Geotechnical Completion Report

99 ESCOTTS ROAD STAGE 2, TUAKAU

For

HUGHES DEVELOPMENTS LIMITED

J00779 | Lander Geotechnical Consultants Limited | 6 March 2020

6 March 2020 Ref No: J00779

Hughes Developments Limited
C/- CivilPlan Consultants Limited
PO Box 97796
Auckland 2241

Attention: Mr R Pitkethley

Dear Ryan

RE: Geotechnical Completion Report for Residential Subdivision at Stage 2 – 99 Escotts Road, Tuakau

This report presents all supporting geotechnical data and our Suitability Statement in relation to land development works undertaken at the above location.

It has been prepared in accordance with instructions received from CivilPlan Consultants 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 you require any further clarification on any aspects of this report, please do not hesitate to contact the undersigned.

For and on behalf of Lander Geotechnical Consultants Limited

S.G. Lander

Principal Geotechnical Engineer
CMEngNZ, CPEng., IntPE(NZ)

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1 INTRODUCTION AND DESCRIPTION OF SUBDIVISION

This Geotechnical Completion Report has been prepared for Hughes Developments Limited as part of the documentation required to be submitted to the Waikato District Council following residential subdivisional development.

It contains our Suitability Statement, relevant test data and the CivilPlan Consultants Limited as-built plan set relating to Stage 2 of the 99 Escotts Road Residential Subdivision as follows:

Table 1: CivilPlan Consultants Limited As-Built Drawings

Title	Reference No.	Date
Finished Contours Asbuilt Plan	2011-02-AB200	March 2020
Underfill Drains Asbuilt Plan	2011-02-AB205	March 2020
Isopach Asbuilt Plan	2011-02-AB220	March 2020
Slope Analysis Asbuilt Plan (2 sheets)	2011-02-AB290 to AB291	March 2020
Stormwater Asbuilt Plan (5 sheets)	2011-02-AB400 to AB404	March 2020
Wastewater Asbuilt Plan (4 sheets)	2011-02-AB410 to AB413	March 2020
Water Supply Asbuilt Plan (5 sheets)	2011-02-AB500 to AB504	March 2020
Power Supply Asbuilt Plan (2 sheets)	2011-02-AB600 to AB601	March 2020
Chorus Asbuilt Plan (2 sheets)	2011-02-AB610 to AB611	March 2020

This report covers the construction period June 2019 to February 2020. It is intended to be used for certification purposes as follows:

- 39 residential lots numbered 43 to 54 and 67 to 93;
- 2 new roads named Tauroa Drive (part) and Kairoa Court;
- 1 jointly owned access lots numbered as lot 500;
- 3 local purpose (esplanade) reserves numbered as lots 400 to 402;
- 3 local purpose (accessway) reserves numbered as lots 200 to 202;
- 2 local purpose (drainage) reserves numbered as lots 301 and 401. Lot 401 contains two stormwater ponds.

This stage of the subdivision is located at 99 Escotts Road and as can be seen on the fill as-built plan, most of the lots have been partly or totally affected by filling, to a maximum depth of approximately 1.5m.

2 RELATED REPORTS

In the preparation of this GCR, Lander Geotechnical have reviewed the following reports for 99 Escotts Road, Tuakau, which are summarised in Table 2 below:

Table 2: Lander Geotechnical Consultants Related Geotechnical Reports

Subdivision Title	Reference No.	Issue Date
Geotechnical Investigation Report	J00779-Rev1	28 March 2018
Geotechnical Retaining Wall Design Report	J00779	9 May 2018
Geotechnical Completion Report (Stage 1)	J00779	27 June 2019

3 EARTHWORKS OPERATIONS

3.1 Plant

The main items of plant used by the Contractor, Twomey Construction Limited were:

- Excavators (various sizes);
- 2x Twin Motorscrapers;
- 1x 4WD Padfoot Compactor;
- 1x Articulated Dump Truck;
- 1x Smooth Drum Roller;
- 1 Bulldozer;
- 1x Tractor with Disc Ploughs.

3.2 Construction Programme

Bulk earthworks operations were mostly encompassed and certified by the Stage 1 GCR and this previous report should be referred to for the construction programme prior to June 2019.

Following this period of bulk earthworks, drainage and services were installed, roads formed and sealed, and topsoil respread across all lots. An embankment was also formed for a permanent silt pond in lot 402.

In February 2020, we observed the flushing of the counterfort drains, and permanent outlets were formed for the retaining walls and underfill drains in lots 82, 83 and 86 to 88.

4 QUALITY ASSURANCE AND CONTROLS

4.1 Site Observations

During the earthworks engineering inspections were undertaken on a regular basis to assess compliance with NZS 4431 and our project specific recommendations and specifications. Project specific inspections were required on this stage of the development for:

- gully areas prior to the placement of fill materials to ascertain that all mullock and soft inorganic subsoils had been removed to our satisfaction;
- installation of underfill drains;
- all aspects of retaining wall construction for walls 1 to 3 (e.g. pile hole excavations, drainage placement etc.).

4.2 Quality Control Criteria

Due to the varying soil types being used as filling, the compaction control criteria of minimum allowable shear strength and maximum allowable air voids were mainly used for quality assurance purposes.

Specification details were as follows:

Minimum Shear Strength and Maximum Air Voids Method

(a)	Air Voids Percentage	
	(As defined in NZS 4402)	
	General Fill	
	Average value less than	10%
	Maximum single value	12%
(b)	Undrained Shear Strength	
	(Measured by Pilcon shear vane - calibrated using NZGS 2001 method)	
	General fill	
	Average value not less than	140 kPa
	Minimum single value	120 kPa
Note:	The average value shall be determined over any ten consecutive tests	

In addition to the above, a higher specification was required for the fill embankments for the stormwater ponds within Lot 401. This specification was:

- Maximum air voids of 6%
- Minimum shear strength of 140kPa

Where hardfill was used on site as fill, a minimum clegg impact value of 15 was also specified.

4.3 Quality Assurance Testing

(i) In-situ density monitoring was carried out as for the general fill areas and a series of hand auger boreholes were also drilled at selected locations as an added check on quality control.

(ii) Regular insitu density, strength and water content tests were carried out on all areas of the filling at or in excess of the frequency recommended by NZS 4431.

(iii) Control tests carried out on the filling showed that on some occasions the required compaction standards were not being achieved.

(iv) Results of the test failures were relayed to the site foreman and/or his staff, and to the best of our knowledge the affected areas of fill were re-worked as necessary. In each case, further testing was carried out until compliance with the standards was achieved.

5 PROJECT EVALUATION

5.1 Bearing Capacity and Settlement of Building Foundations

Following the completion of earthworks operations, we returned to the site in April 2019 and drilled a series of hand auger boreholes at appropriate natural ground locations in order to determine representative finished ground conditions and hence evaluate likely foundation options for future building development.

At current subgrade levels all filled and undisturbed natural ground has a geotechnical ultimate bearing capacity of 300 kPa within the influence of conventional shallow residential building foundation loads. Where a geotechnical ultimate bearing capacity greater than 300 kPa is required, further specific site investigation and design of foundations should be carried out prior to building consent application.

Where any building platforms have been rutted by heavy machinery, or softened due to ponded rainwater, they should be trimmed back to competent ground and reinstated with compacted hardfill or recompacted clay fill to meet the subdivision's compaction criteria outlined in Section 4.2 to design subgrade level prior to the commencement of building construction.

It should be noted that NZS 3604 only allows a maximum backfill depth of 600mm over the building platform of a dwelling unless an Engineering design solution is proposed, on account of the risk of induced consolidation of the subsoils caused by the weight of the backfill.

5.2 Expansive Soils

Three sets of Expansive soil tests were carried out on samples selected from around the site and within the zone of likely influence of shallow building foundations.

These limit tests were carried out in accordance with NZS 4402, "Methods of Testing Soils for Civil Engineering Purposes" test section 2 and were primarily intended to assess the Expansive Classes of the site materials as defined in AS 2870, "Residential Slabs and Footings – Construction". All test results are IANZ (International Accreditation New Zealand) endorsed and full details are appended.

The AS 2870 Site Class for this subdivision is H1 (high) and a characteristic surface movement (y_s) of up to 60mm can be expected.

We recommend the final building platforms are trimmed and protected immediately using hardfill to minimise desiccation and the potential for post building construction heave beneath the floor slabs / driveways, etc.

5.3 Lot Gradients

Stability conditions at this site have been enhanced by the installation of sub-soil drainage and the construction of retaining walls as outlined in the Stage 1 GCR, and will not be reiterated herein.

The appended as built plans show retaining wall Specific Design Zone areas and lots having gradients steeper than 1(v) in 4(h) or being immediately adjacent to land having such gradients. The extent of these areas has been determined by site gradients and our final walkover inspection, but there may be localised areas having such gradients that have not been shown on the plans.

We are satisfied that these lots are not subject to the hazards described in section 71(3) of the Building Act.

Details of resulting building and earthworks restrictions within the vicinity of these areas steeper than 1(v) in 4(h) within residential lots are presented in the Suitability Statement.

5.4 Fill Induced Settlement

As a result of our pre-fill inspections, the installation of subsoil drainage, quality control testing and the elapsed time since the placement of the majority of the filling, we are of the opinion that induced differential settlements beneath or within the certified filling due to its imposed weight should be insignificant with respect to conventional NZS 3604 residential building development.

5.5 Service Trenches

As is normal on all subdivisions, building developments involving foundations within a 45 degree zone of influence from public service pipe inverts will require Engineering input.

5.6 Land Drainage

5.6.1 Underfill Drains

The appended cut-fill contours as-built plans show the positions of several perforated underfill drain that was placed in a mucked out gully invert prior to filling to intercept groundwater seepages, as required by NZS 4431. The drain comprises a 160mm-diameter, perforated, heavy duty drain coil embedded in drainage metal and fully wrapped in non-woven geotextile cloth.

The drain was intended to intercept localised groundwater seepages and springs during earthworks and to help provide general control over groundwater levels and were installed as a precautionary measure, not as remedial works for any existing instability, therefore it needs no specific maintenance.

5.6.2 Counterfort Drains

During earthworks construction, a series of counterfort drains were constructed beyond the south-east boundary of lots 75 and 78 (below retaining wall 1) in the positions shown on the appended cut/fill plan. Typical trench excavation depths for the counterfort drains were approximately 3m.

These drains were installed to help control groundwater levels in the area for slope stability reasons and are linked into the stormwater disposal system, as shown on the appended asbuilt plans.

These drains have been robustly constructed and require no specific maintenance.

5.7 Stormwater Detention Ponds

Two new wet stormwater detention ponds have been constructed in the vicinity of lot 401. Where fill has been placed to form the pond walls, this was required to meet a higher fill compaction criteria as outlined in Section 4.2.

The base of these ponds encountered gravelly soils and also some boulders. Given the ponds are generally situated below the invert of the neighbouring steam, an impermeable liner for these ponds was not required (i.e. as groundwater was observed to infiltrate into the ponds).

5.8 Retaining Walls

Some areas of the site have been stabilised by the construction of boundary retaining walls in the locations shown on the finished contours asbuilt plans. Details regarding these retaining walls are contained in the Stage 1 GCR.

An associated Specific Design Zone is shown on the as-built plan set and details of resulting building and earthworks restrictions within the associated Specific Design Zones of these walls are presented in the Suitability Statement.

5.9 Topsoil

Topsoil depths in likely building platform areas were checked by the drilling of a borehole in the approximate centre of each of the residential lots. Our findings, which are indicative only and subject to variation at other locations, show that likely topsoil depths are generally between 50mm and 250mm, however, within lot 52 a topsoil depth of 400mm was noted.

Site specific findings are presented in the Suitability Statement Summary.

5.10 Contractor's 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 to (i) and (ii) during the execution of the works,

(iv) The conditions of Resource, Earthworks and Building Consents where applicable,

(v) The relevant Lander Geotechnical Consultants Limited reports, recommendations and site instructions

and that all as-built information and other details provided to the Client and/or Lander Geotechnical Consultants Limited are accurate and correct in all respects.

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

I, S.G. Lander, of Lander Geotechnical Consultants 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 on Stage 2 of the 99 Escotts Road, Tuakau residential subdivision.

2. The extent of preliminary investigations carried out to date are described in geotechnical reports summarised in Table 2 and the conclusions and recommendations of those documents have been re-evaluated in the preparation of this report. The results of all tests carried out are appended.

3. In my professional opinion, not to be construed as a guarantee, I consider that:

   (a) The earth fills shown on the appended fill as-built plan have been placed in compliance with NZS 4431 and related documents.

   (b) The completed earthworks give due regard to land slope and foundation stability considerations within the residential lots, but as shown on the appended slope analysis asbuilt plans, lots 70 to 72, 79, 80 and 82 to 88 contain areas that are steeper than 1(v) in 4(h) (as shown in red on the attached plans) which can be prone to soil creep. No building construction or earthworks are permitted within these areas without further geotechnical investigation and/or foundation design.

   (c) No building construction, including the construction of additional retaining walls and no earthworks should take place should take place within a horizontal distance equal to the wall face height (measured from the top of the wall) behind the cantilever pole retaining wall 1 on the south-east boundary of lots 74, 75 and 78 (as hatched by the Specific Design Zone on the finished contours plans) unless endorsed by specific foundation designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that no additional loads are applied to the walls. Specific site investigation should not be required.

   (d) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for foundation design on all residential lots. Where a geotechnical bearing capacity greater than 300 kPa is required, (i.e. outside the limits of NZS 3604, such as when piling is undertaken), further specific site investigation and design of foundations should be carried out prior to building consent application.

   (e) The backfilling and compaction of the live stormwater and sanitary sewer 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 specific site investigations, foundation designs and by construction inspections undertaken 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.

   (f) The assessed AS 2870 expansive site Class for all lots is H1 (high) and the characteristic ground surface movement (y_s) is up to 60mm.

   (g) Subject to the geotechnical limitations, restrictions, recommendations and expansive soil assessments associated with 3(b), 3(c), 3(d), 3(e), and 3(f) above:

(i) The filled and undisturbed original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 and related documents.

(ii) On all lots, foundation design may be carried out in accordance with AS 2870 (Class H1) or alternatively, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 900mm.

For buildings having brittle exterior cladding appropriate control joints should also be specifically designed depending on architectural specifications and structural form.

4. Road subgrades (i.e. Tauroa Drive (part) and Kairoa Court) within Stage 2 have been formed having due regard for slope stability and settlement, although available subgrade strengths are dependent on site conditions and variable results should be expected.

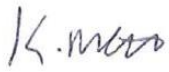
5. Reserve areas and the stormwater ponds within the drainage reserve have been formed to standards appropriate for their intended use.

The professional opinion contained within this report is furnished to the Waikato District Council and Hughes Developments 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.

The appended table summarises the status of each residential lot covered by this Suitability Statement.

For and on behalf of Lander Geotechnical Consultants Limited

Prepared by:



K. Meffan
Engineering Geologist
MEngNZ

Reviewed by:

C.J. Edwards
Senior Engineering Geologist
CMEngNZ (PEngGeol)

Authorised By:

Shane Lander

Principal Geotechnical Engineer
CMEngNZ, CPEng., IntPE(NZ)

Table 3: Suitability Statement Summary

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
43	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	200	300	H1
44	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
45	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
46	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
47	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
48	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
49	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
50	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
51	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
52	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	400	300	H1
53	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
54	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
67	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
68	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
69	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
70	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
71	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm	50	300	H1
72	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm	100	300	H1
73	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
74	No construction or earthworks within specific design zone (as shown on the finished contours asbuilt plan) unless endorsed by specific foundation designs and construction inspections due to presence of cantilever pole retaining wall. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
75	No construction or earthworks within specific design zone (as shown on the finished contours asbuilt plan) unless endorsed by specific foundation designs and construction inspections due to presence of cantilever pole retaining wall. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
76	No construction or earthworks within specific design zone (as shown on the finished contours asbuilt plan) unless endorsed by specific foundation designs and construction inspections due to presence of cantilever pole retaining wall. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
77	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	50	300	H1
78	No construction or earthworks within specific design zone (as shown on the finished contours asbuilt plan) unless endorsed by specific foundation designs and construction inspections due to presence of cantilever pole retaining wall. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
79	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	200	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
80	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
81	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	50	300	H1
82	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
83	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
84	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
85	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
86	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	200	300	H1
87	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	250	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
88	No building construction or earthworks permitted within areas steeper than 1(v) in 4 (h) as shown on the slope analysis asbuilt plan, unless endorsed by specific geotechnical investigations and/or foundation designs and construction inspections. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	200	300	H1
89	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
90	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
91	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	100	300	H1
92	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	150	300	H1
93	AS 2870 foundation design or NZS 3604 with minimum footing depth 900mm.	300	300	H1

Appendix 1

CivilPlan Consultants Limited As-Built Plans

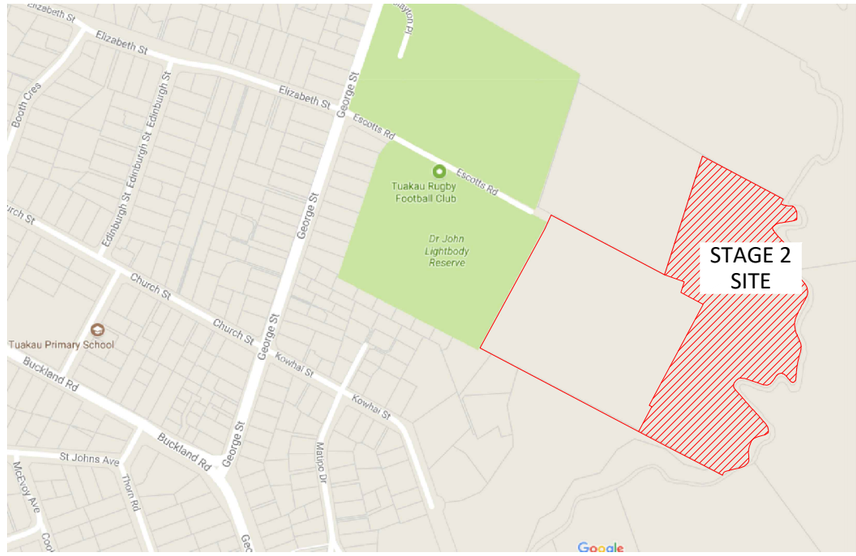
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU
PROJECT NUMBER: 2011-02

CIVILPLAN CONSULTANTS

STAGE 2 - ASBUILT ISSUE
MARCH 2020

Sheet List Table

Sheet Number	Sheet Title
2011-02-AB000	COVER SHEET
200-Earthworks	
2011-02-AB205	UNDERFILL DRAINS ASBUILT PLAN
2011-02-AB200	FINISHED CONTOURS ASBUILT PLAN
2011-02-AB220	ISOPACH ASBUILT PLAN-SHEET 1
2011-02-AB225	ISOPACH ASBUILT PLAN-SHEET 2
2011-02-AB290	SLOPE ANALYSIS ASBUILT PLAN-SHEET 1
2011-02-AB291	SLOPE ANALYSIS ASBUILT PLAN-SHEET 2
300-Roading	
2011-02-AB300	ROADING ASBUILT-PAVEMENT PLAN-SHEET 1
2011-02-AB301	ROADING ASBUILT-PAVEMENT PLAN-SHEET 2
2011-02-AB302	ROADING ASBUILT-FEATURES PLAN-SHEET 1
2011-02-AB303	ROADING ASBUILT-FEATURES PLAN-SHEET 2
400-Drainage	
2011-02-AB400	STORMWATER ASBUILT-OVERALL LAYOUT
2011-02-AB401	STORMWATER ASBUILT-DETAIL SHEET 1
2011-02-AB402	STORMWATER ASBUILT-DETAIL SHEET 2
2011-02-AB403	STORMWATER ASBUILT-DETAIL SHEET 3
2011-02-AB404	STORMWATER ASBUILT-COORDINATE SCHEDULES
2011-02-AB410	WASTEWATER ASBUILT-OVERALL LAYOUT
2011-02-AB411	WASTEWATER ASBUILT-DETAIL SHEET 1
2011-02-AB412	WASTEWATER ASBUILT-DETAIL SHEET 2
2011-02-AB413	WASTEWATER ASBUILT-DETAIL SHEET 3
500-Water Supply	
2011-02-AB500	WATER SUPPLY ASBUILT-OVERALL LAYOUT-SHEET 1
2011-02-AB501	WATER SUPPLY ASBUILT-DETAIL SHEET 1
2011-02-AB502	WATER SUPPLY ASBUILT-DETAIL SHEET 2
2011-02-AB503	WATER SUPPLY ASBUILT-DETAIL SHEET 3
2011-02-AB504	WATER SUPPLY ASBUILT-COORDINATE SCHEDULES
600-Services	
2011-02-AB600	POWER SUPPLY ASBUILT PLAN-STAGE 2-SHEET 1
2011-02-AB601	POWER SUPPLY ASBUILT PLAN-STAGE 2-SHEET 2
2011-02-AB610	CHORUS ASBUILT PLAN-SHEET 1
2011-02-AB611	CHORUS ASBUILT PLAN-SHEET 2



LEGEND

- EXISTING CONTOUR (10.0)
- ASBUILT MINOR CONTOUR
- ASBUILT MAJOR CONTOUR (10.0)
- ASBUILT SUB-SOIL DRAIN
- ASBUILT COUNTERFORT DRAIN
- ASBUILT RETAINING WALL
- STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2018 AND 2019.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE CUT/FILL DEPTH CONTOURS SHOWN ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
CHECKED: RJP 06.03.20
APPROVED: RJP 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
FINISHED CONTOURS ASBUILT PLAN
STAGE 1 AND STAGE 2 - SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:750 / 1:1500
SCALE BAR 1:1500@A3 0 15 30 45 60 75m
DRAWING NUMBER: 2011-02-AB200 REV: A

LEGEND

- EXISTING CONTOUR
- ASBUILT MINOR CONTOUR
- ASBUILT MAJOR CONTOUR
- 10.0 EARTHWORK EXTENT
- ASBUILT SUB-SOIL DRAIN
- ASBUILT COUNTERFORT DRAIN
- ASBUILT RETAINING WALL
- STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2018, 2019, AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE CUT/FILL DEPTH CONTOURS SHOWN ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

SCHEDULE OF COORDINATES

POINT No.	mE	mN	LEVEL
UF 3.01	416532.79	757295.37	29.42
UF 3.02	416531.51	757293.98	29.45
UF 3.03	416531.76	757292.71	29.35
UF 3.04	416533.50	757291.63	29.19
UF 3.05	416537.29	757290.90	29.05
UF 3.06	416541.10	757288.21	28.96
UF 3.07	416546.75	757285.79	28.75
UF 3.08	416550.14	757286.12	28.62
UF 3.09	416552.67	757284.88	28.73
UF 3.10	416557.56	757283.01	28.62
UF 4.01	416533.06	757267.83	29.28
UF 4.02	416532.07	757263.07	29.18
UF 4.03	416532.27	757259.04	29.12
UF 4.04	416535.58	757255.86	28.83
UF 4.05	416539.61	757252.99	28.46
UF 4.06	416545.04	757249.37	28.24
UF 4.07	416553.21	757241.77	27.70
UF 5.01	416534.85	757171.21	29.87
UF 5.02	416535.76	757170.61	29.70
UF 5.03	416540.26	757170.77	28.75
UF 5.04	416543.32	757171.89	28.70
UF 5.05	416545.77	757175.09	28.70
UF 5.06	416547.28	757178.48	28.70
UF 5.07	416547.77	757182.78	28.66
UF 5.08	416547.15	757189.61	28.61
UF 5.09	416547.68	757191.29	28.66
UF 5.10	416553.69	757194.65	28.26
UF 5.11	416561.45	757197.66	27.90
UF 5.12	416569.27	757199.34	27.76
UF 5.13	416537.40	757186.18	29.78
UF 5.14	416538.68	757191.11	29.57
UF 5.15	416543.81	757190.54	28.95
UF 5.16	416538.51	757197.07	30.01
CF 1.1	416483.95	757047.28	26.80
CF 1.2	416496.83	757046.22	26.53
CF 2.1	416487.84	757058.33	26.70
CF 2.2	416499.01	757049.70	26.29
CF 3.1	416493.96	757064.77	26.50
CF 3.2	416500.47	757052.40	26.41
CF 4.1	416505.92	757067.04	26.26
CF 4.2	416506.50	757056.40	26.15

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
CHECKED: RJP 06.03.20
APPROVED: RJP 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
UNDERFILL DRAINS ASBUILT PLAN
STAGE 2 - DETAIL SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:750 / 1:1500
SCALE BAR 1:1500@A3 0 15 30 45 60 75m
DRAWING NUMBER: 2011-02-AB205 REV: A

LEGEND

- 10.0 — ASBUILT CUT ISOPACH
- 10.0 — ASBUILT FILL ISOPACH
- EARTHWORKS ZERO CUT/FILL LINE
- ASBUILT UNDERFILL DRAIN
- ASBUILT COUNTERFORT DRAIN
- STAGE BOUNDARY

CUT — ASBUILT CUT

FILL — ASBUILT FILL

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2018, 2019 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE CUT/FILL DEPTH CONTOURS SHOWN ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
CHECKED: RJP 06.03.20
APPROVED: RJP 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
ISOPACH ASBUILT PLAN - STAGE 2
EXISTING SURFACE TO ASBUILT SURFACE
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:750 / 1:1500
SCALE BAR 1:1500@A3 0 15 30 45 60 75m
DRAWING NUMBER: 2011-02-AB220 REV: A

Printed by: RYAN@06.03.20 // Filepath: S:\JOBS\2011 - HUGHES DEVELOPMENTS TUAKAU\CAD\ASBUILTS\STAGE 2\2011-02-AB220.DWG

LEGEND

- 10.0 — ASBUILT CUT ISOPACH
- 10.0 — ASBUILT FILL ISOPACH
- EARTHWORKS ZERO CUT/FILL LINE
- ASBUILT UNDERFILL DRAIN
- ASBUILT COUNTERFORT DRAIN
- STAGE BOUNDARY
- CUT — ASBUILT CUT
- FILL — ASBUILT FILL

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2018, 2019 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE CUT/FILL DEPTH CONTOURS SHOWN ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
CHECKED: RJP 06.03.20
APPROVED: RJP 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
ISOPACH ASBUILT PLAN - STAGE 2
STRIPPED SURFACE TO FINISHED SURFACE
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:750 / 1:1500
SCALE BAR 1:1500@A3 0 15 30 45 60 75m
DRAWING NUMBER: 2011-02-AB225 REV: A

LEGEND

- EXISTING CONTOUR
- ASBUILT MINOR CONTOUR
- ASBUILT MAJOR CONTOUR
- EARTHWORK EXTENT
- ASBUILT SUB-SOIL DRAIN
- ASBUILT RETAINING WALL
- SLOPES OVER 1 IN 4
- STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2018 AND 2019.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE CONTOURS SHOWN ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

		DATE
DRAWN:	DKP	03.2020
CHECKED:	RJP	06.03.20
APPROVED:	RJP	06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
SLOPE ANALYSIS ASBUILT PLAN
STAGE 2 - SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB290 REV: A

LEGEND

- EXISTING CONTOUR
- ASBUILT MINOR CONTOUR
- ASBUILT MAJOR CONTOUR
- EARTHWORK EXTENT
- ASBUILT SUB-SOIL DRAIN
- ASBUILT RETAINING WALL
- SLOPES OVER 1 IN 4
- STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2018 AND 2019.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE CONTOURS SHOWN ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

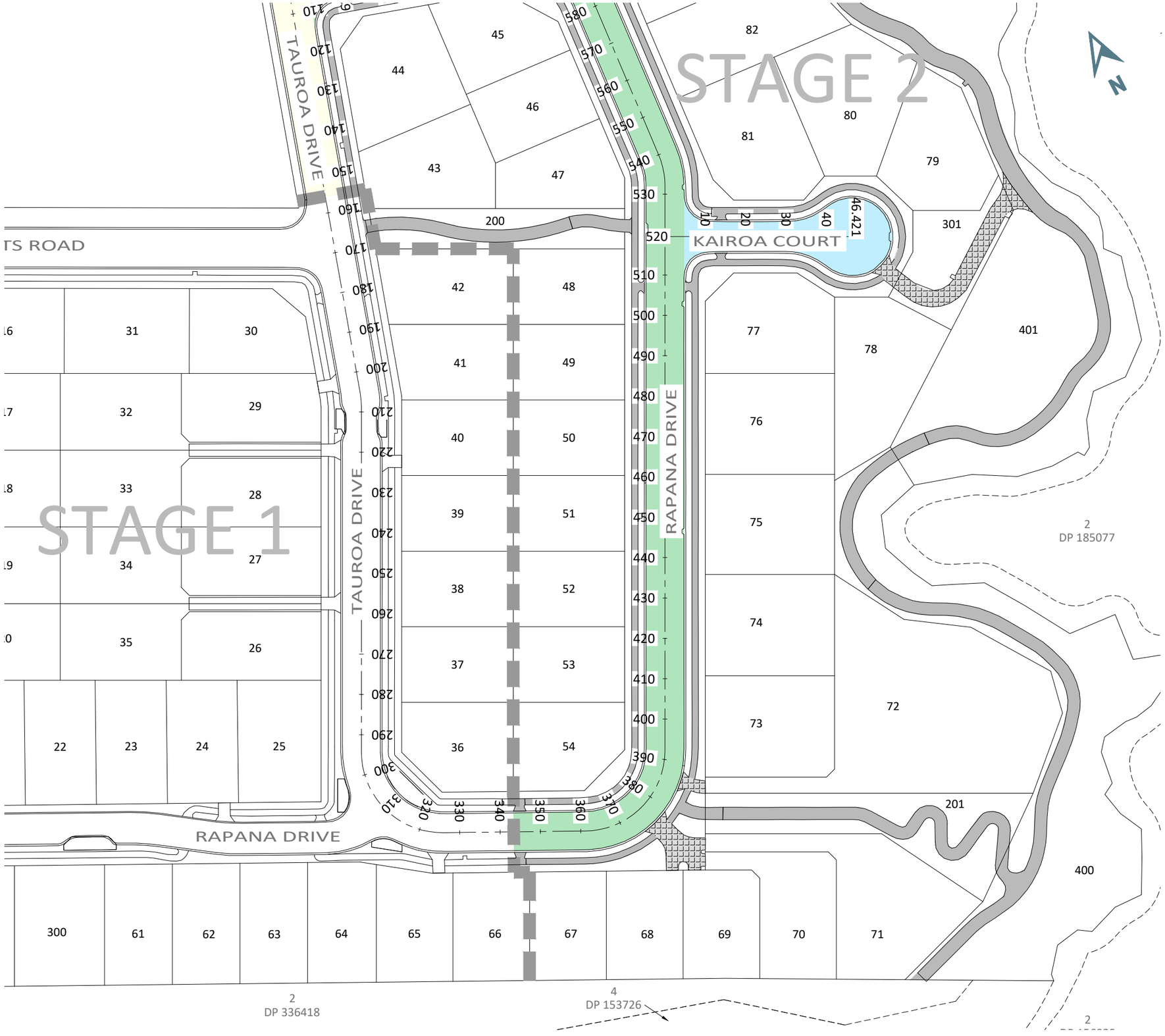
DRAWN:	DKP	DATE: 03.2020
CHECKED:	RJP	DATE: 06.03.20
APPROVED:	RJP	DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
SLOPE ANALYSIS ASBUILT PLAN
STAGE 2 - SHEET 2
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB291 REV: A



PAVEMENT CONSTRUCTION SCHEDULE				
ROAD	SUBGRADE STRENGTH	SUBBASE DEPTH (mm)	BASECOURSE DEPTH (mm)	SURFACING DEPTH (mm)
ROAD	CBR	GAP 65	AP40 NZTA M/4	DG10 / AC 14
RAPANA DRIVE	5%	250	150	30
KIAROA COURT	5%	250	150	30
TAUROA DRIVE	5%	250	150	30

OTHER CONCRETE	
FOOTPATHS AND RESERVE PATHS	ROAD CROSSINGS AND ACCESSWAYS
NO REINFORCEMENT	1 LAYERS 665 MESH
100 THICK	150 THICK

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2018 AND 2019.
3. ALL ROADS ARE STANDARD CONSTRUCTION WITH NO UNDERCUTS OR GEOTEXTILE.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PAVEMENT DEPTHS ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

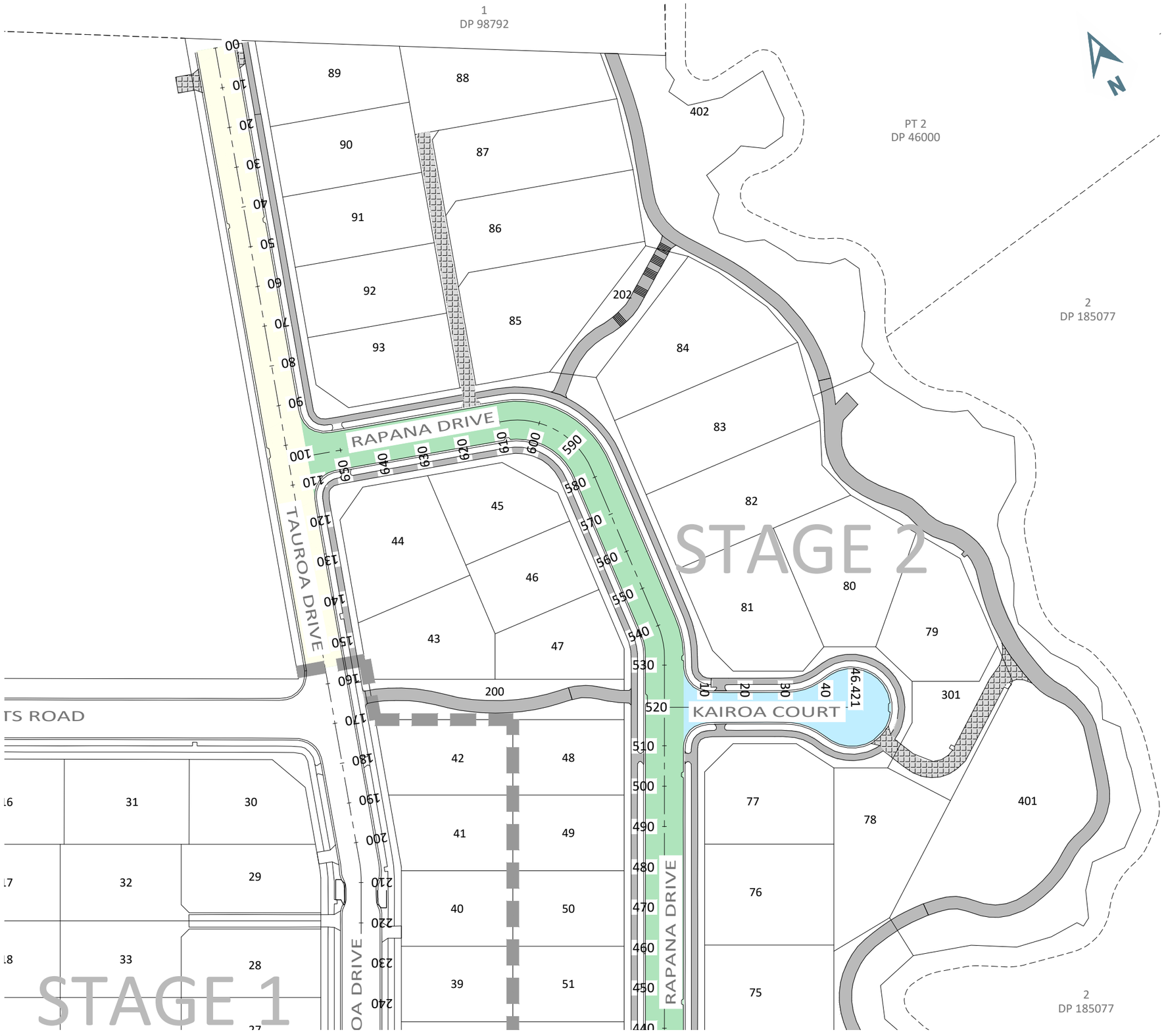
DRAWN:	DKP	DATE: 03.2020
CHECKED:	RJP	DATE: 06.03.20
APPROVED:	RJP	DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
ROADING PAVEMENT ASBUILT PLAN
STAGE 2 - SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB300 REV: A



PAVEMENT CONSTRUCTION SCHEDULE				
ROAD	SUBGRADE STRENGTH	SUBBASE DEPTH (mm)	BASECOURSE DEPTH (mm)	SURFACING DEPTH (mm)
ROAD	CBR	GAP 65	AP40 NZTA M/4	DG10 / AC 14
RAPANA DRIVE	5%	250	150	30
KIAROA COURT	5%	250	150	30
TAUROA DRIVE	5%	250	150	30

OTHER CONCRETE	
FOOTPATHS AND RESERVE PATHS	ROAD CROSSINGS AND ACCESSWAYS
NO REINFORCEMENT	1 LAYERS 665 MESH
100 THICK	150 THICK

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2018 AND 2019.
3. ALL ROADS ARE STANDARD CONSTRUCTION WITH NO UNDERCUTS OR GEOTEXTILE.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PAVEMENT DEPTHS ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN:	DKP	DATE: 03.2020
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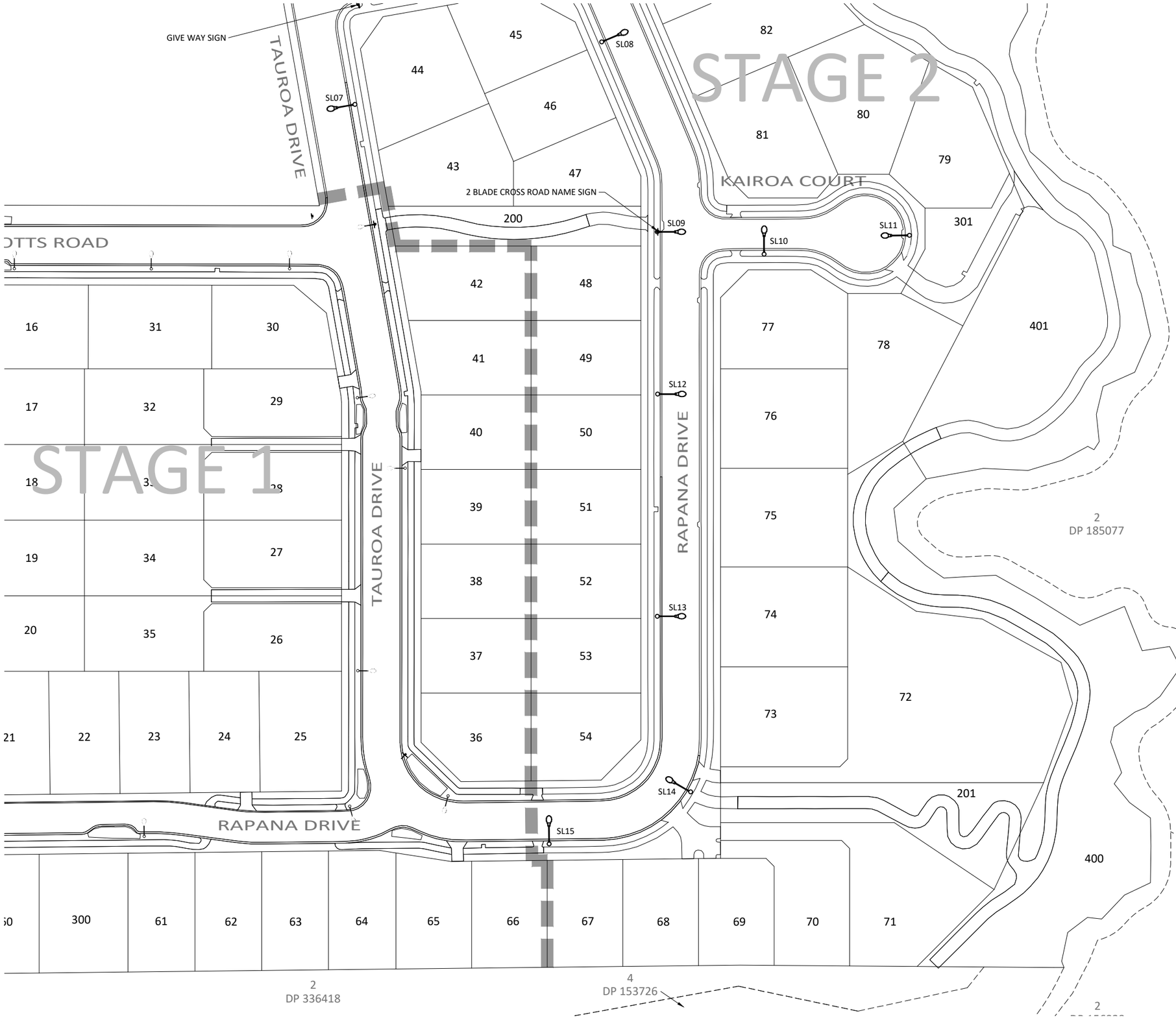
APPROVED:	RJP	DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
ROADING PAVEMENT ASBUILT PLAN
STAGE 2 - SHEET 2
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB301 REV: A



LEGEND

ASBUILT

- STREETLIGHT
- 2 BLADE CROSS ROAD NAME SIGN
- STREET SIGN
- PW-68 CHEVRON SIGN
- STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.
3. SL1-9,12-15 STREETLIGHT DETAILS:
   - 3.1. 8m VISULO - MINI STALK (IBEX LIGHTING)
   - 3.2. 1m OUTREACH
   - 3.3. 27.5 WATT EACH
   - 3.4. ZERO DEGREE TILT ANGLE
   - 3.5. CIRCULAR GALVANISED POLE, PAINTED BLACK
4. SL10,11 STREETLIGHT DETAILS:
   - 4.1. 8m VISULO - MINI STALK (IBEX LIGHTING)
   - 4.2. 1m OUTREACH
   - 4.3. 22.3 WATT EACH
   - 4.4. ZERO DEGREE TILT ANGLE
   - 4.5. CIRCULAR GALVANISED POLE, PAINTED BLACK

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE STREET LIGHTING, SIGN POSITIONS AND ROAD MARKINGS ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

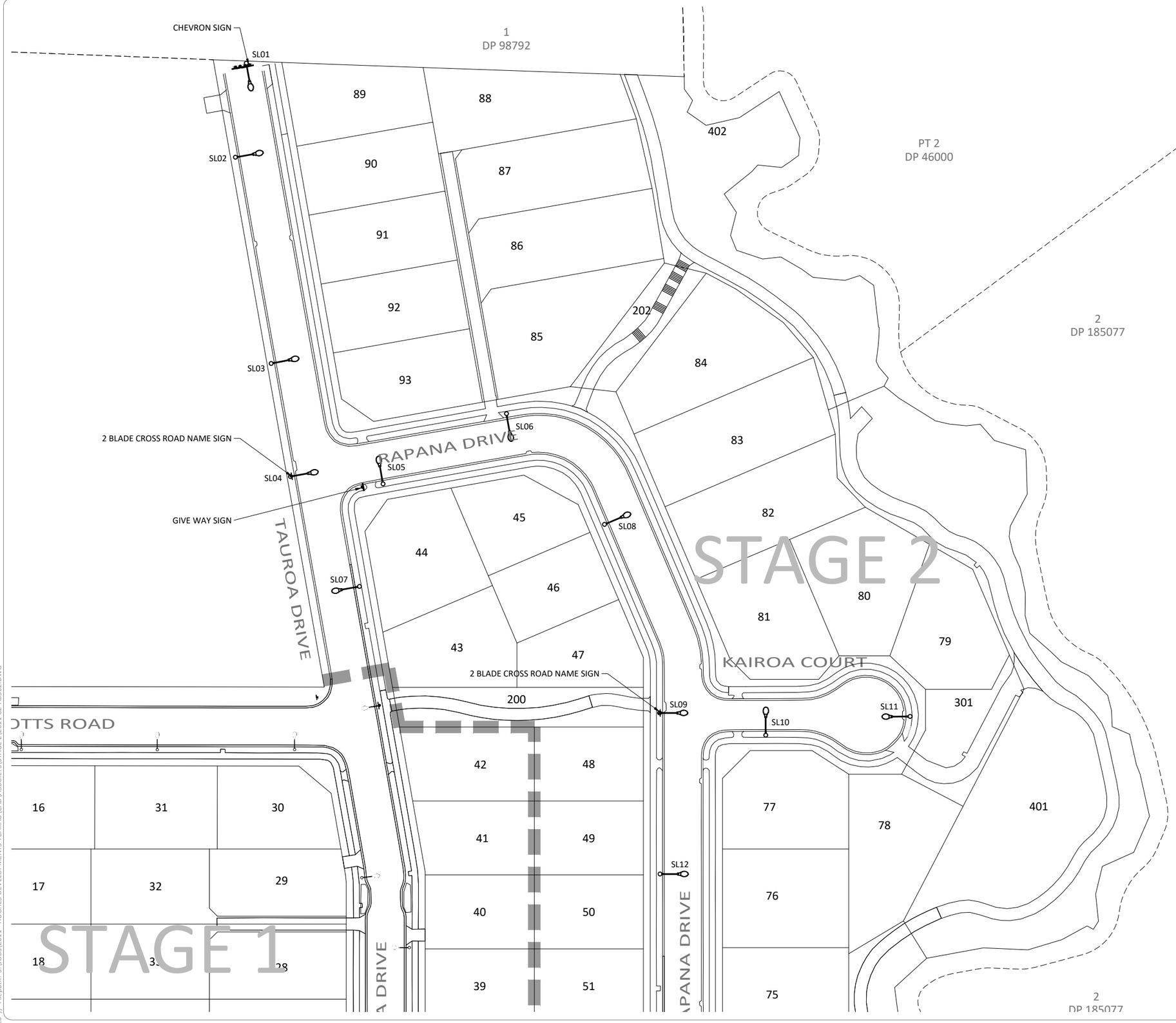
DRAWN:	DKP	DATE: 03.2020
CHECKED:	RJP	DATE: 06.03.20
APPROVED:	RJP	DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
ROADING FEATURES ASBUILT PLAN
STAGE 2 - SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB302 REV: A



LEGEND

ASBUILT

- STREETLIGHT
- 2 BLADE CROSS ROAD NAME SIGN
- STREET SIGN
- PW-68 CHEVRON SIGN
- STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.
3. SL1-9,12-15 STREETLIGHT DETAILS:
   - 3.1. 8m VISULO - MINI STALK (IBEX LIGHTING)
   - 3.2. 1m OUTREACH
   - 3.3. 27.5 WATT EACH
   - 3.4. ZERO DEGREE TILT ANGLE
   - 3.5. CIRCULAR GALVANISED POLE, PAINTED BLACK
4. SL10,11 STREETLIGHT DETAILS:
   - 4.1. 8m VISULO - MINI STALK (IBEX LIGHTING)
   - 4.2. 1m OUTREACH
   - 4.3. 22.3 WATT EACH
   - 4.4. ZERO DEGREE TILT ANGLE
   - 4.5. CIRCULAR GALVANISED POLE, PAINTED BLACK

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE STREET LIGHTING, SIGN POSITIONS AND ROAD MARKINGS ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN:	DKP	DATE: 03.2020
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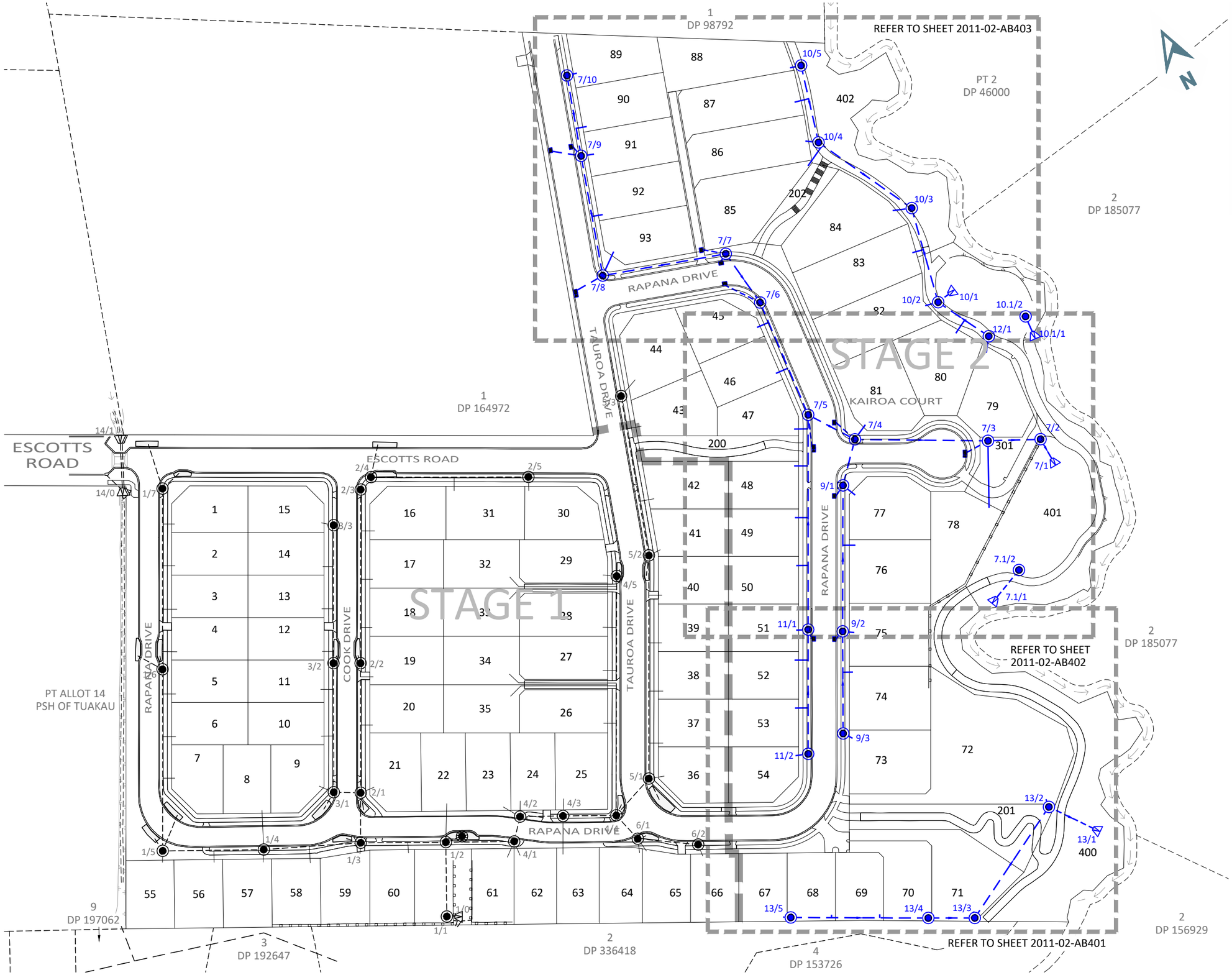
CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
ROADING FEATURES ASBUILT PLAN
STAGE 2 - SHEET 2
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB303 REV: A



LEGEND

EXISTING

- (CR) — PLOTTED FROM COUNCIL RECORDS
- DN1350 SW — STORMWATER LINE AND MANHOLE

ASBUILT

- DN300 — STORMWATER LINE AND MANHOLE
- X.Xm — STORMWATER CONNECTION
- STORMWATER CATCHPIT
- SCRUFFY DOME INLET/OUTLET MANHOLE
- STORMWATER INLET
- STORMWATER OUTLET
- STAGE BOUNDARY

NOTES

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM.
2. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
3. ALL STORMWATER LINES OVER DN150 ARE RCRRJ.
4. ALL DN 100 & DN 150 STORMWATER LINES ARE uPVC DWV SN16 AS/NZ 1260.
5. ALL SINGLE CATCHPIT LEADS ARE DN225 RCRRJ CLASS 4 PIPE.
6. ALL DOUBLE CATCHPIT LEADS ARE DN300 RCRRJ CLASS 4 PIPE.
7. ALL INVERTS ARE MEASURED CLOCKWISE FROM THE OUTLET.
8. MANHOLES ARE 1050mm UNLESS SHOWN OTHERWISE.
9. SEE SHEET 2011-02-AB404 FOR CO-ORDINATE SCHEDULES.
10. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS, SCHEDULE OF CO-ORDINATES AND LID LEVELS, ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
CHECKED: RJP 06.03.20
APPROVED: RJP 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
STORMWATER ASBUILT
STAGE 2 - OVERALL LAYOUT
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:750 / 1:1500
SCALE BAR 1:1500@A3 0 15 30 45 60 75m
DRAWING NUMBER: 2011-02-AB400 REV: A

SWMH 11/1
LL 37.93
IL_{OUT} 35.88
IL_{IN} 36.34
IL_{IN} 35.97
IL_{IN} 36.57
DN100 4.68m
(@ CH0.00)
3.72
8.66
SCP 11/1
LL 37.78
IL_{OUT} 36.43
SCP 9/2
LL 37.78
IL_{OUT} 36.40
11.06
2.67
SWMH 9/2
LL 38.00
IL_{OUT} 34.82
IL_{IN} 35.04
IL_{IN} 34.90
IL_{IN} 36.34
DN100 4.61m
(@ CH0.00)
DN100 5.34m
(@ CH12.00)
DN225 SW 48.93m @1.7%
DN225 SW 40.19m @0.9%
DN100 4.01m
(@ CH16.06)
DN100 5.12m
(@ CH30.84)
SWMH 9/3
LL 38.17
IL_{OUT} 35.24
IL_{IN} 35.29
1.35
DN100 4.22m
(@ CH0.00)
2.50
2.83
DN100 4.96m
(@ CH0.00)
3.72
SWMH 11/2
LL 38.18
IL_{OUT} 36.82
IL_{IN} 36.89
51
52
53
54
75
74
73
72
71
70
69
68
67
66
201
400
EX.
CP 4
2
DP 185077
4
DP 153726
2
DP 156929
SWMH 13/2
LL 28.36
IL_{OUT} 25.76
IL_{IN} 25.81
IL_{IN} 27.00
DN100 3.25m
(@ CH0.00)
1.15
1.94
DN225 SW 19.41m @0.2%
9.73
17.47
OUTLET 13/1
IL_{OUT} 25.72
DN150 SW 52.53m @1.3%
SWMH 13/5
LL 37.02
IL_{OUT} 34.95
IL_{IN} 35.53
1.45
DN100 3.01m
(@ CH0.00)
1.47
DN100 1.18m
(@ CH38.08)
DN150 SW 54.12m @6.0%
DN100 1.34m
(@ CH19.09)
SWMH 13/4
LL 33.65
IL_{OUT} 31.68
IL_{IN} 31.73
IL_{IN} 32.15
DN100 2.21m
(@ CH0.00)
1.12
1.43
DN150 SW 18.34m @26.6%
SWMH 13/3
LL 28.32
IL_{OUT} 26.43
IL_{IN} 26.80
IL_{IN} 26.84
DN100 2.59m
(@ CH0.00)
0.97
1.30

N

LEGEND

EXISTING

(CR) PLOTTED FROM COUNCIL RECORDS

DN1350 SW STORMWATER LINE AND MANHOLE

ASBUILT

DN300 STORMWATER LINE AND MANHOLE

X.Xm STORMWATER CONNECTION

STORMWATER CATCHPIT

SCRUFFY DOME INLET/OUTLET MANHOLE

STORMWATER INLET

STORMWATER OUTLET

STAGE BOUNDARY

NOTES

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM.
2. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
3. ALL STORMWATER LINES OVER DN150 ARE RCRRJ.
4. ALL DN 100 & DN 150 STORMWATER LINES ARE uPVC DWV SN16 AS/NZ 1260.
5. ALL SINGLE CATCHPIT LEADS ARE DN225 RCRRJ CLASS 4 PIPE.
6. ALL DOUBLE CATCHPIT LEADS ARE DN300 RCRRJ CLASS 4 PIPE.
7. ALL INVERTS ARE MEASURED CLOCKWISE FROM THE OUTLET.
8. MANHOLES ARE 1050mm UNLESS SHOWN OTHERWISE.
9. SEE SHEET 2011-02-AB404 FOR CO-ORDINATE SCHEDULES.
10. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS, SCHEDULE OF CO-ORDINATES AND LID LEVELS, ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN:	DKP	DATE: 03.2020
CHECKED:	RJP	DATE: 06.03.20
APPROVED:	RJP	DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

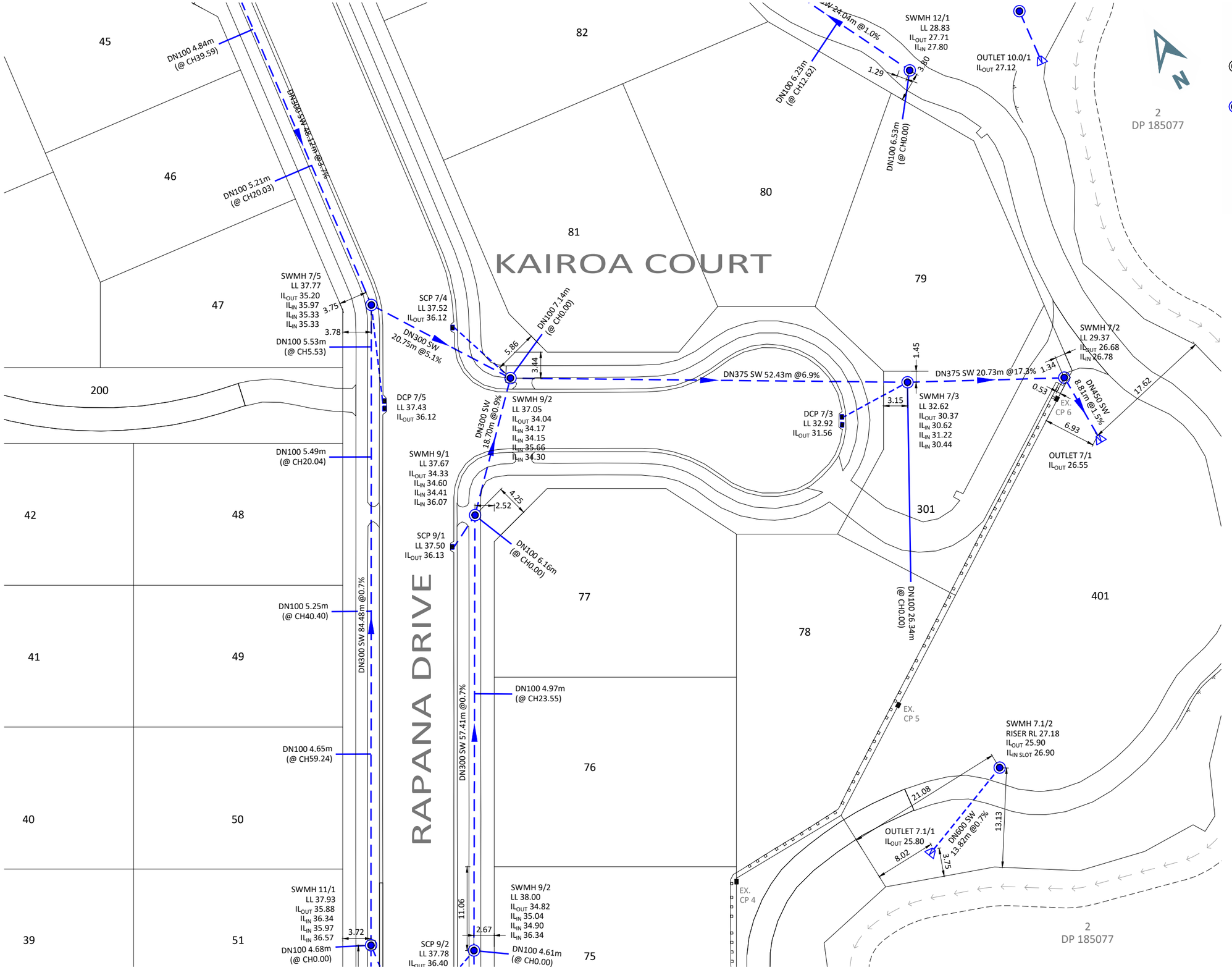
SHEET TITLE:
STORMWATER ASBUILT
STAGE 2 - DETAIL SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT

SCALE: (A1/A3) 1:250 / 1:500

SCALE BAR 1:500@A3 0 5 10 15 20 25m

DRAWING NUMBER: 2011-02-AB401 REV: A



LEGEND

EXISTING

(CR) PLOTTED FROM COUNCIL RECORDS

DN1350 SW STORMWATER LINE AND MANHOLE

ASBUILT

DN300 STORMWATER LINE AND MANHOLE

X.Xm STORMWATER CONNECTION

STORMWATER CATCHPIT

SCRUFFY DOME INLET/OUTLET MANHOLE

STORMWATER INLET

STORMWATER OUTLET

STAGE BOUNDARY

NOTES

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8. MANHOLES ARE 1050mm UNLESS SHOWN OTHERWISE.
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RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

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A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
CHECKED: RJP 06.03.20
APPROVED: RJP 06.03.20

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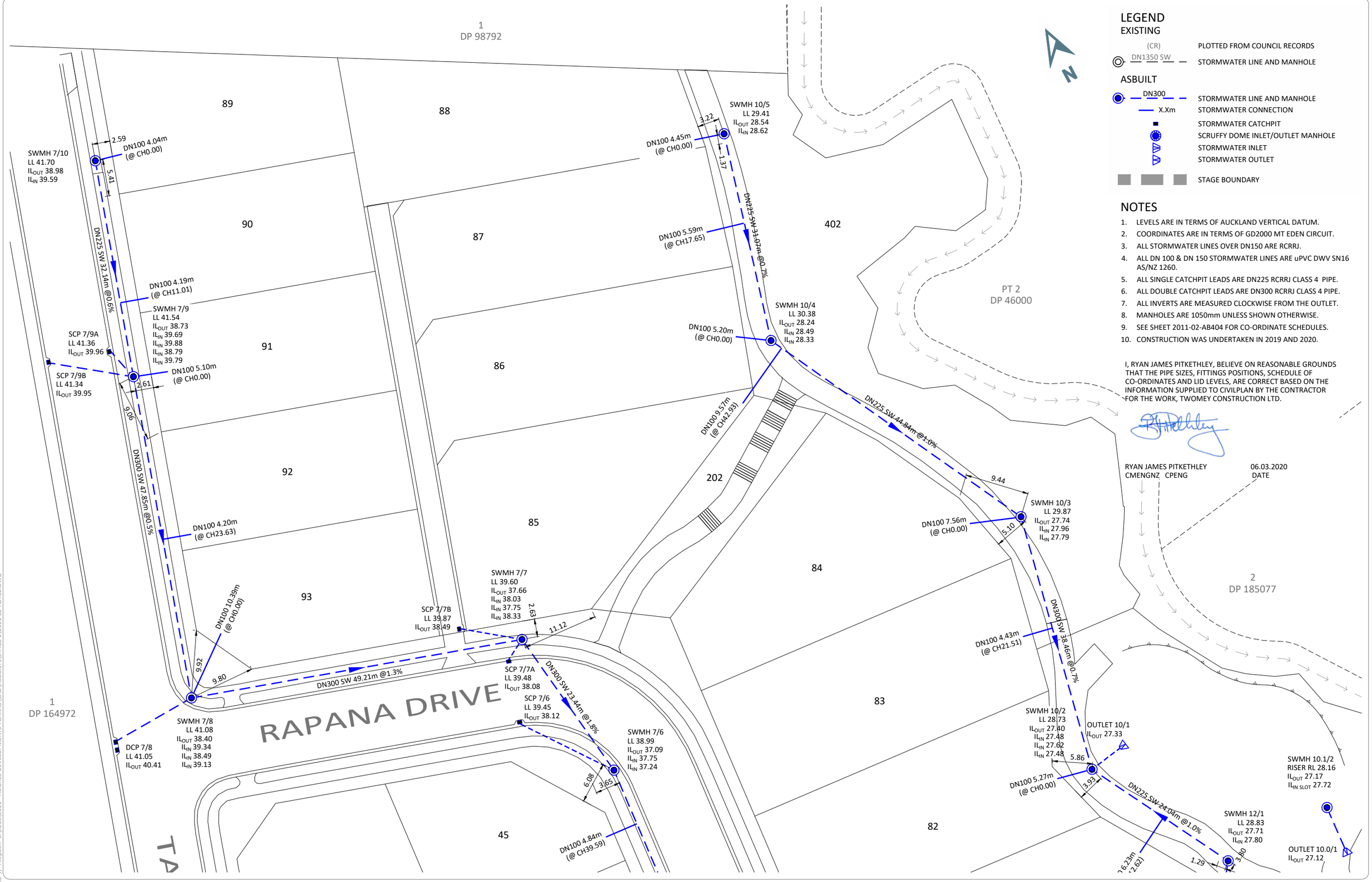
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
STORMWATER ASBUILT
STAGE 2 - DETAIL SHEET 2
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:250 / 1:500
SCALE BAR 1:500@A3 0 5 10 15 20 25m
DRAWING NUMBER: 2011-02-AB402 REV: A



LEGEND

EXISTING

- (CR) — PLOTTED FROM COUNCIL RECORDS
- DN1350 SW — STORMWATER LINE AND MANHOLE

ASBUILT

- DN300 — STORMWATER LINE AND MANHOLE
- X.Xm — STORMWATER CONNECTION
- STORMWATER CATCHPIT
- SCRUFFY DOME INLET/OUTLET MANHOLE
- STORMWATER INLET
- STORMWATER OUTLET
- STAGE BOUNDARY

NOTES

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM.
2. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
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9. SEE SHEET 2011-02-AB404 FOR CO-ORDINATE SCHEDULES.
10. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

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06.03.2020
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PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
STORMWATER ASBUILT
STAGE 2 - DETAIL SHEET 3
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:250 / 1:500
SCALE BAR 1:500@A3 0 5 10 15 20 25m
DRAWING NUMBER: 2011-02-AB403 REV: A

SCHEDULE OF COORDINATES SW MANHOLES-GD2000

POINT No.	mE	mN
OUTLET 10.1/01	416578.18	757143.26
OUTLET 10/01	416556.31	757171.80
OUTLET 13/01	416507.39	756959.49
OUTLET 7.1/01	416516.70	757057.53
OUTLET 7/01	416561.51	757095.48
SWMH 10.1/02	416578.75	757149.74
SWMH 10/02	416551.01	757170.90
SWMH 10/03	416559.26	757208.47
SWMH 10/04	416539.10	757248.52
SWMH 10/05	416547.31	757278.48
SWMH 11/01	416445.16	757081.37
SWMH 11/02	416422.11	757038.21
SWMH 12/01	416562.29	757149.67
SWMH 13/02	416495.92	756975.15
SWMH 13/03	416449.61	756950.34
SWMH 13/04	416433.42	756958.95
SWMH 13/05	416385.79	756984.64
SWMH 7.1/02	416529.43	757062.93
SWMH 7/010	416464.12	757318.43
SWMH 7/02	416561.19	757104.31
SWMH 7/03	416542.65	757113.52
SWMH 7/04	416496.66	757138.69
SWMH 7/05	416485.01	757155.86
SWMH 7/06	416489.12	757203.81
SWMH 7/07	416486.25	757227.07
SWMH 7/08	416439.47	757242.34
SWMH 7/09	416454.14	757287.88
SWMH 9/01	416484.03	757124.95
SWMH 9/02	416456.83	757074.35
SWMH 9/03	416438.05	757038.82

SCHEDULE OF COORDINATES CATCHPITS-GD2000

POINT No.	mE	mN
DCP 7/3	416532.66	757113.09
DCP 7/5	416480.34	757143.44
DCP 7/8	416426.44	757241.31
SCP 11/1	416444.82	757077.45
SCP 7/4	416493.27	757148.06
SCP 7/6	416480.16	757216.31
SCP 7/7A	416483.09	757225.36
SCP 7/7B	416479.06	757232.68
SCP 7/9A	416452.96	757292.71
SCP 7/9B	416443.93	757295.69
SCP 9/1	416479.62	757122.57
SCP 9/2	416453.12	757072.88

NOTES

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM.
2. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
3. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS, SCHEDULE OF CO-ORDINATES AND LID LEVELS, ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.02.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

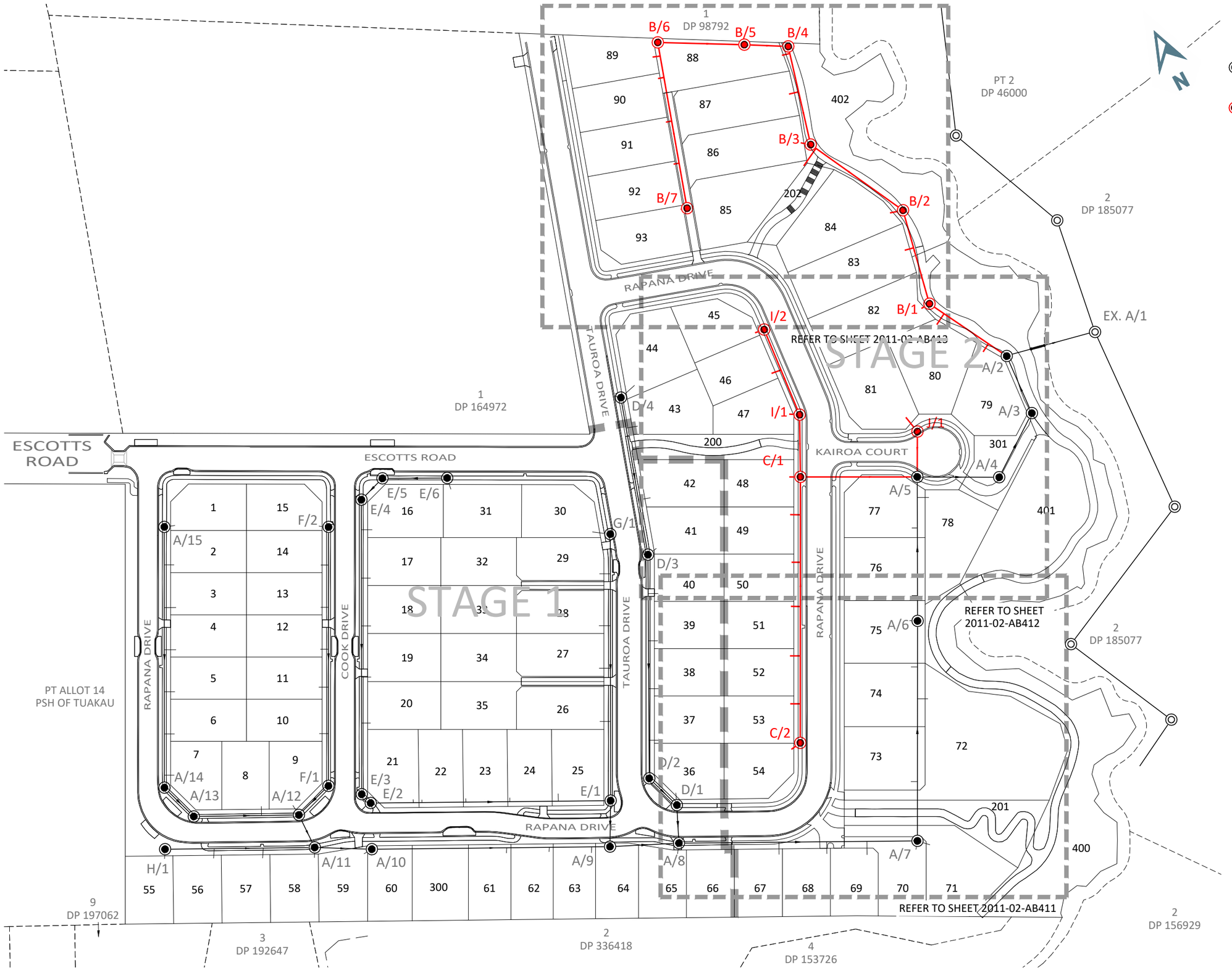
DRAWN: DKP DATE: 03.2020
CHECKED: RJP DATE: 06.03.20
APPROVED: RJP DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
STORMWATER ASBUILT
STAGE 2 - COORDINATE SCHEDULES
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:125 / 1:250
SCALE BAR 1:250@A3 0 2.5 5 7.5 10 12.5m
DRAWING NUMBER: 2011-02-AB404 REV: A



LEGEND

EXISTING

(CR) PLOTTED FROM COUNCIL RECORDS

WASTEWATER LINE AND MANHOLE

ASBUILT

WASTEWATER LINE AND MANHOLE

X.Xm WASTEWATER CONNECTION

STAGE BOUNDARY

NOTES

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM.
2. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
3. ALL WASTEWATER LINES ARE DN150 uPVC SN16 TO AS/NZS1260.
4. ALL WASTEWATER CONNECTIONS ARE DN100 uPVC SN16 TO AS/NZS1260.
5. ALL INVERTS ARE MEASURED CLOCKWISE FROM THE OUTLET.
6. MANHOLES ARE 1050mm UNLESS SHOWN OTHERWISE.
7. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS, SCHEDULE OF CO-ORDINATES AND LID LEVELS, ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

SCHEDULE OF COORDINATES
WW MANHOLES-GD2000

POINT No.	mE	mN
EX. WWMH A/2	416566.83	757138.00
EX. WWMH A/5	416512.97	757112.47
WWMH B/1	416549.50	757170.67
WWMH B/2	416557.73	757208.26
WWMH B/3	416537.73	757248.41
WWMH B/4	416548.17	757286.89
WWMH B/5	416533.15	757295.72
WWMH B/6	416503.37	757312.67
WWMH B/7	416482.64	757249.26
WWMH C/1	416472.15	757134.26
WWMH C/2	416422.47	757041.38
WWMH I/1	416483.47	757156.12
WWMH I/2	416486.94	757192.49
WWMH J/1	416521.46	757128.24

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
CHECKED: RJP 06.03.20
APPROVED: RJP 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
WASTEWATER ASBUILT
STAGE 2 - OVERALL LAYOUT
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:750 / 1:1500
SCALE BAR 1:1500@A3 0 15 30 45 60 75m
DRAWING NUMBER: 2011-02-AB410 REV: A

RAPANA D

40 50 39 51 38 52 37 53 36 54 65 66 67 68 69 70 71 72 73 74 75 201

DN100 3.65m (@ CH51.29)

DN100 4.11m (@ CH70.87)

DN100 3.87m (@ CH89.89)

DN150 WW 105.32m @0.9%

2.54

0.14

DN100 4.34m (@ CH0.00)

WWMH C/2
LL 38.21
IL_{OUT} 36.82
IL_{IN} 36.91

WWMH A/6
LL 32.83
IL_{OUT} 31.51
IL_{IN} 31.55

WWMH D/1
LL 37.87
IL_{OUT} 36.37
IL_{IN} 36.41
IL_{IN} 36.42

WWMH A/8
LL 37.91
IL_{OUT} 34.19
IL_{IN} 34.57
IL_{IN} 34.25
IL_{IN} 36.29

WWMH A/7
LL 35.96
IL_{OUT} 32.81
IL_{IN} 33.07
IL_{IN} 33.03
IL_{IN} 32.91

N

LEGEND

EXISTING

(CR) PLOTTED FROM COUNCIL RECORDS

WASTEWATER LINE AND MANHOLE

ASBUILT

WASTEWATER LINE AND MANHOLE

X.Xm WASTEWATER CONNECTION

STAGE BOUNDARY

NOTES

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7. SEE SHEET 2011-02-AB410 FOR CO-ORDINATE SCHEDULE.
8. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

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RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
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Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

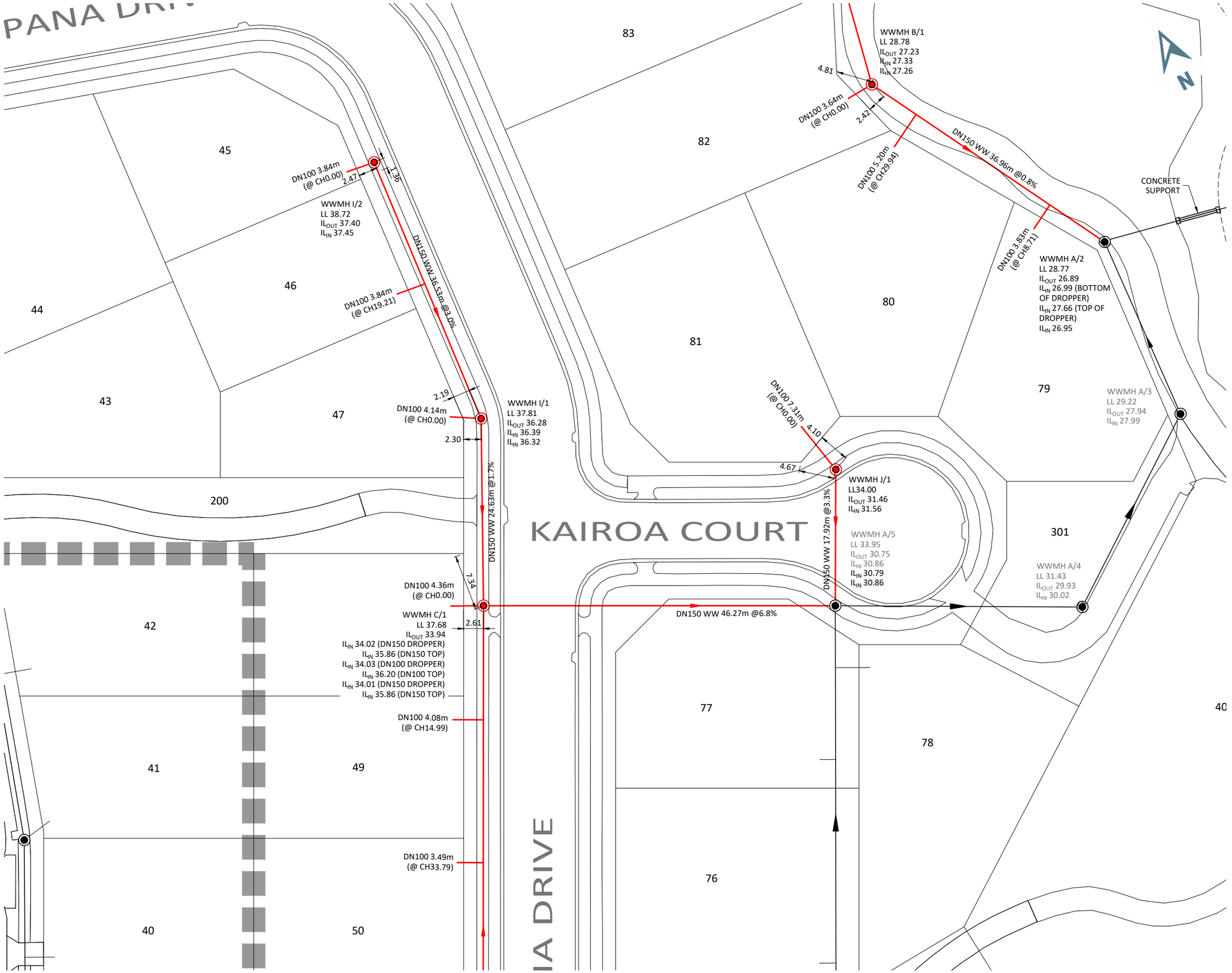
SHEET TITLE:
WASTEWATER ASBUILT
STAGE 2 - DETAIL SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT

SCALE: (A1/A3) 1:250 / 1:500

SCALE BAR 1:500@A3 0 5 10 15 20 25m

DRAWING NUMBER: 2011-02-AB411 REV: A



LEGEND

EXISTING

(CR) PLOTTED FROM COUNCIL RECORDS

WASTEWATER LINE AND MANHOLE

ASBUILT

WASTEWATER LINE AND MANHOLE

X.Xm WASTEWATER CONNECTION

STAGE BOUNDARY

NOTES

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CMENGNZ CPENG

06.03.2020
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PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
WASTEWATER ASBUILT
STAGE 2 - DETAIL SHEET 2
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:250 / 1:500
SCALE BAR 1:500@A3 0 5 10 15 20 25m
DRAWING NUMBER: 2011-02-AB412 REV: A

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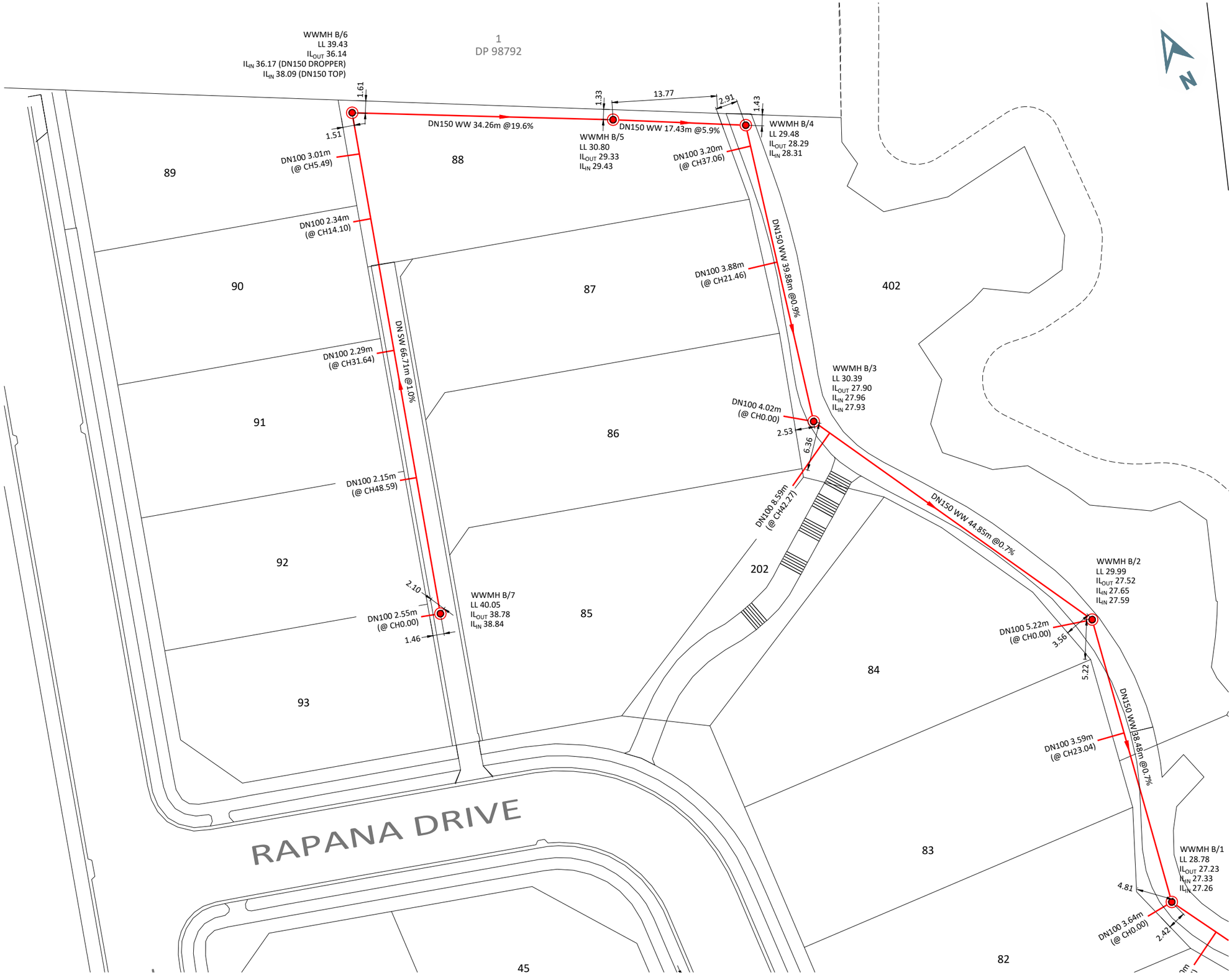

LEGEND

EXISTING

(CR) PLOTTED FROM COUNCIL RECORDS

WASTEWATER LINE AND MANHOLE

ASBUILT

WASTEWATER LINE AND MANHOLE

X.Xm WASTEWATER CONNECTION

STAGE BOUNDARY

NOTES

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CMENGNZ CPENG

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PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

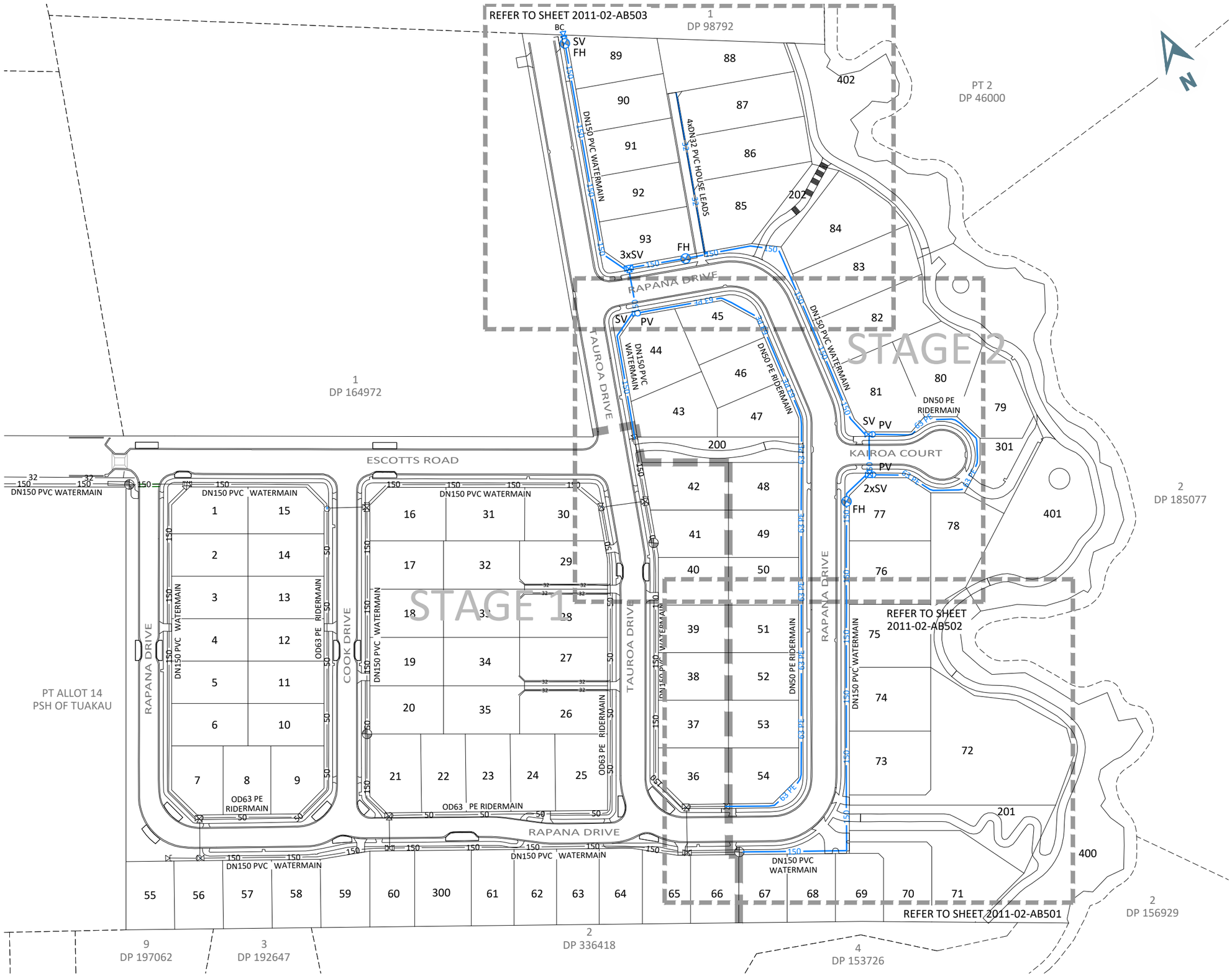
SHEET TITLE:
WASTEWATER ASBUILT
STAGE 2 - DETAIL SHEET 3
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT

SCALE: (A1/A3) 1:250 / 1:500

SCALE BAR 1:500@A3 0 5 10 15 20 25m

DRAWING NUMBER: 2011-02-AB413 REV: A



LEGEND

EXISTING

(CR)	PLOTTED FROM COUNCIL RECORDS
32	DN32 RIDERMAIN
100	DN100 WATERMAIN
200	DN200 WATERMAIN
	FIRE HYDRANT
	SLUICE VALVE
	PEET VALVE
	BLANK CAP

ASBUILT

32	DN20 PE HOUSE CONNECTION
63 PE	OD63 PE RIDERMAIN
100	DN100 WATERMAIN
150	DN150 WATERMAIN
200	DN200 WATERMAIN
FH	FIRE HYDRANT
SV	SLUICE VALVE
PV	PEET VALVE
BC	BLANK CAP (WITH THRUST BLOCK)
W	WATER METER
	STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
3. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.
4. SEE 2011-02-AB504 FOR COORDINATE SCHEDULES.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS AND SCHEDULE OF CO-ORDINATES ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY CMENGNZ CPENG — 06.03.2020 DATE

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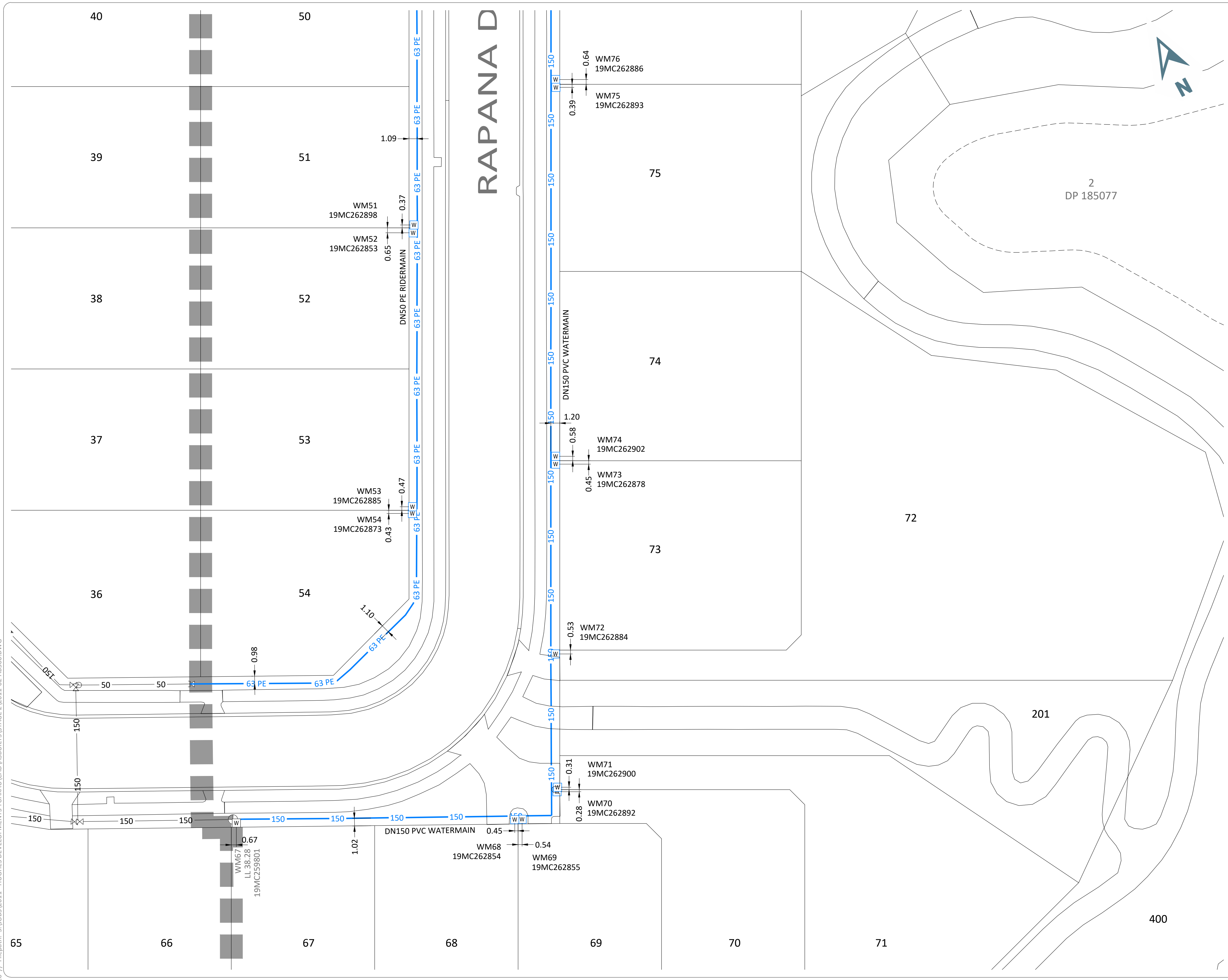
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
WATER SUPPLY ASBUILT PLAN
STAGE 2 - OVERALL LAYOUT
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:750 / 1:1500
SCALE BAR 1:1500@A3 0 15 30 45 60 75m
DRAWING NUMBER: 2011-02-AB500 REV: A



LEGEND

EXISTING

(CR)	PLOTTED FROM COUNCIL RECORDS
32	DN32 RIDERMAIN
100	DN100 WATERMAIN
200	DN200 WATERMAIN
	FIRE HYDRANT
	SLUICE VALVE
	PEET VALVE
	BLANK CAP

ASBUILT

32	DN20 PE HOUSE CONNECTION
63 PE	OD63 PE RIDERMAIN
100	DN100 WATERMAIN
150	DN150 WATERMAIN
200	DN200 WATERMAIN
FH	FIRE HYDRANT
SV	SLUICE VALVE
PV	PEET VALVE
BC	BLANK CAP (WITH THRUST BLOCK)
W	WATER METER
	STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
3. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.
4. SEE 2011-02-AB504 FOR COORDINATE SCHEDULES.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS AND SCHEDULE OF CO-ORDINATES ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

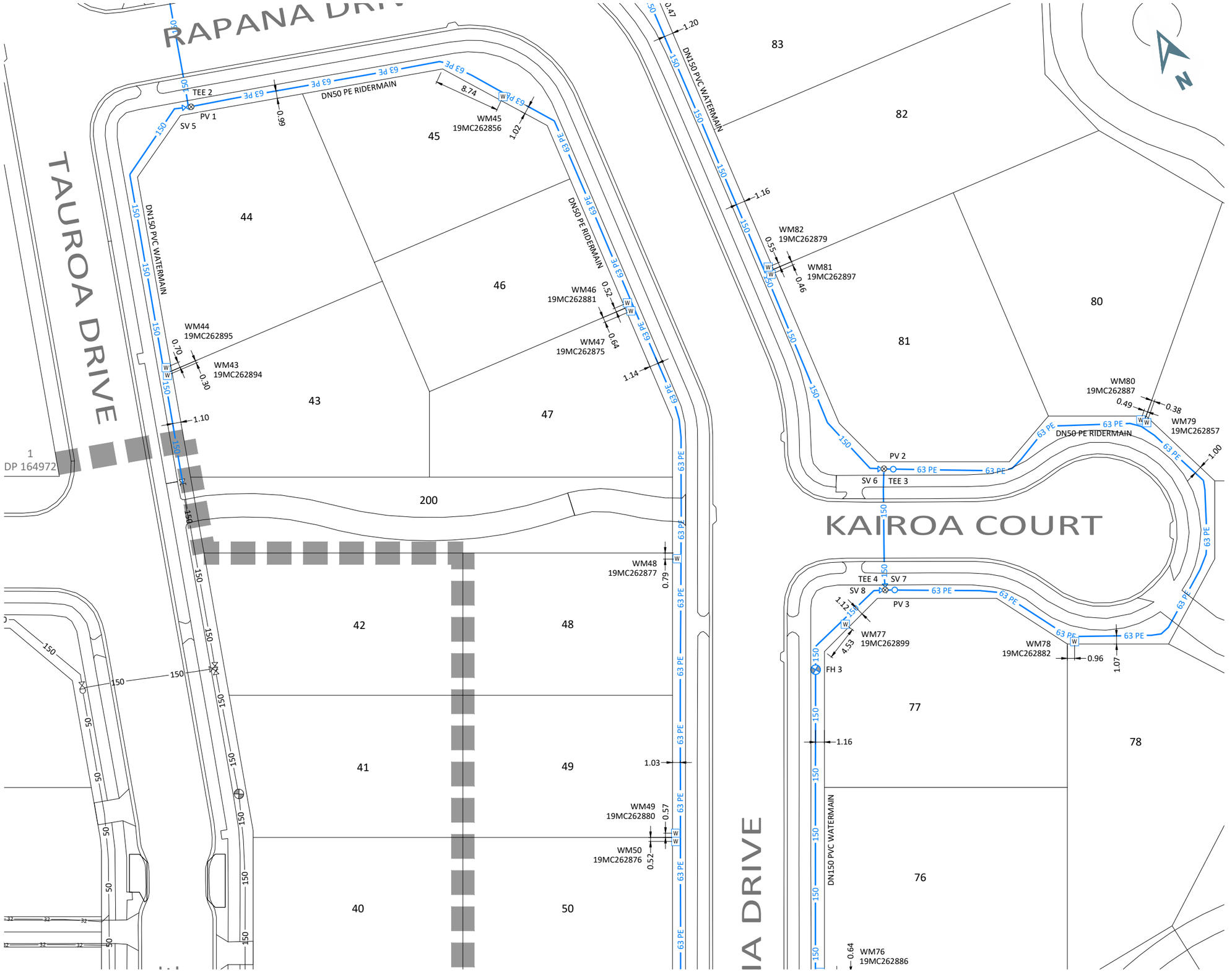
DRAWN: DKP	DATE: 03.2020
CHECKED: RJP	DATE: 06.03.20
APPROVED: RJP	DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
WATER SUPPLY ASBUILT PLAN
STAGE 2 - DETAIL SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:250 / 1:500
SCALE BAR 1:500@A3 0 5 10 15 20 25m
DRAWING NUMBER: 2011-02-AB501 REV: A



LEGEND

EXISTING

(CR)	PLOTTED FROM COUNCIL RECORDS
32	DN32 RIDERMAIN
100	DN100 WATERMAIN
200	DN200 WATERMAIN
	FIRE HYDRANT
	SLUICE VALVE
	PEET VALVE
	BLANK CAP

ASBUILT

32	DN20 PE HOUSE CONNECTION
63 PE	OD63 PE RIDERMAIN
100	DN100 WATERMAIN
150	DN150 WATERMAIN
200	DN200 WATERMAIN
FH	FIRE HYDRANT
SV	SLUICE VALVE
PV	PEET VALVE
BC	BLANK CAP (WITH THRUST BLOCK)
W	WATER METER
	STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
3. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.
4. SEE 2011-02-AB504 FOR COORDINATE SCHEDULES.

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RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

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A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP DATE: 03.2020
CHECKED: RJP DATE: 06.03.20
APPROVED: RJP DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
WATER SUPPLY ASBUILT PLAN
STAGE 2 - DETAIL SHEET 2
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:250 / 1:500
SCALE BAR 1:500@A3 0 5 10 15 20 25m
DRAWING NUMBER: 2011-02-AB502 REV: A

Printed by: RYAN@06.03.20 // Filepath: S:\JOBS\2011 - HUGHES DEVELOPMENTS TUAKAU\CAD\ASBUILTS\STAGE 2\2011-02-AB500.DWG

LEGEND

EXISTING

(CR)	PLOTTED FROM COUNCIL RECORDS
32	DN32 RIDERMAIN
100	DN100 WATERMAIN
200	DN200 WATERMAIN
	FIRE HYDRANT
	SLUICE VALVE
	PEET VALVE
	BLANK CAP

ASBUILT

32	DN20 PE HOUSE CONNECTION
63 PE	OD63 PE RIDERMAIN
100	DN100 WATERMAIN
150	DN150 WATERMAIN
200	DN200 WATERMAIN
FH	FIRE HYDRANT
SV	SLUICE VALVE
PV	PEET VALVE
BC	BLANK CAP (WITH THRUST BLOCK)
W	WATER METER
	STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
3. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.
4. SEE 2011-02-AB504 FOR COORDINATE SCHEDULES.

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RYAN JAMES PITKETHLEY — 06.03.2020
CMENGNZ CPENG — DATE

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
CHECKED: RJP 06.03.20
APPROVED: RJP 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
WATER SUPPLY ASBUILT PLAN
STAGE 2 - DETAIL SHEET 3
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:250 / 1:500
SCALE BAR 1:500@A3 0 5 10 15 20 25m
DRAWING NUMBER: 2011-02-AB503 REV: A

SCHEDULE OF COORDINATES SLUICE VALVES-GD2000		
POINT No.	mE	mN
SV 1	416470.02	757331.79
SV 2	416449.79	757240.64
SV 3	416450.02	757240.20
SV 4	416450.42	757240.44
SV 5	416444.17	757223.50
SV 6	416502.57	757138.35
SV 7	416495.67	757124.36
SV 8	416495.20	757124.17

SCHEDULE OF COORDINATES PEET VALVES-GD2000		
POINT No.	mE	mN
PV 1	416444.81	757223.23
PV 2	416503.92	757137.59
PV 3	416496.58	757123.46

SCHEDULE OF COORDINATES HYDRANTS-GD2000		
POINT No.	mE	mN
FH 1	416469.55	757330.38
FH 2	416471.63	757233.31
FH 3	416482.47	757119.11

SCHEDULE OF COORDINATES BLANK CAP-GD2000		
POINT No.	mE	mN
BC 1	416470.56	757333.22

SCHEDULE OF COORDINATES TEES-GD2000		
POINT No.	mE	mN
TEE 1	416450.08	757240.54
TEE 2	416444.81	757223.23
TEE 3	416502.86	757138.20
TEE 4	416495.48	757124.06

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
3. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS AND SCHEDULE OF CO-ORDINATES ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

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CMENGNZ CPENG

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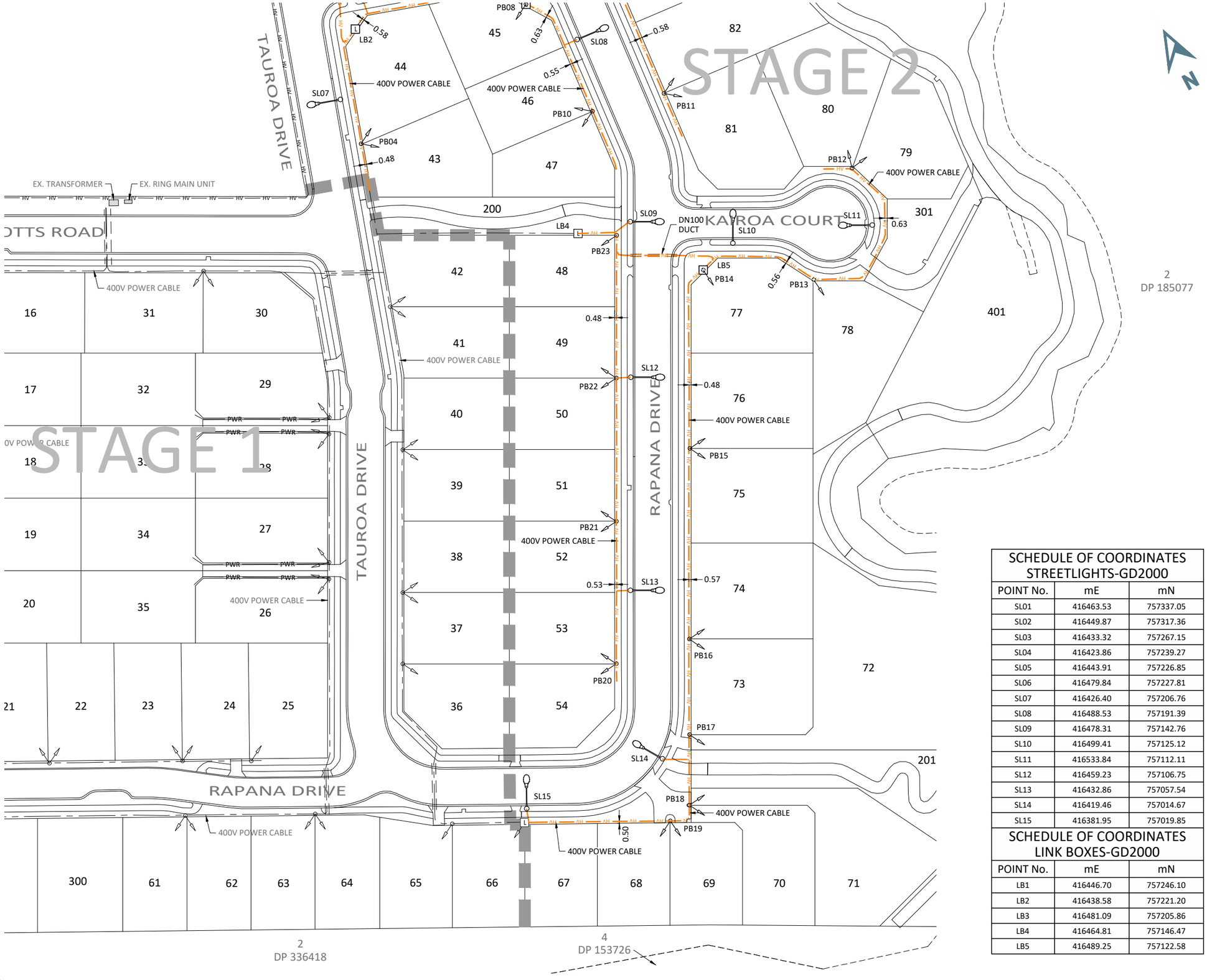
PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
WATER SUPPLY ASBUILT PLAN
STAGE 2 - COORDINATE SCHEDULES
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) NOT TO SCALE
SCALE BAR N.T.S.
DRAWING NUMBER: 2011-02-AB504 REV: A



LEGEND

ASBUILT

- PILLAR BOX
- HV POWER CABLE
- LV POWER CABLE
- HOUSE POWER CABLE
- DN100 PVC DUCT
- STREETLIGHT
- LINK BOX

EXISTING

- PILLAR BOX
- HV POWER CABLE
- LV POWER CABLE
- HOUSE POWER CABLE
- DN100 PVC DUCT
- STREETLIGHT
- LINK BOX
- RMU — RING MAIN UNIT
- TRANSFORMER

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

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RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

SCHEDULE OF COORDINATES STREETLIGHTS-GD2000

POINT No.	mE	mN
SL01	416463.53	757337.05
SL02	416449.87	757317.36
SL03	416433.32	757267.15
SL04	416423.86	757239.27
SL05	416443.91	757226.85
SL06	416479.84	757227.81
SL07	416426.40	757206.76
SL08	416488.53	757191.39
SL09	416478.31	757142.76
SL10	416499.41	757125.12
SL11	416533.84	757112.11
SL12	416459.23	757106.75
SL13	416432.86	757057.54
SL14	416419.46	757014.67
SL15	416381.95	757019.85

SCHEDULE OF COORDINATES LINK BOXES-GD2000

POINT No.	mE	mN
LB1	416446.70	757246.10
LB2	416438.58	757221.20
LB3	416481.09	757205.86
LB4	416464.81	757146.47
LB5	416489.25	757122.58

SCHEDULE OF COORDINATES PILLAR BOXES-GD2000

POINT No.	mE	mN
PB01	416464.42	757312.73
PB02	416458.88	757295.81
PB03	416447.89	757262.21
PB04	416425.74	757193.96
PB05	416499.21	757292.52
PB06	416492.71	757272.76
PB07	416487.19	757255.77
PB08	416481.09	757205.86
PB09	416505.52	757208.08
PB10	416483.21	757172.94
PB11	416501.98	757168.22
PB12	416536.23	757127.78
PB13	416513.59	757106.66
PB14	416489.25	757122.58
PB15	416464.13	757082.98
PB16	416440.46	757039.00
PB17	416428.71	757016.88
PB18	416419.99	757000.60
PB19	416413.62	756999.32
PB20	416420.54	757042.31
PB21	416438.11	757075.19
PB22	416455.80	757108.32
PB23	416473.50	757141.26

REV	REVISION DETAILS	BY	DATE
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DRAWN: DKP DATE: 03.2020
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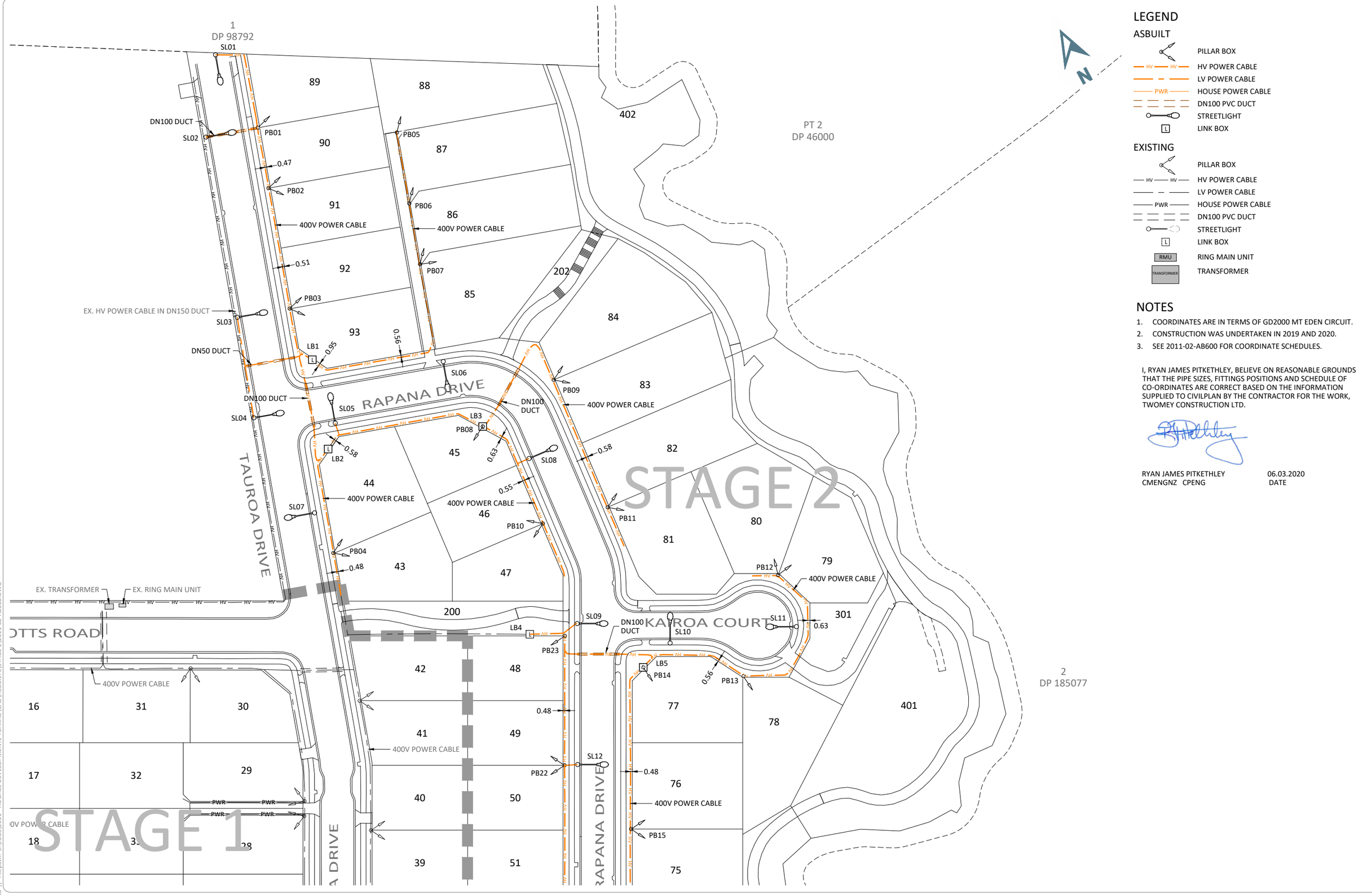
APPROVED: RJP DATE: 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
POWER SUPPLY ASBUILT PLAN
STAGE 2 - SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB600 REV: A



LEGEND

ASBUILT

- PILLAR BOX
- HV POWER CABLE
- LV POWER CABLE
- HOUSE POWER CABLE
- DN100 PVC DUCT
- STREETLIGHT
- LINK BOX

EXISTING

- PILLAR BOX
- HV POWER CABLE
- LV POWER CABLE
- HOUSE POWER CABLE
- DN100 PVC DUCT
- STREETLIGHT
- LINK BOX
- RMU — RING MAIN UNIT
- TRANSFORMER

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.
3. SEE 2011-02-AB600 FOR COORDINATE SCHEDULES.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS AND SCHEDULE OF CO-ORDINATES ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

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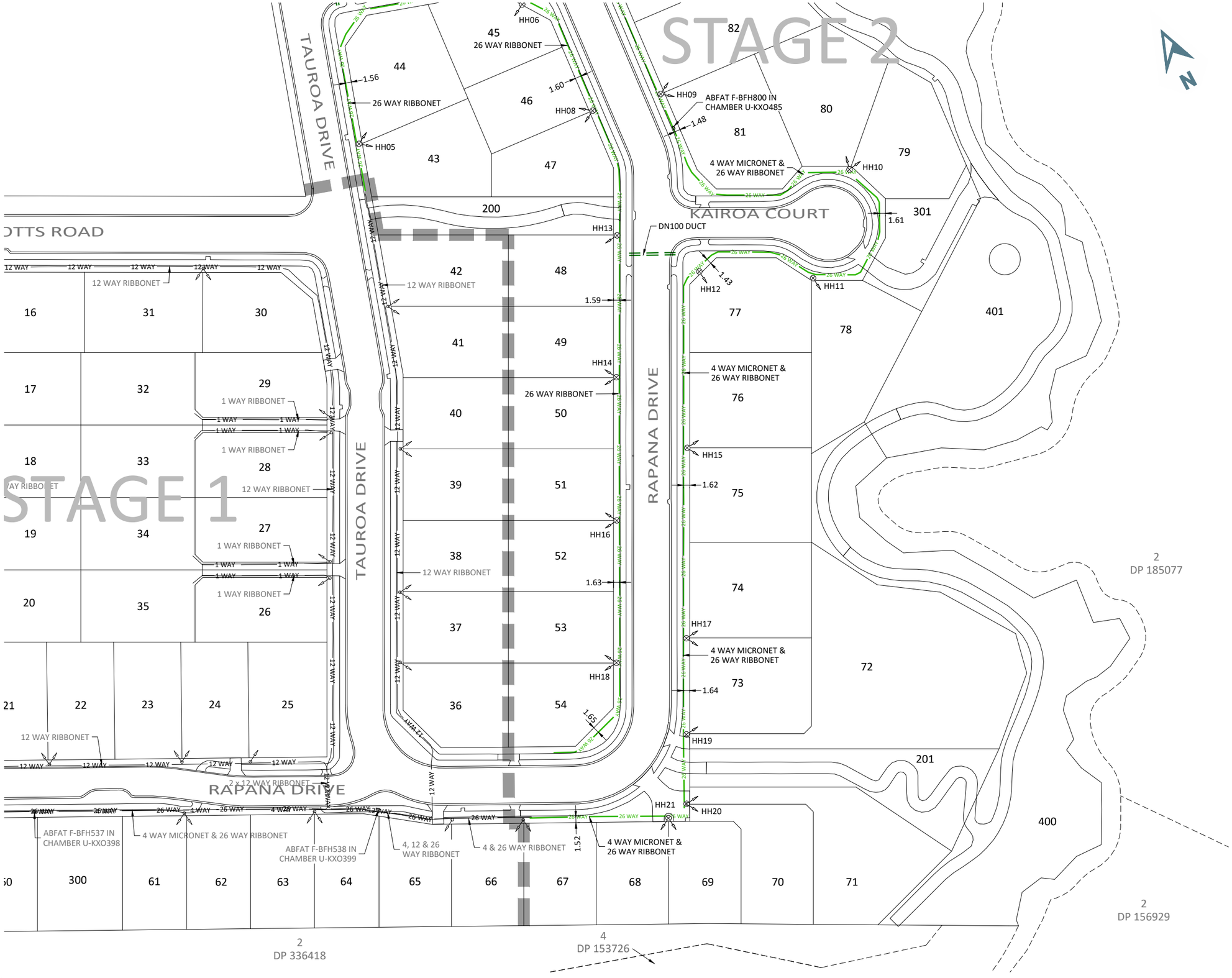
CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
POWER SUPPLY ASBUILT PLAN
STAGE 2 - SHEET 2
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB601 REV: A



LEGEND

ASBUILT

- HANDHOLE & HOUSE LEADS
- 1 WAY RIBBONET
- 4 WAY RIBBONET
- 12 WAY RIBBONET
- 26 WAY RIBBONET
- 4 WAY MICRONET
- DN100 PVC DUCT

EXISTING

- HANDHOLE & HOUSE LEADS
- 1 WAY RIBBONET
- 4 WAY RIBBONET
- 12 WAY RIBBONET
- 26 WAY RIBBONET
- 4 WAY MICRONET
- DN100 PVC DUCT
- STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS AND SCHEDULE OF CO-ORDINATES ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

SCHEDULE OF COORDINATES HAND HOLES-GD2000

POINT No.	mE	mN
HH01	416463.61	757313.10
HH02	416458.41	757295.92
HH03	416447.35	757262.49
HH04	416479.20	757231.31
HH05	416425.37	757194.08
HH06	416480.42	757206.17
HH07	416505.03	757208.06
HH08	416483.59	757172.84
HH09	416501.40	757168.31
HH10	416535.77	757127.49
HH11	416513.93	757106.86
HH12	416488.39	757122.44
HH13	416473.81	757140.97
HH14	416456.13	757108.23
HH15	416463.80	757083.13
HH16	416438.53	757075.01
HH17	416440.11	757039.16
HH18	416420.86	757042.14
HH19	416428.19	757016.91
HH20	416419.67	757000.82
HH21	416413.70	756999.75

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

DRAWN: DKP 03.2020
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APPROVED: RJP 06.03.20

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
CHORUS ASBUILT PLAN
STAGE 2 - SHEET 1
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB610 REV: A

LEGEND

ASBUILT

- HANDHOLE & HOUSE LEADS
- 1 WAY — 1 WAY RIBBONET
- 4 WAY — 4 WAY RIBBONET
- 12 WAY — 12 WAY RIBBONET
- 26 WAY — 26 WAY RIBBONET
- 4 WAY MICRONET
- DN100 PVC DUCT

EXISTING

- HANDHOLE & HOUSE LEADS
- 1 WAY — 1 WAY RIBBONET
- 4 WAY — 4 WAY RIBBONET
- 12 WAY — 12 WAY RIBBONET
- 26 WAY — 26 WAY RIBBONET
- 4 WAY MICRONET
- DN100 PVC DUCT
- STAGE BOUNDARY

NOTES

1. COORDINATES ARE IN TERMS OF GD2000 MT EDEN CIRCUIT.
2. CONSTRUCTION WAS UNDERTAKEN IN 2019 AND 2020.

I, RYAN JAMES PITKETHLEY, BELIEVE ON REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS POSITIONS AND SCHEDULE OF CO-ORDINATES ARE CORRECT BASED ON THE INFORMATION SUPPLIED TO CIVILPLAN BY THE CONTRACTOR FOR THE WORK, TWOMEY CONSTRUCTION LTD.

RYAN JAMES PITKETHLEY
CMENGNZ CPENG

06.03.2020
DATE

SCHEDULE OF COORDINATES HAND HOLES-GD2000

POINT No.	mE	mN
HH01	416463.61	757313.10
HH02	416458.41	757295.92
HH03	416447.35	757262.49
HH04	416479.20	757231.31
HH05	416425.37	757194.08
HH06	416480.42	757206.17
HH07	416505.03	757208.06
HH08	416483.59	757172.84
HH09	416501.40	757168.31
HH10	416535.77	757127.49
HH11	416513.93	757106.86
HH12	416488.39	757122.44
HH13	416473.81	757140.97
HH14	416456.13	757108.23
HH15	416463.80	757083.13
HH16	416438.53	757075.01
HH17	416440.11	757039.16
HH18	416420.86	757042.14
HH19	416428.19	757016.91
HH20	416419.67	757000.82
HH21	416413.70	756999.75

REV	REVISION DETAILS	BY	DATE
A	AS BUILT ISSUE	TRS	06.03.20

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Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
HUGHES DEVELOPMENTS LIMITED
99 ESCOTTS ROAD
TUAKAU

SHEET TITLE:
CHORUS ASBUILT PLAN
STAGE 2 - SHEET 2
SUB0311/18 & LUC0489/18

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 2011-02-AB611 REV: A

Appendix 2

Field Density Test Summary Sheets

GEOTECHNICS

Our Ref: 1009213.0070.0.0/1
Customer Ref: J00779
5 June 2019

Lander Geotechnical Ltd
PO Box 97 385
Manukau
Auckland 2241

Attention: Shane Lander

Dear Shane

99 Escotts Road, Tuakau

Site Report

Customer's Instructions

We were instructed to:

Complete nuclear densometer, shear vane and impact hammer testing at the above mentioned site when requested and report the results.

Specifications

As per email from Mike (Lander Geotechnical) on the 8/01/2019 the specification for Earthworks Testing was as follows;

- Average air voids <10% with maximum air voids 12%.
- Average shear strength >140 kPa with minimum single value 120 kPa.
- Average value to be determined over 10 consecutive tests.

Dates of Procedures

Testing was carried out from the 16/1/2019 to the 8/05/2019.

Locations

Testing was carried out as instructed by the contractor on site. Test locations were selected on site by the Geotechnics technician on behalf of the customer.

The attached plan provides indicative locations only and is not to scale. All other information we provide regarding location should be referenced to the asset owner.

Samples

Samples taken for moisture content verification purposes were disposed of 24 hours after testing.

Methods

NZGS 8:2001 - Test method for determining the vane shear strength of a cohesive soil using a hand held shear vane.

NZS 4407:1991 Test 4.2.1 - Method using a nuclear surface moisture-density gauge (Direct Transmission Mode) – NDM

NZS 4402:1986 Test 2.1 - Determination of water content

ASTM D 5874-16 - Standard test method for determination of the impact value (IV) of a soil – Impact Test

Material Description

Material descriptions are provided in the attached results.

Results

The following is attached:

Earthworks testing results, impact hammer results and testing location plans.

Test Remarks

Shear Vane

Shear Vane tests are potentially unsuitable for material described in the earthworks summary as 'Clay SILT w gravels' or 'Clay Strippings'. Tests in these materials may not be compliant with the stated test method and results are therefore not covered under the IANZ endorsement of this report. Results are provided for your own interpretation and inference.

NDM – Direct Transmission

The test method may not be appropriate for materials containing a nominal maximum particle size of >40 mm.

Nuclear densometers are calibrated for a bulk density range of 1,728 kg/m^3 to 2,756 kg/m^3. Test results outside of these bulk density limits are not covered under the IANZ endorsement of this report.

An assumed solid density value of 2.70t/m^3 was agreed with the customer. We do not take responsibility for misrepresentation or misinterpretation arising from the use of this assumed value to calculate air voids.

Oven calculated air voids (%) have been reported as zero if negative. The calculation of air voids is based on wet density, moisture content and the solid density. The wet density is measured by the nuclear densometer and the moisture content by oven drying. The calculation of air voids is not part of the test in NZS 4407 and is therefore not covered under the IANZ endorsement of this report.

Determination of Water Content

Samples used for the determination of the water content were taken in conjunction with nuclear densometer testing and disposed of after 24 hours.

Impact Value

Field procedure A was used. The test method is appropriate for materials having a maximum particle size of less than 37.5 mm. Results of tests that were performed on materials containing larger particle sizes, are not covered under the IANZ endorsement of this report.

Calculations of equivalent CBR are based on CBR = IV^{2}x0.07.

Pass/Fail Criteria

We accept no liability for any circumstances that may arise due to the inclusion of the pass/fail criteria or the use of this information by third parties. Pass/fail criteria are based solely on numerical values with no consideration given to uncertainty and are not covered under the IANZ endorsement of these results.

General Remarks

This report has been prepared for the benefit of Lander Geotechnical Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. The inherent uncertainties of site investigation work, mean the nature and continuity of subsoil away from the test location could vary from the data logged.

We provide the results for your interpretation and inference.

Descriptions are enclosed for your information, but are not covered under the IANZ endorsement of this report.

Sample(s) not destroyed during testing will be retained for one month from the date of this report before being discarded.

Please reproduce this report in full when transmitting to others or including in internal reports.

If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of the letterhead page.

GEOTECHNICS LTD

Report prepared by:

.....
Josh Allan
Project Manager

Authorised for Geotechnics by:

.....
Steven Anderson
Project Director
Approved Signatory

Report checked by:

.....
Daniel Brasting
CMT Field Coordinator

IANZ ACCREDITED LABORATORY

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

5-Jun-19

t:\geotechnicsgroup\projects\1009213\1009213.0070 - 99 escotts road, tuakau\workingmaterial\20190605 jra rpt1.docx

GEOTECHNICS

Job: 99 Escotts Road, Tuakau

Client: Lander Geotechnical Ltd.

Job #	1009213.0070.0.0/1
Entered By	JRA
Checked By	VIVE / SEBA
Approved By	SJA

URN	Tech.	Date	Location	Layer	Material	Test Type	NDM 0°			NDM 90°			AVERAGE NDM			Solid Density (t/m³) Assumed	Oven Moisture content (%)	Final Corrected		Average Air Voids (10 X Tests)	Shear Vane Reading (kPa)						Retest URN	PASS / FAIL	Comments
						NDM / SV	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)			Oven Dry Density (t/m³)	Average Air Voids (%)		Reading 1	Reading 2	Reading 3	Reading 4	Average SV (4 x Tests)	Average SV (10 X Sets)		(P) Pass / (F) Fail	
1.1	JRA	16/01/2019	Retaining Wall Backfill	~1m below FL	Clay SILT	NDM / SV	1.63	41.9	9.1	1.66	39.6	8.7	**1.65**	**40.8**	**8.9**	2.70	52.3	1.08	**3.3**	-	154	136	121	124	134	-	-	P
1.2						NDM / SV	1.63	48.7	6.2	1.63	48.0	6.4	**1.63**	**48.4**	**6.3**	2.70	51.6	1.07	**4.8**	-	184	163	136	199	171	-	-	P
2.1	JRA	24/01/2019	North East Fill - See Site Plan	RL 29.8	Clay SILT w gravels	NDM / SV	1.79	37.3	3.1	1.78	38.0	3.2	**1.78**	**37.7**	**3.2**	2.70	43.2	1.25	**0.0**	-	187	211	166	211	194	-	-	P
2.2				RL 29.7		NDM / SV	1.81	35.9	3.1	1.80	36.7	3.0	**1.80**	**36.3**	**3.0**	2.70	41.0	1.28	**0.3**	-	211	211	193	208	206	-	-	P
3.1	JRA	30/01/2019	South Retaining Wall Fill - See Site Plan	RL 30.4	Clay SILT	NDM / SV	1.54	51.6	9.8	1.54	52.2	9.7	**1.54**	**51.9**	**9.7**	2.70	51.9	1.01	**9.7**	-	166	130	157	181	159	-	-	P
3.2			South East Fill - See Site Plan	RL 37.6		NDM / SV	1.60	44.8	9.6	1.60	42.6	10.9	**1.60**	**43.7**	**10.2**	2.70	41.2	1.13	**11.5**	-	211	211	UTP	UTP	211	-	-	P
4.1	JRA	1/02/2019	South Retaining Wall Fill - See Site Plan	~FL	Clay SILT	NDM / SV	1.59	58.6	4.3	1.59	59.2	3.8	**1.59**	**58.9**	**4.1**	2.70	67.0	0.95	**1.0**	-	195	196	169	211	193	-	-	P
4.2						NDM / SV	1.57	52.3	8.0	1.57	52.0	8.3	**1.57**	**52.2**	**8.2**	2.70	50.7	1.04	**8.8**	-	178	163	196	166	176	-	-	P
5.1	JRA	9/02/2019	South Retaining Wall Fill - See Site Plan	~1m below FL	Clay SILT	NDM / SV	1.63	51.6	4.8	1.63	51.9	4.8	**1.63**	**51.8**	**4.8**	2.70	51.9	1.07	**4.7**	-	175	208	211	196	198	-	-	P	Retests after fill from URN 3 & 4 was removed and replaced
5.2						NDM / SV	1.66	51.9	2.9	1.66	49.9	3.6	**1.66**	**50.9**	**3.2**	2.70	48.5	1.12	**4.3**	4.8	199	211	211	193	204	184	-	P	
6.1	JRA	2/03/2019	South Retaining Wall Fill	~2m below FL	Clay SILT	NDM / SV	1.68	40.9	7.1	1.67	40.2	7.7	**1.68**	**40.6**	**7.4**	2.70	36.2	1.23	**9.8**	5.5	185	185	UTP	185	185	189	-	P	
6.2			North East Fill	~FL		NDM / SV	1.73	39.8	5.1	1.72	41.6	4.4	**1.72**	**40.7**	**4.7**	2.70	39.0	1.24	**5.7**	5.6	185	185	185	UTP	185	191	-	P	
7.1	JRA	8/03/2019	South Retaining Wall Fill	~1m below FL	Clay SILT	NDM / SV	1.66	42.2	7.6	1.66	39.2	9.3	**1.66**	**40.7**	**8.5**	2.70	39.6	1.19	**9.0**	6.5	185	UTP	UTP	182	184	190	-	P	
7.2						NDM / SV	1.80	38.1	1.9	1.80	37.0	2.6	**1.80**	**37.6**	**2.3**	2.70	34.6	1.34	**4.1**	6.9	185	185	185	164	180	187	-	P	
8.1	JRA	13/03/2019	South Retaining Wall Fill	~FL	Clay SILT	NDM / SV	1.72	50.5	0.1	1.72	48.8	0.8	**1.72**	**49.7**	**0.4**	2.70	44.9	1.19	**2.8**	6.2	185	185	185	185	185	190	-	P	
8.2						NDM / SV	1.73	45.0	2.1	1.73	45.1	2.2	**1.73**	**45.1**	**2.1**	2.70	41.5	1.22	**4.0**	5.4	185	185	185	185	185	187	-	P	
9.1	JRA	14/03/2019	South Retaining Wall Fill	Base of RW	Clay SILT	NDM / SV	1.66	50.0	3.5	1.65	50.3	4.0	**1.66**	**50.2**	**3.8**	2.70	51.4	1.09	**3.2**	5.6	185	142	185	145	164	184	-	P	
9.2				Toe of Batter		NDM / SV	1.68	47.7	3.5	1.68	48.9	3.2	**1.68**	**48.3**	**3.4**	2.70	46.7	1.14	**4.1**	5.2	185	185	161	148	170	184	-	P	
10.1	JRA	19/03/2019	North East Fill - See Site Plan	~0.3m below FL	Clay SILT	NDM / SV	1.79	36.2	3.8	1.79	37.5	3.0	**1.79**	**36.9**	**3.4**	2.70	35.8	1.32	**4.0**	5.1	185	185	148	185	176	182	-	P	
10.2						NDM / SV	1.71	41.3	5.2	1.71	41.7	5.0	**1.71**	**41.5**	**5.1**	2.70	38.1	1.24	**7.0**	5.4	185	185	185	185	185	180	-	P	
11.1	VIVE	27/03/2019	North East Fill - See Site Plan	~1m placed	Clay SILT	NDM / SV	1.79	34.1	5.1	1.77	34.8	5.8	**1.78**	**34.5**	**5.5**	2.70	48.1	1.20	**0.0**	4.4	160	211	196	211	195	181	-	P	
11.2						NDM / SV	1.55	33.2	18.4	1.54	31.9	19.3	**1.55**	**32.6**	**18.8**	2.70	36.1	1.14	**16.9**	-	178	163	211	205	189	-	**20.2**	F	
12.1	JRA	5/04/2019	South Retaining Wall Fill	~1.5m below top of RW	Clay SILT w gravels	NDM / SV	1.84	36.8	0.7	1.84	36.7	0.9	**1.84**	**36.8**	**0.8**	2.70	38.5	1.33	**0.0**	4.6	185	185	185	185	185	181	-	P	
12.2				~1m below top of RW		NDM / SV	1.92	30.5	0.9	1.88	32.6	1.2	**1.90**	**31.6**	**1.0**	2.70	34.1	1.42	**0.0**	4.2	185	185	185	185	185	182	-	P	
13.1	JRA	9/04/2019	Old SILT Pond & South Retaining Wall Fill	~1.5m below top of RW	Clay SILT w gravels	NDM / SV	1.77	41.9	1.6	1.76	40.9	2.5	**1.77**	**41.4**	**2.1**	2.70	40.7	1.25	**2.5**	4.2	185	161	185	171	176	181	-	P	
13.2				~2m below top of RW		NDM / SV	1.78	39.2	2.7	1.78	40.1	1.9	**1.78**	**39.7**	**2.3**	2.70	40.1	1.27	**2.0**	4.0	148	185	174	145	163	179	-	P	
15.1	VIVE	16/04/2019	Fill Area-See Site Plan	~0.7m Placed	Clay SILT w gravels	NDM / SV	1.71	38.2	6.9	1.72	37.9	6.7	**1.71**	**38.1**	**6.8**	2.70	42.4	1.20	**4.4**	4.1	211	211	211	181	204	183	-	P	
15.2						NDM / SV	1.68	38.2	8.8	1.71	40.2	5.9	**1.69**	**39.2**	**7.3**	2.70	37.3	1.23	**8.4**	4.5	181	169	166	133	162	182	-	P	
16.1	VIVE	17/04/2019	Fill Area-See Site Plan	~1.2m Placed	Clay SILT w gravels	NDM / SV	1.73	35.7	7.4	1.75	35.9	6.1	**1.74**	**35.8**	**6.7**	2.70	33.6	1.30	**8.1**	4.9	178	181	175	142	169	181	-	P	
16.2						NDM / SV	1.65	47.5	5.6	1.66	43.7	6.9	**1.65**	**45.6**	**6.2**	2.70	56.4	1.06	**1.3**	4.4	211	184	211	211	204	183	-	P	
17.1	VIVE	26/04/2019	South Retaining Wall Fill	~1.5m below top of RW	Clay SILT	NDM / SV	1.67	45.1	5.6	1.66	47.5	4.6	**1.67**	**46.3**	**5.1**	2.70	49.3	1.12	**3.6**	4.7	136	157	136	133	141	178	-	P	
17.2				~1m below top of RW		NDM / SV	1.68	48.7	3.4	1.66	50.5	3.4	**1.67**	**49.6**	**3.4**	2.70	55.3	1.07	**0.8**	3.1	166	208	136	181	173	176	-	P	
18.1	VIVE	1/05/2019	South Retaining Wall Fill	~1m below top of RW	Clay SILT	NDM / SV	1.68	43.9	5.5	1.68	46.8	4.3	**1.68**	**45.4**	**4.9**	2.70	52.3	1.10	**1.6**	3.3	154	142	181	154	158	173	-	P	
18.2						NDM / SV	1.87	21.3	10.0	1.89	20.9	9.4	**1.88**	**21.1**	**9.7**	2.70	20.9	1.56	**9.9**	4.3	211	211	181	211	204	175	-	P	
19.1	JRA	3/05/2019	South Retaining Wall Fill	~0.5m below FL	Clay Strippings	NDM / SV	1.97	18.0	8.1	1.99	17.6	7.8	**1.98**	**17.8**	**7.9**	2.70	16.8	1.69	**8.8**	4.9	UTP	UTP	UTP	UTP	UTP	175	-	P	
19.2						NDM / SV	1.91	19.1	9.9	1.92	18.3	10.3	**1.91**	**18.7**	**10.1**	2.70	20.9	1.58	**8.2**	5.5	UTP	UTP	UTP	UTP	UTP	177	-	P	
20.1	JRA	8/05/2019	South Retaining Wall Fill	Top of RW (~FL)	Clay Strippings	NDM / SV	1.88	28.7	4.2	1.88	27.6	4.8	**1.88**	**28.2**	**4.5**	2.70	38.3	1.36	**0.0**	5.1	185	UTP	UTP	UTP	185	174	-	P	
20.2			North East Fill - See Site Plan	~1m placed	Clay SILT	NDM / SV	1.76	31.9	7.9	1.77	32.9	7.0	**1.77**	**32.4**	**7.4**	2.70	33.9	1.32	**6.5**	4.9	185	185	UTP	185	185	177	-	P	Retest of URN 11.2

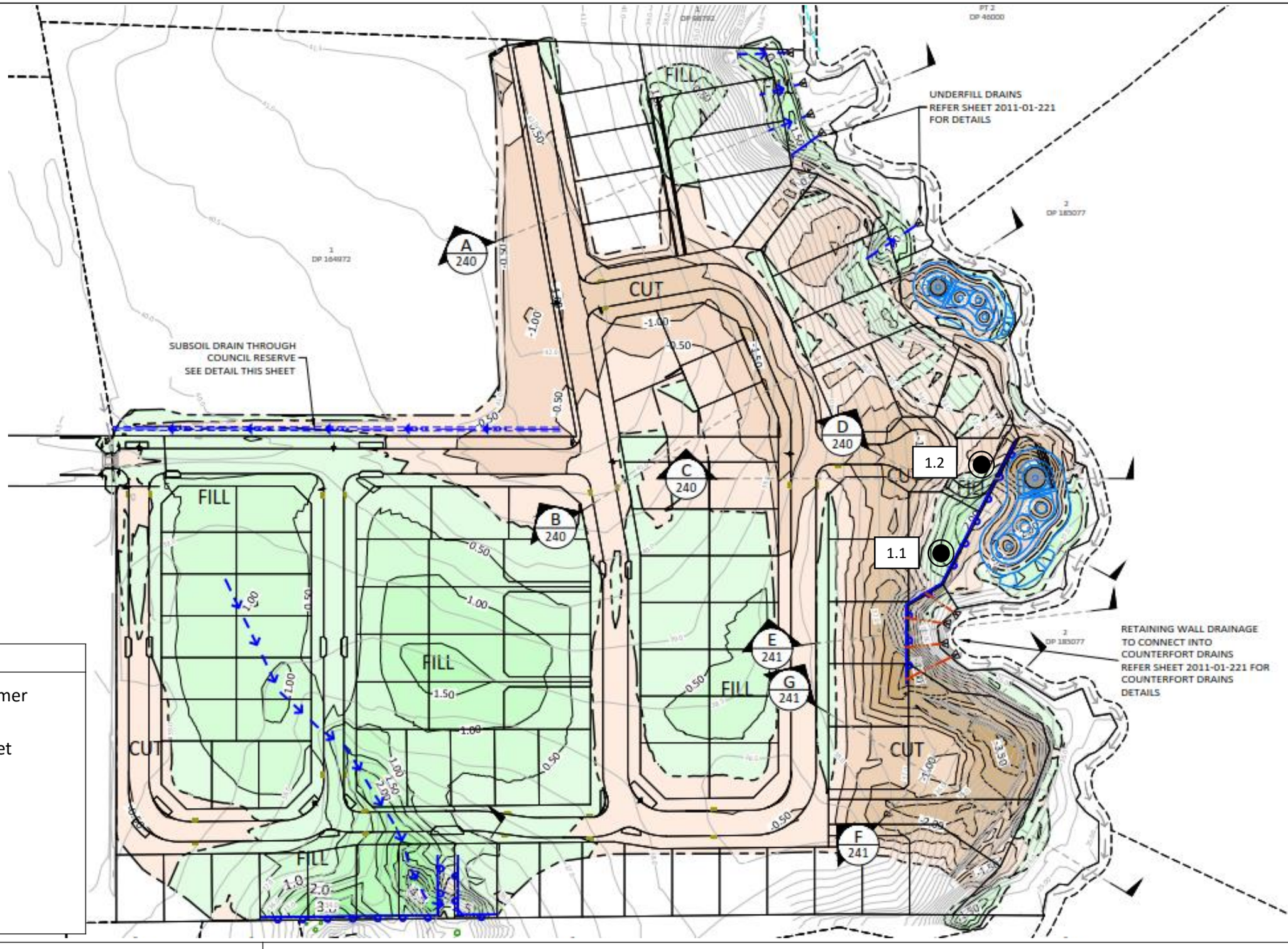
GEOTECHNICS

Job : **99 Escotts Road, Tuakau**

Customer: **Lander Geotechnical Ltd.**

Job #	**1009213.0070.0.0/1**
Entered By	**VIVE**
Checked By	**SEBA**
Approved By	**JRA**

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								**Impact Value 1**	**Retest URN**	**PASS / FAIL**	**Comments**
								Wet Density	Dry Density (t/m^3)	Moisture Content (%)	Maximum Dry Density (t/m^3)	% Maximum Dry Density	Solid Density (t/m^3)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
14.1	VIVE	13/04/2019	GAP 65	Old SILT Pond Area - See Site Plan	Subgrade Improvement	-	-	-	-	-	-	-	-	-	-	**16**	-	**P**	**Impact value > 15 required for backfill as informed by Jock (Twomey).**
14.2						-	-	-	-	-	-	-	-	-	-	**16**	-	**P**	
14.3						-	-	-	-	-	-	-	-	-	-	**29**	-	**P**	
14.4						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
14.5						-	-	-	-	-	-	-	-	-	-	**27**	-	**P**	
14.6						-	-	-	-	-	-	-	-	-	-	**18**	-	**P**	



Legend:

- Impact Hammer
- NDM & SV Set
- Shear Vane
- Scala
- Hand Auger

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e. enquiry@geotechnics.co.nz

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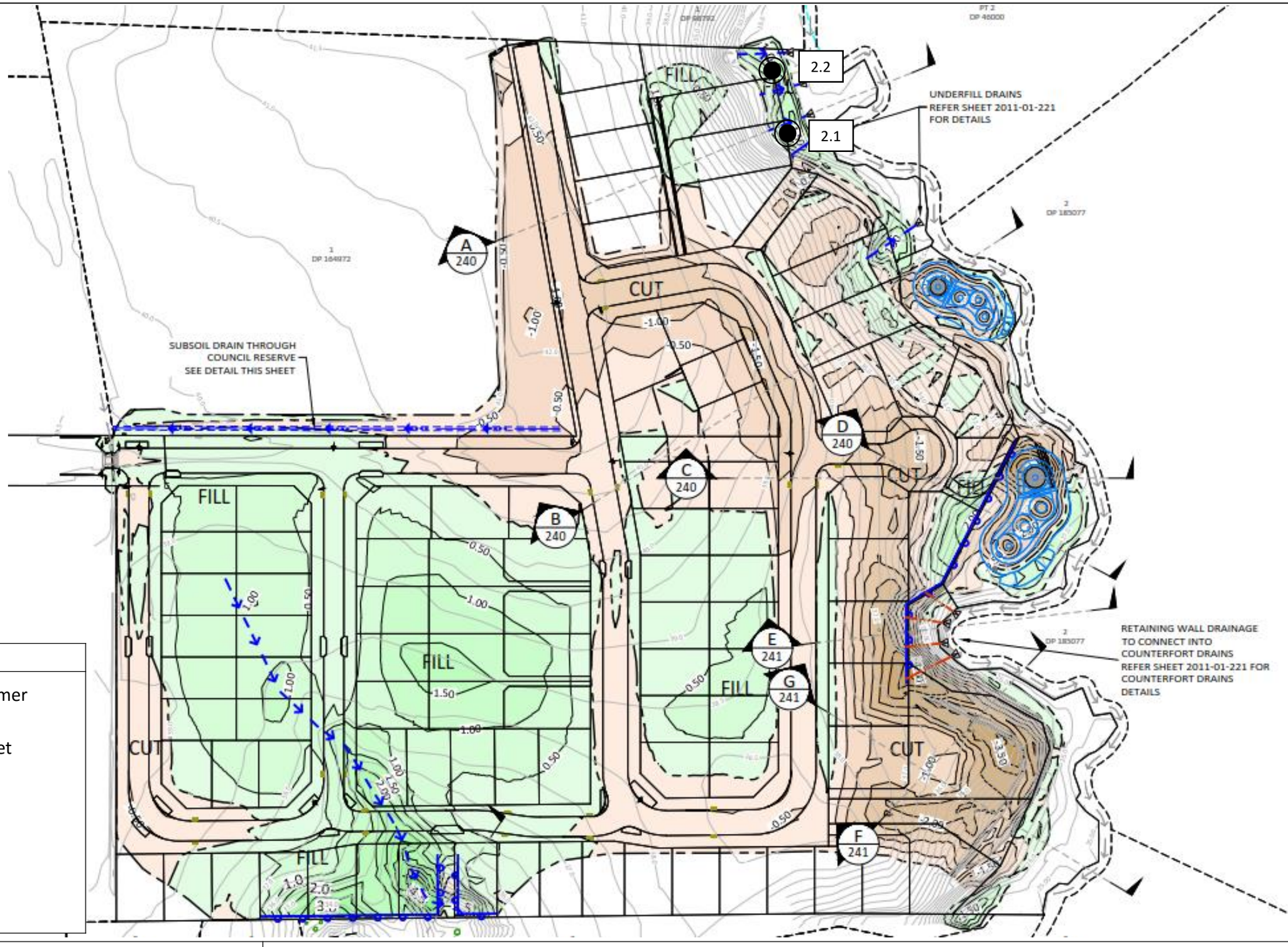
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	16/1/19
Location:	Retaining Wall Backfill	Job No.:	1009213.0070.0.0/1	URN:	1	Date:	16/1/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	24/1/19
Location:	Stage 2- Fill Area	Job No.:	1009213.0070.0.0/1	URN:	2	Date:	24/1/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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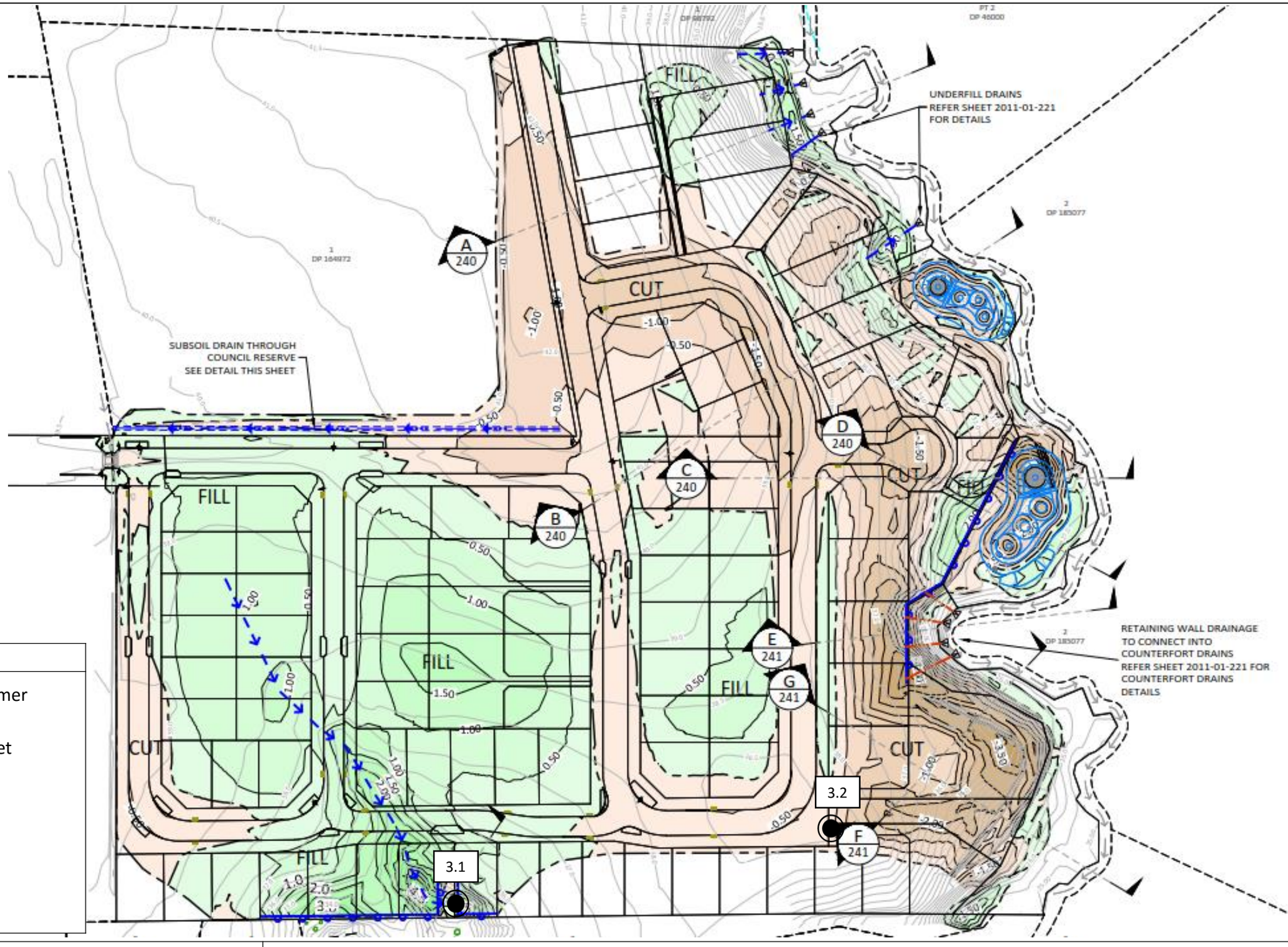

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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	30/1/19
Location:	Fill Areas	Job No.:	1009213.0070.0.0/1	URN:	3	Date:	30/1/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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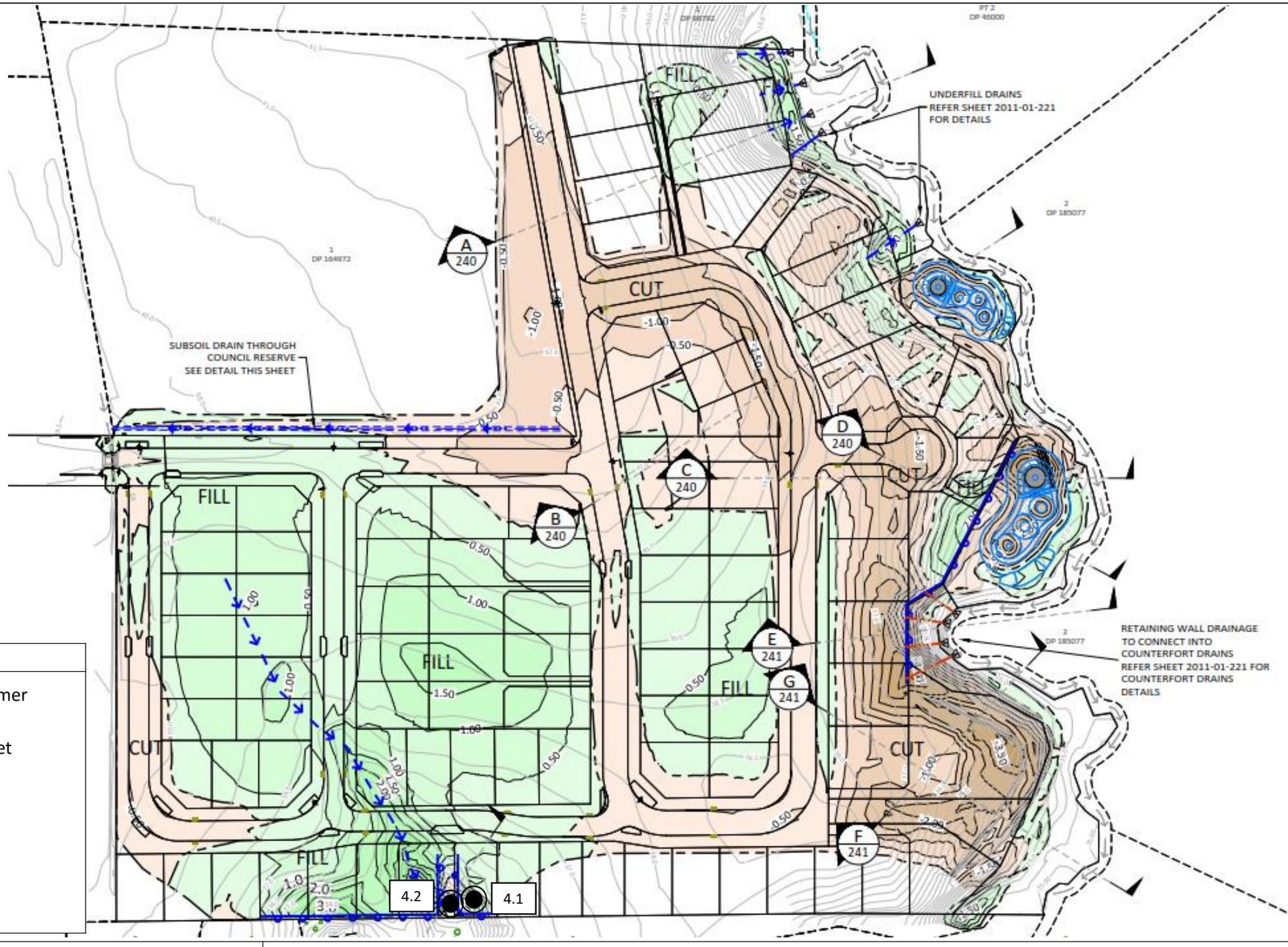

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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	1/2/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	4	Date:	1/2/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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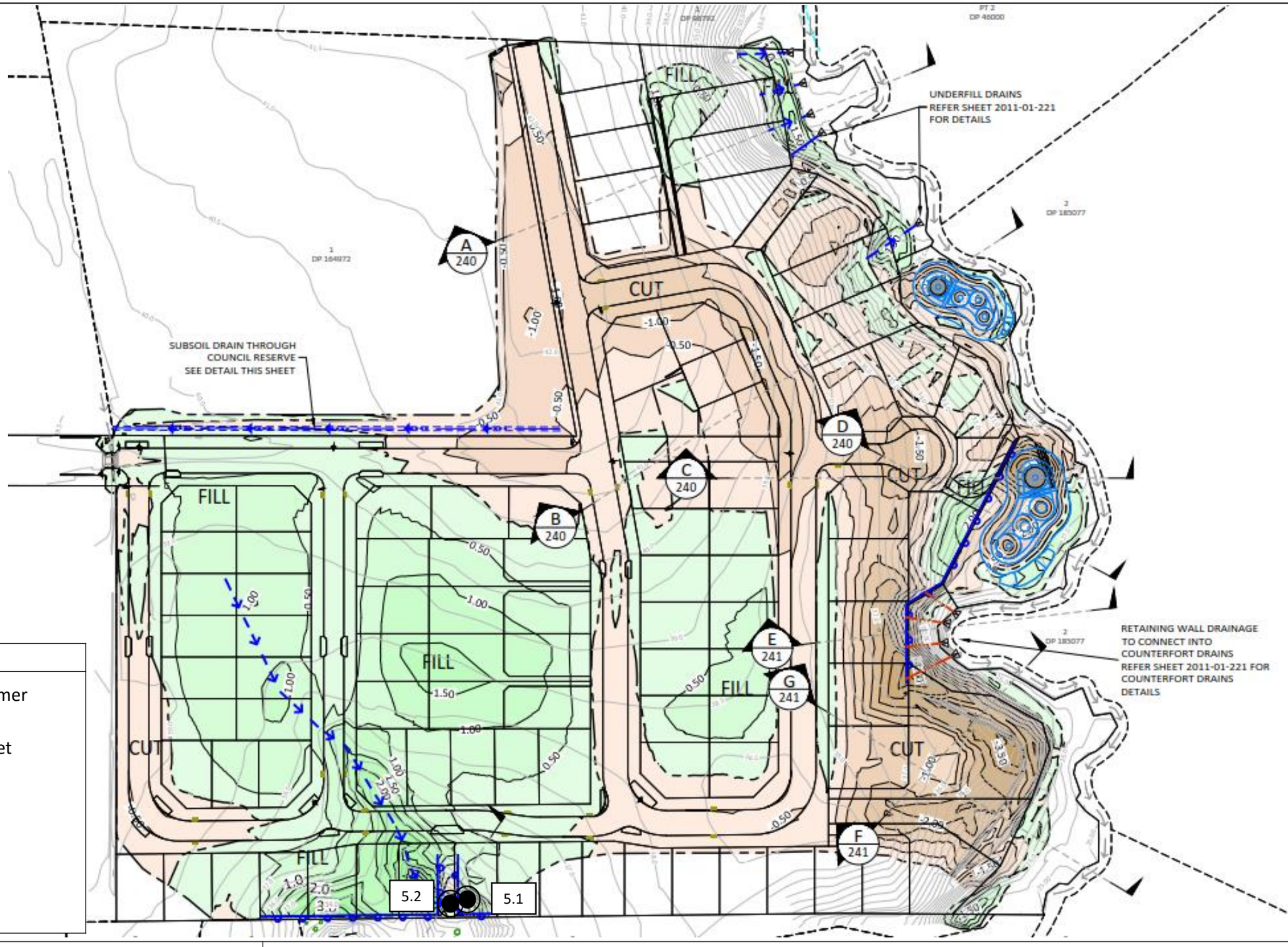

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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	9/2/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	5	Date:	9/2/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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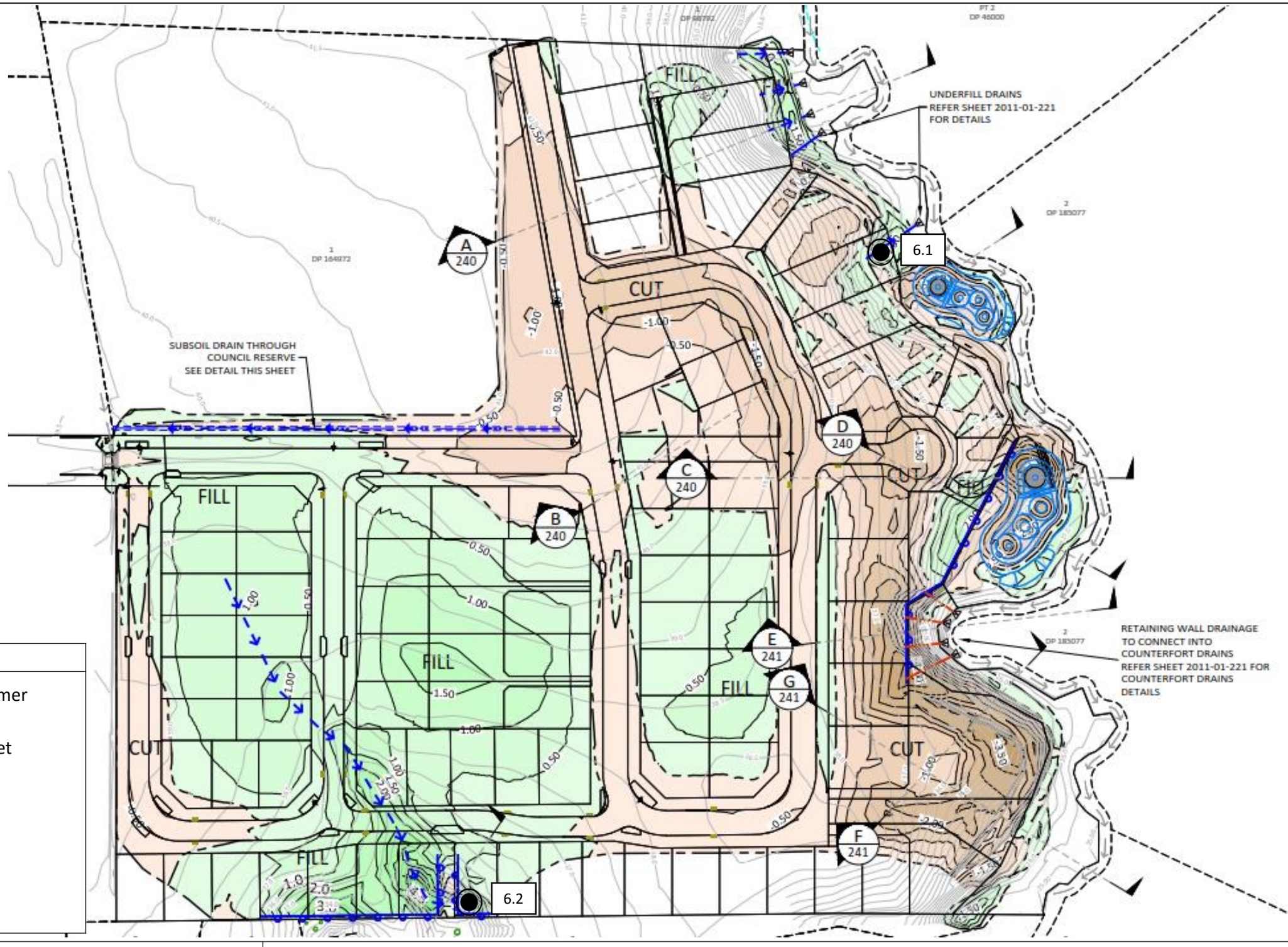

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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	2/3/19
Location:	Fill Area	Job No.:	1009213.0070.0.0/1	URN:	6	Date:	2/3/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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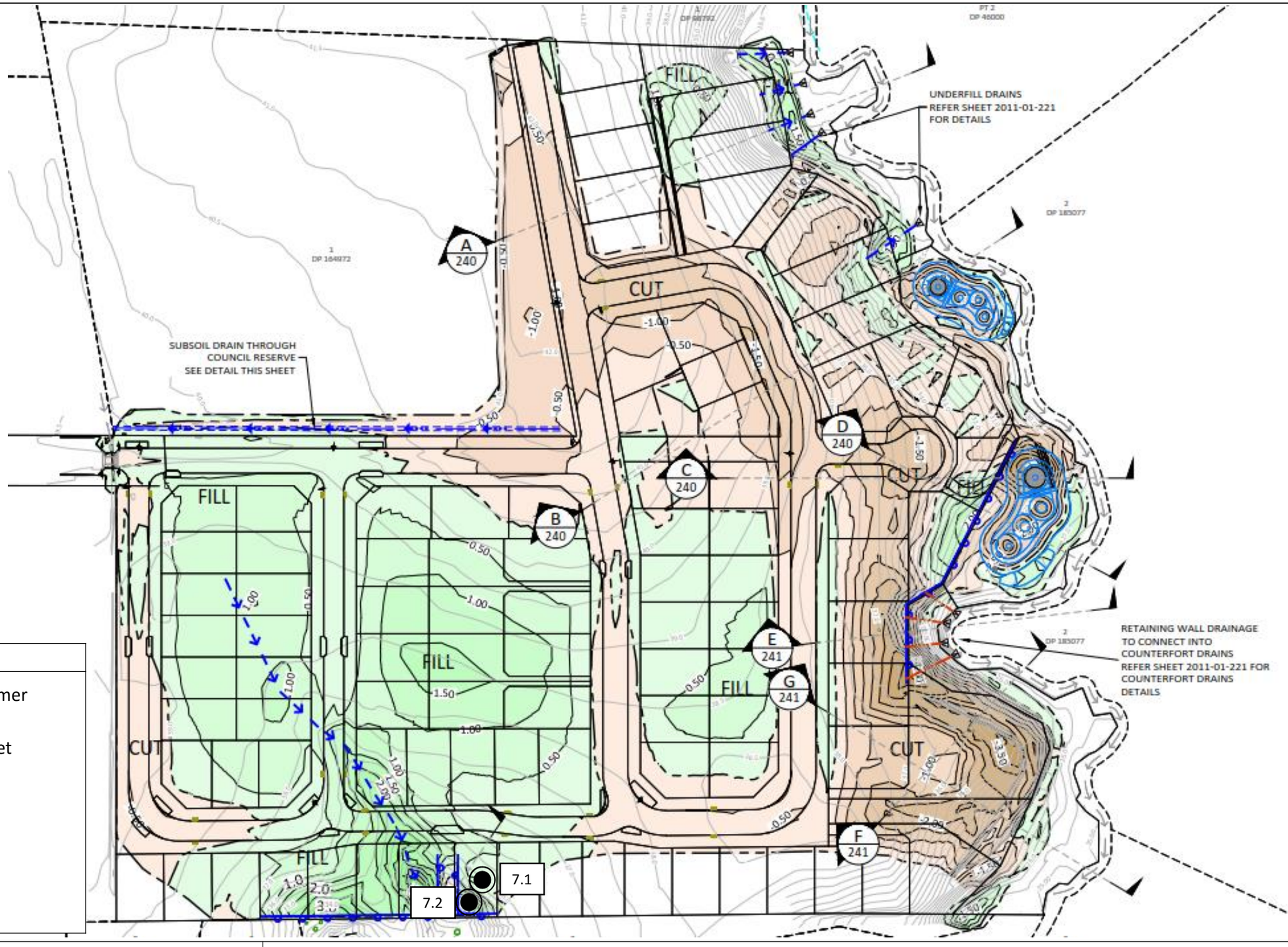

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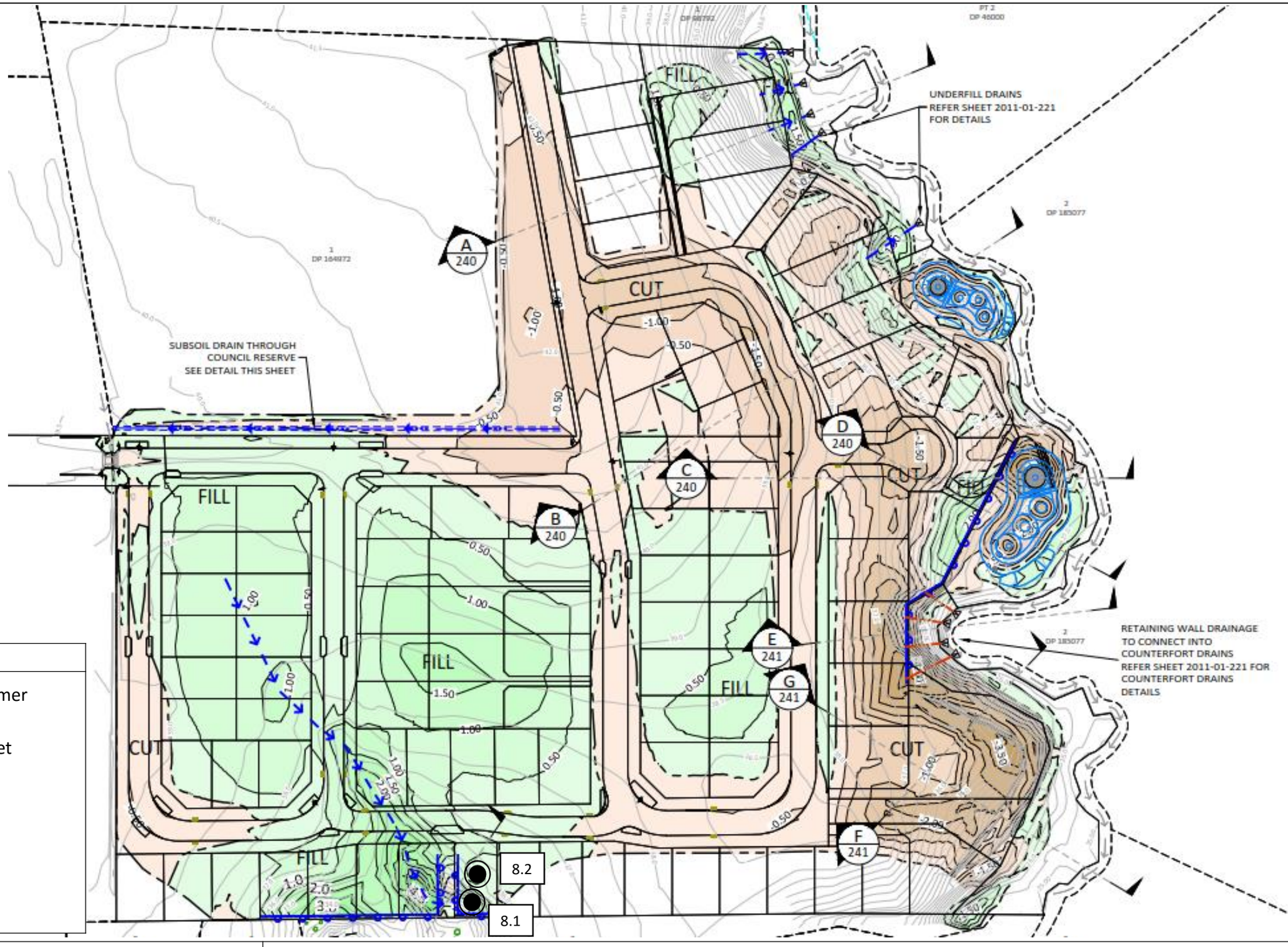
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	8/3/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	7	Date:	8/3/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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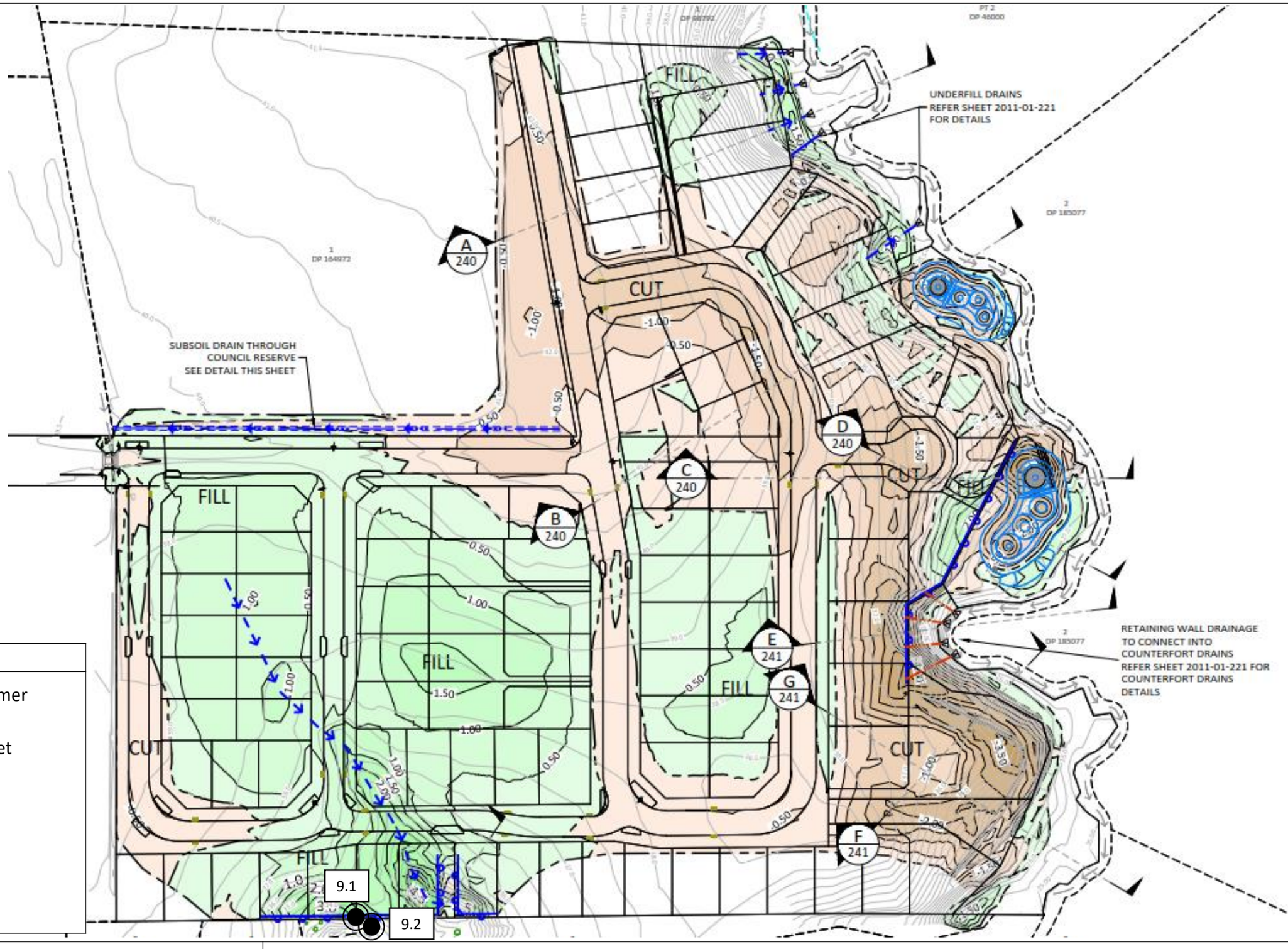
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	13/3/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	8	Date:	13/3/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



Legend:

- Impact Hammer
- NDM & SV Set
- Shear Vane
- Scala
- Hand Auger

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e. enquiry@geotechnics.co.nz

w. www.geotechnics.co.nz

Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	14/3/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	9	Date:	14/3/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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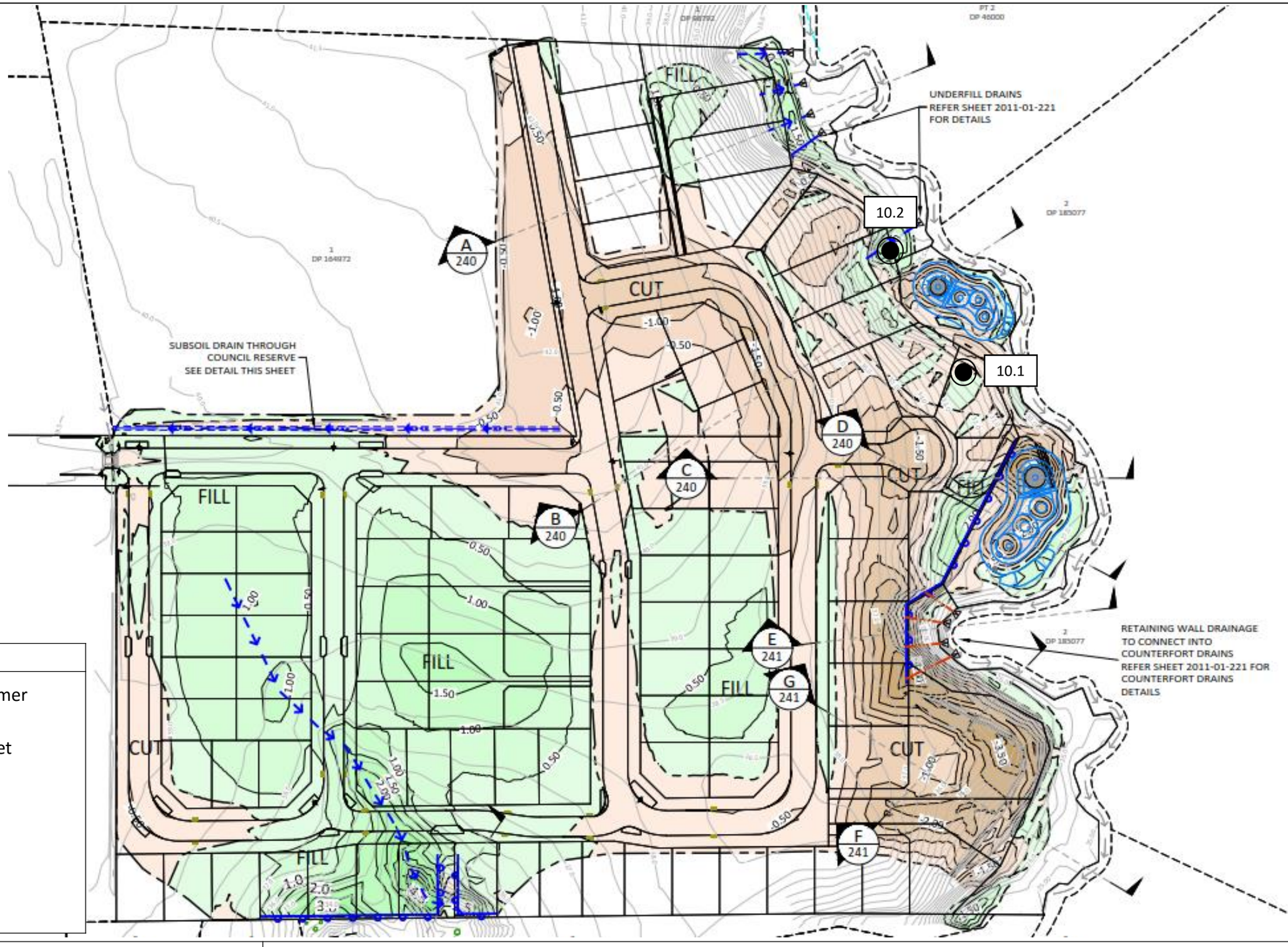

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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	19/3/19
Location:	Stage 2 Fill Area	Job No.:	1009213.0070.0.0/1	URN:	10	Date:	19/3/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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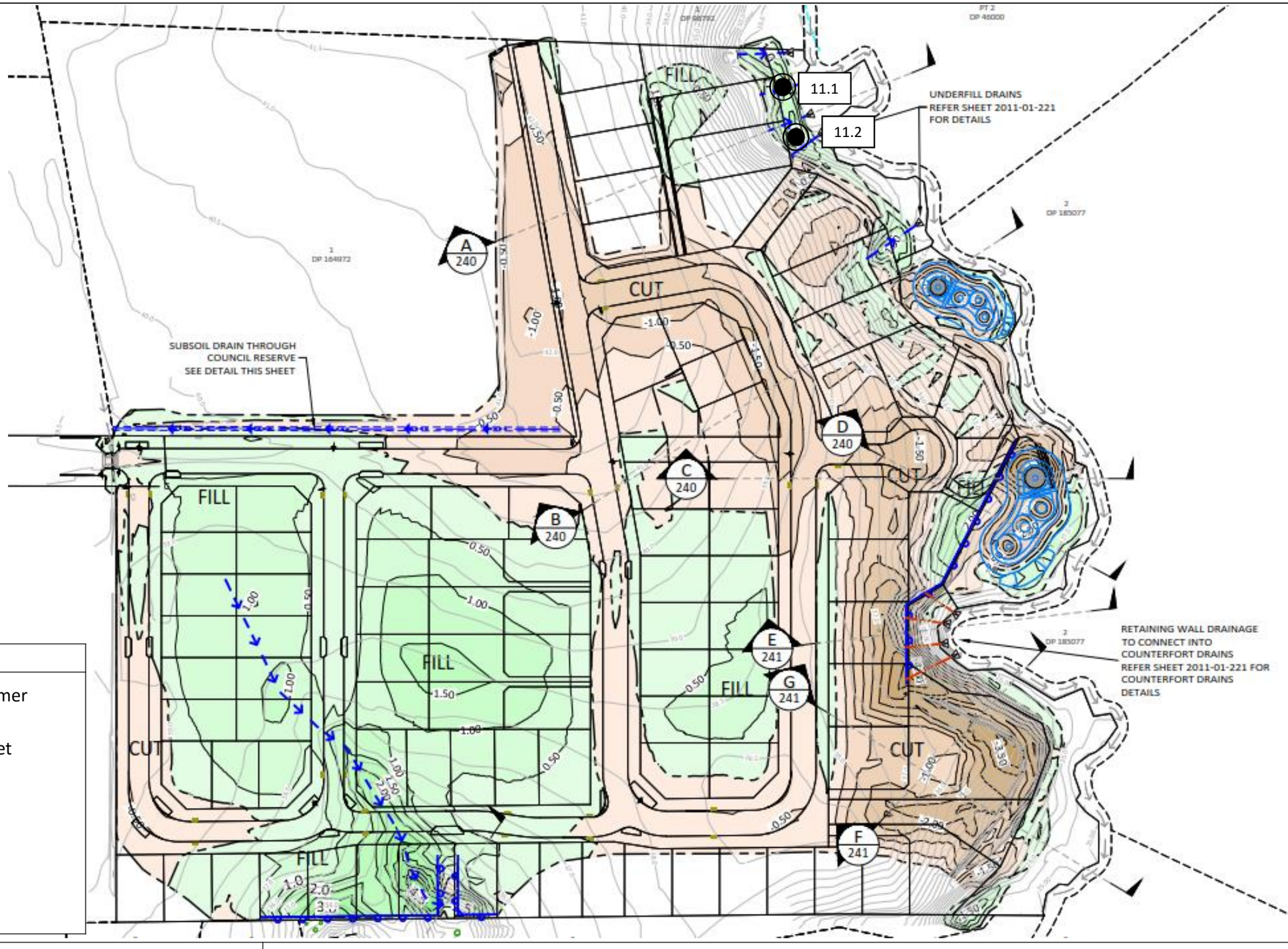

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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	VIVE	Date:	27/3/19
Location:	Stage 2 Fill Area	Job No.:	1009213.0070.0.0/1	URN:	11	Date:	27/3/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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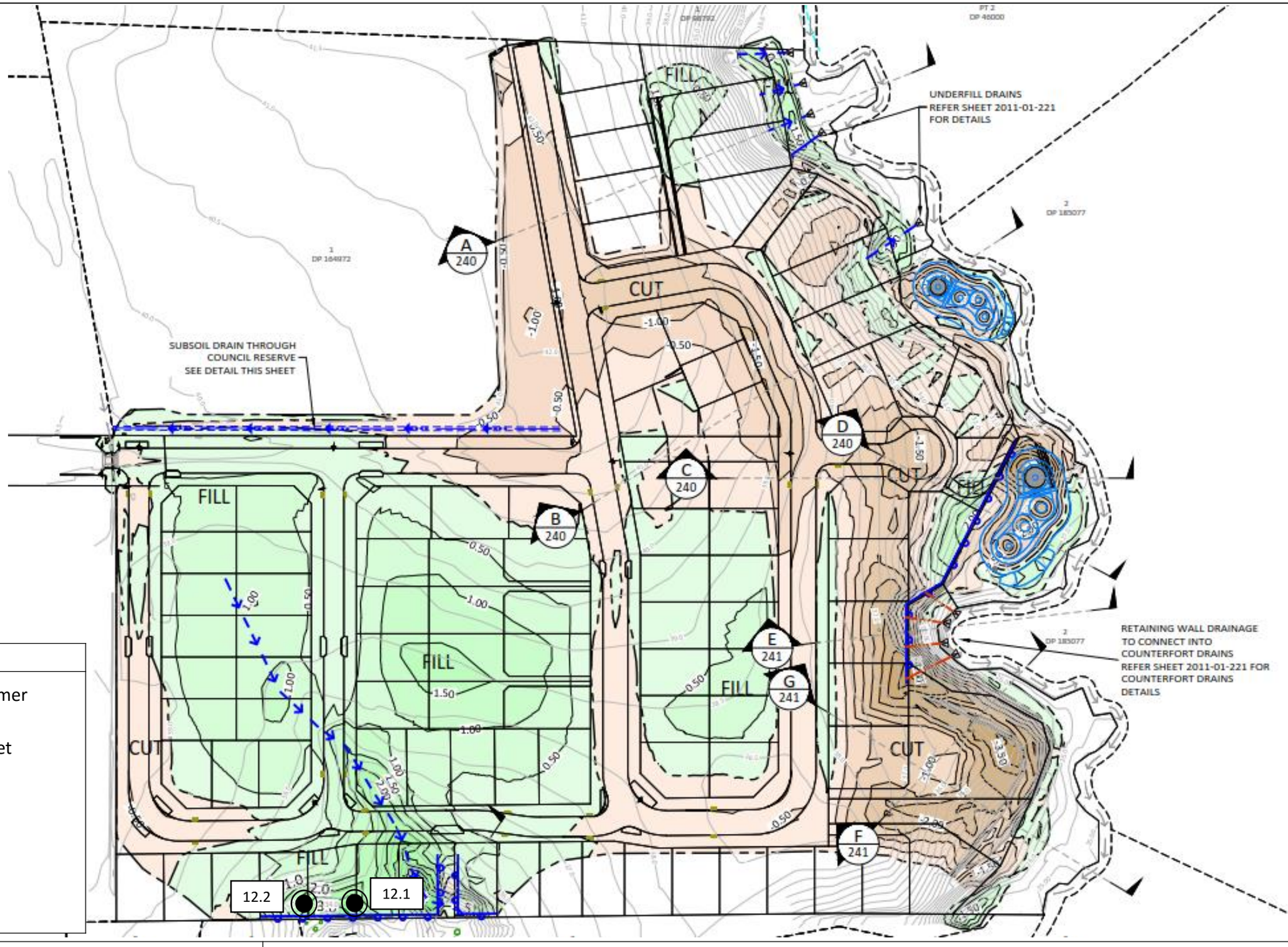

Legend:

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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	5/4/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	12	Date:	5/4/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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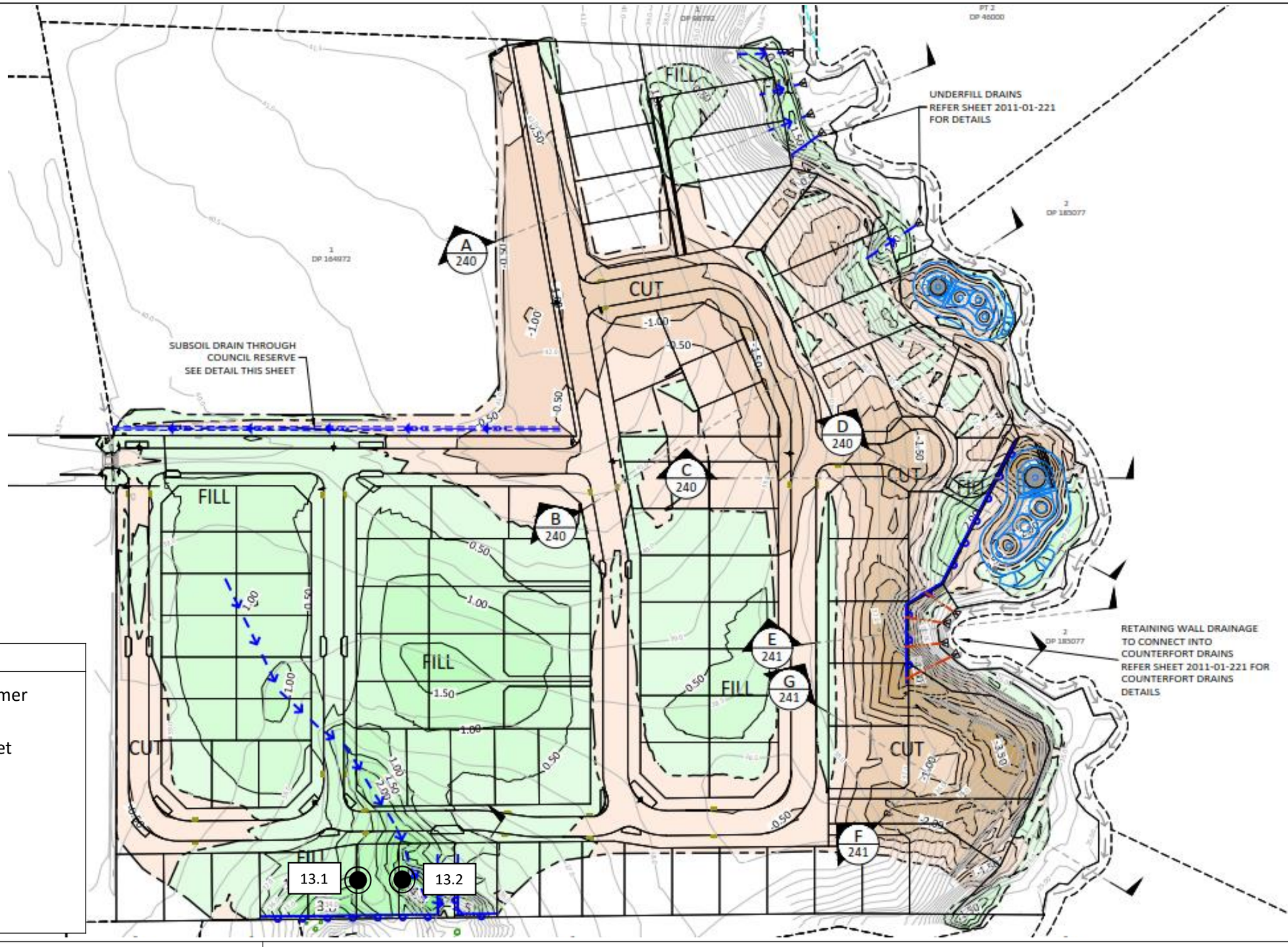

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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	9/4/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	13	Date:	9/4/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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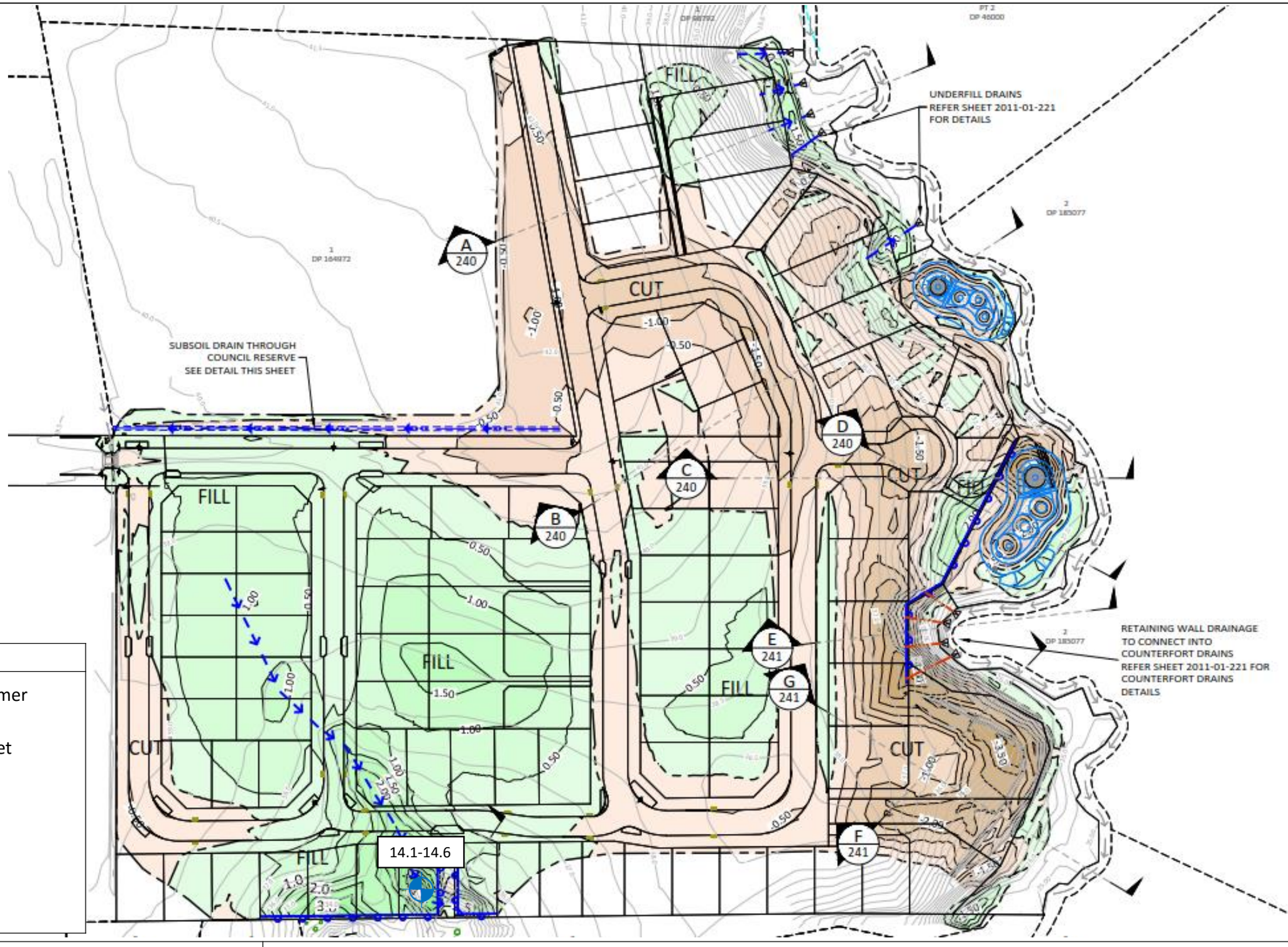

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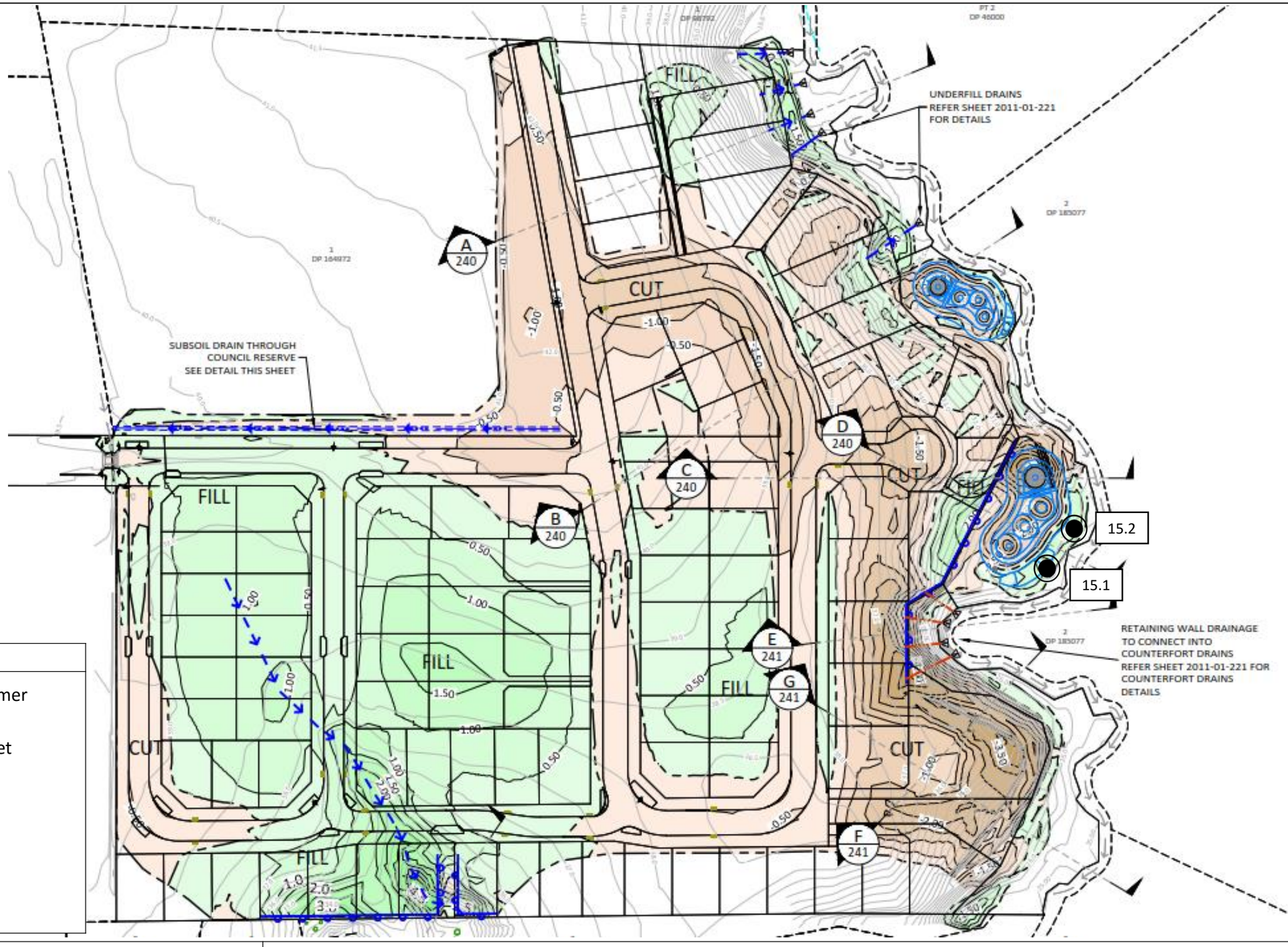
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	VIVE	Date:	13/4/19
Location:	Subgrade Improvement @ Detention Tank Area	Job No.:	1009213.0070.0.0/1	URN:	14	Date:	13/4/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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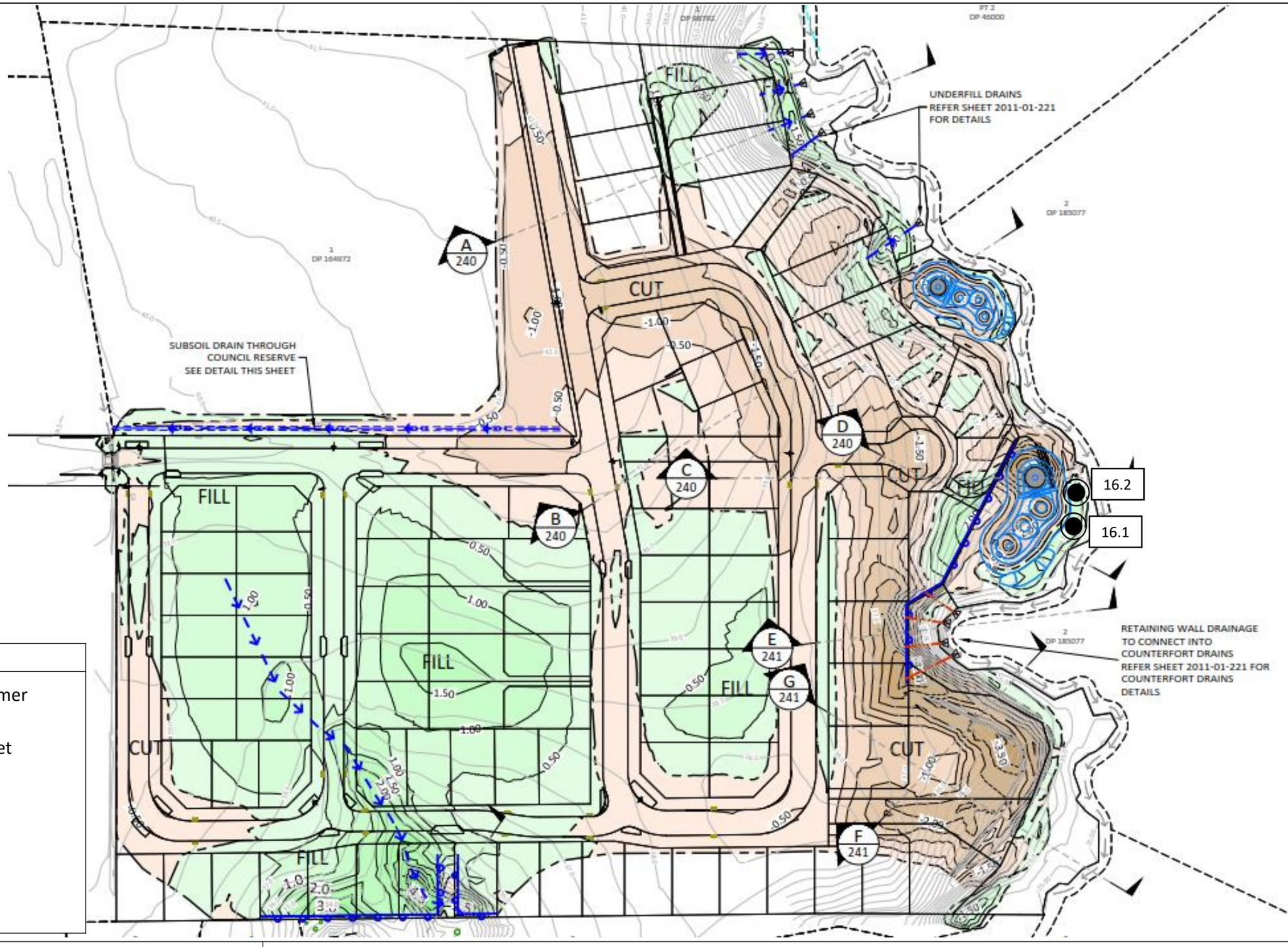
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	VIVE	Date:	16/4/19
Location:	Stage 2 Fill Area	Job No.:	1009213.0070.0.0/1	URN:	15	Date:	16/4/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



Legend:

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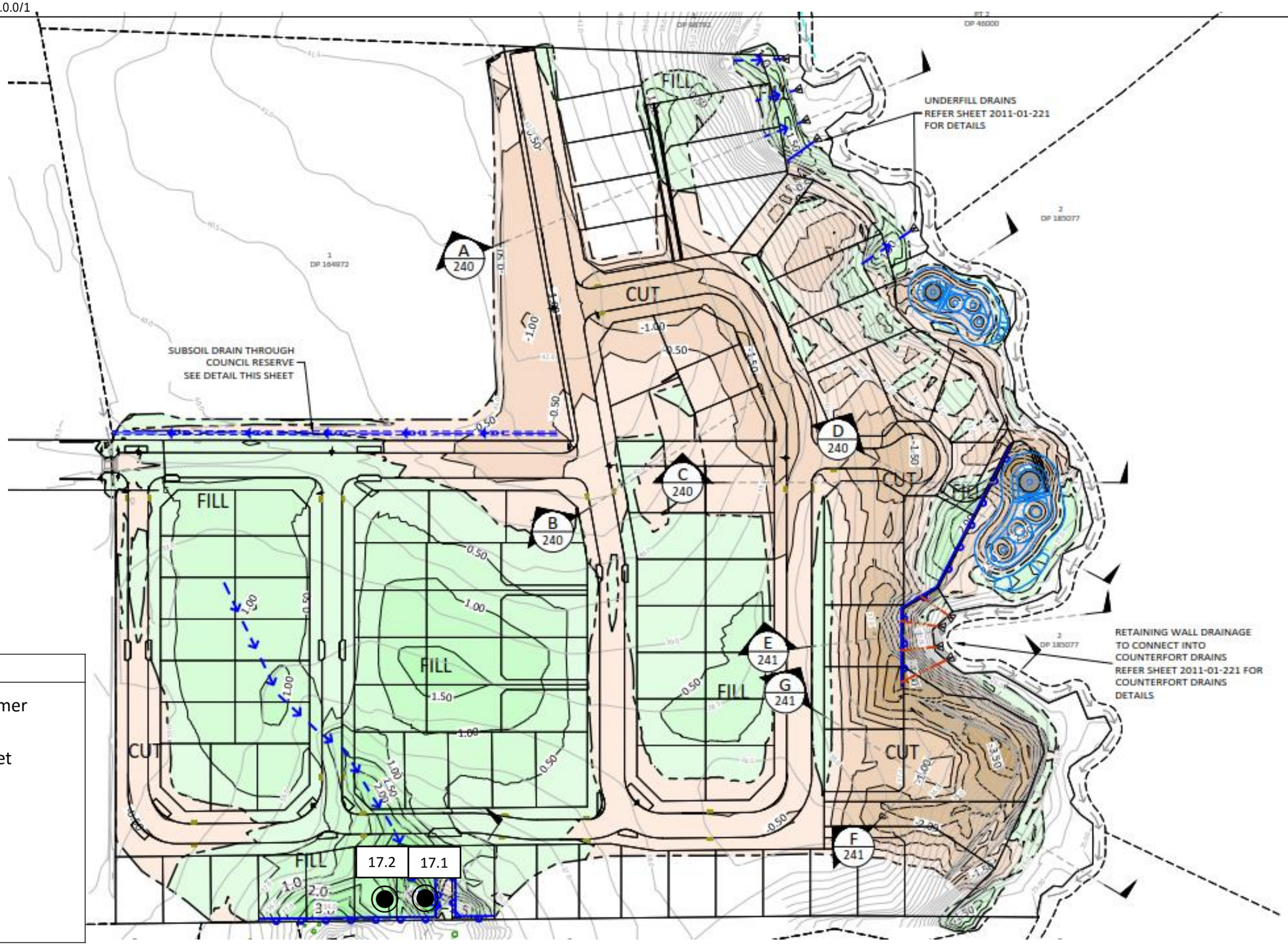
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	VIVE	Date:	17/4/19
Location:	Stage 2 Fill Area	Job No.:	1009213.0070.0.0/1	URN:	16	Date:	17/4/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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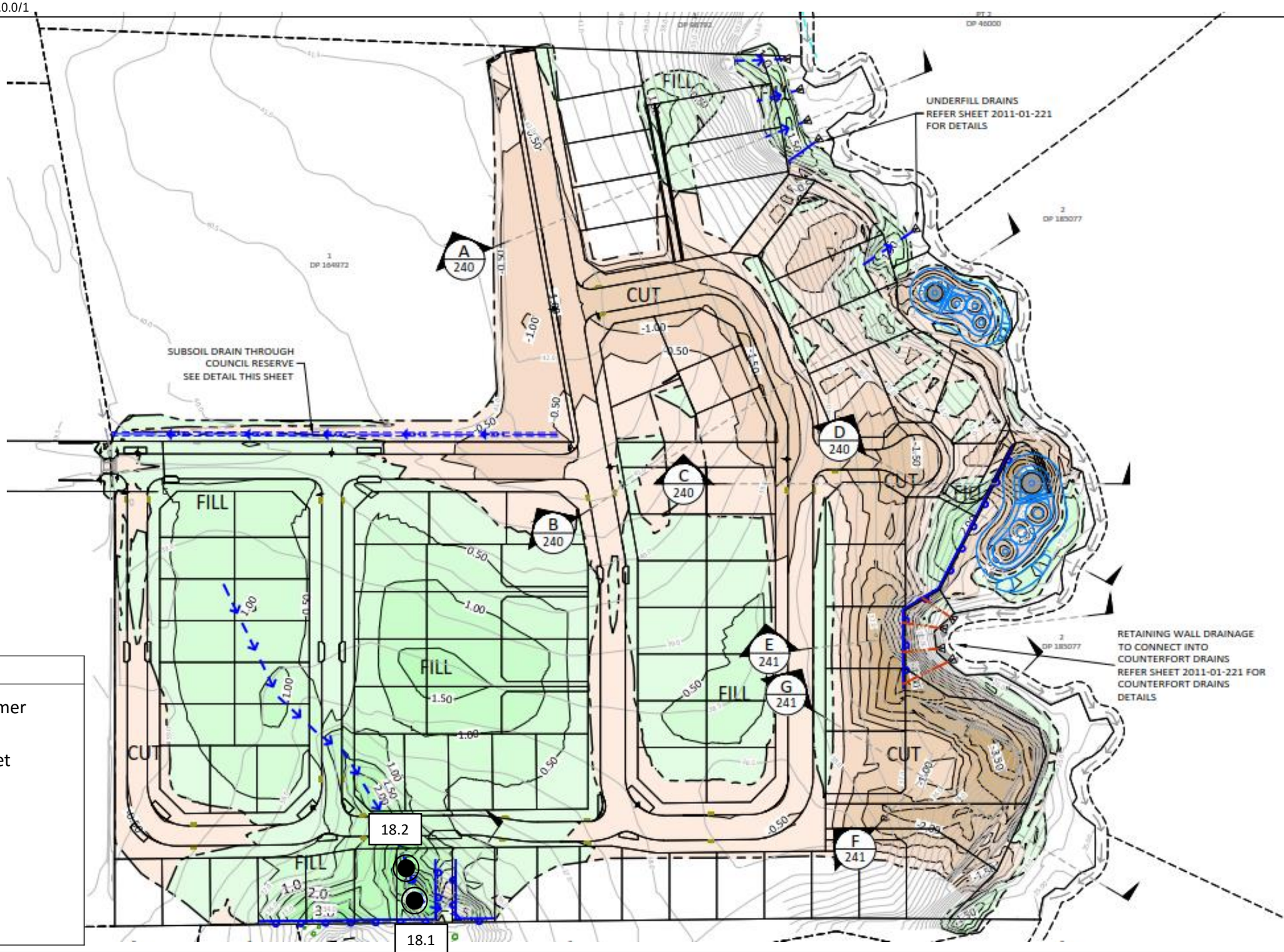
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	VIVE	Date:	26/4/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	17	Date:	26/4/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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- Scala
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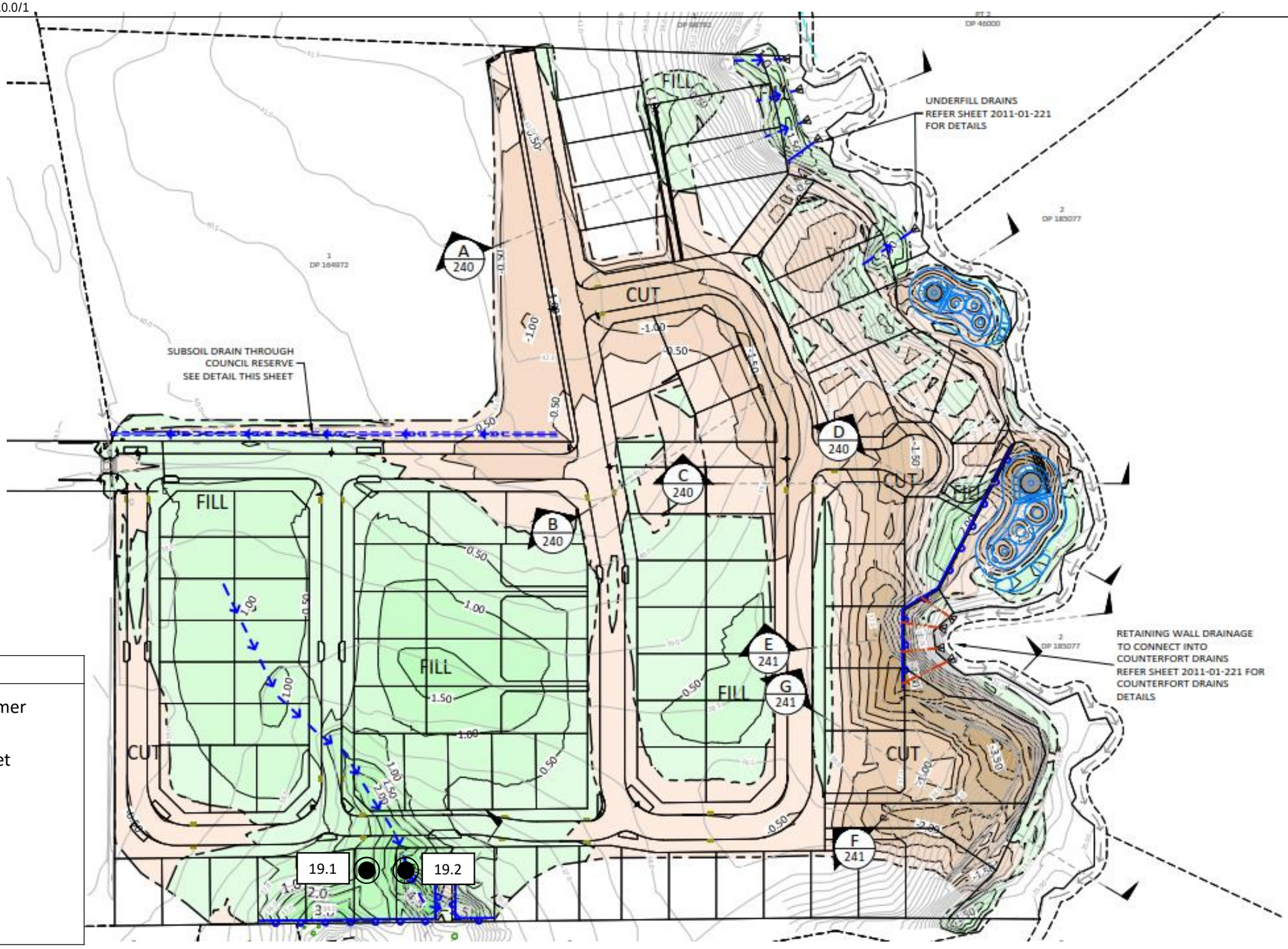
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	VIVE	Date:	01/05/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	18	Date:	01/05/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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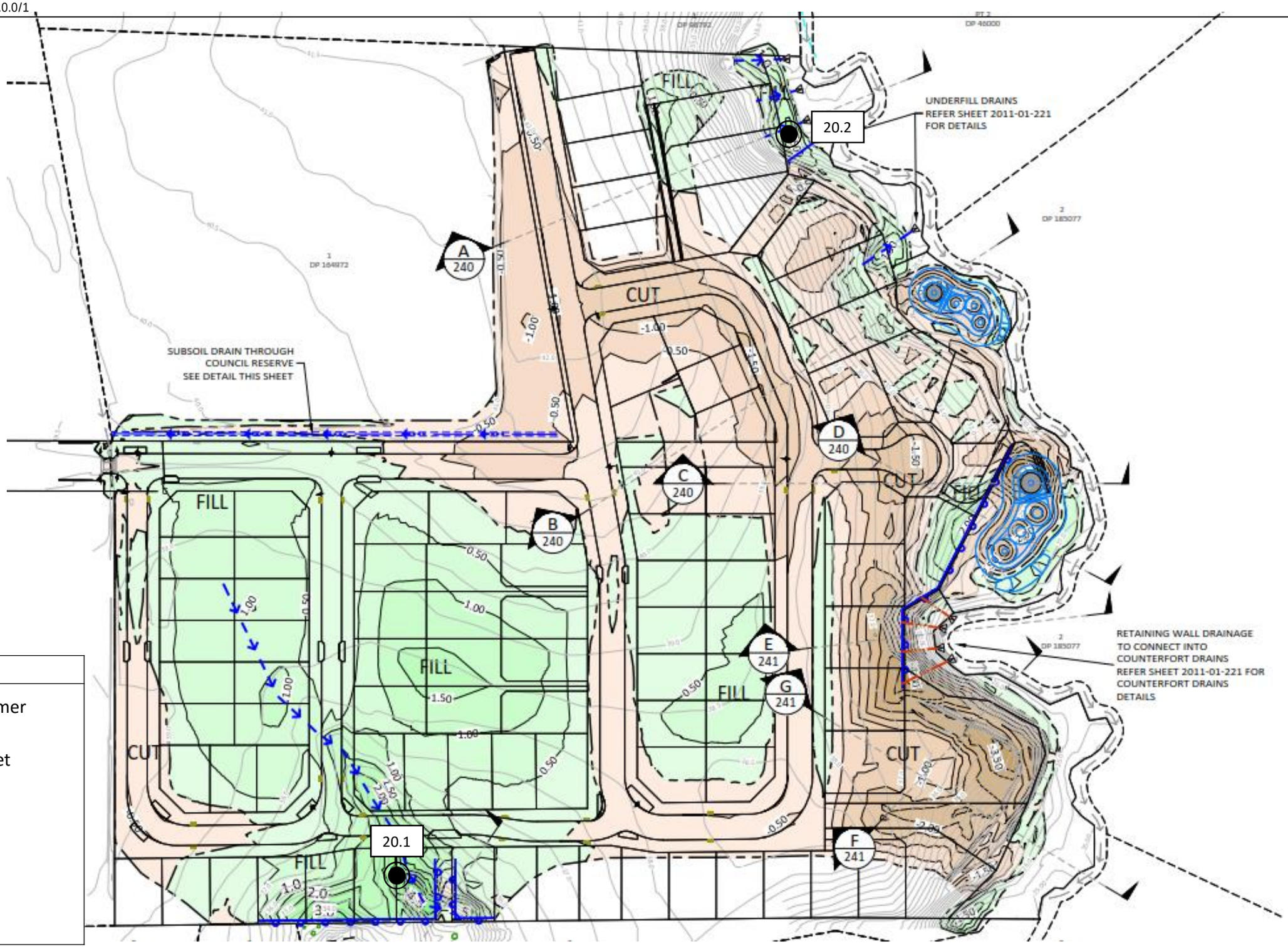
Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	3/05/19
Location:	South RW Fill Area	Job No.:	1009213.0070.0.0/1	URN:	19	Date:	3/05/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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Test Location Plan

Site:	99 Escott's Road, Tuakau	Job Name:	99 Escott's Road, Tuakau	Drawn:	JRA	Date:	8/05/19
Location:	South RW Fill Area & Stage 2 North Fill	Job No.:	1009213.0070.0.0/1	URN:	20	Date:	8/05/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N

Our Ref: 1009213.0070.0.0/2
Customer Ref: J00779
25 February 2020

Lander Geotechnical Ltd
PO Box 97 385
Manukau
Auckland 2241

Attention: Shane Lander

Dear Shane

99 Escotts Road, Tuakau - Stage 2

Site Report

Customer's Instructions

We were instructed to:

Complete nuclear densometer and shear vane testing at the above mentioned site when requested and report the results.

Specifications

As requested by Chris Edwards (Lander Geotechnical) the specification for the Pond Bund Testing was as follows;

- Air voids < 6%.
- Shear strength >140 kPa.

Dates of Procedures

Testing was carried out from the 11/01/2020 to the 14/01/2020.

Locations

Testing was carried out as instructed by the contractor on site. Test locations were selected on site by the Geotechnics technician on behalf of the customer.

The attached plans provide indicative locations only and are not to scale. All other information we provide regarding location should be referenced to the asset owner.

Samples

Samples taken for moisture content verification purposes were disposed of 24 hours after testing.

Methods

NZGS 8:2001 - Test method for determining the vane shear strength of a cohesive soil using a hand held shear vane.

NZS 4407:2015 Test 4.2.1 - Method using a nuclear surface moisture-density gauge (Direct Transmission Mode) – NDM

NZS 4402:1986 Test 2.1 - Determination of water content

Material Description

Material descriptions are provided in the attached results.

Results

The following is attached:

Earthworks testing results and testing location plans.

Test Remarks

Shear Vane

Shear Vane tests are potentially unsuitable for material described in the earthworks summary as 'Clay SILT w gravels'. Tests in these materials may not be compliant with the stated test method and results are therefore not covered under the IANZ endorsement of this report. Results are provided for your own interpretation and inference.

NDM – Direct Transmission

The test method may not be appropriate for materials containing a nominal maximum particle size of >40 mm.

Nuclear densometers are calibrated for a bulk density range of 1,728 kg/m^3 to 2,756 kg/m^3. Test results outside of these bulk density limits are not covered under the IANZ endorsement of this report.

An assumed solid density value of 2.70 t/m^3 was agreed with the customer. We do not take responsibility for misrepresentation or misinterpretation arising from the use of this assumed value to calculate air voids.

Oven calculated air voids (%) have been reported as zero if negative. The calculation of air voids is based on wet density, moisture content and the solid density. The wet density is measured by the nuclear densometer and the moisture content by oven drying. The calculation of air voids is not part of the test in NZS 4407 and is therefore not covered under the IANZ endorsement of this report.

Determination of Water Content

Samples used for the determination of the water content were taken in conjunction with nuclear densometer testing and disposed of after 24 hours.

Pass/Fail Criteria

We accept no liability for any circumstances that may arise due to the inclusion of the pass/fail criteria or the use of this information by third parties. Pass/fail criteria are based solely on numerical values with no consideration given to uncertainty and are not covered under the IANZ endorsement of these results.

General Remarks

This report has been prepared for the benefit of Lander Geotechnical Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement. The inherent uncertainties of site investigation work, mean the nature and continuity of subsoil away from the test location could vary from the data logged.

We provide the results for your interpretation and inference.

Descriptions are enclosed for your information, but are not covered under the IANZ endorsement of this report.

Sample(s) not destroyed during testing will be retained for one month from the date of this report before being discarded.

Please reproduce this report in full when transmitting to others or including in internal reports.

If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of the letterhead page.

GEOTECHNICS LTD

Report prepared by:

.....

Josh Allan
Project Manager

Authorised for Geotechnics by:

.....

Steven Anderson
Project Director
Approved Signatory

Report checked by:

.....

Seven Baker
CMT Field Technician

IANZ ACCREDITED LABORATORY

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

25-Feb-20

t:\geotechnicsgroup\projects\1009213\1009213.0070 - 99 escotts road, tuakau\workingmaterial\report 2\20200225 jra rpt2.docx

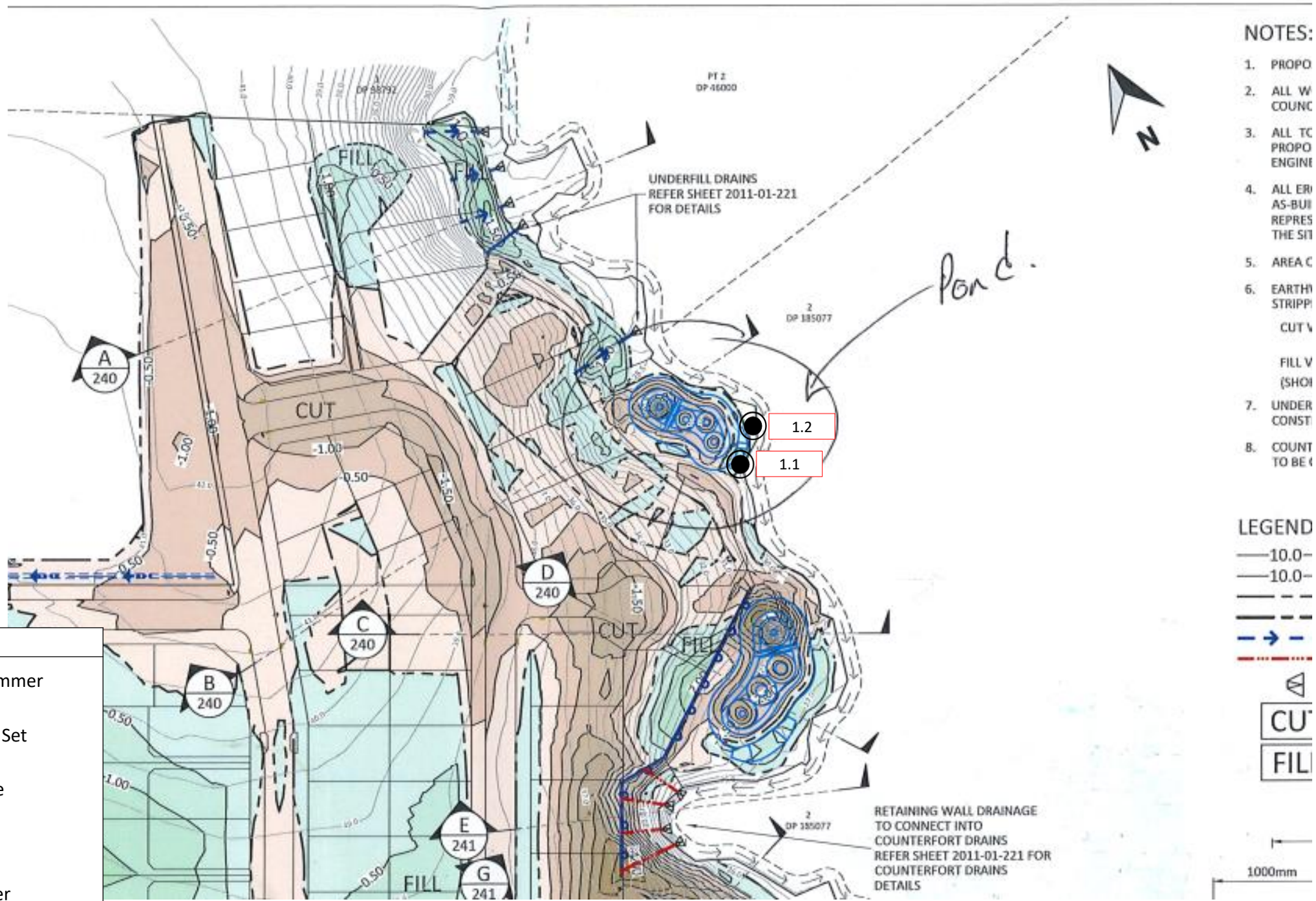
GEOTECHNICS

Job: 99 Escotts Road, Tuakau

Client: Lander Geotechnical Ltd.

Job #	1009213.0070.0.0/2
Entered By	FRHA
Checked By	JRA
Approved By	SJA

URN	Tech.	Date	Location	Layer	Material	Test Type	NDM 0°			NDM 90°			AVERAGE NDM			Solid Density (t/m³) Assumed	Oven Moisture content (%)	Final Corrected		Average Air Voids (10 X Tests)	Shear Vane Reading (kPa)						Retest URN	PASS / FAIL	Comments
						NDM / SV	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)			Oven Dry Density (t/m³)	Average Air Voids (%)		Reading 1	Reading 2	Reading 3	Reading 4	Average SV (4 x Tests)	Average SV (10 X Sets)		(P) Pass / (F) Fail	
1.1	FRHA	11/01/2020	Ex. SILT Pond - See site plan	~0.5 below FL	Clay SILT	NDM / SV	1.76	45.3	0.0	1.77	42.1	1.2	**1.77**	**43.7**	**0.6**	2.70	40.1	1.26	**2.6**	-	>191	>191	>191	>191	>191	-	-	P	
1.2						NDM / SV	1.77	42.6	1.1	1.78	42.7	0.6	**1.77**	**42.7**	**0.9**	2.70	45.5	1.22	**0.0**	-	>191	>191	>191	>191	>191	-	-	P	
2.1	FRHA	13/01/2020	Ex. SILT Pond - See site plan	~FL	Clay SILT w gravels	NDM / SV	1.58	50.6	7.9	1.59	49.7	7.6	**1.59**	**50.2**	**7.7**	2.70	48.4	1.07	**8.5**	-	147	150	>191	>191	>170	-	**2.1**	F	Air voids greater than 6% Jock informed and restesting scheduled (URN 3).
2.3						NDM / SV	1.69	40.6	6.9	1.70	42.7	5.0	**1.69**	**41.7**	**5.9**	2.70	42.3	1.19	**5.6**	-	>191	>191	>191	>191	>191	-	**2.2**	P	
3.1	FRHA	14/01/2020	Ex. SILT Pond - See site plan	~FL	Clay SILT w gravels	NDM / SV	1.66	49.8	3.5	1.66	47.8	4.6	**1.66**	**48.8**	**4.0**	2.70	46.7	1.13	**5.0**	-	>191	>191	>191	>191	>191	-	-	P	Retest of URN 2.1
3.2						NDM / SV	1.72	42.3	4.1	1.72	41.8	4.1	**1.72**	**42.1**	**4.1**	2.70	43.1	1.20	**3.5**	-	>191	>191	>191	>191	>191	-	-	P	Retest of URN 2.2



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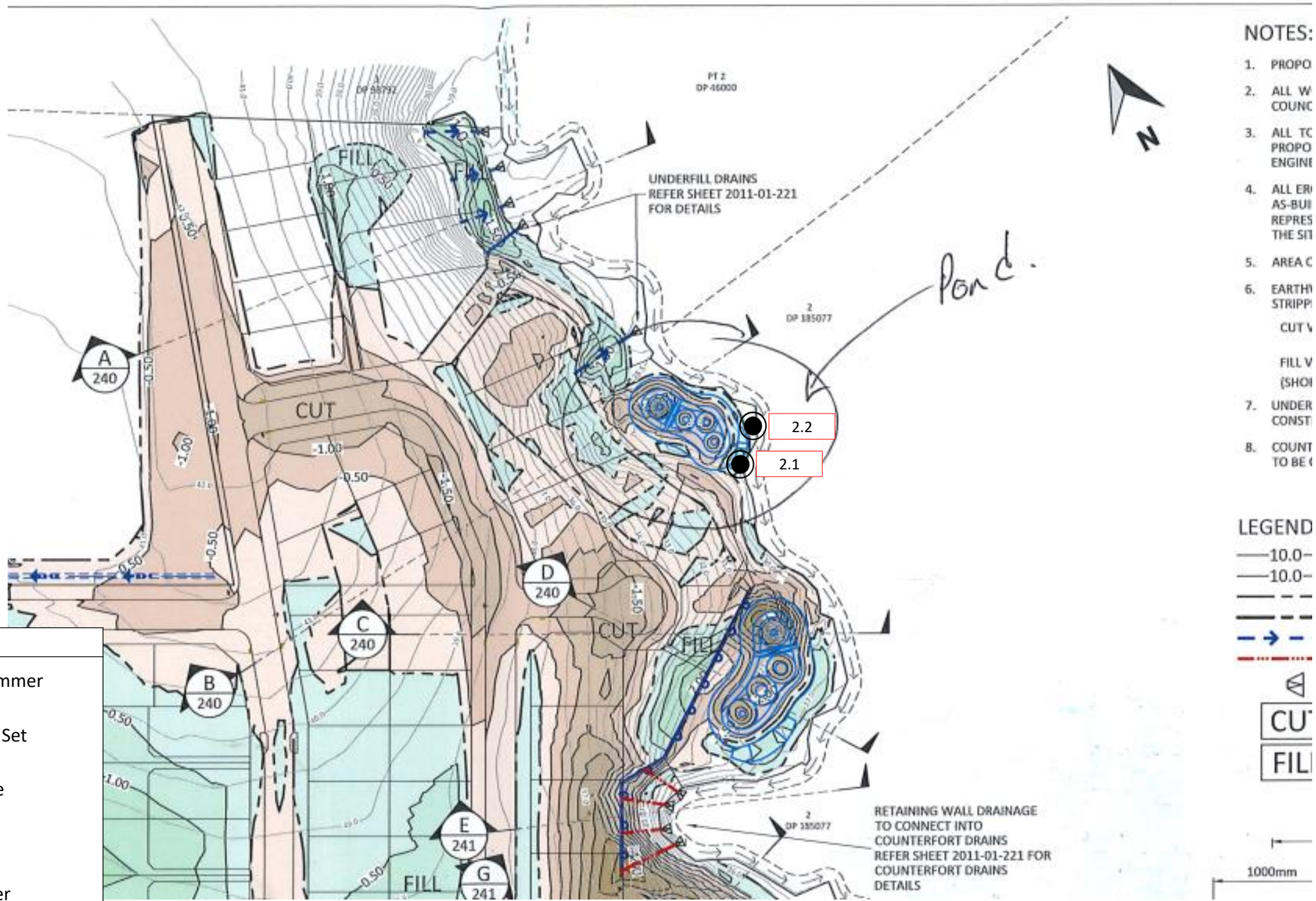
w. www.geotechnics.co.nz

Test Location Plan

Site:	99 Escotts Road, Tuakau	Job Name:	99 Escotts Road Tuakau G-LD	Drawn:	FRHA	Date:	11/01/20
Location:	Pond	Job No.:	1009213.0070.0.0/2	URN:	1	Date:	11/01/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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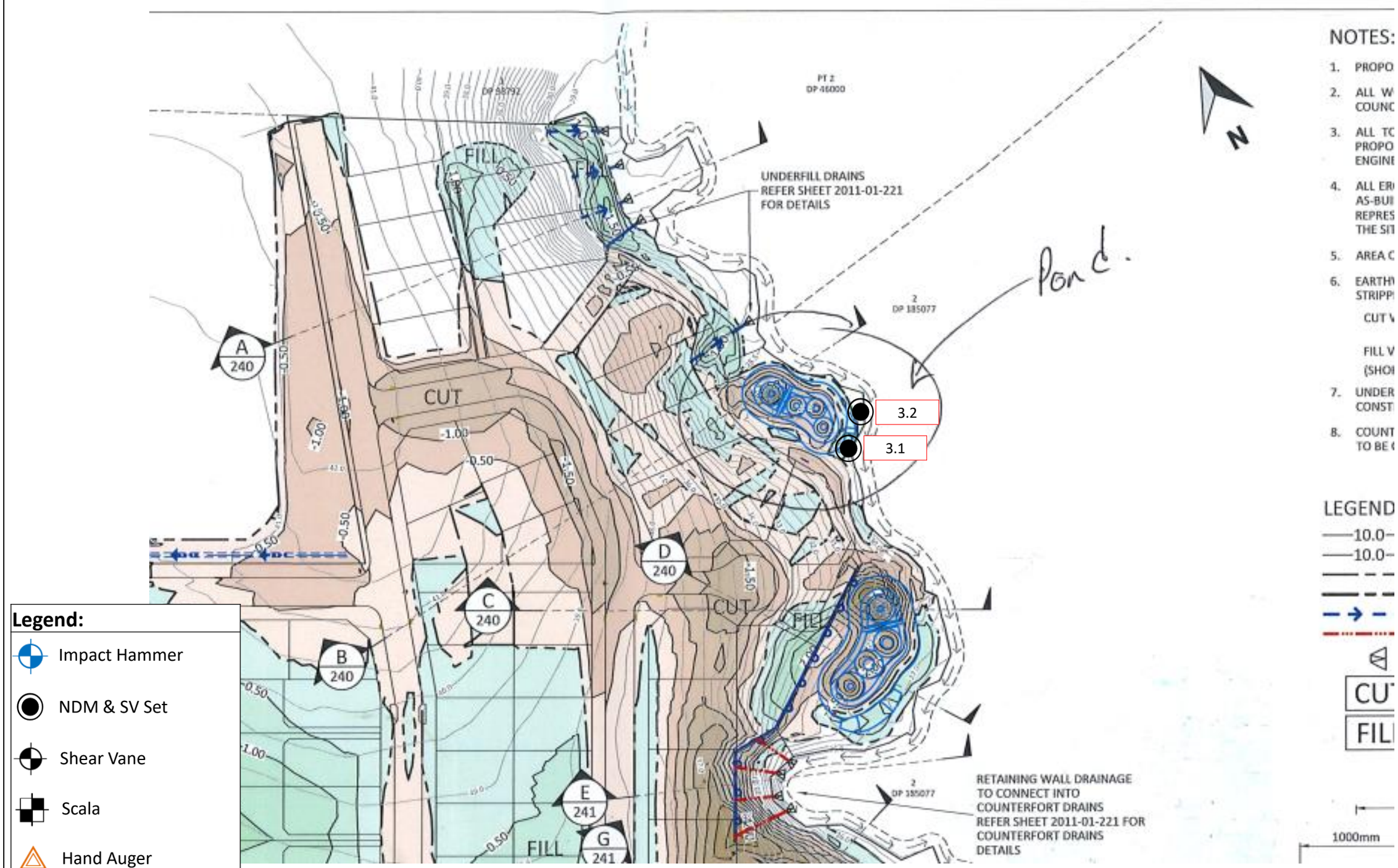
Test Location Plan

Site:	99 Escotts Road, Tuakau	Job Name:	99 Escotts Road Tuakau G-LD	Drawn:	FRHA	Date:	13/01/20
Location:	Pond	Job No.:	1009213.0070.0.0/2	URN:	2	Date:	13/01/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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Test Location Plan

Site:	99 Escotts Road, Tuakau	Job Name:	99 Escotts Road Tuakau G-LD	Drawn:	FRHA	Date:	14/01/20
Location:	Pond	Job No.:	1009213.0070.0.0/2	URN:	3	Date:	14/01/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

Appendix 3

Soil Classification Test Results

GEOTECHNICS

Our Ref: 1009521.1008/Rep1
Customer Ref: J00779
17 February 2020

Lander Geotechnical Consultants Limited
Level 3/3 Osterley Way
Manukau
Auckland 2104

Attention: Chris Edwards

Dear Chris

99 Escotts Road, Tuakau

Laboratory Test Report

Samples from the above mentioned site have been tested as received according to your instructions and the results are included in this report. Results apply only to the sample(s) tested.

Descriptions are enclosed for your information, but are not covered under the IANZ endorsement of this report.

This report has been prepared for the benefit of Lander Geotechnical Consultants Limited, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement.

This report may be reproduced only in full.

Samples not destroyed during testing will be retained for one month from the date of this report before being discarded. If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of this page.

GEOTECHNICS LTD

Report prepared by:

.....
Brendon Kingham
Laboratory Coordinator
Approved Signatory

Authorised for Geotechnics by:

Paul Burton
I have reviewed this document
2020.02.17 11:43:13 +13'00'

.....
Paul Burton
Project Director

Report checked by:

.....
Tylah Wardrope
Laboratory Technician

IANZ ACCREDITED LABORATORY

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

17-Feb-20
t:\geotechnicsgroup\projects\1009521\1009521.1008\2020.0217.99 escotts road.rep01.docx

GEOTECHNICS

Tauranga
15C Amber Crescent
Judea
Tauranga 3110
New Zealand

p +64 7 571 0280

Report No: MAT:S20TG000035
Issue No: 1

Material Test Report

Customer: Lander Geotechnical
Address: Level 3, 3 Osterley Way
Manukau, 2104
Project: 99 Escotts Road, Tuakau
Project No.: 1009521.1008
Customer Reference No.: J01232
Report Authorised By : Brendon Kingham

Approved By:
Brendon Kingham
(Geotechnical Technician)
Date of Issue: 17/02/2020

Sample Details

Location	99 Escotts Road, Tuakau
Geotechnics ID	S20TG000035
Sample Reference	LOT73
Sample Description	SILT with some clay and some sand, trace rootlets; orange brown. Moist, extremely high plasticity.
Sample Depth	0.5m
Bottom Depth	1.0m

Test Results

Description	Method	Result	Limits
Moisture Content [NZS 4402:1986 Test 2.1]			
Moisture Content (%)		70.4	
Date Tested		11/02/2020	

Comments

This test result is IANZ accredited.

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GEOTECHNICS
15C Amber Crescent
Judea
Tauranga 3110
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Geotechnics Project Number	1009521.1008
QESTLab Work Order ID	W20TG-0014
Customer Project ID	J01232

Determination of Liquid & Plastic Limit, Plasticity Index - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

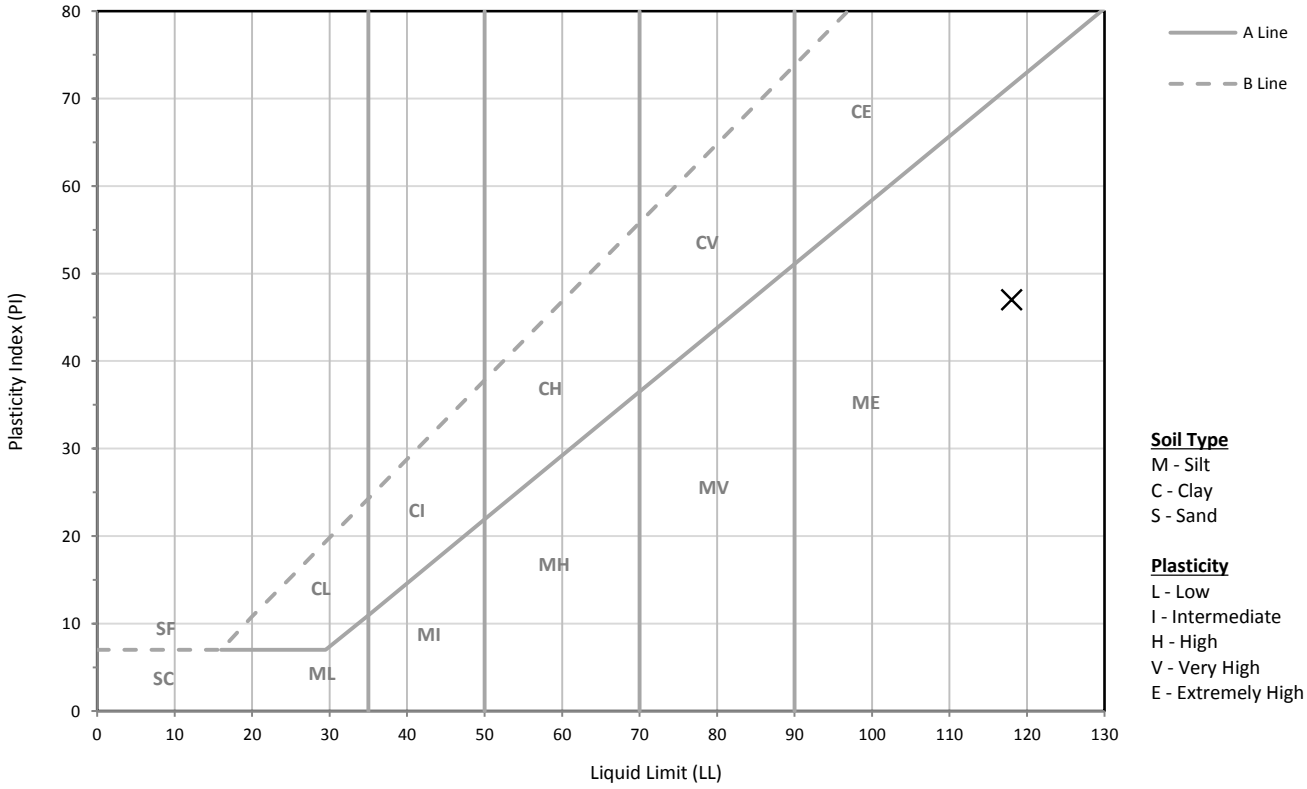
TEST DETAILS

LOCATION	**Description**	99 Escotts Road, Tuakau		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S20TG000035		
	Reference	LOT73	**Top Depth**	0.5m
	Sampled By	Others, Tested As Received	**Bottom Depth**	1.0m
	Description	SILT with some clay and some sand, trace rootlets; orange brown. Moist, extremely high plasticity.		
SPECIMEN	**Reference**	N/A	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**118**
Plastic Limit	**71**
Plasticity Index	**47**

Plasticity Chart - BS 5930:1999



TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve. • This test result is IANZ accredited.

Approved Signatory	Brendon Kingham
Date	17/02/2020

GEOTECHNICS

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Geotechnics Project Number	1009521.1008
QESTLab Work Order ID	W20TG-0014
Customer Project ID	J01232

Determination of the Linear Shrinkage - NZS 4402:1986 Test 2.6

TEST DETAILS

LOCATION	**Description**	99 Escotts Road, Tuakau		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S20TG000035		
	Reference	LOT73	**Top Depth**	0.5m
	Sampled By	Others, Tested As Received	**Bottom Depth**	1.0m
	Description	SILT with some clay and some sand, trace rootlets; orange brown. Moist, extremely high plasticity.		
SPECIMEN	**Reference**		**Depth**	
	Description			

Linear Shrinkage	**27%**

TEST REMARKS

• This test result is IANZ accredited.

Approved Signatory	Brendon Kingham
Date	17/02/2020

GEOTECHNICS

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Report No: MAT:S20TG000036
Issue No: 1

Material Test Report

Customer: Lander Geotechnical
Address: Level 3, 3 Osterley Way
Manukau, 2104
Project: 99 Escotts Road, Tuakau
Project No.: 1009521.1008
Customer Reference No.: J01232
Report Authorised By : Brendon Kingham

Approved By:
Brendon Kingham
(Geotechnical Technician)
Date of Issue: 17/02/2020

Sample Details

Location	99 Escotts Road, Tuakau
Geotechnics ID	S20TG000036
Sample Reference	LOT80
Sample Description	Clayey SILT with some sand, trace rootlets; brown. Moist, extremely high plasticity.
Sample Depth	0.5m
Bottom Depth	1.0m

Test Results

Description	Method	Result	Limits
Moisture Content [NZS 4402:1986 Test 2.1]			
Moisture Content (%)		45.2	
Date Tested		11/02/2020	

Comments

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Geotechnics Project Number	1009521.1008
QESTLab Work Order ID	W20TG-0014
Customer Project ID	J01232

Determination of Liquid & Plastic Limit, Plasticity Index - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

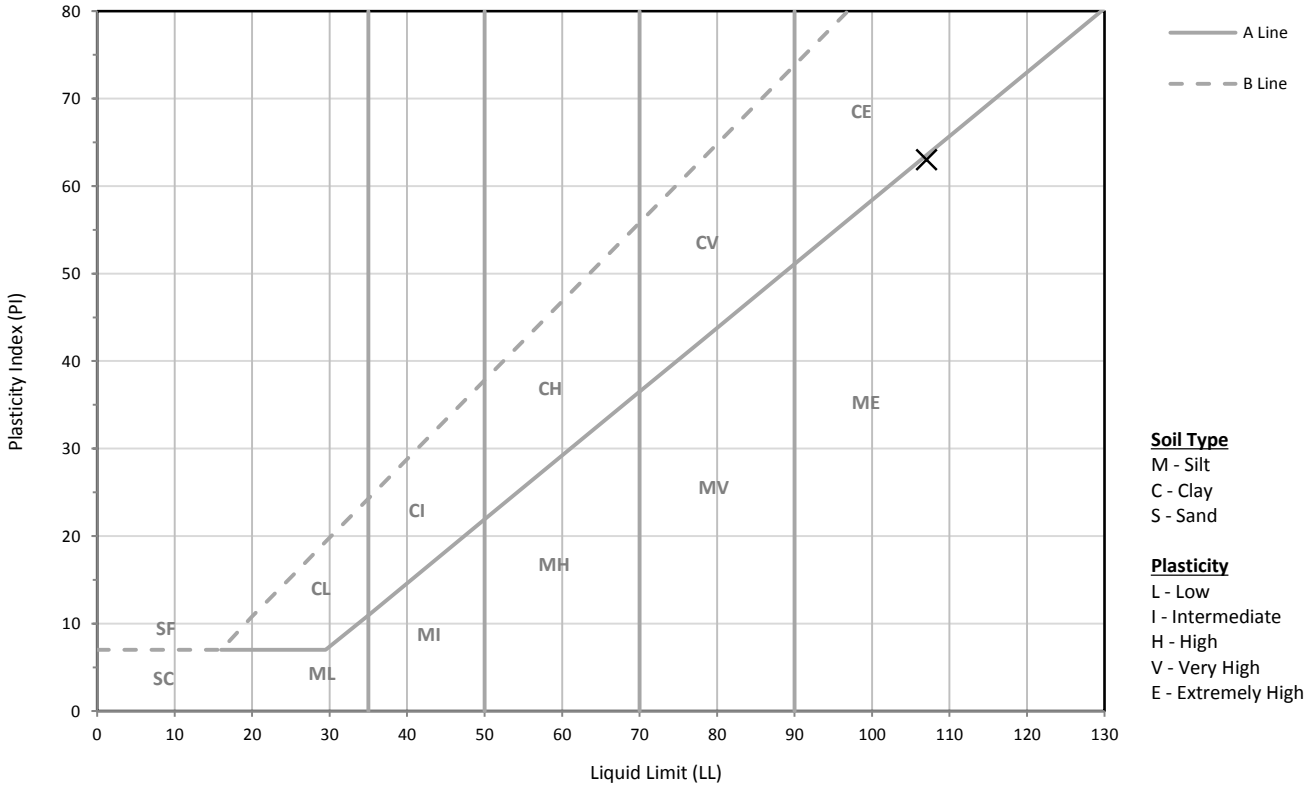
TEST DETAILS

LOCATION	**Description**	99 Escotts Road, Tuakau		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S20TG000036		
	Reference	LOT80	**Top Depth**	0.5m
	Sampled By	Others, Tested As Received	**Bottom Depth**	1.0m
	Description	Clayey SILT with some sand, trace rootlets; brown. Moist, extremely high plasticity.		
SPECIMEN	**Reference**	N/A	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**107**
Plastic Limit	**44**
Plasticity Index	**63**

Plasticity Chart - BS 5930:1999



TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve. • This test result is IANZ accredited.

Approved Signatory	Brendon Kingham
Date	17/02/2020

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Geotechnics Project Number	1009521.1008
QESTLab Work Order ID	W20TG-0014
Customer Project ID	J01232

Determination of the Linear Shrinkage - NZS 4402:1986 Test 2.6

TEST DETAILS

LOCATION	**Description**	99 Escotts Road, Tuakau		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S20TG000036		
	Reference	LOT80	**Top Depth**	0.5m
	Sampled By	Others, Tested As Received	**Bottom Depth**	1.0m
	Description	Clayey SILT with some sand, trace rootlets; brown. Moist, extremely high plasticity.		
SPECIMEN	**Reference**		**Depth**	
	Description			

Linear Shrinkage **24%**

TEST REMARKS

• This test result is IANZ accredited.

Approved Signatory Brendon Kingham

Date 17/02/2020

GEOTECHNICS

Tauranga
15C Amber Crescent
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Report No: MAT:S20TG000037
Issue No: 1

Material Test Report

Customer: Lander Geotechnical
Address: Level 3, 3 Osterley Way
Manukau, 2104
Project: 99 Escotts Road, Tuakau
Project No.: 1009521.1008
Customer Reference No.: J01232
Report Authorised By : Brendon Kingham

Approved By:
Brendon Kingham
(Geotechnical Technician)
Date of Issue: 17/02/2020

Sample Details

Location	99 Escotts Road, Tuakau
Geotechnics ID	S20TG000037
Sample Reference	LOT91
Sample Description	Clayey SILT with some sand, trace rootlets; orange brown. Moist, extremely high plastcity.
Sample Depth	0.5m
Bottom Depth	1.0m

Test Results

Description	Method	Result	Limits
Moisture Content [NZS 4402:1986 Test 2.1]			
Moisture Content (%)		64.4	
Date Tested		11/02/2020	

Comments

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Geotechnics Project Number	1009521.1008
QESTLab Work Order ID	W20TG-0014
Customer Project ID	J01232

Determination of Liquid & Plastic Limit, Plasticity Index - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

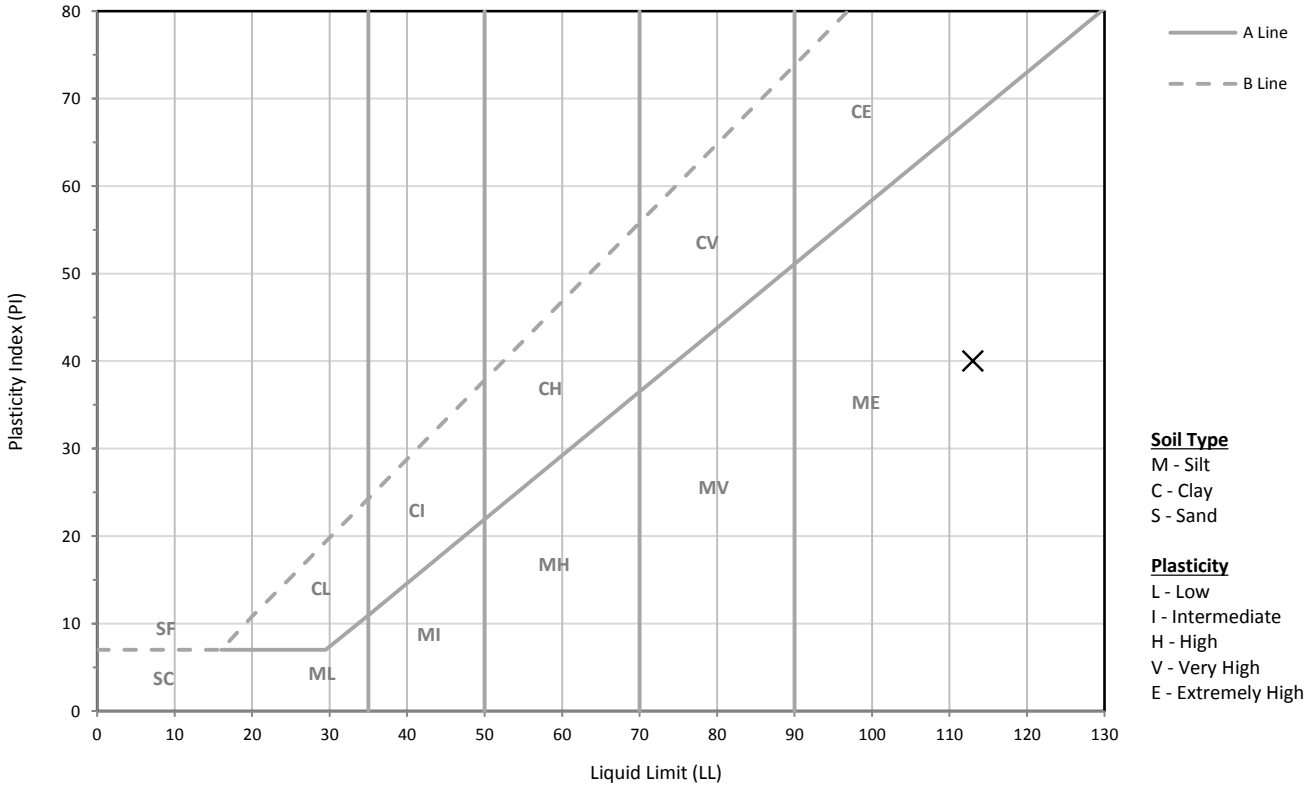
TEST DETAILS

LOCATION	**Description**	99 Escotts Road, Tuakau		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S20TG000037		
	Reference	LOT91	**Top Depth**	0.5m
	Sampled By	Others, Tested As Received	**Bottom Depth**	1.0m
	Description	Clayey SILT with some sand, trace rootlets; orange brown. Moist, extremely high plastcity.		
SPECIMEN	**Reference**	N/A	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**113**
Plastic Limit	**73**
Plasticity Index	**40**

Plasticity Chart - BS 5930:1999



TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve. • This test result is IANZ accredited.

Approved Signatory	Brendon Kingham
Date	17/02/2020

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Geotechnics Project Number	1009521.1008
QESTLab Work Order ID	W20TG-0014
Customer Project ID	J01232

Determination of the Linear Shrinkage - NZS 4402:1986 Test 2.6

TEST DETAILS

LOCATION	**Description**	99 Escotts Road, Tuakau		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S20TG000037		
	Reference	LOT91	**Top Depth**	0.5m
	Sampled By	Others, Tested As Received	**Bottom Depth**	1.0m
	Description	Clayey SILT with some sand, trace rootlets; orange brown. Moist, extremely high plastcity.		
SPECIMEN	**Reference**		**Depth**	
	Description			

Linear Shrinkage **26%**

TEST REMARKS

• This test result is IANZ accredited.

Approved Signatory Brendon Kingham

Date 17/02/2020