15	Fill	Sandy CLAY	Pond	1749405	5949023	-	150	~ 6.8m from base	238	232	155	193	1.80	32.9	1.35	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01934

Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 21/05/2019



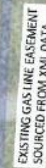
Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: .										
										 <div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> Tests indicated as not accredited are outside the scope of the laboratory's accreditation </div> <div style="display: inline-block; vertical-align: middle; margin-left: 100px;">  Approved Signatory: Cesar Pura Issue date: 24/05/2019 </div>										
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Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
22/05/2019	19W01936	TR	16	Fill	Stabilised Sandy CLAY	Pond	1749406	5949025	-	150	~ 7.6m from base	238	179	207	155	1.82	36.9	1.33	2.70	2


NOT TO SCALE

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TR

22/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  Tests indicated as not accredited are outside the scope of the laboratory's accreditation Approved Signatory: Cesar Pura Issue date: 28/05/2019									
Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
23/05/2019	19W01938	TR	17	Fill	Stabilised Sandy CLAY	Pond	1749411	5949028	8.2	150		238	238	200	171	1.87	31.4	1.42	2.70	3
23/05/2019	19W01938	TR	18	Fill	Stabilised Sandy CLAY	Pond	1749390	5949029	8.2	150		141	141	143	150	1.85	33.4	1.39	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01938

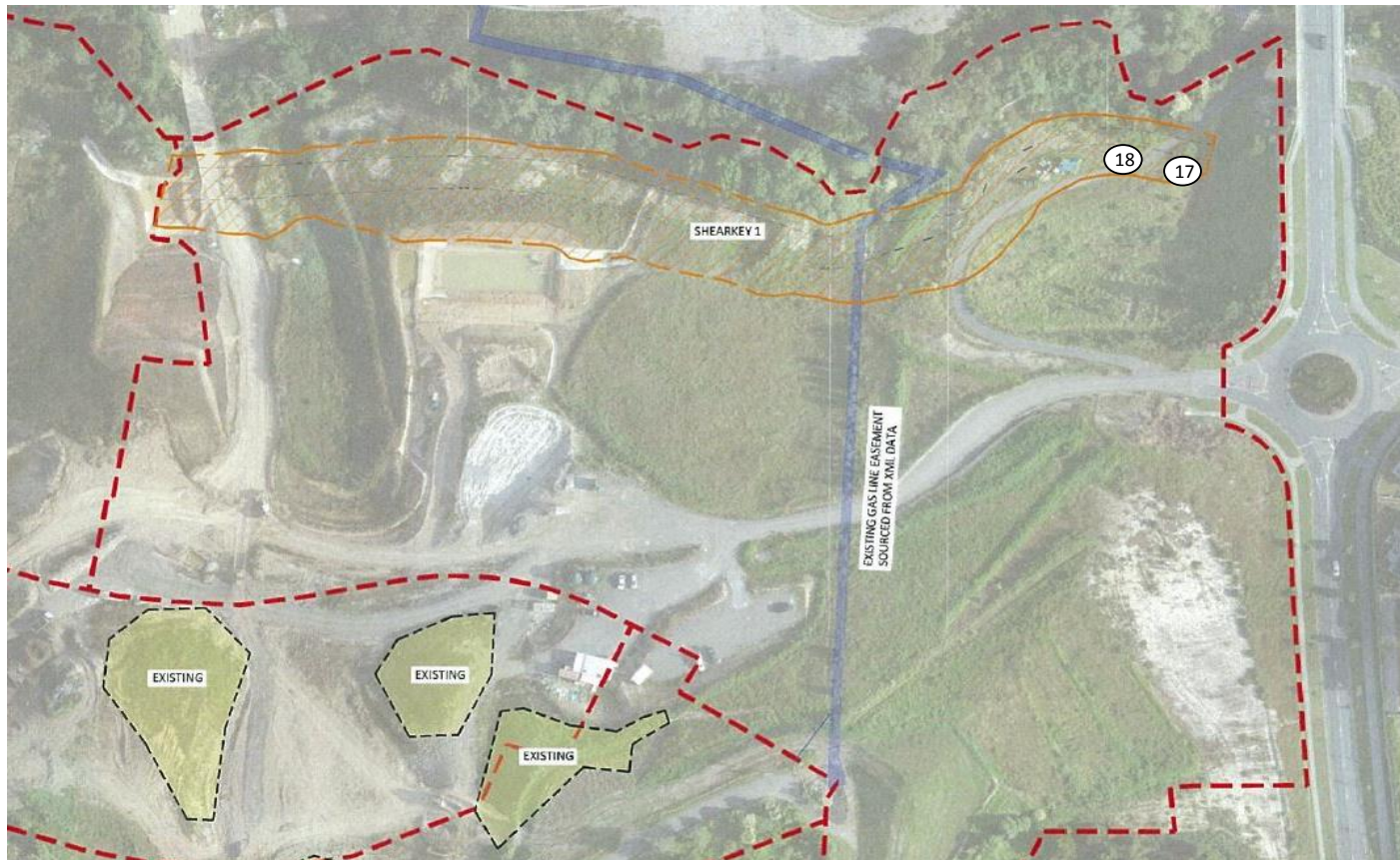
Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 23/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 28/05/2019 </div> </div>									
Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
24/05/2019	19W01946	TR	19	Fill	Stabilised Sandy CLAY	Shear Key 1	1749409	5949053	7.5	150		UTP	238	155	193	1.83	31.4	1.39	2.70	5
24/05/2019	19W01946	TR	20	Fill	Stabilised Sandy CLAY	Shear Key 1	1749387	5949051	7.5	150		234	234	210	210	1.75	32.3	1.32	2.70	8

Project No: 773-ETAM00991AA

Work Order No: ETAM19W01946

Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 24/05/2019



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="font-size: 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: 13/01/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
9/01/2020	20W00024	JJ	68	Fill	Silty CLAY	Gully 1	1749172	5949024	-	150	~0.8m to Finished Level	UTP	UTP	UTP	UTP	1.92	26.4	1.52	2.70	4
9/01/2020	20W00024	JJ	69	Fill	Silty CLAY	Gully 1	1749175	5949010	-	150	~0.8m to Finished Level	UTP	UTP	UTP	UTP	1.85	29.2	1.43	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00024

Page No: 2 of 2


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

Location: As below

Tested by: JJ

Date tested: 9/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> <p>Approved Signatory: Cesar Pura</p> <p>Issue date: 15/01/2020</p> </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
13/01/2020	20W00037	TR	73	Fill	Silty CLAY	Gully 1	1749170	5949039	9.40	150		202	202	173	192	1.88	28.1	1.46	2.70	5
13/01/2020	20W00037	TR	74	Fill	Silty CLAY	Gully 1	1749178	5949011	9.80	150		202	202	195	192	1.92	27.9	1.50	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00037

Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 13/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 22/01/2020 </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
14/01/2020	20W00048	MP	75	Fill	Silty CLAY	Gully 1	1749177	5948974	10.31	150		UTP	UTP	UTP	183	1.92	26.0	1.53	2.70	4
14/01/2020	20W00048	MP	76	Fill	Silty CLAY	Gully 1	1749174	5948983	10.25	150		UTP	UTP	UTP	UTP	1.85	26.8	1.46	2.70	7
14/01/2020	20W00048	MP	77	Fill	Silty CLAY	Gully 1	1749176	5948798	10.05	150		183	183	166	UTP	1.89	28.2	1.47	2.70	4

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00048

Page No: 2 of 2

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

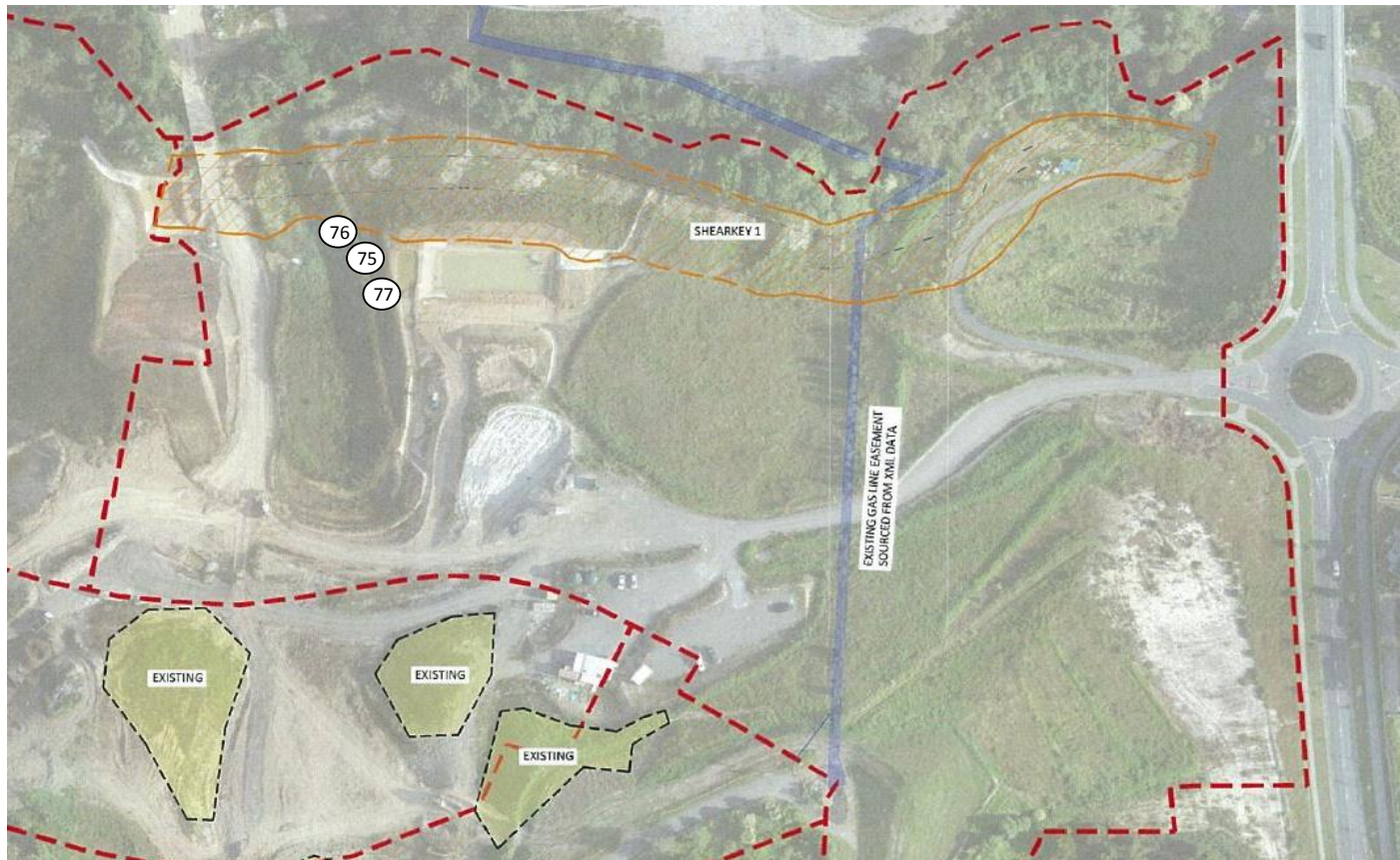
Location: As below



Tested by:

MP

Date tested:

14/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: center;">  <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 <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
16/01/2020	20W00065	TR	78	Fill	Gravelly CLAY	East Gully	1749214	5948942	12.50	150		202	202	202	202	1.90	31.1	1.45	2.70	1
16/01/2020	20W00065	TR	79	Fill	Gravelly CLAY	East Gully	1749229	5948465	22.00	150		202	163	150	152	1.89	31.2	1.44	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00065

Page No: 2 of 2

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

Location: As below



Tested by:

TR

Date tested:

16/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 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 <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
17/01/2020	20W00069	TR	80	Fill	Gravelly CLAY	Gully 1	1749177	5948951	11.65	150		152	155	166	173	1.89	31.4	1.44	2.70	2
17/01/2020	20W00069	TR	81	Fill	Gravelly CLAY	Gully 1	1749175	5949010	11.30	150		159	162	202	157	1.88	36.0	1.38	2.70	0

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00069

Page No: 2 of 2

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

Location: As below



Tested by:

TR

Date tested:

17/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 22/01/2020 </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
20/01/2020	20W00086	TR	82	Fill	Gravelly CLAY	Gully 1	1749159	5949008	12.50	150		UTP	UTP	UTP	UTP	1.90	22.6	1.55	2.70	8
20/01/2020	20W00086	TR	83	Fill	Gravelly CLAY	Gully 1	1749171	5948992	12.30	150		UTP	UTP	UTP	UTP	1.86	25.5	1.48	2.70	7
20/01/2020	20W00086	TR	84	Fill	Gravelly CLAY	Gully 1	1749178	5948975	12.20	150		UTP	UTP	UTP	UTP	1.85	28.2	1.45	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00086

Page No: 2 of 2

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

Location: As below



Tested by:

TR

Date tested:

20/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div style="font-size: small;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 23/01/2020 </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
21/01/2020	20W00100	TR	85	Fill	Silty CLAY	Gully 1	1749170	5948938	-	150		202	202	162	152	1.81	27.6	1.42	2.70	8
21/01/2020	20W00100	TR	86	Fill	Silty CLAY	Gully 1	1749182	5948970	-	150		152	162	150	202	1.79	40.7	1.28	2.70	1

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00100

Page No: 2 of 2


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

Location: As below

Tested by: TR

Date tested: 21/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 29/01/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																					
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
22/01/2020	20W00118	TR	87	Fill	Silty CLAY	Gully 1	1749165	5949017	13.00	150		202+	162	192	UTP	1.89	26.8	1.49	2.70	5	
22/01/2020	20W00118	TR	88	Fill	Silty CLAY	Gully 1	1749189	5948993	13.00	150		UTP	182	202	185	1.90	24.0	1.53	2.70	7	
22/01/2020	20W00118	TR	89	Fill	Silty CLAY	Undercut Wall 306	1749387	5948934	17.10	150		150	150	162	159	1.82	34.1	1.36	2.70	3	
22/01/2020	20W00118	TR	90	Fill	Silty CLAY	Undercut Wall 306	1749393	5948916	18.10	150		150	171	185	155	1.71	40.8	1.22	2.70	5	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00118

Page No: 2 of 2

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

Location: As below



Tested by:

TR

Date tested:

22/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  All tests reported herein have been performed in accordance with the laboratory's scope of accreditation <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 29/01/2020 </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
23/01/2020	20W00123	TR	91	Fill	Silty CLAY	Gully 1	1749175	5949010	13.23	150		162	159	202+	202+	1.82	27.2	1.43	2.70	8
23/01/2020	20W00123	TR	92	Fill	Silty CLAY	Gully 1	1749176	5948989	13.19	150		169	198	162	192	1.87	28.0	1.46	2.70	5
23/01/2020	20W00123	TR	93	Fill	Silty CLAY	Gully 1	1749177	5948973	14.30	150		185	195	182	202	1.87	28.1	1.46	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00123

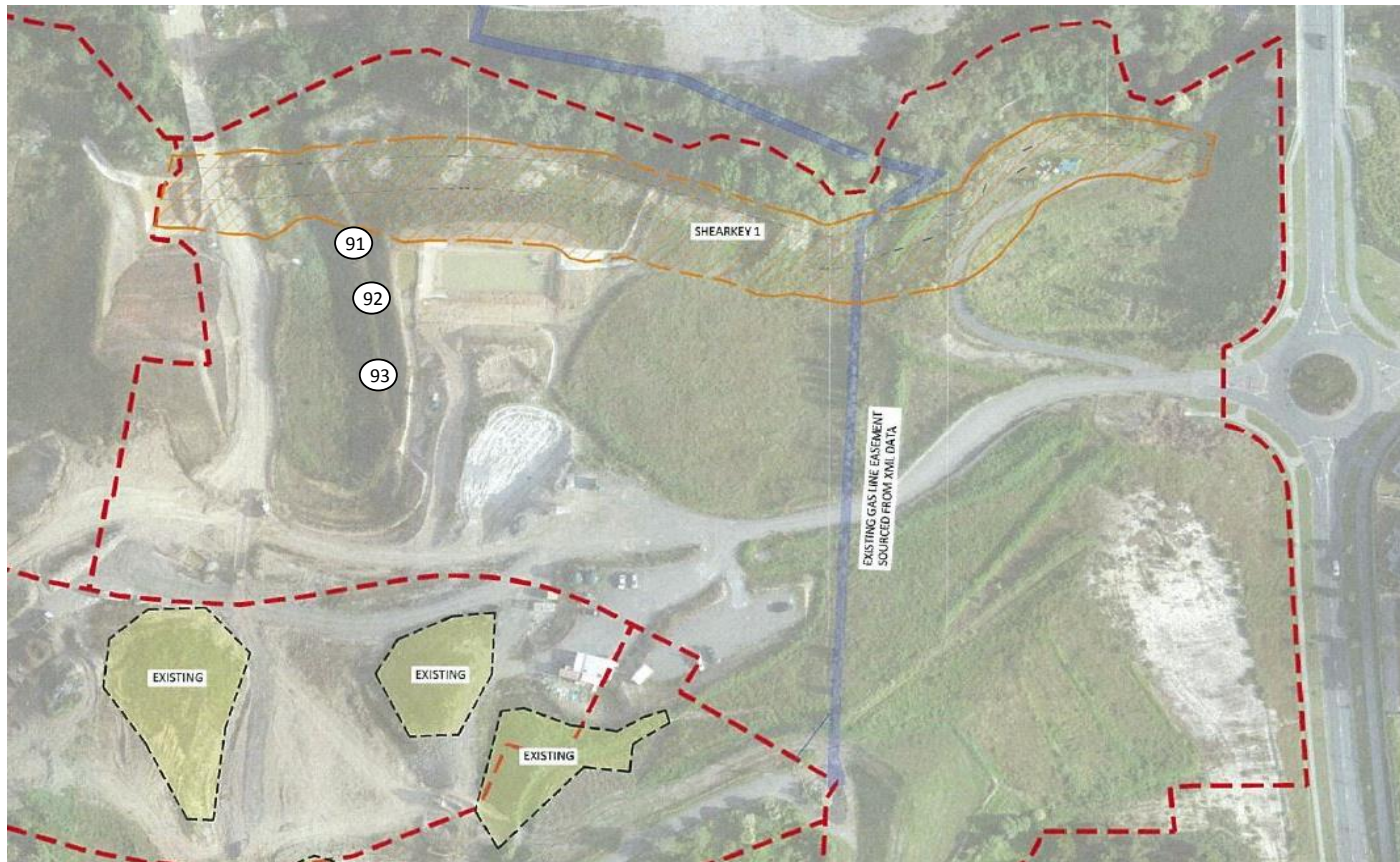
Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 23/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div style="text-align: center;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 29/01/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
24/01/2020	20W00128	TR	94	Fill	Silty CLAY	Gully 1	1749156	5949011	13.91	150		UTP	UTP	UTP	UTP	1.89	32.2	1.43	2.70	1
24/01/2020	20W00128	TR	95	Fill	Silty CLAY	Gully 1	1749180	5948962	14.92	150		157	202	195	150	1.78	36.1	1.30	2.70	5
24/01/2020	20W00128	TR	96	Fill	Silty CLAY	Wall 306	1749411	5948910	18.88	150		126	124	140	121	1.78	37.7	1.29	2.70	4
24/01/2020	20W00128	TR	97	Fill	Silty CLAY	Wall 306	1749429	5948912	18.98	150		140	126	124	138	1.77	38.9	1.27	2.70	3
24/01/2020	20W00128	TR	98	Fill	Silty CLAY	Wall 306	1749412	5948911	18.88	150	Retest of Test No. 96	202	202	202	189	1.82	36.3	1.33	2.70	2
24/01/2020	20W00128	TR	99	Fill	Silty CLAY	Wall 306	1749430	5948909	18.98	150	Retest of Test No. 97	189	182	185	198	1.82	32.7	1.37	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00128

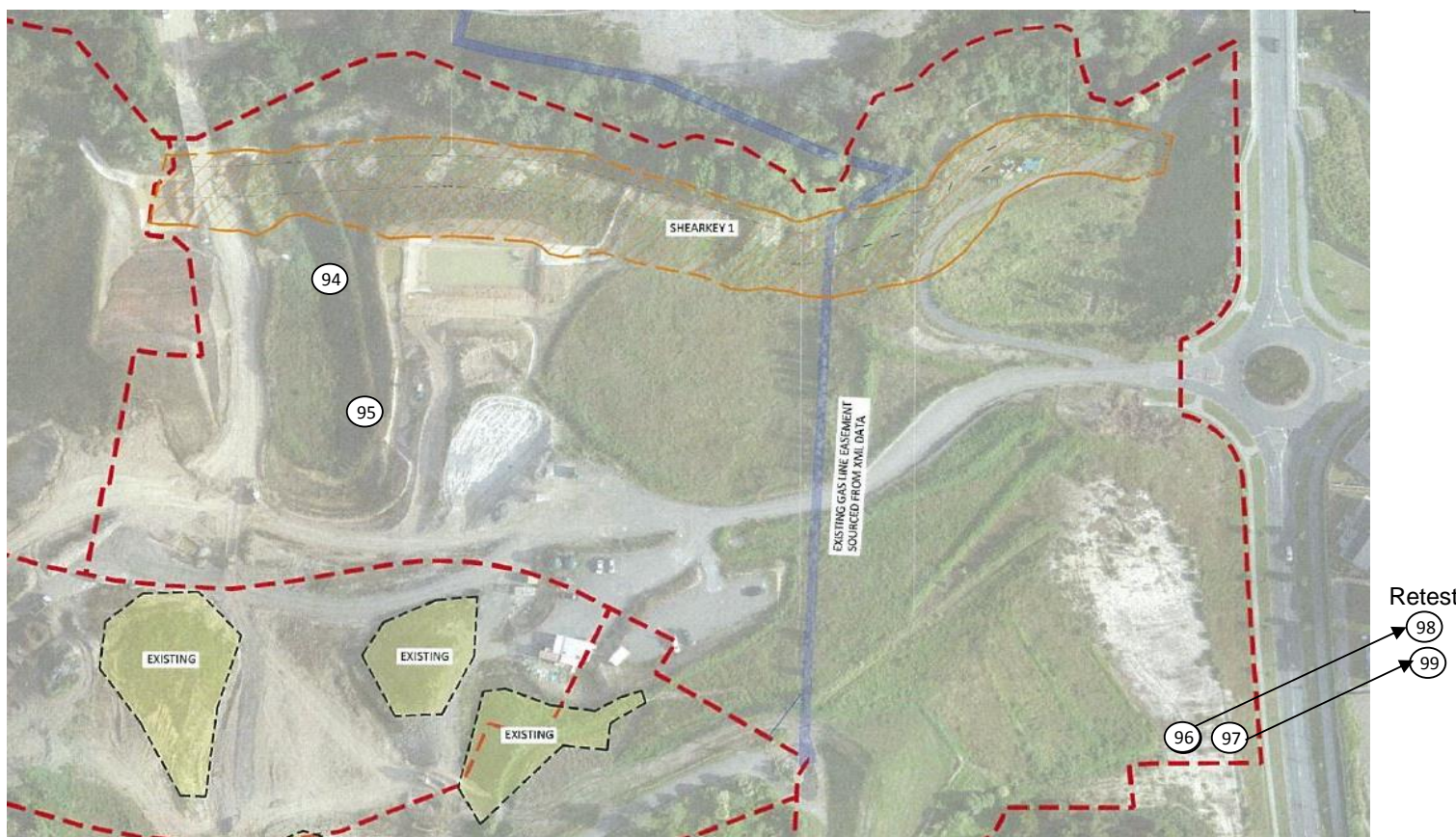
Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 24/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div style="text-align: center;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 4/02/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
28/01/2020	20W00171	MP	100	Fill	Silty CLAY	Gully 1	1749183	5948956	-	150		176	202	189	185	1.91	24.9	1.52	2.70	5
28/01/2020	20W00171	MP	101	Fill	Silty CLAY	Gully 1	1749167	5948986	-	150		173	185	202	202	1.89	26.6	1.49	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00171

Page No: 2 of 2

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

Location: As below



Tested by:

MP

Date tested:

28/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div style="text-align: center;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 4/02/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
29/01/2020	20W00215	TR	102	Fill	Silty CLAY	Gully 1	1749184	5948964	17.50	150		202	202	202	189	1.87	28.0	1.46	2.70	5
29/01/2020	20W00215	TR	103	Fill	Silty CLAY	Gully 1	1749162	5948981	17.50	150		182	152	173	189	1.88	33.9	1.40	2.70	0

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00215

Page No: 2 of 2

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

Location: As below



Tested by:

TR

Date tested:

29/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  All tests reported herein have been performed in accordance with the laboratory's scope of accreditation <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 4/02/2020 </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
30/01/2020	20W00219	TR	104	Fill	Silty CLAY	Gully 1	1749162	5948975	18.00	150		150	173	185	159	1.87	33.6	1.40	2.70	1
30/01/2020	20W00219	TR	105	Fill	Silty Sandy CLAY	Shearkey	1749253	5949039	6.30	150		150	171	185	202	1.83	39.1	1.31	2.70	0
30/01/2020	20W00219	TR	106	Fill	Silty Sandy CLAY	Shearkey	1749268	5949038	4.88	150		157	159	202	182	1.81	35.5	1.33	2.70	3
30/01/2020	20W00219	TR	107	Fill	Silty CLAY	Gully 1	1749175	5948960	18.00	150		150	159	164	189	1.87	28.8	1.45	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00219

Page No: 2 of 2

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

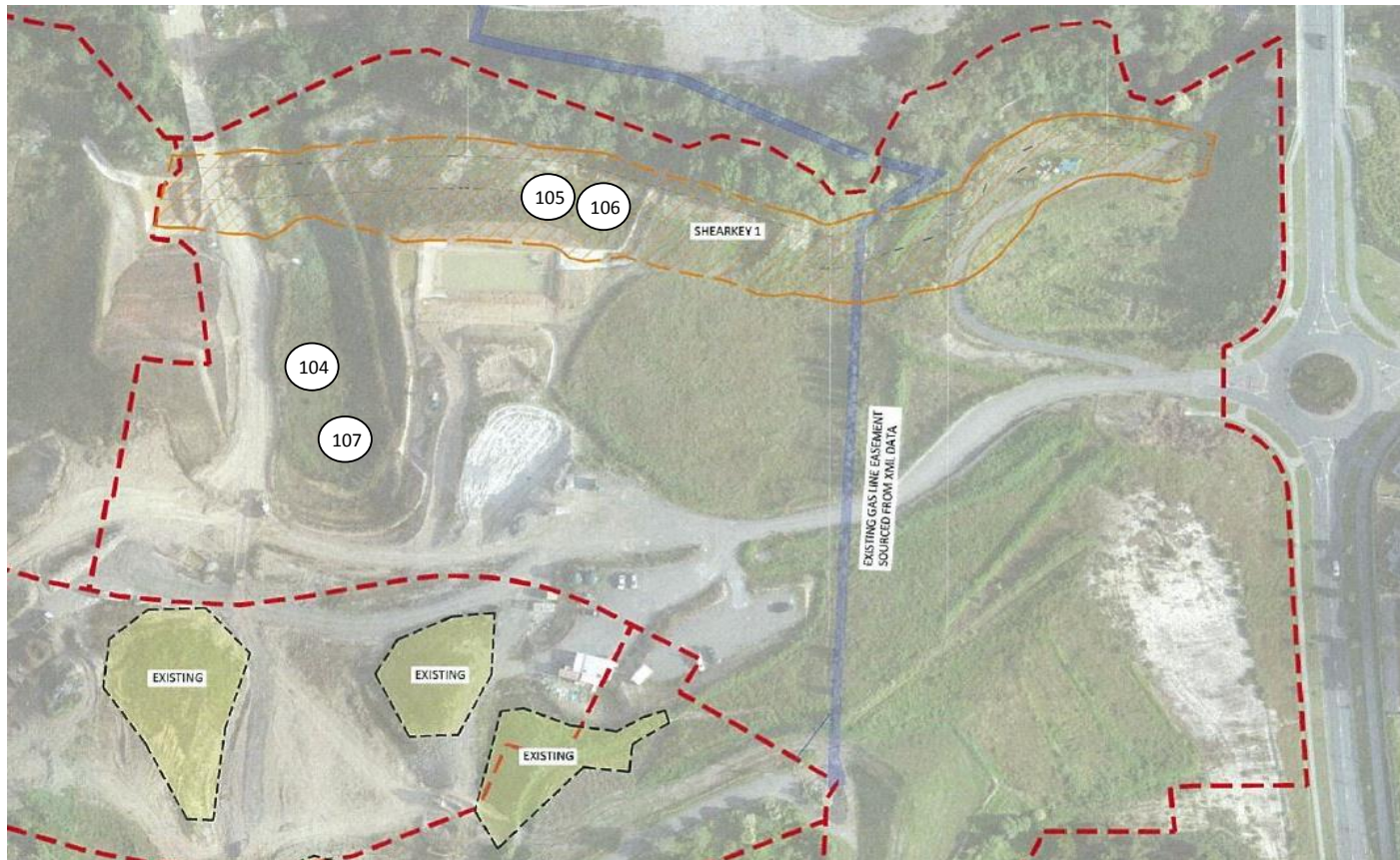
Location: As below



Tested by:

TR

Date tested:

30/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div style="text-align: center;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 4/02/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
31/01/2020	20W00230	MP	108	Fill	CLAY	Shearkey	1749264	5949039	5.50	150		UTP	UTP	202+	202+	1.90	32.2	1.44	2.70	0
31/01/2020	20W00230	MP	109	Fill	CLAY	Shearkey	1749251	5949042	7.00	150		185	162	150	150	1.81	36.4	1.33	2.70	2
31/01/2020	20W00230	MP	110	Fill	CLAY	Gully 1	1749161	5948951	19.04	150		150	150	150	185	1.80	34.0	1.35	2.70	4
31/01/2020	20W00230	MP	111	Fill	CLAY	Gully 1	1749192	5948974	17.80	150		150	150	150	138	1.82	38.0	1.32	2.70	1
31/01/2020	20W00230	MP	112	Fill	CLAY	Undercut	1749450	5948854	20.00	150		202	202	202	202	1.83	30.6	1.40	2.70	5
31/01/2020	20W00230	MP	113	Fill	CLAY	Undercut	1749448	5948873	20.00	150		150	150	162	162	1.84	33.6	1.37	2.70	3

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00230

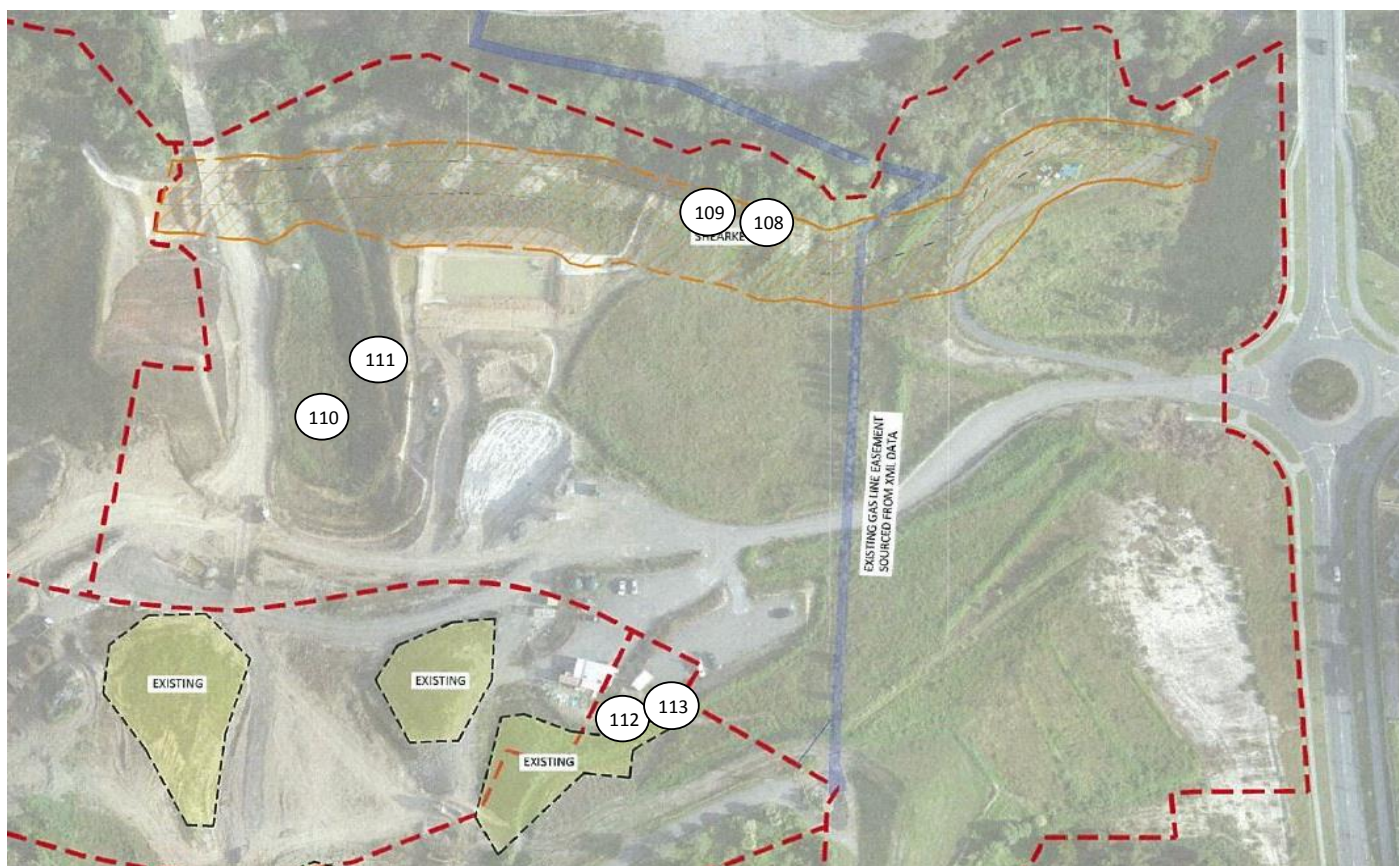
Page No: 2 of 2



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

Location: As below

Tested by: MP

Date tested: 31/01/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 8/02/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
3/02/2020	20W00250	TR	114	Fill	Silty CLAY	Gully 1	1749161	5948967	-	150		202	202	UTP	UTP	1.83	31.8	1.39	2.70	4
3/02/2020	20W00250	TR	115	Fill	Silty CLAY	Gully 1	1749193	5948958	-	150		202	202	189	182	1.88	28.5	1.46	2.70	4
3/02/2020	20W00250	TR	116	Fill	Silty CLAY	306 Undercut	1749449	5948897	21.00	150		171	198	202	162	1.72	34.8	1.28	2.70	8
3/02/2020	20W00250	TR	117	Fill	Silty CLAY	306 Undercut	1749444	5948876	21.00	150		171	198	UTP	164	1.82	34.2	1.35	2.70	4
3/02/2020	20W00250	TR	118	Fill	Silty CLAY	306 Undercut	1749443	5948856	21.00	150		202	202	198	162	1.78	33.7	1.33	2.70	6
3/02/2020	20W00250	TR	119	Fill	Silty CLAY	306 Undercut	1749449	5948839	21.00	150		202	171	182	166	1.82	34.2	1.36	2.70	3

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00250

Page No: 2 of 2

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

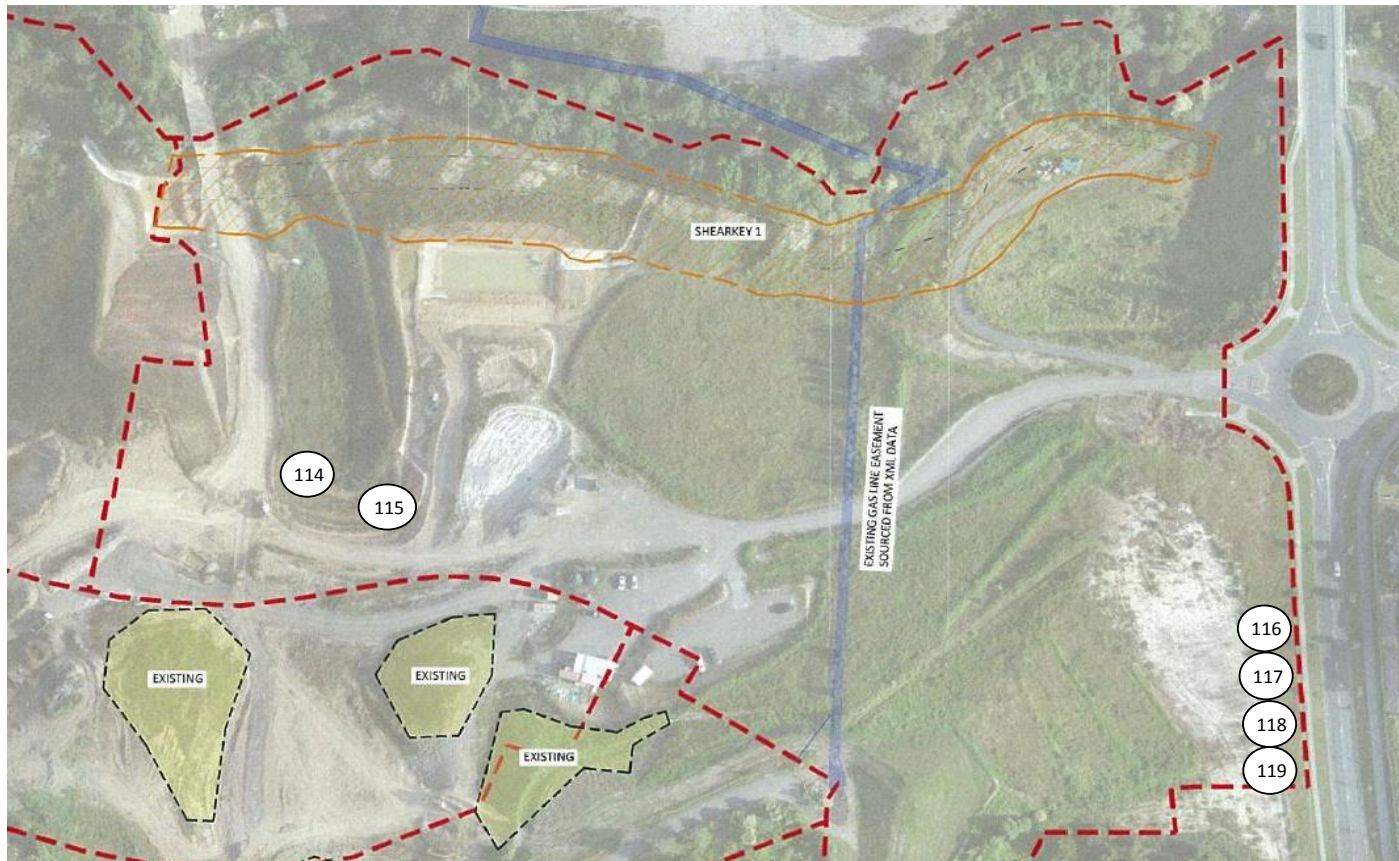
Location: As below



Tested by:

TR

Date tested:

3/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  IANZ ACCREDITED LABORATORY </div> <div style="text-align: center;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/02/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
4/02/2020	20W00269	TR	120	Fill	Silty CLAY	Gully 1	1749191	5948942	20.50	150		202	198	171	182	1.87	32.9	1.41	2.70	2
4/02/2020	20W00269	TR	121	Fill	Silty CLAY	Gully 1	1749188	5948975	20.50	150		198	185	202	195	1.83	28.9	1.42	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00269

Page No: 2 of 2

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

Location: As below


Tested by:

TR

Date tested:

4/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 11/02/2020</p> </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
5/02/2020	20W00285	TR	122	Fill	Silty CLAY	Gully 1	1749156	5948939	21.75	150		202	202	182	162	1.89	24.6	1.52	2.70	6
5/02/2020	20W00285	TR	123	Fill	Silty CLAY	Gully 1	1749176	5948966	20.50	150		202	202	189	185	1.91	31.6	1.45	2.70	1
5/02/2020	20W00285	TR	124	Fill	Silty CLAY	Gully 1	1749188	5948944	20.60	150		202	202	202	185	1.90	32.1	1.43	2.70	1

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00285

Page No: 2 of 2

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

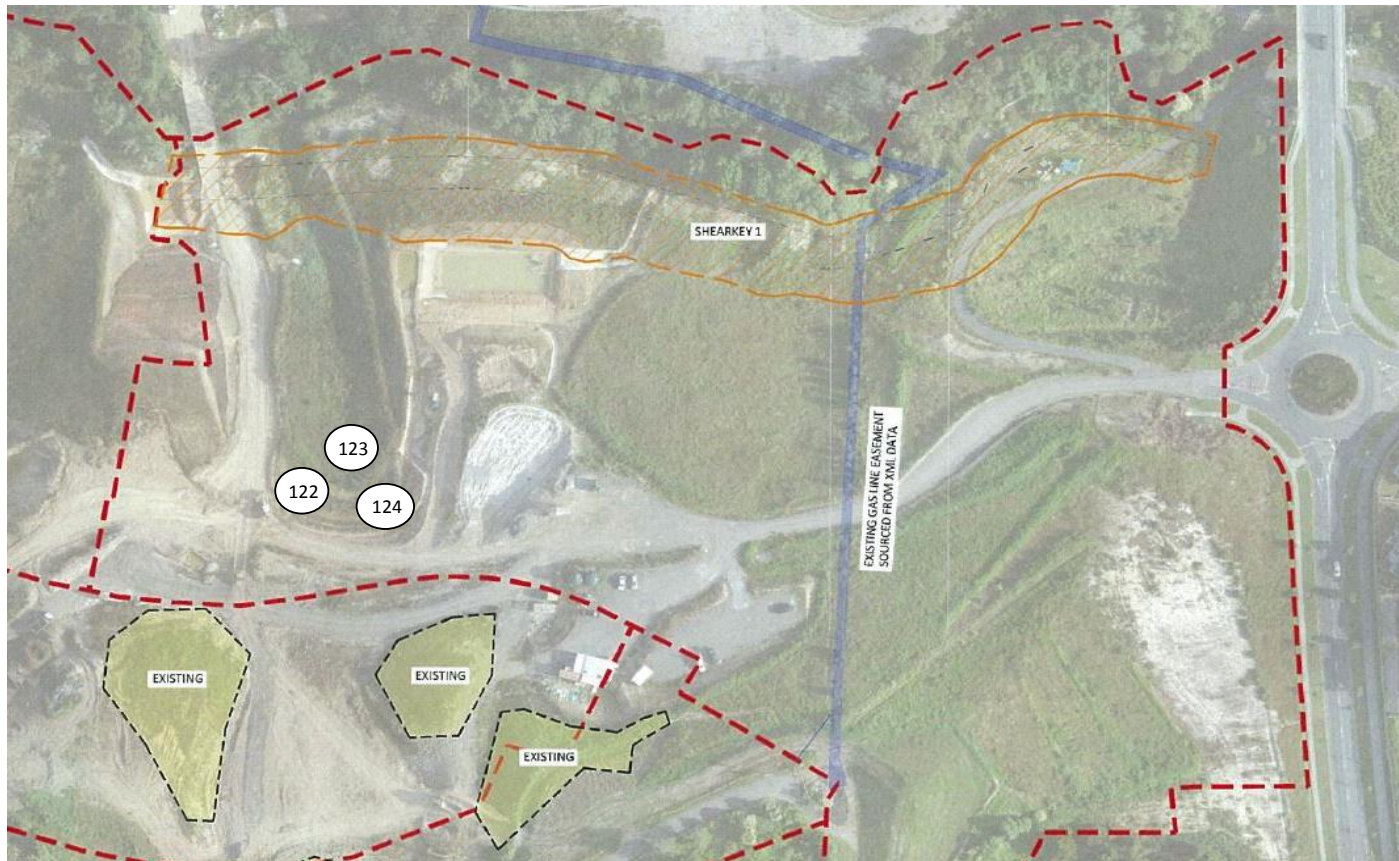
Location: As below



Tested by:

TR

Date tested:

5/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="text-align: center;"> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 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 <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)
8/02/2020	20W00286	MA	125	Fill	CLAY	Area F Shearkey 1	1749704	5949027	4.65	150		152	150	157	192	1.85	34.6	1.37	2.70	2
8/02/2020	20W00286	MA	126	Fill	CLAY	Area F Shearkey 1	1749285	5949033	4.96	150		185	202+	192	176	1.84	36.3	1.35	2.70	1
8/02/2020	20W00286	MA	127	Fill	CLAY	Area F Shearkey 1	1749261	5949034	5.45	150		202+	202+	202+	202+	1.90	29.6	1.46	2.70	3
8/02/2020	20W00286	MA	128	Fill	CLAY	Gully 1	1749215	5948966	21.45	150		202+	202+	198	202+	1.87	28.4	1.46	2.70	5
8/02/2020	20W00286	MA	129	Fill	CLAY	Gully 1	1749191	5948934	21.40	150		UTP	UTP	UTP	UTP	1.91	18.7	1.61	2.70	10

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00286

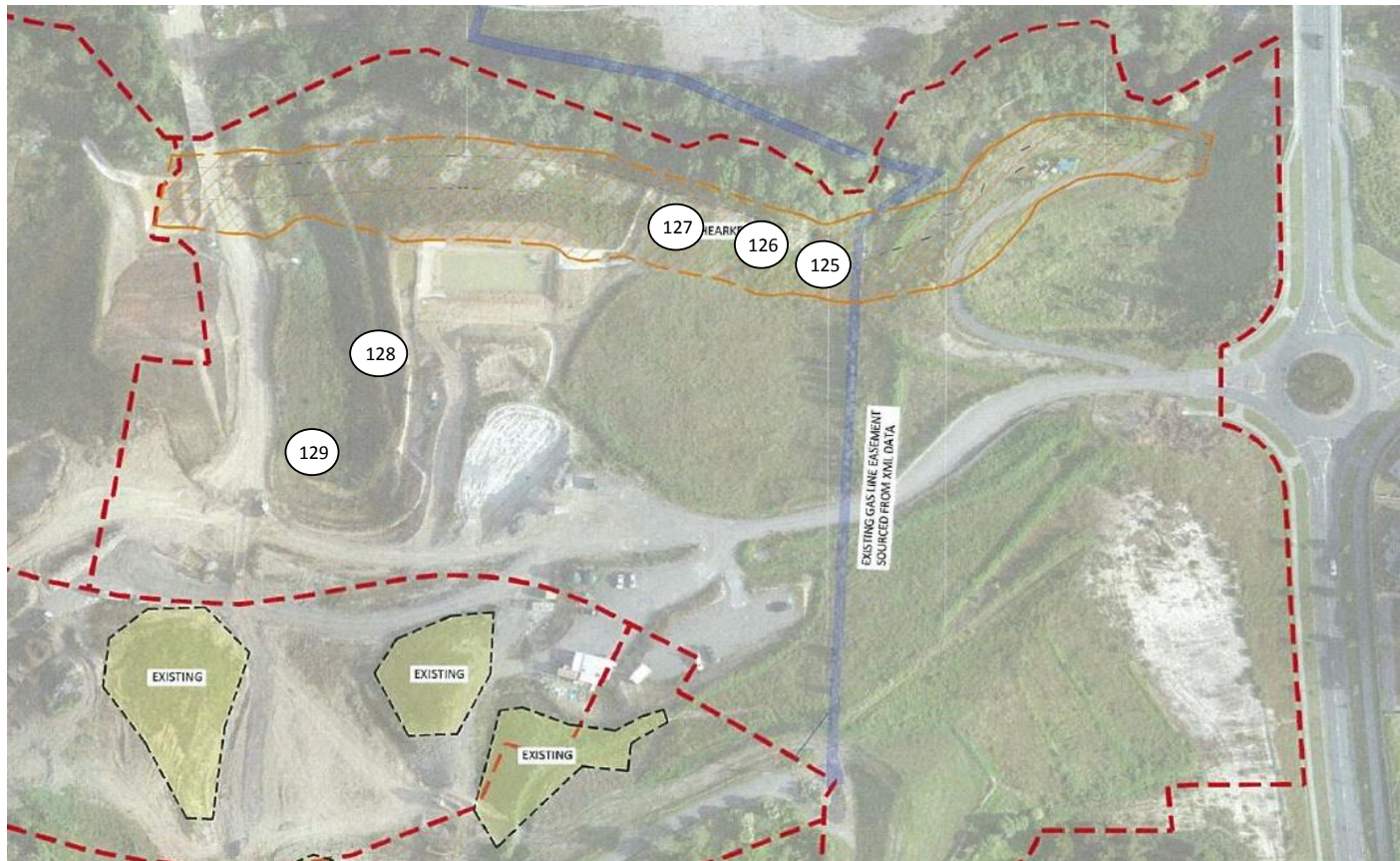
Page No: 2 of 2



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

Location: As below

Tested by: MA

Date tested: 8/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 12/02/2020 </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
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

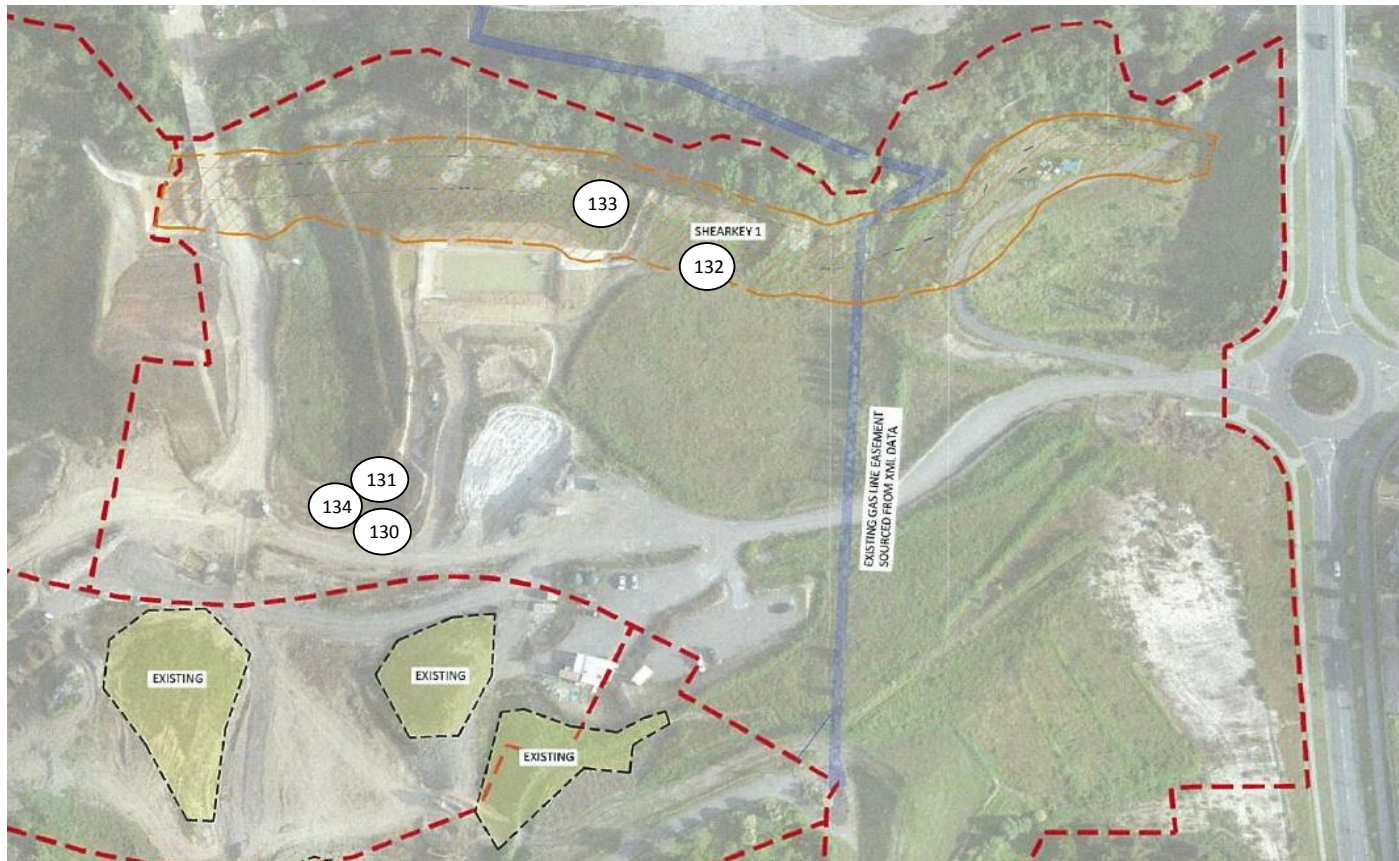
Page No: 2 of 2


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; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 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 UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
13/02/2020	20W00321	LW	146	Fill	Clayey SILT	Shearkey 1	1749264	5949026	8.80	150		145	179	184+	151	1.83	32.4	1.38	2.70	4
13/02/2020	20W00321	LW	147	Fill	Clayey SILT	Shearkey 1	1749280	5949021	8.60	150		138	147	179	174	1.88	28.6	1.46	2.70	4
13/02/2020	20W00321	LW	148	Fill	Clayey SILT	Refer to plan	1749185	5948815	35.80	150		170	147	184+	156	1.88	31.3	1.43	2.70	2
13/02/2020	20W00321	LW	149	Fill	Clayey SILT	Refer to plan	1749206	5948834	35.30	150		179	161	134	147	1.78	33.0	1.34	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00321

Page No: 2 of 2



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

Location: As below

Tested by: LW

Date tested: 13/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2  All tests reported herein have been performed in accordance with the laboratory's scope of accreditation <div style="text-align: right;">  Approved Signatory: Cesar Pura Issue date: 19/02/2020 </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
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

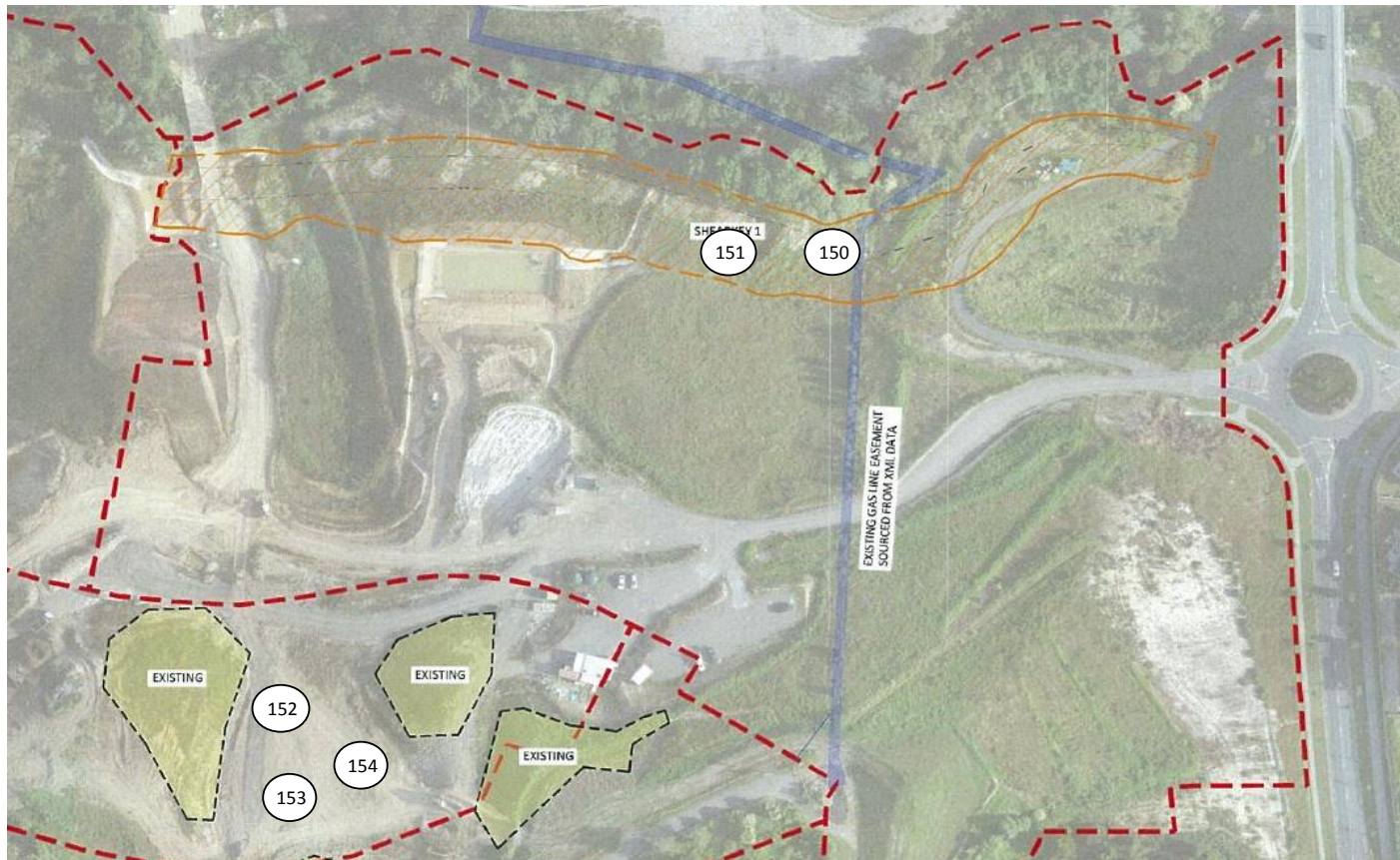
Page No: 2 of 2


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

Location: As below

Tested by: LW

Date tested: 14/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>ACCREDITED LABORATORY</p> </div> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 21/02/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001); Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2); Water Content Testing (in accordance with NZS 4402:1986 Test 2.1); Moisture contents and dry densities are corrected against oven dried moisture content testing.																					
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
18/02/2020	20W00350	TR	158	Fill	Silty CLAY	Refer to plan	1749239	5949032	12.34	150		UTP	UTP	202	202	1.83	30.3	1.41	2.70	5	
18/02/2020	20W00350	TR	159	Fill	Silty CLAY	Refer to plan	1749259	5949014	12.61	150		202	202	202	UTP	1.83	30.0	1.41	2.70	6	
18/02/2020	20W00350	TR	160	Fill	Silty CLAY	Refer to plan	1749285	5949017	11.10	150		162	176	182	185	1.84	30.2	1.41	2.70	5	
18/02/2020	20W00350	TR	161	Fill	Silty CLAY	Shearkey 1	1749333	5949026	4.60	150		185	182	198	173	1.74	32.7	1.31	2.70	9	
18/02/2020	20W00350	TR	162	Fill	Silty CLAY	Shearkey 1	1749317	5949027	4.75	150		162	182	173	185	1.80	32.3	1.36	2.70	6	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00350

Page No: 2 of 2

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

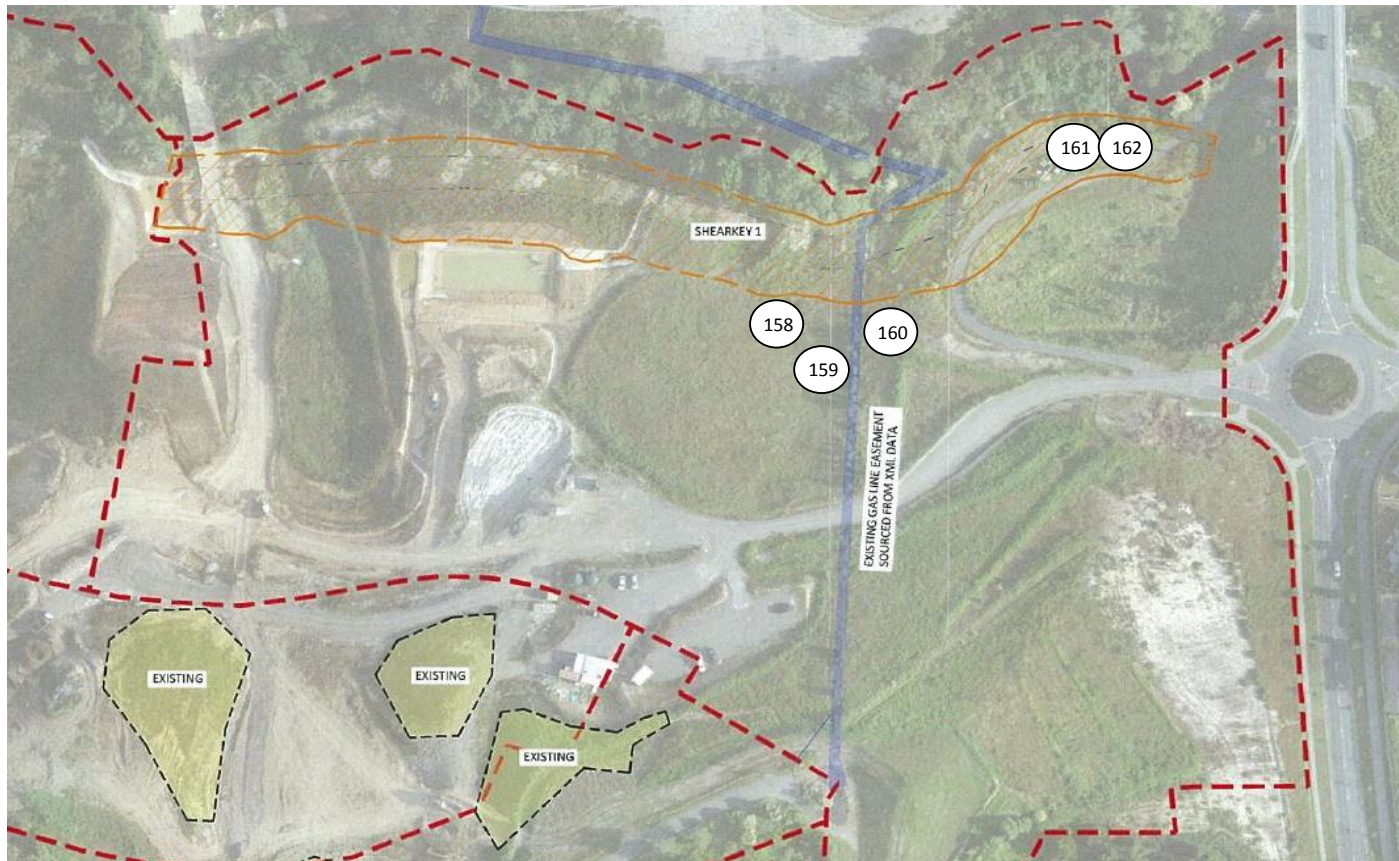
Location: As below

Tested by:

TR

Date tested:

18/02/2020



Client: Coffey Services NZ Ltd (Auckland)										PROJECT CODE: 773-ETAM00991AA										
Address PO Box 8261, Symonds Street, Auckland 1150										Page: 1 of 2										
Attention: Stephen Parkes										<div><div>IANZ ACCREDITED LABORATORY</div><div>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</div><div><div>Approved Signatory:</div><div>Issue date:</div></div><div><div>Cesar Pura</div><div>2/24/2020</div></div></div>										
c.c.: -																				
Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6																				
Location: Access off Arran Drive, Orewa																				
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
19/02/2020	20W00361	TR	163	Fill	Silty CLAY	Gully 1	1749179	5948827	37.20	150		155	UTP	169	UTP	1.89	24.7	1.52	2.70	6
19/02/2020	20W00361	TR	164	Fill	Silty CLAY	Gully 1	1749174	5948807	36.80	150		155	162	169	155	1.86	31.3	1.42	2.70	3
19/02/2020	20W00361	TR	165	Fill	Silty CLAY	Gully 1	1749219	5948842	37.50	150		UTP	UTP	UTP	UTP	1.86	33.4	1.39	2.70	2
19/02/2020	20W00361	TR	166	Fill	Silty CLAY	Shearkey 1	1749310	5949023	5.90	150		143	148	155	182	1.81	35.6	1.33	2.70	3
19/02/2020	20W00361	TR	167	Fill	Silty CLAY	Shearkey 1	1749320	5949018	5.70	150		148	155	147	162	1.81	33.3	1.36	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00361

Page No: 2 of 2

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

Location: As below

Tested by:

TR

Date tested:

19/02/20



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																					
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
25/02/2020	20W00403	TR	179	Fill	Silty CLAY	Gully 1	1749183	5948799	39.50	150		181+	181+	181+	181+	1.85	27.1	1.45	2.70	7	
25/02/2020	20W00403	TR	180	Fill	Silty CLAY	Gully 1	1749156	5948809	39.80	150		169	176	179	181	1.90	30.1	1.46	2.70	2	
25/02/2020	20W00403	TR	181	Fill	Silty CLAY	Shearkey 1	1749347	5949027	4.50	150		169	162	155	166	1.76	36.3	1.29	2.70	5	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00403

Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 25/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
26/02/2020	20W00425	TR	182	Fill	Silty CLAY	Shearkey 1	1749330	5949023	6.30	150		181+	169	142	155	1.81	36.1	1.33	2.70	3
26/02/2020	20W00425	TR	183	Fill	Silty CLAY	Shearkey 1	1749341	5949031	5.80	150		155	158	142	162	1.80	39.3	1.29	2.70	1
26/02/2020	20W00425	TR	184	Fill	Silty CLAY	Shearkey 1	1749353	5949025	5.50	150		181+	181+	162	169	1.76	45.6	1.21	2.70	0

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00425

Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 26/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
27/02/2020	20W00428	TR	185	Fill	Silty CLAY	Shearkey 1	1749336	5949032	6.80	150		UTP	181+	181+	155	1.81	33.8	1.35	2.70	4
27/02/2020	20W00428	TR	186	Fill	Silty CLAY	Shearkey 1	1749343	5949026	6.90	150		UTP	181+	181+	156	1.78	39.7	1.27	2.70	2
27/02/2020	20W00428	TR	187	Fill	Silty CLAY	Shearkey 1	1749354	5949026	6.90	150		UTP	UTP	181+	181+	1.82	31.6	1.38	2.70	5
27/02/2020	20W00428	TR	188	Fill	Gravelly CLAY	Gully 1	1749165	5948910	25.50	150		UTP	UTP	UTP	UTP	1.84	32.1	1.40	2.70	4
27/02/2020	20W00428	TR	189	Fill	Gravelly CLAY	Gully 1	1749195	5948918	25.10	150		UTP	181+	181+	169	1.86	32.7	1.40	2.70	2

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00428

Page No: 2 of 2

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

Location: As below



Tested by:

TR

Date tested:

27/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
28/02/2020	20W00451	TR	190	Fill	Silty CLAY	Shearkey 1	1749325	5949023	7.60	150		181+	181+	181+	181+	1.79	41.4	1.27	2.70	1
28/02/2020	20W00451	TR	191	Fill	Silty CLAY	Shearkey 1	1749341	5949022	8.10	150		155	170	181+	181+	1.75	46.2	1.20	2.70	0
28/02/2020	20W00451	TR	192	Fill	Silty CLAY	Shearkey 1	1749356	5949032	8.40	150		170	162	181+	181+	1.78	36.1	1.30	2.70	5
28/02/2020	20W00451	TR	193	Fill	Gravelly CLAY	Gully 1	1749183	5948908	27.70	150		UTP	181+	181+	181+	1.80	31.3	1.37	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00451

Page No: 2 of 2

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

Location: As below

Tested by: TR

Date tested: 28/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> Approved Signatory: Cesar Pura Issue date: 11/03/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
2/03/2020	20W00469	TR	194	Fill	Silty CLAY	Gully 1	1749213	5948920	26.00	150		UTP	UTP	UTP	169	1.91	29.2	1.48	2.70	2
2/03/2020	20W00469	TR	195	Fill	Silty CLAY	Gully 1	1749190	5948895	26.30	150		UTP	UTP	UTP	UTP	1.91	24.3	1.53	2.70	6
2/03/2020	20W00469	TR	196	Fill	Silty CLAY	Gully 1	1749170	5948905	26.90	150		UTP	UTP	UTP	UTP	1.98	25.4	1.58	2.70	2
2/03/2020	20W00469	TR	197	Fill	Gravelly CLAY	Shearkey 1	1749355	5949018	9.80	150		UTP	181+	148	155	1.87	32.3	1.41	2.70	2
2/03/2020	20W00469	TR	198	Fill	Gravelly CLAY	Shearkey 1	1749319	5949005	9.80	150		181+	155	UTP	UTP	1.86	27.9	1.45	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00469

Page No: 2 of 2

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

Location: As below

Tested by: TR

Date tested: 28/02/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 11/03/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
3/03/2020	20W00471	TR	199	Fill	Silty CLAY	Gully 1	1749203	5948910	26.40	150		181+	181+	181+	142	1.88	31.4	1.43	2.70	2
3/03/2020	20W00471	TR	200	Fill	Silty CLAY	Gully 1	1749198	5948894	26.40	150		181+	181+	148	155	1.85	30.8	1.41	2.70	4
3/03/2020	20W00471	TR	201	Fill	Silty CLAY	Gully 1	1749176	5948900	2.70	150		181+	181+	181+	UTP	1.86	32.6	1.41	2.70	2
3/03/2020	20W00471	TR	202	Fill	Gravelly CLAY	Shearkey 1	1749311	5949009	12.90	150		UTP	UTP	UTP	UTP	1.85	24.1	1.49	2.70	9
3/03/2020	20W00471	TR	203	Fill	Silty CLAY	Shearkey 1	1749331	5949012	10.90	150		181+	181+	UTP	UTP	1.88	28.5	1.46	2.70	4

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00471

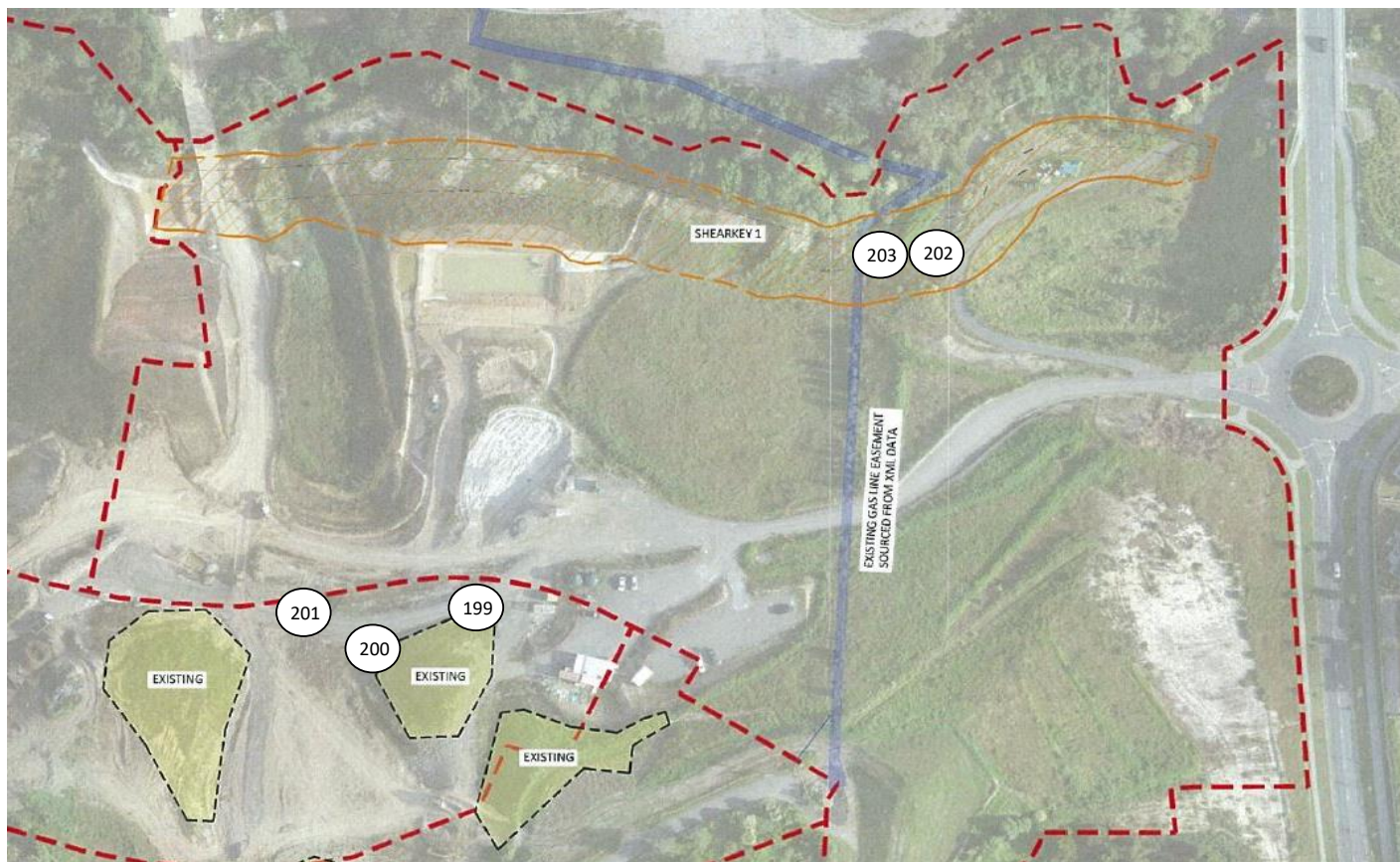
Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 3/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa		PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 20/03/2020 </div> </div>	
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Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00495

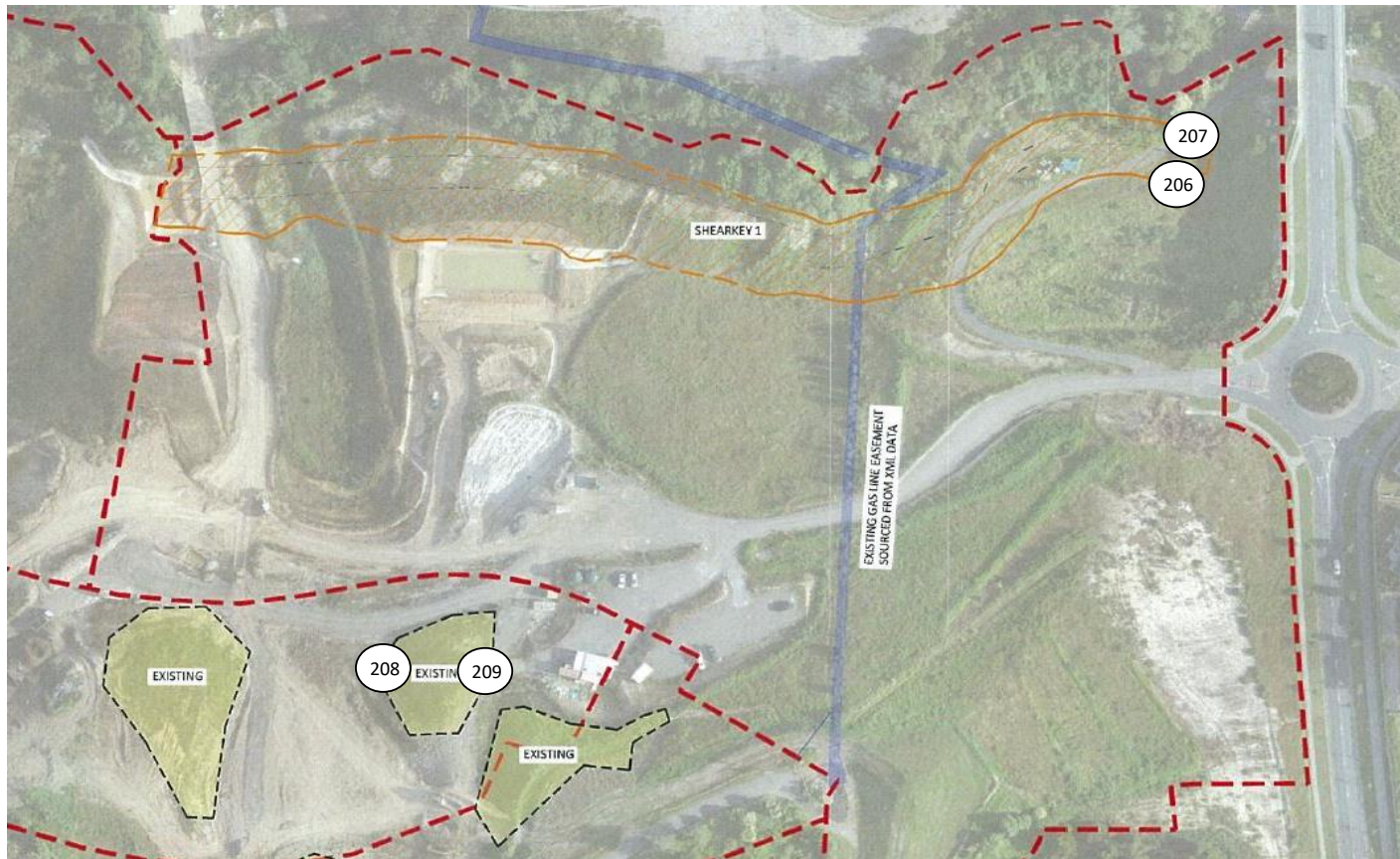
Page No: 2 of 2


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

Location: As below

Tested by: TR

Date tested: 5/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 20/03/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
6/03/2020	20W00496	LW	210	Fill	Clayey SILT	Behind Wall 700	1749311	5949004	12.05	150		UTP	UTP	UTP	UTP	1.89	24.1	1.52	2.70	7
6/03/2020	20W00496	LW	211	Fill	Clayey SILT	Behind Wall 700	1749328	5949002	11.99	150		UTP	UTP	UTP	UTP	1.89	22.8	1.54	2.70	8
6/03/2020	20W00496	LW	212	Fill	Clayey SILT	Behind Wall 700	1749328	5949008	12.05	150		UTP	UTP	UTP	UTP	1.90	29.0	1.47	2.70	3
6/03/2020	20W00496	LW	213	Fill	Clayey SILT	General Fill	1749221	5948909	27.30	150		UTP	UTP	UTP	UTP	1.85	27.6	1.45	2.70	7
6/03/2020	20W00496	LW	214	Fill	Clayey SILT	General Fill	1749180	5948886	28.10	150		UTP	UTP	UTP	UTP	1.89	28.2	1.47	2.70	4

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00496

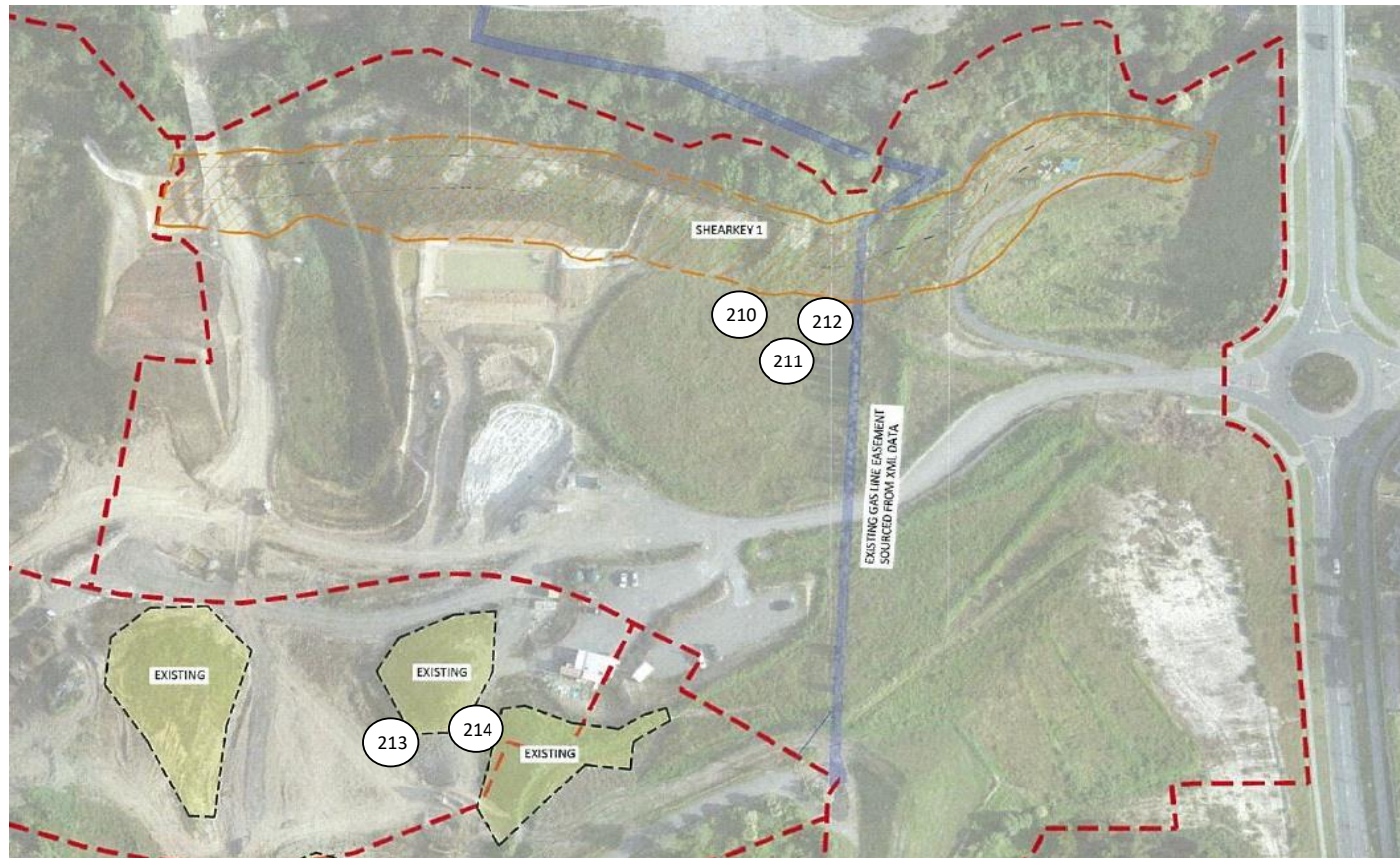
Page No: 2 of 2



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

Location: As below

Tested by: LW

Date tested: 6/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 20/03/2020 </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
9/03/2020	20W00517	TR	215	Fill	Silty CLAY	Gully 1	1749196	5948888	27.60	150		181+	181+	181+	181+	1.85	31.8	1.41	2.70	3
9/03/2020	20W00517	TR	216	Fill	Silty CLAY	Gully 1	1749228	5948912	28.30	150		UTP	UTP	UTP	UTP	1.84	27.3	1.44	2.70	7
9/03/2020	20W00517	TR	217	Fill	Silty CLAY	Refer to plan	1749271	5948983	13.00	150		UTP	UTP	UTP	UTP	1.78	27.8	1.39	2.70	10
9/03/2020	20W00517	TR	218	Fill	Silty CLAY	Refer to plan	1749288	5948979	12.61	150		181+	181+	181+	181+	1.84	33.3	1.38	2.70	3

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00517

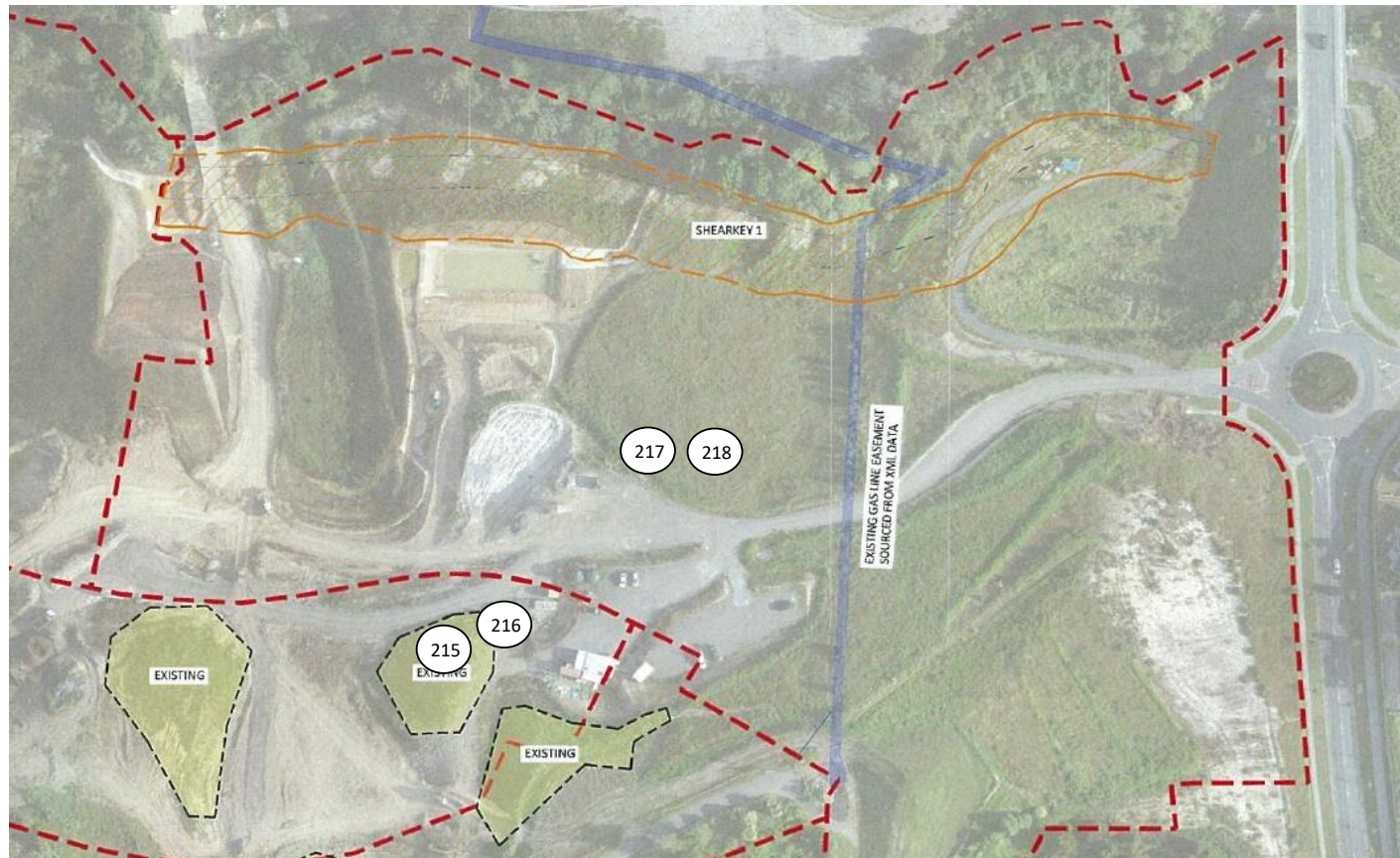
Page No: 2 of 2

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

Location: As below

Tested by: TR

Date tested: 9/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;"> Approved Signatory: Cesar Pura Issue date: 20/03/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
10/03/2020	20W00532	TR	219	Fill	Silty CLAY	Gully 1	1749185	5948896	28.80	150		181+	181+	181+	181+	1.86	29.5	1.44	2.70	4
10/03/2020	20W00532	TR	220	Fill	Silty CLAY	Gully 1	1749203	5948884	28.50	150		181+	181+	172	144	1.85	31.1	1.41	2.70	4
10/03/2020	20W00532	TR	221	Fill	Silty CLAY	Refer to plan	1749298	5948986	12.50	150		181+	181+	181+	181+	1.74	32.8	1.31	2.70	9

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00532

Page No: 2 of 2


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

Location: As below

Tested by: TR

Date tested: 10/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> <p>Approved Signatory: Cesar Pura Issue date: 20/03/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
11/03/2020	20W00549	TR	222	Fill	Silty CLAY	Gully 1	1749199	5948906	29.10	150		169	170	155	162	1.91	33.5	1.43	2.70	0
11/03/2020	20W00549	TR	223	Fill	Silty CLAY	Gully 1	1749218	5948905	28.80	150		UTP	UTP	181	181	1.87	31.2	1.43	2.70	3
11/03/2020	20W00549	TR	224	Fill	Silty CLAY	Refer to plan	1749382	5948941	18.50	150		181+	181+	UTP	169	1.75	40.8	1.24	2.70	3

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00549

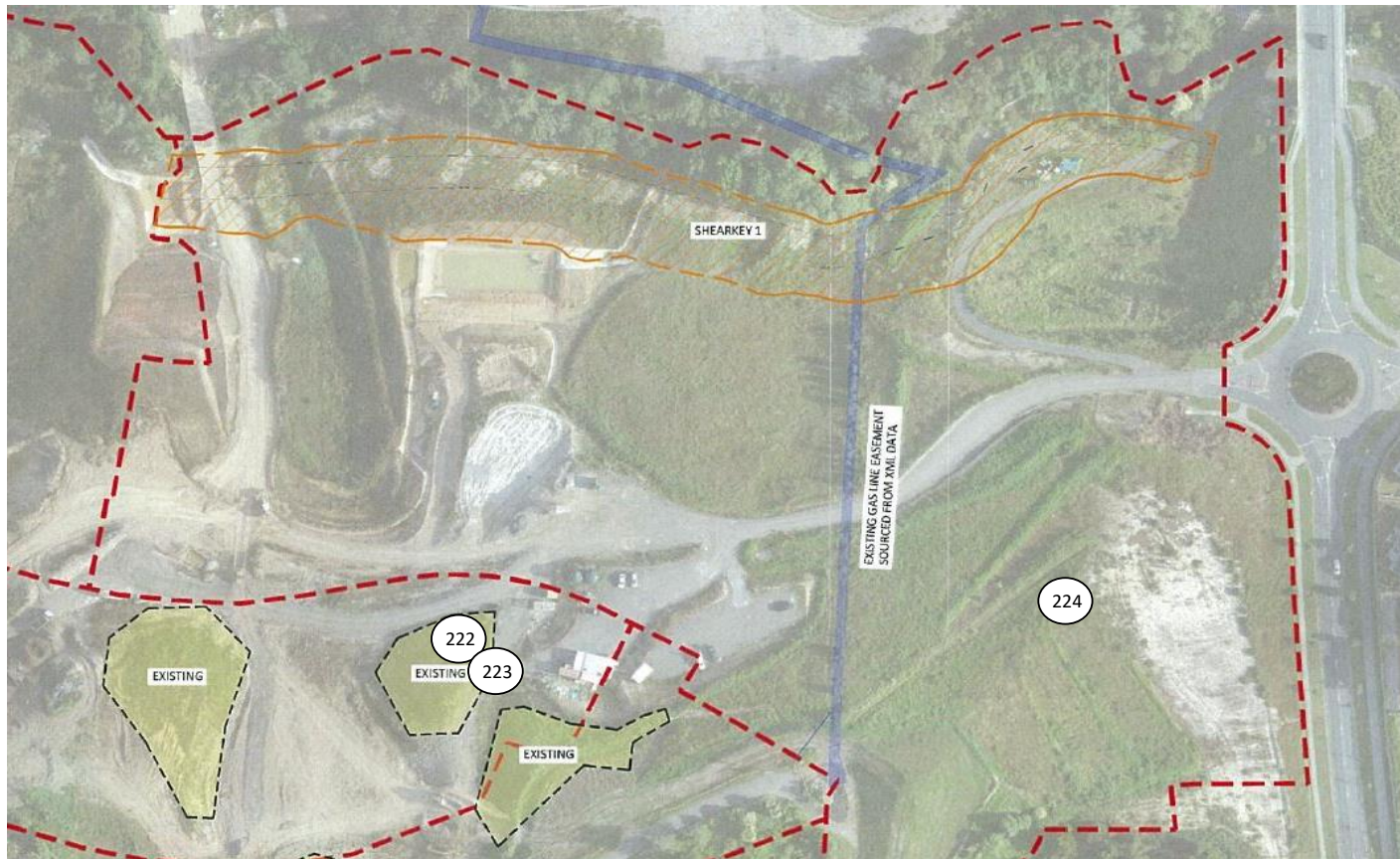
Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 11/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>ACCREDITED LABORATORY</p> </div> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 23/03/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																					
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)	
12/03/2020	20W00562	TR	225	Fill	Silty CLAY	Gully 1	1749197	5948887	29.30	150		181+	181+	169	155	1.84	33.2	1.38	2.70	3	
12/03/2020	20W00562	TR	226	Fill	Silty CLAY	Gully 1	1749196	5948902	29.40	150		148	169	155	181+	1.90	25.6	1.51	2.70	5	
12/03/2020	20W00562	TR	227	Fill	Silty CLAY	Gully 1	1749175	5948893	29.60	150		UTP	UTP	181+	181+	1.86	36.6	1.36	2.70	0	
12/03/2020	20W00562	TR	228	Fill	Silty CLAY	Undercut 5	1749249	5948992	12.60	150		148	155	170	175	1.82	33.2	1.36	2.70	4	
12/03/2020	20W00562	TR	229	Fill	Silty CLAY	Undercut 5	1749205	5948998	13.40	150		UTP	UTP	181+	181+	1.84	32.7	1.39	2.70	3	
12/03/2020	20W00562	TR	230	Fill	Gravelly CLAY	Wall 306	1749382	5948937	19.12	150		UTP	UTP	UTP	UTP	1.77	29.8	1.37	2.70	9	
12/03/2020	20W00562	TR	231	Fill	Gravelly CLAY	Wall 306	1749386	5948908	19.65	150		UTP	UTP	181+	181+	1.76	37.2	1.28	2.70	5	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00562

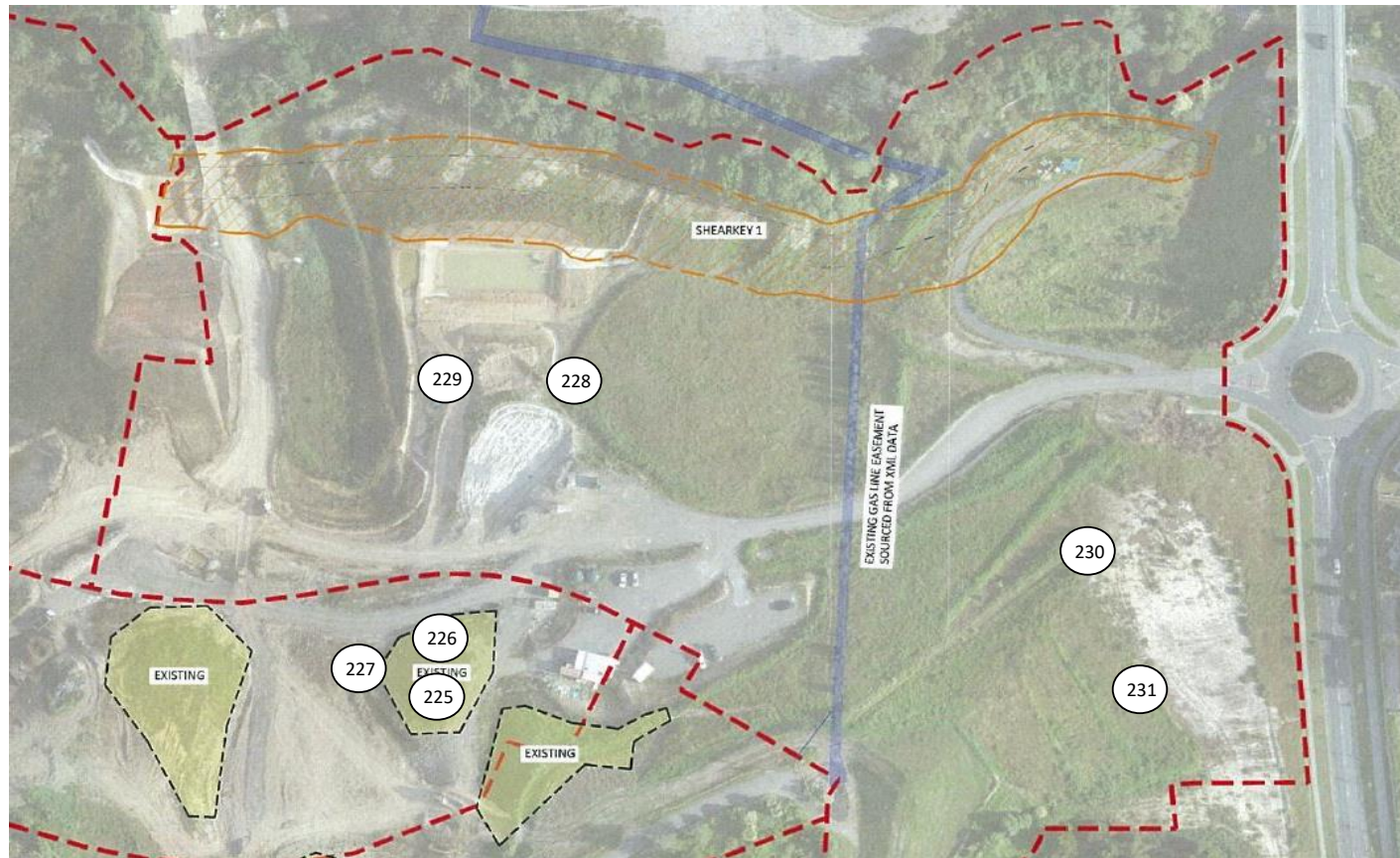
Page No: 2 of 2



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

Location: As below

Tested by: TR

Date tested: 12/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa											PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;">  <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 100px; text-align: right;">  Approved Signatory: Cesar Pura Issue date: 23/03/2020 </div> </div>									
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00570

Page No: 2 of 2



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

Location: As below

Tested by: MP

Date tested: 13/03/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa												PROJECT CODE: 773-ETAM00991AA Page: 1 of 1 <div style="display: flex; align-items: center; justify-content: space-between; padding: 10px;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="font-size: small;"> All tests reported herein have been performed in accordance with the laboratory's scope of accreditation </div> <div style="text-align: right;">  Approved Signatory: Joanna Jones Issue date: 26/05/2020 </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	Chainage (m)	Offset (m)	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa <small>UTP = Unable to penetrate</small>				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) <small>Assumed</small>	Air Voids (%)	
21/05/2020	20W00804	LW	261	Fill	Clayey SILT	Shear Key 1	150		1749304	5949026	6.56	150		157	163	144	148	1.87	32.2	1.41	2.70	2	
21/05/2020	20W00804	LW	262	Fill	Clayey SILT	Shear Key 1	150		1749288	5949032	6.54	150		174	166	183+	183+	1.88	29.6	1.45	2.70	3	

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00804

Page No: 2 of 2



Project: 8

Location: As below

Tested by: LW

Date tested: 21/05/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>ACCREDITED LABORATORY</p> </div> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Cesar Pura Issue date: 3/06/2020</p> </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
22/05/2020	20W00820	LW	263	Fill	Clayey SILT	Shear Key 1	1749300	5949027	7.02	150		UTP	UTP	UTP	UTP	1.89	29.9	1.46	2.70	2
22/05/2020	20W00820	LW	264	Fill	Clayey SILT	Shear Key 1	1749288	5949032	7.09	150		UTP	UTP	UTP	UTP	1.85	29.5	1.43	2.70	5

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W00820

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 22/05/2020



Client: Coffey Services NZ Ltd (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa										PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="display: flex; align-items: center;"> <div> <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="margin-left: 20px; text-align: right;"> Approved Signatory: Cesar Pura Issue date: 19/06/2020 </div> </div>										
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001); Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2); Water Content Testing (in accordance with NZS 4402:1986 Test 2.1); Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
17/06/2020	20W01017	MA	265	Fill	CLAY	Wall 306	391631.9	831716.0	23.40	150	GPS Coordinates supplied by Contractor - MA	150	145	175	159	1.84	34.3	1.37	2.70	2
17/06/2020	20W01017	MA	266	Fill	CLAY	Wall 306	391595.3	831736.2	21.95	150		UTP	UTP	UTP	UTP	1.78	33.2	1.34	2.70	6

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01017

Page No: 2 of 2

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

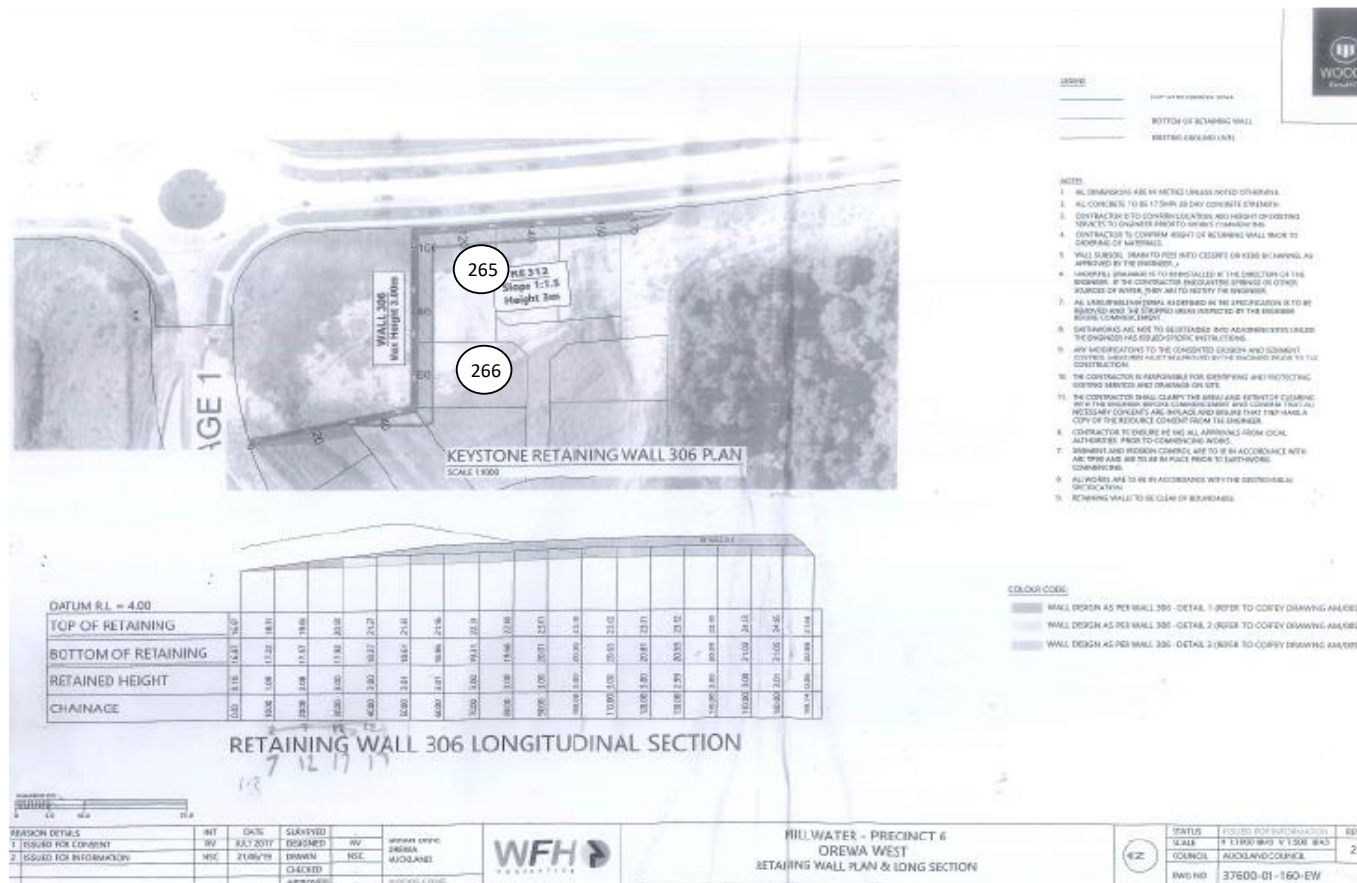
Location: As below


Tested by:

MA

Date tested:

17/06/2020



Client: Coffey Services NZ Ltd (Auckland)										PROJECT CODE: 773-ETAM00991AA										
Address PO Box 8261, Symonds Street, Auckland 1150										Page: 1 of 2										
Attention: Stephen Parkes										<div><div>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</div><div>Approved Signatory: Cesar Pura</div><div>Issue date: 2/11/2020</div></div>										
c.c: -																				
Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6																				
Location: Access off Arran Drive, Orewa																				
Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
30/10/2020	20W01670	LW	269	Fill	Clayey SILT	Pond 5 Western Wall	1749026	5948991	20.85	150		144	161	UTP	UTP	1.85	29.8	1.43	2.70	5
30/10/2020	20W01670	LW	270	Fill	Clayey SILT	Pond 5 Western Wall	1749018	5948982	20.85	150		UTP	177+	177+	167	1.87	31.0	1.42	2.70	3

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01670

Page No: 2 of 2

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



Location: Pond 5

Tested by: LW

Date tested: 30/10/2020





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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa				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								
31/10/2020	20W01671	LW	271	Fill	Silty CLAY	Pond 5 Western Wall	1749024	5948995	21.10	150		170	170	170	170	1.83	28.6	1.42	2.70	7
31/10/2020	20W01671	LW	272	Fill	Silty CLAY	Pond 5 Western Wall	1749026	5948977	21.30	150		170	170	170	170	1.88	28.6	1.46	2.70	4

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01671

Page No: 2 of 2

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


Location: Pond 5

Tested by: SC

Date tested: 31/10/2020





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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01694

Page No: 2 of 2

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


Location: As below

Tested by: LW

Date tested: 3/11/2020





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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01795

Page No: 2 of 2

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


Location: As below

Tested by: LW

Date tested: 20/11/2020





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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01810

Page No: 2 of 2



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

Location: As below

Tested by: LW

Date tested: 23/11/2020



Client: Coffey Services (NZ) Limited (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="text-align: center;">  <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: James McKelvey Issue date: 4/12/2020 </div>
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Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01858

Page No: 2 of 2

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

Location: As below



Tested by:

LW

Date tested:

2/12/2020



Client: Coffey Services (NZ) Limited (Auckland) Address: PO Box 8261, Symonds Street, Auckland 1150 Attention: Stephen Parkes c.c.: - Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6 Location: Access off Arran Drive, Orewa	PROJECT CODE: 773-ETAM00991AA Page: 1 of 2 <div style="text-align: center;">  <p>All tests reported herein have been performed in accordance with the laboratory's scope of accreditation</p> </div> <div style="text-align: right;">  Approved Signatory: James McKelvey Issue date: 7/12/2020 </div>
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Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM...	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (T/m ³)	Oven Water Content (%)	Dry Density (T/m ³)	Solid Density (T/m ³) Assumed	Air Voids (%)
4/12/2020	20W01867	SC	295	Fill	Clayey SILT	Refer to plan	1749077	5949050	-	150	Shear key	153	153	153	153	1.84	29.8	1.42	2.70	5
4/12/2020	20W01867	SC	296	Fill	Clayey SILT	Refer to plan	1749090	5949054	-	150	Shear key	153	153	153	143	1.88	31.1	1.43	2.70	2
4/12/2020	20W01867	SC	297	Fill	Clayey SILT	Refer to plan	1749182	5948965	-	150		170	170	170	170	1.89	31.4	1.43	2.70	2
4/12/2020	20W01867	SC	298	Fill	Clayey SILT	Refer to plan	1749174	5948951	-	150		170	170	170	170	1.87	29.6	1.44	2.70	4

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01867

Page No: 2 of 2

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

Location: As below

Tested by:



SC

Date tested:

4/12/2020





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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01927

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 12/12/2020



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

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

{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

Earthworks Fill Report

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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/12/2020	ETAM20W01960	LW	311	1.89	28.6	1.47	2.70	3	UTP	UTP	UTP	UTP	Retaining Wall 311, CH100	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	312	1.91	30.1	1.46	2.70	2	UTP	UTP	UTP	UTP	Retaining Wall 311, CH150	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	313	1.93	29.6	1.49	2.70	1	UTP	UTP	UTP	UTP	Retaining Wall 311, CH170	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	314	1.83	31.6	1.39	2.70	4	158+	158+	158+	144	Shear Key	1749070	5949059	-	Clayey SILT	-
14/12/2020	ETAM20W01960	LW	315	1.87	30.0	1.44	2.70	4	140	154	149	158	Shear Key	1749077	5949063	-	Clayey SILT	-
14/12/2020	ETAM20W01960	LW	316	1.83	29.9	1.41	2.70	6	UTP	UTP	UTP	UTP	Gully 1 above RW 311	1749190	5948966	-	Clayey SILT	0.6m below top of Blocks
14/12/2020	ETAM20W01960	LW	317	1.90	30.2	1.46	2.70	2	UTP	UTP	UTP	UTP	Gully 1 above RW 311	1749175	5948949	-	Clayey SILT	0.3m below top of Blocks

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01960

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 14/12/2020



Earthworks Fill Report

Report No: EFIL:ETAM20W01962
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01962

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
(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
15/12/2020	ETAM20W01962	LW	318	1.87	28.6	1.46	2.70	5	UTP	UTP	UTP	UTP	Shear Key	1749053	5949067	6.5	Clayey SILT	
15/12/2020	ETAM20W01962	LW	319	1.91	29.1	1.48	2.70	2	UTP	UTP	UTP	UTP	Shear Key	1749060	5949068	6.8	Clayey SILT	
15/12/2020	ETAM20W01962	LW	320	1.85	26.7	1.46	2.70	7	158+	158+	158+	158+	Gully 1	1749139	5948974	-	Clayey SILT	At finished level
15/12/2020	ETAM20W01962	LW	321	1.92	28.7	1.50	2.70	2	158+	158+	158+	158+	Gully 1	1749110	5948963	-	Clayey SILT	At finished level

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01962

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 15/12/2020



Issue date: 05/05/17

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
(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
16/12/2020	ETAM20W01963	LW	322	1.87	37.2	1.36	2.70	0	158+	158+	158+	158+	Gully 2	1749071	5949068	8.5	Clayey SILT	
16/12/2020	ETAM20W01963	LW	323	1.89	36.1	1.39	2.70	0	158+	158+	158+	158+	Gully 2	1749051	5949066	8.6	Clayey SILT	
16/12/2020	ETAM20W01963	LW	324	1.90	32.5	1.43	2.70	0	UTP	UTP	158+	158+	Shear Key	1749091	5949049	7.0	Clayey SILT	
16/12/2020	ETAM20W01963	LW	325	1.91	33.3	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749081	5949031	7.0	Clayey SILT	
16/12/2020	ETAM20W01963	LW	326	1.88	33.9	1.41	2.70	0	UTP	UTP	UTP	UTP	Gully 1	1749127	5948956	-	Clayey SILT	0.8m below finished level
16/12/2020	ETAM20W01963	LW	327	1.92	34.5	1.43	2.70	2	UTP	UTP	UTP	UTP	Gully 1	1749128	5948930	-	Clayey SILT	0.8m below finished level

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01963

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 16/12/2020



Earthworks Fill Report

Report No: EFIL:ETAM20W01998

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 22/12/2020

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
21/12/2020	ETAM20W01998	LW	334	1.85	37.6	1.35	2.70	0	140	154	158	158	Retaining Wall 700	1749263	5949036	9.50	Clayey SILT	
21/12/2020	ETAM20W01998	LW	335	1.84	33.8	1.38	2.70	3	158+	158+	144	154	Retaining Wall 700	1749299	5949020	9.50	Clayey SILT	
21/12/2020	ETAM20W01998	LW	336	1.88	37.8	1.36	2.70	0	158+	158+	158+	158+	Shear Key	1749070	5949063	9.60	Clayey SILT	
21/12/2020	ETAM20W01998	LW	337	1.89	23.1	1.54	2.70	8	UTP	UTP	UTP	UTP	Shear Key	1749067	5949050	9.80	Clayey SILT	

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM20W01998

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 21/12/2020



Issue date: 050517

Earthworks Fill Report

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

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



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 13/01/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
11/01/2021	ETAM21W00038	LW	344	1.93	27.8	1.51	2.70	2	UTP	UTP	UTP	UTP	Gully 2	1749081	5949048	10.2	Clayey SILT	
11/01/2021	ETAM21W00038	LW	345	1.90	21.1	1.57	2.70	9	UTP	UTP	UTP	UTP	Gully 2	1749076	5949033	11.0	Clayey SILT	
11/01/2021	ETAM21W00038	LW	346	1.85	30.4	1.42	2.70	4	UTP	UTP	158+	158+	RW 311 Drainage Fill	1749308	5949003	-	Clayey SILT	Base of wall.
11/01/2021	ETAM21W00038	LW	347	1.93	29.1	1.49	2.70	1	UTP	UTP	UTP	UTP	RW 311 Drainage Fill	1749276	5948989	-	Clayey SILT	Base of wall.

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00038

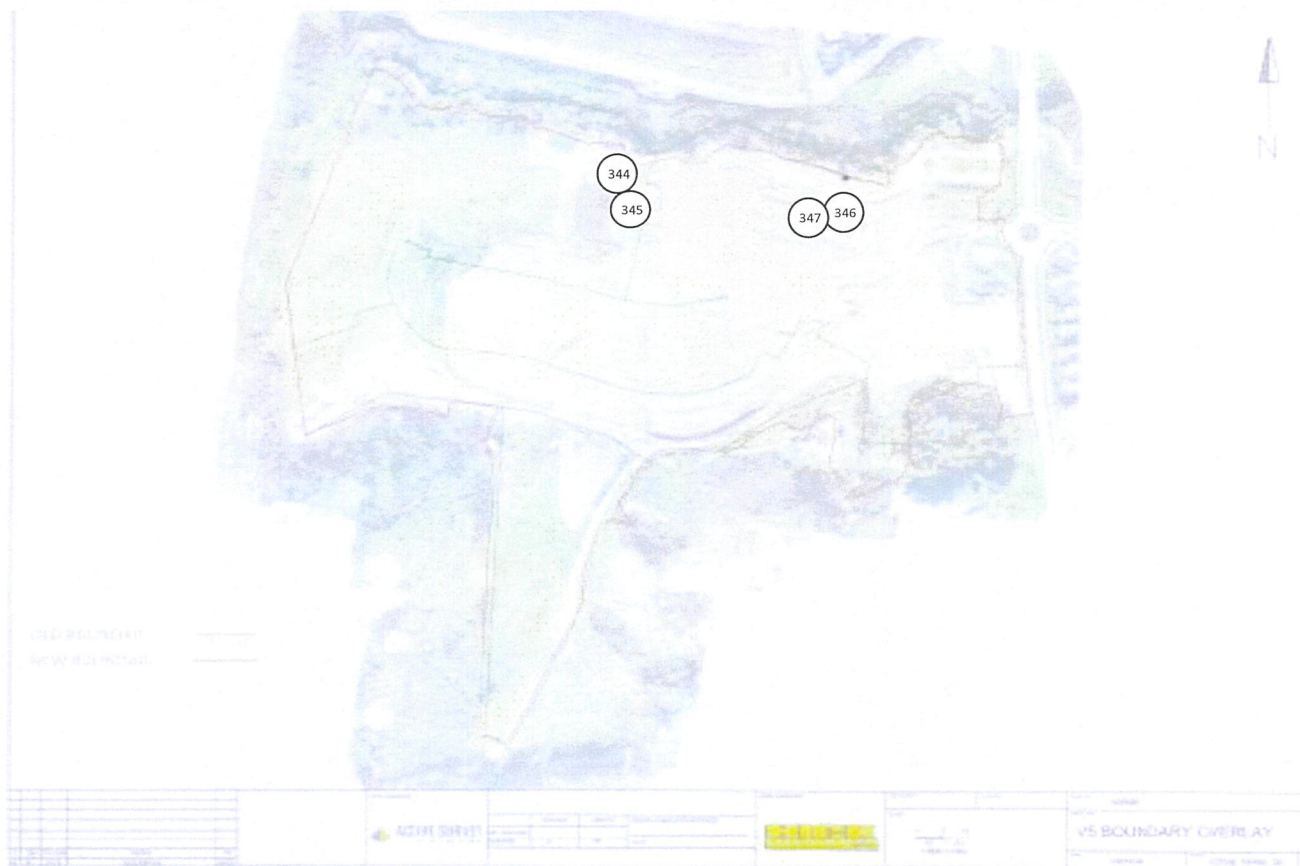
Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 11/01/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00144

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 28/01/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
27/01/2021	ETAM21W00144	LW	371	1.97	30.2	1.51	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749002	5949088	8.50	Clayey SILT	
27/01/2021	ETAM21W00144	LW	372	1.97	31.6	1.50	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749033	5949075	8.15	Clayey SILT	
27/01/2021	ETAM21W00144	LW	373	1.83	30.1	1.41	2.70	6	UTP	UTP	158+	158+	RE Wall 313	1749450	5949820	-	Clayey SILT	0.3m above base

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00144

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 27/01/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00157

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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

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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 29/01/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
28/01/2021	ETAM21W00157	LW	374	1.95	28.9	1.51	2.70	0	158+	UTP	UTP	UTP	RE Wall 313	1749451	5948820	-	Clayey SILT	0.6m above base
28/01/2021	ETAM21W00157	LW	375	1.96	29.6	1.51	2.70	0	158+	158+	158+	UTP	Shear Key	1749029	5949077	8.90	Clayey SILT	
28/01/2021	ETAM21W00157	LW	376	1.94	27.9	1.51	2.70	2	158+	158+	UTP	UTP	Shear Key	1749027	5949065	9.00	Clayey SILT	

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00157

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 28/01/2021



Earthworks Fill Report

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

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



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

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



 Approved Signatory: Cesar Pura
 Senior Technician

IANZ Site Number: 105

Date of Issue: 2/02/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
29/01/2021	ETAM21W00160	LW	377	1.96	30.0	1.51	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749008	5949081	9.80	Clayey SILT	
29/01/2021	ETAM21W00160	LW	378	1.97	34.0	1.47	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749033	5949062	10.00	Clayey SILT	
29/01/2021	ETAM21W00160	LW	379	1.83	31.9	1.38	2.70	5	140	158+	144	154	RE Wall 313	1749440	5948837	-	Clayey SILT	
29/01/2021	ETAM21W00160	LW	380	1.82	32.2	1.38	2.70	5	158+	158+	158+	144	RE Wall 313	1749436	5948869	-	Clayey SILT	

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00160

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 29/01/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00195

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 9/02/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
5/02/2021	ETAM21W00195	LW	397	1.91	32.7	1.44	2.70	0	140	140	158	154	Retaining Wall 306	1749394	5948903	22.50	Clayey SILT	
5/02/2021	ETAM21W00195	LW	398	1.94	29.7	1.49	2.70	0	UTP	UTP	158+	158+	Retaining Wall 306	1749422	5948908	23.80	Clayey SILT	
5/02/2021	ETAM21W00195	LW	399	1.95	42.6	1.37	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749016	5949066	11.00	Clayey SILT	
5/02/2021	ETAM21W00195	LW	400	1.95	35.5	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749039	5949056	11.50	Clayey SILT	

Comments:

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

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00195

Page No: 2 of 2

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

Location: As below

Tested by:

LW

Date tested:

5/02/2021

Report No: EFIL:ETAM21W00206

Issue No:1

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



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

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



Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 10/02/2021

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
9/02/2021	ETAM21W00206	LW	401	1.92	36.9	1.40	2.70	0	140	158+	158+	158+	Retaining Wall 306	1749396	5948905	23.60	Clayey SILT	
9/02/2021	ETAM21W00206	LW	402	1.89	32.4	1.43	2.70	1	140	144	144	140	Retaining Wall 306	1749421	5948906	24.30	Clayey SILT	

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00206

Page No: 2 of 2

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

Location: As below

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



Issue date: 050517

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

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

Earthworks Fill Report

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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/02/2021	ETAM21W00248	LW	405	1.91	32.6	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749039	5949058	11.80	Clayey SILT	
22/02/2021	ETAM21W00248	LW	406	1.88	34.0	1.40	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749063	5949061	11.90	Clayey SILT	
22/02/2021	ETAM21W00248	LW	407	1.94	33.1	1.46	2.70	0	UTP	UTP	UTP	UTP	Gully 2	1749104	5949039	12.65	Clayey SILT	
22/02/2021	ETAM21W00248	LW	408	1.91	44.2	1.45	2.70	0	158+	158+	UTP	UTP	Gully 2	1749048	5949013	14.80	Clayey SILT	
22/02/2021	ETAM21W00248	LW	409	1.96	31.3	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully 2	1749062	5948988	16.20	Clayey SILT	
22/02/2021	ETAM21W00248	LW	410	1.79	44.2	1.24	2.70	0	140	144	132	154	Retaining Wall 306	1749407	5948897	26.30	Silty CLAY	
22/02/2021	ETAM21W00248	LW	411	1.79	43.0	1.25	2.70	0	140	158	154	154	Retaining Wall 306	1749429	5948899	26.50	Silty CLAY	
22/02/2021	ETAM21W00248	LW	412	1.80	40.7	1.28	2.70	0	144	158	144	140	Retaining Wall 306	1749438	5948888	26.80	Silty CLAY	

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00248

Page No: 2 of 2

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

Location: As below

Tested by:

LW

Date tested:

22/02/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00268
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00268

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



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 25/02/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
24/02/2021	ETAM21W00268	LW	416	1.88	39.1	1.35	2.70	0	158+	158+	158+	158+	Retaining Wall 306	1749399	5948889	28.00	Clayey SILT	
24/02/2021	ETAM21W00268	LW	417	1.91	40.0	1.36	2.70	0	158+	158+	158+	158+	Retaining Wall 306	1749421	5948881	27.65	Clayey SILT	

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00268

Page No: 2 of 2

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

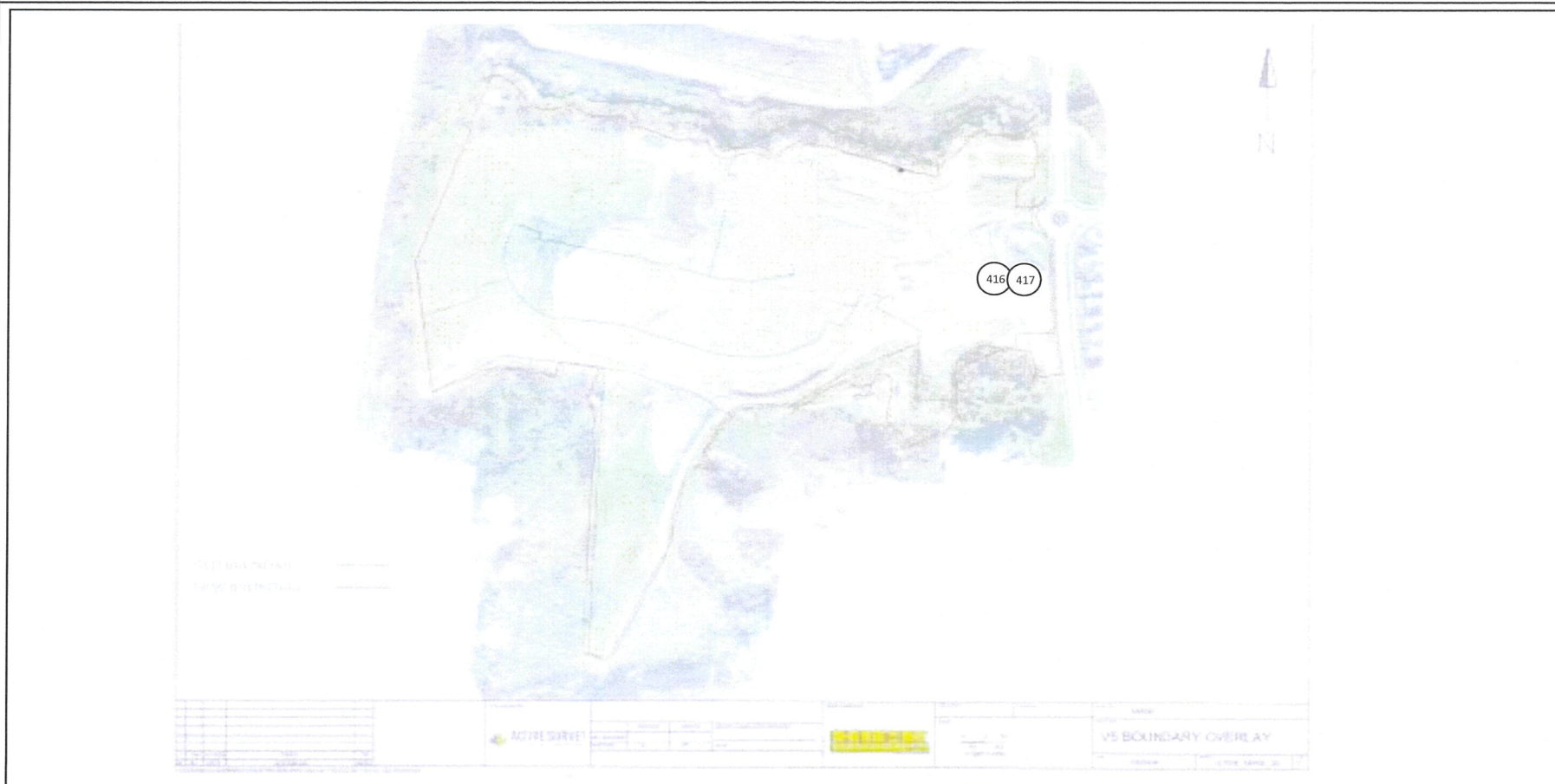
Location: As below

Tested by:

LW

Date tested:

24/02/2021



Issue date: 050517

Earthworks Fill Report

Report No: EFIL:ETAM21W00301

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/03/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
3/03/2021	ETAM21W00301	LW	427	1.91	31.5	1.46	2.70	0	140	144	158+	158+	Office Area	1749245	5948883	-	Silty CLAY	2.0m below finished level
3/03/2021	ETAM21W00301	LW	428	1.90	32.0	1.44	2.70	1	158+	158+	158+	140	Office Area	1749237	5948899	-	Silty CLAY	2.0m below finished level

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00301

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 3/03/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00407
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00407

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



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

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



 Approved Signatory: Cesar Pura
 Senior Technician

IANZ Site Number: 105

Date of Issue: 25/03/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/03/2021	ETAM21W00407	LW	449	1.84	38.4	1.33	2.70	0	158+	158+	158+	158+	North Fill Area	1749146	5949019	-	Silty CLAY	2.5m below finished level
22/03/2021	ETAM21W00407	LW	450	1.79	36.0	1.32	2.70	4	140	144	140	158	North Fill Area	1749159	5949021	-	Silty CLAY	4.0m below finished level
22/03/2021	ETAM21W00407	LW	451	1.84	37.8	1.33	2.70	0	140	158+	158+	158+	Gully 1	1749255	5948962	-	Silty CLAY	3.0m below finished level
22/03/2021	ETAM21W00407	LW	452	1.88	34.3	1.40	2.70	0	140	144	144	154	Gully 1	1749286	5948950	-	Silty CLAY	3.0m below finished level

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00407

Page No: 2 of 2

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

Location: As below

Tested by:

LW

Date tested:

22/03/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00456

Issue No:1

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

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

Principal: Stephen Parkes

cc to: Ricky Thomson

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 31/03/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
30/03/2021	ETAM21W00456	LW	463	1.84	30.0	1.42	2.70	5	UTP	UTP	179+	179+	Undercut Backfill Area	1749249	5948915	-	Silty CLAY	2.0m below finished level
30/03/2021	ETAM21W00456	LW	464	1.90	26.1	1.51	2.70	5	UTP	UTP	UTP	UTP	Undercut Backfill Area	1749264	5948903	-	Silty CLAY	1.5m below finished level
30/03/2021	ETAM21W00456	LW	465	1.88	33.9	1.40	2.70	1	179+	179+	179+	179+	Undercut Backfill Area	1749228	5948922	-	Silty CLAY	2.0m below finished level
30/03/2021	ETAM21W00456	LW	466	1.90	32.6	1.44	2.70	0	179+	179+	179+	179+	Undercut Backfill Area	1749216	5948920	-	Silty CLAY	2.5m below finished level

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00456

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 30/03/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W00471

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W00471

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

Principal: Stephen Parkes

cc to: Ricky Thomson

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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

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



Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 6/04/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
1/04/2021	ETAM21W00471	LW	467	1.92	33.6	1.44	2.70	0	179+	179+	179+	179+	Undercut Backfill Area	1749222	5948921	-	Silty CLAY	1.5m below finished level
1/04/2021	ETAM21W00471	LW	468	1.90	32.7	1.43	2.70	0	179+	179+	179+	179+	Undercut Backfill Area	1749256	5948908	-	Silty CLAY	1.0m below finished level
1/04/2021	ETAM21W00471	LW	469	1.90	34.9	1.41	2.70	0	179+	179+	179+	179+	Gully 2	1749079	5948966	-	Silty CLAY	1.0m below finished level
1/04/2021	ETAM21W00471	LW	470	1.91	33.4	1.43	2.70	0	179+	179+	179+	179+	Gully 2	1749069	5948960	-	Silty CLAY	1.0m below finished level

Comments:

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

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00471

Page No: 2 of 2

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

Location: As below

Tested by:

LW

Date tested:

1/04/2021



Earthworks Fill Report

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

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



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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 9/04/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/04/2021	ETAM21W00486	LW	471	1.82	32.9	1.37	2.70	4	146	160	149	135	Gully 2	1749046	5948990	-	Silty CLAY	At finished level
7/04/2021	ETAM21W00486	LW	472	1.86	33.0	1.40	2.70	2	147	146	152	164	Gully 2	1749071	5948949	-	Silty CLAY	At finished level
7/04/2021	ETAM21W00486	LW	473	1.87	33.6	1.40	2.70	1	160	179	149	140	Gully 2	1749093	5948967	-	Silty CLAY	1.0m below finished level
7/04/2021	ETAM21W00486	LW	474	1.85	34.2	1.38	2.70	2	146	156	164	150	Gully 2	1749112	5948936	-	Silty CLAY	1.0m below finished level
7/04/2021	ETAM21W00486	LW	475	1.84	32.2	1.39	2.70	4	179+	179+	179+	179+	Pond Backfill	1749393	5949018	-	Silty CLAY	3.0m below finished level
7/04/2021	ETAM21W00486	LW	476	1.85	32.2	1.40	2.70	3	179+	179+	179+	179+	Pond Backfill	1749409	5949015	-	Silty CLAY	3.0m below finished level

Comments:

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

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00486

Page No: 2 of 2

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

Location: As below

Tested by: LW

Date tested: 7/04/2021

Earthworks Fill Report

Report No: EFIL:ETAM21W00627

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



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

Test Results

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

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

Comments:

Earthworks Fill Report

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

Report No: EFIL:ETAM21W00627

Issue No:1

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



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

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

Site Plan - not to scale



Earthworks Fill Report

Report No: EFIL:ETAM21W00637

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



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

Test Results

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

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

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM21W00637

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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

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

Site Plan - not to scale



Earthworks Fill Report

Report No: EFIL:ETAM21W00703

Issue No:1

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

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

Principal: Stephen Parkes

cc to: Ricky Thomson

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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

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



Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 25/05/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
24/05/2021	ETAM21W00703	AK	523	1.82	39.7	1.30	2.70	0	180	180	153	153	SWMH Drainage Line 103-105	1749345	5949023	10.09	Silty CLAY	
24/05/2021	ETAM21W00703	AK	524	1.96	31.6	1.49	2.70	0	153	153	170	170		1749349	5949028	9.73	Silty CLAY	
24/05/2021	ETAM21W00703	AK	525	1.72	34.3	1.28	2.70	9	153	153	145	178		1749354	5949041	9.12	Silty CLAY	

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W00703

Issue No:1

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

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

Principal: Stephen Parkes

cc to: Ricky Thomson

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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

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Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 25/05/2021



Earthworks Fill Report

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

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



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



Approved Signatory: Cesar Pura
 Senior Technician
 IANZ Site Number: 105
 Date of Issue: 26/05/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
25/05/2021	ETAM21W00711	LW	526	1.87	32.1	1.42	2.70	2	134	171	131	143	SSMH 1-D 1-C	1749421	5949052	-	Clayey SILT	At finished level
25/05/2021	ETAM21W00711	LW	527	1.89	31.7	1.44	2.70	1	146	156	137	127	SSMH 1-C 1-B	1749384	5949060	-	Clayey SILT	At finished level

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W00711

Issue No:1

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

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

Principal: Stephen Parkes

cc to: Ricky Thomson

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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

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Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 26/05/2021



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

Report No: EFIL:ETAM21W00729

Issue No:1

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

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

Principal: Stephen Parkes

cc to: Ricky Thomson

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 28/05/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
27/05/2021	ETAM21W00729	LW	528	1.92	28.9	1.49	2.70	2	179+	179+	179+	179+	Slip Remedial Area	1749263	5948822	38.75	Clayey SILT	-
27/05/2021	ETAM21W00729	LW	529	1.86	28.8	1.44	2.70	5	179+	179+	179+	179+	MH 100/2 - 100/3 Drainline	1749354	5949044	-	Clayey SILT	At finished level

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W00729

Issue No:1

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

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

Principal: Stephen Parkes

cc to: Ricky Thomson

Project No.: 773-ETAM00991AA

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

Project Location: Access off Arran Drive, Orewa



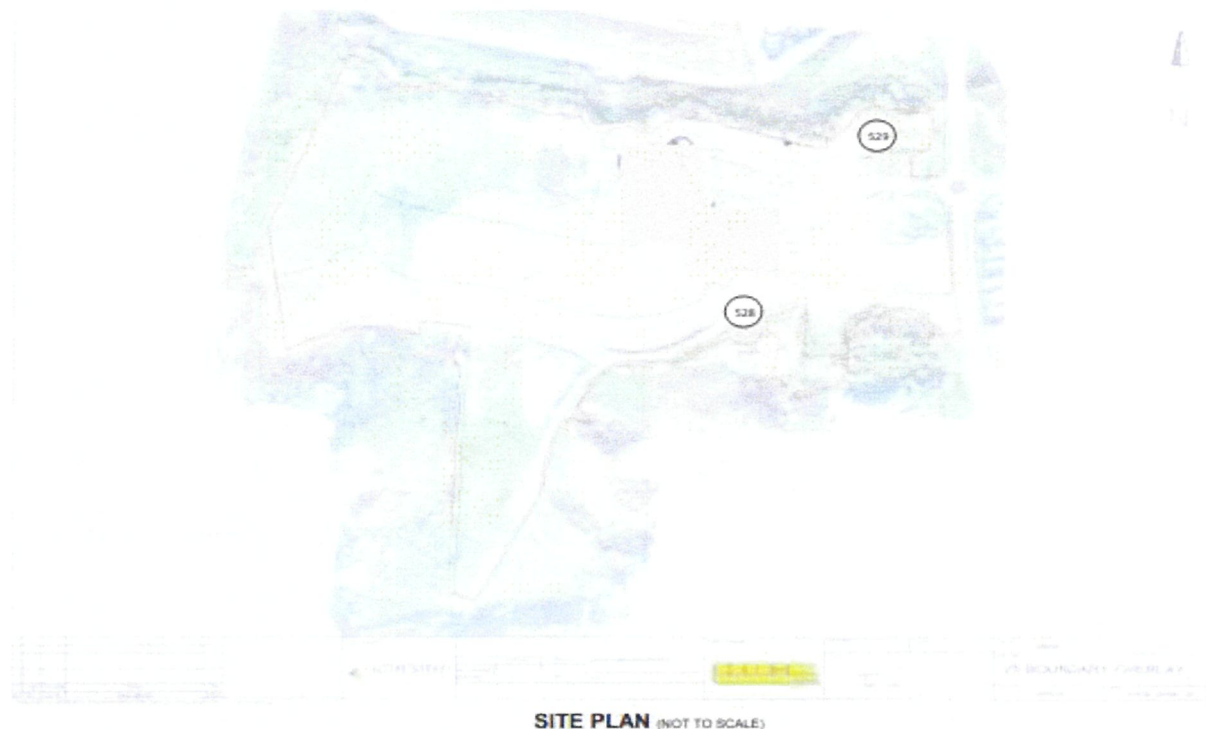
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

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

Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 28/05/2021



Earthworks Fill Report

Report No: EFIL:ETAM21W01446

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W01446

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 29/11/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
26/11/2021	ETAM21W01446	LW	562	1.95	29.9	1.50	2.70	0	UTP	UTP	UTP	208	Gully	1748990	5948890	30.10	Silty CLAY	
26/11/2021	ETAM21W01446	LW	563	1.96	31.3	1.50	2.70	0	UTP	UTP	UTP	UTP	Gully	1749016	5948909	29.50	Silty CLAY	
26/11/2021	ETAM21W01446	LW	564	1.89	34.1	1.41	2.70	0	196	168	160	146	Gully	1749044	5948956	25.80	Silty CLAY	
26/11/2021	ETAM21W01446	LW	565	1.90	32.7	1.43	2.70	0	165	196	188	180	Gully	1749063	5948982	25.40	Silty CLAY	

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01446

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W01446

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 29/11/2021



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

Report No: EFIL:ETAM21W01476

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 6/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
3/12/2021	ETAM21W01476	LW	572	1.88	32.8	1.41	2.70	1	149	172	175+	175+	Shear Key	1748998	5949081	8.10	Clayey SILT	
3/12/2021	ETAM21W01476	LW	573	1.89	33.3	1.42	2.70	0	175+	175+	175+	164	Shear Key	1748991	5949076	9.30	Clayey SILT	
3/12/2021	ETAM21W01476	LW	574	1.87	31.4	1.42	2.70	3	137	175+	175+	153	Gully	1748976	5948881	31.95	Clayey SILT	
3/12/2021	ETAM21W01476	LW	575	1.84	34.1	1.37	2.70	2	149	160	156	153	Gully	1748995	5948918	29.55	Clayey SILT	
3/12/2021	ETAM21W01476	LW	576	1.93	27.6	1.51	2.70	2	UTP	UTP	175+	175+	Gully	1749072	5948958	26.90	Clayey SILT	
3/12/2021	ETAM21W01476	LW	577	1.91	26.7	1.51	2.70	4	UTP	UTP	UTP	175+	Gully	1749105	5948969	27.10	Clayey SILT	

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01476

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 6/12/2021



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



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

Test Results

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

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

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01485

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
7/12/2021	ETAM21W01492	LW	581	1.90	30.9	1.45	2.70	1	149	164	175+	175+	Gully	1748965	5948906	31.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	582	1.98	27.9	1.55	2.70	0	UTP	UTP	UTP	UTP	Gully	1749002	5948937	30.20	Clayey SILT	
7/12/2021	ETAM21W01492	LW	583	1.92	33.2	1.44	2.70	0	UTP	UTP	175+	175+	Gully	1749063	5948944	27.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	584	1.87	30.5	1.43	2.70	3	175+	175+	175+	172	Gully	1749084	5948969	27.40	Clayey SILT	
7/12/2021	ETAM21W01492	LW	585	1.90	33.9	1.42	2.70	0	175+	175+	164	153	Shear Key	1748989	5949067	13.00	Clayey SILT	
7/12/2021	ETAM21W01492	LW	586	1.89	36.9	1.38	2.70	0	175+	160	149	164	Shear Key	1748977	5949066	11.60	Clayey SILT	

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01492

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W01492

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/12/2021



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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



Approved Signatory: Cesar Pura
Senior Technician

IANZ Site Number: 105

Date of Issue: 13/12/2021

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
10/12/2021	ETAM21W01514	LW	589	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749114	5949038	8.60	Clayey SILT	
10/12/2021	ETAM21W01514	LW	590	1.93	33.8	1.44	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749129	5949037	8.50	Clayey SILT	
10/12/2021	ETAM21W01514	LW	591	1.90	31.1	1.45	2.70	1	UTP	UTP	175+	175+	Gully	1749063	5948926	29.00	Clayey SILT	
10/12/2021	ETAM21W01514	LW	592	1.94	31.2	1.48	2.70	0	UTP	UTP	175+	175+	Gully	1749080	5948964	27.60	Clayey SILT	

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01514

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM21W01514

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/12/2021	ETAM21W01557	LW	597	1.88	32.4	1.42	2.70	1	175+	175+	175+	160	Shear Key	1748950	5949089	8.30	Clayey SILT	
22/12/2021	ETAM21W01557	LW	598	1.91	29.9	1.47	2.70	2	175+	175+	175+	175+	Shear Key	1748974	5949084	9.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	599	1.85	37.5	1.35	2.70	0	175+	175+	175+	175+	Gully	1749022	5948881	29.60	Clayey SILT	
22/12/2021	ETAM21W01557	LW	600	1.86	31.8	1.41	2.70	3	175+	175+	175+	175+	Gully	1749046	5948916	29.20	Clayey SILT	
22/12/2021	ETAM21W01557	LW	601	1.98	31.8	1.50	2.70	0	UTP	UTP	UTP	UTP	Gully	1749098	5948940	28.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	602	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully	1749080	5948970	27.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	603	1.94	30.1	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749110	5949033	8.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	604	1.97	29.2	1.52	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749119	5949035	9.00	Clayey SILT	

Comments:

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

Earthworks Fill Report

Report No: EFIL:ETAM21W01557

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

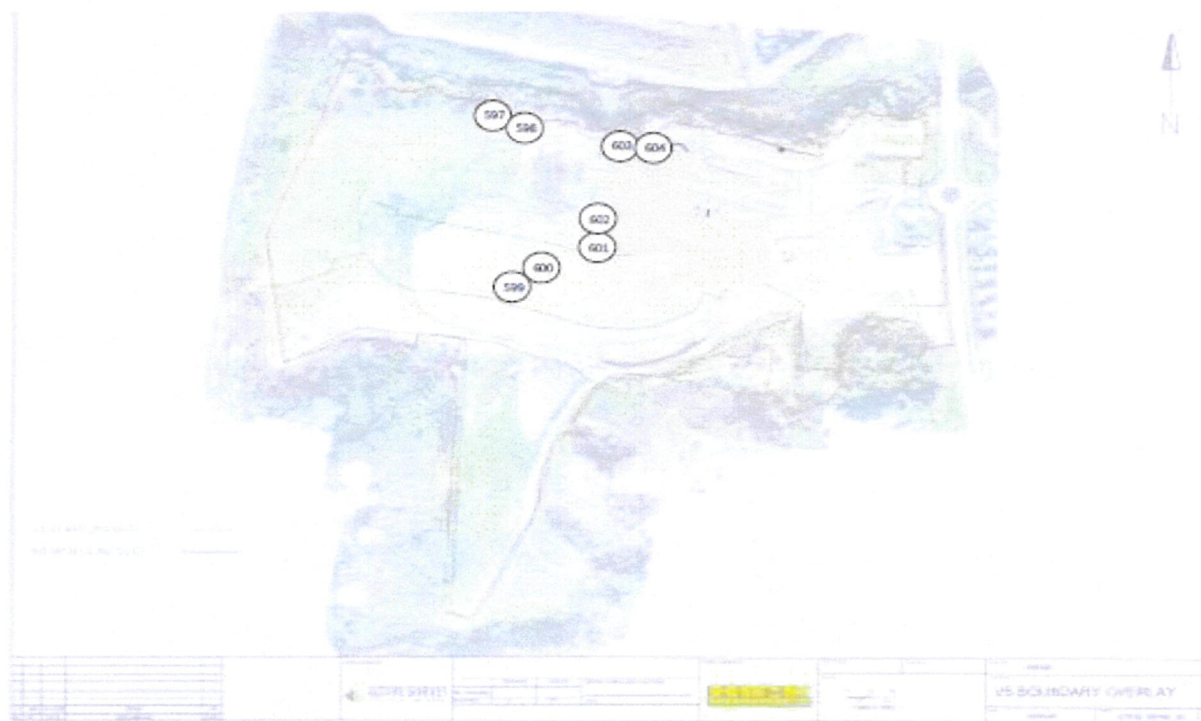
Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa



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

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



SITE PLAN (NOT TO SCALE)

Report No: EFIL:ETAM22W00017

Issue No:1

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

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




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

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Test Results

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

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

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00017

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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



**Auckland Laboratory**

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

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
12/01/2022	ETAM22W00023	LW	617	1.88	27.1	1.48	2.70	5.1	135	UTP	UTP	175	Gully	1749067	5948951	-	Clayey SILT	-
12/01/2022	ETAM22W00023	LW	618	1.94	25.4	1.55	2.70	3.5	175	175	168	149	Gully	1749088	5948969	-	Clayey SILT	-
12/01/2022	ETAM22W00023	LW	619	1.88	32.4	1.42	2.70	1.3	137	172	175	175	Gully	1749045	5948899	-	Clayey SILT	-
12/01/2022	ETAM22W00023	LW	620	1.96	28.4	1.53	2.70	0.2	140	164	137	143	Gully	1478986	5948893	-	Clayey SILT	-

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00023

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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



SITE PLAN (NOT TO SCALE)

**Auckland Laboratory**

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

Report No: EFIL:ETAM22W00032**Issue No:1***This report replaces all previous issues of report no. EFIL:ETAM22W00032***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: 18/01/2022

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/01/2022	ETAM22W00032	LW	621	1.94	32.3	1.46	2.70	0.0	175	175	175	175	Gully	1749069	5948970	26.4	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	622	1.94	30.5	1.49	2.70	0.0	175	175	175	175	Gully	1749082	5948942	26.9	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	623	1.93	25.3	1.54	2.70	4.2	UTP	UTP	UTP	UTP	Gully	1749060	5948913	29.8	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	624	1.94	25.6	1.55	2.70	3.1	175	175	175	175	Gully	1749037	5948891	30.3	Clayey Silt	-

Comments:

Oven Moistures



Earthworks Fill Report

Auckland Laboratory

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

Report No: EFIL:ETAM22W00032

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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





Auckland Laboratory

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

Report No: EFIL:ETAM22W00039

Issue No:1

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

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



E. Paton

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

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Test Results

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

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

Comments:

Report No: EFIL:ETAM22W00039

Issue No:1

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

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



E. Paton

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

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



Auckland Laboratory

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

Report No: EFIL:ETAM22W00062

Issue No:1

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



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

E. Paton

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

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
									UTP	UTP	UTP	UTP						
18/01/2022	ETAM22W00062	IA	632	1.90	26.8	1.50	2.70	4.3	UTP	UTP	UTP	UTP	Ref to plan	1749120	5948916	27.5	Silty Clay	-
18/01/2022	ETAM22W00062	IA	633	1.89	24.1	1.52	2.70	6.8	UTP	UTP	UTP	UTP	Ref to plan	1749100	5948926	27.5	Silty Clay	-
18/01/2022	ETAM22W00062	IA	634	1.86	28.9	1.44	2.70	4.9	UTP	UTP	UTP	UTP	Ref to plan	1748961	5948916	28.7	Silty Clay	-
18/01/2022	ETAM22W00062	IA	635	1.89	29.6	1.46	2.70	2.9	184	150	134	UTP	Ref to plan	1749007	594888	28.7	Silty Clay	-

Comments:

Oven Moistures



Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Auckland Laboratory

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

Report No: EFIL:ETAM22W00062

Issue No:1

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



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

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

Approved Signatory: Eric Paton
Director-Testing

IANZ Site Number: 105

Date of Issue: 26/01/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00072

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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

Test Results

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

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

Comments:



Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00072

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

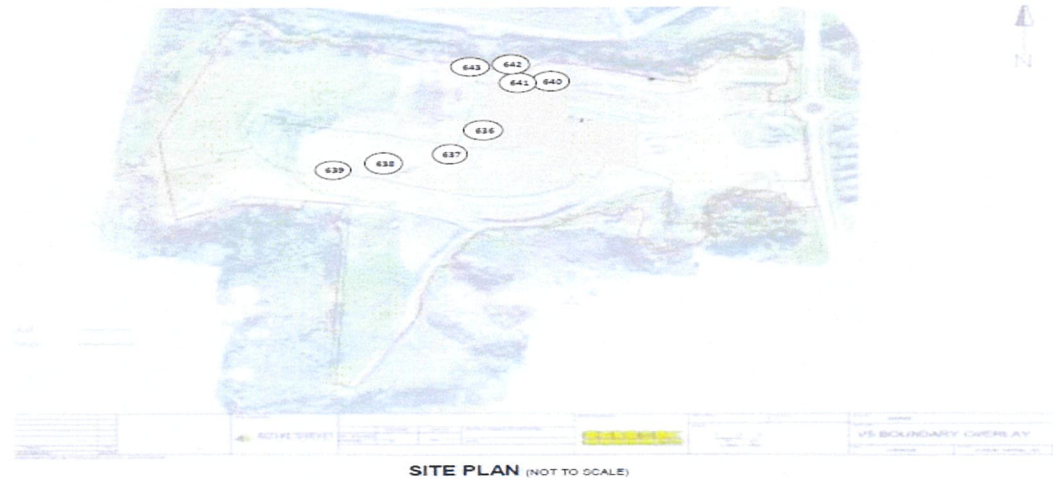
Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa



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

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



**Auckland Laboratory**

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

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 2/02/2022

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/01/2022	ETAM22W00117	LW	650	1.90	31.5	1.44	2.70	1.1	175	149	137	149	Gully	1748995	5948879	30.2	Silty Clay	-
21/01/2022	ETAM22W00117	LW	651	1.91	30.7	1.46	2.70	1.0	175	175	175	160	Gully	1749062	5948926	28	Silty Clay	-
21/01/2022	ETAM22W00117	LW	652	1.92	31.2	1.46	2.70	0.3	168	160	175	175	Gully	1749043	5948902	29.15	Silty Clay	-

Comments:



Earthworks Fill Report

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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00117

Issue No:1

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



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

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

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





Auckland Laboratory

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

Report No: EFIL:ETAM22W00117

Issue No:1

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



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

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

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 2/02/2022

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/01/2022	ETAM22W00117	LW	650	1.90	31.5	1.44	2.70	1.1	175	149	137	149	Gully	1748995	5948879	30.2	Silty Clay	-
21/01/2022	ETAM22W00117	LW	651	1.91	30.7	1.46	2.70	1.0	175	175	175	160	Gully	1749062	5948926	28	Silty Clay	-
21/01/2022	ETAM22W00117	LW	652	1.92	31.2	1.46	2.70	0.3	168	160	175	175	Gully	1749043	5948902	29.15	Silty Clay	-

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00117

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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





Auckland Laboratory

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

Report No: EFIL:ETAM22W00233

Issue No:1

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



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

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

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

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
16/02/2022	ETAM22W00233	SC	678	1.87	33.2	1.41	2.70	1.3	168	168	176	176	Gully	1748996	5748922	-	Silty Clay	-
16/02/2022	ETAM22W00233	SC	679	1.90	30.8	1.45	2.70	1.5	176	176	176	176	Gully	1749039	5948904	-	Silty Clay	-
16/02/2022	ETAM22W00233	SC	680	1.96	24.6	1.58	2.70	2.9	168	176	UTP	168	Gully	1749005	5948886	-	Silty Clay	-

Comments:



Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Auckland Laboratory

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

Report No: EFIL:ETAM22W00233

Issue No:1

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



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

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

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 18/02/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00242

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/02/2022	ETAM22W00242	SC	681	1.77	34.2	1.32	2.70	6.3	188	168	176	184	Ref to plan	1749816	5948951	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	682	1.79	36.2	1.32	2.70	3.7	168	188	188	184	Ref to plan	1749022	5948987	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	683	1.84	30.7	1.41	2.70	4.7	188	188	UTP	UTP	Gully	1748984	5948917	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	684	1.94	26.5	1.53	2.70	2.4	UTP	UTP	188	188	Gully	1749022	5948894	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	685	1.84	41.7	1.30	2.70	0.0	UTP	UTP	UTP	UTP	Silt Pond	1749065	5948937	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	686	1.93	26.5	1.52	2.70	3.2	UTP	UTP	UTP	UTP	Silt Pond	1749109	5948928	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	687	1.86	27.0	1.46	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749058	5949002	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	688	1.80	31.5	1.37	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749081	5948998	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	689	1.73	37.9	1.26	2.70	5.8	146	155	146	160	Stage 1 Rock	1749321	5948750	-	Silty Clay	250mm below F/L

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00242

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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



SITE PLAN (NOT TO SCALE)



Auckland Laboratory

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

Report No: EFIL:ETAM22W00261

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00261



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

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

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

Comments:



Earthworks Fill Report

Auckland Laboratory

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

Report No: EFIL:ETAM22W00261

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00261

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



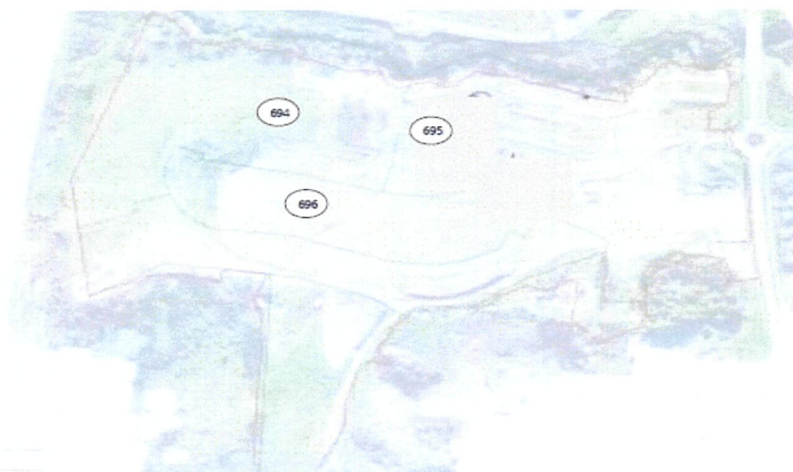
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

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

Approved Signatory: Eric Paton
Director-Testing

IANZ Site Number: 105

Date of Issue: 23/02/2022



Earthworks Fill Report

Report No: EFIL:ETAM22W00341

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/03/2022	ETAM22W00341	SC	723	1.90	28.3	1.48	2.70	3.2	208+	208+	208+	UTP	Gully 2	1748981	5948889	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	724	1.87	29.3	1.45	2.70	4.1	208+	208+	UTP	UTP	Gully 2	1749004	5948916	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	725	1.90	31.9	1.44	2.70	1.0	188	188	208+	208+	Gully 2	1749060	5948901	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	726	1.83	29.5	1.42	2.70	5.8	200	200	UTP	UTP	Silt Pond	1749004	5948988	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	727	1.74	23.0	1.41	2.70	15.3	UTP	UTP	UTP	UTP	A7-A15	1749168	5948985	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	728	1.69	25.0	1.35	2.70	16.1	UTP	UTP	UTP	UTP	A15-15B	1749200	5948998	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	729	1.68	25.6	1.34	2.70	16.1	UTP	UTP	UTP	UTP	15B-15C	1749220	5948990	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	730	1.84	29.5	1.42	2.70	5.5	UTP	UTP	UTP	UTP	15C-15D	1749248	5948982	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	731	1.73	23.4	1.40	2.70	15.3	UTP	UTP	UTP	UTP	15-15D	1749275	5948977	-	Silty CLAY	At finished level

Comments:



Auckland Laboratory

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

Report No: EFIL:ETAM22W00341

Issue No:1

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

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

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



Approved Signatory: Liam Walker

Assistant Manager

IANZ Site Number: 105

Date of Issue: 9/03/2022

Earthworks Fill Report

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



**Auckland Laboratory**

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

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
10/03/2022	ETAM22W00363	SC	737	1.82	25.2	1.45	2.70	9.7	UTP	UTP	UTP	UTP	A 7 - A 15 Retest	1749168	5948985	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	738	1.84	24.8	1.47	2.70	9.0	UTP	UTP	UTP	UTP	15 A - 15 B	1749200	5948998	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	739	1.89	25.5	1.51	2.70	5.9	UTP	UTP	UTP	UTP	15 B - 15 C	1749220	5948996	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	740	1.93	26.3	1.53	2.70	3.1	UTP	UTP	UTP	UTP	15 C - 15 D	1749275	5948977	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	741	1.95	25.3	1.56	2.70	3.1	UTP	UTP	UTP	UTP	Main Gully Fill	1748979	5948877	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	742	1.89	29.3	1.46	2.70	2.9	UTP	UTP	UTP	UTP	Main Gully Fill	1748992	5948915	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	743	1.85	29.8	1.43	2.70	4.7	168	168	160	160	Main Gully Fill	1749052	5948941	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	744	1.84	33.0	1.38	2.70	3.3	146	146	160	160	Silt Pond	1749012	5948961	-	Silty Clay	Finished Level

Comments:



Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Auckland Laboratory

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

Report No: EFIL:ETAM22W00363

Issue No:1

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



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

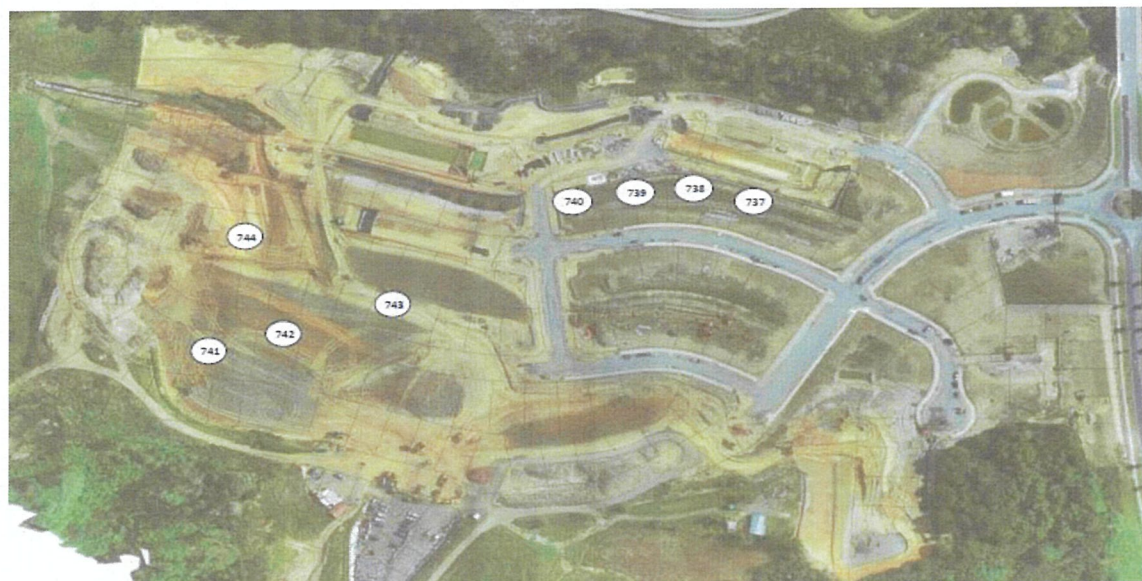
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 14/03/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00405

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
15/03/2022	ETAM22W00405	SC	752	1.79	27.4	1.40	2.70	9.6	145	188	UTP	139	Undercut 10	1748973	5948952	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	753	1.86	30.8	1.42	2.70	3.6	157	168	157	UTP	Gully	1749062	5948940	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	754	1.82	31.9	1.38	2.70	4.7	187	187	UTP	UTP	Gully	1749003	5948870	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	755	1.86	31.4	1.41	2.70	3.3	UTP	UTP	UTP	UTP	Gully	1749053	5948897	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	756	1.81	26.9	1.42	2.70	9.0	UTP	UTP	UTP	UTP	Lot 1004	1749395	5948931	-	Silty Clay	Finished Level
15/03/2022	ETAM22W00405	SC	757	1.85	28.3	1.44	2.70	5.6	UTP	UTP	UTP	UTP	Lot 1004	1749430	5948917	-	Silty Clay	Finished Level

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00405

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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



Earthworks Fill Report

Report No: EFIL:ETAM22W00023

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

E. Paton

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 14/01/2022



SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
13/01/2022	ETAM22W00032	LW	621	1.94	32.3	1.46	2.70	0.0	175	175	175	175	Gully	1749069	5948970	26.4	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	622	1.94	30.5	1.49	2.70	0.0	175	175	175	175	Gully	1749082	5948942	26.9	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	623	1.93	25.3	1.54	2.70	4.2	UTP	UTP	UTP	UTP	Gully	1749060	5948913	29.8	Clayey Silt	-
13/01/2022	ETAM22W00032	LW	624	1.94	25.6	1.55	2.70	3.1	175	175	175	175	Gully	1749037	5948891	30.3	Clayey Silt	-

Comments:

Oven Moistures



Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00032

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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



Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



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

Test Results

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

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

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

Comments:

Earthworks Fill Report

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

Report No: EFIL:ETAM22W00039

Issue No:1

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



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

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

E. Peter

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 18/01/2022

SITE PLAN (NOT TO SCALE)

Earthworks Fill Report

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/01/2022	ETAM22W00062	IA	632	1.90	26.8	1.50	2.70	4.3	UTP	UTP	UTP	UTP	Ref to plan	1749120	5948916	27.5	Silty Clay	-
18/01/2022	ETAM22W00062	IA	633	1.89	24.1	1.52	2.70	6.8	UTP	UTP	UTP	UTP	Ref to plan	1749100	5948926	27.5	Silty Clay	-
18/01/2022	ETAM22W00062	IA	634	1.86	28.9	1.44	2.70	4.9	UTP	UTP	UTP	UTP	Ref to plan	1748961	5948916	28.7	Silty Clay	-
18/01/2022	ETAM22W00062	IA	635	1.89	29.6	1.46	2.70	2.9	184	150	134	UTP	Ref to plan	1749007	5948888	28.7	Silty Clay	-

Comments:



Oven Moistures



Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00062	
Issue No:1	
<i>This report replaces all previous issues of report no. EFIL:ETAM22W00062</i>	
	All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. {This document may not be altered or reproduced except in full. This report relates only to the positions tested.}
	
	Approved Signatory: Eric Paton Director-Testing IANZ Site Number: 105 Date of Issue: 26/01/2022

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



Earthworks Fill Report

Report No: EFIL:ETAM22W00072

Issue No: 1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



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

Test Results

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

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

Comments:



Auckland Laboratory

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

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Report No: EFIL:ETAM22W00072

Issue No:1

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



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

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

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 26/01/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00117

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 2/02/2022

Test Results



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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/01/2022	ETAM22W00117	LW	650	1.90	31.5	1.44	2.70	1.1	175	149	137	149	Gully	1748995	5948879	30.2	Silty Clay	-
21/01/2022	ETAM22W00117	LW	651	1.91	30.7	1.46	2.70	1.0	175	175	175	160	Gully	1749062	5948926	28	Silty Clay	-
21/01/2022	ETAM22W00117	LW	652	1.92	31.2	1.46	2.70	0.3	168	160	175	175	Gully	1749043	5948902	29.15	Silty Clay	-

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00117	
Issue No:1	
<i>This report replaces all previous issues of report no. EFIL:ETAM22W00117</i>	
	All tests reported herein have been performed in accordance with the laboratory's 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	

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 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:ETAM22W00117

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/01/2022	ETAM22W00117	LW	650	1.90	31.5	1.44	2.70	1.1	175	149	137	149	Gully	1748995	5948879	30.2	Silty Clay	-
21/01/2022	ETAM22W00117	LW	651	1.91	30.7	1.46	2.70	1.0	175	175	175	160	Gully	1749062	5948926	28	Silty Clay	-
21/01/2022	ETAM22W00117	LW	652	1.92	31.2	1.46	2.70	0.3	168	160	175	175	Gully	1749043	5948902	29.15	Silty Clay	-

Comments:



Earthworks Fill Report

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

Auckland Laboratory

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

Report No: EFIL:ETAM22W00117

Issue No:1

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



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

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

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



SITE PLAN (NOT TO SCALE)



Auckland Laboratory

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

Report No: EFIL:ETAM22W00117

Issue No:1

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

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

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



Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 2/02/2022

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
21/01/2022	ETAM22W00117	LW	650	1.90	31.5	1.44	2.70	1.1	175	149	137	149	Gully	1748995	5948879	30.2	Silty Clay	-
21/01/2022	ETAM22W00117	LW	651	1.91	30.7	1.46	2.70	1.0	175	175	175	160	Gully	1749062	5948926	28	Silty Clay	-
21/01/2022	ETAM22W00117	LW	652	1.92	31.2	1.46	2.70	0.3	168	160	175	175	Gully	1749043	5948902	29.15	Silty Clay	-

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00117

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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



**Auckland Laboratory**

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

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

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

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
16/02/2022	ETAM22W00233	SC	678	1.87	33.2	1.41	2.70	1.3	168	168	176	176	Gully	1748996	5748922	-	Silty Clay	-
16/02/2022	ETAM22W00233	SC	679	1.90	30.8	1.45	2.70	1.5	176	176	176	176	Gully	1749039	5948904	-	Silty Clay	-
16/02/2022	ETAM22W00233	SC	680	1.96	24.6	1.58	2.70	2.9	168	176	UTP	168	Gully	1749005	5948886	-	Silty Clay	-

Comments:



Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Auckland Laboratory

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

Report No: EFIL:ETAM22W00233

Issue No:1

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



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

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

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 18/02/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00242

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/02/2022	ETAM22W00242	SC	681	1.77	34.2	1.32	2.70	6.3	188	168	176	184	Ref to plan	1749816	5948951	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	682	1.79	36.2	1.32	2.70	3.7	168	188	188	184	Ref to plan	1749022	5948987	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	683	1.84	30.7	1.41	2.70	4.7	188	188	UTP	UTP	Gully	1748984	5948917	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	684	1.94	26.5	1.53	2.70	2.4	UTP	UTP	188	188	Gully	1749022	5948894	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	685	1.84	41.7	1.30	2.70	0.0	UTP	UTP	UTP	UTP	Silt Pond	1749065	5948937	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	686	1.93	26.5	1.52	2.70	3.2	UTP	UTP	UTP	UTP	Silt Pond	1749109	5948928	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	687	1.86	27.0	1.46	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749058	5949002	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	688	1.80	31.5	1.37	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749081	5948998	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	689	1.73	37.9	1.26	2.70	5.8	146	155	146	160	Stage 1 Rock	1749321	5948750	-	Silty Clay	250mm below F/L

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00242

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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



SITE PLAN (NOT TO SCALE)

**Auckland Laboratory**

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

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

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

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

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 23/02/2022

Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/02/2022	ETAM22W00261	SC	694	1.87	28.4	1.45	2.70	5.0	188	188	168	168	Siltpond Backfill	1749016	5948957	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	695	1.83	33.2	1.37	2.70	3.5	168	168	168	168	Gully	1749076	5948939	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	696	1.89	27.5	1.48	2.70	4.3	168	168	188	188	Main Gully	1749025	5948902	-	Silty Clay	-

Comments:



Earthworks Fill Report

Auckland Laboratory

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

Report No: EFIL:ETAM22W00261

Issue No:1

This report replaces all previous issues of report no. EFIL:ETAM22W00261

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



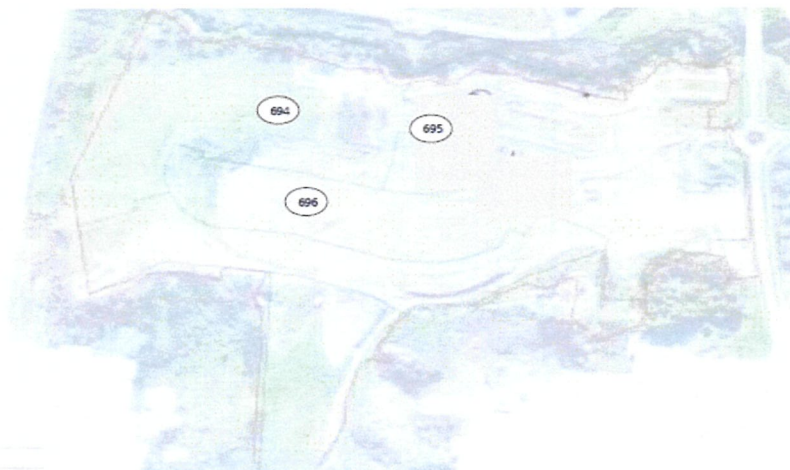
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

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

Approved Signatory: Eric Paton
Director-Testing

IANZ Site Number: 105

Date of Issue: 23/02/2022



Earthworks Fill Report

Report No: EFIL:ETAM22W00341

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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



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

Test Results

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/03/2022	ETAM22W00341	SC	723	1.90	28.3	1.48	2.70	3.2	208+	208+	208+	UTP	Gully 2	1748981	5948889	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	724	1.87	29.3	1.45	2.70	4.1	208+	208+	UTP	UTP	Gully 2	1749004	5948916	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	725	1.90	31.9	1.44	2.70	1.0	188	188	208+	208+	Gully 2	1749060	5948901	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	726	1.83	29.5	1.42	2.70	5.8	200	200	UTP	UTP	Silt Pond	1749004	5948988	-	Silty CLAY	RL unavailable
7/03/2022	ETAM22W00341	SC	727	1.74	23.0	1.41	2.70	15.3	UTP	UTP	UTP	UTP	A7-A15	1749168	5948985	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	728	1.69	25.0	1.35	2.70	16.1	UTP	UTP	UTP	UTP	A15-15B	1749200	5948998	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	729	1.68	25.6	1.34	2.70	16.1	UTP	UTP	UTP	UTP	15B-15C	1749220	5948990	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	730	1.84	29.5	1.42	2.70	5.5	UTP	UTP	UTP	UTP	15C-15D	1749248	5948982	-	Silty CLAY	At finished level
7/03/2022	ETAM22W00341	SC	731	1.73	23.4	1.40	2.70	15.3	UTP	UTP	UTP	UTP	15-15D	1749275	5948977	-	Silty CLAY	At finished level

Comments:



Auckland Laboratory

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

Report No: EFIL:ETAM22W00341

Issue No:1

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

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

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



Approved Signatory: Liam Walker

Assistant Manager

IANZ Site Number: 105

Date of Issue: 9/03/2022

Earthworks Fill Report

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





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00363

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
10/03/2022	ETAM22W00363	SC	737	1.82	25.2	1.45	2.70	9.7	UTP	UTP	UTP	UTP	A 7 - A 15 Retest	1749168	5948985	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	738	1.84	24.8	1.47	2.70	9.0	UTP	UTP	UTP	UTP	15 A - 15 B	1749200	5948998	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	739	1.89	25.5	1.51	2.70	5.9	UTP	UTP	UTP	UTP	15 B - 15 C	1749220	5948996	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	740	1.93	26.3	1.53	2.70	3.1	UTP	UTP	UTP	UTP	15 C - 15 D	1749275	5948977	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	741	1.95	25.3	1.56	2.70	3.1	UTP	UTP	UTP	UTP	Main Gully Fill	1748979	5948877	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	742	1.89	29.3	1.46	2.70	2.9	UTP	UTP	UTP	UTP	Main Gully Fill	1748992	5948915	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	743	1.85	29.8	1.43	2.70	4.7	168	168	160	160	Main Gully Fill	1749052	5948941	-	Silty Clay	Finished Level
10/03/2022	ETAM22W00363	SC	744	1.84	33.0	1.38	2.70	3.3	146	146	160	160	Silt Pond	1749012	5948961	-	Silty Clay	Finished Level

Comments:



Earthworks Fill Report

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa

Auckland Laboratory

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

Report No: EFIL:ETAM22W00363

Issue No:1

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



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

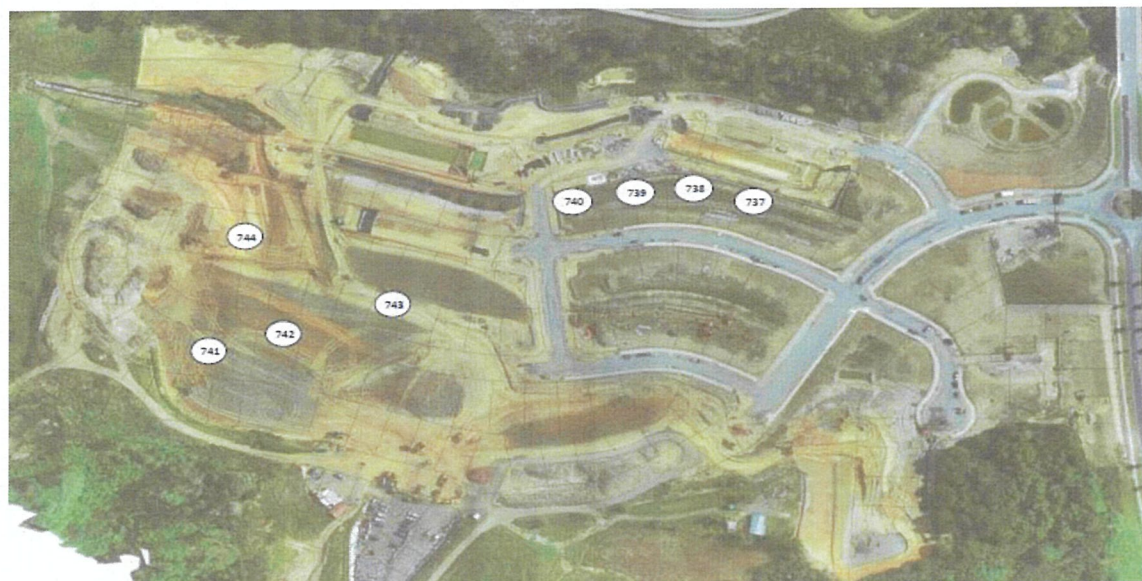
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton

Director-Testing

IANZ Site Number: 105

Date of Issue: 14/03/2022





Auckland Laboratory

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

Earthworks Fill Report

Report No: EFIL:ETAM22W00405

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



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

E. Paton

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

Test Results

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

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

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m ³	Oven Water Content %	Dry Density t/m ³	Solid Density t/m ³	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
15/03/2022	ETAM22W00405	SC	752	1.79	27.4	1.40	2.70	9.6	145	188	UTP	139	Undercut 10	1748973	5948952	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	753	1.86	30.8	1.42	2.70	3.6	157	168	157	UTP	Gully	1749062	5948940	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	754	1.82	31.9	1.38	2.70	4.7	187	187	UTP	UTP	Gully	1749003	5948870	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	755	1.86	31.4	1.41	2.70	3.3	UTP	UTP	UTP	UTP	Gully	1749053	5948897	-	Silty Clay	-
15/03/2022	ETAM22W00405	SC	756	1.81	26.9	1.42	2.70	9.0	UTP	UTP	UTP	UTP	Lot 1004	1749395	5948931	-	Silty Clay	Finished Level
15/03/2022	ETAM22W00405	SC	757	1.85	28.3	1.44	2.70	5.6	UTP	UTP	UTP	UTP	Lot 1004	1749430	5948917	-	Silty Clay	Finished Level

Comments:

Earthworks Fill Report

Report No: EFIL:ETAM22W00405

Issue No:1

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

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

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

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

Project Location: 117 Kowhai Road, Orewa



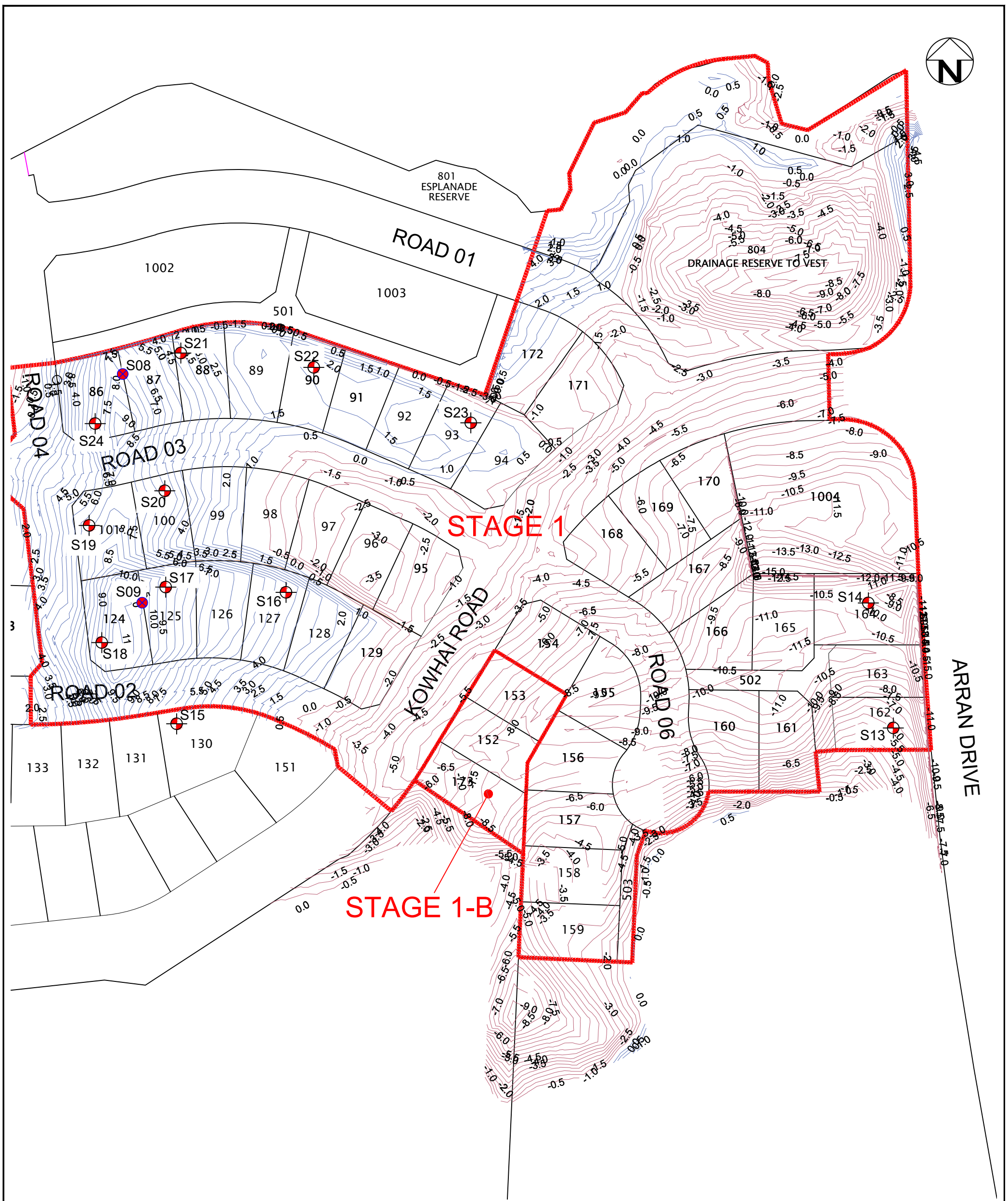
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)

E. Paton

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



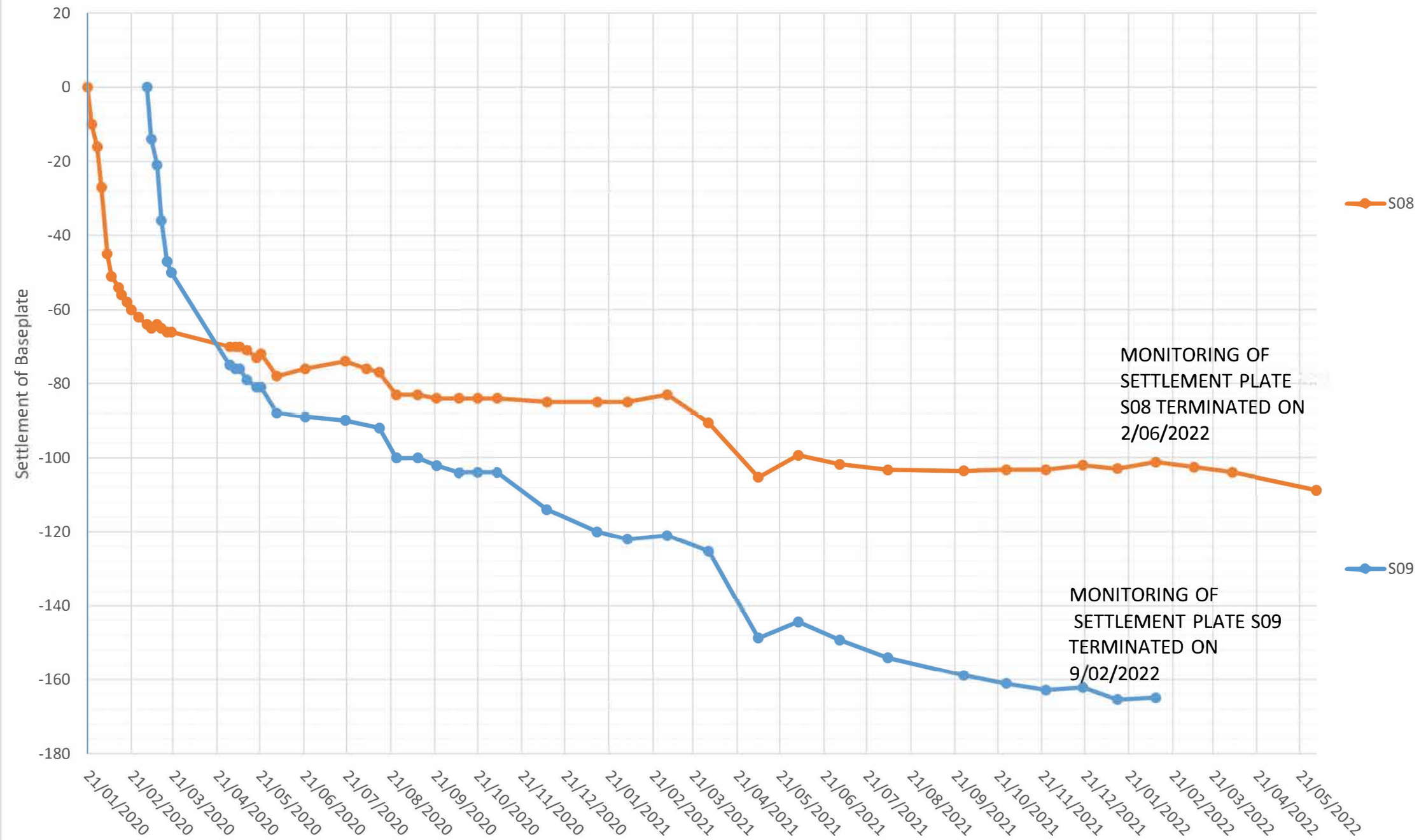
APPENDIX E: MONITORING RESULTS



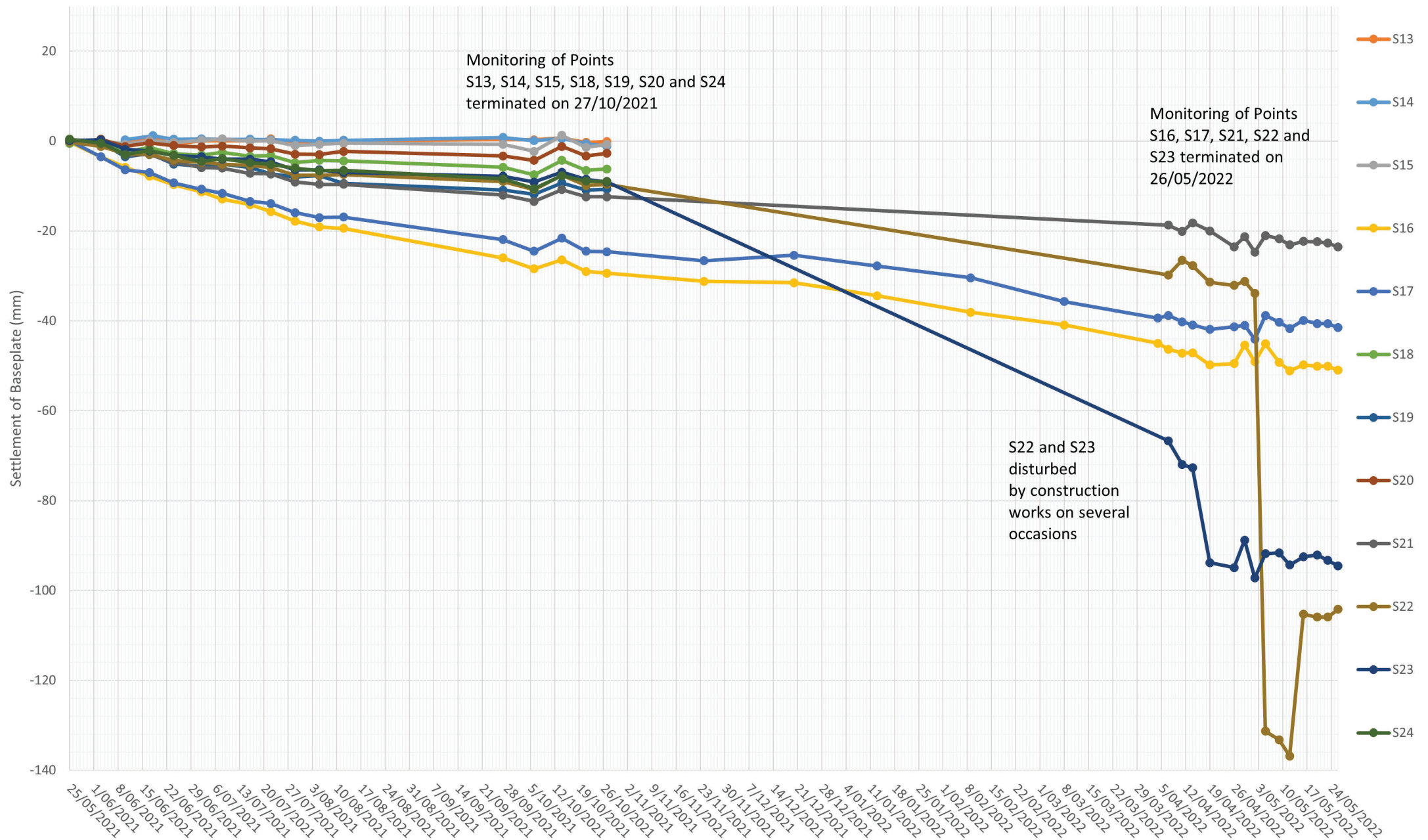
revision	no.	description	drawn	approved	date	<div>LEGEND</div> <div><div><div></div>AS-BUILT CUT CONTOUR</div><div><div></div>AS-BUILT FILL CONTOUR</div></div> <div><div><div></div>GROUND LEVEL SETTLEMENT MONITORING POINT</div><div><div></div>SETTLEMENT BASE PLATES</div></div>				
	A	ORIGINAL ISSUE	RZ	SP	06/06/2022					

<div><div>012.52537.55062.5</div><div>SCALE1:1250 (A3)METRES</div></div>	drawn	RZ	<div><div>Tt</div><div>TETRA TECH</div><div>COFFEY</div></div>	client:WFH PROPERTIES LIMITED		
	approved	SP		project:MILLWATER PRECINCT 6 - SUBDIVISION STAGE 1		
	date	06/06/2022		title:SETTLEMENT MONITORING LOCATION PLAN		
	scale	AS SHOWN		project no:773-AKLGE206639		
	original size	A3		figure no:AT/003		rev:A

Arran Hill P6 - Settlement of Baseplates (mm)

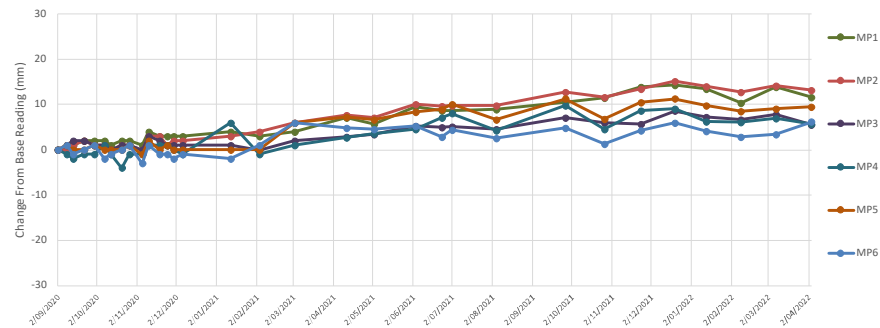


Arran Hill P6 - Ground Settlement

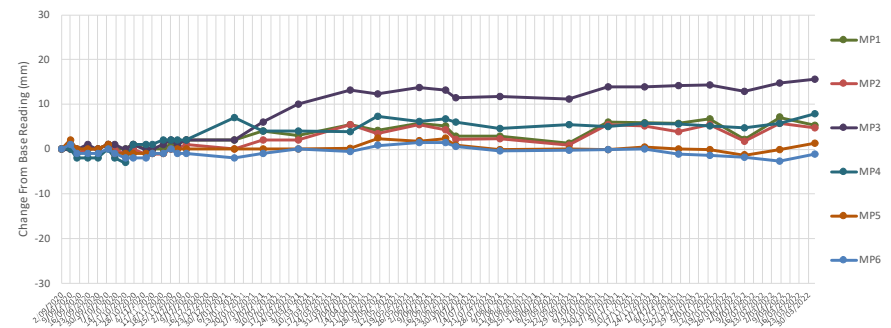




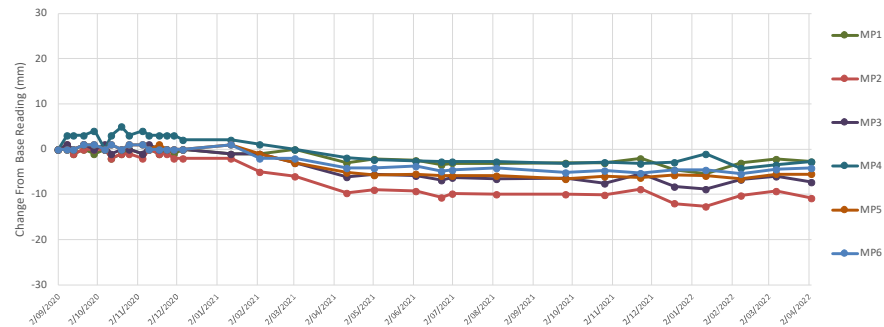
37610 - Arran Hill P6 - Wall 306 - Easting



37610 - Arran Hill P6 - Wall 306 - Northing

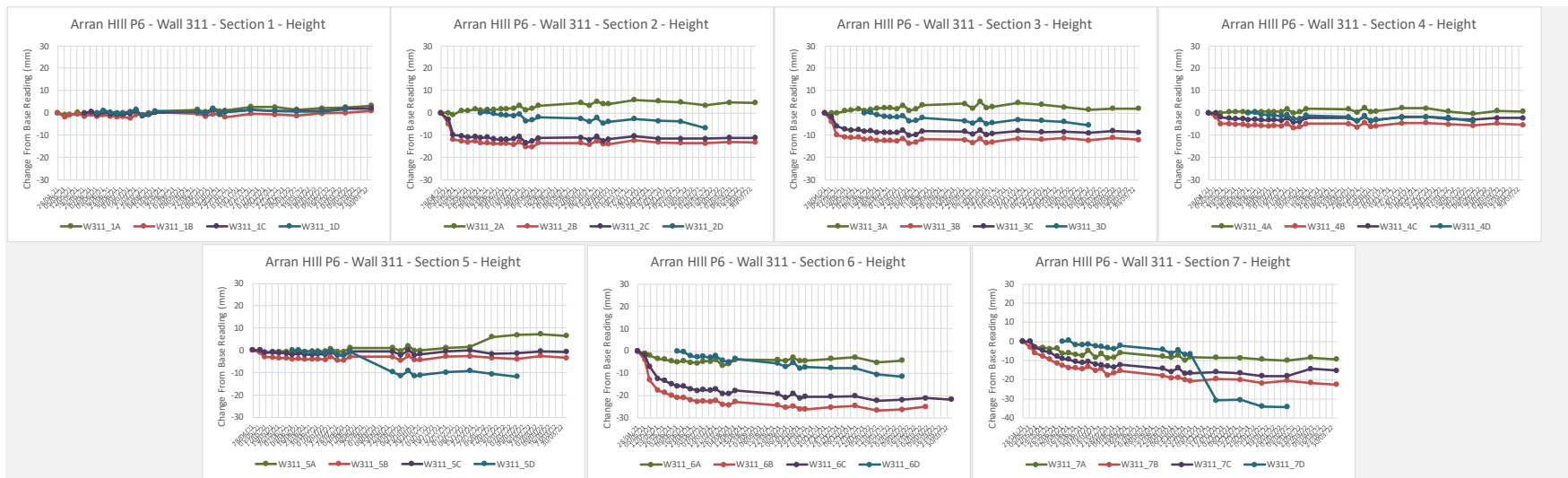


37610 - Arran Hill P6 - Wall 306 - Height





W311_7A
W311_7C
W311_7B
W311_7D
W311_6A
W311_6B
W311_6C
W311_6D
W311_5A
W311_5C
W311_5B
W311_5D
W311_4A
W311_4B
W311_4C
W311_4D
W311_3A
W311_3B
W311_3C
W311_3D
W311_2A
W311_2B
W311_2C
W311_2D
W311_1A
W311_1B
W311_1C
W311_1D



APPENDIX F: PRODUCER STATEMENT – CONSTRUCTION REVIEWS (PS4)

7 March 2022

Our ref: 773-AKLGE206639-BF

WFH Properties Limited

Attention: WFH Properties

Geotechnical Observation of In Ground Palisade Wall Founding Conditions at Millwater Precinct 6, Stage 1, Orewa West (Building Consent No. BCO10301029-6)

This letter is to confirm the scope of work relating to the attached Producer Statement (PS4 – Construction Review Geotechnical, Palisade Wall – PW804).

Tetra Tech Coffey carried out regular site visits at Millwater between April 2021 and February 2022 to observe the construction of in-ground palisade wall PW804 within Stage 1 – Precinct 6. The palisade wall extended over 159m and was constructed with differing embedment depths and steel section lengths. Typical pile details included a 1.5m centre-to-centre spacing, 500mm diameter bored pile holes and a minimum concrete strength of 32MPa. The completed pile depths ranged from 6.0m to 9.0m below finished ground level.

During the course of construction we recorded the depth, diameter, spacing, subsoil conditions and steel type for each pile. The material encountered throughout the drilling was as anticipated and comprised natural, inorganic, orange and grey, moderately plastic, clayey silts and silty clays overlying competent bedrock derived from the East Coast Bays Formation.

The wall alignment between Piles 1 to 7 (CH0 to CH9) and Piles 54 to 58 (CH79.50 to CH85.50) was altered during construction due to the close proximity of underground services. The pile depth, spacing and diameter remained unchanged. The alterations to the wall alignment are not expected to compromise the function of the wall.

On the basis of our construction observations and in-situ soils testing, we are satisfied that the ground conditions exposed within the in-ground palisade wall pile holes were generally consistent with those that formed the basis of the recommendations contained in our Geotechnical Design Report dated 9 March 2021 (Ref: AKLGE206639-AU Rev.1).

Accordingly, we attach our PS4 certificate for the above mentioned works.

For and on behalf of Coffey

Prepared By:



Tasman Lambert Andrews
Graduate Engineering Geologist

Reviewed and Authorised By:



Peter Marchant
Principal Geotechnical Engineer
CMEngNZ, CPEng

Attachments – PW804 As-Built Plan
Producer Statement - Construction Review (PS4)

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. FULTON HOGAN LAND DEVELOPMENT
AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO
RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION
WORK BASED ON THIS DRAWING FILE.



LEGEND:

○

STEEL REINFORCED CONCRETE PILE

—

LOT BOUNDARY

NOTES:

-PILES ARE 500mm IN DIAMETER
-PILES DATA SUPPLIED BY CONTRACTOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C	NN	XX/XX/2021

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	KR	
APPROVED	KR	

▲

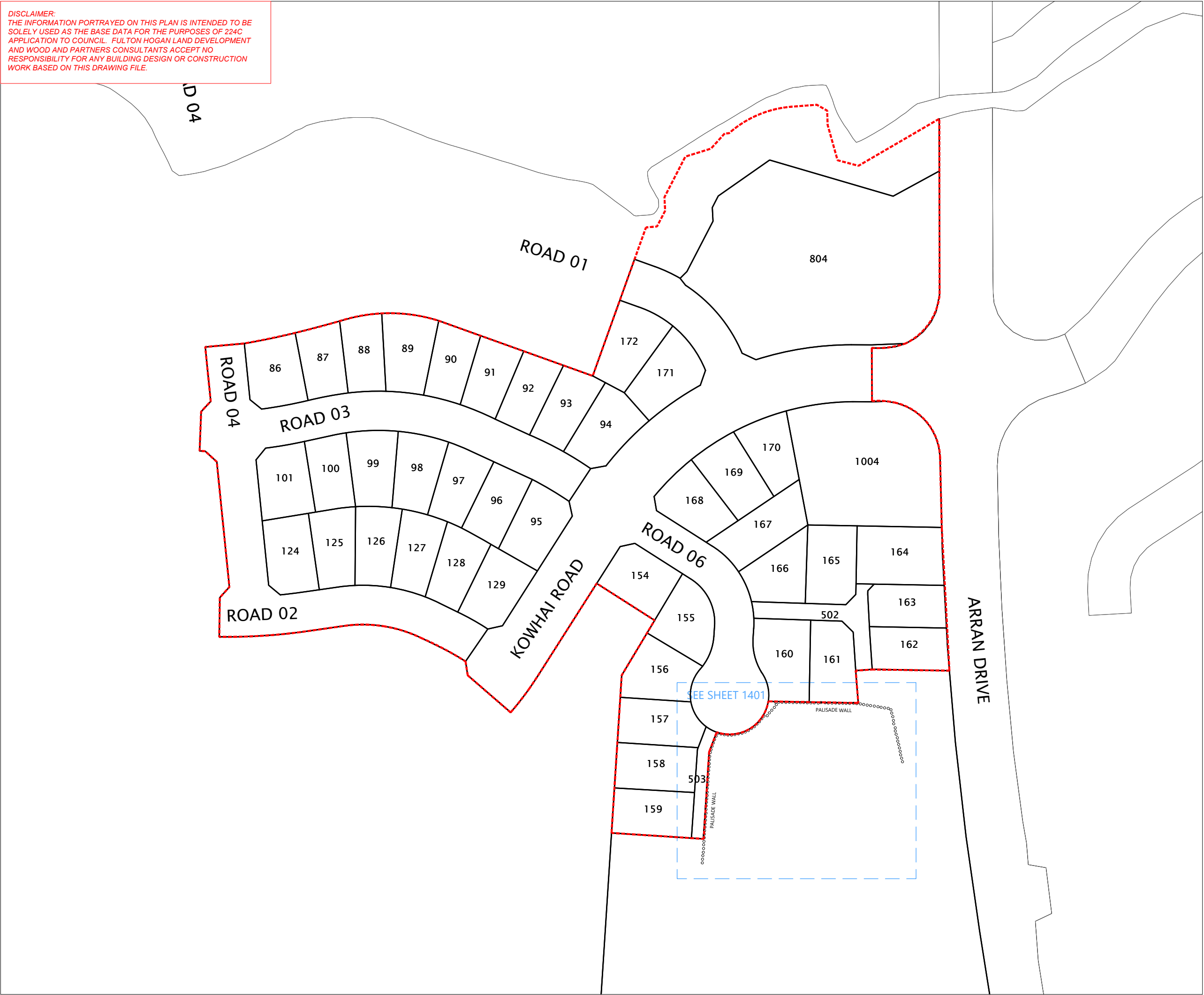
N

WFH
PROPERTIES

ARRAN HILL
PRECINCT 6 - STAGE 1

PALISADE WALL ASBUILT
LAYOUT PLAN
SHEET 1 OF 2

STATUS	AS-BUILT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-P6-01-1500-AB	



C:\12DSYNERGY\DATA\WP-PEN-APP-01\37611 - PRECINCT 6 STAGE 1_484\CAD\SURV\AB\37611_P6_01_1300_AB PALISADE WALLS.DWG, 2022-Mar-11 08:53, PRINT AS PDF PC3, edwinc

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. FULTON HOGAN LAND DEVELOPMENT
AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO
RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION
WORK BASED ON THIS DRAWING FILE.



PALISADE WALL

503

PALISADE WALL

LEGEND:

- STEEL REINFORCED CONCRETE PILE
- LOT BOUNDARY

NOTES:

- PILES ARE 500mm IN DIAMETER
- PILES DATA SUPPLIED BY CONTRACTOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR 224C		XX

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	KR	
APPROVED	KR	



ARRAN HILL
PRECINCT 6 - STAGE 1

PALISADE WALL ASBUILT
SHEET 2 OF 2

STATUS	AS-BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37611-P6-01-1501-AB	

C:\12DSYNERGY\DATA\WP-PEN-APP-01\37611 - PRECINCT 6 STAGE 1_484\CAD\SURV\AB\37611_P6_01_1300_AB PALISADE WALLS.DWG, 2022-Mar-11 08:53, PRINT AS PDF PC3, edwinc

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

ISSUED BY: TETRA TECH COFFEY (NZ) LIMITED

(Construction Review Firm)

TO: WFH PROPERTIES LIMITED

(Owner/Developer)

TO BE SUPPLIED TO: AUCKLAND COUNCIL

(Building Consent Authority)

IN RESPECT OF: GEOTECHNICAL OBSERVATION OF PALISADE WALL FOUNDING CONDITIONS

(Description of Building Work)

AT: MILLWATER - OREWA WEST - PRECINCT 6 - STAGE 1

(Address)

Town/City: AUCKLAND

(Address)

LOT 1 & 2

DP 197353

SO 537746

We TETRA TECH COFFEY (NZ) LIMITED

(Construction Review Firm)

have been engaged by WFH PROPERTIES LIMITED

To provide ☐ CM1 ☐ CM2 ☐ CM3 ☒ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with

owner/developer WFH PROPERTIES LIMITED

or ☐ other GEOTECHNICAL OBSERVATION OF PW804 FOUNDING CONDITIONS

(Extent of Engagement)

in respect of clause(s) B1 STRUCTURE of the Building Code for the building work described in

documents relating to Building Consent No. BCO10301029-6 and those relating to

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

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

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

Building Consent and Building Consent Amendments identified above, with respect to Clause(s) B1 STRUCTURE of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, P. G. MARCHANT am: ☒ CPEng.# 69408

(Name of Construction Review Professional)

I am a member of: ☒ Engineering New Zealand and hold the following qualifications M.E.(CIVIL)

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 P. G. MARCHANT

(Name of Construction Review Professional)

(Signature) 

ON BEHALF OF TETRA TECH COFFEY (NZ) LIMITED

(Construction Review Firm)

Date 07/03/2022

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

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

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

GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Institution of Professional engineers New Zealand (now Engineering New Zealand), ACE New Zealand in consultation with the Building Officials Institute of New Zealand. The original suit of producer statements has been revised at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

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

PS1 Design Intended for use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

PS2 Design Review Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;

PS3 Construction Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011²

PS4 Construction Review Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACE New Zealand and Engineering New Zealand to interpret the Producer Statement.

Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as Engineering New Zealand (formerly IPENZ), provides additional assurance of the designer's standing within the profession. If the design firm is a member of the ACE New Zealand, this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

*Professional Indemnity Insurance

As part of membership requirements, ACE New Zealand requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to \$500,000.

Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-CM5 for Engineers³). The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

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

Attached Particulars

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

Refer Also:

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

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



association of
consulting and
engineering



29 April 2022

Our ref: 773-AKLGE206639-BG

WFH Properties Limited

Attention: WFH Properties

Geotechnical Observation of Retaining Wall 306 construction at Millwater Precinct 6, Stage 1, Orewa West (Building Consent No. BCO10301029-1)

This letter is to confirm the scope of work relating to the attached Producer Statement (PS4 – Construction Review, Reinforced Allan Block Wall – Wall 306, Geotechnical).

Tetra Tech Coffey carried out regular site visits at Millwater between January 2020 and April 2022 to observe the construction of segmental block retaining wall 306 within Stage 1 – Precinct 6. The segmental block wall extended over 208 lineal meters with a maximum retained height of 3.0m, founded on a minimum 2.0m deep and 3.5m wide engineered fill undercut key.

During the course of construction we observed the ground conditions exposed in wall excavations, aggregate and clay fill placement and compaction, geogrid placement, geotextile placement, wall drainage construction, block placement and barrier installation in accordance with Tetra Tech Coffey's Geotechnical Design Report dated 6 April 2020 (Ref: AKLGE206639-AM 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 retaining wall 306 were in accordance with our Geotechnical Design Report dated 6 April 2020 (Ref: AKLGE206639-AM Rev.1), the ground conditions were also generally consistent with those that formed the basis of the recommendation presented in the report.

Accordingly, we attach our PS4 certificate for the above mentioned works.

For and on behalf of Tetra Tech Coffey

Prepared By:

**Tasman Lambert Andrews**
Graduate Engineering Geologist

Reviewed and Authorised By:

**Peter Marchant**
Principal Geotechnical Engineer
CMEng.NZ, CPEng, IntPE (NZ)

Attachments – Producer Statement - Construction Review (PS4)

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

ISSUED BY: TETRA TECH COFFEY (NZ) LIMITED
(Construction Review Firm)

TO: WFH PROPERTIES LIMITED
(Owner/Developer)

TO BE SUPPLIED TO: AUCKLAND COUNCIL
(Building Consent Authority)

IN RESPECT OF: GEOTECHNICAL OBSERVATION OF SEGMENTAL BLOCK RETAINING WALL 306 CONSTRUCTION
(Description of Building Work)

AT: MILLWATER - OREWA WEST - PRECINCT 6 - STAGE 1
(Address)

Town/City: AUCKLAND LOT 2 DP 463561 SO
(Address)

We TETRA TECH COFFEY (NZ) LIMITED have been engaged by WFH PROPERTIES LIMITED
(Construction Review Firm)

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

or ☐ other GEOTECHNICAL OBSERVATION OF RETAINING WALL 306 CONSTRUCTION services
(Extent of Engagement)

in respect of clause(s) B1 STRUCTURE of the Building Code for the building work described in

documents relating to Building Consent No. BCO10301029-1 and those relating to

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

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

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

Building Consent and Building Consent Amendments identified above, with respect to Clause(s) B1 STRUCTURE of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, P. G. MARCHANT am: ☒ CPEng.# 69408
(Name of Construction Review Professional)

I am a member of: ☒ Engineering New Zealand and hold the following qualifications M.E.(CIVIL)

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 P. G. MARCHANT (Signature)

ON BEHALF OF TETRA TECH COFFEY (NZ) LIMITED Date 29/04/2022
(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



association of
consulting and
engineering



16 June 2022

Our ref: 773-AKLGE206639-BH

WFH Properties Limited

Attention: WFH Properties

Geotechnical Observation of Retaining Walls 311 and 312 construction at Millwater Precinct 6, Stage 1 and 2, Orewa West (Building Consent No. BCO10301029-3)

This letter is to confirm the scope of work relating to the attached Producer Statement (PS4 – Construction Review, Mass Block Wall – Walls 311 and 312, Geotechnical).

Tetra Tech Coffey carried out regular site visits to Millwater between November 2020 and June 2022 to observe the construction of Mass Block retaining walls 311 and 312 within Precinct 6 of the Millwater Subdivisional Development.

Mass Block Wall 311 extended over 188 lineal meters with a maximum retained height of 3.0m, founded on a 2.0m deep, 6.0m wide engineered fill undercut key from chainage 35-170m to maintain adequate global stability factors of safety. Between chainage 0-35m and 170-188, the wall was founded within engineered fill placed in the subdivision fill areas.

Mass Block Wall 312 extended over 171 lineal meters with a maximum retained height of 3.0m, founded on a 2.0m deep and 6.0m wide engineered fill undercut key from chainage 0-40m and 130-155m. Between chainage 40-130 the wall was founded within engineered fill.

During the course of construction, we carried out near daily site visits to observe and test the undrained shear strength of the wall foundation soils, monitor aggregate and clay fill placement and compaction, geogrid and geotextile placement, wall drainage construction, facing block placement and pedestrian barrier installation in accordance with Tetra Tech Coffey's Geotechnical Design Report dated 6 April 2020 (Ref: AKLGE206639-AL Rev.1).

On the basis of our construction observations and in-situ soil and aggregate testing, we are satisfied that the site works undertaken to construct Mass Block Retaining Walls 311 and 312 were in accordance with our Geotechnical Design Report dated 6 April 2020 (Ref: AKLGE206639-AL Rev.1), the ground conditions were also generally consistent with those that formed the basis of the recommendation presented in the report.

Accordingly, we attach our PS4 certificate for the above-mentioned works.

For and on behalf of Tetra Tech Coffey

Prepared By:



Tasman Lambert Andrews
Graduate Engineering Geologist

Reviewed and Authorised By:



Peter Marchant
Principal Geotechnical Engineer
CMEng.NZ, CPEng, IntPE (NZ)

Attachments – Producer Statement - Construction Review (PS4)

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

ISSUED BY: TETRA TECH COFFEY (NZ) LIMITED

(Construction Review Firm)

TO: WFH PROPERTIES LIMITED

(Owner/Developer)

TO BE SUPPLIED TO: AUCKLAND COUNCIL

(Building Consent Authority)

IN RESPECT OF: GEOTECHNICAL OBS OF MASS BLOCK RETAINING WALLS 311 & 312 DURING CONSTRUCTION

(Description of Building Work)

AT: MILLWATER - OREWA WEST - PRECINCT 6 - STAGES 1 & 2

(Address)

Town/City: AUCKLAND

(Address)

LOT 2

DP 463561

SO

We TETRA TECH COFFEY (NZ) LIMITED

(Construction Review Firm)

have been engaged by WFH PROPERTIES LIMITED

To provide ☐ CM1 ☐ CM2 ☐ CM3 ☒ CM4 ☐ CM5 (Engineering Categories) or ☐ observation as per agreement with

owner/developer WFH PROPERTIES LIMITED

or ☐ other services

(Extent of Engagement)

in respect of clause(s) B1 STRUCTURE of the Building Code for the building work described in

documents relating to Building Consent No. BCO10301029-3 and those relating to

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

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

On the basis of ☒ this review ☐ these review(s) and information supplied by the contractor during the course of the works and **on behalf of the firm** undertaking this Construction Review, I believe on reasonable grounds that

☒ All or ☐ Part only of the building works have been completed in accordance with the relevant requirements of the

Building Consent and Building Consent Amendments identified above, with respect to Clause(s) B1 STRUCTURE of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, P. G. MARCHANT

(Name of Construction Review Professional)

am: ☒ CPEng.# 69408

I am a member of: ☒ Engineering New Zealand and hold the following qualifications M.E.(CIVIL)

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 P. G. MARCHANT

(Name of Construction Review Professional)

(Signature)

ON BEHALF OF TETRA TECH COFFEY (NZ) LIMITED

(Construction Review Firm)

Date 16/06/2022

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

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

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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