

LIQUEFACTION ANALYSIS REPORT

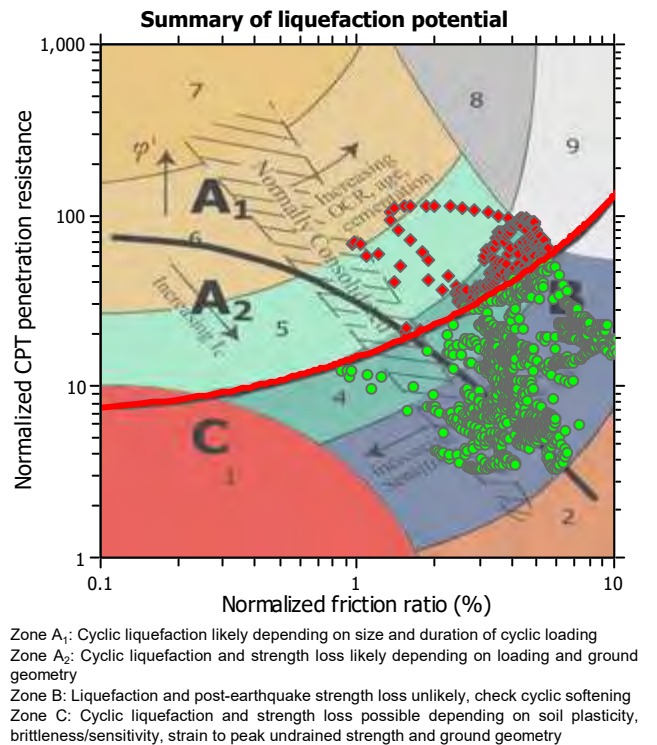
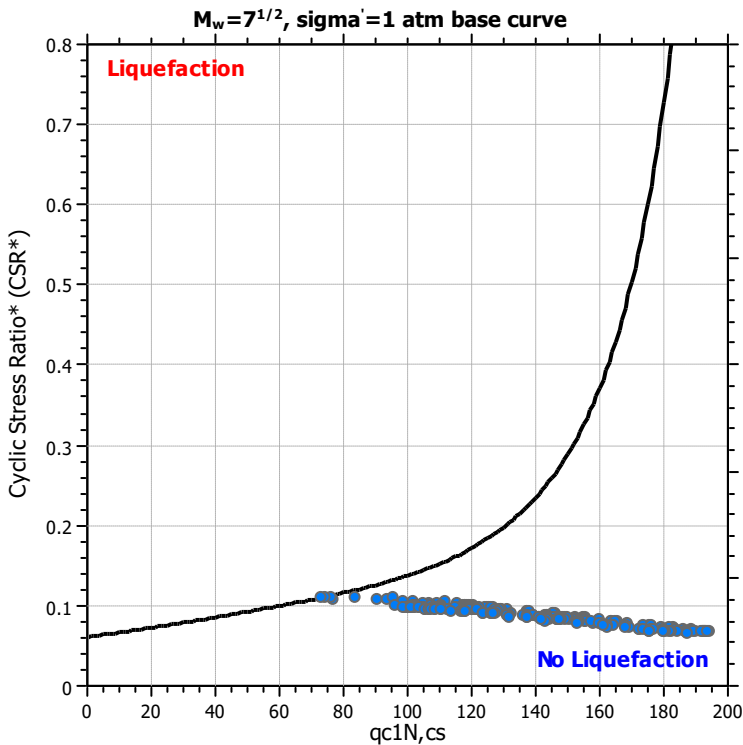
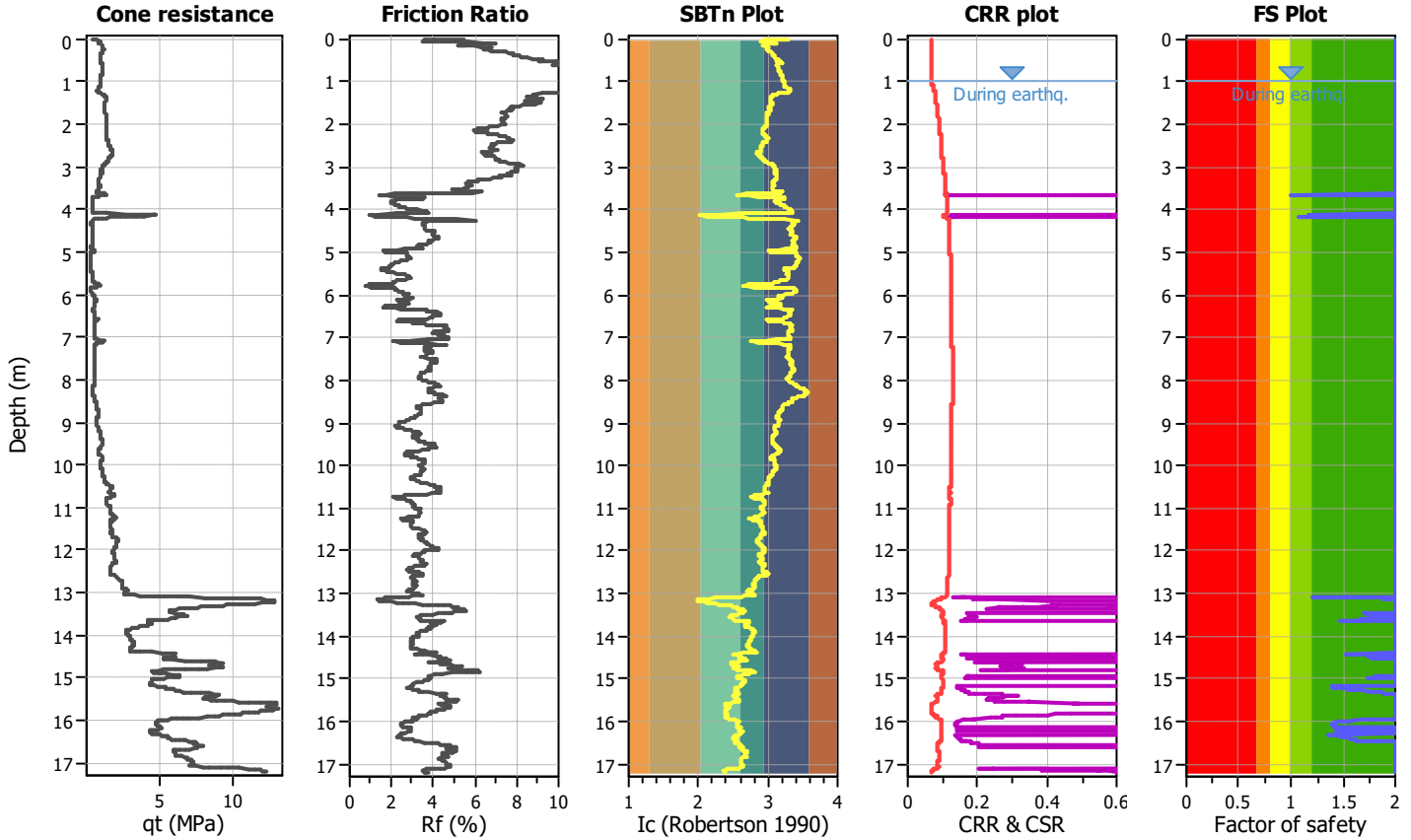
Project title : Willowridge Developments

Location : Aucks Road Russell

CPT file : CPT04

Input parameters and analysis data

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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_g applied:	Yes		



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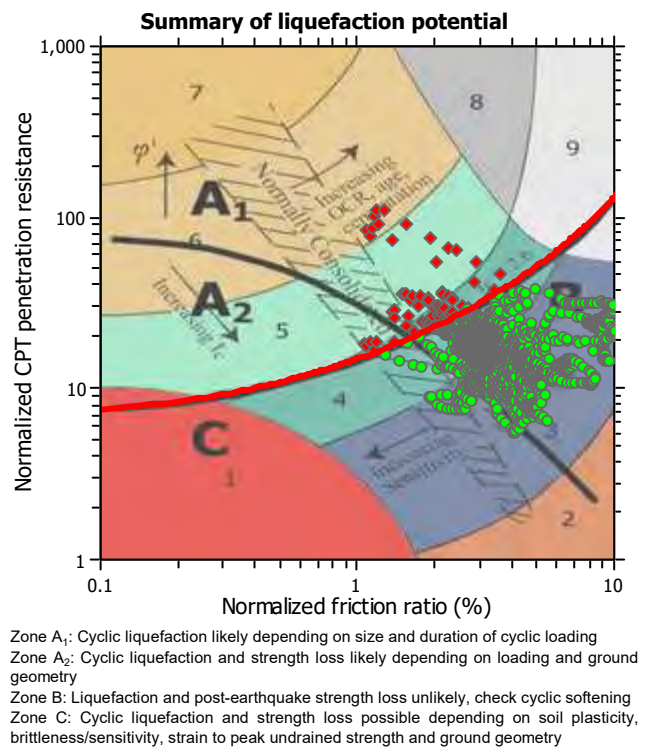
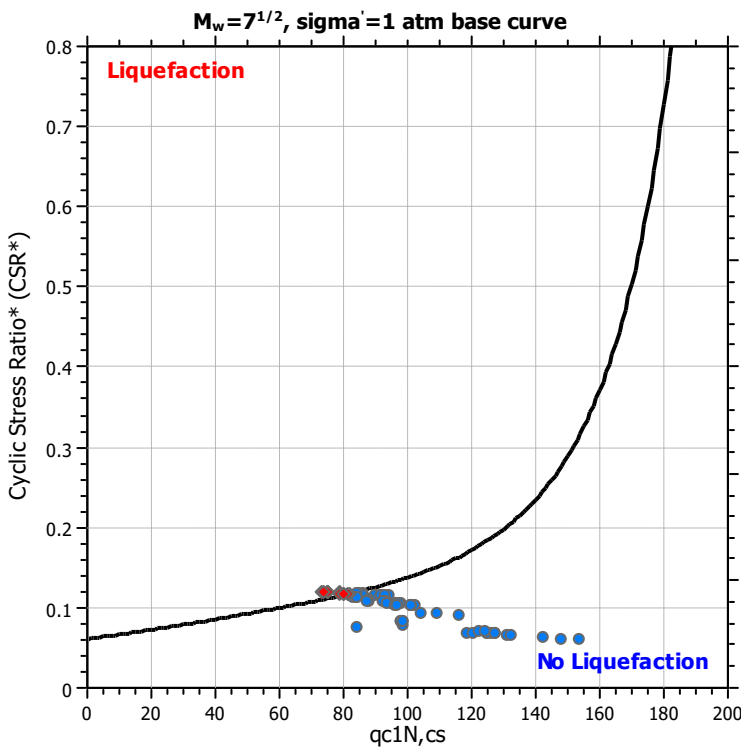
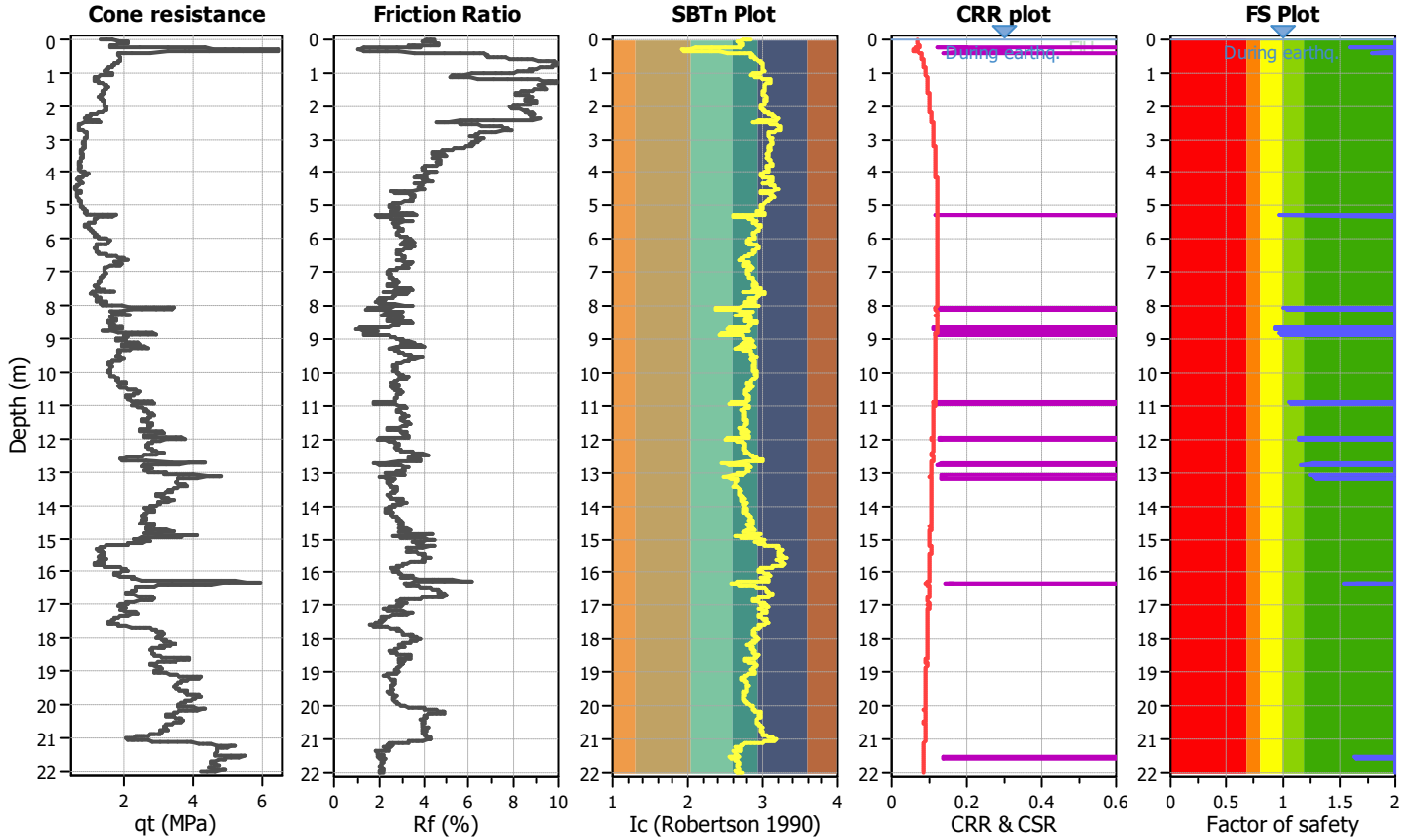
Project title : Willowridge Developments

Location : Aucks Road Russell

CPT file : CPT05

Input parameters and analysis data

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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_g applied:	Yes		



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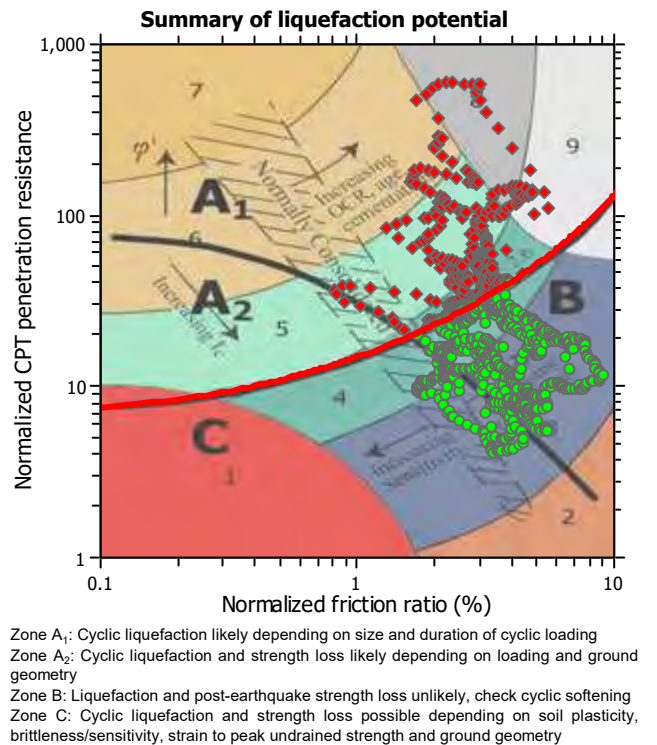
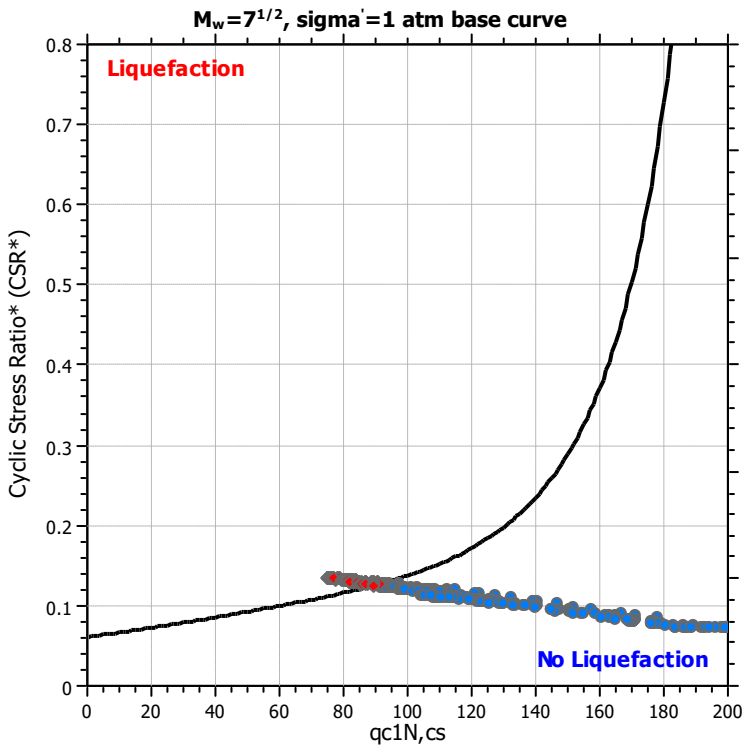
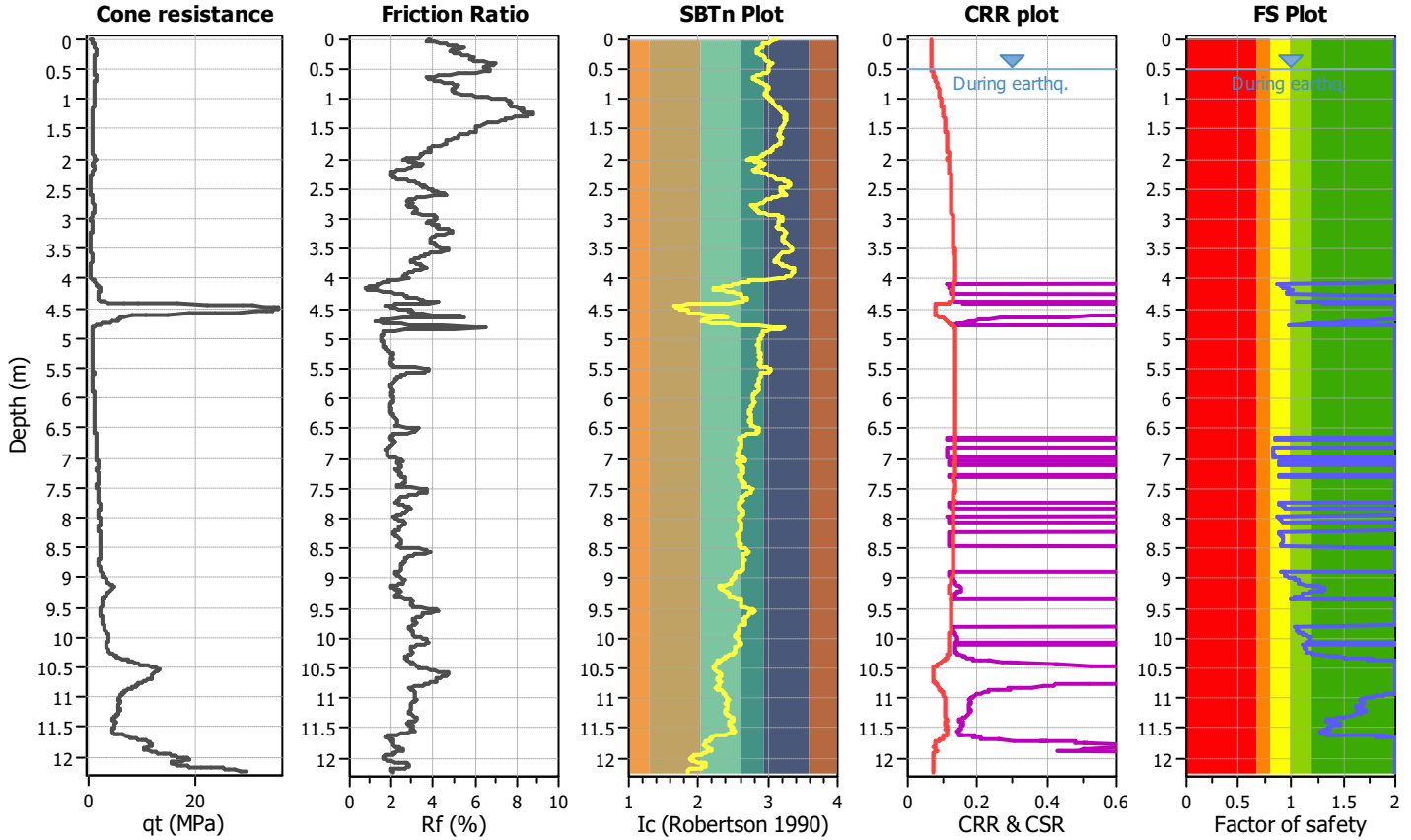
Project title : Willowridge Developments

Location : Aucks Road Russell

CPT file : CPT06

Input parameters and analysis data

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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_g applied:	Yes		



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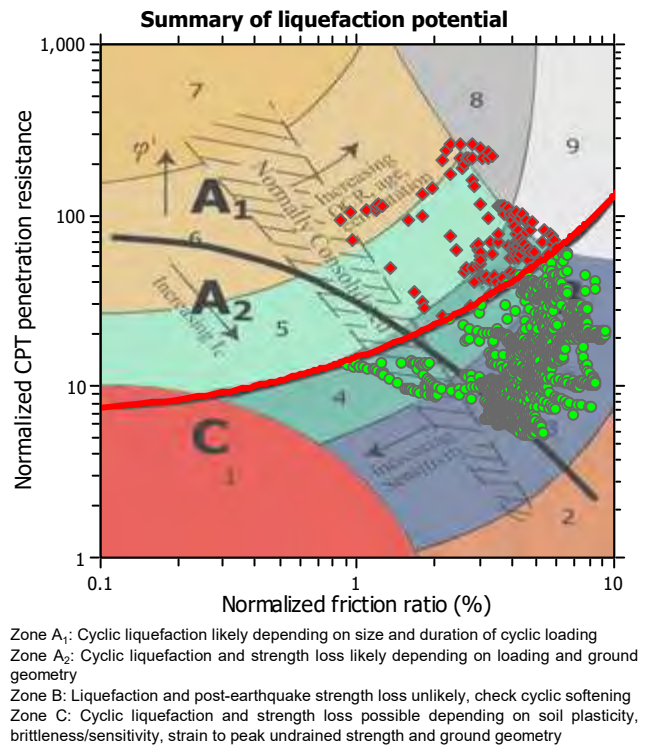
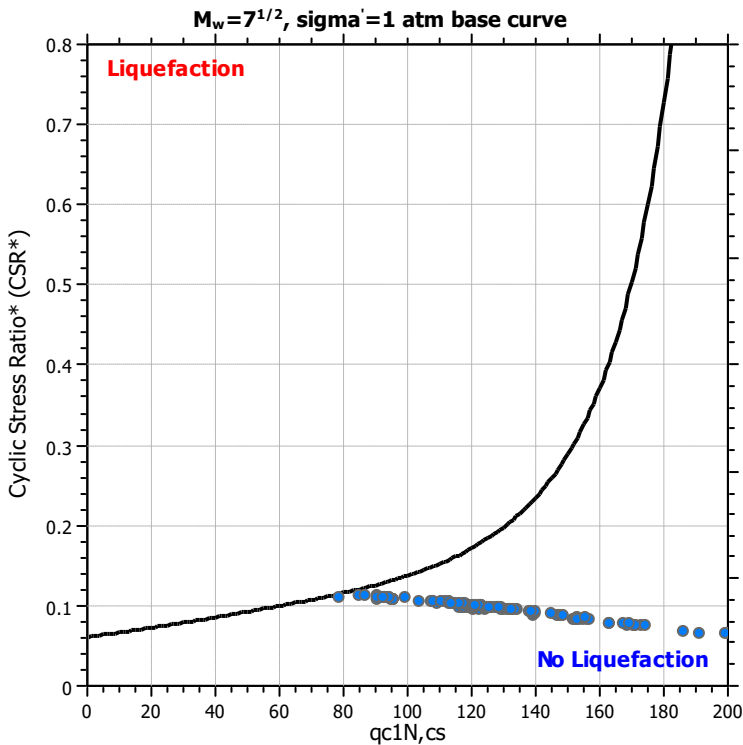
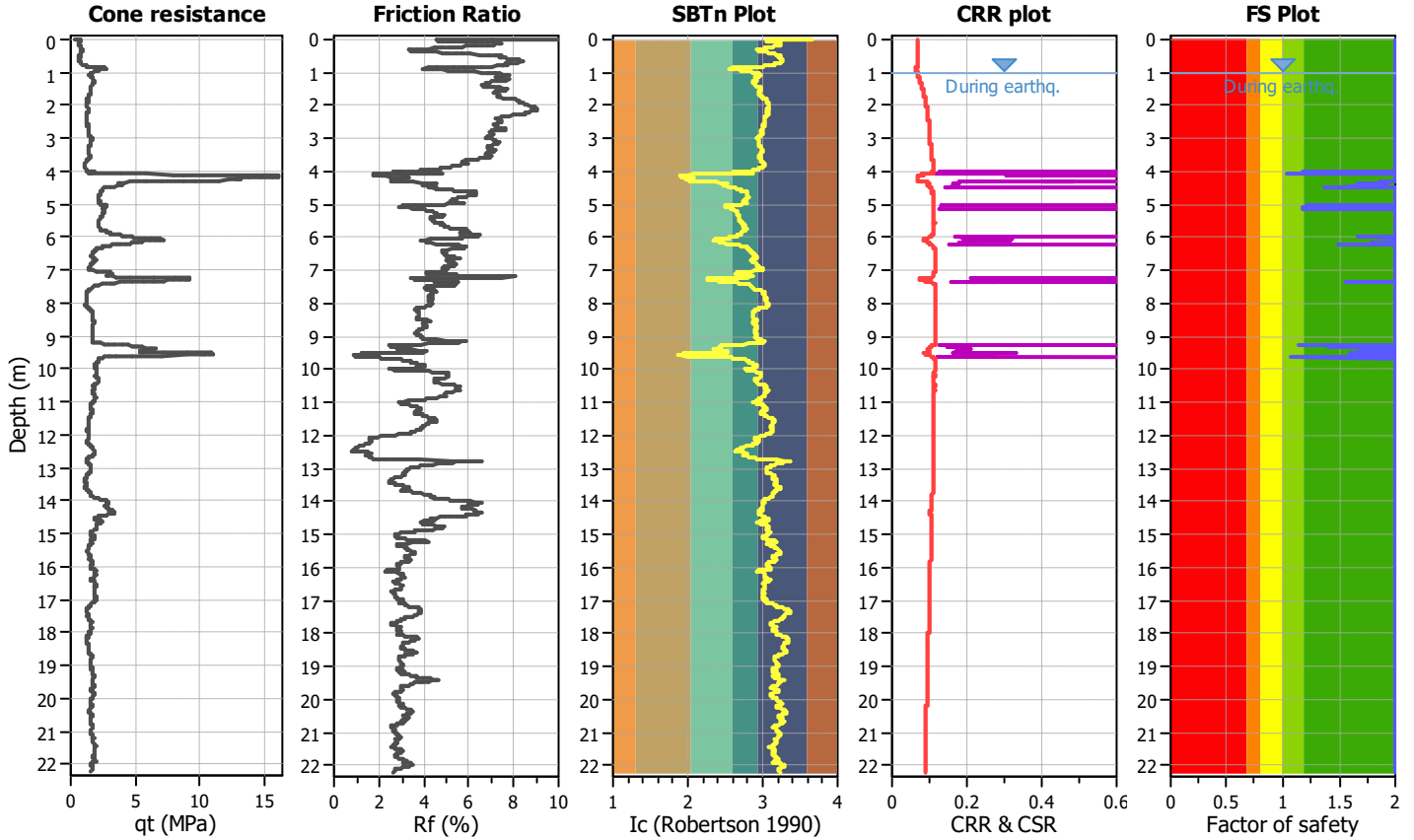
Project title : Willowridge Developments

Location : Aucks Road Russell

CPT file : CPT09

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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_g applied:	Yes		



LIQUEFACTION ANALYSIS REPORT

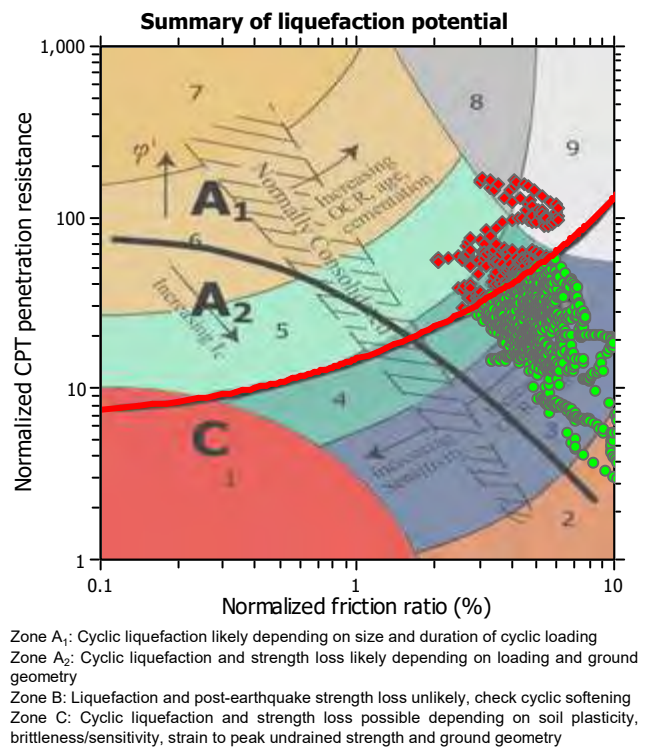
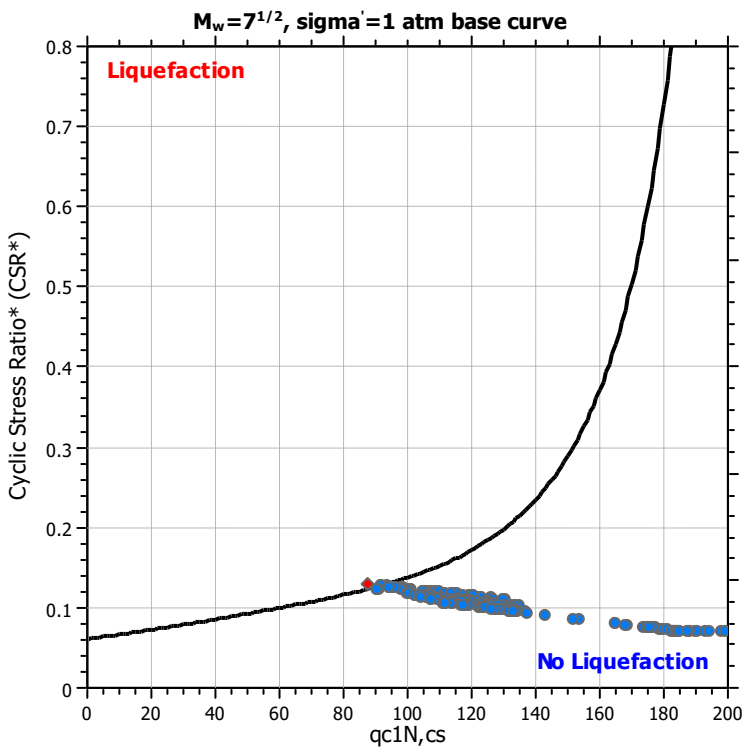
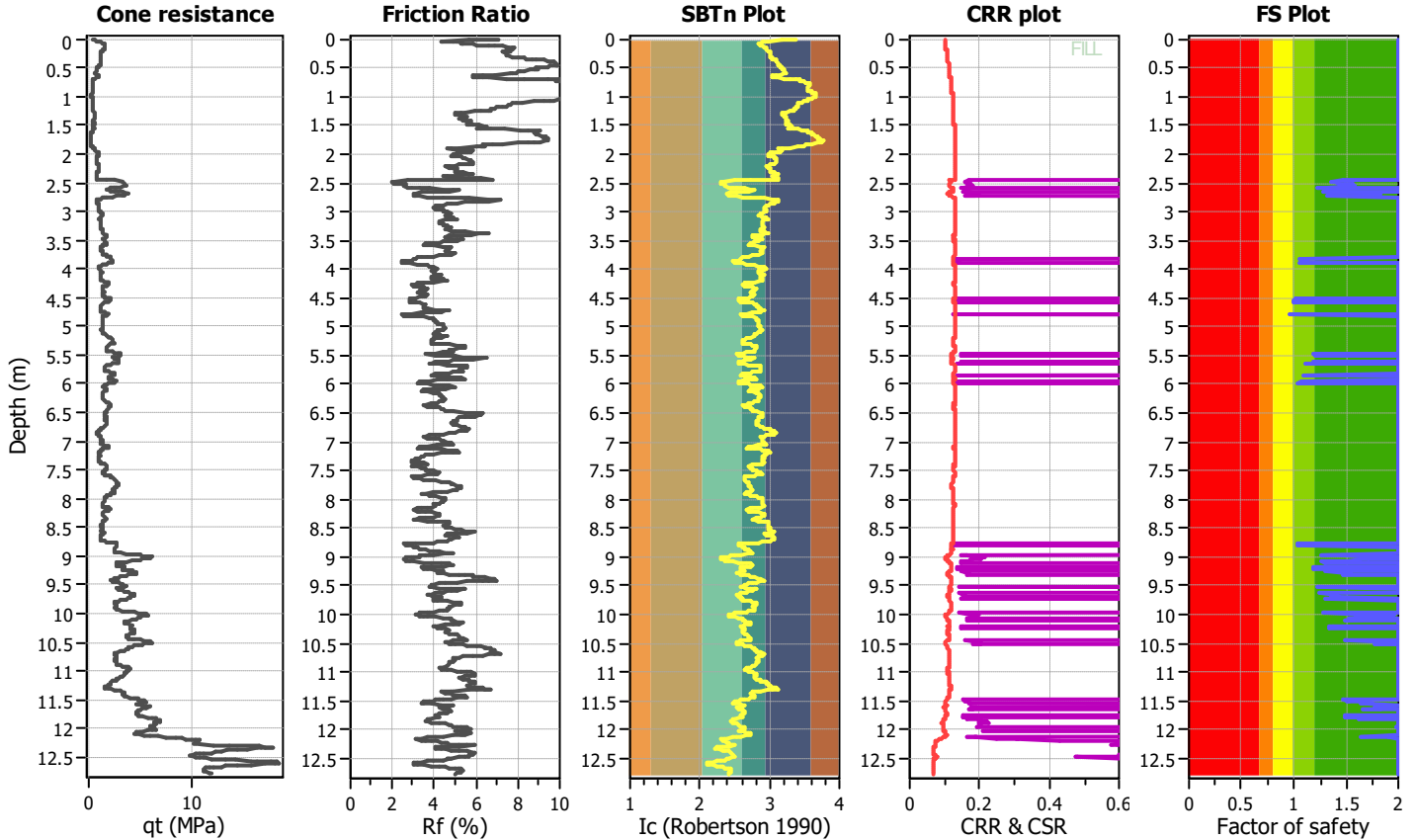
Project title : Willowridge Developments

Location : Aucks Road Russell

CPT file : CPT21

Input parameters and analysis data

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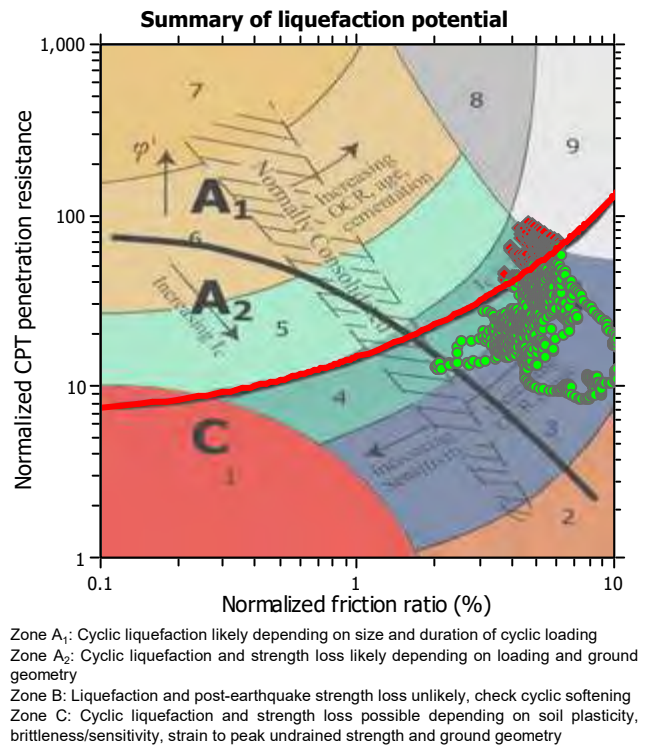
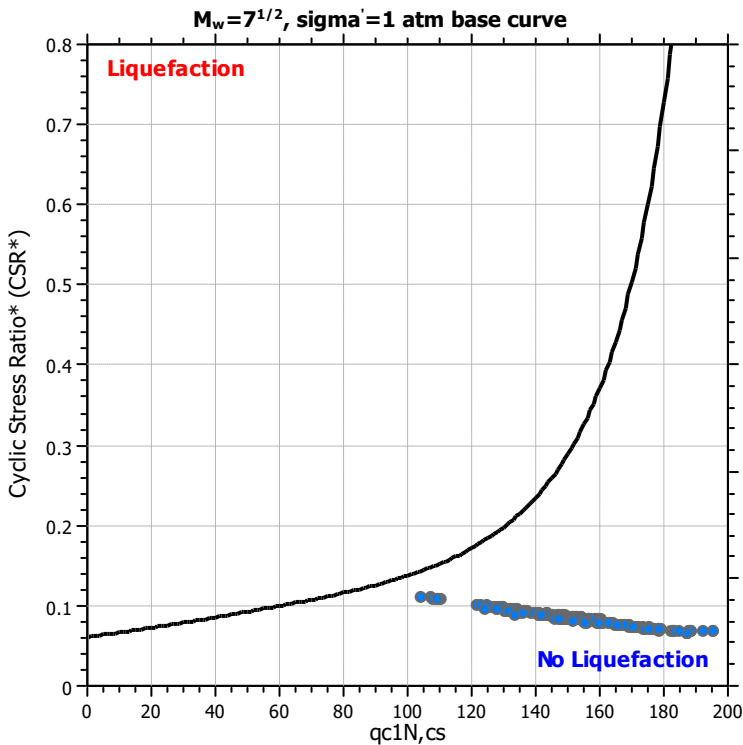
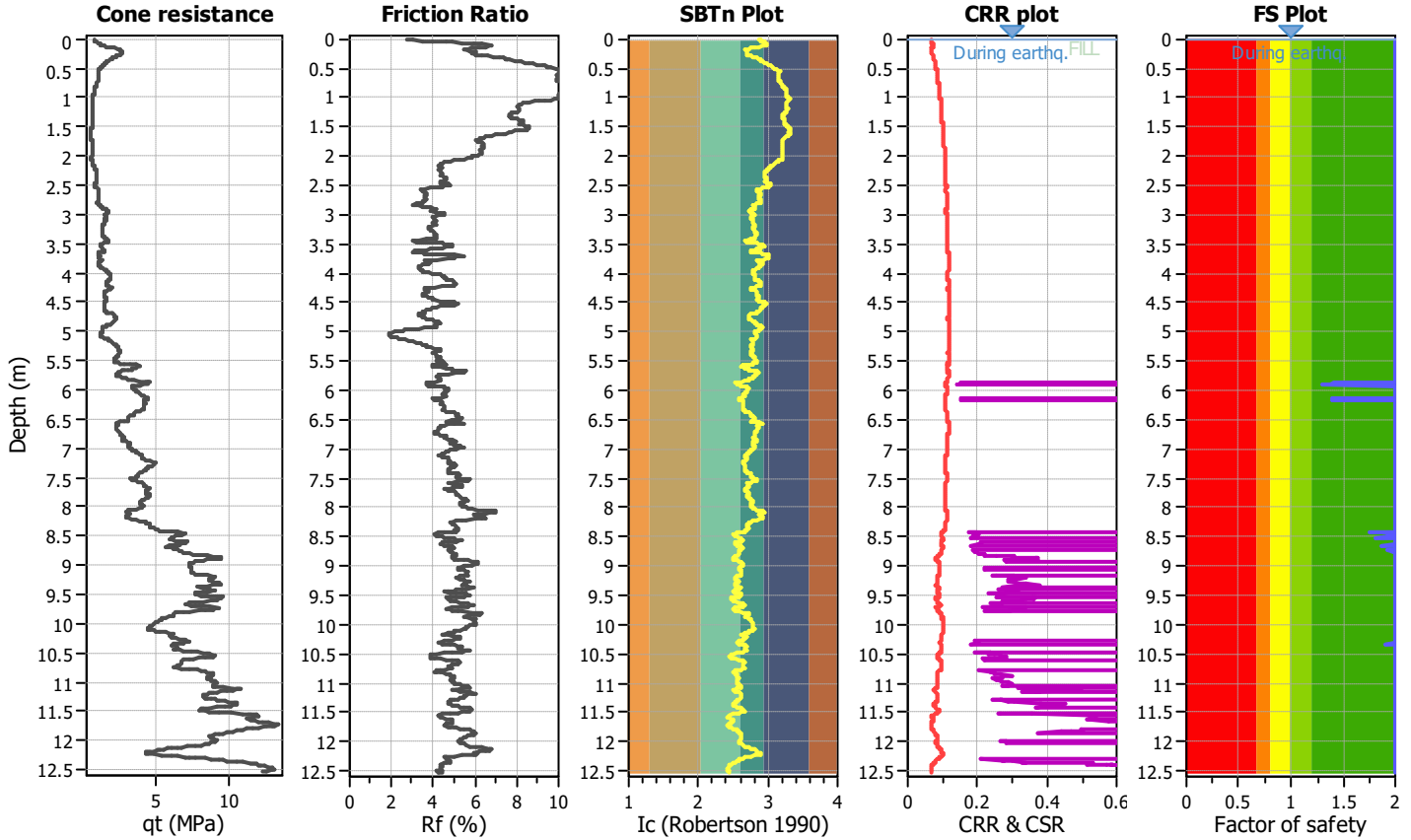
Project title : Willowridge Developments

Location : Aucks Road Russell

CPT file : CPT22

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LIQUEFACTION ANALYSIS REPORT

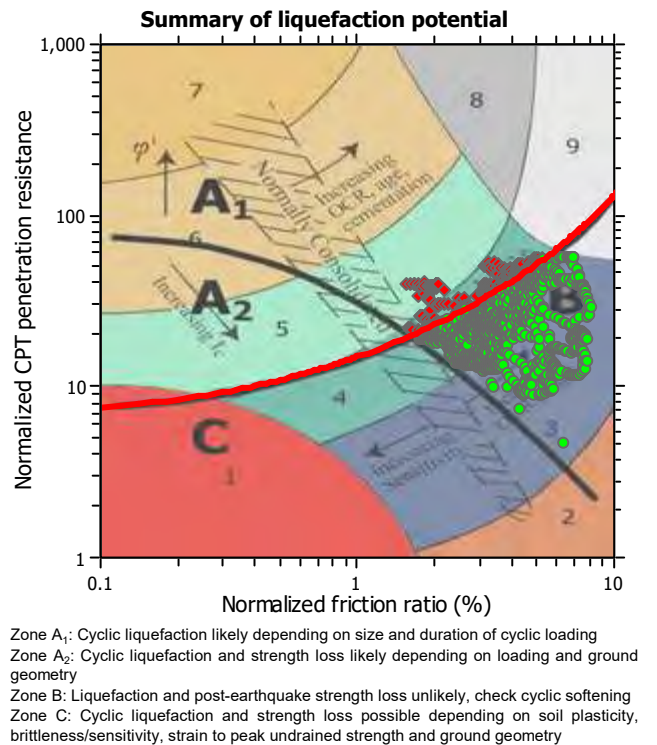
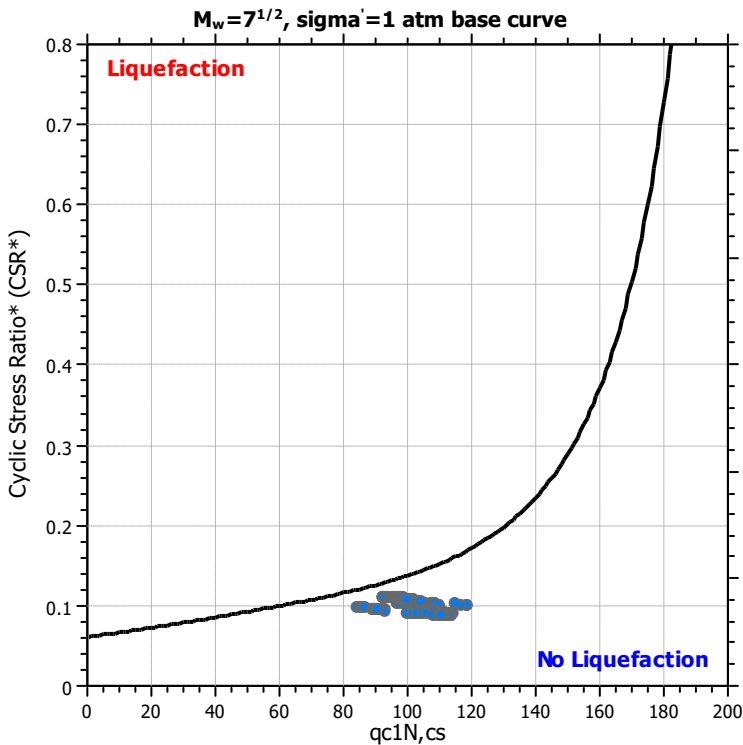
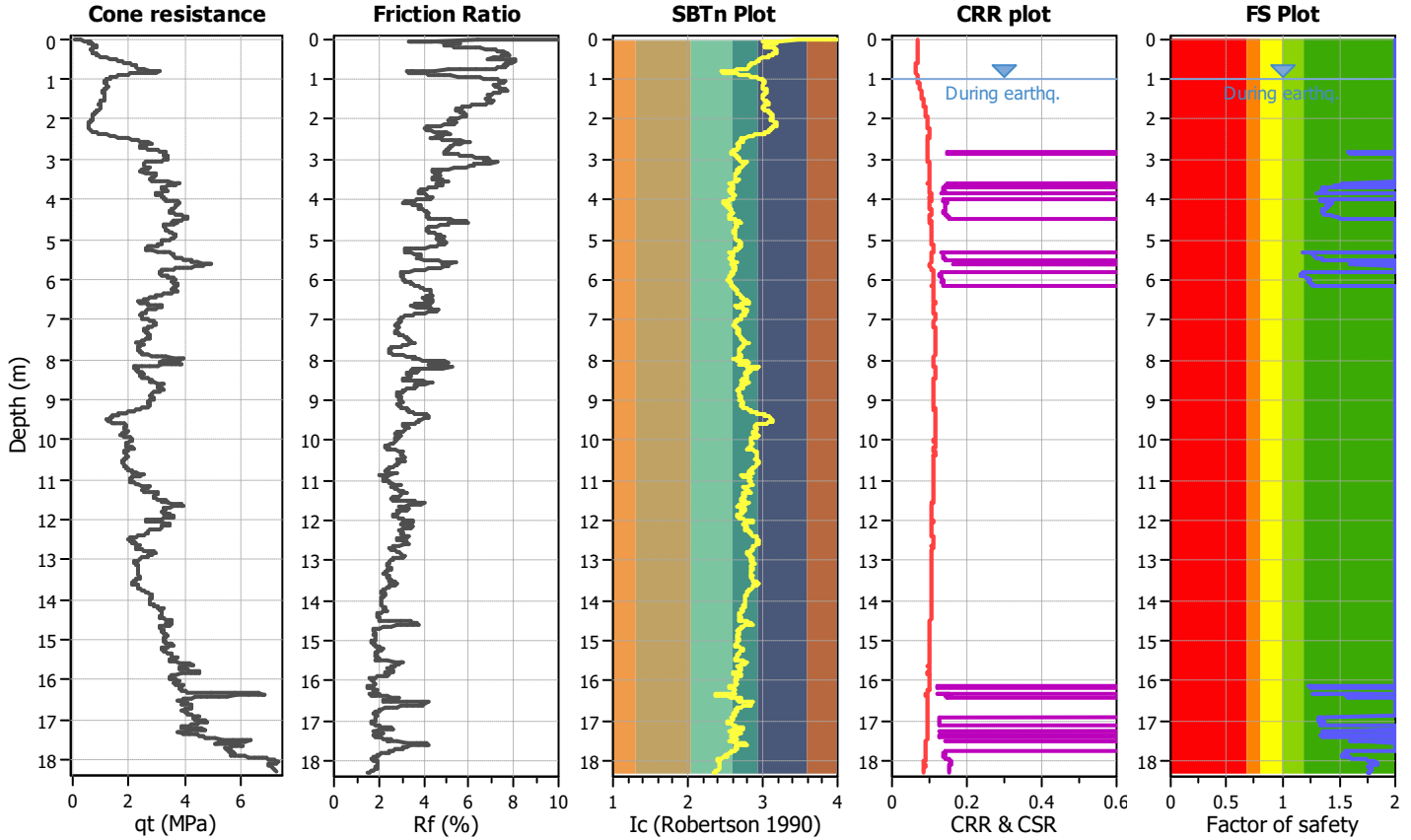
Project title : Willowridge Developments

Location : Aucks Road Russell

CPT file : CPT25

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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



LIQUEFACTION ANALYSIS REPORT

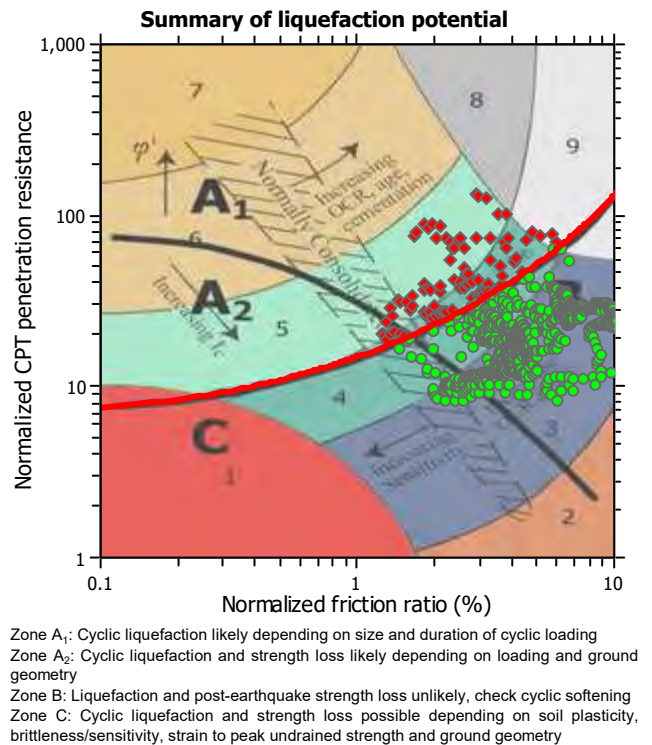
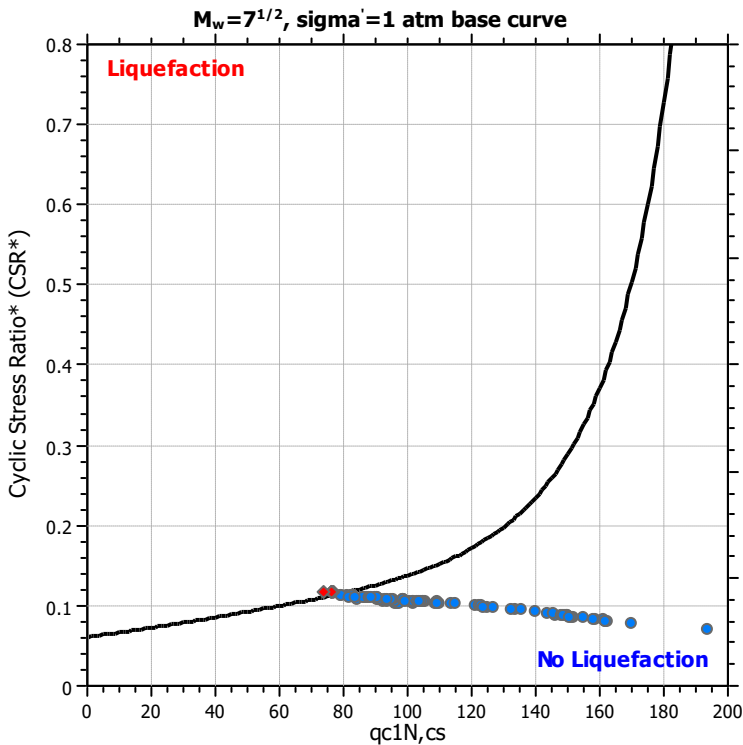
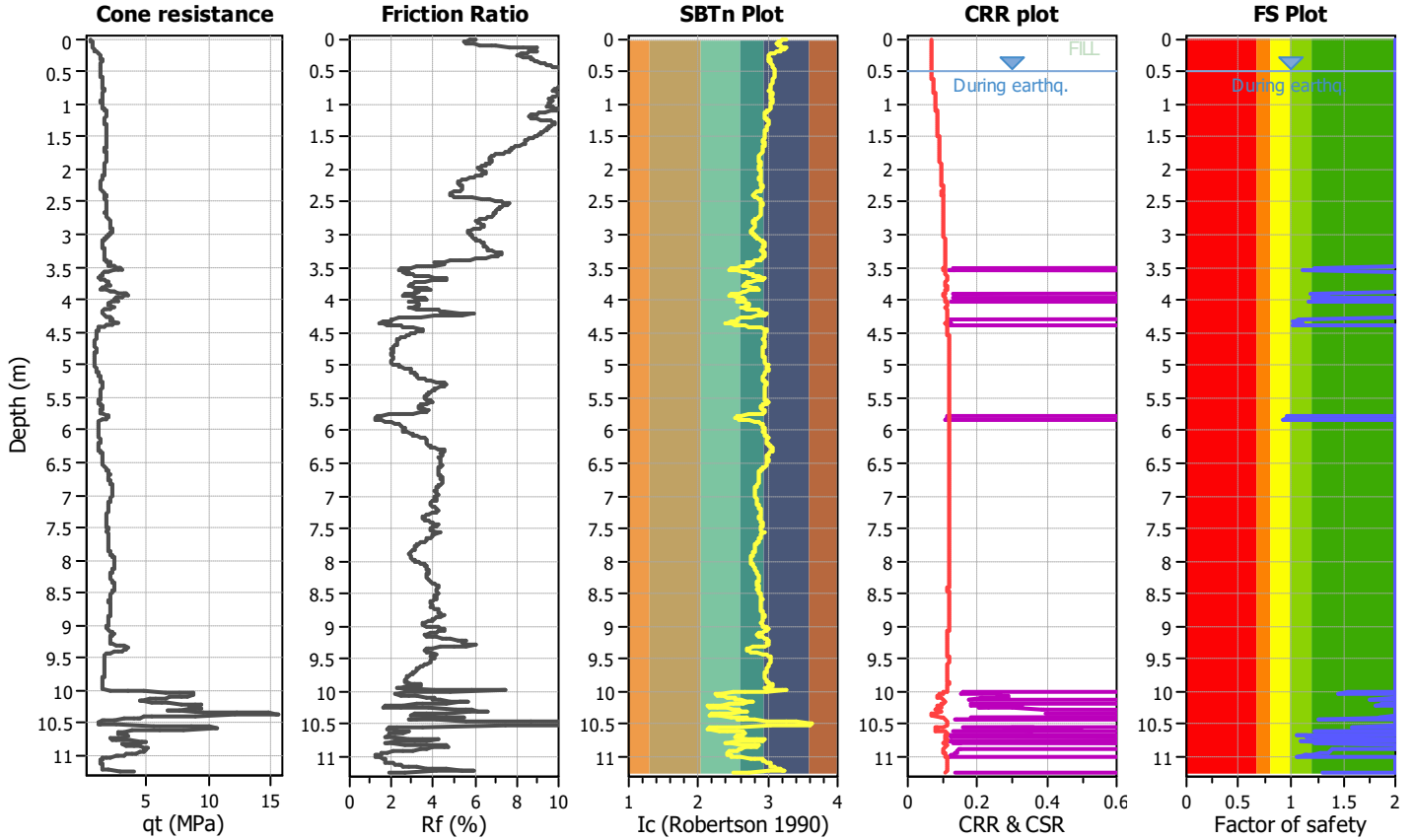
Project title : Willowridge Developments

Location : Aucks Road Russell

CPT file : CPT30

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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



Mr T Mandeno
Maven Associates Limited
Level 1, 5 Owens Road
Epsom
Auckland 1023

22 November 2024

Copy via email: tobym@maven.co.nz

Dear Toby

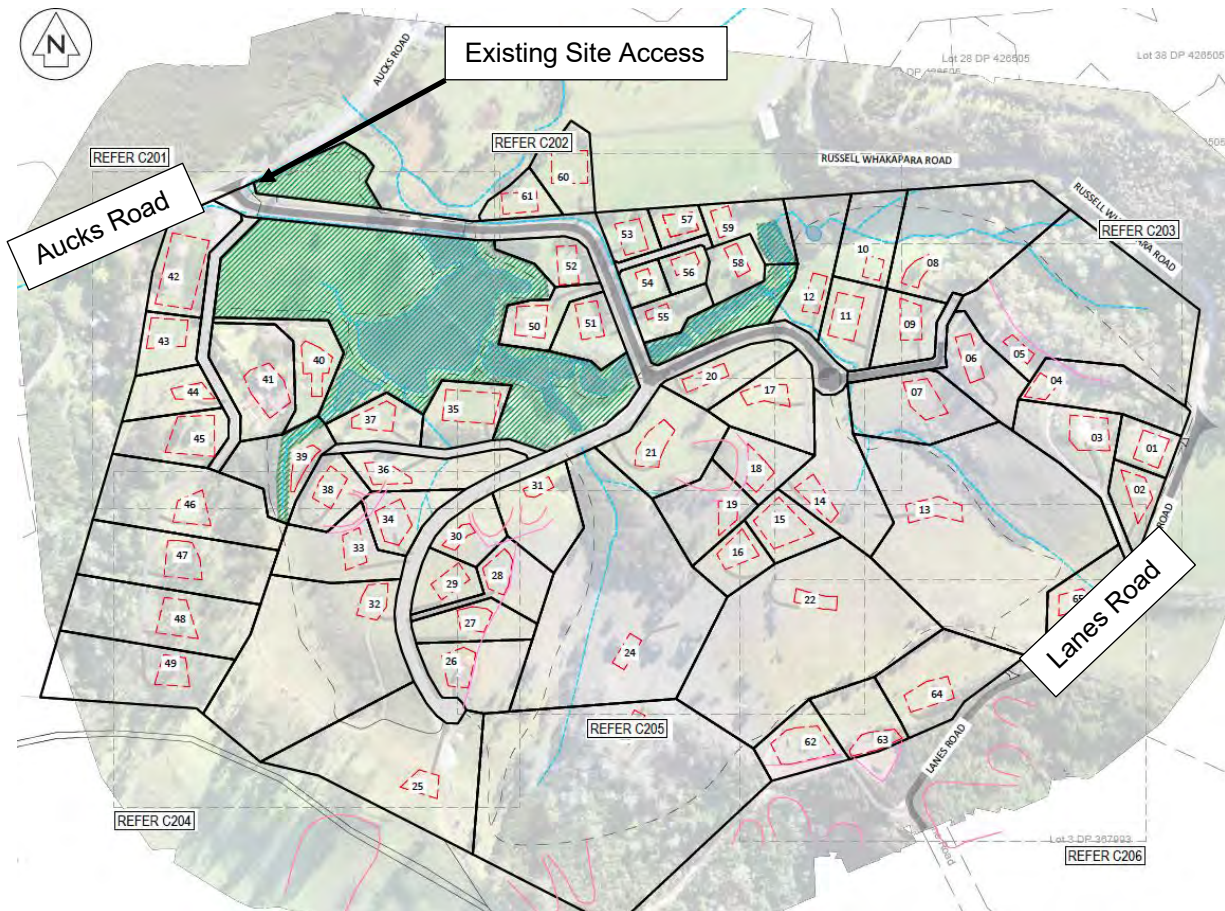
TRAFFIC REPORT – 39 AUCKS ROAD, RUSSELL

Further to your instruction, we are pleased to provide this traffic assessment for the proposed residential subdivision at 39 Aucks Road in Russell.

1 PROPOSAL

The proposal seeks to establish 65 residential lots at 39 Aucks Road in Russell. The lot layout is shown in Figure 1.

Figure 1: Proposed Subdivision



The majority of lots (57 lots) are proposed to be accessed via an existing access on Aucks Road. The remaining lots (Lots 1 to 4, and 62 to 65) are proposed to be accessed via Lanes Road.

This report focusses on the acceptability of access, and internal road design.

2 BACKGROUND

As outlined in the Civil Engineering Report, the site has been the subject to various development applications. The most recent being a 2 lot subdivision (Council Ref 2170042-RMASUB) which was completed. The earlier subdivision for 12 lots (Council ref RC2010379) was consented, the infrastructure built, s223 and survey approval achieved, however, s224c and engineering sign off was not completed.

The internal road, including the intersection to Aucks Road has been formed, as has several constructed private Right of Ways. Power and telecommunications infrastructure was also constructed within the site.

We understand that the vehicle crossings for the lots on Lanes Road were previously assessed as part of earlier consents

3 EXISTING SITE CONDITIONS

3.1 SITE LOCATION

The site is located between Aucks Road and Lanes Road in Russell. The site is zoned Coastal Living in the Far North District Council Operative District Plan. Figure 2 shows the zoning of the site.

Figure 2: Operative Zoning



3.2 ROAD LAYOUT

Aucks Road is a two-lane rural road with no footpaths or on-street parking. Photograph 1 and Photograph 2 show Aucks Road either side of the site access.

Photograph 1: Aucks Road – looking south toward Okiato

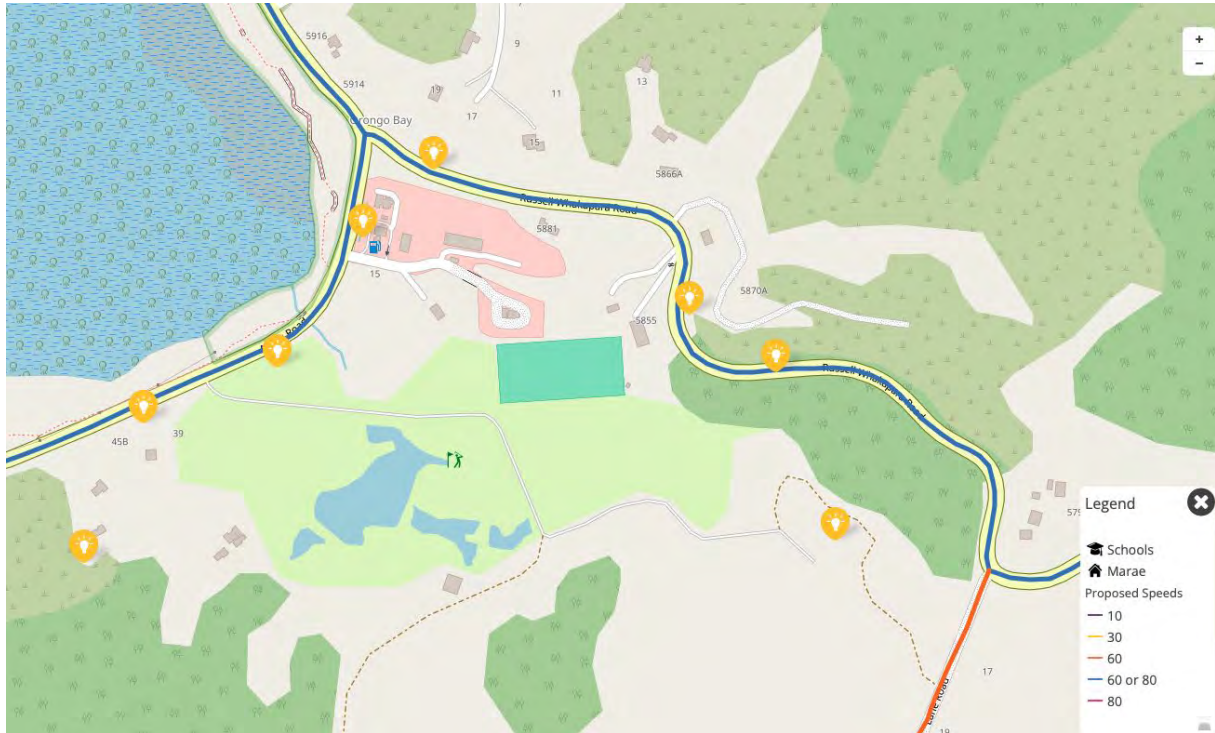


Photograph 2: Aucks Road – looking north toward Russell village



The posted speed limit on Aucks Road is currently 100 km/hr however a speed limit reduction is currently being investigated by Far North District Council to reduce the speed limit to 60 km/hr or 80 km/hr. An excerpt from the consultation website is shown in Figure 3.

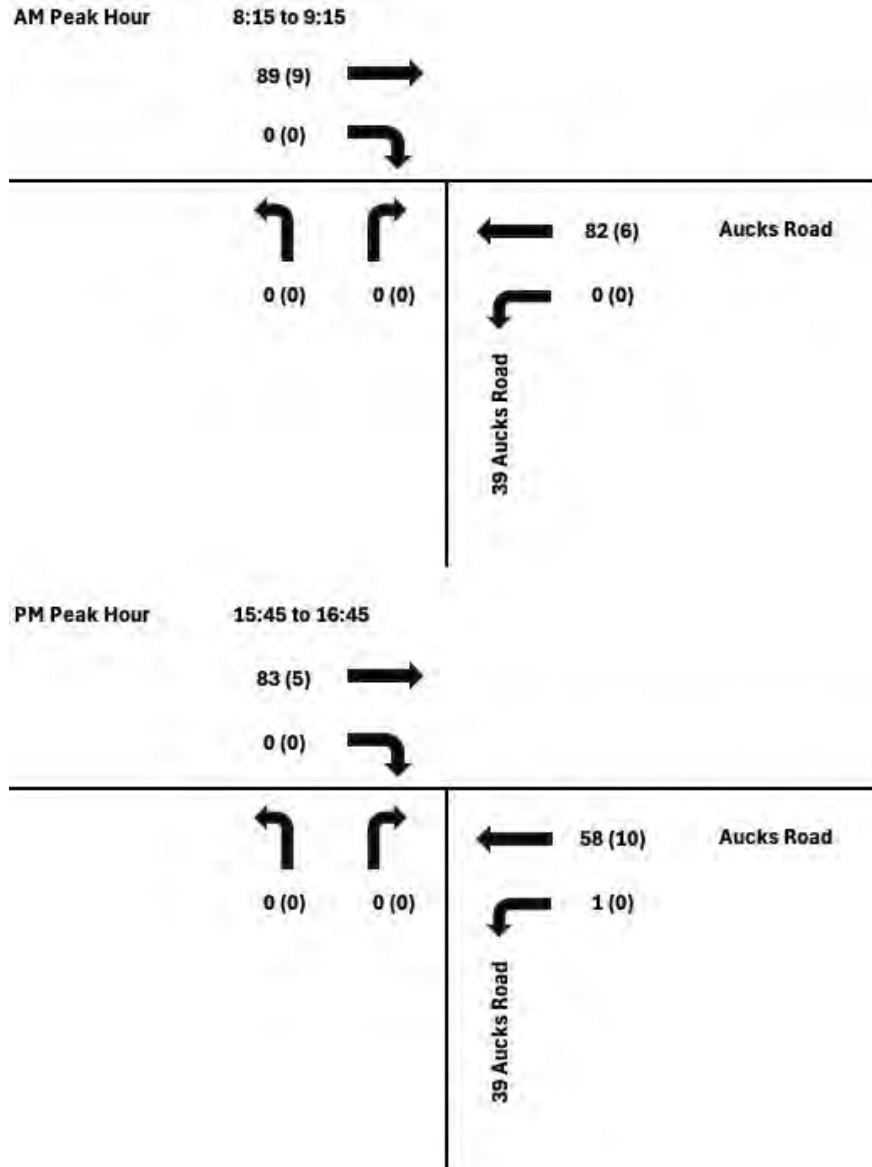
Figure 3: Speed Limit Consultation



3.3 TRAFFIC VOLUMES

The traffic volumes at the existing Aucks Road/ site access intersection were surveyed on 5 November 2024. The results of the surveys are shown in Figure 4.

Figure 4: Existing Traffic Volumes



The volumes are considered to be low with peak hourly volumes of approximately 150 to 200 vehicles per hour (vph). Based on peak hour volumes, we estimate the daily volumes are in the order of 2,000 vpd.

We have also obtained summer traffic count data for Aucks Road from Far North District Council which shows similar traffic volumes. We consider this is likely due to the car ferry constraining the amount of traffic that can use the road in the summer months. This data is shown in **Attachment A**.

3.4 CRASH HISTORY

A search of the NZTA Crash Analysis System (CAS) was undertaken for all reported crashes on Aucks Road within 500 m of the site access for a five year period from 2019 to 2023 inclusive. All crashes entered into the system for 2024 were also included.

A total of three crashes were recorded, all of which occurred at the Russell Road/ Aucks Road intersection i.e. east of the site. The crashes are summarised as follows:

- Crash ID: 2023258205 – Serious injury crash involving a northbound vehicle on Aucks Road completing a u-turn at the Russell Whakapara Road intersection and hitting a motorcycle.
- Crash ID: 201976103 – Non-injury crash involving a vehicle losing control on Russell Whakapara Road, and
- Crash ID: 2022233571 – Non-injury crash involving a vehicle losing control on Russell Whakapara Road.

The crash diagram is shown in Figure 5.

Figure 5: Crash Diagram



Importantly, the crashes are located approximately 350 m north of the site access and there have been no crashes near the site access. We consider the proposed development is unlikely to adversely affect road safety near the development.

4 TRIP GENERATION

The trip generating potential of the site has been estimated based on the RTA Guide. All lots, given their size, are expected to be occupied by standalone homes. While there is potential for residents to be transient i.e. houses used as holiday homes, we have conservatively assessed all dwellings as being fully occupied.

The 'dwelling house' trip generation rate from the RTA Guide has the following rates:

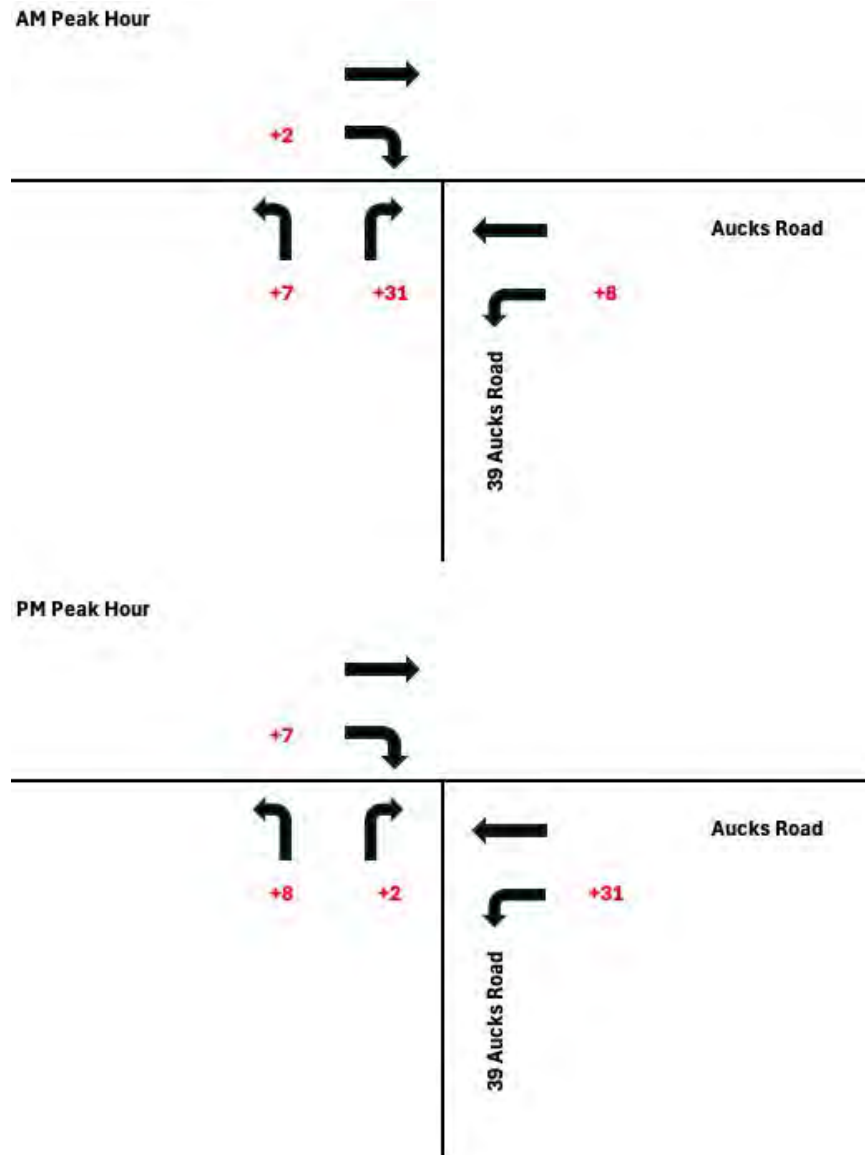
- Peak hour trip generation rate: 0.85 trips per dwelling, and
- Daily trip generation rate: 9 trips per dwelling.

In terms of the Aucks Road/ site access intersection, 57 lots are proposed to use this access. This equates to an estimated 48 trips in the peak hour and 513 trips per day. The trips are predicted to be distributed as follows:

- AM peak hour – 80% outbound and 20% inbound, and 80% to/from Russell (east) and 20% to/from Okiato (west), and
- PM peak hour – 20% outbound and 80% inbound, and 80% to/from Russell (east) and 20% to/from Okiato (west).

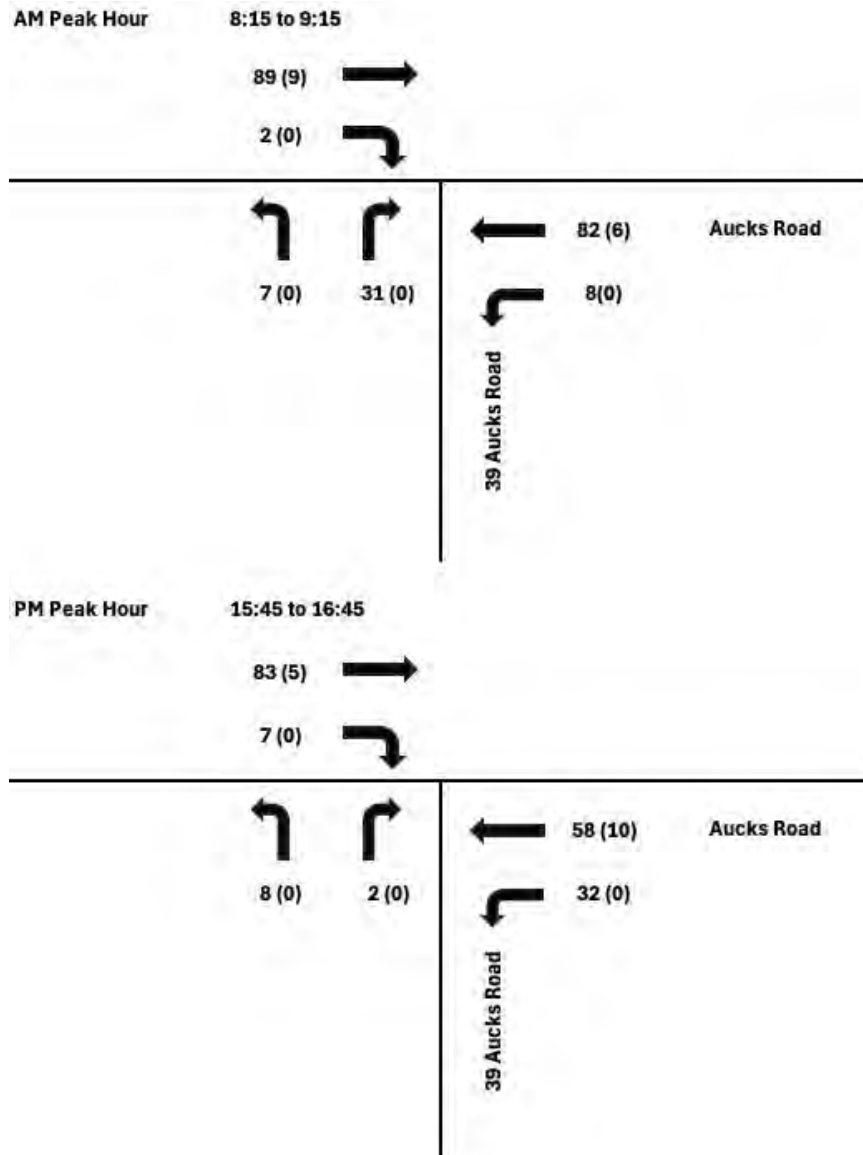
The estimated additional traffic volumes generated by the development are shown in Figure 6.

Figure 6: Additional Traffic Volumes



The total traffic volumes at the access are shown in Figure 7.

Figure 7: Total Traffic Volumes



5 EFFECTS ON ROAD NETWORK

Based on the additional volumes anticipated to be generated at the Aucks Road site access, we have undertaken traffic modelling to understand the likely operation of the access. The traffic volumes in Figure 7 were modelled in SIDRA 9.1 and the results of the modelling are shown in Table 1 and Table 2.

Table 1: Site Access Performance – Morning Peak Hour

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: Site Access															
1	L2	All MCs	7	0.0	7	0.0	0.039	4.8	LOS A	0.1	1.0	0.28	0.55	0.28	55.9
3	R2	All MCs	33	0.0	33	0.0	0.039	5.6	LOS A	0.1	1.0	0.28	0.55	0.28	55.8
Approach			40	0.0	40	0.0	0.039	5.4	LOS A	0.1	1.0	0.28	0.55	0.28	55.8
East: Aucks Road															
4	L2	All MCs	8	0.0	8	0.0	0.054	7.8	LOS A	0.0	0.0	0.00	0.06	0.00	86.0
5	T1	All MCs	93	6.8	93	6.8	0.054	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	98.1
Approach			101	6.3	101	6.3	0.054	0.7	NA	0.0	0.0	0.00	0.06	0.00	97.0
West: Aucks Road															
11	T1	All MCs	103	9.2	103	9.2	0.057	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	99.4
12	R2	All MCs	2	0.0	2	0.0	0.057	7.5	LOS A	0.0	0.1	0.01	0.01	0.01	64.0
Approach			105	9.0	105	9.0	0.057	0.2	NA	0.0	0.1	0.01	0.01	0.01	98.3
All Vehicles			246	6.4	246	6.4	0.057	1.2	NA	0.1	1.0	0.05	0.12	0.05	87.0

Table 2: Site Access Performance – Evening Peak Hour

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: Site Access															
1	L2	All MCs	8	0.0	8	0.0	0.008	4.8	LOS A	0.0	0.2	0.18	0.50	0.18	56.2
3	R2	All MCs	2	0.0	2	0.0	0.008	5.4	LOS A	0.0	0.2	0.18	0.50	0.18	56.0
Approach			11	0.0	11	0.0	0.008	4.9	LOS A	0.0	0.2	0.18	0.50	0.18	56.1
East: Aucks Road															
4	L2	All MCs	34	0.0	34	0.0	0.058	7.8	LOS A	0.0	0.0	0.00	0.22	0.00	81.9
5	T1	All MCs	72	14.7	72	14.7	0.058	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	92.9
Approach			105	10.0	105	10.0	0.058	2.5	NA	0.0	0.0	0.00	0.22	0.00	89.1
West: Aucks Road															
11	T1	All MCs	93	5.7	93	5.7	0.054	0.0	LOS A	0.0	0.3	0.04	0.06	0.04	97.9
12	R2	All MCs	7	0.0	7	0.0	0.054	7.6	LOS A	0.0	0.3	0.04	0.06	0.04	63.4
Approach			100	5.3	100	5.3	0.054	0.6	NA	0.0	0.3	0.04	0.06	0.04	94.2
All Vehicles			216	7.3	216	7.3	0.058	1.7	NA	0.0	0.3	0.03	0.16	0.03	88.7

As shown, the site access performs well with additional traffic volumes. From an operational perspective, no additional upgrades are considered necessary.

6 AUCKS ROAD SITE ACCESS SAFETY

An assessment of visibility at the Aucks Road site access has been undertaken to understand the safety implications of accommodating additional traffic volumes. Sight distances were measured on-site as follows:

- Visibility to east – 150 m from site access and 145 m from eastbound lane i.e. vehicles turning right into site access, and
- Visibility to west – 230 m from site access.

Visibility requirements are calculated based on the approach speed of vehicles. We measured westbound vehicle speeds and the operating speed (85th percentile speed) was calculated to be 66 km/hr. The required visibility for this speed in accordance with Austroads Safe Intersection Sight Distance (SISD) requirements is 139 m. As such, we consider visibility to the east (toward westbound vehicles) to be acceptable. Eastbound vehicle speeds were not measured however were not observed to be significantly higher than westbound operating speeds. As such, the available visibility was considered to comfortably satisfy Austroads SISD requirements. The available visibility provisions at the site access are shown in Photograph 3 and Photograph 4.

Photograph 3: Aucks Road Site Access – Visibility to East



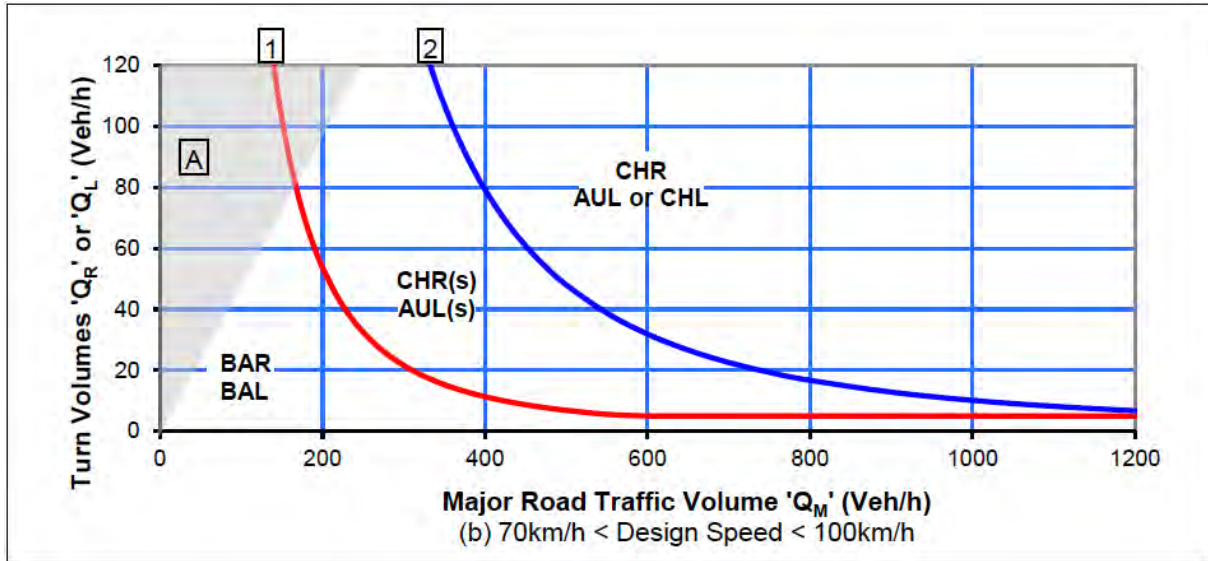
Photograph 4: Aucks Road Site Access – Visibility to West



We have also assessed the access against requirements for auxiliary lanes such as right turn bays. *Austrroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management* provides warrants for auxiliary lanes typically referred to by traffic engineering practitioners in New Zealand.

Given the measured operating speeds, and potential posted speed limit reduction, we consider the most appropriate Austrroads warrant is for a road with a design speed of 70 to 100 km/hr. The Austrroads warrant is shown in Figure 8.

Figure 8: Austroads Auxiliary Lane Warrant



Based on the volumes on Aucks Road (approximately 200 vph), right turn volumes on Aucks Road (less than 10 vph) and left turn volumes of 32 vph, we do not consider any further widening or auxiliary lanes are required.

7 LANES ROAD ACCESSES

The Lanes Road accesses are expected to generate a very low level of traffic movements (approximately 7 vph and 72 vpd). This is considered to have negligible operational effects on Lanes Road and nearby intersections.

In terms of vehicle access locations, these have largely been assessed and approved as part of earlier consents. For clarity, the following access provisions are proposed:

- Lot 1 and Lot 4 are proposed to have a shared access (Driveway 3);
- Lot 2 and Lot 3 are proposed to have a shared access (Driveway 4);
- Lot 65 is proposed to have a dedicated access;
- Lot 64 is proposed to have a dedicated access, and
- Lot 62 and Lot 63 are proposed to have a shared access (Driveway 5).

All of the above shared accesses, which extend into the sit, are proposed to have gradients no steeper than 12.5% (1:8). The majority of Lanes Road is unsealed and has low operating speeds. The existing accesses for the lots as indicated above are considered acceptable.

8 INTERNAL ROAD DESIGN

All of the internal roads within the site are proposed to be privately controlled i.e. not vested to Council. The internal roads all extend from the Aucks Road site access. The existing roads are shown in Photograph 5, Photograph 6, Photograph 7 and Photograph 8.

Photograph 5: Site Access near Aucks Road



Photograph 6: Site Access (approximately 200 m from Aucks Road)



Photograph 7: Site Access (at proposed road extension to west)



Photograph 8: Site Access (at end of internal road looking toward access connection to Lots 5 to 9)



Based on our observations, we consider that all lots served by the existing internal road network are acceptable and therefore have focussed our assessment on the proposed new internal roads serving Lots 21 and Lots 24 to 39. The civil engineering plans shows one new road (Road 2). There are also additional JOALs (JOAL 1 to JOAL 5) and Driveways (Driveway 1 and Driveway 2).

In general, the internal road network follows the design principles below:

- For accesses serving 6 lots or greater – 6.0 m two-way carriageway;

- For accesses serving 3-5 lots – 4.0 m carriageway with passing bays, and
- For accesses serving 1-2 lots – 3.0 m carriageway with passing bays.

The civil plans do not show passing bay locations however it is important to ensure these are located every 50 m and that visibility is provided between the two-way sections so that drivers can observe any opposing vehicles and know when it is safe to proceed into one-lane sections.

In terms of gradients, the following maximum gradients are proposed:

- Road 2 – 13.1% (1:7.6)
- JOAL 1 (extension of existing Road 1) – 13.4% (1:5.9)
- JOAL 2 – 5.7% (1:17.5)
- JOAL 3 – 3.4% (1:29.4)
- JOAL 4 – 18.1% (1:5.5)
- Driveway 1 – 16.8% (1:6)
- Driveway 2 – 17.4% (1:5.7).

These gradients generally follow existing topography and are considered appropriate.

9 CONCLUSION

From a review of the proposed 65 lot subdivision at 39 Aucks Road in Russell, the following can be concluded:

- The site is located on Aucks Road which has low traffic volumes (approximately 200 vph and 2,000 vpd);
- The crash history does not indicate any safety issues on Aucks Road or nearby intersections;
- The traffic expected to be generated by the proposed development can be accommodated within the existing road network. The effects of this generated traffic are considered negligible;
- Sight distance at the Aucks Road site access is considered acceptable and meets appropriate design standards;
- No additional widening is required at the Aucks Road/ site access intersection based on generated traffic volumes and traffic volumes on Aucks Road;
- The existing internal roads are considered acceptable to accommodate additional traffic volumes;
- The proposed internal roads, JOAL and driveways are detailed on the civil engineering drawings and are considered to have appropriate gradients and access widths, and
- We recommend that any one-lane accesses (2 to 5 dwellings) provide passing bays nominally every 50 m however the design will need to ensure that opposing vehicles can see one another between passing bay locations so that drivers know when it is safe to proceed into one lane sections.

Overall, it is concluded that the development is designed appropriately and there are no traffic engineering or transportation planning reasons to preclude approval of the proposed development.

Yours sincerely

Commuter Transportation Consultants



Mike Nixon

Principal Transport Consultant

Mike@commute.kiwi

ATTACHMENT A – SUMMER TRAFFIC VOLUMES

MetroCount Traffic Executive Audit of Data Quality

Site: Aucks Road
Description: 3350m, Summer
Attribute: FFNDC
Direction: 7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration: 13:40 Thursday, 11 January 2024 => 14:07 Thursday, 18 January 2024,
Zone:
File: Aucks Road 0 2024-01-18 1408.EC0 (Plus)
Identifier: MX72VQ64 MC5900-X11 (c)MetroCount 15Aug16
Algorithm: Factory default axle (v5.07)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile: Filter is disabled
Separation: Headway > 0 sec, Span 0 - 100 metre
Name: Default Profile
Scheme: Vehicle classification (NZTA2011)
Units: Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile: Vehicles = 12809 / 12809 (100.00%)

Trigger Statistics

Total Sensor Triggers = 54411
A triggers = 27271 (50.120%)
B triggers = 27140 (49.880%)
A/B Ratio = 100.483%

Vehicle Statistics

Total Vehicles = 12809
A-B Direction = 6620 (51.7%)
B-A Direction = 6189 (48.3%)

MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

Site: Aucks Road
Description: 3350m, Summer
Filter time: 14:00 Thursday, 11 January 2024 => 14:00 Thursday, 18 January 2024
Scheme: Vehicle classification (NZTA2011)
Filter: Cls(1-13) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100) Lane(0-16)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	2.0	0.0	0.0	0.0	0.0	1.0	0.0	0.4	0.4
0100-0200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0200-0300	1.0	1.0	1.0	0.0	1.0	1.0	0.0	0.8	0.7
0300-0400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0400-0500	2.0	2.0	0.0	2.0	0.0	2.0	2.0	1.2	1.4
0500-0600	16.0	13.0	16.0	10.0	13.0	5.0	5.0	13.6	11.1
0600-0700	30.0	31.0	32.0	33.0	32.0	31.0	17.0	31.6	29.4
0700-0800	97.0	87.0	96.0	101.0	93.0	44.0	35.0	94.8	79.0
0800-0900	105.0	112.0	138.0	112.0	121.0	89.0	57.0	117.6	104.9
0900-1000	163.0	129.0	145.0	137.0	152.0	126.0	128.0	145.2	140.0
1000-1100	197.0	150.0	167.0	156.0	176.0	178.0	146.0	169.2	167.1
1100-1200	163.0	121.0	149.0	167.0	203.0	176.0	169.0	160.6	164.0
1200-1300	128.0	147.0	146.0	144.0	191.0	168.0	156.0	151.2	154.3
1300-1400	146.0	110.0	157.0	142.0	142.0	162.0	149.0	139.4	144.0
1400-1500	136.0	138.0	136.0	171.0	194.0	147.0	146.0	155.0	152.6
1500-1600	123.0	142.0	163.0	187.0	164.0	156.0	148.0	155.8	154.7
1600-1700	153.0	119.0	156.0	165.0	185.0	150.0	139.0	155.6	152.4
1700-1800	140.0	121.0	138.0	123.0	147.0	145.0	122.0	133.8	133.7
1800-1900	79.0	42.0	73.0	91.0	114.0	101.0	82.0	79.8	83.1
1900-2000	52.0	41.0	63.0	62.0	60.0	67.0	47.0	55.6	56.0
2000-2100	24.0	24.0	45.0	50.0	66.0	49.0	36.0	41.8	42.0
2100-2200	11.0	25.0	31.0	37.0	62.0	43.0	47.0	33.2	36.6
2200-2300	8.0	4.0	5.0	3.0	11.0	14.0	7.0	6.2	7.4
2300-2400	1.0	2.0	1.0	5.0	3.0	0.0	0.0	2.4	1.7
Totals									
0700-1900	1630.0	1418.0	1664.0	1696.0	1882.0	1642.0	1477.0	1658.0	1629.9
0600-2200	1747.0	1539.0	1835.0	1878.0	2102.0	1832.0	1624.0	1820.2	1793.9
0600-0000	1756.0	1545.0	1841.0	1886.0	2116.0	1846.0	1631.0	1828.8	1803.0
0000-0000	1777.0	1561.0	1858.0	1898.0	2130.0	1855.0	1638.0	1844.8	1816.7
AM Peak	1000	1000	1000	1100	1100	1000	1100		
	197.0	150.0	167.0	167.0	203.0	178.0	169.0		
PM Peak	1600	1200	1500	1500	1400	1200	1200		
	153.0	147.0	163.0	187.0	194.0	168.0	156.0		

* - No data.

Speed Histogram

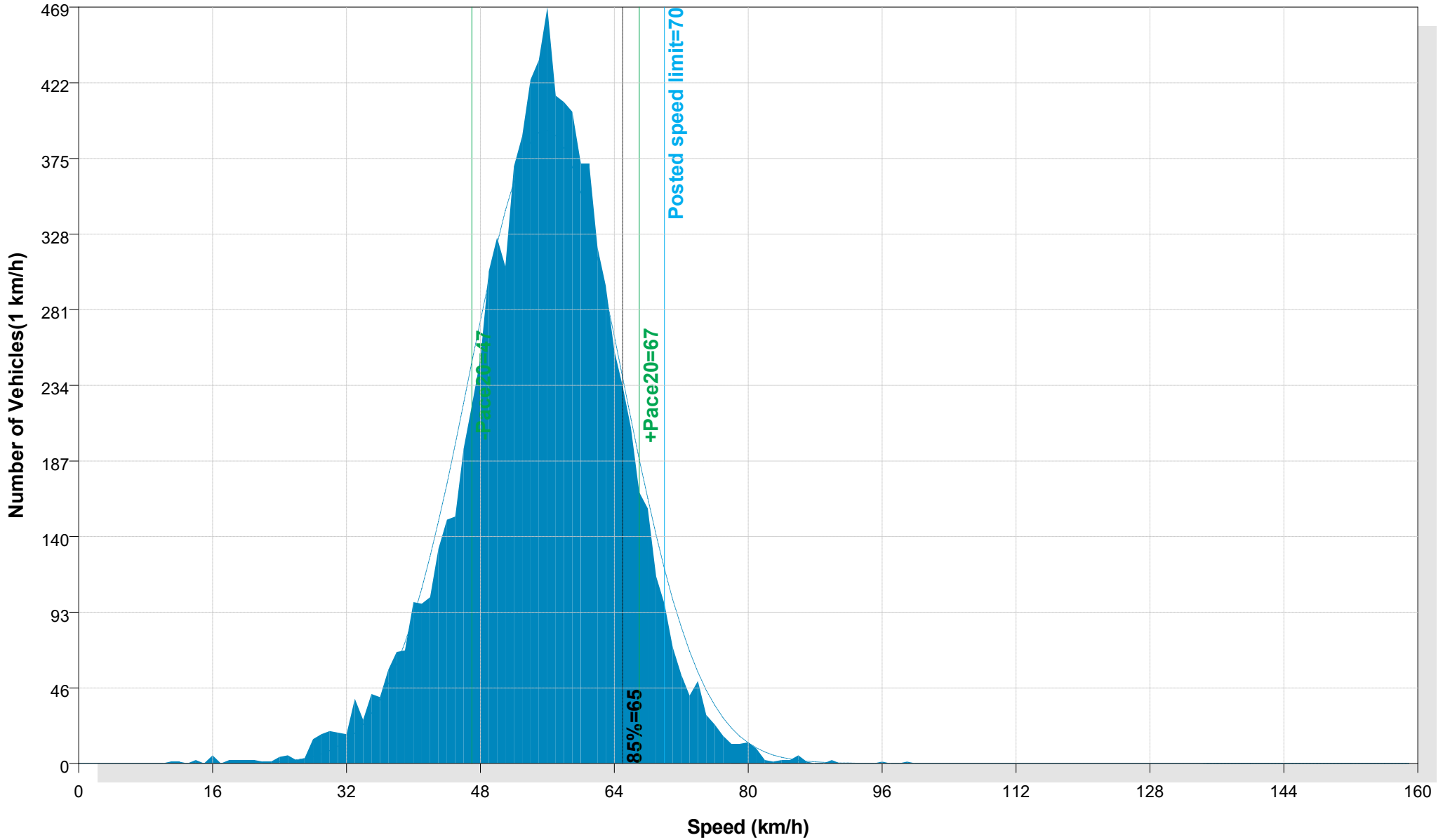
SpeedHist-457 (Metric) **Site:** Aucks Road.0.1NS

Description: 3350m, Summer

Filter time: 14:00 Thursday, 11 January 2024 => 14:00 Thursday, 18 January 2024

Filter: Cls(1-13) Dir(NESW) Sp(10,160) Headway(>4) Span(0 - 100) Lane(0-16)

Scheme: Vehicle classification (NZTA2011)



MetroCount Traffic Executive Speed Statistics

Site: Aucks Road
Description: 3350m, Summer
Filter time: 14:00 Thursday, 11 January 2024 => 14:00 Thursday, 18 January 2024
Scheme: Vehicle classification (NZTA2011)
Filter: Cls(1-13) Dir(NESW) Sp(10,160) Headway(>4) Span(0 - 100) Lane(0-16)

Vehicles = 9086
Posted speed limit = 70 km/h, Exceeding = 453 (4.986%), Mean Exceeding = 74.12 km/h
Maximum = 99.6 km/h, Minimum = 11.1 km/h, Mean = 55.8 km/h
85% Speed = 64.80 km/h, 95% Speed = 70.02 km/h, Median = 56.16 km/h
20 km/h Pace = 47 - 67, Number in Pace = 6806 (74.91%)
Variance = 85.29, Standard Deviation = 9.23 km/h

Speed Bins

Speed	Bin	Below	Above	Energy	vMult	n * vMult
0 - 10	0 0.000%	0 0.000%	9086 100.0%	0.00	0.00	0.00
10 - 20	13 0.143%	13 0.143%	9073 99.857%	0.00	0.00	0.00
20 - 30	53 0.583%	66 0.726%	9020 99.417%	0.00	0.00	0.00
30 - 40	405 4.457%	471 5.184%	8615 94.816%	0.00	0.00	0.00
40 - 50	1712 18.84%	2183 24.03%	6903 75.97%	0.00	0.00	0.00
50 - 60	3950 43.47%	6133 67.50%	2953 32.50%	0.00	0.00	0.00
60 - 70	2500 27.51%	8633 95.01%	453 4.986%	0.00	0.00	0.00
70 - 80	414 4.556%	9047 99.57%	39 0.429%	0.00	0.00	0.00
80 - 90	35 0.385%	9082 100.0%	4 0.044%	0.00	0.00	0.00
90 - 100	4 0.044%	9086 100.0%	0 0.000%	0.00	0.00	0.00
100 - 110	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
110 - 120	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
120 - 130	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
130 - 140	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
140 - 150	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
150 - 160	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
160 - 170	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
170 - 180	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
180 - 190	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00
190 - 200	0 0.000%	9086 100.0%	0 0.000%	0.00	0.00	0.00

Total Speed Rating = 0.00
Total Moving Energy (Estimated) = 0.00

Speed limit fields

Limit	Below	Above
0 | 70 (PSL)	8633 95.0%	453 5.0%

MetroCount Traffic Executive Class Speed Matrix

Site: Aucks Road
Description: 3350m, Summer
Filter time: 14:00 Thursday, 11 January 2024 => 14:00 Thursday, 18 January 2024
Scheme: Vehicle classification (NZTA2011)
Filter: Cls(1-13) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100) Lane(0-16)

km/h	Class													Total	
	MC&PC 1	PC&LCV 2	PC&LCV 3	BUS&MCV 4	BUS&HCV 5	HCV1 6	HCV1 7	HCV2 8	HCV2 9	HCV2 10	HCV2 11	HCV2 12	HCV2 13		
10- 20	11	2	.	.	.	.	.	.	.	.	.	.	.	13	0.1%
20- 30	2	49	1	6	4	.	.	.	.	.	.	.	.	62	0.5%
30- 40	4	401	16	38	11	2	.	2	2	.	3	1	.	480	3.8%
40- 50	24	2214	96	203	55	12	2	.	.	.	3	3	.	2612	20.5%
50- 60	37	5351	182	372	37	9	2	1	2	1	3	3	.	6000	47.2%
60- 70	28	2766	76	180	8	2	.	.	.	.	1	.	.	3061	24.1%
70- 80	13	401	8	24	1	.	.	.	.	.	.	.	.	447	3.5%
80- 90	1	33	.	3	.	.	.	.	.	.	.	.	.	37	0.3%
90-100	1	2	.	1	.	.	.	.	.	.	.	.	.	4	0.0%
100-110	1	.	.	.	.	.	.	.	.	.	.	.	.	1	0.0%
110-120	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
120-130	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
130-140	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
140-150	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
150-160	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Total	122	11219	379	827	116	25	4	3	4	1	10	7	0	12717	
	1.0%	88.2%	3.0%	6.5%	0.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%		



CIVIL ENGINEERING REPORT




39 Aucks Road
Russell,
Northland

PROJECT INFORMATION

CLIENT	Willowridge Developments Limited
PROJECT	309001

DOCUMENT CONTROL

DATE OF ISSUE	29/11/2024
REVISION	A

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Contents

1.	Introduction	4
1.1.	Purpose of this report	4
1.2.	Site Description.....	4
1.3.	Legal Description	5
1.4.	Consent History	5
1.5.	Redevelopment Outcome	6
2.	Earthworks Management	6
2.1.	Earthworks	6
2.2.	Erosion and Sediment Control	7
3.	Transportation	9
3.1.	Design Standards	9
4.	Stormwater	11
4.1.	Design Standards	11
4.2.	Existing Network	11
4.3.	Stormwater Capacity	12
4.4.	Stormwater Quality	12
5.	Flooding	13
6.	Wastewater	14
6.1.	Design Standards	14
6.2.	Reticulation	14
7.	Water	15
7.1.	Design Standards	15
7.2.	Reticulation	15
7.3.	Firefighting Supply.....	15
8.	Other Services	16
9.	Conclusion	16
	Appendix A – Engineering Plan.....	17
	Appendix B – Engineering Calculations and Catchment	18
	Appendix C – Coastal Flood Water Level	19
	Appendix D – Wastewater Feasibility Report	20
	Appendix E – Top Energy Supply Confirmation	21

1. Introduction

1.1. Purpose of this report

The purpose of this report is to provide an assessment of earthworks and infrastructure associated with the proposed development. The information provided herein outlines the methodology associated with the proposed infrastructure onsite and the potential capacity to service the proposed development.

The calculations and assessments included in this report are preliminary in nature based on the information available at the time of issue. Final design plans and calculations will be provided at Engineering Approval and Building Consent Stage, as required.

This report will be read in conjunction with the engineering drawings and calculations and will accompany the resource consent application.

1.2. Site Description

The site is located on the eastern side of Aucks Road and also features frontage to Russell Whakapara Road to the north, and Lanes Road to the east. The site is located five minutes by car to Russell. The site features undulating topography, with four prominent ridges that slope down to the north. There are overland flowpaths/streams within the bottom of the spurs which flow into a manmade pond near Aucks Road. The site location is shown below within Figure 1:

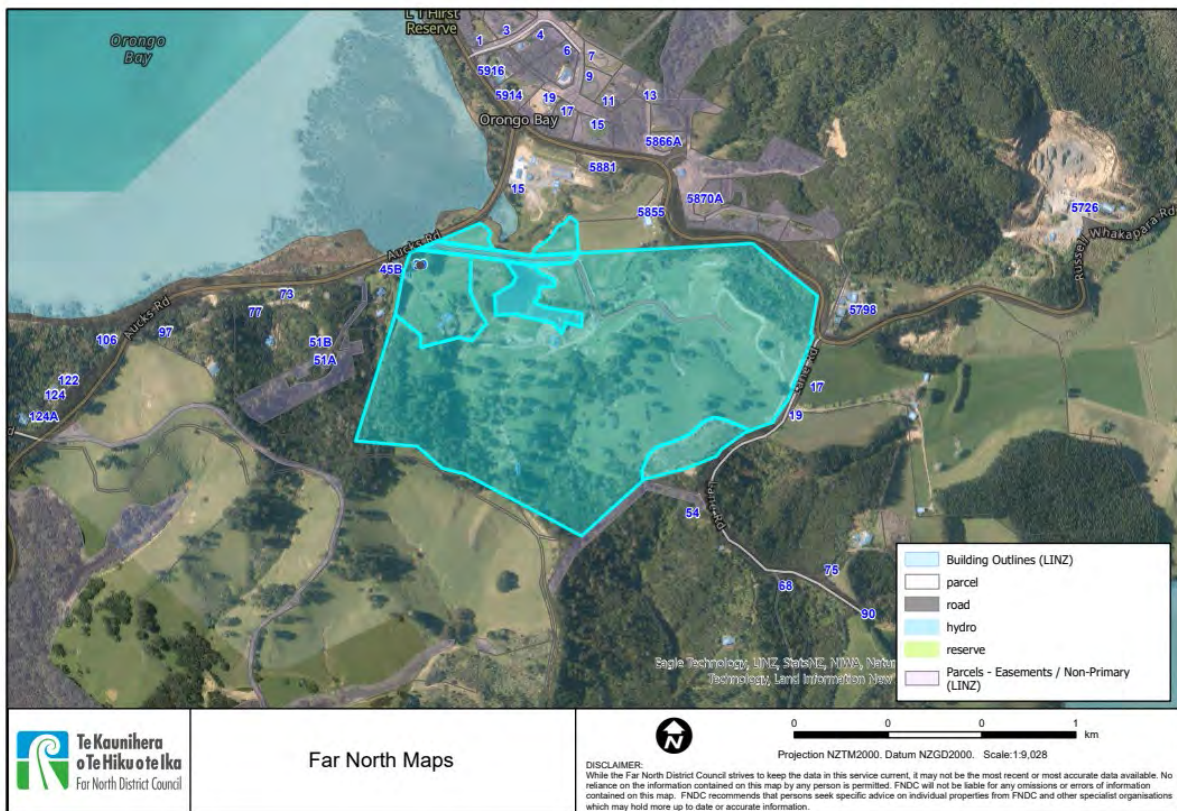


Figure 1: Subject Site. (in blue). Source: Far North Maps

There are various existing access points to the site which are well formed. The primary being the access from Aucks Road which is well formed and sealed. This provides access to the 5.5m wide road constructed as part of the previous consent. A separate access to the existing dwelling and outbuilding

is also provided from Aucks Road. There are also several formed crossings from Lane Road, which provide vehicle access to the formed lots at the top of the property.

1.3. Legal Description

The site is legally described as the following:

Lot	Appellation	Record of Title
2	DP 542129	912227
1	DP 542129	912226
1	DP 187577	476989
3	DP 420232	476989
4	DP 420232	476989

The site comprises an area of **43.28Ha** and is owned by Willowridge Developments Limited (the Applicant).

1.4. Consent History

The site has been the subject to various development applications over the years. The most recent being a 2 lot subdivision, consent Council Ref (2170042-RMASUB) which was completed. The earlier subdivision for 12 lots (Council ref RC2010379) had been consented, the infrastructure built, s223 and survey approval achieved, however, s224c and engineering sign off was not completed, and the consent has since lapsed.

The road (to vest), including intersection to Aucks Road has been formed, as has several private Right of Ways. Power and telecommunications infrastructure was also constructed within the site. Maven have visited the site and can confirm that the existing roading network is well formed, and suitable for re-use without requiring further upgrades.



Figure 2: Aerial photo taken in 2022, showing the existing roading network in the site.

1.5. Redevelopment Outcome

The consent seeks Council approval for a countryside living development delivering a total of 65 residential fee-simple lots. Access will be provided by way of a network of privately owned Jointly Owned Access Lots (JOALs), and private right of ways (RoWs).

The site is not benefited by reticulated services, so roof caught water will provide the potable and non-potable supply for all future lots. Wastewater will be treated and disposed of too ground within the respective lot boundaries. Lots will be provided with power and telecommunications via upgrades to the existing networks.

The proposed development can be seen below within Figure 3, which is an extract from the concept plan prepared by Littoralis Landscape Architecture Limited. This shows the intended roading network, lots, and revegetation planting intended within the site.



Figure 3: Concept Plan Source; Littoralis

2. Earthworks Management

2.1. Earthworks

Earthworks will be undertaken to support the development. Earthworks will be required for the construction of roading, drainage, driveways, retaining walls and the formation of private driveways and building platforms.

The earthworks for the shared accessways will be undertaken in the same stage, however, it is probable that earthworks within the respective lots themselves will be undertaken on a staged basis, and sediment control accordingly will be managed on a lot-by-lot basis.

2.1.1. Geotechnical Investigation

Geotechnical assessment report has been undertaken for the development site by Haigh Workman Limited. Refer to the resource consent application for more information, including a full copy of the Geotech Report.

The report provides the information required for subdivisional earthworks and geotechnical issues for subsequent building design and construction on each residential lot. However, the site-specific geotechnical report required at time of building.

Haigh Workman have reviewed the Maven earthworks design, and the overall platforms and accessway design has been modified to accord with the recommendations of the report. The Geotech features and setbacks are also shown on the appended Maven drawings for ease of reference.

Geotech supervision during construction will be provided, and a Geotech completion Report (GCR) will be provided at the completion of the earthworks.

2.1.2. Earthworks Summary

The Engineering Drawings (Refer to Appendix A) detail the extent of the earthworks and Erosion and sediment control measures to be implemented during construction, refer to engineering plan C200.

The following is a summary of the proposed works:

Bulk Earthworks (topsoil stripping inclusive)	
Total area of ground disturbance	55,400m ²
Total volume of cut	17,900m ³
Total volume of fill	12,800m ³
Maximum cut and fill depth	2.300 fill /3.200m cut
Total Volume (deficit)	5,100m ³ (Cut)
Total area of Streamworks (fill)	850 m ²

2.2. Erosion and Sediment Control

The proposed erosion and sediment control measures are set out in the engineering drawings within Appendix A of this report, refer to drawings in the C230 series. The erosion and sediment controls are subject to the Far North District Council code of practice (Erosion, Sediment and Dust Control 2.4.2.2) which is also references Auckland Council Guideline Document GD2016/005 - Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016.

Earthworks will likely be undertaken in a staged approach, and thus the final sediment control methodology will be subject to agreed staging and contractor methodology. In summary, the platform earthworks within the respective lots will be managed (if isolated from larger earthwork areas) via silt fences or bunds.

For larger areas of earthworks, where platforms and accessways are being formed, primary sediment controls will be via way of one SRP and several DEBs which have and will be sized for their final catchments. A network of clean and dirty water diversions will manage the flow of clean and dirty water through the development site during construction. The SRPs and DEBs have been sized as per the GD05, refer to the Calculations in Appendix B.

Silt control measures will need to be installed onsite, checked, and confirmed acceptable by the Engineer before works commence. During earthworks, the sediment control measures will be maintained such that they function as proposed. The site will be progressively stabilised with mulch, seed and metal as earthwork levels are achieved. Silt control measures will only be removed once the site is considered fully stabilised in accordance with GD2016/005.

2.2.1. Streamworks / Pond Earthworks

The proposal includes partial infilling of manmade waterbodies as to improve the layout of the lots within the development, and to provide sufficient space for wastewater disposal. The location of the works is shown below within Figure 4, below



Figure 4: Location of streamworks (in red highlight)

A draft methodology is detailed below, of which will be finalized in a Streamworks Management Plan (SMP) as a condition of consent.

- Block inlet and outlet of pond. Partially dewater into downstream waterbody via pump, protected via net to ensure no fish etc can be sucked in. This will be done under the watch of a suitably qualified ecologist, in accordance with an approved Fish Management Plan once the level is sufficiently down, an inspection to confirm if any fish exist will be done.
- The suitably qualified ecologist can then make a call, as to whether there is no fish, whereby they can allow the full dewatering or if there is fish, the works will be done under partial dewatering only.
- If the works are to be done under partial dewatering, the area to be infilled will be blocked off from the pond area by carefully installing rocks or sandbags. Compacted clay and finally topsoil will be placed over the final level and grassed/planted to stabilise.

2.2.2. Monitoring

All sediment control measures will be checked regularly to ensure that they are performing as intended.

A site walk over shall be undertaken daily before leaving the site to identify any corrective maintenance required. A more thorough inspection will be undertaken at the end of each week, before and after a forecast major storm event, to identify any required preventative and/or corrective maintenance.

3. Transportation

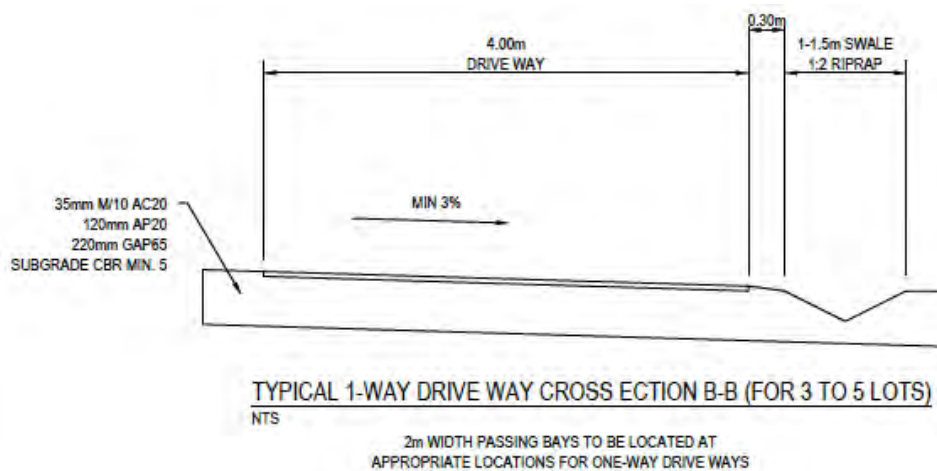
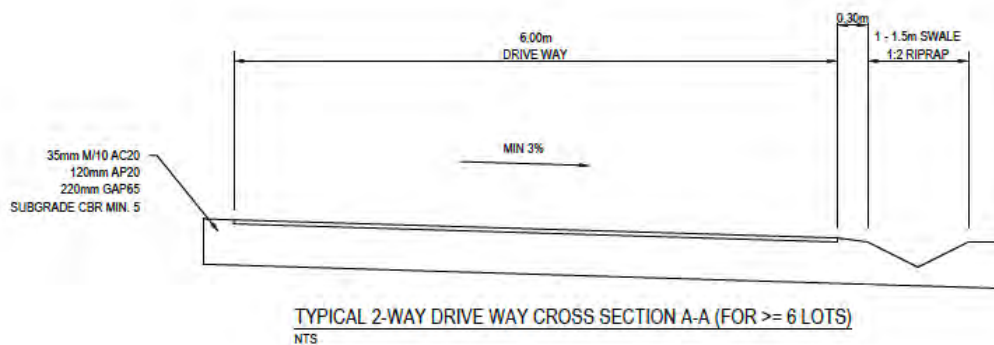
3.1. Design Standards

The transportation access design has considered the Far North District Council Engineering Standards & Guidelines, Version 0.6 May 2023. We note that the standards are to be used in conjunction with NZS 4404:2004) transportation.

As was discussed at the pre-application meeting with FNDC, the application does not propose the vesting of any public roads. All accessways are to be maintained as private JOALs or ROWs, which will be owned and managed by the Residents Association, of which all lot owners will be members of. Whilst we note this does not comply with Section 3.2.28 (Private Accessways) this is considered a suitable outcome, and one which finds balance between formed widths, traffic volumes, design outcomes and ongoing maintenance costs.

3.1.1. Formed Widths

Whilst the formed and in some instances legal widths do not comply with Section 3.2.28, the private accessways feature formed widths and surfaces which will ensure safe and efficient vehicle access to all lots within the development. There are three formed and legal widths proposed, and these are detailed within the appended drawings (C300 series, Appendix A) with extract and summary provided below:



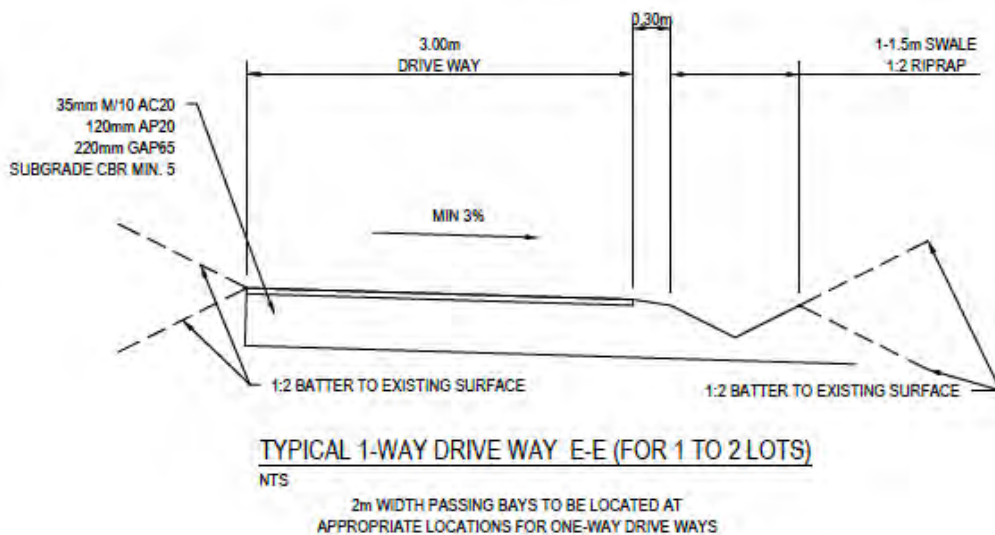


Figure 4: Proposed Roading Cross-sections

- 6 + lots – single crossfall, 6m chipseal carriageway, with table drain/or swale depending on grade.
- 3-5 lots – single crossfall, 4m chipseal carriageway, with table drain or swale depending on grade. Passing bays to 6m formed width are provided in suitable locations to allow for passing vehicles.
- 1-2 lots – single cross-fall, 3m formed accessway with table drain or swale depending on grade.

Please note driveways for single lots/platforms may not be formed at the time of subdivision and will instead be formed by future lot owners at time of building consent/house construction.

3.1.2. Accessway Grades

All grades feature a maximum grade of 20.2%, which comply with the allowable 22.2% as per the requirements of the code. All shared accessways will be provided with a chipseal finish, ensuring suitable traction and safe vehicle movements in all weather conditions. The grades have been reduced as far as reasonably possible. The site features significant contour and further reductions would result in the introduction of larger retaining walls, of which are not desired or needed with the current design.

3.1.3. Existing Intersection

The existing intersection from Aucks Road is well formed and considered suitable for the development, including the increased intensity of vehicle movements. The vehicle crossing features a formed width of 12.00m at the edge of seal, and a formed width of 38.00m at the property boundary. The existing intersection does not feature lighting, and as such it is proposed to provide a pole-mounted light on the western side of Aucks Road to improve safety of the road users.

Refer to memo from Commute for further commentary. Commute has undertaken a full review of the intersection, including traffic counting, and have confirmed that no upgrades are needed to support the intended intensity and future vehicle movements.

3.1.4. Pedestrian Access

Pedestrian movements through the site will be via way of off-road formed pedestrian tracks through either shared (communal land) or where in private land, will be protected by easements to allow residents to use. Given the nature of the development and outcome sort, this is preferred over standard footpaths within the road corridors. We note that Aucks Road does not feature any footpaths, so this approach seems in keeping with the existing context.

4. Stormwater

4.1. Design Standards

The Far North District Council Engineering Standards & Guidelines Version 0.6 May 2023 (used in conjunction with NZS 4404:2004) sets out design and construction standards for stormwater and requires all land development projects to be provided with a suitable means of stormwater disposal.

Stormwater systems have been designed for the development in general accordance with FNDC Engineering Standards and other applicable standards. The primary pipe system sized up to the 10-year event and the secondary system and watercourse to manage runoff from events exceeding the 100yr ARI.

4.2. Existing Network

There is no existing public stormwater network within the site. There are, however, existing watercourses, manmade ponds and other features, and a network of culverts under both existing accessways, farm tracks and between the various manmade features contained within the intended communal land. Ultimate discharge is via a stream which feeds into the Coastal Marine Area (CMA) through a bridge under Aucks Road.

4.2.1. Discharge and Zone

This site is zoned as Coastal living Zone under the Far North District Plan. To constitute a permitted activity, a maximum of 15% of the total site area may be used for impermeable surface (roofs, driveways & sealed areas).

The proposed new dwelling roof is to be ~44,945m² and other paving areas are to be ~19,974m², therefore bringing the total theoretical impermeable surface area to approximately 15.0% of the gross site area. The following sections of the report provide an assessment against the permitted standards of Section C.6.4.2 (Stormwater Discharges – permitted activity) of the Northland Regional Plan.

4.2.2. Proposed Reticulation

Stormwater control within the site will build upon the existing network of table drains, swales and culverts which direct stormwater from the formed accessways into the manmade pond and associated features.

The accessways will feature formed table drains and/or swales, depending on grade. The table drains will feature rip-rap, check dams and other design features as to ensure erosion in the steeper sections are mitigated. Specific details will be subject to detailed design, but will comply with Sections 3.2.14.3, and 4.3.11.3 of the FNDC Engineering Standards and have been sized to convey the 10-yr flows of the receiving catchments.

Existing overland flowpaths have been mapped and retained as part of the development. There are several roadways which cross over these, however, all the culverts are existing and are to be retained

as part of this consent. No further culverts are required, aside from culverts required over table drains and swales to allow for private driveways to be formed. The design and location will be subject to future engineering approval from FNDC.

4.2.3. On-lot Water Supply Potable and Non-potable supply for Lots

The stormwater roof runoff from the proposed dwellings will be directed to tanks, likely to be buried. At a minimum 2x 22,500L tanks will be required. These tanks will provide potable and non-potable supply to the future dwellings via a private pump. The tanks will also provide firefighting supply, unless alternative arrangements are agreed with via Fire Emergency New Zealand (FENZ). It is likely that purchasers will provide more than the minimum 45,000L, and this will be detailed and approved as part of the future building consent applications at time of house construction.

Stormwater discharge meets the requirements from Proposed regional plan for Northland C.6.4.2. The stormwater runoff and tank overflow will be directed to the existing flow path (unless otherwise specified) via an adequate dispersal system as shown in Appendix A Engineering Drawings. Haigh Workman have identified some lots which require specific design to avoid stability issues, and the recommendations have been included in the design, including specific discharge points for Lots 4, 5, 18, 19, 26-28 and 62-64.

4.3. Stormwater Capacity

The table drains and stormwater outfalls have been sized for the 10-year AEP event as per Sections 3.2.14.3, and 4.3.11.3 of the FNDC Engineering Standards. Please refer to appended calculations within Appendix B for further detail.

100-yr overland flow has also been provided, with flows directed away from building platforms and to existing overland flowpaths and streams as required. Given the proximity of the CMA and lack of downstream catchment, there is no requirement for attenuation.

4.4. Stormwater Quality

The site will only support private vehicles and will consist of low volume private right of ways. The runoff will be conveyed via table drains and swales which will provide for treatment before discharge into the receiving environment.

Given the nature of the use, and traffic volumes, the discharge will not contain more than 15 milligrams per litre of total petroleum hydrocarbons, and thus is considered to comply with C.4.6.2 (7) of the Northland Regional Plan. Furthermore, an assessment of C.4.6.2 (8) is provided below

8) the discharge does not cause any of the following effects in the receiving waters beyond the zone of reasonable mixing:

- a) the production of conspicuous oil or grease films, scums or foams, of floatable or suspended materials, or*
- b) a conspicuous change in the colour or visual clarity, or*
- c) an emission of objectionable odour, or*
- d) the rendering of freshwater unsuitable for consumption by farm animals, or*

e) the rendering of freshwater taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.

The discharge will not result in any of the above conditions, and will be controlled via table drains, swales and the existing pond in the site. As such, formal treatment is not considered necessary as the permitted standards listed above will be complied with by the proposed stormwater solution.

Swale along the driveway calculations for the proposed site are attached to this report in Appendix B.

Please refer to the appended engineering drawings and calculations for further detail.

5. Flooding

NRC View map does not show any Urban Stormwater flooding within the site. However, there is coastal flood hazard within the site.

Coastal inundation information comes from T&T coastal flood hazard assessment for Northland region 2019-2020 for Northland Regional Council. The maximum water level for flooding hazard zone has been confirmed as being 3.2m RL (2016 NZVD) from Northland regional Council (Refer to Appendix C Coastal flood water level).

The existing vehicle crossing from Auks Road will be under the 100-year coastal flood water level, as is Auks Road itself. A section of the existing JOAL would also be subject to future flooding. Please refer to Maven Drawings C430 for further detail. An extract of which an extract is provided below

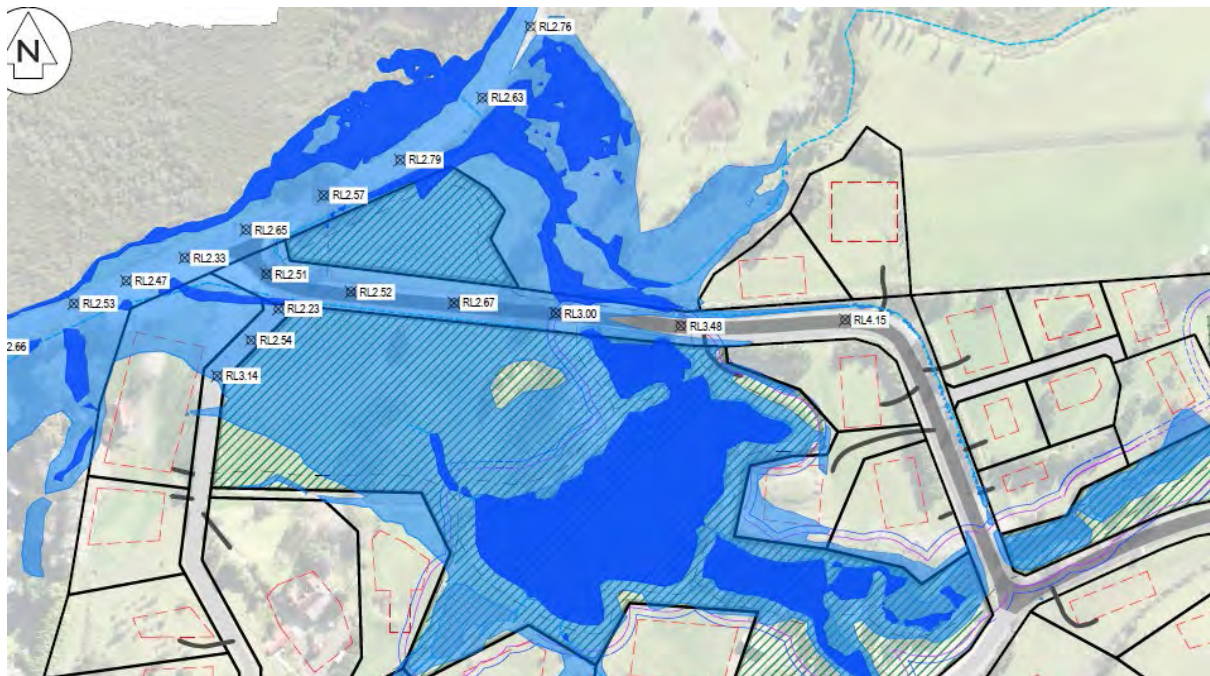


Figure 5: Future 100-yr flood level with sea level rise and spot levels (refer Maven Drawing C430 for further detail)

The flooding is an existing condition, and there is no ability to remove the future flooding from Auks Road as part of this development.

We note that the flooding is based on the assumed sea level rise predictions, and if true would require FNDC to provide a solution to ensure vehicle access is maintained to Russell which would otherwise be cut off.

The internal roads are for the most part elevated above the future 100-yr flood level, except for the immediate area near Aucks Road which has to tie into existing levels. The effects are negligible given that the site will not be accessible from the public road. If Aucks Road was lifted in the future by FNDC to ensure access to Russell, the internal accessway could be easily lifted to RL 3m, to allow 200mm ponding. However, this is not possible at the moment as grades from Aucks Road would not work, nor would it seem logical given the current height of Aucks Road.

All Individual building platform are located away from the coastal flood zone 3 extent of 100-YEAR ARI Static Water level, except for Lot 55 and lot 42. Specific platform design has been provided as to ensure suitable building platforms are provided above the 100-yr levels. Target subgrade heights for all platforms are RL 4.2, which would see future FFLs of 4.5m RL, which well exceeds the minimum 3.7m RL required.

All dwellings will be elevated above adjacent JOAL corridors to ensure sufficient freeboard is provided from any future coastal flood hazard water level and watercourse during a storm event in accordance with NZS 4404:2004 and the New Zealand Building Code.

6. Wastewater

6.1. Design Standards

The FNDC sets out design and construction standards for wastewater and requires all land development projects to be provided with a suitable means of wastewater disposal. As per the agreement between Northland Regional Council and FNDC, the assessment of the wastewater discharge within the lots will be undertaken by FNDC, with assessment made against the relevant provisions of the Northland Regional Plan.

6.2. Reticulation

6.2.1. Existing Network

There is no existing wastewater network within the site, or nearby. The existing dwellings (x2) contained within proposed Lots 41 and 42 feature existing septic tanks and dripper irrigation networks. The locations will be confirmed as part of the subdivision and modified to ensure they are retained in their respective lot boundaries prior to issue of titles.

6.2.2. Proposed Reticulation

Future wastewater discharge will be by way of discharge to ground, via either primary or secondary levels of treatment. The following assumptions have been made in establishing the design flow for each lot:

The following assumptions were made in establishing the design flow for each of the lots:

- Each dwelling has four bedrooms
- The design occupancy for each dwelling is 6 people
- Water usage per person is a conservative 180 L/d
- Total daily design flow is 1,080 L/d
- Soils are category 5/6 soils as per AS/NZS 1547:2012

- Minimum of secondary treatment to be provided
- Loading rate of 3 mm/d
- 100% reserve area

The designated treatment areas are indicative and will be confirmed through the building consent process. For the most part the indicative disposal areas comply with the setback provisions of the NRCP, however, the disposal fields for Lots 55, 58 and 59, where 10m setback is sought for the disposal areas. This needs consent under the NRCP, but will be mitigated by requiring tertiary treatment prior to discharge. This is considered to be acceptable, and will avoid any effects otherwise created.

GWE have assisted Maven with the design of the wastewater disposal, please refer to their memo attached within Appendix D for further information. Final design will be subject to future building consent approval, but subject to compliance with the reporting provided and design guidelines and recommendations by GWE, any effects on the receiving environment can be suitably mitigated.

7. Water

7.1. Design Standards

The Far North District Council (FNDC) sets out design and construction standards for water reticulation, potable water supply and firefighting supply in accordance with **SNZPAS 4509:2003** (NZ Fire Service Fire Fighting Water Supply Code of Practice).

7.2. Reticulation

7.2.1. Existing Reticulation

There is no existing water network within the site or nearby. Potable and non-potable supply for each future lot will be provided by way of tanks which will contain roof caught water. This will also provide fire fighting supply as required.

7.2.2. Proposed Reticulation

It is proposed to provide on-site roof fed rainwater tanks for each lot at the building consent stage. It is anticipated that lots will provide a minimum total of 45,000L of water storage, within 2 x 22,500L tanks for water supply with a suitable pump chamber. Provision of additional water tanks above this minimum is expected by many future lot owners, depending on the size of the house, number of occupants and likely frequency of stays (holiday house vs permanent residents etc).

7.3. Firefighting Supply

The New Zealand Fire Service Firefighting Water Supplies Code of Practice (SNZ PAS 4509:2008) states that 45m³ of water storage should be available within 90m from each dwelling for firefighting purposes within non-reticulated urban developments, with FW2 water supply classification. The 90m distance is measured from the point where the water supply is available rather than the water source itself.

Discussions have been had with Fire and Emergency New Zealand (FENZ), who have confirmed that they will accept a minimum of 10,000L storage volume per lot. A formal request has been made to FENZ with indicative tank locations for the future house typologies. Access to the tanks will be enabled through side yards, 1m minimum clearance was required (and will be enabled).

A consent notice will be registered on each title which will require 10,000L of storage volume retained on each lot. This will be ensured through the inlet for the dwelling supply being above the required

10,000L firefighting supply within a tank. Buried tanks are acceptable to FENZ, subject to access to the lids which must be retained accessible and not buried or under structures. Ultimate details will be provided, as required, at building consent stage.

An alternative solution (using the existing water bodies/pond for lower lots will be discussed with FENZ, and if the final agreement differs from above, this will be detailed in support of future consent notices and building consent applications.

8. Other Services

Power and telecommunication services will need to be constructed from the closest connection point to the site and is make it available for use. Consultation has commenced, and confirmation of supply for power is provided by Top Energy, refer Appendix E.

Chorus Ltd will provide detailed designs is required, although it is likely reticulated telecommunications will not be needed, with wireless supply a more likely option. Confirmation of supply will be provided as per a condition of any consent issued.

9. Conclusion

Earthworks are required in support of the proposed development for the construction of roading, infrastructure, building platforms and services. The earthworks will be supported by specific sediment controls, and will be undertaken under Geotech and Civil engineering supervision. A Geotech Completion Report will be provided at the completion of the earthworks operation.

Stormwater drainage can be provided for the proposed development consistent with The Far North District Council (FNDC) Engineering Standards. The final design will be subject to Engineering Plan Approval from FNDC. Formal treatment is not required, nor is any attenuation given the downstream catchment and proximity to the coast.

The onsite sewage system for individual lots will be designed in detail and submitted during the building consent process for approval by the Far North District Council (FNDC). This report and GWE memo confirms that all lots have suitable areas for the treatment and disposal of wastewater as per the Northland Regional Plan provisions. In some areas, consent is needed for 10m setback, however, secondary treatment will be provided.

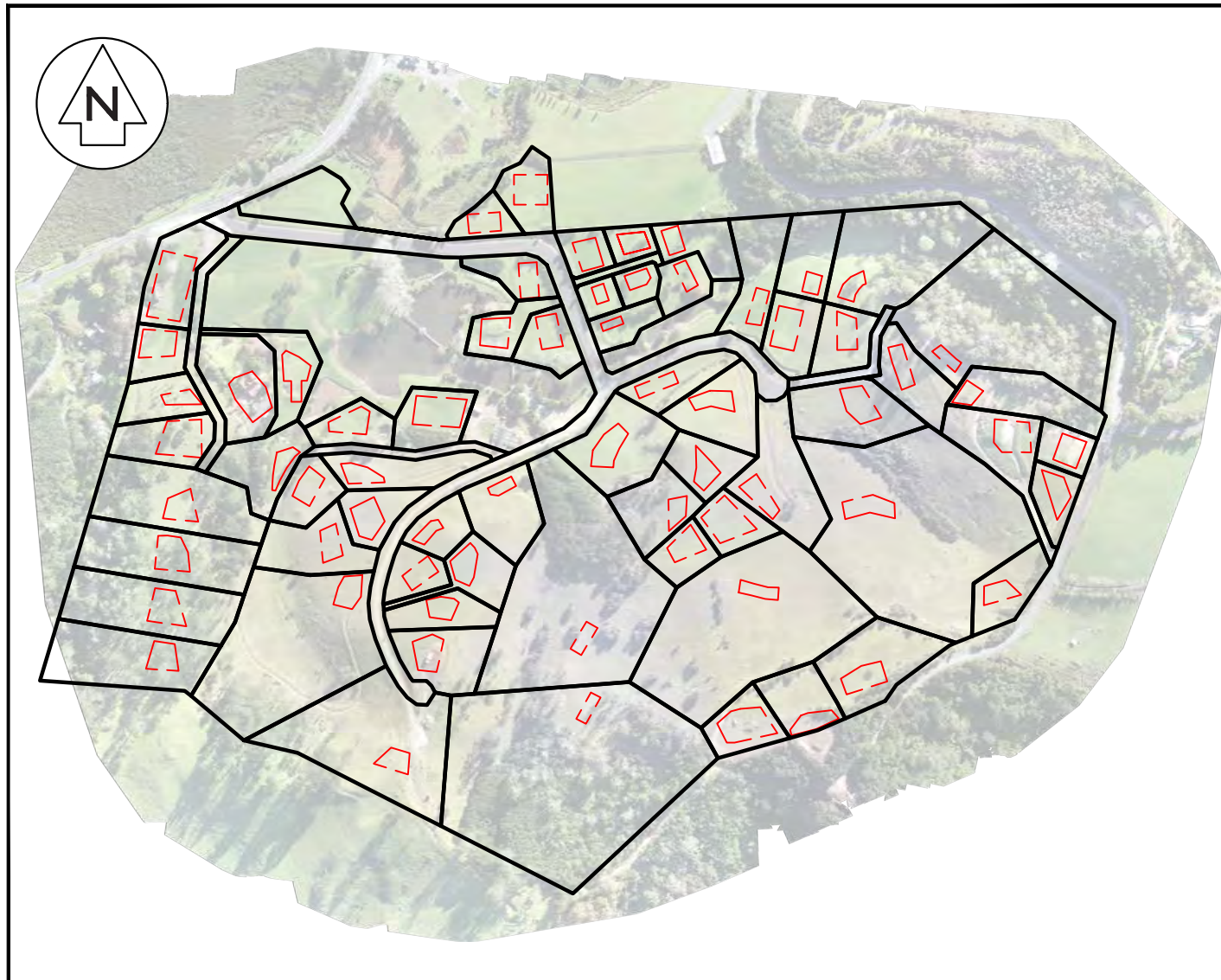
There is no public water supply in the site. Potable, non-potable and firefighting supply will be provided via tanks onsite. A minimum of 2 x 22,500L per lot will need to be provided. Consent notices will require this to be provided at building consent stage, including the requirement firefighting.

Power and telecommunication infrastructure is available for the development; however, new cable and connections will need to be installed to service the new site.

Information gathered to date confirms the site is suitable for the proposed redevelopment from a civil engineering perspective.

Appendix A – Engineering Plan

**DEVELOPMENT OF
 39 AUCKS ROAD,
 RUSSELL
 FOR
 WILLOWRIDGE DEVELOPEMETS LTD**



LOCALITY PLAN
 SCALE: N.T.S

RESOURCE CONSENT

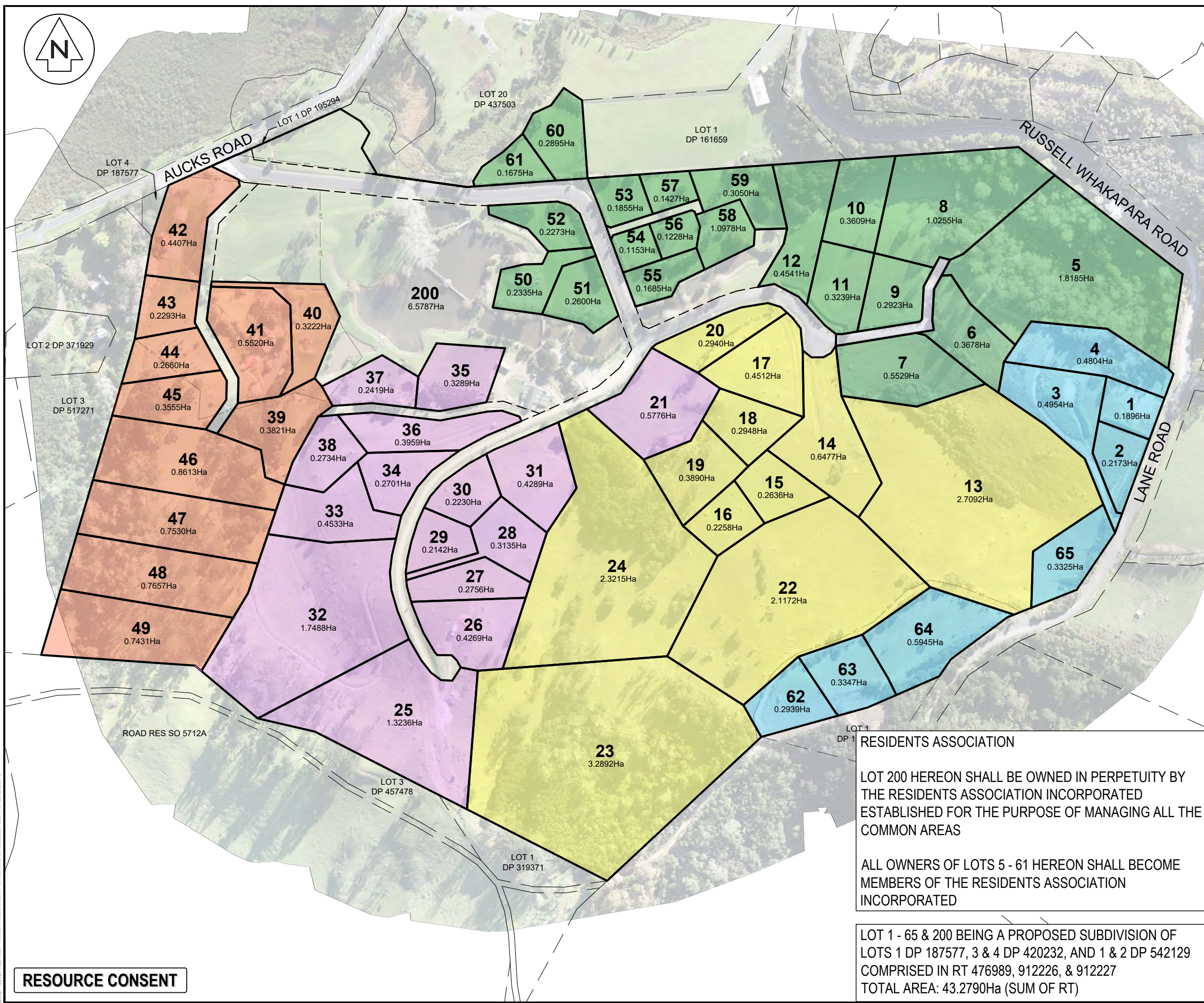
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C000	COVER SHEET & INDEX	B	10/2024
C050	TOPOGRAPHICAL SURVEY PLAN	B	10/2024
C160	SCHEME PLAN	B	10/2024
C200	PROPOSED EARTHWORKS PLAN	A	10/2024
C220	PROPOSED CUT-FILL PLAN	A	10/2024
C230	PROPOSED EROSION AND SEDIMENT CONTROL	A	10/2024
C240	PROPOSED EROSION AND SEDIMENT CONTROL DETAILS	A	10/2024
C300	PROPOSED ROADING LAYOUT PLAN	A	10/2024
C310	PROPOSED ROADING LONGSECTION PLAN	A	10/2024
C320	PROPOSED ROADING CROSS SECTIONS	A	10/2024
C400	STORMWATER LAYOUT PLAN	A	10/2024
C500	WASTEWATER LAYOUT PLAN	A	10/2024

PROJECT NUMBER : 309001

ISSUED DATE : OCTOBER 2024



- NOTES
- COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000.
 - BOUNDARIES ARE SUBJECT TO FINAL SURVEY.



LEGEND

- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- STAGE 5

PR BDY
RT
REFERENCE TITLE
PR EASEMENT

TOTAL AREA: 43.7162 Ha
 COMPRISED IN: LOT 1 DP 187577, 182616 NA117C/424
 THIS SITE IS ZONED "COASTAL LIVING ZONE"
 THE SETBACKS ARE 10M FROM ALL SITE BOUNDARIES FOR SITS OVER 5000 m²
 AND 3m FOR SITES UNDER 5000 m²
 AND 3m FROM MHWs AND THE TOP OF THE BANK OF ANY RIVER THAT HAS A
 WIDTH EXCEEDING 3m (EX. BRIDGES, CULVERTS AND FENCES)

Rev	Description	By	Date
B	RESOURCE CONSENT	CJP	10/2024
A	INFORMATION	JAW	08/2024
Survey	MAVEN		06/2024
Design	CP		07/2024
Drawn	YG		07/2024
Checked	CP		07/2024

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Project
**DEVELOPMENT OF
 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 SCHEME PLAN
 OVERALL STAGING**

RESIDENTS ASSOCIATION

LOT 200 HEREON SHALL BE OWNED IN PERPETUITY BY THE RESIDENTS ASSOCIATION INCORPORATED ESTABLISHED FOR THE PURPOSE OF MANAGING ALL THE COMMON AREAS

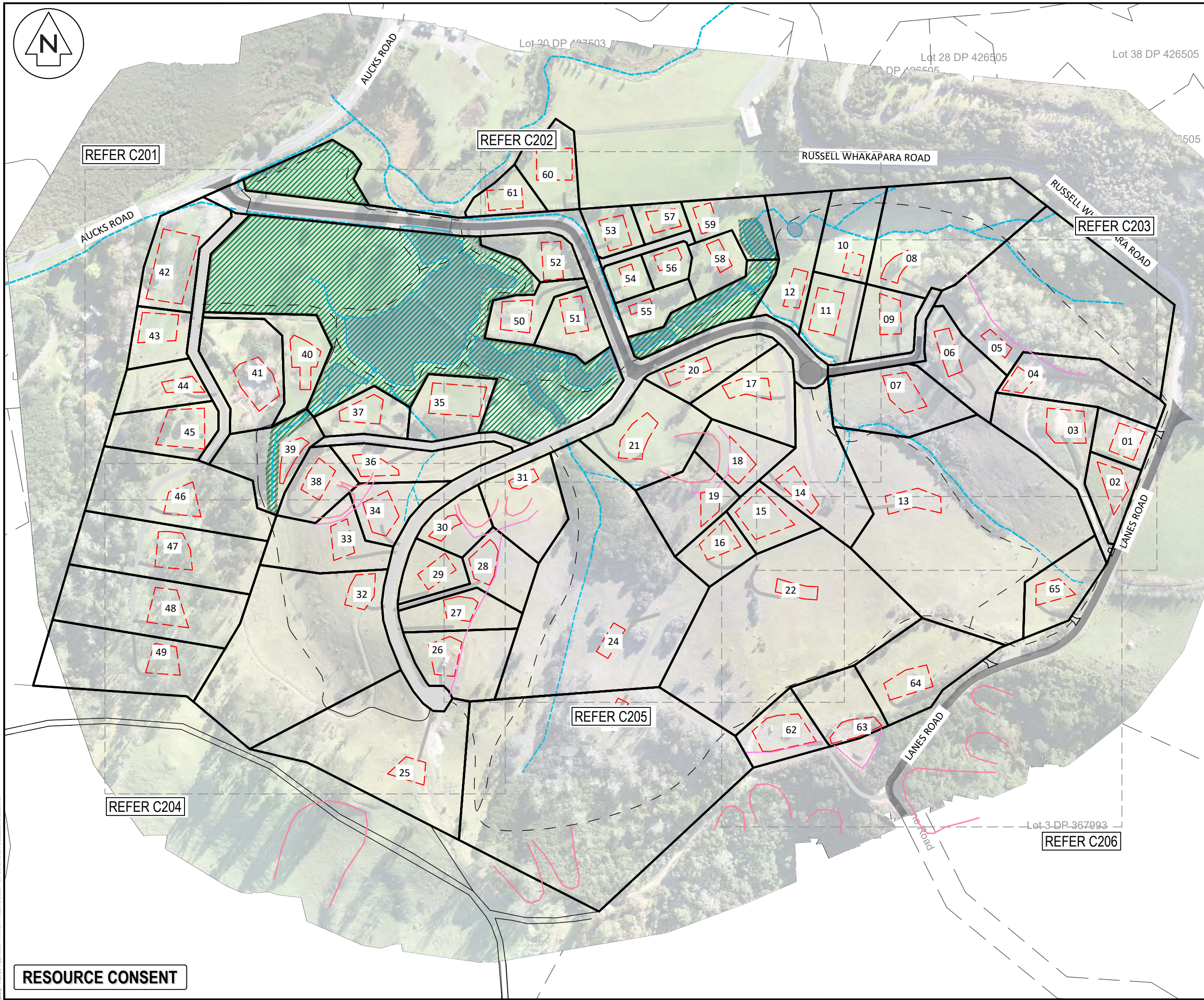
ALL OWNERS OF LOTS 5 - 61 HEREON SHALL BECOME MEMBERS OF THE RESIDENTS ASSOCIATION INCORPORATED

LOT 1 - 65 & 200 BEING A PROPOSED SUBDIVISION OF LOTS 1 DP 187577, 3 & 4 DP 420232, AND 1 & 2 DP 542129
 COMPRISED IN RT 476989, 912226, & 912227
 TOTAL AREA: 43.2790Ha (SUM OF RT)

Project no.	309001 - WILLOWRIDGE
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Cad file	C160 - SCHEME.DWG
Drawing no.	STAGING
Rev	B

RESOURCE CONSENT

DATE: 10/12/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD - RUSSELL\DWG\SC160 - SCHEME.DWG



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF NZVD2016
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
 5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
 7. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECENT VOLUMES TO

LEGEND

	EX B'DY
	PROP B'DY
	INDICATIVE BUILDING PLATFORM

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
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 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 EARTHWORKS
 OVERALL PLAN**

Project no.	309001 - WILLOWRIDGE
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Cad file	C200.DWG
Drawing no.	C200
Rev	A

RESOURCE CONSENT

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UCKS ROAD

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- LEGEND
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 - PROP BDY
 - EX MAJOR CONTOUR
 - EX MINOR CONTOUR
 - PR MAJOR CONTOUR
 - PR MINOR CONTOUR
 - PROP EXTENT WORK
 - INDICATIVE BUILDING PLATFORM
 - GEO FEATURE
 - GEO SETBACK LINE

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

**PROPOSED SUBDIVISION
OF 39 AUCKS ROAD
RUSSELL
FOR
WILLOWRIDGE DEV. LTD.**

**PROPOSED
EARTHWORKS
PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C200.DWG
Drawing no.	C201
Rev	A

RESOURCE CONSENT

DATE: 11/27/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C200.DWG



RUSSELL WHAKAPARA ROAD

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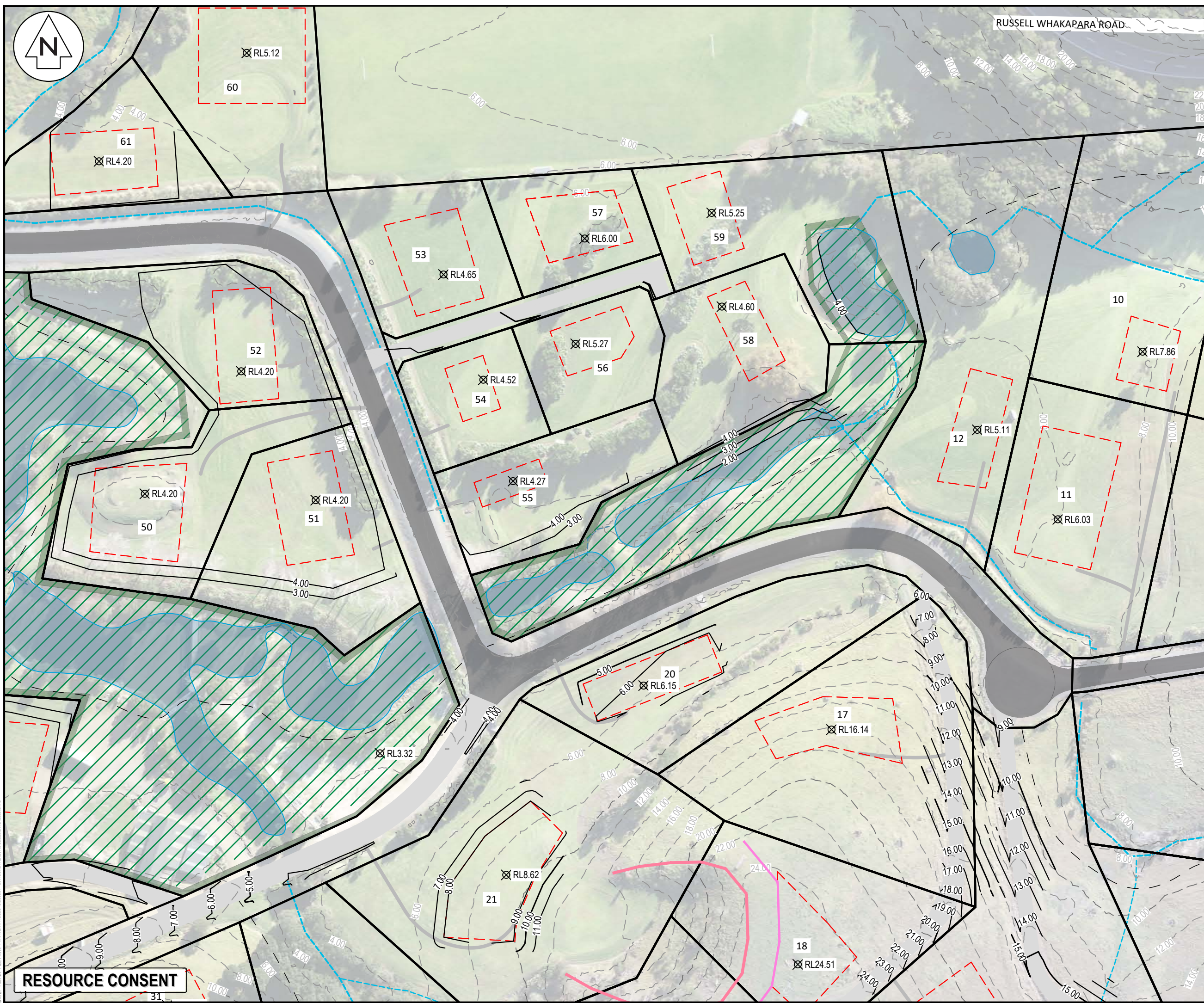
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Design	JAW		07/2024
Drawn	JAW		07/2024
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Project
**PROPOSED SUBDIVISION
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Title
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Project no.	309001 - WILLOWRIDGE
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Drawing no.	C202
Rev	A



DATE: 11/2024 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD - RUSSELL\DWG\C200.DWG

RESOURCE CONSENT



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 - PR MINOR CONTOUR
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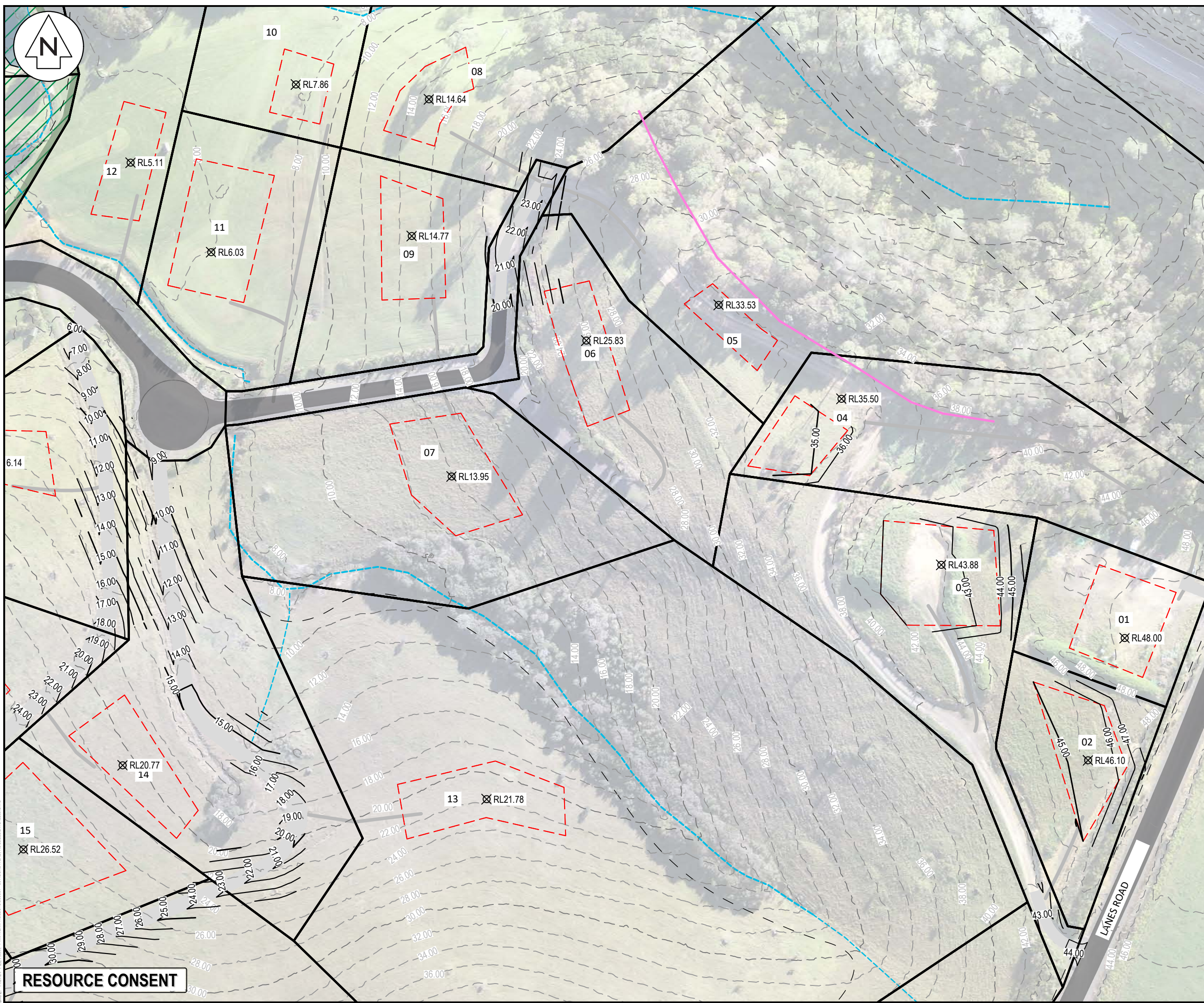
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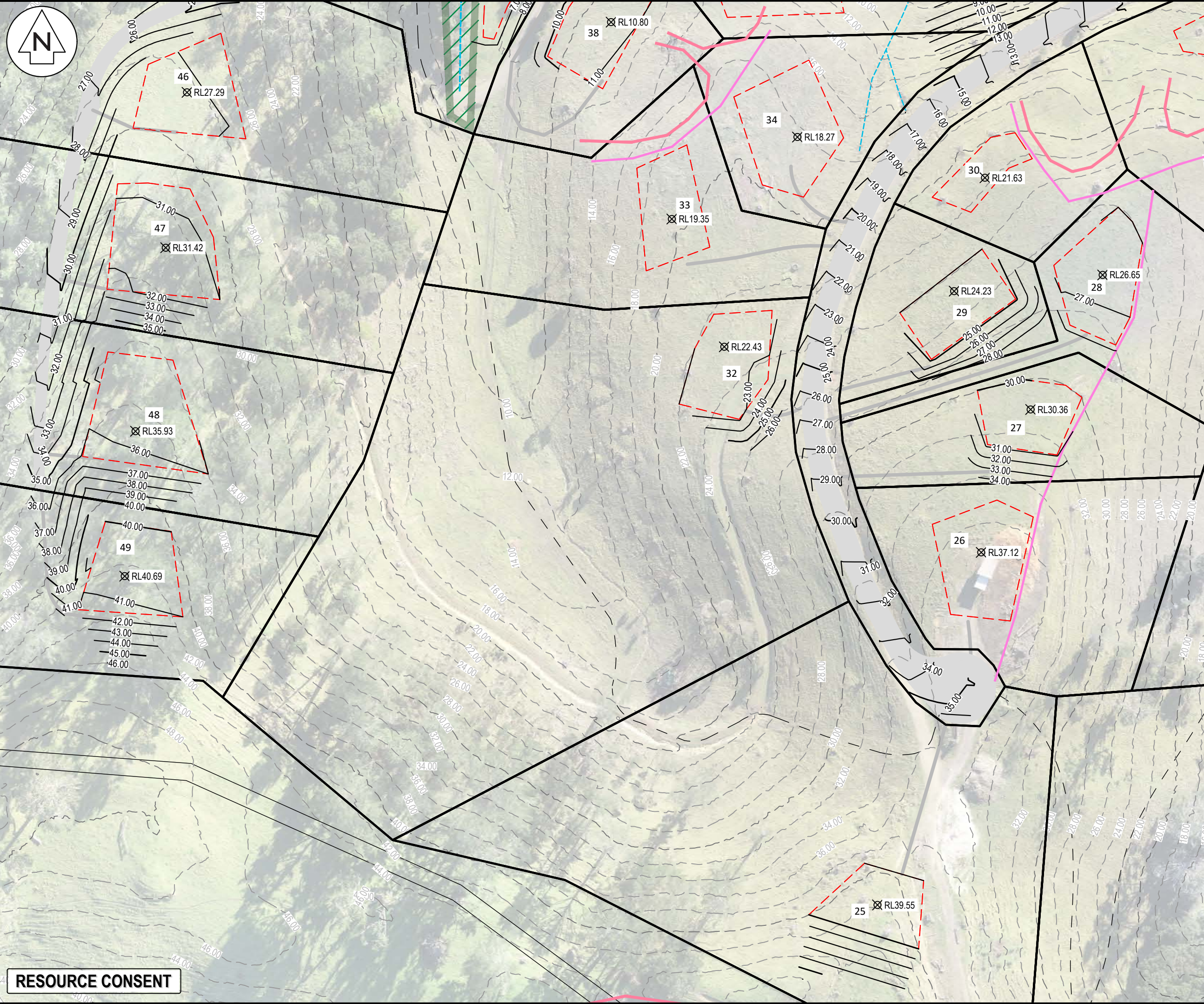
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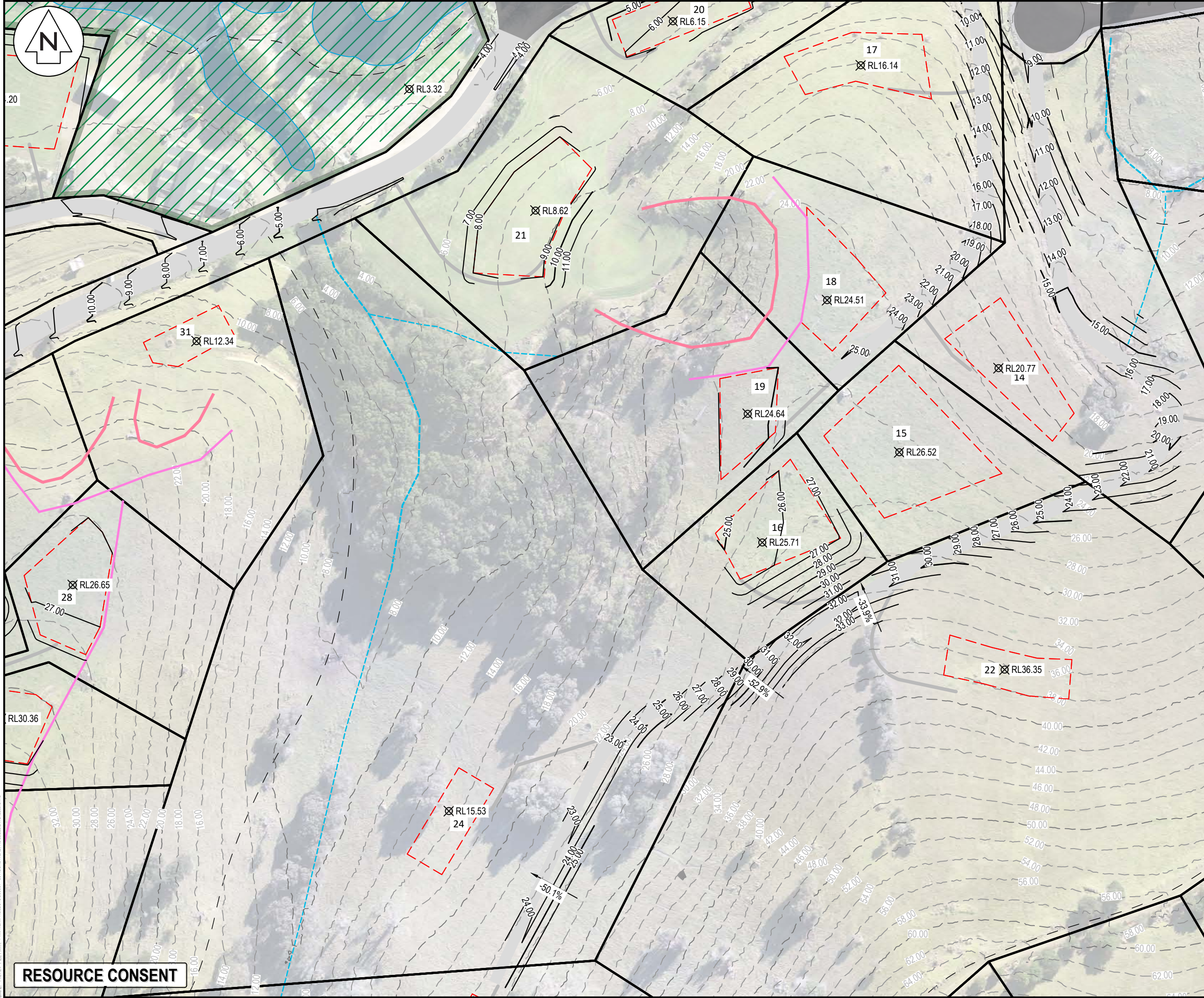
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 EARTHWORKS
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C200.DWG
Drawing no.	C204
Rev	A

DATE: 11/27/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C200.DWG

RESOURCE CONSENT



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF NZVD2016
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
 5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
 7. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECENT VOLUMES TO

LEGEND

	EX BDY
	PROP BDY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	PR MAJOR CONTOUR
	PR MINOR CONTOUR
	PROP EXTENT WORK
	INDICATIVE BUILDING PLATFORM
	GEO FEATURE
	GEO SETBACK LINE

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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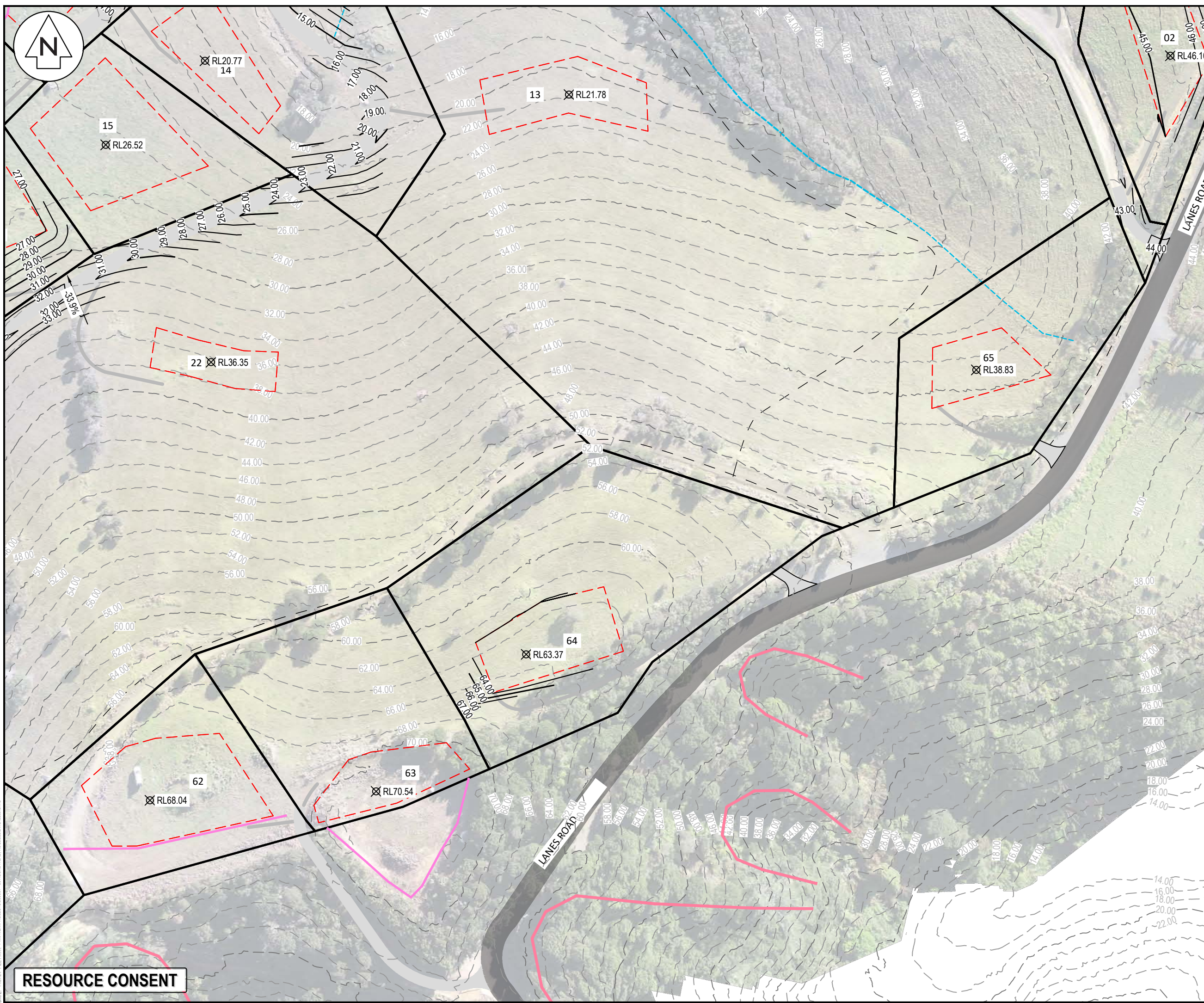
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 EARTHWORKS
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C200.DWG
Drawing no.	C205
Rev	A

RESOURCE CONSENT

DATE: 11/2/24 FILEPATH: F:\Maven\Projects\309001 - 39 AUCKS ROAD - RUSSELL\DWG\C200.DWG



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF NZVD2016
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LEGEND

	EX BDY
	PROP BDY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	PR MAJOR CONTOUR
	PR MINOR CONTOUR
	PROP EXTENT WORK
	INDICATIVE BUILDING PLATFORM
	GEO FEATURE
	GEO SETBACK LINE

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 EARTHWORKS
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C200.DWG
Drawing no.	C206
Rev	A

DATE: 11/2/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C200.DWG

RESOURCE CONSENT



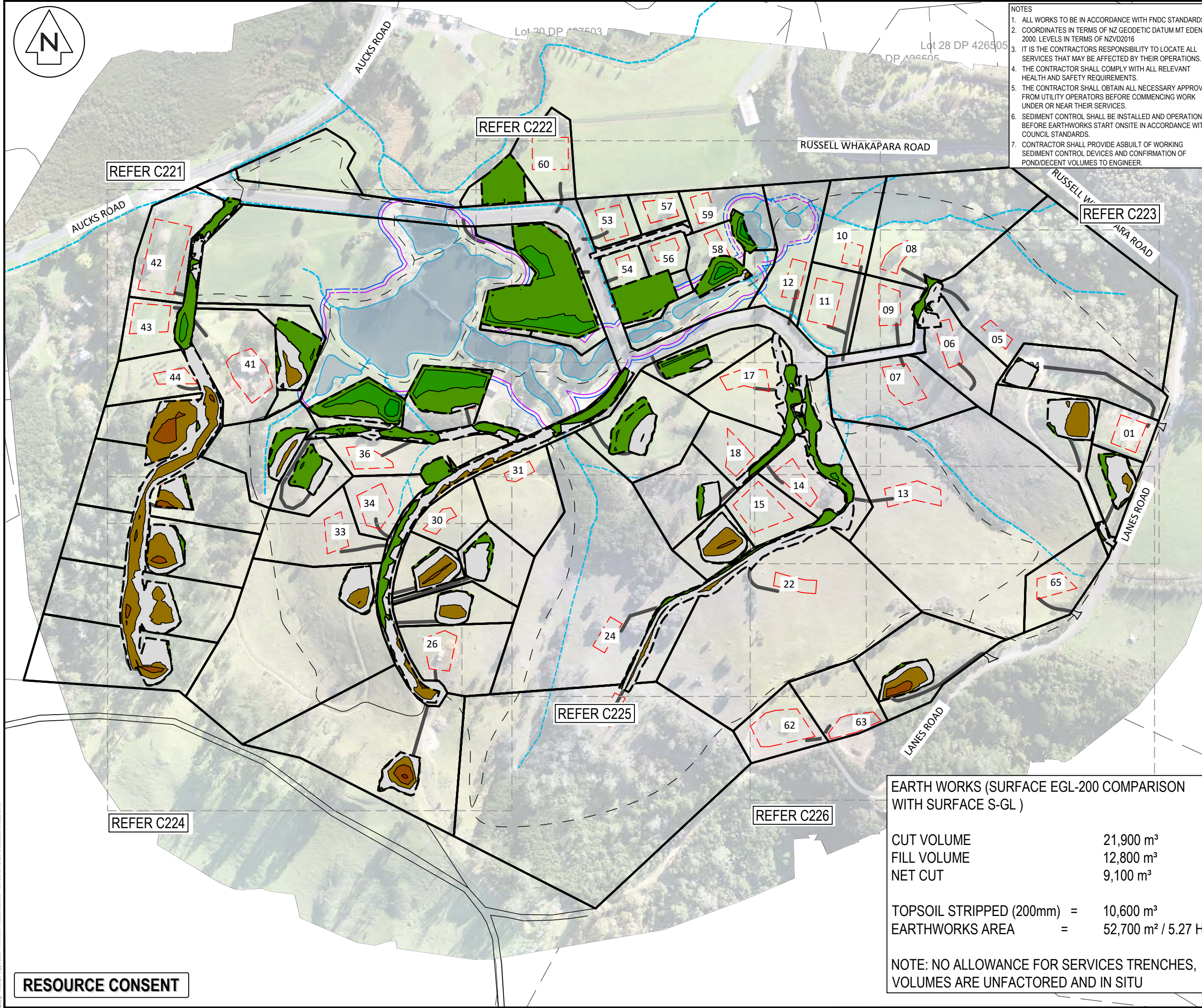
- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF NZVD2016
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LEGEND

	EX BDY
	PROP BDY
	PROP EXTENT WORK

Cut/Fill Table

Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-3.000	
2	-3.000	-2.000	
3	-2.000	-1.000	
4	-1.000	0.000	
5	0.000	1.000	
6	1.000	2.000	
7	2.000	3.000	



Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 CUT AND FILL
 OVERALL PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:13000 @ A3
Cad file	C220.DWG
Drawing no.	C220
Rev	A

EARTH WORKS (SURFACE EGL-200 COMPARISON WITH SURFACE S-GL)

CUT VOLUME	21,900 m ³
FILL VOLUME	12,800 m ³
NET CUT	9,100 m ³
TOPSOIL STRIPPED (200mm)	= 10,600 m ³
EARTHWORKS AREA	= 52,700 m ² / 5.27 Ha

NOTE: NO ALLOWANCE FOR SERVICES TRENCHES, VOLUMES ARE UNFACTORED AND IN SITU

RESOURCE CONSENT

DATE: 11/27/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C220.DWG



LEGEND

---	EX BDY
---	PROP BDY
---	PROP EXTENT WORK
---	INDICATIVE BUILDING PLATFORM
---	15m OFFSET FROM POND
---	12m OFFSET FROM POND

Cut/Fill Table

Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-3.000	Red
2	-3.000	-2.000	Brown
3	-2.000	-1.000	Orange
4	-1.000	0.000	Light Green
5	0.000	1.000	Green
6	1.000	2.000	Dark Green
7	2.000	3.000	Very Dark Green

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024



Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 CUT AND FILL
 PLAN**

Project no.	309001 - WILLOWRIDGE		
Scale	1:1000 @ A3		
Cad file	C220.DWG		
Drawing no.	C221	Rev	A



DATE: 11/2024 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C220.DWG

RESOURCE CONSENT



RUSSELL WHAKAPARA ROAD

LEGEND

- EX BDY
- PROP BDY
- PROP EXTENT WORK
- INDICATIVE BUILDING PLATFORM
- 15m OFFSET FROM POND
- 12m OFFSET FROM POND

Cut/Fill Table			
Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-3.000	
2	-3.000	-2.000	
3	-2.000	-1.000	
4	-1.000	0.000	
5	0.000	1.000	
6	1.000	2.000	
7	2.000	3.000	

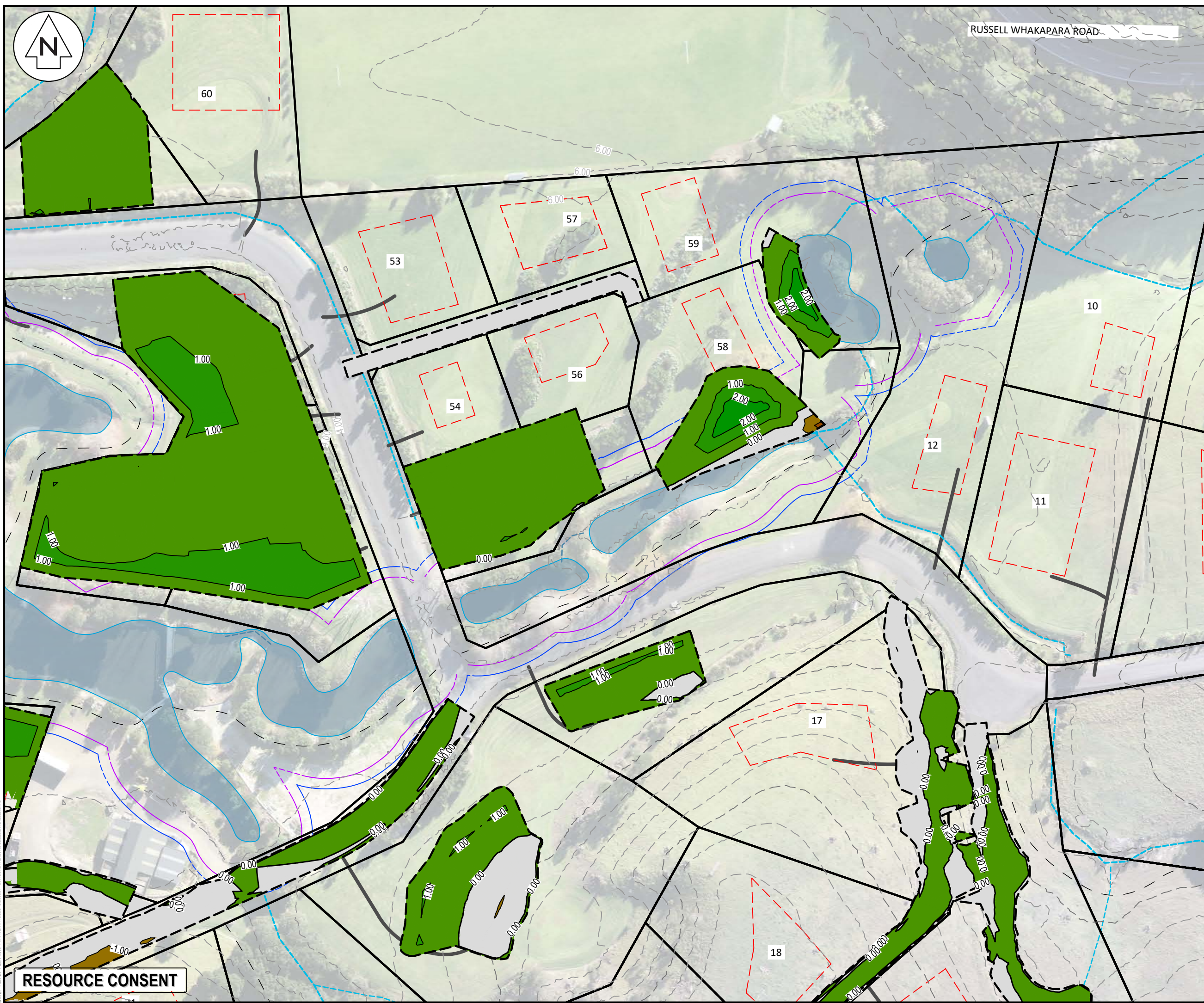
Rev	Description	By	Date
A	FOR RC	JAW	11/2024

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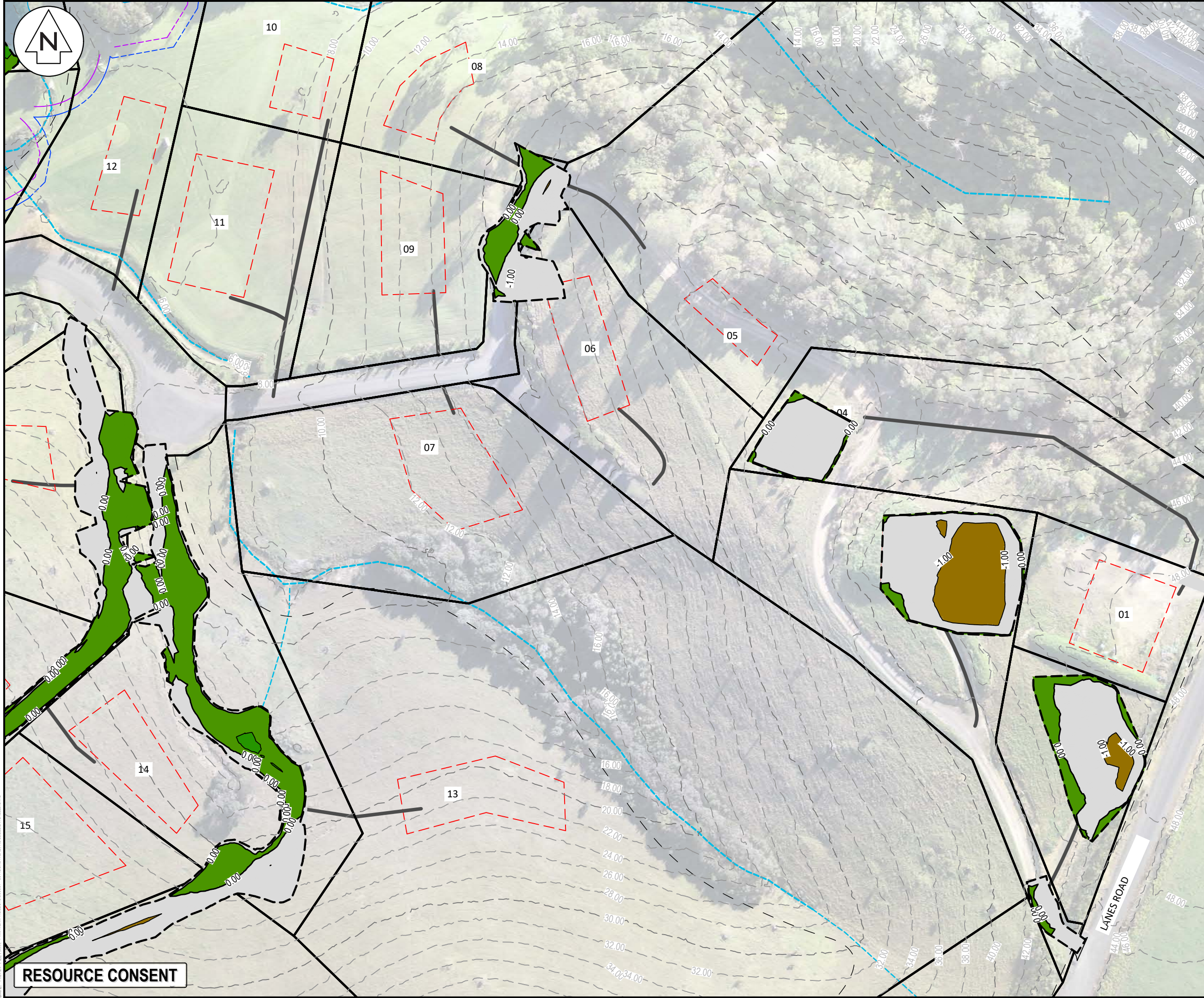
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 CUT AND FILL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C220.DWG
Drawing no.	C222
Rev	A



DATE: 11/2024 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD - RUSSELL\DWG\C222.DWG



LEGEND

- EX BDY
- PROP BDY
- PROP EXTENT WORK
- INDICATIVE BUILDING PLATFORM
- 15m OFFSET FROM POND
- 12m OFFSET FROM POND

Cut/Fill Table			
Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-3.000	Dark Red
2	-3.000	-2.000	Red
3	-2.000	-1.000	Brown
4	-1.000	0.000	Light Grey
5	0.000	1.000	Light Green
6	1.000	2.000	Green
7	2.000	3.000	Dark Green

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
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 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 CUT AND FILL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C220.DWG
Drawing no.	C223
Rev	A

DATE: 11/2/24 FILEPATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C220.DWG

RESOURCE CONSENT



LEGEND

- EX BDY
- PROP BDY
- PROP EXTENT WORK
- INDICATIVE BUILDING PLATFORM
- 15m OFFSET FROM POND
- 12m OFFSET FROM POND

Cut/Fill Table			
Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-3.000	
2	-3.000	-2.000	
3	-2.000	-1.000	
4	-1.000	0.000	
5	0.000	1.000	
6	1.000	2.000	
7	2.000	3.000	

Rev	Description	By	Date
A	FOR RC	JAW	11/2024

Survey	Design	Drawn	Checked
MAVEN	JAW	JAW	TM

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Project
**PROPOSED SUBDIVISION
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Title
**PROPOSED
 CUT AND FILL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C220.DWG
Drawing no.	C224
Rev	A



FOR INFORMATION

DATE: 11/2/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C220.DWG



LEGEND

- EX BDY
- PROP BDY
- - - PROP EXTENT WORK
- INDICATIVE BUILDING PLATFORM
- - - 15m OFFSET FROM POND
- - - 12m OFFSET FROM POND

Cut/Fill Table			
Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-3.000	Red
2	-3.000	-2.000	Brown
3	-2.000	-1.000	Orange
4	-1.000	0.000	Light Green
5	0.000	1.000	Green
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Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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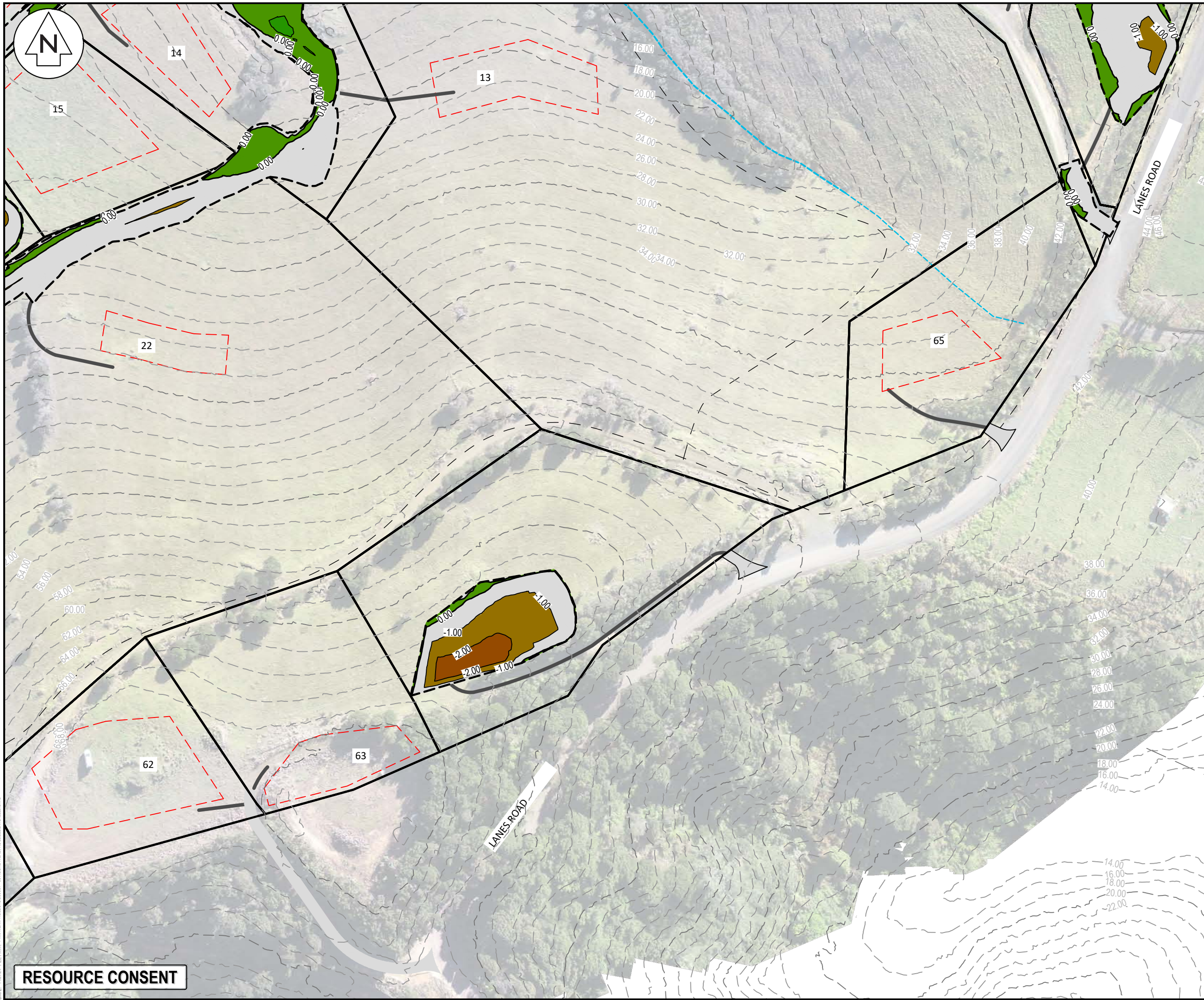
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 CUT AND FILL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C220.DWG
Drawing no.	C225
Rev	A

DATE: 11/27/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C220.DWG

RESOURCE CONSENT



LEGEND

- EX BDY
- PROP EXTENT WORK
- INDICATIVE BUILDING PLATFORM
- 15m OFFSET FROM POND
- 12m OFFSET FROM POND

Cut/Fill Table			
Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-3.000	
2	-3.000	-2.000	
3	-2.000	-1.000	
4	-1.000	0.000	
5	0.000	1.000	
6	1.000	2.000	
7	2.000	3.000	

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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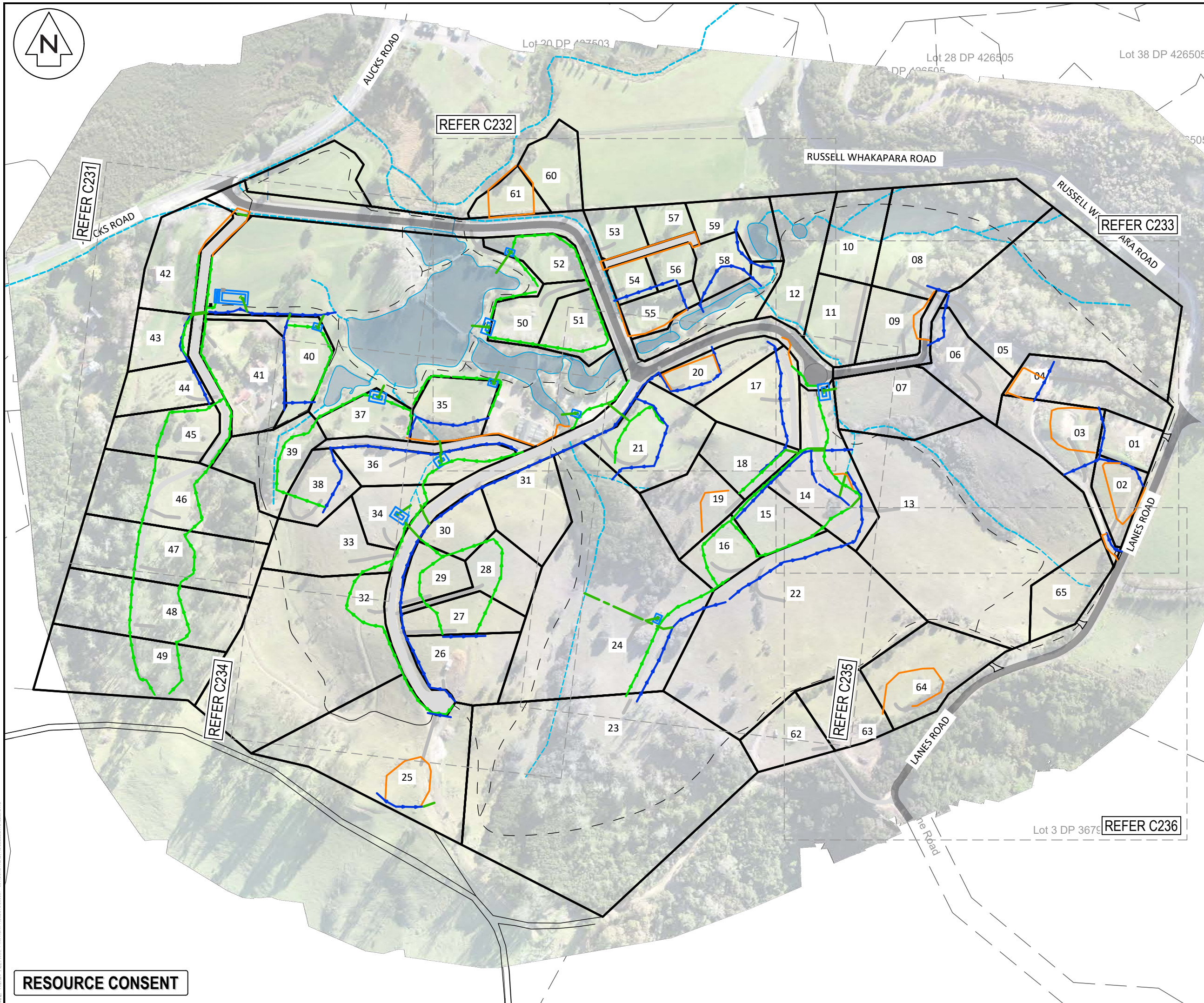
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 CUT AND FILL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C220.DWG
Drawing no.	C226
Rev	A

RESOURCE CONSENT

DATE: 11/2024 FILEPATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C226.DWG



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF NZVD2016
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LEGEND

	EX BDY
	PROP BDY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	PR MAJOR CONTOUR
	PR MINOR CONTOUR
	PROP EXTENT WORK
	PROP CLEANWATER
	PROP DIRTYWATER
	PROP SW PIPE
	PROP SILT FENCE
	PROP STOCKPILE
	PROP DECANT
	PROP DECANT BAR

A	FOR RC	JAW	11/2024
Rev	Description	By	Date
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED EROSION
 AND SEDIMENT CONTROL
 OVERALL PLAN**

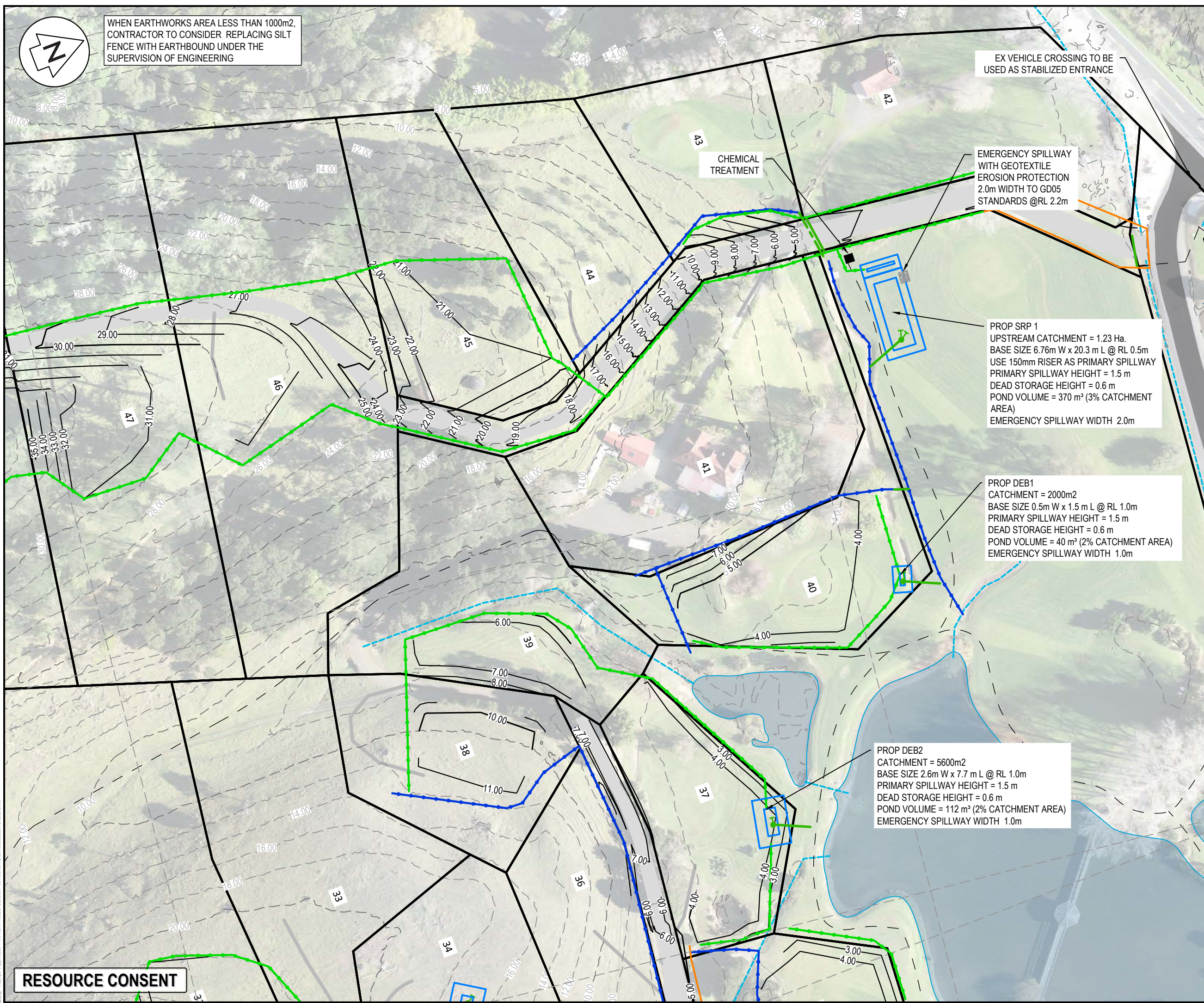
Project no.	309001 - WILLOWRIDGE		
Scale	1:3000 @ A3		
Cad file	C230.DWG		
Drawing no.	C230	Rev	A

RESOURCE CONSENT

DATE: 11/2024 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C230.DWG



WHEN EARTHWORKS AREA LESS THAN 1000m², CONTRACTOR TO CONSIDER REPLACING SILT FENCE WITH EARTHBOUND UNDER THE SUPERVISION OF ENGINEERING



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
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LEGEND

	EX BDY
	PROP BDY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	PR MAJOR CONTOUR
	PR MINOR CONTOUR
	PROP EXTENT WORK
	PROP CLEANWATER
	PROP DIRTYWATER
	PROP SW PIPE
	PROP SILT FENCE
	PROP STOCKPILE
	PROP DECANT
	PROP DECANT BAR

A	FOR RC	JAW	11/2024
Rev	Description	By	Date
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024



Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED EROSION AND SEDIMENT CONTROL PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C230.DWG
Drawing no.	C231
Rev	A

RESOURCE CONSENT

DATE: 11/2/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C231.DWG



WHEN EARTHWORKS AREA LESS THAN 1000m², CONTRACTOR TO CONSIDER REPLACING SILT FENCE WITH EARTHBOUND UNDER THE SUPERVISION OF ENGINEERING

- NOTES
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LEGEND

	EX BDY
	PROP BDY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	PR MAJOR CONTOUR
	PR MINOR CONTOUR
	PROP EXTENT WORK
	PROP CLEANWATER
	PROP DIRTYWATER
	PROP SW PIPE
	PROP SILT FENCE
	PROP STOCKPILE
	PROP DECANT
	PROP DECANT BAR

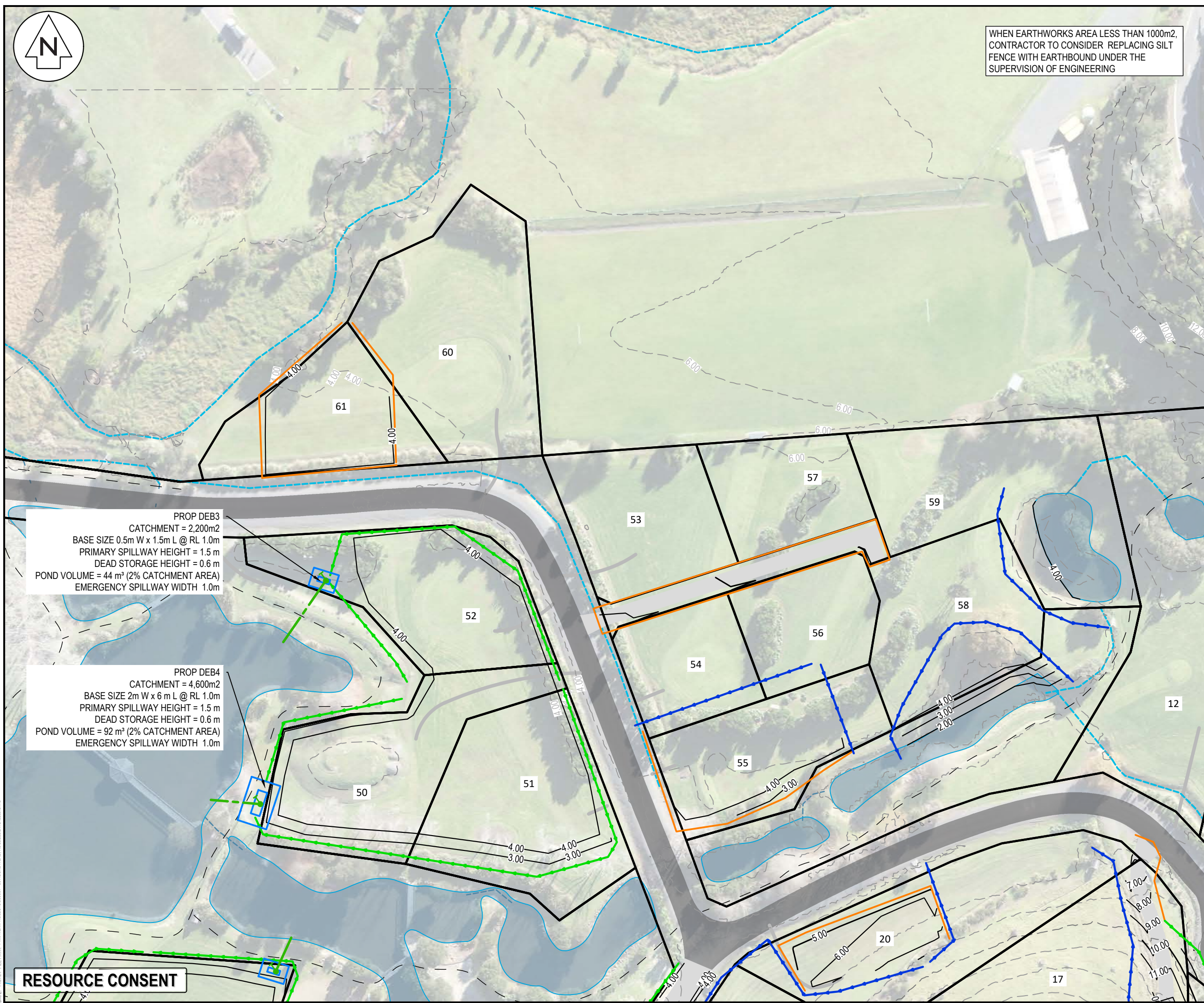
Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
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Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
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 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED EROSION
 AND SEDIMENT CONTROL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C230.DWG
Drawing no.	C232
Rev	A



PROP DEB3
 CATCHMENT = 2,200m²
 BASE SIZE 0.5m W x 1.5m L @ RL 1.0m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 44 m³ (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

PROP DEB4
 CATCHMENT = 4,600m²
 BASE SIZE 2m W x 6 m L @ RL 1.0m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 92 m³ (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

RESOURCE CONSENT

DATE: 11/27/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C232.DWG



WHEN EARTHWORKS AREA LESS THAN 1000m², CONTRACTOR TO CONSIDER REPLACING SILT FENCE WITH EARTHBOUND UNDER THE SUPERVISION OF ENGINEERING

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
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- LEGEND
- EX BDY
 - PROP BDY
 - EX MAJOR CONTOUR
 - EX MINOR CONTOUR
 - PR MAJOR CONTOUR
 - PR MINOR CONTOUR
 - PROP EXTENT WORK
 - > PROP CLEANWATER
 - > PROP DIRTYWATER
 - > PROP SW PIPE
 - PROP SILT FENCE
 - PROP STOCKPILE
 - PROP DECANT
 - PROP DECANT BAR

PROP DEB10
 CATCHMENT = 4,800m²
 BASE SIZE 2.2 m W x 6.5m L @ RL 7.5m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 96 m³ (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

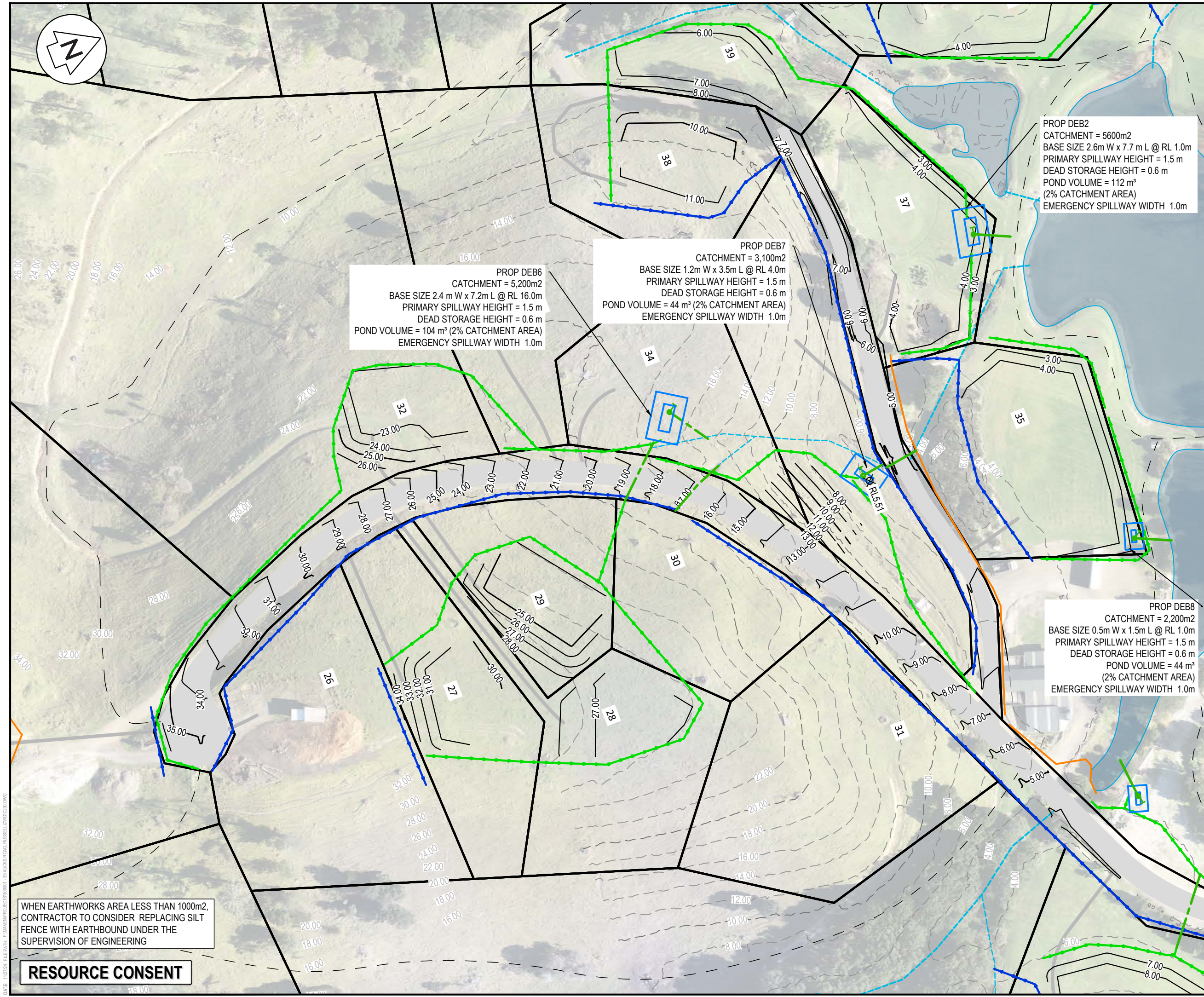
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED EROSION
 AND SEDIMENT CONTROL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C230.DWG
Drawing no.	C233
Rev	A

RESOURCE CONSENT

DATE: 11/27/24 FILEPATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C233.DWG



PROP DEB2
 CATCHMENT = 5600m²
 BASE SIZE 2.6m W x 7.7 m L @ RL 1.0m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 112 m³
 (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

PROP DEB6
 CATCHMENT = 5,200m²
 BASE SIZE 2.4 m W x 7.2m L @ RL 16.0m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 104 m³ (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

PROP DEB7
 CATCHMENT = 3,100m²
 BASE SIZE 1.2m W x 3.5m L @ RL 4.0m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 44 m³ (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

PROP DEB8
 CATCHMENT = 2,200m²
 BASE SIZE 0.5m W x 1.5m L @ RL 1.0m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 44 m³
 (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

- NOTES**
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF NZVD2016
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
 5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
 7. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECENT VOLUMES TO

LEGEND

	EX BDY
	PROP BDY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	PR MAJOR CONTOUR
	PR MINOR CONTOUR
	PROP EXTENT WORK
	PROP CLEANWATER
	PROP DIRTYWATER
	PROP SW PIPE
	PROP SILT FENCE
	PROP STOCKPILE
	PROP DECANT
	PROP DECANT BAR

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED EROSION
 AND SEDIMENT CONTROL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C230.DWG
Drawing no.	C234
Rev	A

WHEN EARTHWORKS AREA LESS THAN 1000m², CONTRACTOR TO CONSIDER REPLACING SILT FENCE WITH EARTHBOUND UNDER THE SUPERVISION OF ENGINEERING

RESOURCE CONSENT

DATE: 11/2/24 FILEPATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C230.DWG

PROP DEB8
 CATCHMENT = 2,200m²
 BASE SIZE 0.5m W x 1.5m L @ RL 1.0m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 44 m³ (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

PROP DEB9
 CATCHMENT = 1,000m²
 BASE SIZE 0.3m W x 1.0m L @ RL 19.5m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 20 m³ (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

PROP DEB10
 CATCHMENT = 4,800m²
 BASE SIZE 2.2 m W x 6.5m L @ RL 7.5m
 PRIMARY SPILLWAY HEIGHT = 1.5 m
 DEAD STORAGE HEIGHT = 0.6 m
 POND VOLUME = 96 m³ (2% CATCHMENT AREA)
 EMERGENCY SPILLWAY WIDTH 1.0m

WHEN EARTHWORKS AREA LESS THAN 1000m²,
 CONTRACTOR TO CONSIDER REPLACING SILT
 FENCE WITH EARTHBOUND UNDER THE
 SUPERVISION OF ENGINEERING

RESOURCE CONSENT

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF NZVD2016
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
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 6. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
 7. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECANT VOLUMES TO

LEGEND

	EX BDY
	PROP BDY
	EX MAJOR CONTOUR
	EX MINOR CONTOUR
	PR MAJOR CONTOUR
	PR MINOR CONTOUR
	PROP EXTENT WORK
	PROP CLEANWATER
	PROP DIRTYWATER
	PROP SW PIPE
	PROP SILT FENCE
	PROP STOCKPILE
	PROP DECANT
	PROP DECANT BAR

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED EROSION
 AND SEDIMENT CONTROL
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C230.DWG
Drawing no.	C235
Rev	A

DATE: 11/2/24 FILE PATH: F:\Maven\Projects\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C235.DWG



WHEN EARTHWORKS AREA LESS THAN 1000m², CONTRACTOR TO CONSIDER REPLACING SILT FENCE WITH EARTHBOUND UNDER THE SUPERVISION OF ENGINEERING

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF NZVD2016
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- LEGEND
- EX BDY
 - PROP BDY
 - EX MAJOR CONTOUR
 - EX MINOR CONTOUR
 - PR MAJOR CONTOUR
 - PR MINOR CONTOUR
 - PROP EXTENT WORK
 - PROP CLEANWATER
 - PROP DIRTYWATER
 - PROP SW PIPE
 - PROP SILT FENCE
 - PROP STOCKPILE
 - PROP DECANT
 - PROP DECANT BAR

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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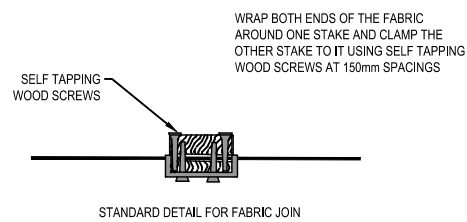
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED EROSION
 AND SEDIMENT CONTROL
 PLAN**

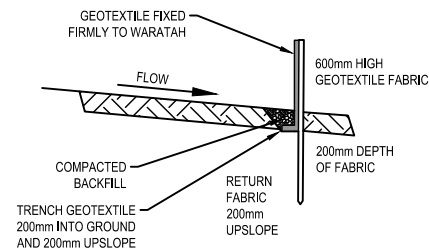
Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C230.DWG
Drawing no.	C236
Rev	A

RESOURCE CONSENT

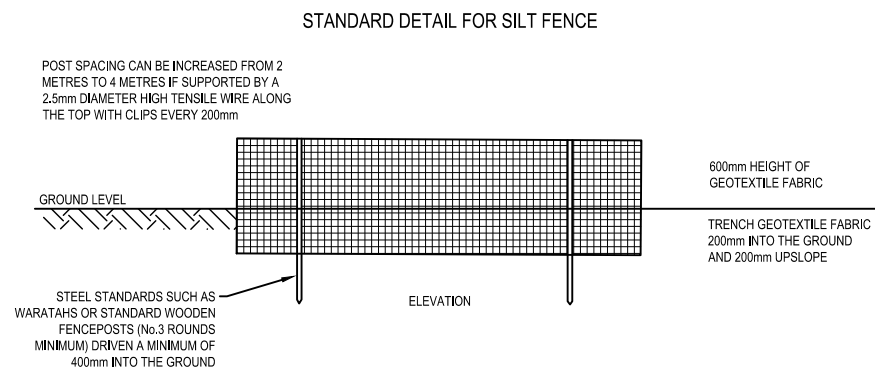
DATE: 11/27/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C236.DWG



STANDARD DETAIL FOR FABRIC JOIN

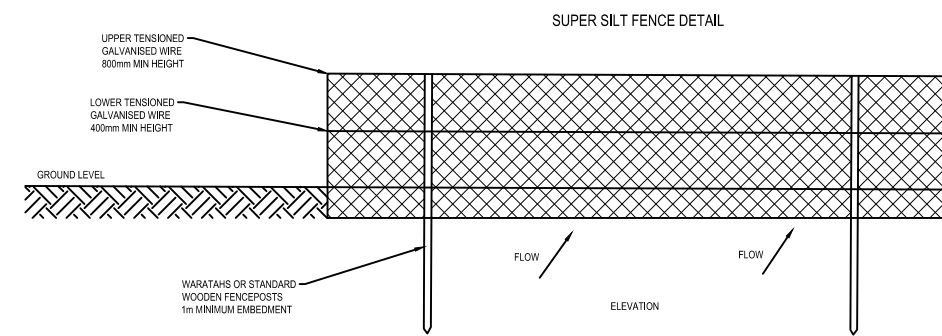


CROSS SECTION



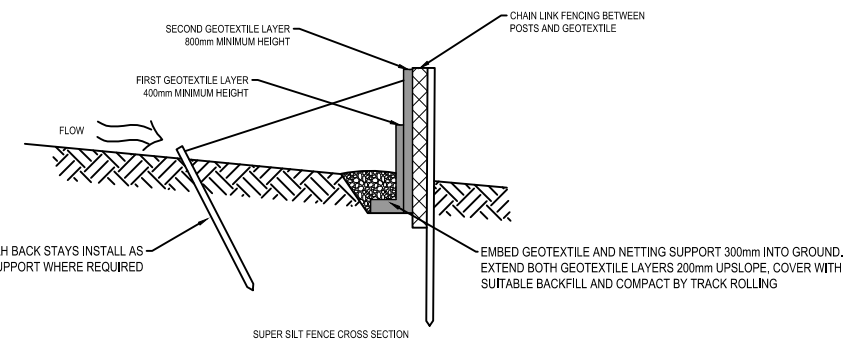
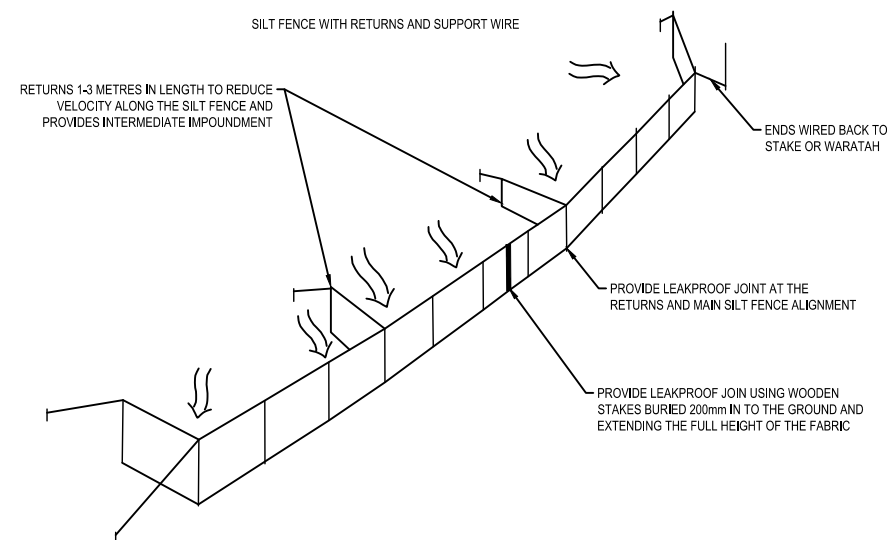
STANDARD DETAIL FOR SILT FENCE

ELEVATION



SUPER SILT FENCE DETAIL

ELEVATION



SUPER SILT FENCE CROSS SECTION

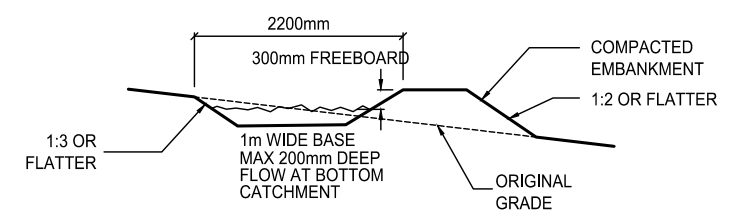
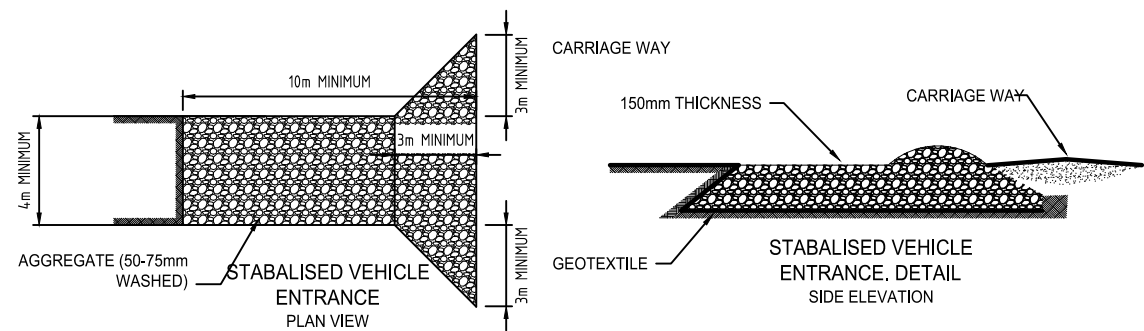
Rev	Description	By	Date
-	FOR RC	JAW	10/2024
Survey	MAVEN		06/2024
Design	-		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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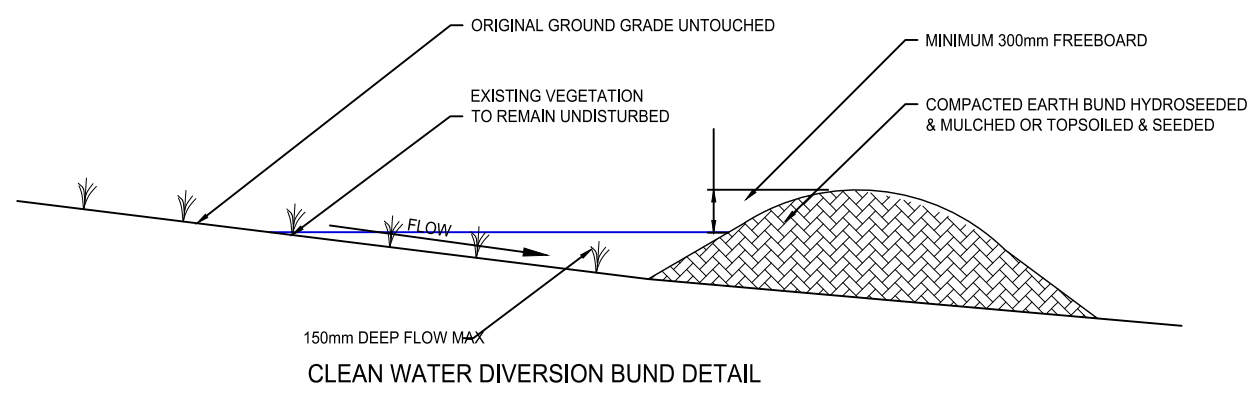
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**EROSION
 AND SEDIMENT CONTROL
 STANDARD DETAILS**

Project no.	309001 - WILLOWRIDGE
Scale	NTS
Cad file	C240 DETAILS.DWG
Drawing no.	C241
Rev	A



TYPICAL CROSS SECTION OF A RUNOFF DIVERSION
TYPICAL DIMENSIONS UNLESS OTHERWISE NOTED



CLEAN WATER DIVERSION BUND DETAIL

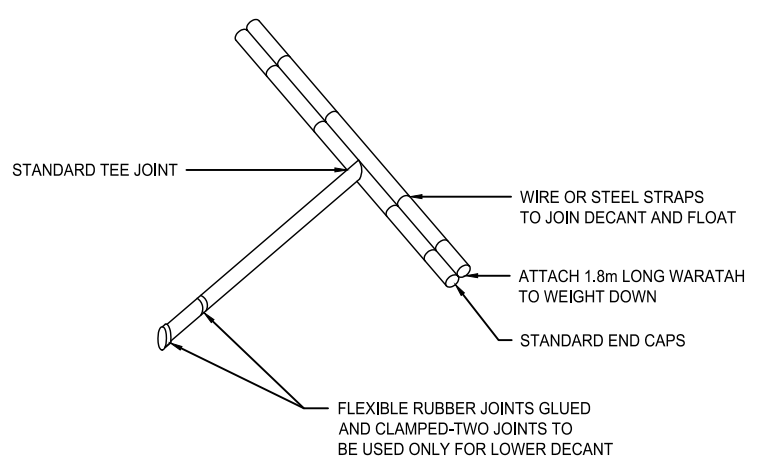
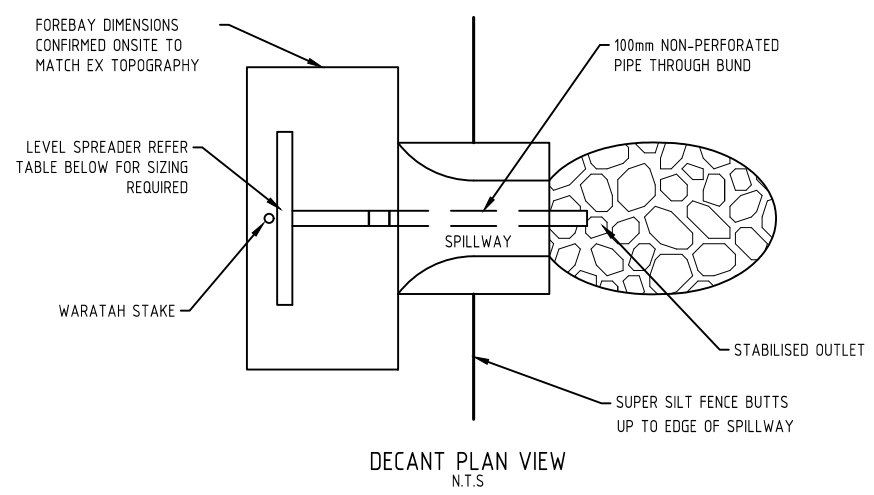
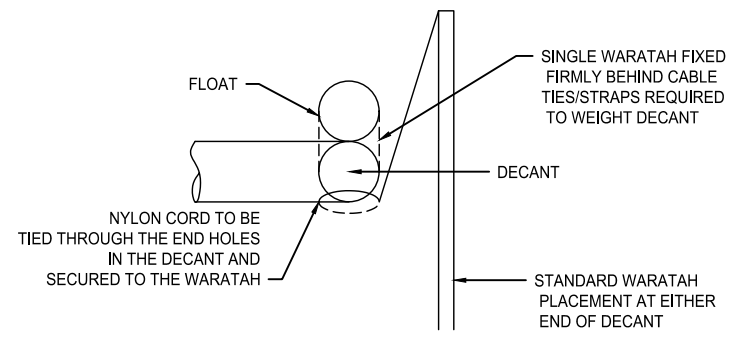
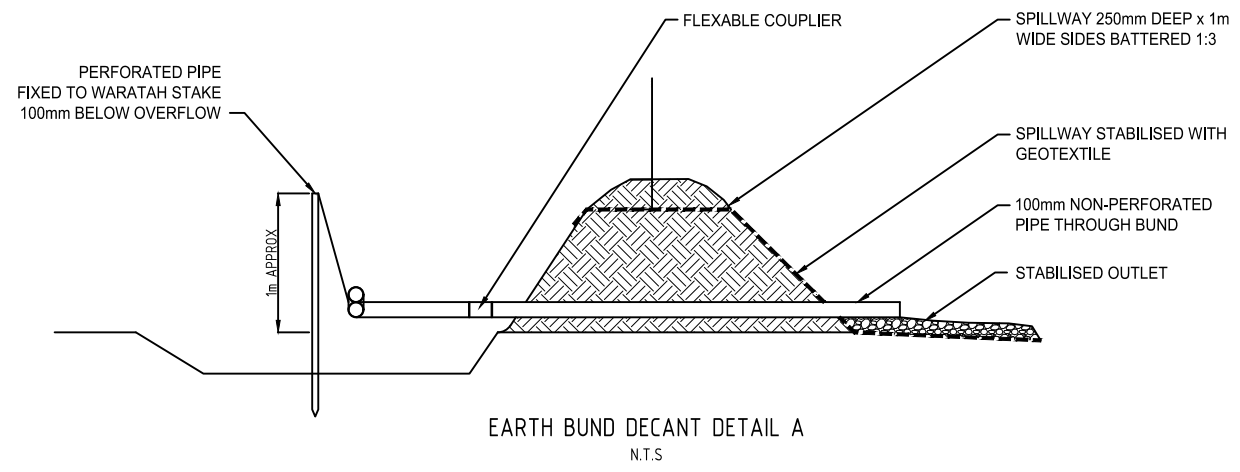
Rev	Description	By	Date

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Project
**PROPOSED SUBDIVISION
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 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**EROSION
 AND SEDIMENT CONTROL
 STANDARD DETAILS**

Project no.	309001 - WILLOWRIDGE		
Scale	NTS		
Cad file	C240 DETAILS.DWG		
Drawing no.	C242	Rev	A



LEVEL SPREADER DESIGN CRITERIA (20 YEAR STORM EVENT)				
DESIGN FLOW (m ³ /sec)	INLET WIDTH (m)	DEPTH (m)	END WIDTH (m)	LENGTH (mm)
0-0.3	3	150	1	3
0.3-0.6	5	180	1	7
0.6-0.9	7	220	1	10

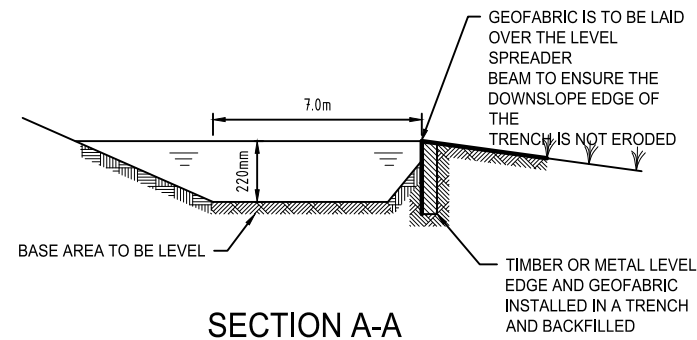
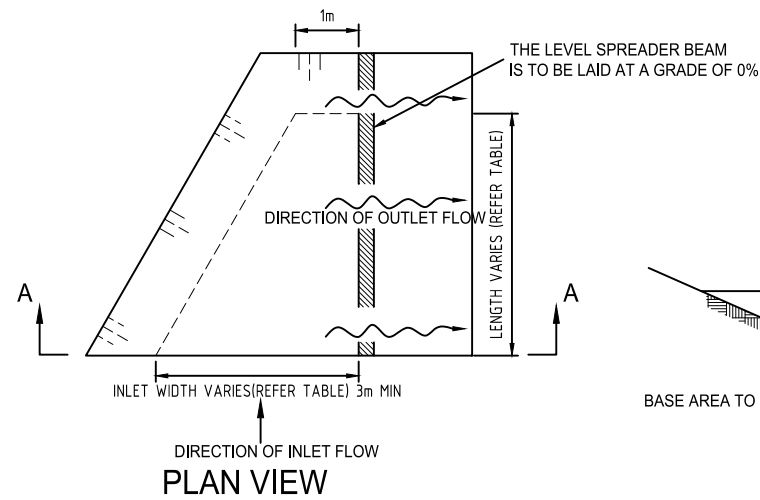
Rev	Description	By	Date

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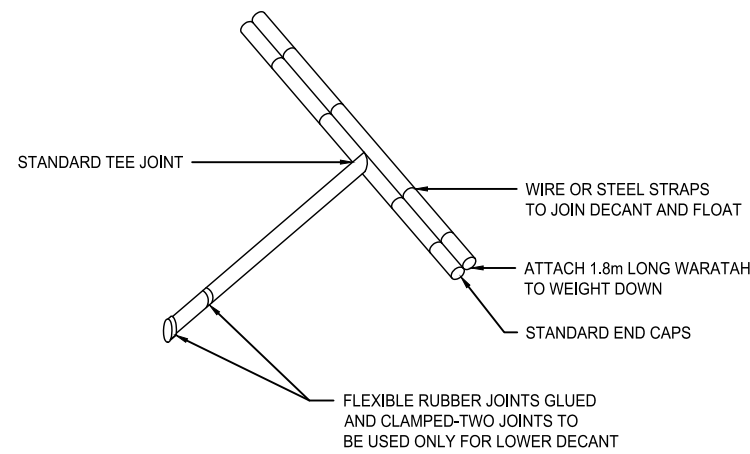
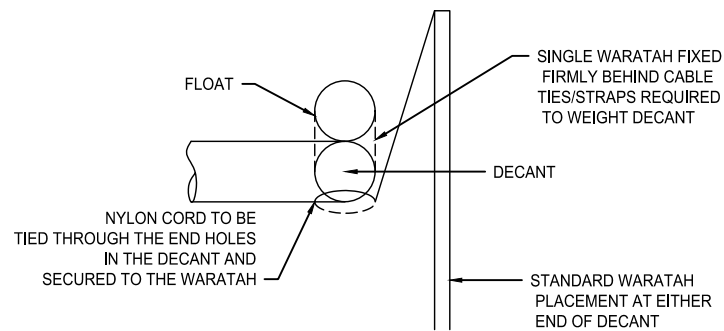
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**EROSION
 AND SEDIMENT CONTROL
 STANDARD DETAILS**

Project no.	309001 - WILLOWRIDGE
Scale	NTS
Cad file	C240 DETAILS.DWG
Drawing no.	C243
Rev	A



LEVEL SPREADER DESIGN CRITERIA (20 YEAR STORM EVENT)				
DESIGN FLOW (m ³ /sec)	INLET WIDTH (m)	DEPTH (m)	END WIDTH (m)	LENGTH (mm)
0-0.3	3	150	1	3
0.3-0.6	5	180	1	7
0.6-0.9	7	220	1	10



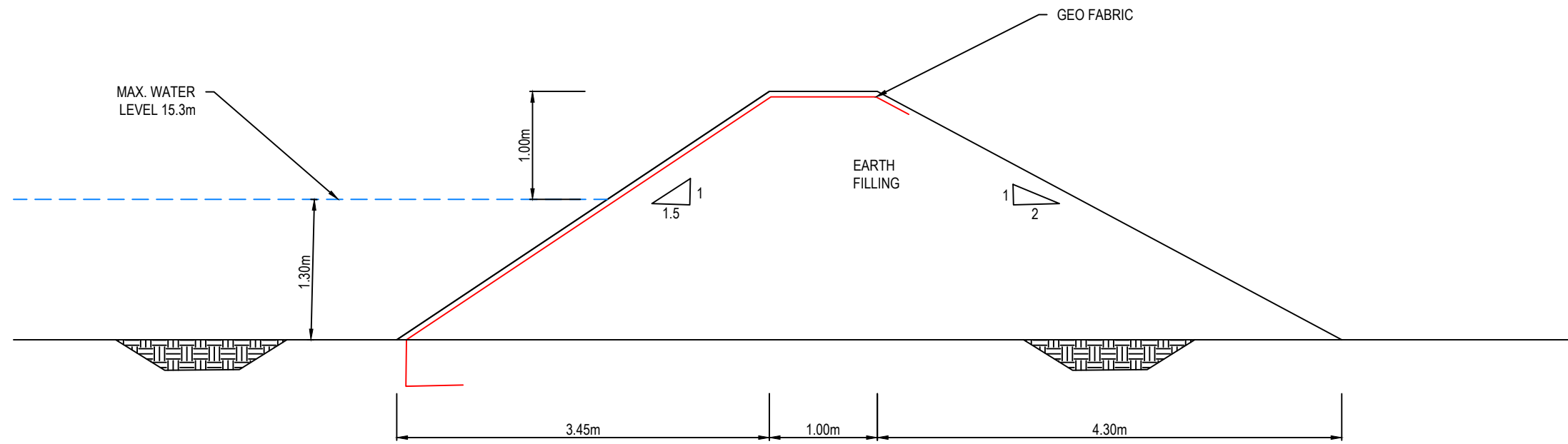
Rev	Description	By	Date

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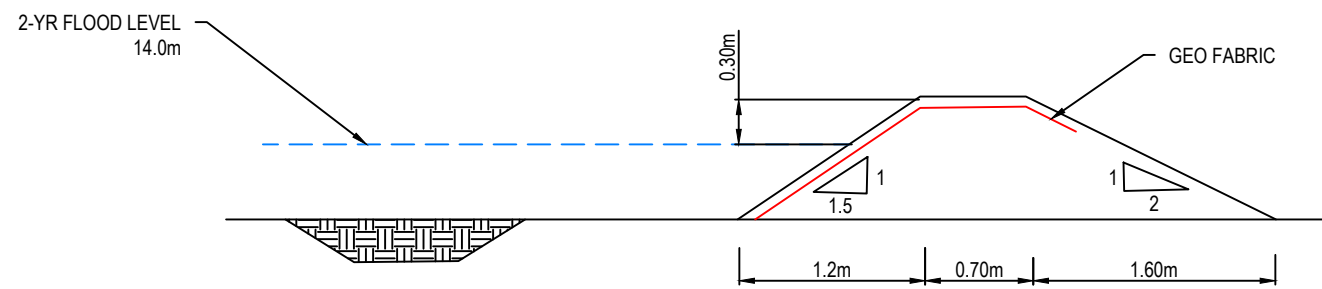
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**EROSION
 AND SEDIMENT CONTROL
 STANDARD DETAILS**

Project no.	309001 - WILLOWRIDGE		
Scale	NTS		
Cad file	C240 DETAILS.DWG		
Drawing no.	C245	Rev	A



UPSTREAM COFFERDAM CORSS SECTION
NTS



DOWNSTREAM COFFERDAM CORSS SECTION
NTS

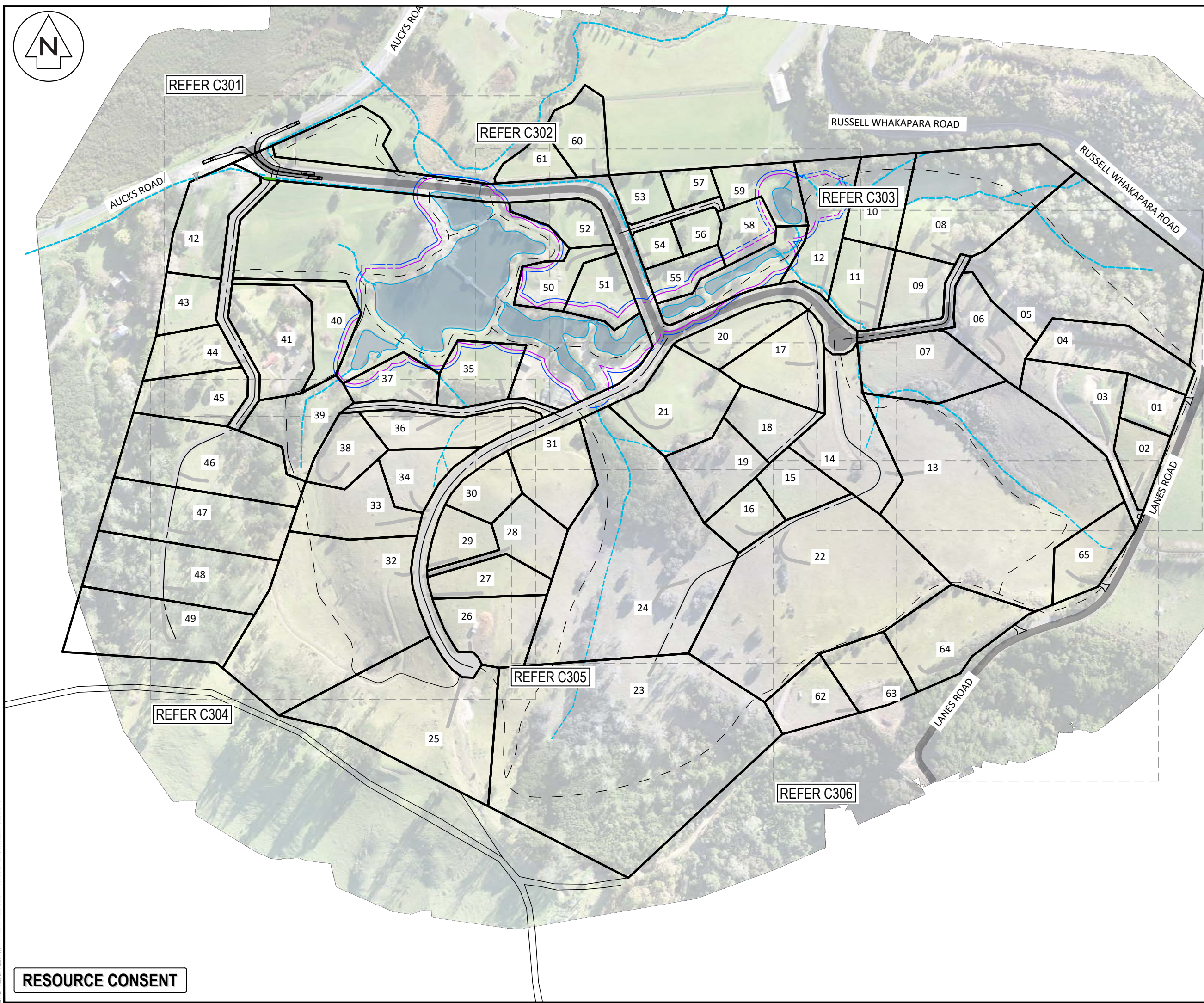
Rev	Description	By	Date

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Project
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 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**EROSION
 AND SEDIMENT CONTROL
 STANDARD DETAILS**

Project no.	309001 - WILLOWRIDGE
Scale	NTS
Cad file	C240 DETAILS.DWG
Drawing no.	C246
Rev	A



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. CONTRACTOR IS TO AVOID USING GPS FOR SET OUT OF THE KERB LEVELS WHERE GRADIENTS ARE LESS THAN 1%.
 3. FINAL PAVEMENT DESIGN SUBJECT TO CBR/BEM TESTS ON SUBGRADE MATERIAL.
 4. SETOUT SCHEDULE WITH COORDINATES OF CHAINAGE POINTS ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.
 5. REFER TO LONG SECTION FOR FINISHED CENTRELINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
 6. STREET LIGHTING SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE NEW ZEALAND STANDARDS INCLUDING BUT NOT RESTRICTED TO THE CURRENT VERSION OF AS/NZS 1158 LIGHTING FOR ROADS AND PUBLIC SPACES SERIES OF STANDARDS.

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 ROADING
 OVERALL PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:3000 @ A3
Cad file	C300.DWG
Drawing no.	C300
Rev	A

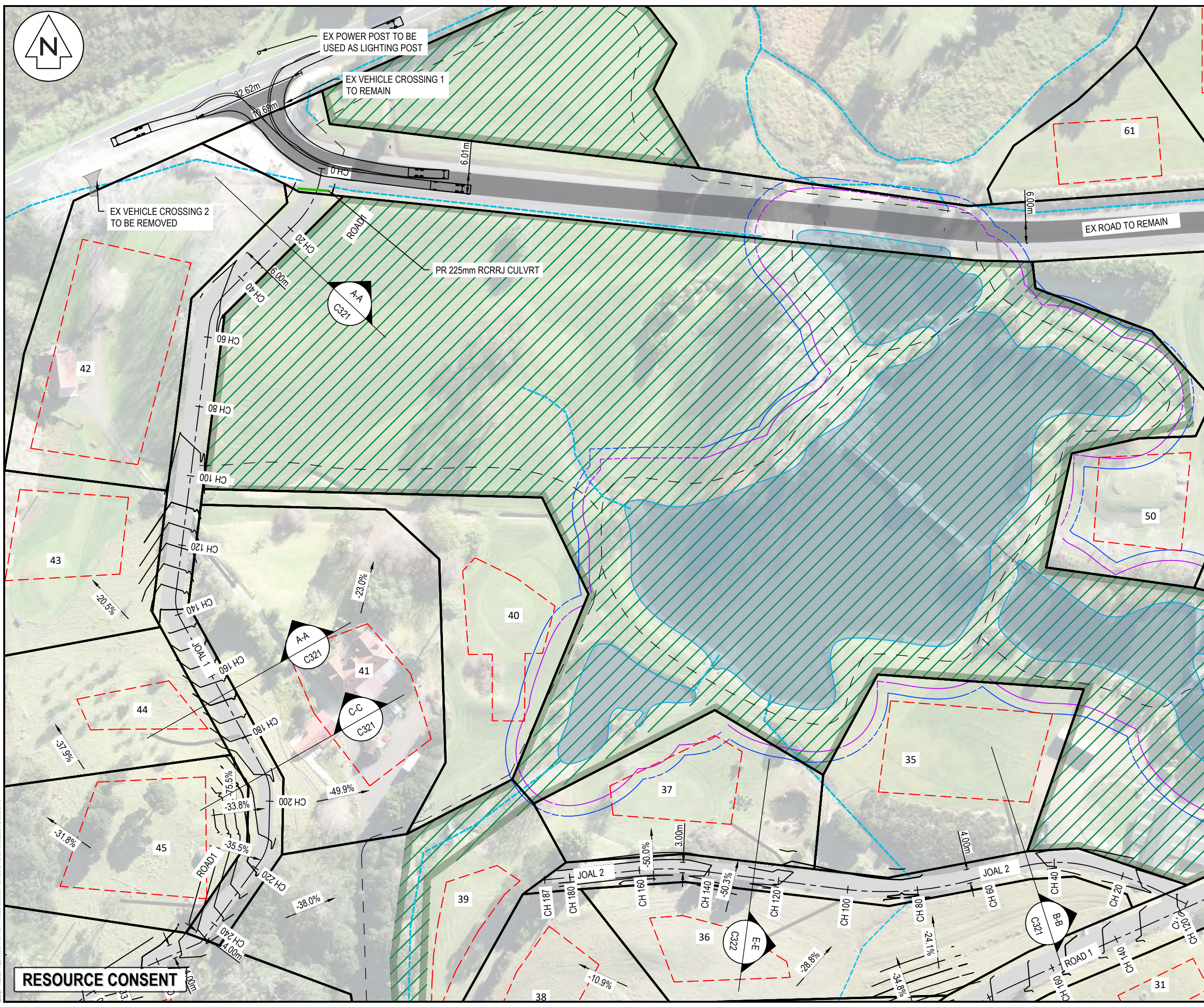
RESOURCE CONSENT

DATE: 11/27/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C300.DWG



LEGEND

	EX BDY
	PROP BDY
	PR WALKWAY
	15m OFFSET FROM POND
	12M OFFSET FROM POND
	INDICATIVE BUILDING PLATFORM
	EX PAVE
	PROPOSED PAVE



Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
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Project
**PROPOSED SUBDIVISION
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 FOR
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Title
**PROPOSED
 ROADING
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C300.DWG
Drawing no.	C301
Rev	A

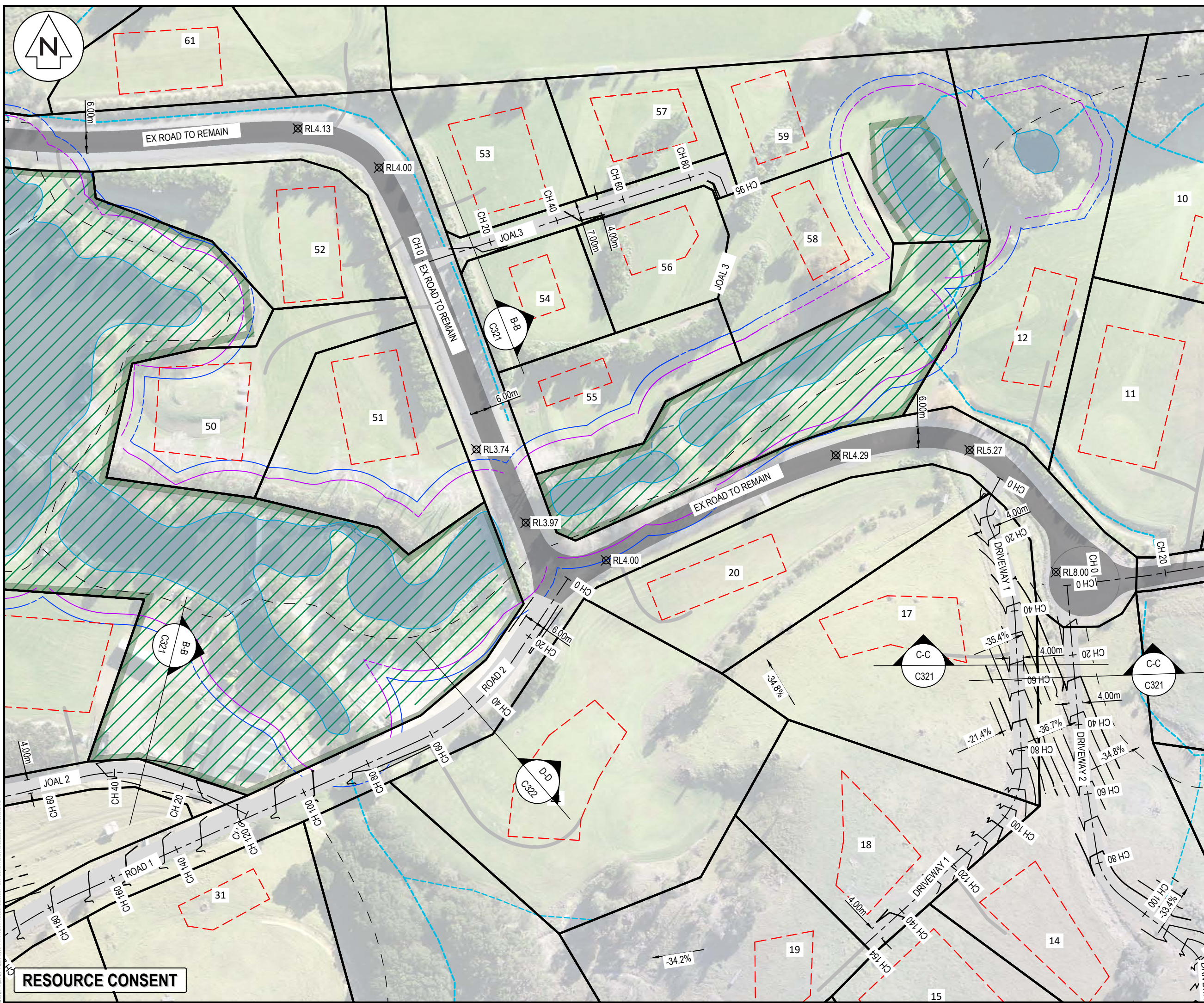
RESOURCE CONSENT

DATE: 11/2024 FILEPATH: F:\Maven\Projects\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C300.DWG



LEGEND

	EX BDY
	PROP BDY
	PR WALKWAY
	15m OFFSET FROM POND
	12M OFFSET FROM POND
	INDICATIVE BUILDING PLATFORM
	EX PAVE
	PROPOSED PAVE



Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
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Title
**PROPOSED
 ROADING
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C300.DWG
Drawing no.	C302
Rev	A

DATE: 11/27/24 FILEPATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD - RUSSELL\DWG\C302.DWG



LEGEND

- EX BDY
- PROP BDY
- - - PR WALKWAY
- - - 15m OFFSET FROM POND
- - - 12m OFFSET FROM POND
- - - INDICATIVE BUILDING
- - - PLATFORM
- - - EX PAVE
- - - PROPOSED PAVE

Rev	Description	By	Date
A	FOR RC	JAW	11/2024

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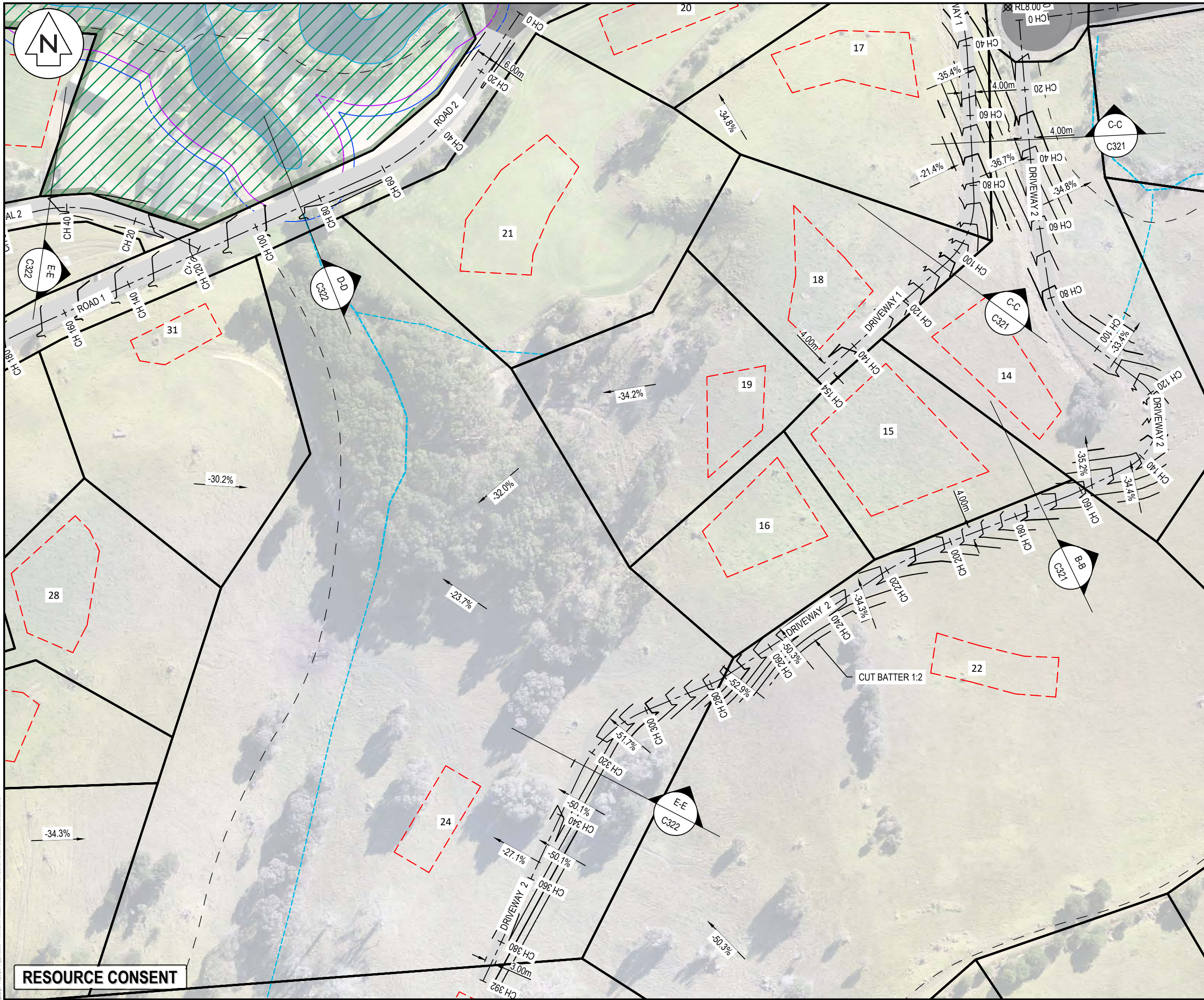
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 ROADING
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C300.DWG
Drawing no.	C304
Rev	A

RESOURCE CONSENT

DATE: 11/27/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C300.DWG



LEGEND

---	EX BDY
---	PROP BDY
---	PR WALKWAY
---	15m OFFSET FROM POND
---	12M OFFSET FROM POND
---	INDICATIVE BUILDING PLATFORM
---	EX PAVE
---	PROPOSED PAVE

NOTES
 1. DRIVEWAY 2 FROM CH 240 TO END, THE CUT GRADE TO BE 1:2

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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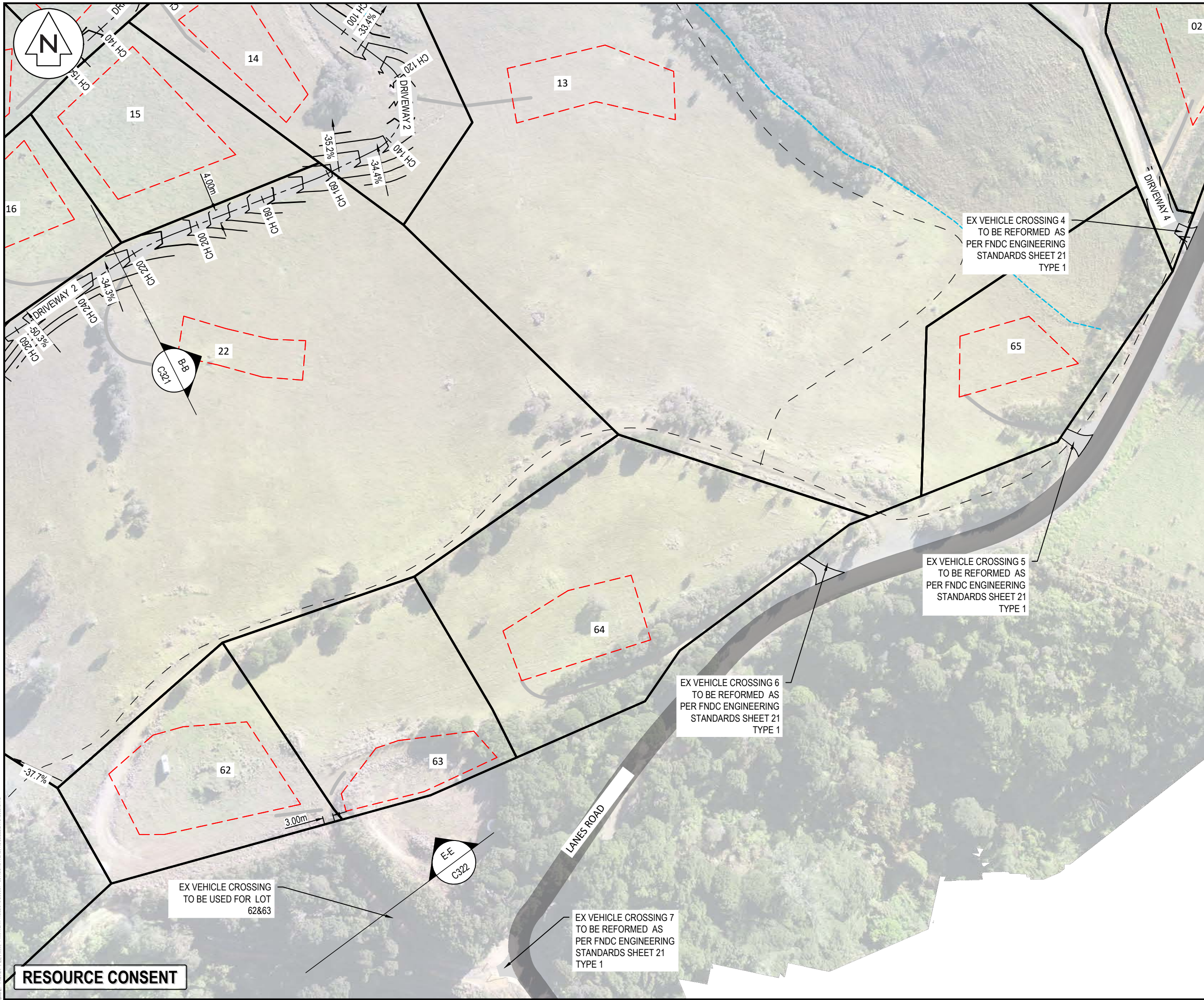
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 ROADING
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C300.DWG
Drawing no.	C305
Rev	A

DATE: 11/27/24 FILEPATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C300.DWG

RESOURCE CONSENT



LEGEND

	EX BDY
	PROP BDY
	PR WALKWAY
	15m OFFSET FROM POND
	12M OFFSET FROM POND
	INDICATIVE BUILDING PLATFORM
	EX PAVE
	PROPOSED PAVE

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

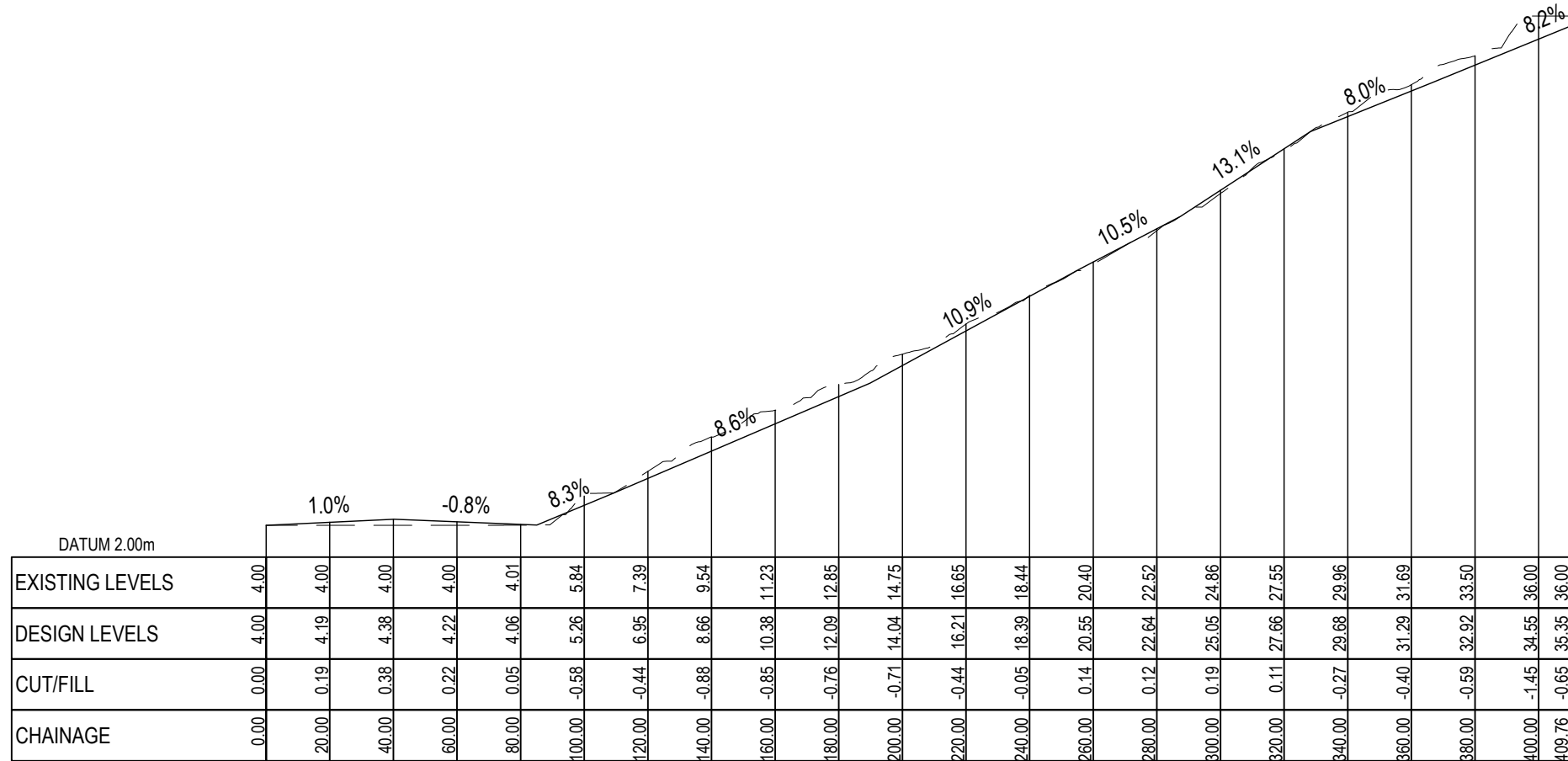
Title
**PROPOSED
 ROADING
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C300.DWG
Drawing no.	C306
Rev	A

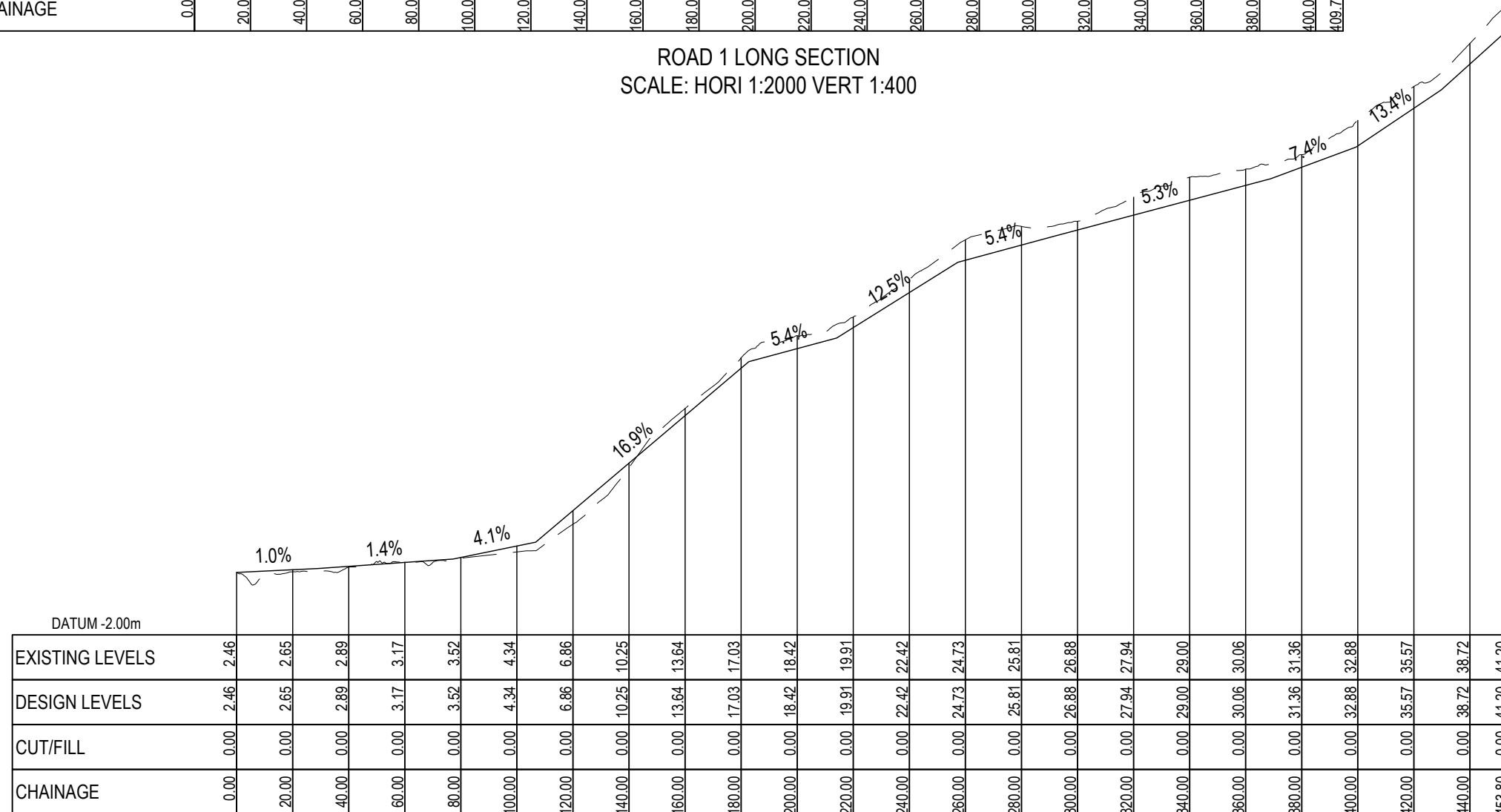
RESOURCE CONSENT

DATE: 11/2/24 FILEPATH: F:\Maven\Projects\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C300.DWG

DATE: 11/2/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C310.DWG



ROAD 1 LONG SECTION
SCALE: HORI 1:2000 VERT 1:400



JOAL1 LONG SECTION
SCALE: HORI 1:2000 VERT 1:400

LEGEND
 --- EX GROUND LEVEL
 --- PR GROUND LEVEL

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024



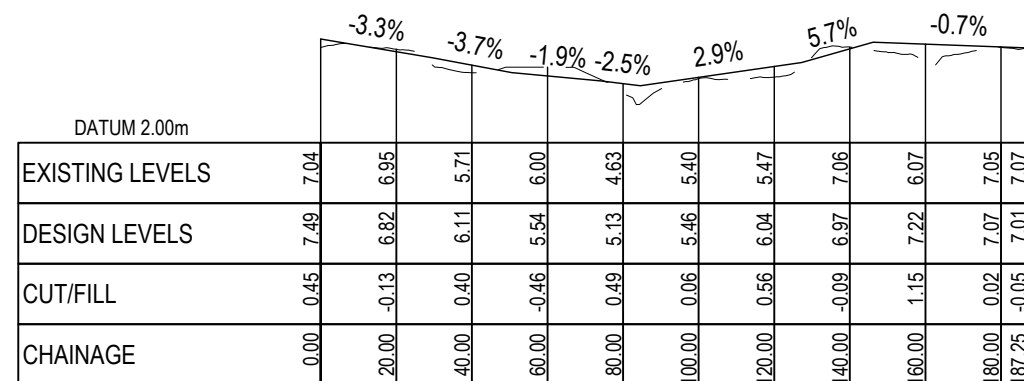
Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 ROADING
 LONG SECTIONS**

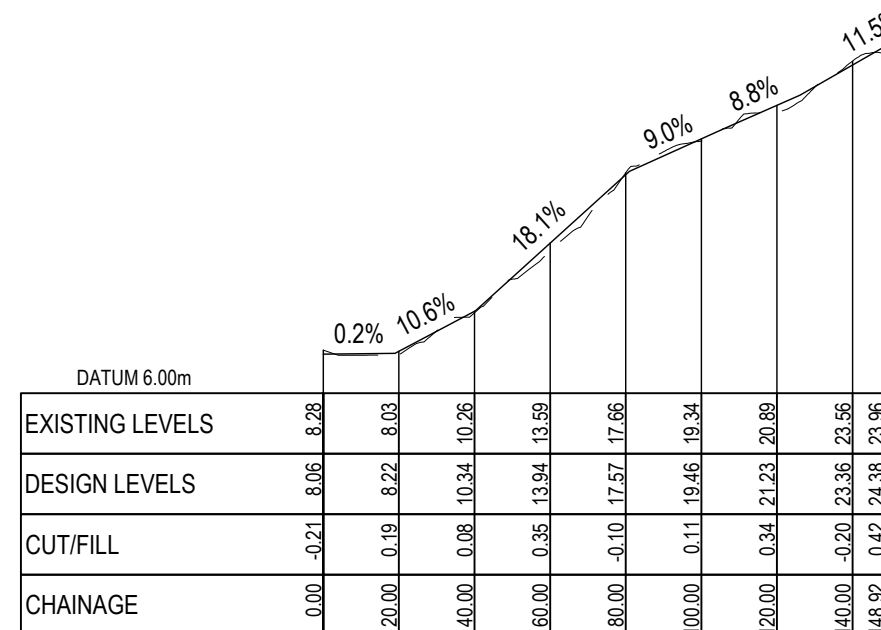
Project no.	309001 - WILLOWRIDGE		
Scale	1:1000 @ A3		
Cad file	C300.DWG		
Drawing no.	C310	Rev	A

RESOURCE CONSENT

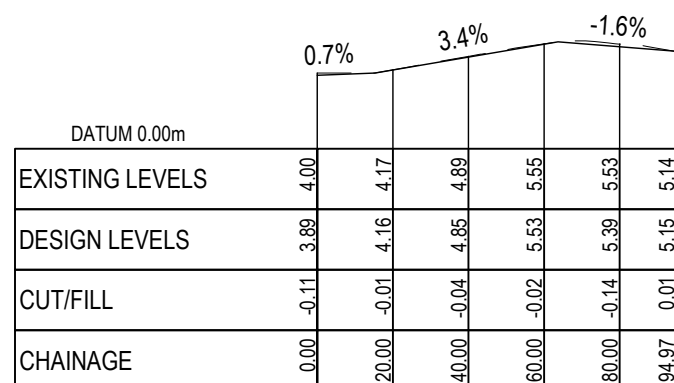
LEGEND
 ——— EX GROUND LEVEL
 ——— PR GROUND LEVEL



JOAL 2 LONG SECTION
 SCALE: HORI 1:2000 VERT 1:400



JOAL 4 LONG SECTION
 SCALE: HORI 1:2000 VERT 1:400



JOAL 3 LONG SECTION
 SCALE: HORI 1:2000 VERT 1:400

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024



Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

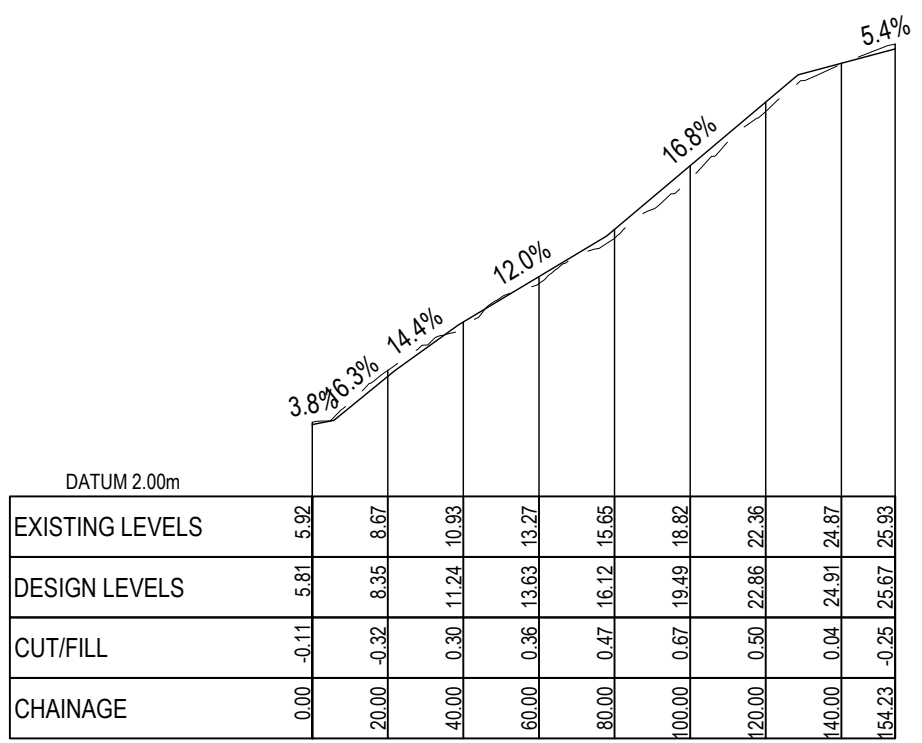
Title
**PROPOSED
 ROADING
 LONG SECTIONS**

Project no.	309001 - WILLOWRIDGE		
Scale	1:1000 @ A3		
Cad file	C300.DWG		
Drawing no.	C311	Rev	A

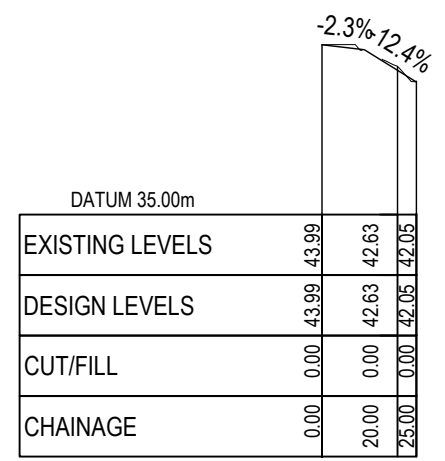
RESOURCE CONSENT

DATE: 11/2/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD - RUSSELL\DWG\C300.DWG

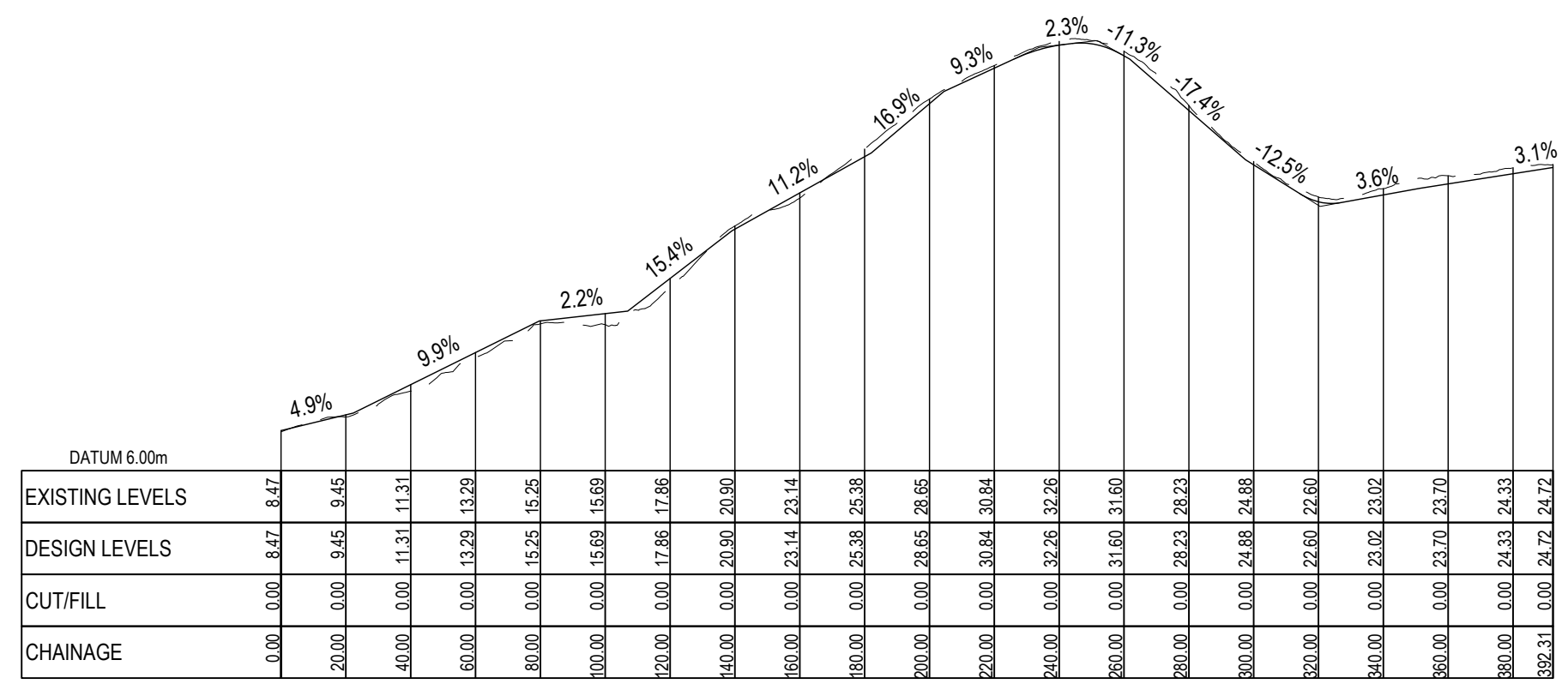
LEGEND
 --- EX GROUND LEVEL
 --- PR GROUND LEVEL



DRIVEWAY 1 LONG SECTION
 SCALE: HORI 1:2000 VERT 1:400



DRIVEWAY 4 LONG SECTION
 SCALE: HORI 1:2000 VERT 1:400



DRIVEWAY 2 LONG SECTION
 SCALE: HORI 1:2000 VERT 1:400

RESOURCE CONSENT

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024

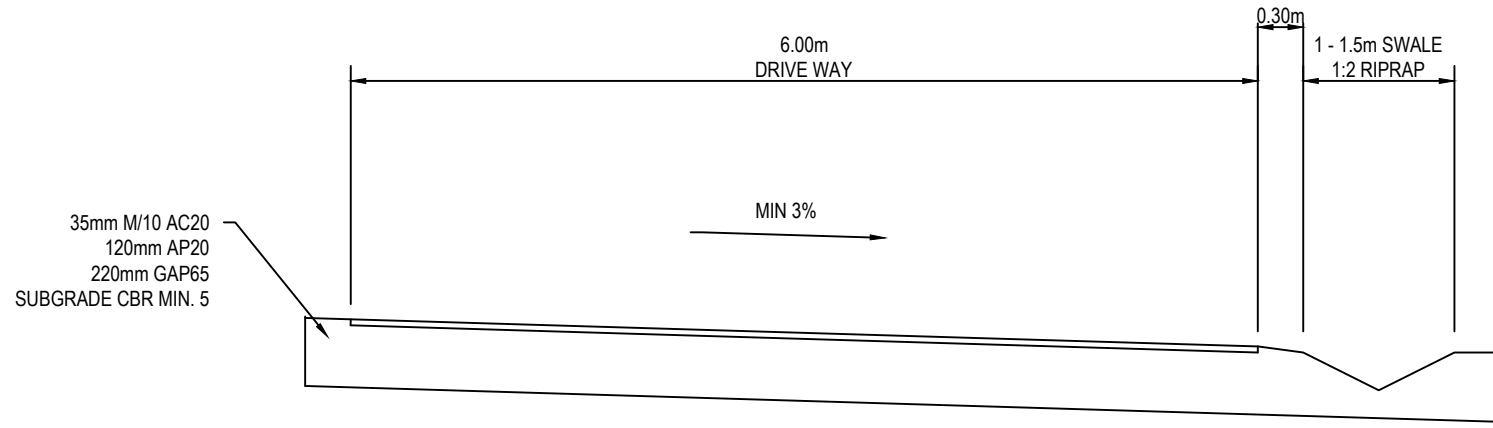


Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

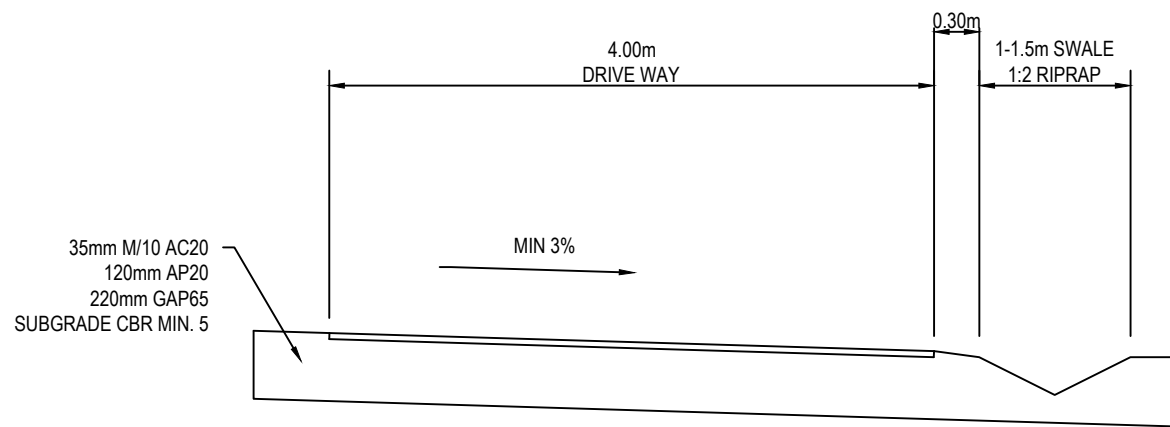
Title
**PROPOSED
 ROADING
 LONG SECTIONS**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C300.DWG
Drawing no.	C312
Rev	A

DATE: 11/27/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C300.DWG

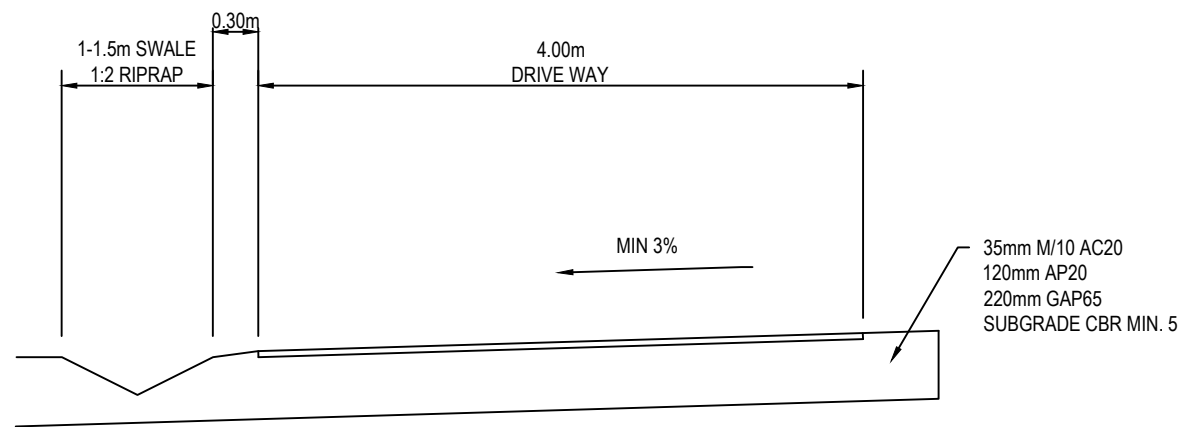


TYPICAL 2-WAY DRIVE WAY CROSS SECTION A-A (FOR >= 6 LOTS)
NTS



TYPICAL 1-WAY DRIVE WAY CROSS SECTION B-B (FOR 3 TO 5 LOTS)
NTS

2m WIDTH PASSING BAYS TO BE LOCATED AT
APPROPRIATE LOCATIONS FOR ONE-WAY DRIVEWAYS



TYPICAL 1-WAY DRIVE WAY CROSS SECTION C-C (FOR 3 TO 5 LOTS)
NTS

2m WIDTH PASSING BAYS TO BE LOCATED AT
APPROPRIATE LOCATIONS FOR ONE-WAY DRIVEWAYS

Rev	Description	By	Date
A	FOR RC	JAW	11/2024
Survey	MAVEN		06/2024
Design	JAW		07/2024
Drawn	JAW		07/2024
Checked	TM		07/2024



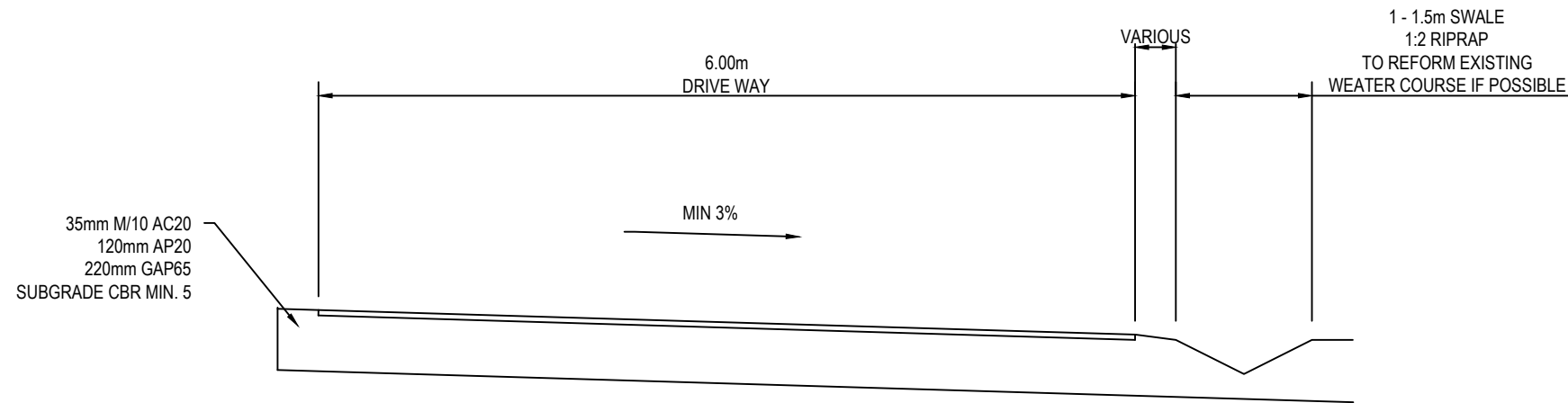
Project
**PROPOSED SUBDIVISION
OF 39 AUCKS ROAD
RUSSELL
FOR
WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
ROADING
CROSS SECTIONS**

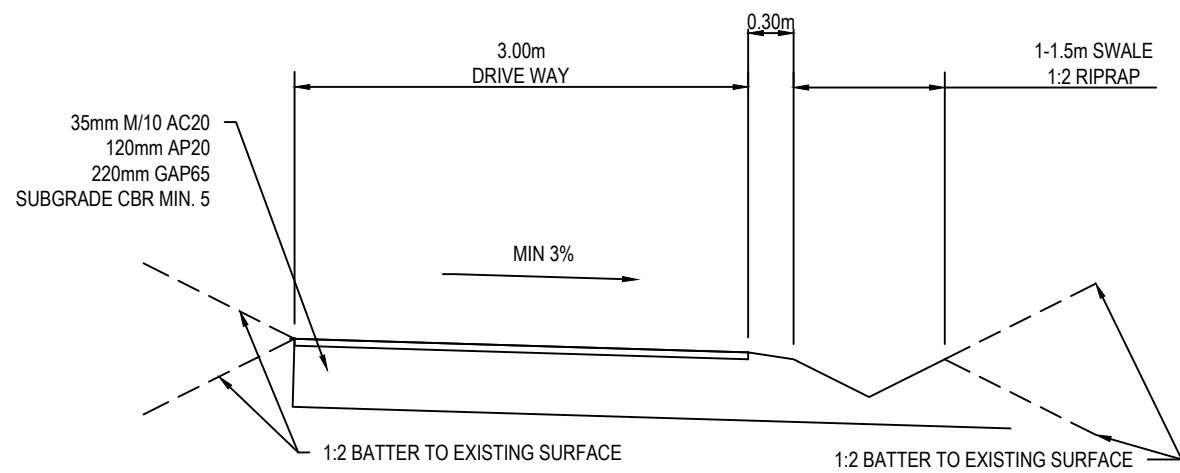
Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C300.DWG
Drawing no.	C321
Rev	A

DATE: 11/2/24 FILEPATH: F:\M\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C300.DWG

RESOURCE CONSENT

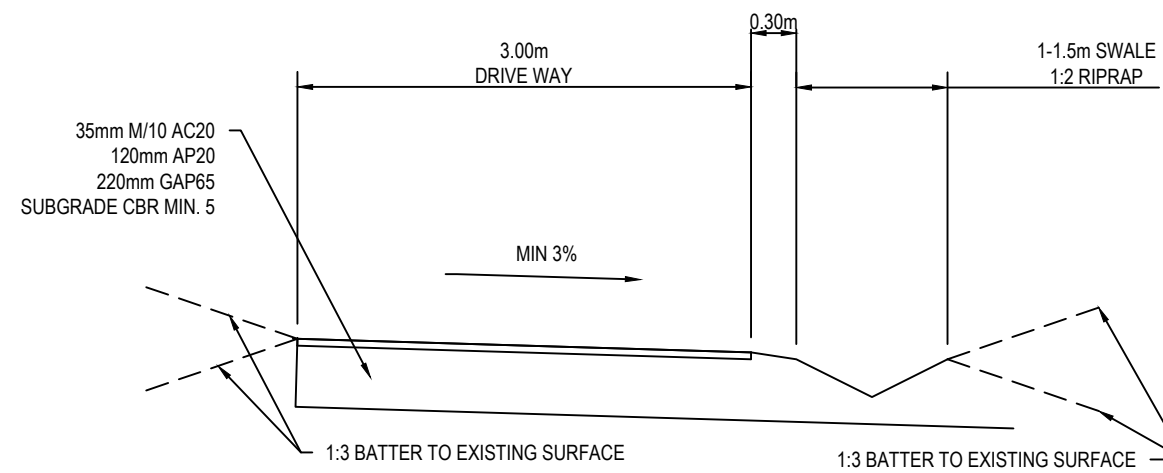


TYPICAL 2-WAY DRIVE WAY CROSS SECTION D-D (FOR >= 6 LOTS)
NTS



TYPICAL 1-WAY DRIVE WAY E-E (FOR 1 TO 2 LOTS)
NTS

2m WIDTH PASSING BAYS TO BE LOCATED AT APPROPRIATE LOCATIONS FOR ONE-WAY DRIVEWAYS



TYPICAL 1-WAY DRIVE WAY F-F (FOR 1 TO 2 LOTS)
NTS

2m WIDTH PASSING BAYS TO BE LOCATED AT APPROPRIATE LOCATIONS FOR ONE-WAY DRIVEWAYS

Rev	Description	By	Date
A	FOR RC	JAW	11/2024

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 Auckland 1023

Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 ROADING
 CROSS SECTIONS**

Project no.	309001 - WILLOWRIDGE		
Scale	1:1000 @ A3		
Cad file	C300.DWG		
Drawing no.	C322	Rev	A

DATE: 11/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C300.DWG

RESOURCE CONSENT



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING, 10 - 20% WEAK CONCRETE BEDDING GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
 5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
 6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
 7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
 8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
 9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
 11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

- LEGEND
- EX BDY (Solid black line)
 - PROP BDY (Dashed black line)
 - EX INTERMITTENT STEAM (Blue dashed line with arrows)
 - EX OLFP (Blue solid line with arrows)
 - EX WATERCOURSE (Green dashed line with arrows)
 - PR WATERCOURSE (Green solid line with arrows)

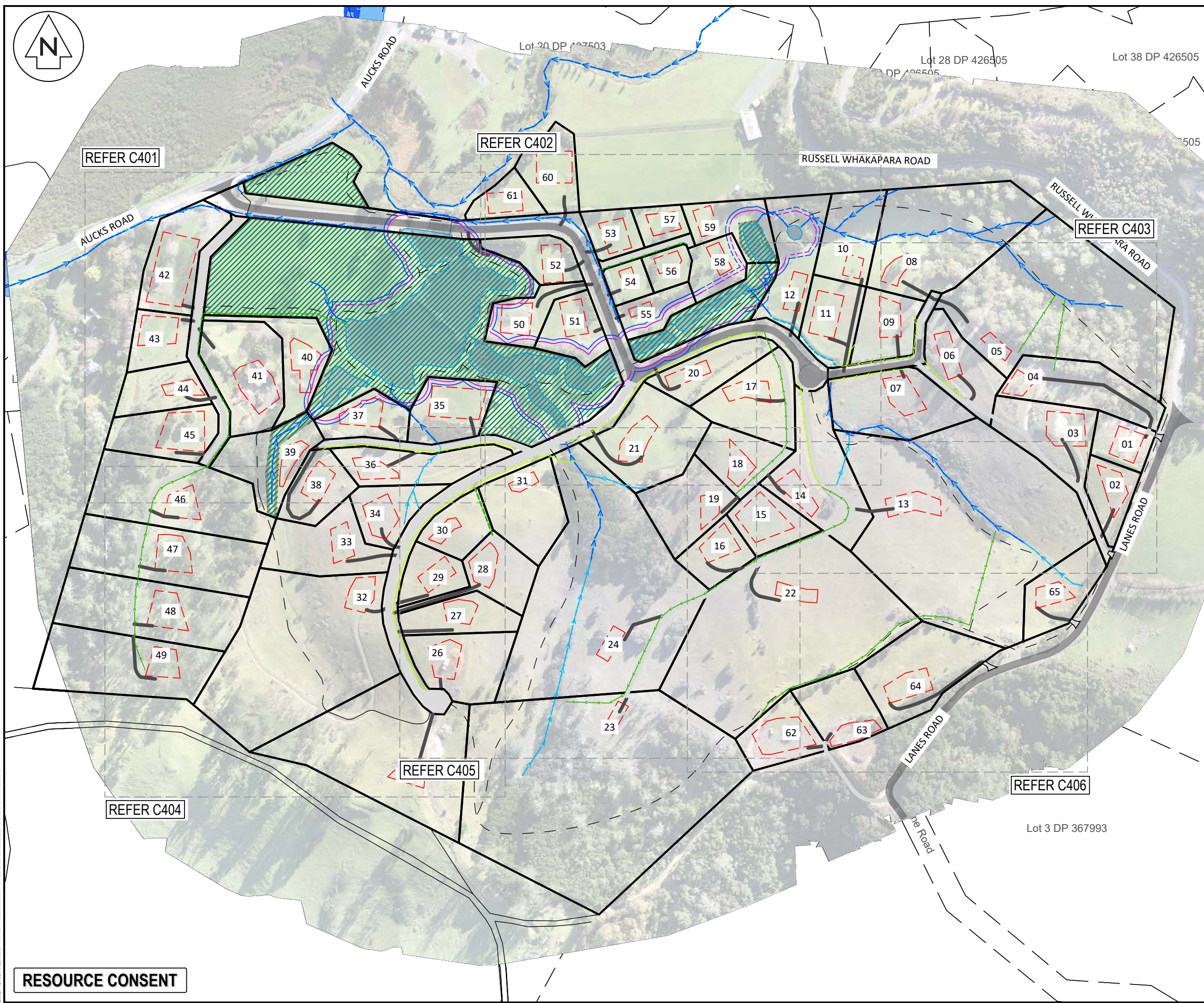
A	RESOURCE CONSENT	AO	09/2024
Rev	Description	By	Date
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 STORMWATER
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:3000 @ A3
Cad file	C400-STORMWATER.DWG
Drawing no.	C400
Rev	A



DATE: 10/1/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C400-STORMWATER.DWG

RESOURCE CONSENT



THE PROPOSED 2 x 25,000L STORMWATER TANK WILL BE USED FOR WATER SUPPLY WITH A SUITABLE PUMP CHAMBER. LOCATION TO CONFIRMED AT BUILDING CONSENT STAGE. STORMWATER AND TANK OVERFLOW WILL BE DIRECTED TO THE EXISTING FLOWPATH (UNLESS OTHERWISE SPECIFIED) VIA AN ADEQUATE DISPERSAL SYSTEM.

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING, 10 - 20% WEAK CONCRETE BEDDING GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
 5. EACH CONNECTION SHALL BE MARKED BY A 50MMx50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
 6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
 7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
 8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
 9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
 11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

- LEGEND
- EX BDY (Solid black line)
 - PROP BDY (Dashed black line)
 - EX INTERMITTENT STEAM (Blue line with arrows)
 - EX OLFP (Blue line with arrows)
 - EX WATERCOURSE (Yellow line with arrows)
 - PR WATERCOURSE (Green line with arrows)

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		07/2024

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Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED STORMWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C400-STORMWATER.DWG
Drawing no.	C401
Rev	A

ALL SWALES TO BE 1.2 BATTERY-CHW INEL UNLESS NOTED OTHERWISE

SWALE	TOP WIDTH (m)	DEPTH (m)
1	1.10	0.55
2	1.30	0.75
3	0.80	0.40
4	0.65	0.33
5	0.95	0.45
6	1.10	0.55
7	0.80	0.40
8	0.95	0.45
9	1.45	0.73
10	0.90	0.30
11	1.80	0.80
12	0.65	0.33

LOT 44-49 STORMWATER DISCHARGE TO THE PROPOSED ROADSIDE DISH DRAIN

AUCKS ROAD

RESOURCE CONSENT

DATE: 10/1/24 FILE PATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C400-STORMWATER.DWG



THE PROPOSED 2 x 25,000L STORMWATER TANK WILL BE USED FOR WATER SUPPLY WITH A SUITABLE PUMP CHAMBER. LOCATION TO CONFIRMED AT BUILDING CONSENT STAGE. STORMWATER AND TANK OVERFLOW WILL BE DIRECTED TO THE EXISTING FLOWPATH(UNLESS OTHERWISE SPECIFIED) VIA AN ADEQUATE DISPERSAL SYSTEM.

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
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 5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
 6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
 7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICED AREAS.
 8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
 9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
 11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.
- LEGEND
- EX BDY (Solid black line)
 - PROP BDY (Dashed black line)
 - EX INTERMITTENT STEAM (Blue line with arrows)
 - EX OLFP (Light blue line with arrows)
 - EX WATERCOURSE (Yellow line with arrows)
 - PR WATERCOURSE (Green line with arrows)

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024

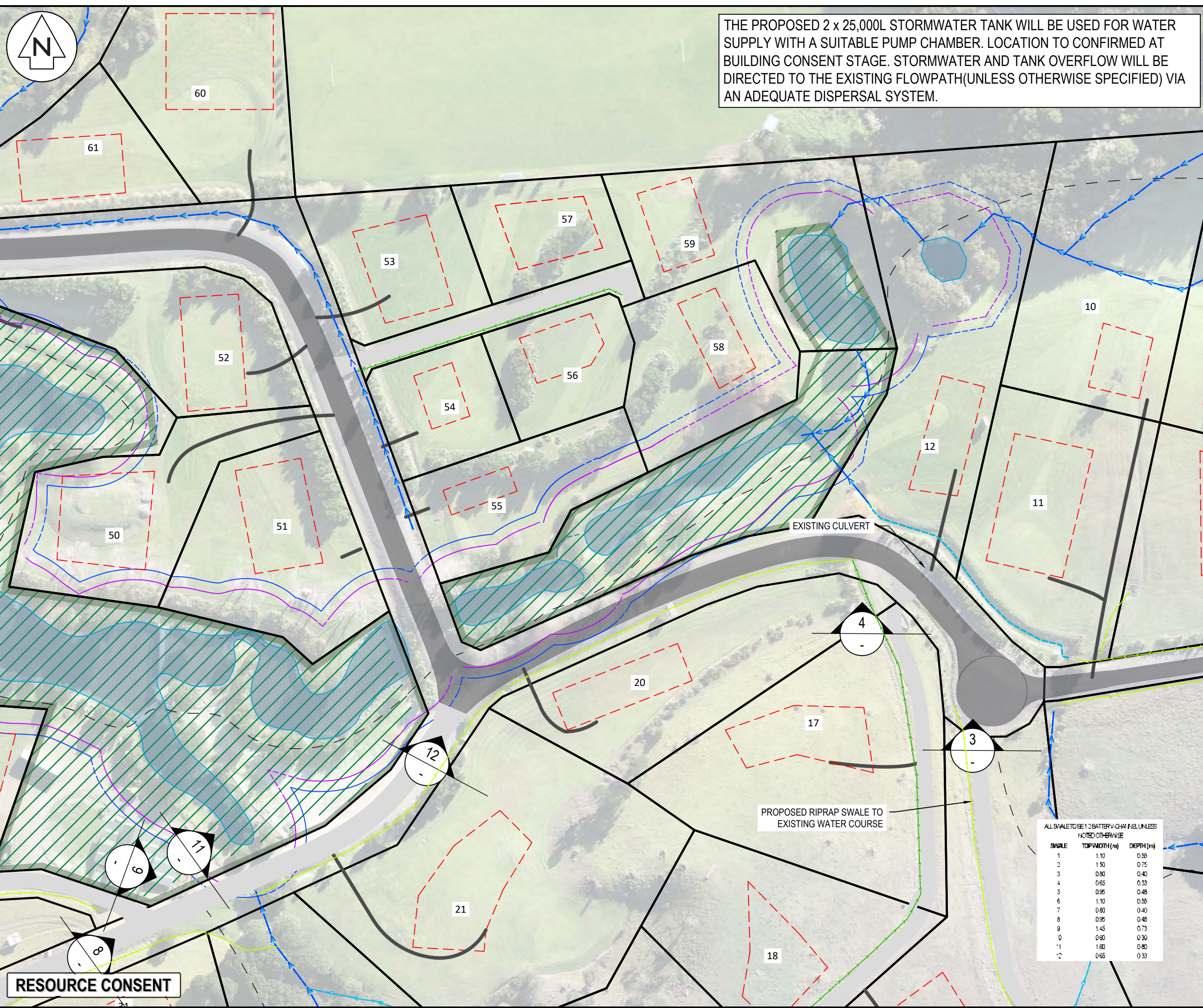
Survey	MAVEN	Date	06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 STORMWATER
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C400-STORMWATER.DWG
Drawing no.	C402
Rev	A

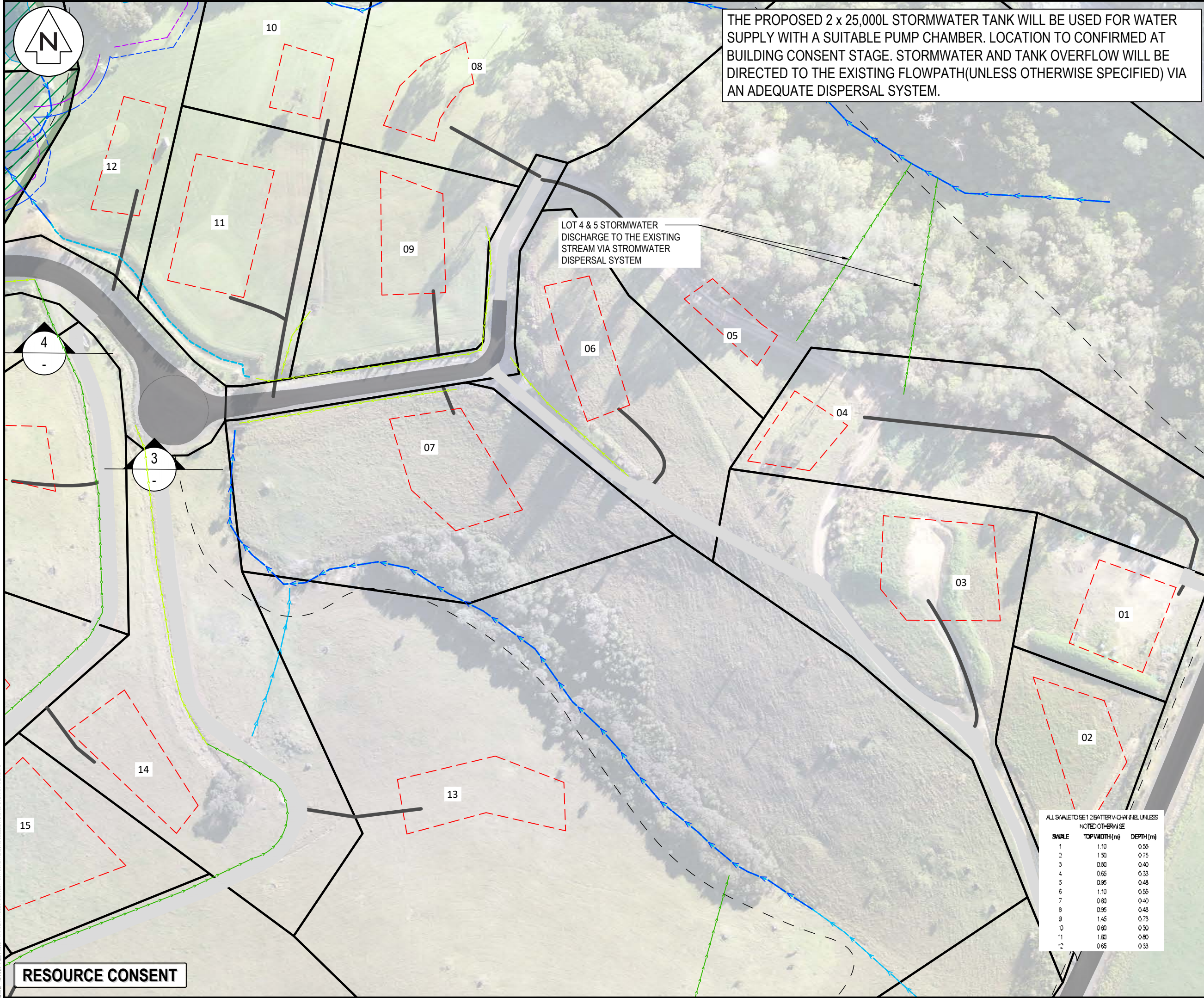


ALL SWALES TO BE 1:2 BATTERY CHAIN UNLESS NOTED OTHERWISE

SWALE	TOP WIDTH (m)	DEPTH (m)
1	1.10	0.55
2	1.30	0.75
3	0.80	0.40
4	0.65	0.33
5	0.95	0.45
6	1.10	0.55
7	0.80	0.40
8	0.95	0.45
9	1.45	0.73
10	0.60	0.30
11	1.80	0.80
12	0.65	0.33

RESOURCE CONSENT

DATE: 10/1/24 FILE PATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD - RUSSELL\DWG\309001-STORMWATER.DWG



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
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 5. EACH CONNECTION SHALL BE MARKED BY A 50MMx50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
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 9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
 11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.
- LEGEND
- EX BDY
 - PROP BDY
 - EX INTERMITTENT STEAM
 - EX OLFP
 - EX WATERCOURSE
 - PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		07/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 STORMWATER
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C400-STORMWATER.DWG
Drawing no.	C403
Rev	A

ALL S/WALE TO BE 1200mm x 1200mm UNLESS NOTED OTHERWISE

S/WALE	TOP WIDTH (m)	DEPTH (m)
1	1.10	0.55
2	1.30	0.75
3	0.80	0.40
4	0.65	0.33
5	0.95	0.45
6	1.10	0.55
7	0.80	0.40
8	0.95	0.45
9	1.45	0.73
10	0.90	0.30
11	1.80	0.80
12	0.65	0.33

RESOURCE CONSENT

DATE: 10/1/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C400-STORMWATER.DWG



THE PROPOSED 2 x 25,000L STORMWATER TANK WILL BE USED FOR WATER SUPPLY WITH A SUITABLE PUMP CHAMBER. LOCATION TO CONFIRMED AT BUILDING CONSENT STAGE. STORMWATER AND TANK OVERFLOW WILL BE DIRECTED TO THE EXISTING FLOWPATH(UNLESS OTHERWISE SPECIFIED) VIA AN ADEQUATE DISPERSAL SYSTEM.

LOT 44-49 STORMWATER DISCHARGE TO THE PROPOSED ROADSIDE DISH DRAIN

PROPOSED PRIVATE DN100 STORMWATER LINE FOR LOT 28 TO ROAD SWALE

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING, 10 - 20% WEAK CONCRETE BEDDING GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
 5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
 6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
 7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
 8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
 9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
 11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

- LEGEND
- EX BDY (Solid black line)
 - PROP BDY (Dashed black line)
 - EX INTERMITTENT STEAM (Blue line with arrows)
 - EX OLFP (Blue line with arrows)
 - EX WATERCOURSE (Yellow line with arrows)
 - PR WATERCOURSE (Green line with arrows)

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		07/2024

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Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED STORMWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C400-STORMWATER.DWG
Drawing no.	C404
Rev	A

ALL SWALES TO BE 1.2 BATTERY CHW IN EL UNLESS NOTED OTHERWISE

SWALE	TOP WIDTH (m)	DEPTH (m)
1	1.10	0.55
2	1.30	0.75
3	0.80	0.40
4	0.65	0.33
5	0.95	0.45
6	1.10	0.55
7	0.80	0.40
8	0.95	0.45
9	1.45	0.73
10	0.90	0.30
11	1.80	0.80
12	0.65	0.33

DATE: 10/1/24 FILE PATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C400-STORMWATER.DWG

RESOURCE CONSENT



THE PROPOSED 2 x 25,000L STORMWATER TANK WILL BE USED FOR WATER SUPPLY WITH A SUITABLE PUMP CHAMBER. LOCATION TO CONFIRMED AT BUILDING CONSENT STAGE. STORMWATER AND TANK OVERFLOW WILL BE DIRECTED TO THE EXISTING FLOWPATH (UNLESS OTHERWISE SPECIFIED) VIA AN ADEQUATE DISPERSAL SYSTEM.

LOT 18 & 19 STORMWATER DISCHARGE TO THE PROPOSED ROADSIDE DISH DRAIN

LOT 28 STORMWATER DISCHARGE TO THE PROPOSED ROADSIDE DISH DRAIN VIA PROPOSED NEW STORMWATER LINE

LOT 26 & 27 STORMWATER DISCHARGE TO THE PROPOSED ROADSIDE DISH DRAIN

RODSIDE SWALE DRAIN DISCHARGE TO EXISTING WATER COURSE

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING, 10 - 20% WEAK CONCRETE BEDDING GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
 5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
 6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
 7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
 8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
 9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
 11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

LEGEND

	EX BDY
	PROP BDY
	EX INTERMITTENT STEAM
	EX OLFP
	EX WATERCOURSE
	PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		07/2024

Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED STORMWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C400-STORMWATER.DWG
Drawing no.	C405
Rev	A

ALL SWALE TO BE 1.2 BATTERY CHV INEL UNLESS NOTED OTHERWISE

SWALE	TOP WIDTH (m)	DEPTH (m)
1	1.10	0.55
2	1.30	0.75
3	0.80	0.40
4	0.65	0.33
5	0.95	0.45
6	1.10	0.55
7	0.80	0.40
8	0.95	0.45
9	1.45	0.73
10	0.60	0.30
11	1.80	0.80
12	0.65	0.33

DATE: 10/1/24 FILE PATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C400-STORMWATER.DWG

RESOURCE CONSENT



THE PROPOSED 2 x 25,000L STORMWATER TANK WILL BE USED FOR WATER SUPPLY WITH A SUITABLE PUMP CHAMBER. LOCATION TO CONFIRMED AT BUILDING CONSENT STAGE. STORMWATER AND TANK OVERFLOW WILL BE DIRECTED TO THE EXISTING FLOWPATH (UNLESS OTHERWISE SPECIFIED) VIA AN ADEQUATE DISPERSAL SYSTEM.

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING, 10 - 20% WEAK CONCRETE BEDDING GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
 5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
 6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
 7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
 8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
 9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
 10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
 11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

LEGEND

	EX BDY
	PROP BDY
	EX INTERMITTENT STEAM
	EX OLFP
	EX WATERCOURSE
	PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		07/2024

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 Auckland 1023

Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 STORMWATER
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C400-STORMWATER.DWG
Drawing no.	C406
Rev	A

ALL SWALES TO BE 1:2 BATTERY CHW IN EL UNLESS NOTED OTHERWISE

SWALE	TOP WIDTH (m)	DEPTH (m)
1	1.10	0.55
2	1.50	0.75
3	0.80	0.40
4	0.65	0.33
5	0.95	0.45
6	1.10	0.55
7	0.80	0.40
8	0.95	0.45
9	1.45	0.73
10	0.60	0.30
11	1.80	0.80
12	0.65	0.33

PROPOSED NEW RIPRAP SWAL DRAIN TO EXISTING WATER COURSE

LOT 62, 63 & 64 STORMWATER DISCHARGE TO THE PROPOSED ROADSIDE DISH DRAIN

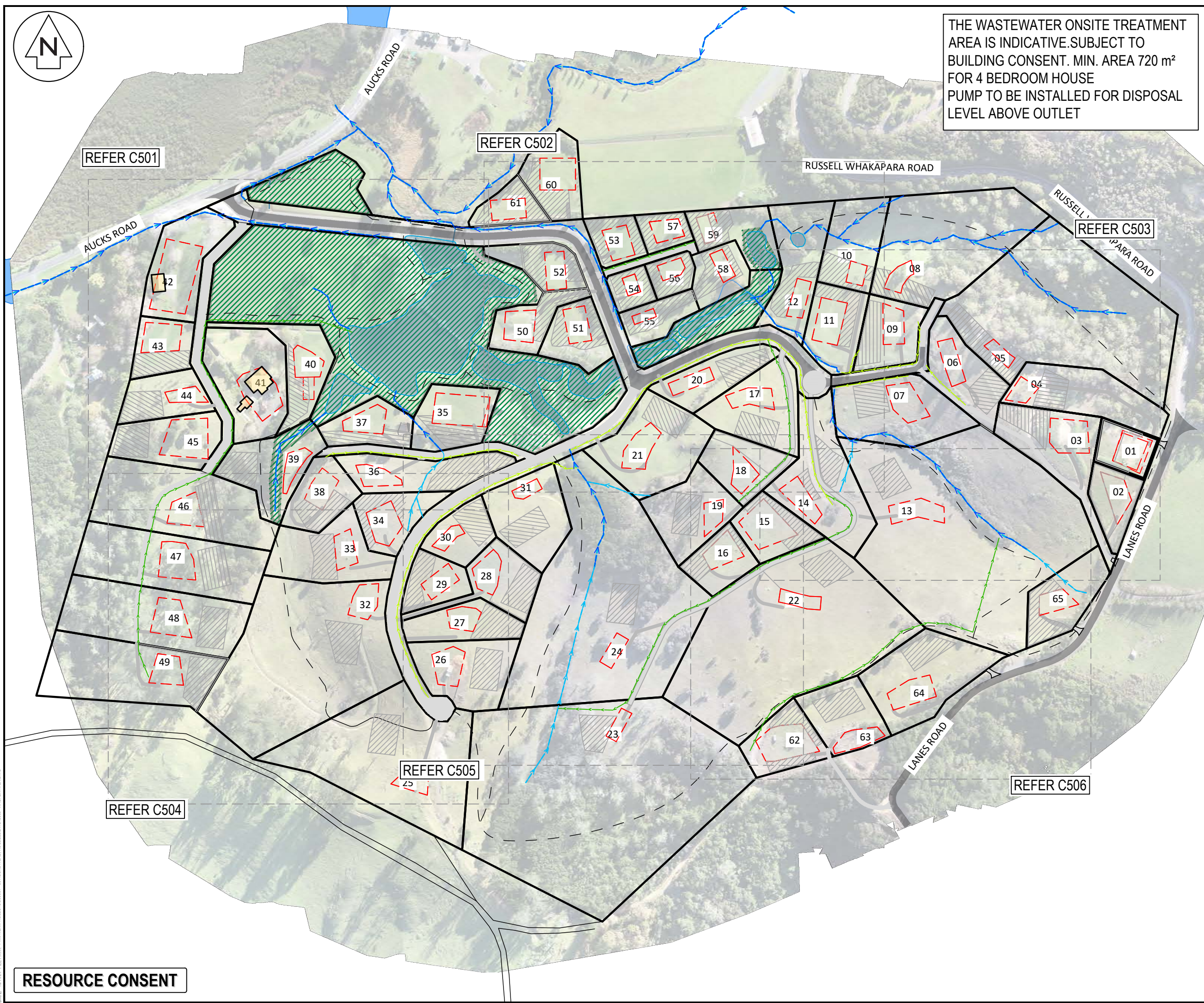
RESOURCE CONSENT

DATE: 10/1/24 FILEPATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\C400-STORMWATER.DWG



THE WASTEWATER ONSITE TREATMENT AREA IS INDICATIVE. SUBJECT TO BUILDING CONSENT. MIN. AREA 720 m² FOR 4 BEDROOM HOUSE PUMP TO BE INSTALLED FOR DISPOSAL LEVEL ABOVE OUTLET

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PUMP TO BE INSTALLED WHEN WW DISPOSAL LEVEL IS HIGHER WW DISCHARGE LEVEL



LEGEND

- EX BDY
- PROP BDY
- INDICATIVE PROPOSED WASTEWATER ONSITE TREATMENT AREA
- EX INTERMITTENT STREAM
- EX OLFP
- EX WATERCOURSE
- PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		09/2024

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Project
**PROPOSED SUBDIVISION
 OF 39 AUCKS ROAD
 RUSSELL
 FOR
 WILLOWRIDGE DEV. LTD.**

Title
**PROPOSED
 WASTEWATER
 PLAN**

Project no.	309001 - WILLOWRIDGE
Scale	1:3000 @ A3
Cad file	C500- WASTEWATER.DWG
Drawing no.	C500
Rev	A

RESOURCE CONSENT

DATE: 10/1/24 FILEPATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\020 - WASTEWATER.DWG

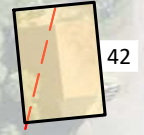


THE WASTEWATER ONSITE TREATMENT AREA IS INDICATIVE. SUBJECT TO BUILDING CONSENT. MIN. AREA 720 m² FOR 4 BEDROOM HOUSE PUMP TO BE INSTALLED FOR DISPOSAL LEVEL ABOVE OUTLET

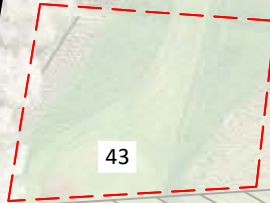
- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PUMP TO BE INSTALLED WHEN WW DISPOSAL LEVEL IS HIGHER WW DISCHARGE LEVEL

UCKS ROAD

EX BUILDING, EX DISPOSAL FIELD TO BE LOCATED AND CONFIEMD TO BE WITHIN PROPOSED LOT BOUNDARY



42



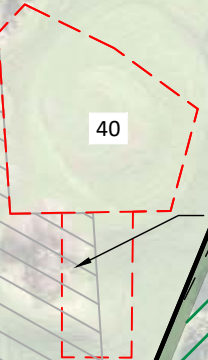
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10.42m

EX BUILDING, EX DISPOSAL FIELD TO BE LOCATED AND CONFIEMD TO BE WITHIN PROPOSED LOT BOUNDARY



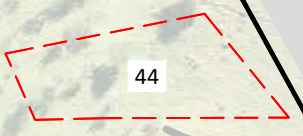
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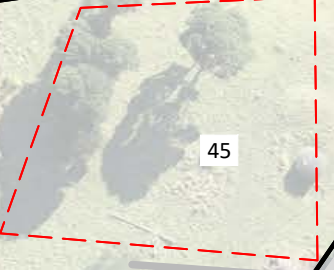
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TERTIARY WASTEWATER TREATMENT LEVEL OR ABOVE IS REQUIRED FOR LOT 40 TO SATISFY MIN 10m CLEARANCE TO STEAM

POND



44



45

5.00m

MIN 10.00m CLEARANCE

39

37

5.00m

MIN 5.00m CLEARANCE

EXISTING CULVERT

35

36

38

46

- LEGEND
- EX BDY
 - PROP BDY
 - INDICATIVE PROPOSED WASTEWATER ONSITE TREATMENT AREA
 - EX INTERMITTENT STEAM
 - EX OLFP
 - EX WATERCOURSE
 - PR WATERCOURSE

A	RESOURCE CONSENT	AO	09/2024
Rev	Description	By	Date
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		09/2024



Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED WASTEWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C500 - WASTEWATER.DWG
Drawing no.	C501
Rev	A

RESOURCE CONSENT

DATE: 10/12/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\020 - WASTEWATER.DWG



THE WASTEWATER ONSITE TREATMENT AREA IS INDICATIVE. SUBJECT TO BUILDING CONSENT. MIN. AREA 720 m² FOR 4 BEDROOM HOUSE PUMP TO BE INSTALLED FOR DISPOSAL LEVEL ABOVE OUTLET

TERTIARY WASTEWATER TREATMENT LEVEL OR ABOVE IS REQUIRED FOR LOT 60 & 61 TO SATISFY MIN 10m CLEARANCE TO STEAM

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PUMP TO BE INSTALLED WHEN WW DISPOSAL LEVEL IS HIGHER WW DISCHARGE LEVEL

- LEGEND
- EX BDY
 - PROP BDY
 - INDICATIVE PROPOSED WASTEWATER ONSITE TREATMENT AREA
 - EX INTERMITTENT STEAM
 - EX OLFP
 - EX WATERCOURSE
 - PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		09/2024

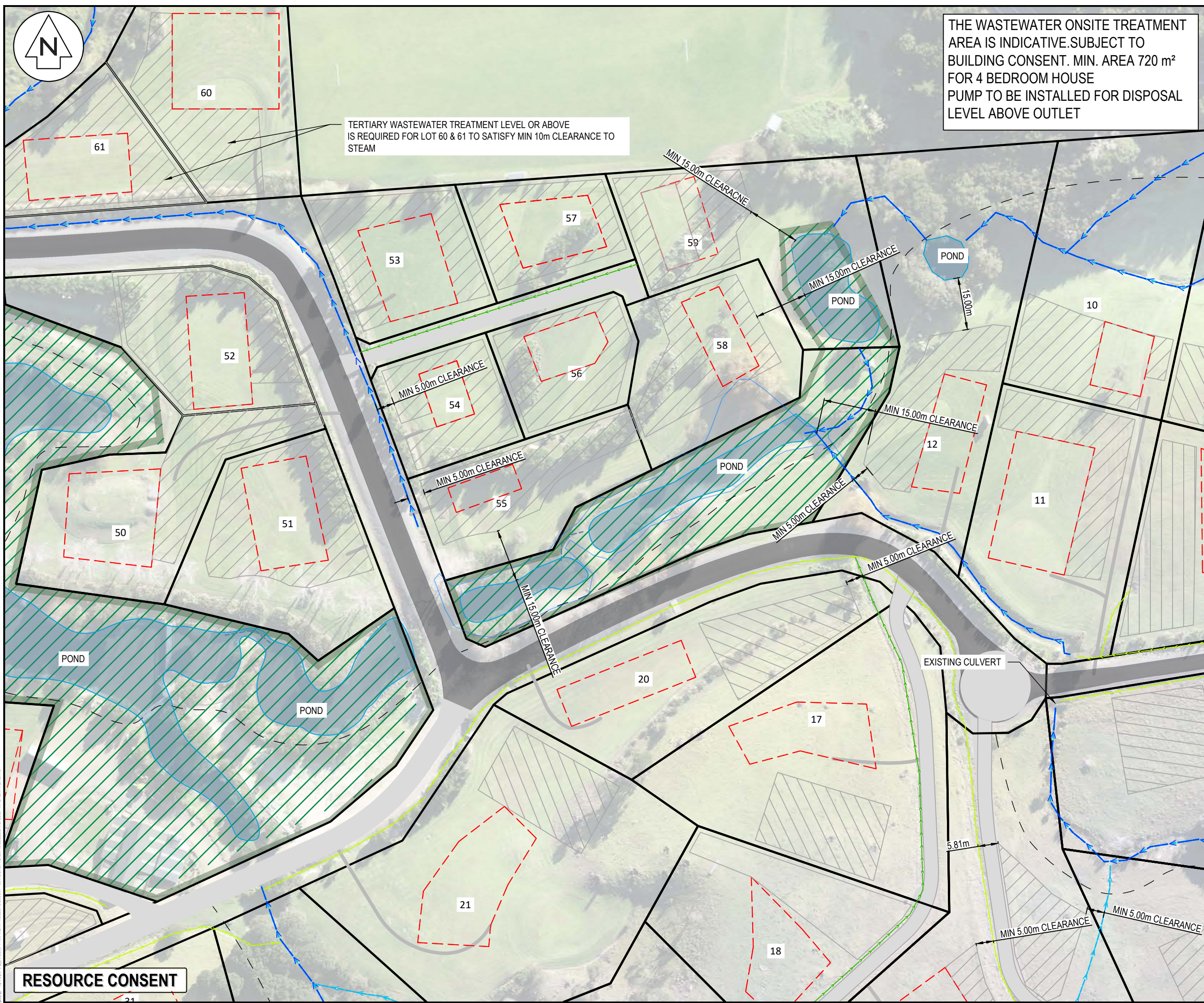
Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED WASTEWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C500- WASTEWATER.DWG
Drawing no.	C502
Rev	A

DATE: 10/1/24 FILEPATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\020- WASTEWATER.DWG

RESOURCE CONSENT





THE WASTEWATER ONSITE TREATMENT AREA IS INDICATIVE. SUBJECT TO BUILDING CONSENT. MIN. AREA 720 m² FOR 4 BEDROOM HOUSE PUMP TO BE INSTALLED FOR DISPOSAL LEVEL ABOVE OUTLET

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH FNDC STANDARDS.
 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
 4. PUMP TO BE INSTALLED WHEN WW DISPOSAL LEVEL IS HIGHER WW DISCHARGE LEVEL

- LEGEND
- EX BDY
 - PROP BDY
 - INDICATIVE PROPOSED WASTEWATER ONSITE TREATMENT AREA
 - EX INTERMITTENT STEAM
 - EX OLFP
 - EX WATERCOURSE
 - PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		09/2024

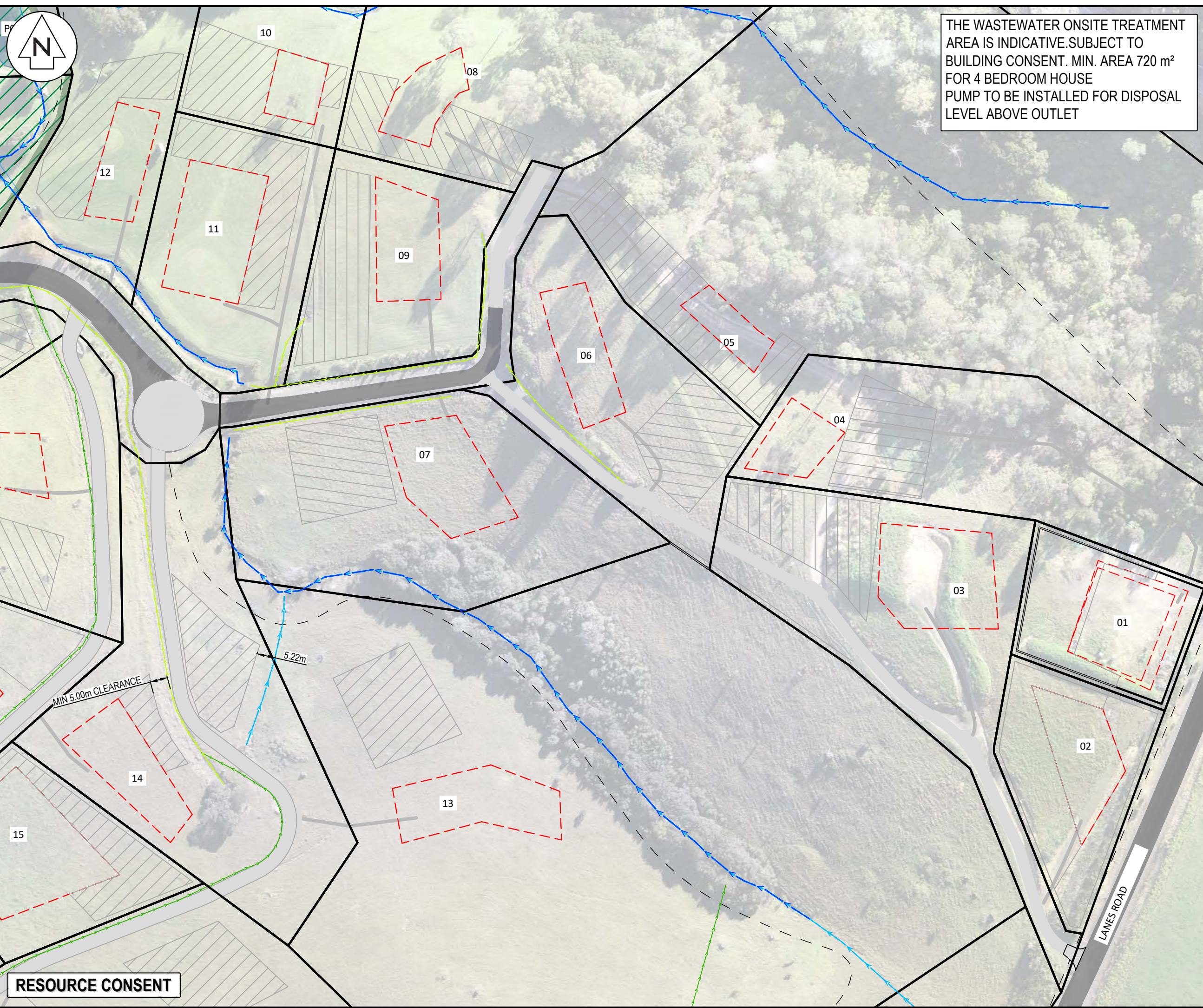
Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED WASTEWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C500 - WASTEWATER.DWG
Drawing no.	C503
Rev	A

DATE: 10/1/24 FILE PATH: F:\Maven\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\020 - WASTEWATER.DWG

RESOURCE CONSENT





THE WASTEWATER ONSITE TREATMENT AREA IS INDICATIVE. SUBJECT TO BUILDING CONSENT. MIN. AREA 720 m² FOR 4 BEDROOM HOUSE PUMP TO BE INSTALLED FOR DISPOSAL LEVEL ABOVE OUTLET

- NOTES
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 4. PUMP TO BE INSTALLED WHEN WW DISPOSAL LEVEL IS HIGHER WW DISCHARGE LEVEL

- LEGEND
- EX BDY
 - PROP BDY
 - INDICATIVE PROPOSED WASTEWATER ONSITE TREATMENT AREA
 - EX INTERMITTENT STEAM
 - EX OLFP
 - EX WATERCOURSE
 - PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		09/2024

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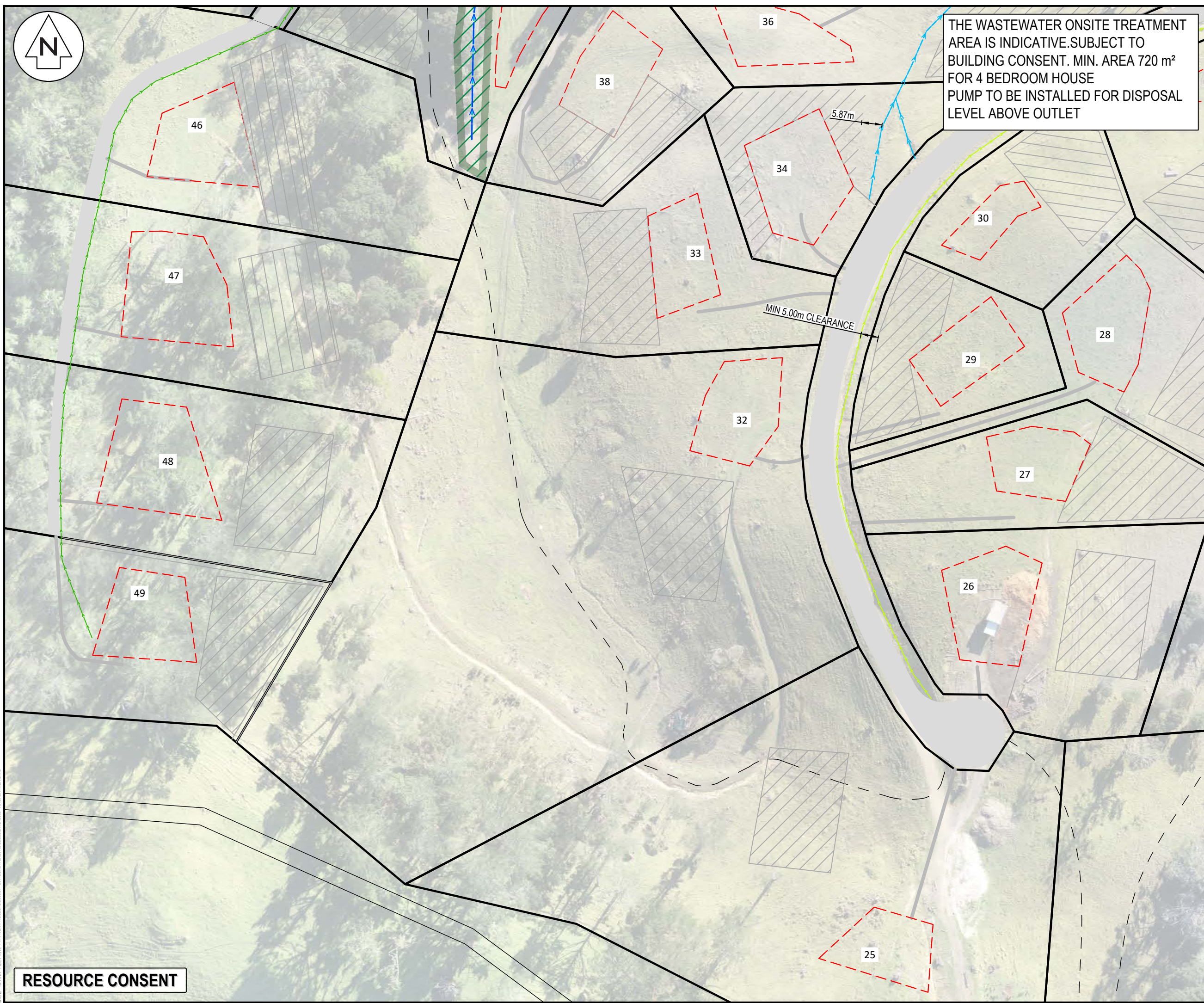
Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED WASTEWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C500- WASTEWATER.DWG
Drawing no.	C504
Rev	A

DATE: 10/1/24 FILE PATH: F:\M\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\050 - WASTEWATER.DWG

RESOURCE CONSENT





THE WASTEWATER ONSITE TREATMENT AREA IS INDICATIVE. SUBJECT TO BUILDING CONSENT. MIN. AREA 720 m² FOR 4 BEDROOM HOUSE PUMP TO BE INSTALLED FOR DISPOSAL LEVEL ABOVE OUTLET

- NOTES
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 4. PUMP TO BE INSTALLED WHEN WW DISPOSAL LEVEL IS HIGHER WW DISCHARGE LEVEL

- LEGEND
- EX BDY
 - PROP BDY
 - INDICATIVE PROPOSED WASTEWATER ONSITE TREATMENT AREA
 - EX INTERMITTENT STEAM
 - EX OLFP
 - EX WATERCOURSE
 - PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		09/2024

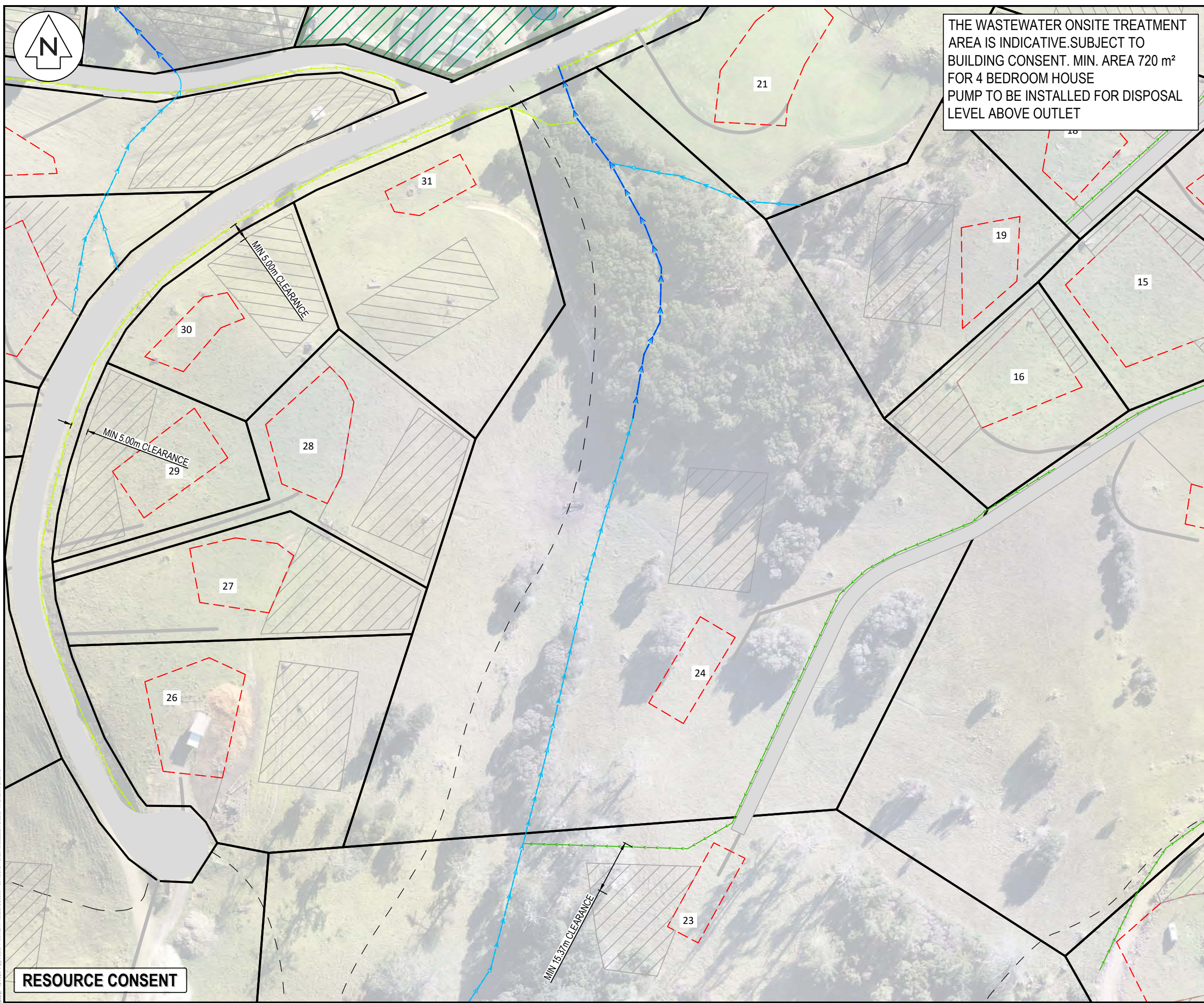
Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED WASTEWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C500 - WASTEWATER.DWG
Drawing no.	C505
Rev	A

DATE: 10/1/24 FILE PATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\050 - WASTEWATER.DWG

RESOURCE CONSENT





THE WASTEWATER ONSITE TREATMENT AREA IS INDICATIVE. SUBJECT TO BUILDING CONSENT. MIN. AREA 720 m² FOR 4 BEDROOM HOUSE PUMP TO BE INSTALLED FOR DISPOSAL LEVEL ABOVE OUTLET

- NOTES
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 2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
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 4. PUMP TO BE INSTALLED WHEN WW DISPOSAL LEVEL IS HIGHER WW DISCHARGE LEVEL

- LEGEND
- EX BDY
 - PROP BDY
 - INDICATIVE PROPOSED WASTEWATER ONSITE TREATMENT AREA
 - EX INTERMITTENT STEAM
 - EX OLFP
 - EX WATERCOURSE
 - PR WATERCOURSE

Rev	Description	By	Date
A	RESOURCE CONSENT	AO	09/2024
Survey	MAVEN		06/2024
Design	AO		07/2024
Drawn	TY		09/2024
Checked	TM		09/2024

Project
PROPOSED SUBDIVISION OF 39 AUCKS ROAD RUSSELL FOR WILLOWRIDGE DEV. LTD.

Title
PROPOSED WASTEWATER PLAN

Project no.	309001 - WILLOWRIDGE
Scale	1:1000 @ A3
Cad file	C500- WASTEWATER.DWG
Drawing no.	C506
Rev	A

DATE: 10/1/24 FILE PATH: F:\MVEN\PROJECTS\309001 - 39 AUCKS ROAD, RUSSELL\DWG\050 - WASTEWATER.DWG

RESOURCE CONSENT

MIN 5.00m CLEARANCE

LANES ROAD

5.56m

18

19

15

14

13

16

22

65

64

62

63

Appendix B – Engineering Calculations and Catchment



Job Title
Calc Title

39 Aucks Road, Russell
TP108 - SEDIMENT YIELD

Author
JAW

Date
10/2024

Checked
AC

Design Spreadsheet for USLE

Calc 1: Estimate of Sediment Generation (A), tonnes/ha/yr

A = R x K x LS x C x P

- Where A = Sediment Generation (tonnes/ha/ya)
- R = Rainfall Erosion Index (J/hectare)
- K = Soil Erodibility Factor (tonnes/unit of R)
- LS = Slope Length and steepness Factor
- C = Ground Cover Factor
- P = Roughness Factor

Rainfall Erosion Index

R = 0.008828 * P^{2.2} * 1.7

P = 66.568

P is the 2yr 24 hour rainfall from HIRDS for a 6 hour duration period

HIRDS 2yr = 106 mm/24hr

Therefore R = 153.99 J/ha

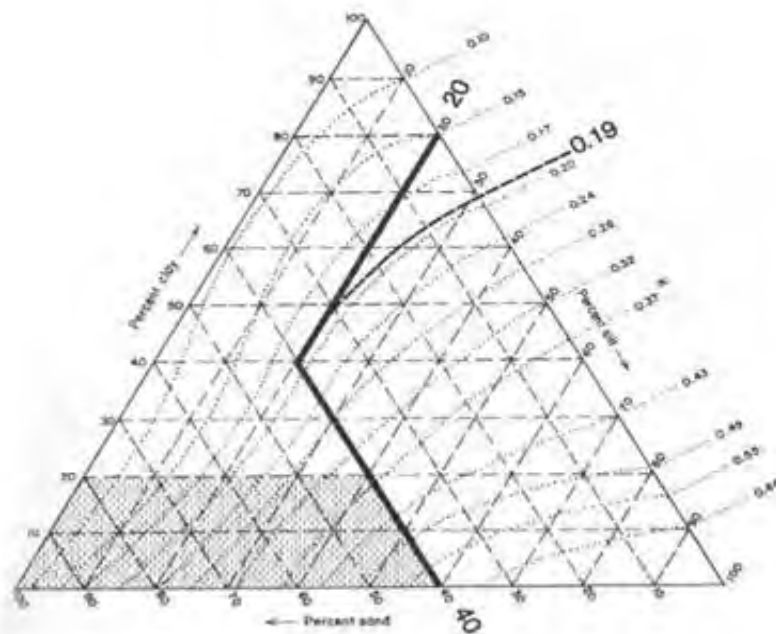


Figure 1: USLE Nomograph for Estimating k value

Soil Erodibility Factor

K = k x Organic % Factor x M-I Factor

The K factor can be determined by using the nomograph method, which requires that a particle size analysis be done to determine the percentages of sand, very fine sand, silt and clay. Use the figure above to determine appropriate K value.

Site Geology		
sand	%	0
silt	%	80
clay	%	20

Therefore from Figure 1 of USLE, k value unfactored =
k = 0.15

Organic % = 4

Therefore from Table 1 of USLE, Organic % Factor =
O%F = -0.14

Metric To Imperial Factor
M-I Factor = 1.32

Therefore **K** = **0.0132 tonnes/unit of R**

Correct for organic content using Table 1 (the nomograph assumes 2% organic matter).

Table 1

K Value	Correction factor when percent organic matter is				
	0% (clay)	1%	2%	3%	4% (topsoil)
Greater than 0.40	+ 0.14	+ 0.07	0	- 0.07	- 0.14
0.20 – 0.40	+ 0.10	+ 0.05	0	- 0.05	- 0.10
Less than 0.20	+ 0.06	+ 0.03	0	- 0.03	- 0.06

In this table, exposed clay is considered 0% organic; topsoil 4% organic. In our example, if the surface is clay, the value would be corrected by adding 0.06 to the K value of 0.19 i.e. K = 0.25

Multiply the corrected K value by 1.32 to convert from imperial to metric i.e. K = 0.33 (tonnes/unit of R)

Table 1: USLE Organic % Correction Factor

Slope Length and Steepness Factor

LS = From Appendix 1 equation

Slope Length = 454

Maximum Elevation = 36

Minimum Elevation = 4

Slope As a % = 7.05

Therefore m = 0.5

Therefore **LS** = **1.77**

Ground Cover Factor

C = 1 Assumed site as **Bare Soil**
and taking value from Table 2

Roughness Factor

P = 1.32 Assumed site as **Bare Soil**
and taking value from Table 2

Ground Cover Factor

This is the ratio of soil loss from an actual site (or parts of a site) with specific ground cover (e.g. clay, topsoil, grass) compared to a bare site (i.e. no vegetation or topsoil). The bare site is given a value of 1.0.

Roughness Factor

The P factor provides adjustment for the degree to which surface roughness affects the erosion of sediment from a site (or part of a site).

As a standard practice, it is appropriate to use the range of C and P values given in Table 2 below.

Table 2

Treatment	C factor	P factor
Bare Soil		
- compacted and smooth	1.0	1.32
- track walked on contour	1.0	1.2
- rough irregular surface	1.0	0.9
- disked to 250 mm depth	1.0	0.8
Native vegetation (undisturbed)	0.01	1.0
Pasture (undisturbed)	0.02	1.0
Establishing grass	0.1	1.0
Mulch – on subsoil ⁴	0.15 (3 month period only)	1.0
Mulch – on topsoil ³	0.05 (3 month period only)	1.0

Table 2: USLE Organic % Correction Factor

Therefore A = 4.76 tonnes/ha/yr

Estimate of Sediment yield

S (Yeild) = A x Area x SD x SCE x Duration

where A = 4.76 tonnes/ha/yr

Area = 5.9 ha

SDR = 0.5

SCM = 0.5 %

Duration = 0.5 yrs

SDR Sediment Deilvery Ratio, 0.5 for slopes < 10%, 0.7 for slopes > 10%

SCM Sediment Contro Measures (%) 50% is considered conservative

Therefore S (Yeild) = 3.511 tonnes / per 6 months

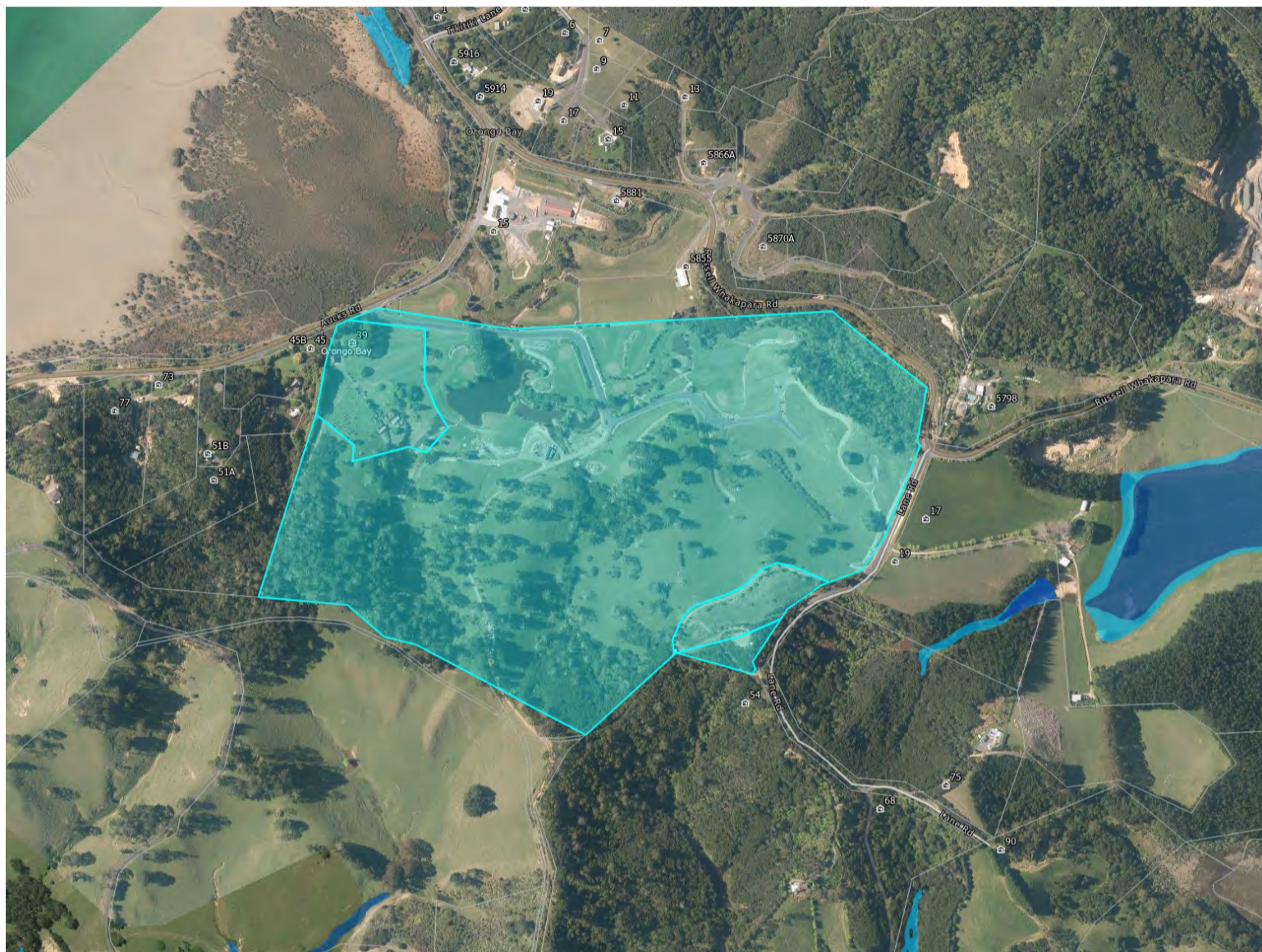
Appendix C – Coastal Flood Water Level

Wendy Ma

From: Nicole Basher <nicoleb@nrc.govt.nz>
Sent: Monday, 23 September 2024 9:52 am
To: Amanda Or
Subject: RE: Maven Associates Limited Flood Data Request 34 Aucks Road Russell 20240920
Attachments: 34 Aucks Rd - CFHZ.PNG

Hi Amanda,

The river flood modelling we (NRC) have for that area, is the regionwide model which is a high level model that covers the region. The regionwide model does not intersect any of those four parcels. See below image.



The coastal modelling does intersect a couple of those parcels I have attached a map of those. The type of model that the coastal modelling is, a bathtub model, means for each site we have static inundation levels in NZVD for each zone.

The levels for the 'Kororareka Bay' site are below:
Coastal Flood Hazard Zone 0 (Current) – 1.7 m NZVD
Coastal Flood Hazard Zone 1 (50 years) – 2.2 m NZVD
Coastal Flood Hazard Zone 2 (100 years) – 2.9 m NZVD
Coastal Flood Hazard Zone 3 (100 years + Rapid SLR Scenario) – 3.2 m NZVD

Links to information and reports on the coastal flood hazard assessments can be found via the webpage here: <https://www.nrc.govt.nz/coastalhazards>

Might still be worthwhile getting in touch with the Far North District Council to make sure they don't hold any other info, in regards to stormwater, inhouse that might be of use to you.

Our modelling disclaimers are linked below:

[Coastal Flood Hazard Disclaimer](#)
[River Flood Map Disclaimer](#)

Kind regards,

Ngā mihi

Nicole Basher
Rivers and Natural Hazards Officer
Northland Regional Council » Te Kaunihera ā rohe o Te Taitokerau

M 0272162199
P 09 470 1210 | EXT 9240



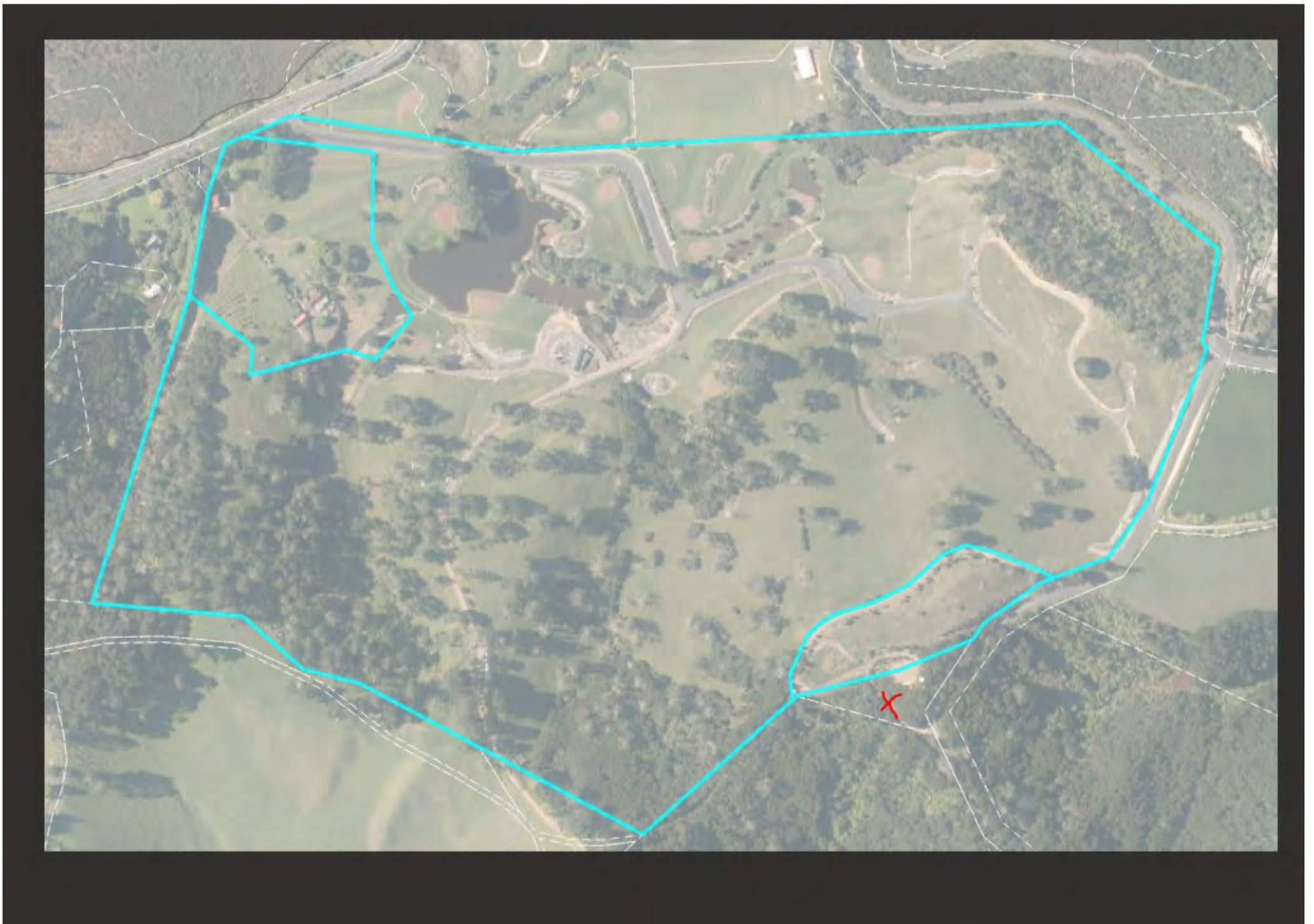


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From: Amanda Or <amandao@maven.co.nz>
Sent: Monday, September 23, 2024 9:26 AM
To: Nicole Basher <nicoleb@nrc.govt.nz>
Subject: Re: Maven Associates Limited Flood Data Request 34 Aucks Road Russell 20240920

Hi Nicole

Can you please include the red asterisk lot?
I must have missed it when i listed the lots (probably why there was a double up)



Kind regards
Amanda

Amanda Or
SENIOR ENGINEER
BE (Civil), MEngNZ



MAVEN ASSOCIATES LIMITED
09 242 2713 | 027 216 7444
amandao@maven.co.nz
www.maven.co.nz
Level 1, 5 Owens Road, Epsom

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From: Nicole Basher <nicoleb@nrc.govt.nz>
Sent: Monday, 23 September 2024 9:23 am
To: Amanda Or <amandao@maven.co.nz>
Subject: RE: Maven Associates Limited Flood Data Request 34 Aucks Road Russell 20240920

Hi Amanda,

Thanks for that, most helpful.
So, the below selected three parcels? As Lot 1 DP 542129 was listed twice.



Ngā mihi

Nicole Basher
Rivers and Natural Hazards Officer
Northland Regional Council » Te Kaunihera ā rohe o Te Taitokerau

M 0272162199
P 09 470 1210 | EXT 9240



P 0800 002 004 » W www.nrc.govt.nz



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From: Amanda Or <amandao@maven.co.nz>
Sent: Monday, September 23, 2024 9:15 AM
To: Nicole Basher <nicoleb@nrc.govt.nz>
Subject: Re: Maven Associates Limited Flood Data Request 34 Aucks Road Russell 20240920

Hi Nicole

Lot numbers that we are interested in:

Lot 1 DP 542129
Lot 1 DP 187577
Lot 2 DP 542129
Lot 1 DP 542129

Kind regards,

Amanda

Amanda Or
SENIOR ENGINEER
BE (Civil), MEngNZ



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From: Nicole Basher <nicoleb@nrc.govt.nz>
Sent: Monday, 23 September 2024 9:00 am
To: Amanda Or <amandao@maven.co.nz>
Subject: RE: Maven Associates Limited Flood Data Request 34 Aucks Road Russell 20240920

Morning Amanda,

NRC have coastal flood modelling and river flood modelling in that area, I could provide some levels from those.

If you were after stormwater drainage modelling, then I would suggest getting in touch with the district council (FNDC) as they manage/own stormwater assets.

Do you have a lot number or another identifier I could go off of? Just to identify the property and see if any of NRC's flood modelling intersect it. When I search the address, I get the below location on the road.



Ngā mihi

Nicole Basher

Rivers and Natural Hazards Officer

Northland Regional Council » Te Kaunihera ā rohe o Te Taitokerau

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On Fri, 20 Sep 13:39 , Amanda <amandao@maven.co.nz> wrote:

Hi

I am working on a site at 34 Aucks Road, Russel.

I was wondering if we could get of hold of any stormwater modelling/flooding information in the area that Council may have?

I have downloaded the Coastal Flood Hazard Zone maps from NRC open data site.

Kind regards,

Amanda

Amanda Or
SENIOR ENGINEER
BE (Civil), MEngNZ



MAVEN ASSOCIATES LIMITED

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amandao@maven.co.nz

www.maven.co.nz



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Appendix D – Wastewater Feasibility Report

Technical Memorandum

39 Aucks Road, Russell

Wastewater Feasibility Report

Maven Associates Limited

TO: Maven Associates Limited

REF: J5962

FROM: Dylan Walton, Paul Han

DATE: 29 November 2024

INTRODUCTION

This wastewater assessment report was prepared by GWE Consulting Ltd (GWE) for Maven Associates Limited as our client. The assessment covers a proposed 65 Lot subdivision at 39 Aucks Road, Russell, Northland.

The report considers wastewater management for feasibility purposes for a potential future residential 65 Lot subdivision. The report provides a general assessment of all lots to determine the suitability for onsite wastewater treatment and land disposal.

For subdivision consent purposes it must be demonstrated that each lot can treat and dispose of wastewater on site as a permitted activity.

The recommendations in this report are based on the information received from the client. The assessment is in accordance with Northland Regional Council "Proposed Regional Plan for Northland" (NRCP) and Australian/New Zealand Standard. On-site Domestic Wastewater Management (AS/NZS 1547:2012).

PROPOSAL

The site is proposed to be subdivided to create Lots 1-65. GWE has been provided with Scheme Plan (Rev B) for Subdivision prepared by *Maven Associates Limited* dated October 2024 (Appendix A). The site is located on the eastern side of Aucks Road, with additional frontage along Russell Whakapara Road to the north and Lanes Road to the east. The property was formerly a golf course, has an undulating terrain featuring four prominent ridges sloping northward. Streams and overland flow paths run along the base of these ridges, converging into manmade pond at the north-centre of the site.

The property is located outside water and wastewater network services, and wastewater generated on each lot will need to be treated and disposed of on that lot. Water supply to each lot will be provided by roof water supply. All 65 lots will require onsite wastewater treatment and disposal. For wastewater feasibility, GWE have conservatively allowed for a 4-bedroom dwelling on each undeveloped lot (this covers additional rooms such as family, recreation, games, office,

study, sewing, work, etc which could be utilised as potential bedrooms) with an associated peak occupancy of 6 people.

DESIGN ASSUMPTIONS AND DISCHARGE DETAILS

For each future residential lot, we have assumed four potential bedrooms with an associated peak occupancy of 6 people. It should be noted that any study, office, gym or similar room within any future dwelling may be considered a 'potential bedroom'.

For feasibility studies, we assume water supply will be from onsite roof water tank supply. As per AS/NZS 1547 Table H3, 180 L per person per day (L/p/d) is designed for with standard water fixtures. Although not assumed, we recommend full water reduction fixtures to promote water conservation. Actual water usage may be lower than 180 L/p/d if water-reduction fixtures are specified at building consent stage.

If reticulated community or bore-water supply is provided, a higher design flow will need to be applied e.g. 200 L/person/day.

Table 1 outlines the assumed design flow allowance for future Lots.

Table 1: Design Flow Allowance and Assumptions

LOT	1-65 Lots
DEVELOPMENT	4-bedroom dwelling per Lot
NO. OF PERSONS	6 people per dwelling
WATER SUPPLY	Roof water tank
WATER FIXTURES	Standard Fixtures assumed*
DAILY FLOW ALLOWANCE	180 Litres/person/day
DESIGN FLOW RATE	1,080 Litres/day
OTHER NOTES	No grey-water reuse recycling proposed.

Note:

**Actual water usage may be lower than 180 l/p/d if water-reduction fixtures are specified at building consent stage. Water-reduction fixtures include dual flush toilets, shower and tap flow restrictors, aerator faucets, water-conserving/front loading washing machines, no bath*

Discharge will be domestic type wastewater. Domestic type wastewater is generated from residential kitchens, bathrooms, laundries and toilets – it does not allow for trade waste or commercial effluent.

WASTEWATER TREATMENT SYSTEM

Table 2 presents the recommended secondary wastewater treatment systems for the site. Due to site constraints, including poorly draining soils and the presence of surface water features (such as stormwater flow paths, overland flow paths, ponds, and wetlands), a minimum of advanced secondary treatment, classified as grade A treatment from the On-site Effluent Treatment National Testing Programme (OSET NTP), is advised.

Table 2: Recommended Onsite Wastewater Treatment System

WASTEWATER TREATMENT SYSTEM*	Innoflow Advantex Recirculating Packed Bed Reactor Hydrozone Pureflow Ecosystems Reflections Textile Filter
-------------------------------------	---

	Hynds Environmental Eloy Oxyfix Oasis Clearwater Waipapa Tanks Econotreat Or similar, approved wastewater treatment systems
TERTIARY TREATMENT	Davey, UV Water Systems Ltd, or similar UV unit, where required.
EFFLUENT QUALITY	BOD ₅ <20 mg/L, TSS <30 mg/L
ALARM SYSTEM	Minimum requirement - visual and audible alarm located at plant.

Note:

**All treatment systems should have anti-floatation.*

The type and capacity of the treatment plant and UV system for each site shall be based on peak flow design capacity. The peak flows for each site will be determined once architectural drawings have confirmed potential occupancy at building consent stage.

LAND DISPOSAL

On-site land disposal must comply with setback distances from key site features, as outlined in the NRCP, to qualify as a permitted activity. The design should adhere to the standards specified in AS/NZS 1547 (see Table 3). The rules governing on-site wastewater discharges are detailed in Chapter C6.1 of the Northland Regional Council's "Proposed Regional Plan for Northland" (NRCP). A critical consideration is maintaining the required separation distances from site features such as property boundaries and overland flow paths, as specified in Table 8 of the NRCP and summarized in Table 3 below:

Table 3: Setback Distances

FEATURE	PRP RULE C.6.1.3	AS/NZS 1547
Floodplain	Outside 5% AEP	-
Stormwater Flow Path	5 m	15 – 100 m
River, lake, stream, pond, dam or natural wetland	15 m	
Existing water supply bore	20 m	15 - 50 m
Groundwater table	0.6 m	0.6 - 1.5 m
Property boundary	1.5 m	1.5 - 50 m
Buildings/houses	-	2 - >6 m
Recreation areas (e.g. play areas, pools, etc)	-	3 - 15 m
In-ground water tank	-	4 - 15 m
Retaining wall, embankments, etc	-	3 m or 45°

Notes:

AEP – Annual Exceedance Probability

Land disposal should meet PRP Rules, as minimum. If the site is residentially developed, the existing water bores may need to be decommissioned, and existing OLFs/open drains diverted. Stormwater, surface water and future tank overflow should be carefully considered to minimise effects on wastewater disposal. Cut-off drains, or improved surface drainage, can be installed to prevent land disposal systems from hydraulic overloading. In addition, the land application system shall be shaped to shed rainfall.

Indicative Disposal Field Areas

The appended drawings 500, 501, 502 and 503 show indicative disposal areas on each of the 65 lots. For the assessment, efforts were made to meet the separation distances given in Table 3.

Apart from Lots 55, 57, 58, and 59, all other lots are adequately sized and positioned to facilitate on-site wastewater treatment and disposal while achieving the required separation distances outlined in Table 3. As a result, wastewater management can be conducted as a permitted activity on these lots.

Wastewater management can be conducted as a permitted activity on Lot 57 by slightly reducing the indicative building platform, which will create sufficient space for wastewater disposal. Consequently, we consider that wastewater disposal can occur as a permitted activity on this lot.

In contrast, the proximity of Lots 55, 58, and 59 to ponds, combined with the requirement that disposal areas be situated at least 15 meters away, results in insufficient space for wastewater handling on these sites to qualify as a restricted discretionary activity. The Northland Regional Council (NRC) plan does not allow for reduced separation distances even with high-level Treatment and have advised that any consent to reduce this will be assessed on an effects basis. However, Table 5.2 of the Auckland Regional Council Technical Publication 58 (TP58) indicates that reduced separation distances of 5 to 10 meters may be permissible in the Auckland Region under high-level treatment conditions (tertiary).

The underlying logic here is based on managing potential risks associated with having disposal fields closer than 15 meters to water bodies. Specifically, the concern relates to the possible transport of nutrients and microorganisms into nearby water bodies. However, if high-level treatment technologies, such as UV disinfection, are employed, the risks of microbial contamination can be significantly mitigated. However, under the current regulations, Lots 55, 58, and 59 do not meet the required separation distance from the ponds.

Therefore, we are applying for subdivision consent based on the fact that nearly all lots will comply with permitted criteria, but consent for discharge for Lots 55, 58, and 59 will be sought, and to ensure the effects are mitigated specific wastewater handling conditions in the subdivision consent will require a higher level of treatment (tertiary) for disposal fields within 15 meters of the ponds.

CONCLUSIONS

The wastewater assessment for the proposed 65-lot subdivision at 39 Aucks Road, Russell, Northland, demonstrates that onsite wastewater treatment and disposal is feasible for most of the lots. Each lot is designed to accommodate a four-bedroom dwelling with a peak occupancy of six people, utilizing roof water tank supply and standard water fixtures. Advanced secondary treatment systems are recommended due to site constraints, ensuring compliance with the Northland Regional Council's Proposed Regional Plan and AS/NZS 1547 standards.

Overall, the site has limitations for wastewater disposal, namely stormwater flow paths, and several ponds and other surface waters. However, all the subject lots (except for Lot 55, 57, 58, and 59) are capable of being developed to treat and dispose of wastewater on-site so that the separation distances to site features such as boundaries and overland flow paths as given in Table 8 of the NRC are achieved.

Subdivision consent will be supported by discharge consent for Lots 55, 58, and 59. To mitigate any receiving environment effects, specific wastewater handling conditions have been put forward in the subdivision consent. This requires a higher level (tertiary) of treatment for disposal fields located within 15 meters of the ponds, as per the accepted practice under TP58.

LIMITATIONS

This report has been prepared for the sole benefit of **Maven Associates Limited** as our Client, and their appointed representatives, according to their instructions, for the specific objectives described herein. This report is qualified in its entirety and should be considered in the light of our Terms of Engagement with the Client and the following:

- a. Data or opinions contained within the report may not be used in other contexts or for any other purpose without our prior review and written agreement. Any reliance will be at the parties' sole risk.
- b. No responsibility is assumed for inaccuracies in reporting by the information providers. In no event, regardless of whether GWE 's consent has been provided, does GWE accept any liability, whether directly or indirectly, for any liability or loss suffered or incurred by any third party to whom this report is disclosed placing any reliance on this report, in part or in full.
- c. GWE has relied on information provided by the Client and by third parties to produce this document and arrive at its conclusions. GWE has not verified information provided (unless specifically noted otherwise) and we assume no responsibility and make no representations with respect to the adequacy, accuracy, or completeness of such information.

Prepared by:



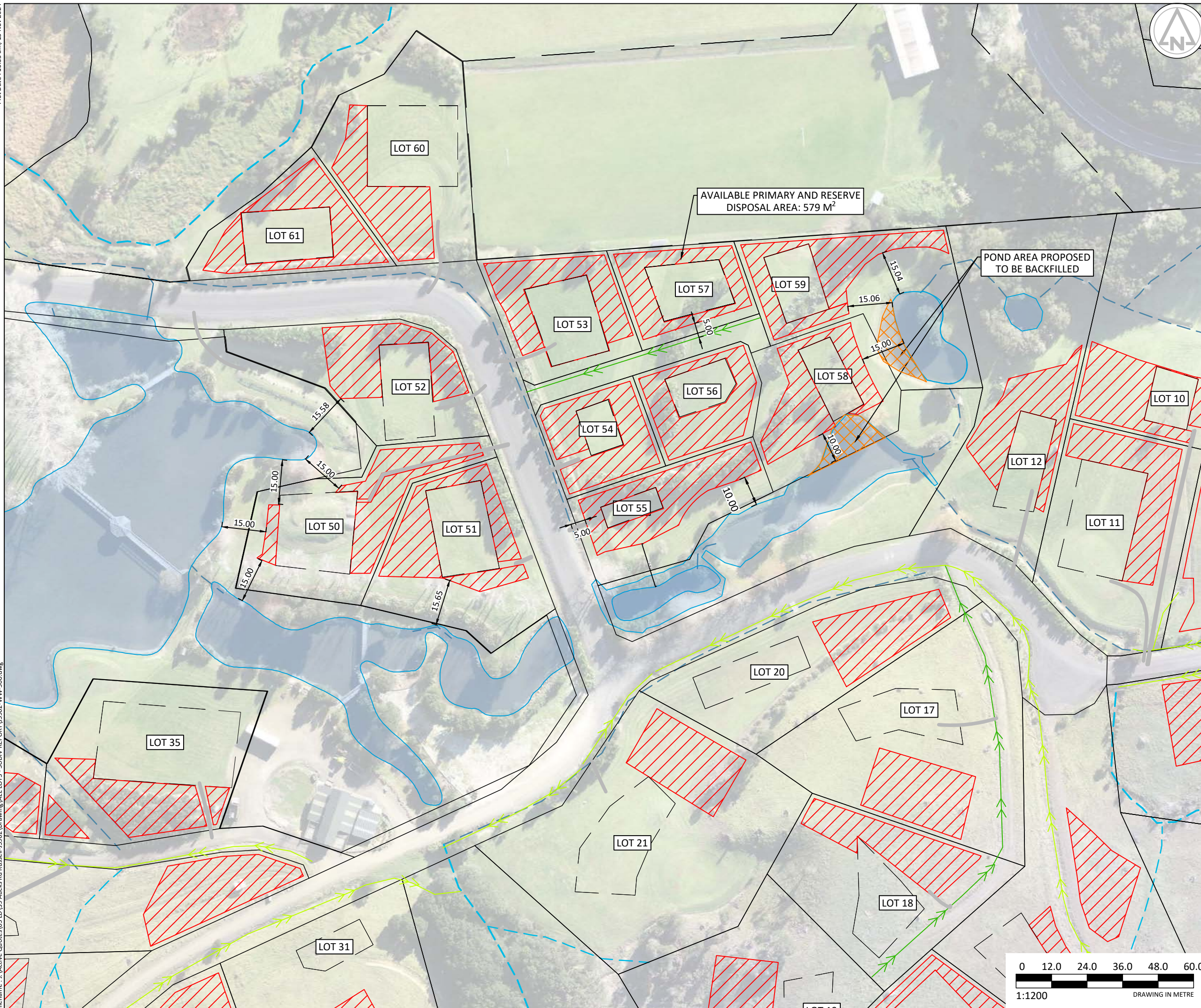
Paul Han
Graduate Engineer

Reviewed by:



Dylan Walton
Senior Wastewater Engineer

APPENDIX A: WASTEWATER SITE PLANS



NOTES:

- DRAWING IS BASED ON DATA PROPOSED EARTHWORK PLAN BY MAVEN ASSOCIATES LTD (DATED 07/2024).
- SEPARATION DISTANCES IS ALL MET:
 - SURFACE WATER (INCL. OVERLAND FLOW, STORM WATER WATERWAYS, ROADSIDE DRAINAGE): 5m
 - PONDS: 15m (10m for LOT 58 AN LOT 55)
 - LOT BOUNDARY: 1.5m
- PRIMARY AND RESERVE DISPOSAL AREA FOR ALL LOTS EXCEPT LOT 57 ARE 720 M² (360 M² PRIMARY AND 360 M² RESERVE (100%))
 - LOT 57: 579 m²

LEGEND

- OVERLAND FLOW PATH
- INDICATIVE DISPOSAL AREA (PRIMARY AND RESERVE)
- AVAILABLE DISPOSAL AREA WITH UV TREATMENT (PRIMARY AND RESERVE)
- REVISED LOT BOUNDARY
- REVISED LOT BOUNDARY
- POND AREA
- EXISTING SW WATERCOURSE
- PROPOSED SW WATERCOURSE

ISSUE STATUS:

REV	DESCRIPTION	PH	DW	DW	DATE
0	FIRST ISSUE	PH	DW	DW	16/09/24
1	AMENDMENT	CAD	ENG	APPD	DATE

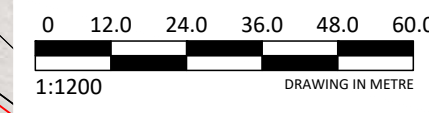
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 AUCKLAND 0622
 P: +64 9 445 8338
 www.gwe.co.nz

PROJECT ADDRESS:
39 AUCKS ROAD, RUSSELL

DRAWING TITLE:
PRELIMINARY WASTEWATER SITE PLAN - SECTION A

CLIENT NAME:
MAVEN ASSOCIATES LIMITED



SCALE: 1:1200	A3
PROJECT No: J5962	DRAWING No: 501
	REV: 0



- NOTES:**
- DRAWING IS BASED ON DATA PROPOSED EARTHWORK PLAN BY MAVEN ASSOCIATES LTD (DATED 07/2024).
 - SEPARATION DISTANCES IS ALL MET:
 - SURFACE WATER (INCL. OVERLAND FLOW, STORM WATER WATER WAYS, ROADSIDE DRAINAGE): 5m
 - PONDS: 15m
 - LOT BOUNDARY: 1.5m
 - PRIMARY AND RESERVE DISPOSAL AREA FOR ALL LOTS EXCEPT LOT 55 ARE EQUAL OR GREATER THAN 720 M² (360 M² PRIMARY AND 360 M² RESERVE (100%))
 - LOT 55: 685 m²

LEGEND

OVERLAND FLOW PATH	
INDICATIVE DISPOSAL AREA (PRIMARY AND RESERVE)	
AVAILABLE DISPOSAL AREA WITH UV TREATMENT (PRIMARY AND RESERVE)	
REVISED LOT BOUNDARY	
REVISED LOT BOUNDARY	
POND AREA	

ISSUE STATUS:

REV	AMENDMENT	PH	DW	DW	DATE
0	FIRST ISSUE	PH	DW	DW	16/09/24
		CAD	ENG	APPD	

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PROJECT ADDRESS:

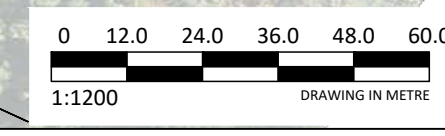
39 AUCKS ROAD, RUSSELL

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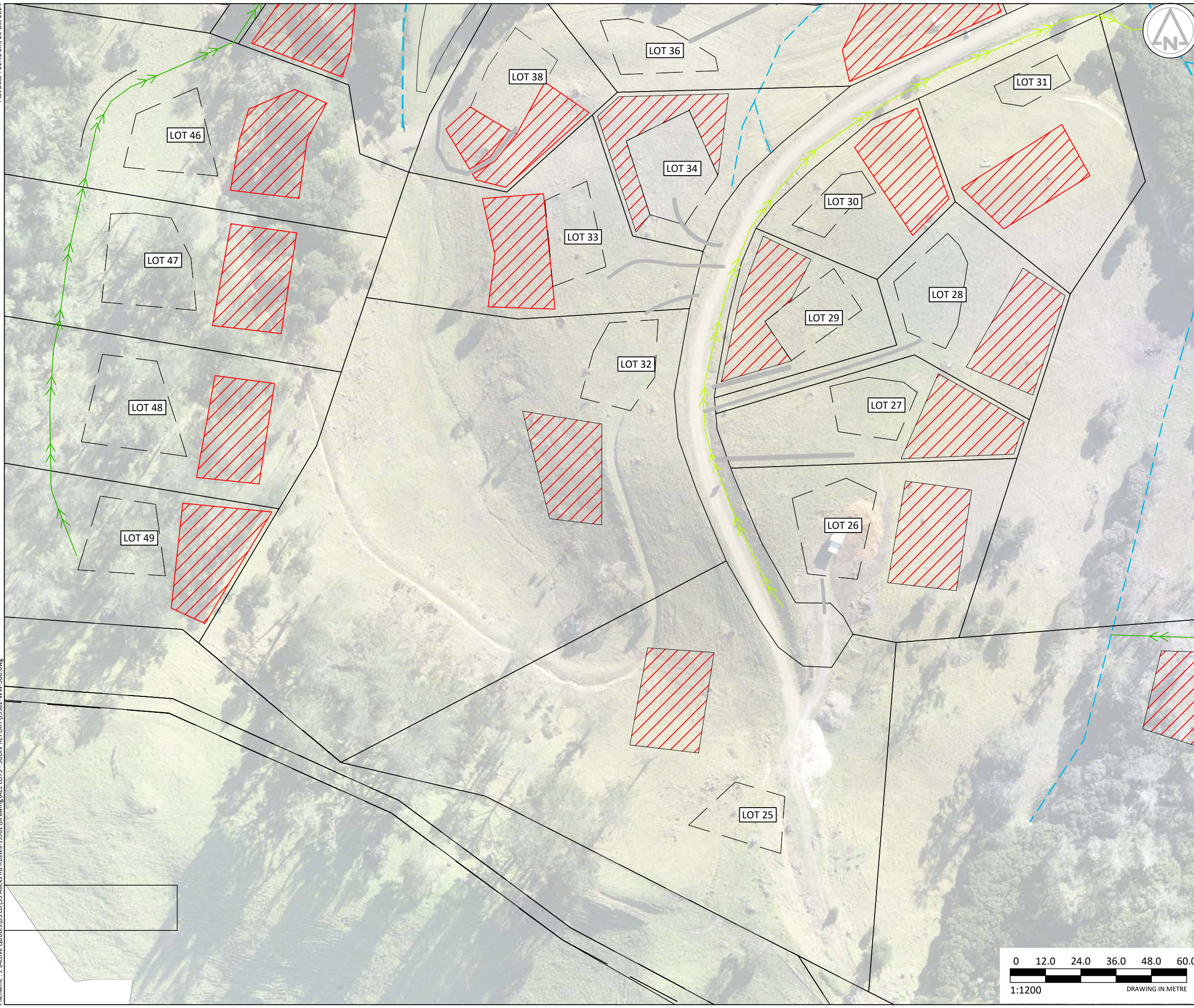
PRELIMINARY WASTEWATER SITE PLAN - SECTION B

CLIENT NAME:

MAVEN ASSOCIATES LIMITED



SCALE: 1:1200	A3
PROJECT No: J5962	DRAWING No: 501
	REV: 0



- NOTES:**
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 - PONDS: 15m
 - LOT BOUNDARY: 1.5m
 - PRIMARY AND RESERVE DISPOSAL AREA FOR ALL LOTS EXCEPT LOT 55 ARE 720 M² (360 M² PRIMARY AND 360 M² RESERVE (100%))
 - LOT 55: 685 m²

LEGEND

OVERLAND FLOW PATH	
INDICATIVE DISPOSAL AREA (PRIMARY AND RESERVE)	
AVAILABLE DISPOSAL AREA WITH UV TREATMENT (PRIMARY AND RESERVE)	
REVISED LOT BOUNDARY	
REVISED LOT BOUNDARY	
POND AREA	

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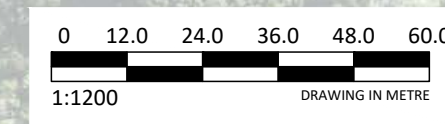
39 AUCKS ROAD, RUSSELL

DRAWING TITLE:

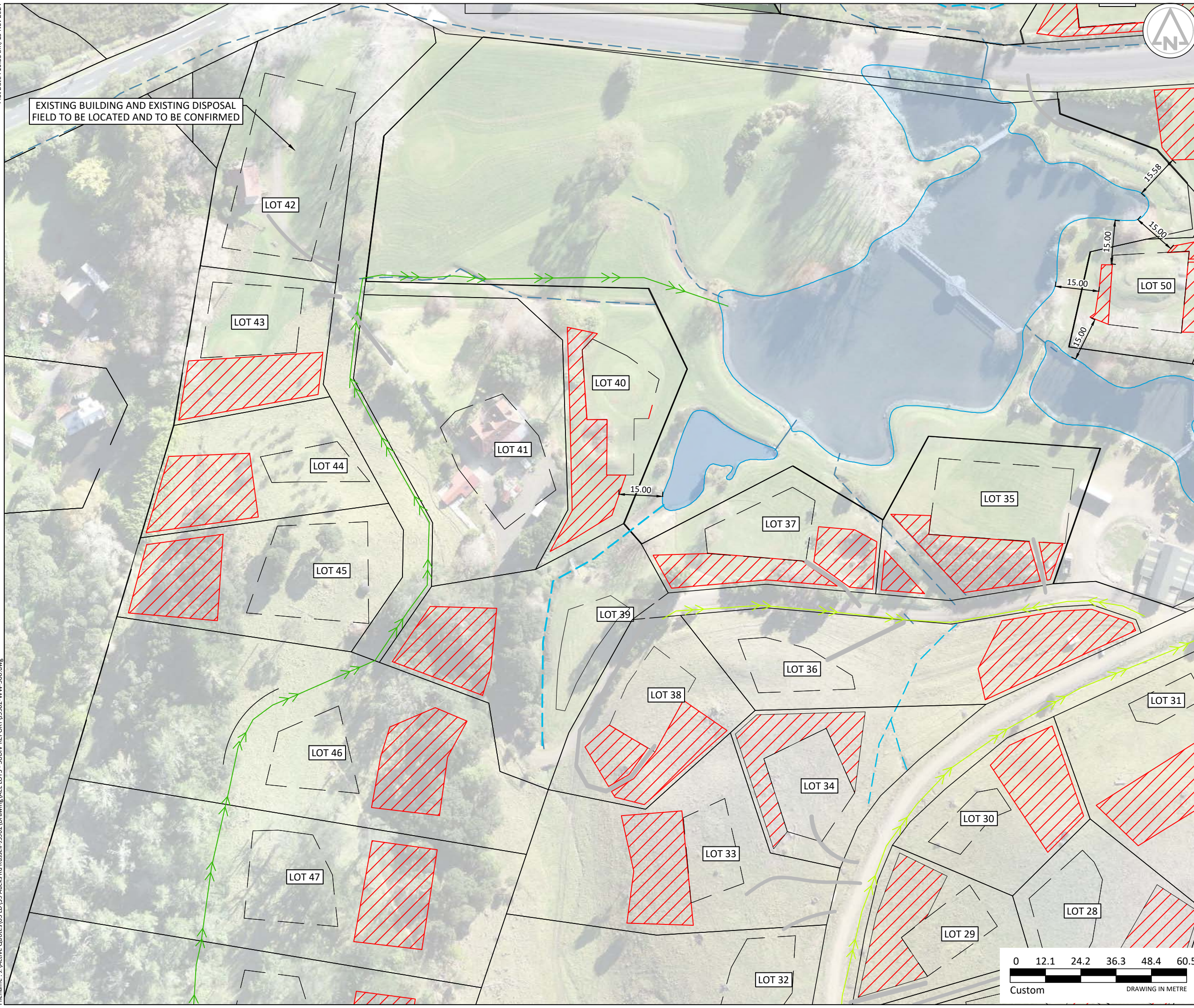
PRELIMINARY WASTEWATER SITE PLAN - SECTION C

CLIENT NAME:

MAVEN ASSOCIATES LIMITED



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PROJECT No: J5962	DRAWING No: 502
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 - LOT 55: 685 m²

LEGEND

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AVAILABLE DISPOSAL AREA WITH UV TREATMENT (PRIMARY AND RESERVE)	
REVISED LOT BOUNDARY	
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POND AREA	

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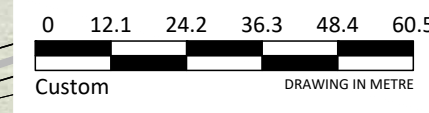
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PROJECT ADDRESS:
39 AUCKS ROAD, RUSSELL

DRAWING TITLE:
PRELIMINARY WASTEWATER SITE PLAN

CLIENT NAME:
MAVEN ASSOCIATES LIMITED



SCALE: Custom	A3
PROJECT No: J5962	DRAWING No: 501
	REV 0

Appendix E – Top Energy Supply Confirmation



Top Energy Limited

Level 2, John Butler Centre
60 Kerikeri Road
P O Box 43
Kerikeri 0245
New Zealand
PH +64 (0)9 401 5440
FAX +64 (0)9 407 0611

23 September 2024

Chris Page
Maven Associates Ltd

Email: chrisp@maven.co.nz

To Whom It May Concern:

**RE: PROPOSED SUBDIVISION
Willowridge Developments Ltd – 39 Aucks Road, Russell.
Lot 1 DP 187577, Lot 3 & 4 DP 420232 and Lot 1 & 2 DP 542129.**

Thank you for your recent correspondence with attached proposed subdivision scheme plans.

Top Energy's requirement for this subdivision is nil.

Top Energy recommends power is made available to the additional lots at the development stage and that an easement in gross in favour of Top Energy be included for the proposed accessways. Design and costs to provide a power supply would be provided after application and an on-site survey have been completed.

Link to application: [Top Energy | Top Energy](#)

In order to get a letter from Top Energy upon completion of your subdivision, a copy of the resource consent decision must be provided.

Yours sincerely

Aaron Birt
Planning and Design
T: 09 407 0685
E: aaron.birt@topenergy.co.nz

Technical Memorandum

39 Aucks Road, Russell

Wastewater Feasibility Report

Maven Associates Limited

TO: Maven Associates Limited

REF: J5962

FROM: Dylan Walton, Paul Han

DATE: 29 November 2024

INTRODUCTION

This wastewater assessment report was prepared by GWE Consulting Ltd (GWE) for Maven Associates Limited as our client. The assessment covers a proposed 65 Lot subdivision at 39 Aucks Road, Russell, Northland.

The report considers wastewater management for feasibility purposes for a potential future residential 65 Lot subdivision. The report provides a general assessment of all lots to determine the suitability for onsite wastewater treatment and land disposal.

For subdivision consent purposes it must be demonstrated that each lot can treat and dispose of wastewater on site as a permitted activity.

The recommendations in this report are based on the information received from the client. The assessment is in accordance with Northland Regional Council "Proposed Regional Plan for Northland" (NRCP) and Australian/New Zealand Standard. On-site Domestic Wastewater Management (AS/NZS 1547:2012).

PROPOSAL

The site is proposed to be subdivided to create Lots 1-65. GWE has been provided with Scheme Plan (Rev B) for Subdivision prepared by *Maven Associates Limited* dated October 2024 (Appendix A). The site is located on the eastern side of Aucks Road, with additional frontage along Russell Whakapara Road to the north and Lanes Road to the east. The property was formerly a golf course, has an undulating terrain featuring four prominent ridges sloping northward. Streams and overland flow paths run along the base of these ridges, converging into manmade pond at the north-centre of the site.

The property is located outside water and wastewater network services, and wastewater generated on each lot will need to be treated and disposed of on that lot. Water supply to each lot will be provided by roof water supply. All 65 lots will require onsite wastewater treatment and disposal. For wastewater feasibility, GWE have conservatively allowed for a 4-bedroom dwelling on each undeveloped lot (this covers additional rooms such as family, recreation, games, office,

study, sewing, work, etc which could be utilised as potential bedrooms) with an associated peak occupancy of 6 people.

DESIGN ASSUMPTIONS AND DISCHARGE DETAILS

For each future residential lot, we have assumed four potential bedrooms with an associated peak occupancy of 6 people. It should be noted that any study, office, gym or similar room within any future dwelling may be considered a 'potential bedroom'.

For feasibility studies, we assume water supply will be from onsite roof water tank supply. As per AS/NZS 1547 Table H3, 180 L per person per day (L/p/d) is designed for with standard water fixtures. Although not assumed, we recommend full water reduction fixtures to promote water conservation. Actual water usage may be lower than 180 L/p/d if water-reduction fixtures are specified at building consent stage.

If reticulated community or bore-water supply is provided, a higher design flow will need to be applied e.g. 200 L/person/day.

Table 1 outlines the assumed design flow allowance for future Lots.

Table 1: Design Flow Allowance and Assumptions

LOT	1-65 Lots
DEVELOPMENT	4-bedroom dwelling per Lot
NO. OF PERSONS	6 people per dwelling
WATER SUPPLY	Roof water tank
WATER FIXTURES	Standard Fixtures assumed*
DAILY FLOW ALLOWANCE	180 Litres/person/day
DESIGN FLOW RATE	1,080 Litres/day
OTHER NOTES	No grey-water reuse recycling proposed.

Note:

**Actual water usage may be lower than 180 l/p/d if water-reduction fixtures are specified at building consent stage. Water-reduction fixtures include dual flush toilets, shower and tap flow restrictors, aerator faucets, water-conserving/front loading washing machines, no bath*

Discharge will be domestic type wastewater. Domestic type wastewater is generated from residential kitchens, bathrooms, laundries and toilets – it does not allow for trade waste or commercial effluent.

WASTEWATER TREATMENT SYSTEM

Table 2 presents the recommended secondary wastewater treatment systems for the site. Due to site constraints, including poorly draining soils and the presence of surface water features (such as stormwater flow paths, overland flow paths, ponds, and wetlands), a minimum of advanced secondary treatment, classified as grade A treatment from the On-site Effluent Treatment National Testing Programme (OSET NTP), is advised.

Table 2: Recommended Onsite Wastewater Treatment System

WASTEWATER TREATMENT SYSTEM*	Innoflow Advantex Recirculating Packed Bed Reactor Hydrozone Pureflow Ecosystems Reflections Textile Filter
-------------------------------------	---

	Hynds Environmental Eloy Oxyfix Oasis Clearwater Waipapa Tanks Econotreat Or similar, approved wastewater treatment systems
TERTIARY TREATMENT	Davey, UV Water Systems Ltd, or similar UV unit, where required.
EFFLUENT QUALITY	BOD ₅ <20 mg/L, TSS <30 mg/L
ALARM SYSTEM	Minimum requirement - visual and audible alarm located at plant.

Note:

**All treatment systems should have anti-floatation.*

The type and capacity of the treatment plant and UV system for each site shall be based on peak flow design capacity. The peak flows for each site will be determined once architectural drawings have confirmed potential occupancy at building consent stage.

LAND DISPOSAL

On-site land disposal must comply with setback distances from key site features, as outlined in the NRCP, to qualify as a permitted activity. The design should adhere to the standards specified in AS/NZS 1547 (see Table 3). The rules governing on-site wastewater discharges are detailed in Chapter C6.1 of the Northland Regional Council's "Proposed Regional Plan for Northland" (NRCP). A critical consideration is maintaining the required separation distances from site features such as property boundaries and overland flow paths, as specified in Table 8 of the NRCP and summarized in Table 3 below:

Table 3: Setback Distances

FEATURE	PRP RULE C.6.1.3	AS/NZS 1547
Floodplain	Outside 5% AEP	-
Stormwater Flow Path	5 m	15 – 100 m
River, lake, stream, pond, dam or natural wetland	15 m	
Existing water supply bore	20 m	15 - 50 m
Groundwater table	0.6 m	0.6 - 1.5 m
Property boundary	1.5 m	1.5 - 50 m
Buildings/houses	-	2 - >6 m
Recreation areas (e.g. play areas, pools, etc)	-	3 - 15 m
In-ground water tank	-	4 - 15 m
Retaining wall, embankments, etc	-	3 m or 45°

Notes:

AEP – Annual Exceedance Probability

Land disposal should meet PRP Rules, as minimum. If the site is residentially developed, the existing water bores may need to be decommissioned, and existing OLFs/open drains diverted. Stormwater, surface water and future tank overflow should be carefully considered to minimise effects on wastewater disposal. Cut-off drains, or improved surface drainage, can be installed to prevent land disposal systems from hydraulic overloading. In addition, the land application system shall be shaped to shed rainfall.

Indicative Disposal Field Areas

The appended drawings 500, 501, 502 and 503 show indicative disposal areas on each of the 65 lots. For the assessment, efforts were made to meet the separation distances given in Table 3.

Apart from Lots 55, 57, 58, and 59, all other lots are adequately sized and positioned to facilitate on-site wastewater treatment and disposal while achieving the required separation distances outlined in Table 3. As a result, wastewater management can be conducted as a permitted activity on these lots.

Wastewater management can be conducted as a permitted activity on Lot 57 by slightly reducing the indicative building platform, which will create sufficient space for wastewater disposal. Consequently, we consider that wastewater disposal can occur as a permitted activity on this lot.

In contrast, the proximity of Lots 55, 58, and 59 to ponds, combined with the requirement that disposal areas be situated at least 15 meters away, results in insufficient space for wastewater handling on these sites to qualify as a restricted discretionary activity. The Northland Regional Council (NRC) plan does not allow for reduced separation distances even with high-level Treatment and have advised that any consent to reduce this will be assessed on an effects basis. However, Table 5.2 of the Auckland Regional Council Technical Publication 58 (TP58) indicates that reduced separation distances of 5 to 10 meters may be permissible in the Auckland Region under high-level treatment conditions (tertiary).

The underlying logic here is based on managing potential risks associated with having disposal fields closer than 15 meters to water bodies. Specifically, the concern relates to the possible transport of nutrients and microorganisms into nearby water bodies. However, if high-level treatment technologies, such as UV disinfection, are employed, the risks of microbial contamination can be significantly mitigated. However, under the current regulations, Lots 55, 58, and 59 do not meet the required separation distance from the ponds.

Therefore, we are applying for subdivision consent based on the fact that nearly all lots will comply with permitted criteria, but consent for discharge for Lots 55, 58, and 59 will be sought, and to ensure the effects are mitigated specific wastewater handling conditions in the subdivision consent will require a higher level of treatment (tertiary) for disposal fields within 15 meters of the ponds.

CONCLUSIONS

The wastewater assessment for the proposed 65-lot subdivision at 39 Aucks Road, Russell, Northland, demonstrates that onsite wastewater treatment and disposal is feasible for most of the lots. Each lot is designed to accommodate a four-bedroom dwelling with a peak occupancy of six people, utilizing roof water tank supply and standard water fixtures. Advanced secondary treatment systems are recommended due to site constraints, ensuring compliance with the Northland Regional Council's Proposed Regional Plan and AS/NZS 1547 standards.

Overall, the site has limitations for wastewater disposal, namely stormwater flow paths, and several ponds and other surface waters. However, all the subject lots (except for Lot 55, 57, 58, and 59) are capable of being developed to treat and dispose of wastewater on-site so that the separation distances to site features such as boundaries and overland flow paths as given in Table 8 of the NRC are achieved.

Subdivision consent will be supported by discharge consent for Lots 55, 58, and 59. To mitigate any receiving environment effects, specific wastewater handling conditions have been put forward in the subdivision consent. This requires a higher level (tertiary) of treatment for disposal fields located within 15 meters of the ponds, as per the accepted practice under TP58.

LIMITATIONS

This report has been prepared for the sole benefit of **Maven Associates Limited** as our Client, and their appointed representatives, according to their instructions, for the specific objectives described herein. This report is qualified in its entirety and should be considered in the light of our Terms of Engagement with the Client and the following:

- a. Data or opinions contained within the report may not be used in other contexts or for any other purpose without our prior review and written agreement. Any reliance will be at the parties' sole risk.
- b. No responsibility is assumed for inaccuracies in reporting by the information providers. In no event, regardless of whether GWE 's consent has been provided, does GWE accept any liability, whether directly or indirectly, for any liability or loss suffered or incurred by any third party to whom this report is disclosed placing any reliance on this report, in part or in full.
- c. GWE has relied on information provided by the Client and by third parties to produce this document and arrive at its conclusions. GWE has not verified information provided (unless specifically noted otherwise) and we assume no responsibility and make no representations with respect to the adequacy, accuracy, or completeness of such information.

Prepared by:



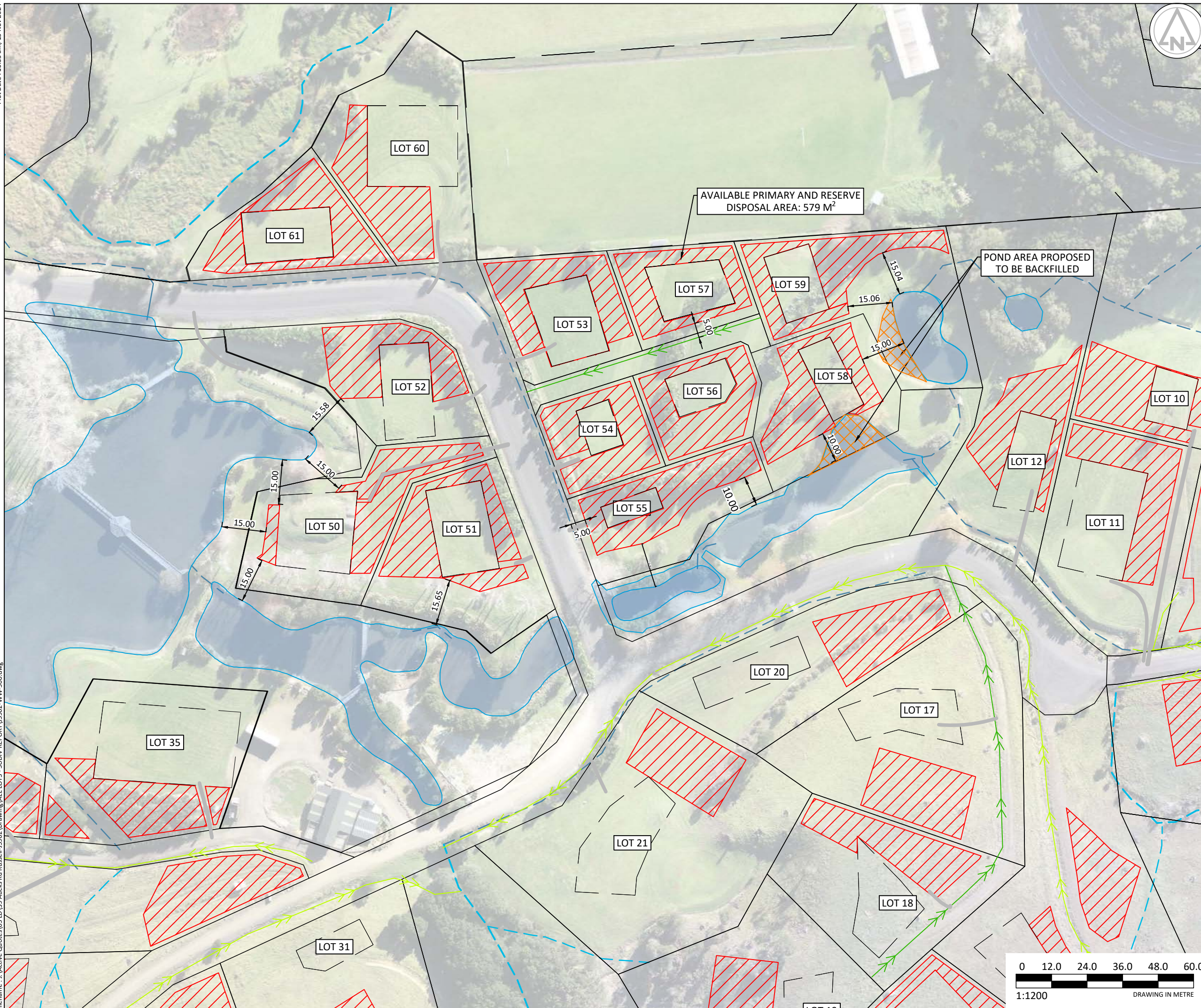
Paul Han
Graduate Engineer

Reviewed by:



Dylan Walton
Senior Wastewater Engineer

APPENDIX A: WASTEWATER SITE PLANS



NOTES:

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- SEPARATION DISTANCES IS ALL MET:
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 - PONDS: 15m (10m for LOT 58 AN LOT 55)
 - LOT BOUNDARY: 1.5m
- PRIMARY AND RESERVE DISPOSAL AREA FOR ALL LOTS EXCEPT LOT 57 ARE 720 M² (360 M² PRIMARY AND 360 M² RESERVE (100%))
 - LOT 57: 579 m²

LEGEND

OVERLAND FLOW PATH	
INDICATIVE DISPOSAL AREA (PRIMARY AND RESERVE)	
AVAILABLE DISPOSAL AREA WITH UV TREATMENT (PRIMARY AND RESERVE)	
REVISED LOT BOUNDARY	
REVISED LOT BOUNDARY	
POND AREA	
EXISTING SW WATERCOURSE	
PROPOSED SW WATERCOURSE	

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PROJECT ADDRESS:
39 AUCKS ROAD, RUSSELL

DRAWING TITLE:
PRELIMINARY WASTEWATER SITE PLAN - SECTION A

CLIENT NAME:
MAVEN ASSOCIATES LIMITED

SCALE: 1:1200	A3
PROJECT No: J5962	DRAWING No: 501
	REV 0

Plot Date : 11:41 am, 23 Oct 2024

J:\Active Quotes\05 LD\39 Aucks Rd Russell-5962\Drawing\ALL LOTS - SUDIV REPORT\5962-WW-500.dwg



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 - LOT BOUNDARY: 1.5m
3. PRIMARY AND RESERVE DISPOSAL AREA FOR ALL LOTS EXCEPT LOT 55 ARE EQUAL OR GREATER THAN 720 M² (360 M² PRIMARY AND 360 M² RESERVE (100%))
 - LOT 55: 685 m²

LEGEND

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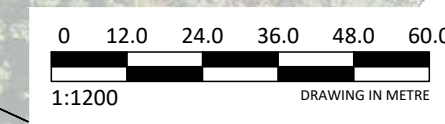
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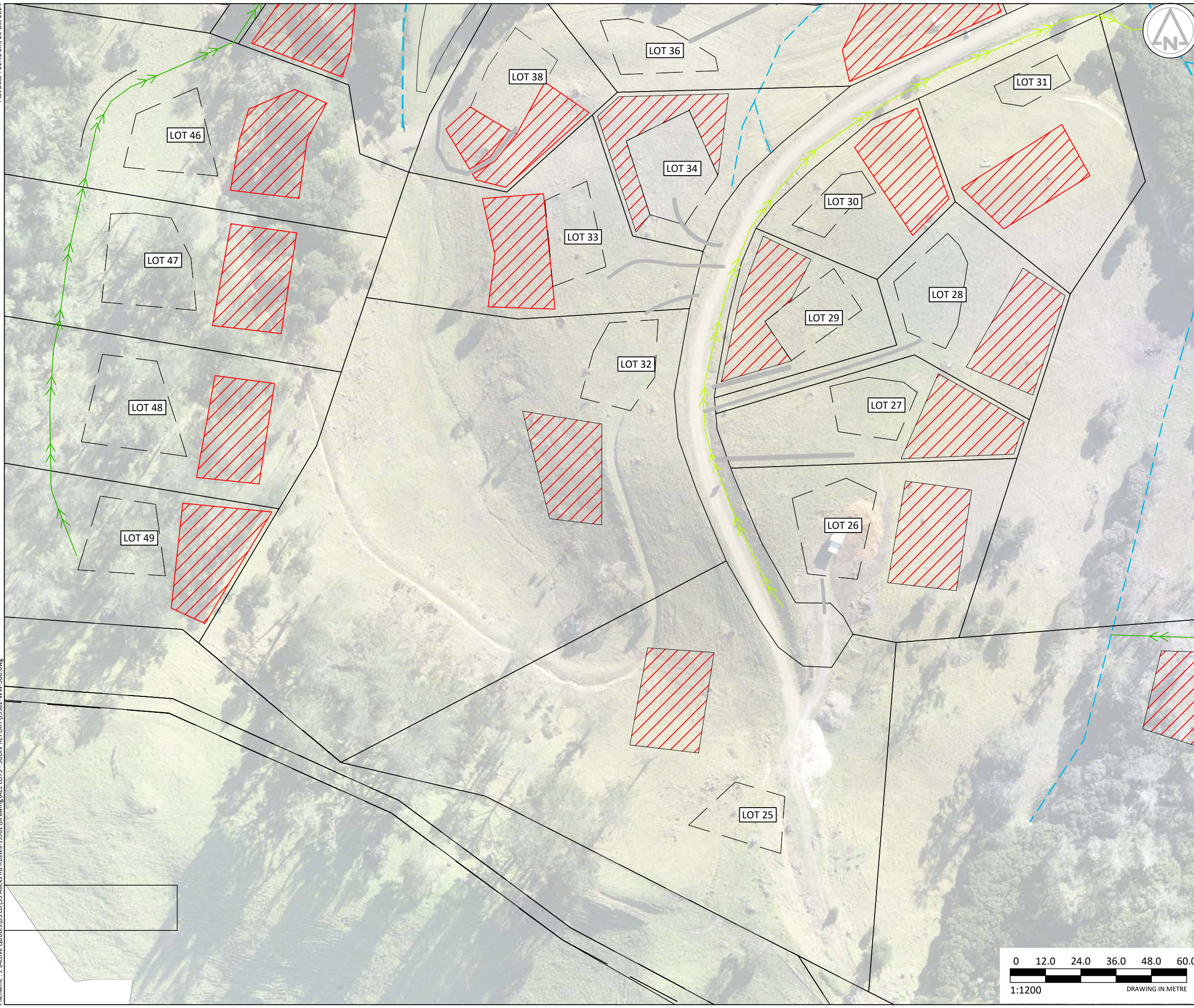
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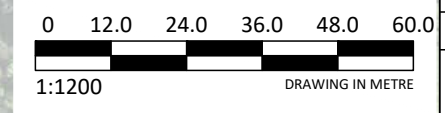
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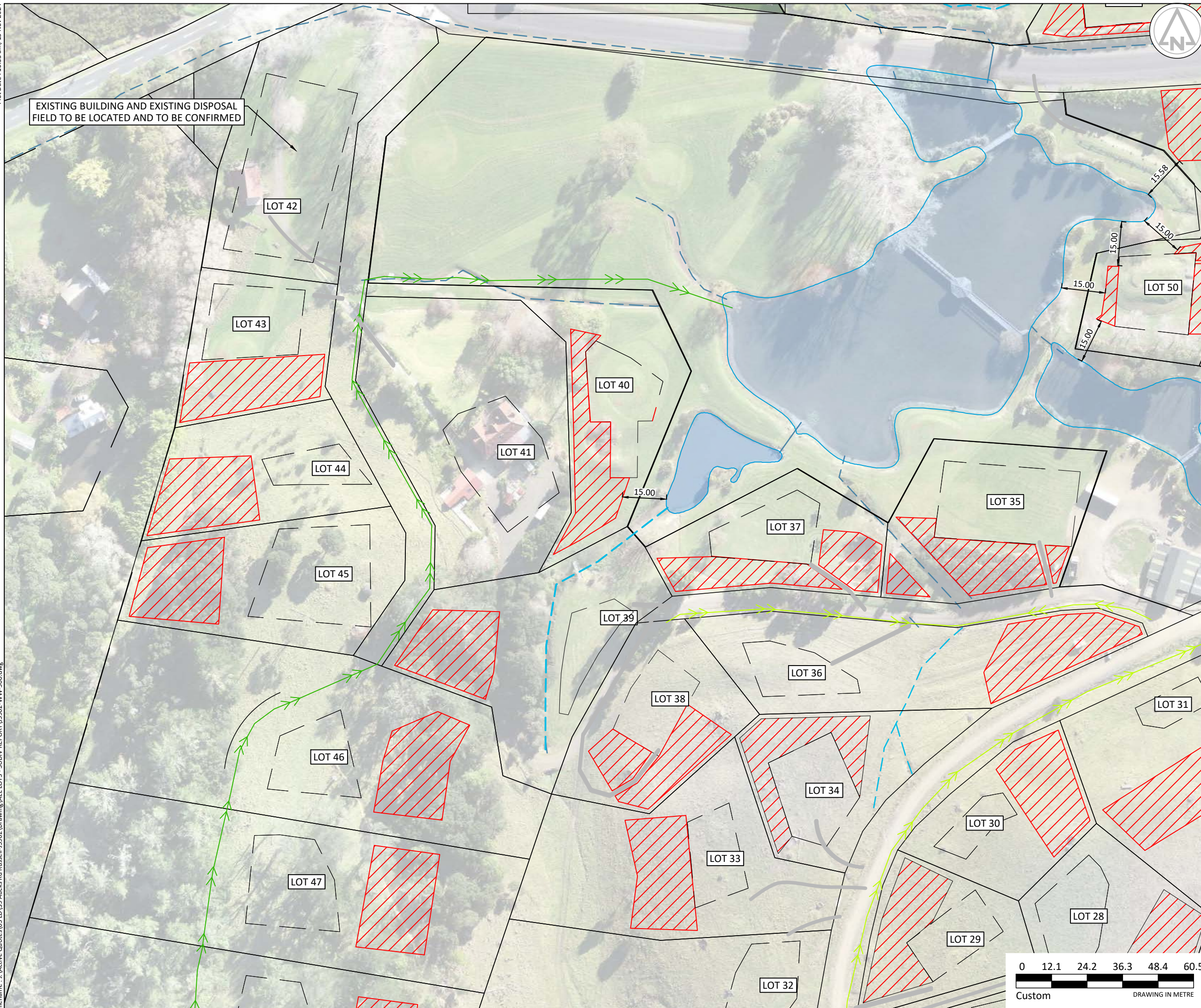
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WILD ECOLOGY

Ecological Report

Proposed subdivision of

39 Aucks Road,
Russell

Prepared for

Willowridge Developments Ltd

December 2024

DOCUMENT QUALITY ASSURANCE

Bibliographic reference for citation: Wild Ecology (2024). *Ecological Report prepared for proposed subdivision of 39 Aucks Road, Russell*. Report prepared by Wild Ecology for the Willowridge Developments Ltd.

Prepared for:	Willowridge Developments Ltd	
Version:	FINAL	
Date:	07/12/2024	
Author:	Madara Vilde Principal Ecologist Wild Ecology	<i>MVilde</i>
Revision History		
Status:	FINAL	Issue date: 07/12/2024
	Draft	Issue date: 14/10/2024
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CONTENTS

Document quality assurance	3
1.0 INTRODUCTION	3
1.1 Background and project description.....	3
1.2 Purpose and Scope	3
2.0 METHODOLOGY	3
2.1 Desktop Review.....	3
2.2 Site Investigation	4
2.3 Evaluation of Ecological Value (NRPS).....	5
2.4 Evaluation of Ecological Effects.....	5
3.0 SITE DESCRIPTION	5
3.1 Site description and location.....	5
3.2 Historic land use	6
3.3 Site characteristics	10
3.3.1 General.....	10
3.3.2 Vegetation	11
3.3.3 Aquatic	12
3.3.4 Wider ecological context.....	13
4.0 ECOLOGICAL SURVEY RESULTS	15
4.1 Terrestrial.....	15
4.1.1 Kanuka scrub/forest (VS2).....	17
4.1.2 Wetlands	18
4.1.3 Mangrove and saltmarsh areas (outside site boundaries).....	21
4.2 Aquatic.....	21
4.2.1 Freshwater habitats	21
4.2.2 Aquatic diversity	23
4.3 Avifauna.....	25
4.4 Lizards	27
4.5 Bats	29
4.6 Summary of values	30
5.0 ECOLOGICAL ENHANCEMENT PROPOSAL	33
5.1 Ecological management and enhancement	33
5.1.1 Revegetation planting	35

5.1.2	Staging of ecological protection and planting	38
5.1.3	Pest plant management	38
5.1.4	Pest animal management	39
5.1.5	Stock exclusion and covenant demarcation	39
5.1.6	Maintenance	40
5.1.7	Monitoring	40
6.0	POTENTIAL ECOLOGICAL EFFECTS AND MITIGATION	41
7.0	RELEVANT PLANNING CONSIDERATIONS	49
7.1.	FNDP Rule 12.7.6.1.1 – Setbacks from Wetlands.....	49
7.2.	FNDP Rule 12.4.6.1.2 – Fire risk to residential units.....	49
7.3.	National Policy Statement for Freshwater Management (2020)	50
7.4.	National Environmental Standards for Freshwater Management (2020)	50
7.4.1	Stormwater management	51
7.4.2	Building setbacks.....	52
7.4.3	Proposed pedestrian footpaths.....	52
7.5.	National Policy Statement for Indigenous Biodiversity (NPS-IB) (2023).....	54
8.0	CONCLUSION AND RECOMMENDATIONS	55
9.0	REFERENCES.....	58

1.0 INTRODUCTION

1.1 Background and project description

Willowridge Developments Ltd ('the Applicant') engaged Wild Ecology to prepare an Ecological Report for a proposed subdivision of 39 Aucks Road, Russell ('the site') under the provisions of the Far North District Plan (Operative).

The layout of the proposed subdivision has been comprehensively designed in consultation with Wild Ecology to ensure that the development avoids, minimises or mitigates potential adverse effects on the indigenous habitats and species present within the site boundaries and wider surrounds. This is accomplished through sensitive development design, utilizing historically cleared areas, steering development away from high ecological value areas or areas with high restoration potential, and implementing development controls such as permanent stock exclusion and domestic pet restrictions.

In addition to minimizing effects, the subdivision design includes comprehensive ecological restoration and enhancement measures. The proposal seeks to restore and enhance the site's ecological values, particularly the existing bush, wetland areas, and natural drainage patterns, through permanent stock exclusion, strategic revegetation planting, pest weed and pest animal control. The area proposed for ecological enhancement and protection totals approximately 16.90 ha. These efforts will be guided by a detailed Ecological Management Plan (EMP), which will be developed as a condition of consent to ensure long-term ecological protection and enhancement across the site.

1.2 Purpose and Scope

The purpose of this Report is to provide a baseline assessment of the ecological features contained within the proposed development site boundaries and immediate surrounds and outline opportunities for ecological enhancement of the existing natural terrestrial and aquatic features on site. This report also considers whether the future intensified development of the site can occur in a manner consistent with the relevant ecological provisions in relation to local, regional and national plans, policy statements and regulations associated with the preservation of indigenous habitats and species.

This report identifies the potential adverse effects of the proposed development on ecological values and the degree to which significant adverse effects can be avoided, remedied, mitigated or offset. Both constraints and opportunities relating to the site's ecological values are identified and discussed.

2.0 METHODOLOGY

2.1 Desktop Review

The desktop investigation included a review of scientific literature (published and unpublished), the Far North District Plan and associated ecological site information, and relevant websites. Ecological databases were also accessed. These included:

- Retrolens historic aerial imagery
- DOC Bio-web Herpetofauna database;
- DOC Bat database;
- iNaturalist New Zealand;
- LENZ Threatened Environments Classification;
- Land Use Classification;
- Baseline Highly Productive Land – Manaaki Whenua;
- Wilderlab eDNA dababase;
- New Zealand Freshwater Fish Database (NZFFD).

2.2. Site Investigation

The site and surrounding areas were visited on the 8th and 9th of November 2022 and 2nd of July 2024 and a general walkover was conducted over the entire site with terrestrial and aquatic features identified. The natural features were surveyed and recorded using a GPS unit (Trimble DA2).

Vegetation was recorded and classified in general accordance with Singers *et al.* (2017). Watercourses on site and immediate surrounds were classified in general accordance with criteria outlined in the Proposed Regional Plan for Northland (February 2024). Wetland delineation was carried out during a site visit on 8th of November 2022 in general accordance with the Ministry for the Environment (MfE) Wetland delineation protocols (2022) which are generally based evaluation of hydrophytic vegetation dominance, presence of hydric soils tool and wetland hydrology.

There were several rainfall events within the 48 hours prior to the 8th of November 2022 survey with a cumulative rainfall of 36mm (NRC Environmental Data Hub).

The following fauna surveys were conducted:

- 5MBC surveys were conducted at various parts of the site to record avifauna (bird) present on site;
- AR4 acoustic recorder was left on site for 24 hrs to obtain additional avifauna and potentially aquatic frog records
- Fish surveys utilising minnow and henaki traps (as per Joy *et al.* 2013)
- eDNA stream survey using a Wilderlab peg-mount passive sampling kit;
- Basic assessment of habitat values for native lizards (skinks and geckos) was undertaken during site visits;
- A baseline acoustic bat survey was undertaken using Acoustic Bat Monitor (ABM);
- Basic assessment of habitat values for bats was undertaken during site visits.

2.3. Evaluation of Ecological Value (NRPS)

Rule 12.2.5.6 of the Far North District Plan (Operative) requires that significance of indigenous vegetation and habitats is assessed by reference to policy 4.4.1 and the significance criteria as outlined under Appendix 5 of the Northland Regional Policy Statement (NRPS (2016)).

2.4. Evaluation of Ecological Effects

As a part of the ecological assessment, potential ecological effects associated with the subdivision consent and subsequent site development on both terrestrial and aquatic values on site were described and assessed. Where necessary, mitigation measures have been outlined to ensure that the site's active development does not result in adverse effects on the environment.

3.0 SITE DESCRIPTION

3.1. Site description and location

The site is zoned 'Coastal Living' under Far North District Plan (Operative) and is located approximately 5km south of Russell (Figure 1). The site covers approximately 43.28 hectares and consists mainly of exotic pastureland, golf tees, a primary dwelling with accessory buildings, an extensive artificial pond system, and scattered indigenous and exotic vegetation (Figure 2).



Figure 1: Showing the site's location in relation Russell, Okiato and Paihia



Figure 2: Showing the general characteristics of the site – site generally slopes in a northerly direction towards Orongo Bay estuarine environment

3.2. Historic land use

Originally the vegetation cover on site and the surrounding area would have been a continuation of the Orongo Bay ecotone transitional area between estuarine and terrestrial environments.

While the site at current day contains some isolated pockets of terrestrial and aquatic habitats, the sites vegetation cover historically would have been best represented by kauri, podocarp, broadleaved forest (WF11) along the sites more elevated southern aspect and kahikatea, puriri forest (WF7-3) along the sites northern aspect grading into mangrove forest and scrub (SA1) immediately north to the site (Singers (2018) (Figure 3).

Anthropogenic land use activities have significantly modified and reduced the extent and quality of the original ecosystem types that would have likely once extended over the area, through extensive land drainage and conversion into pastoral land, with only small pockets of modified vegetation types present on site and immediate surrounds at current day.

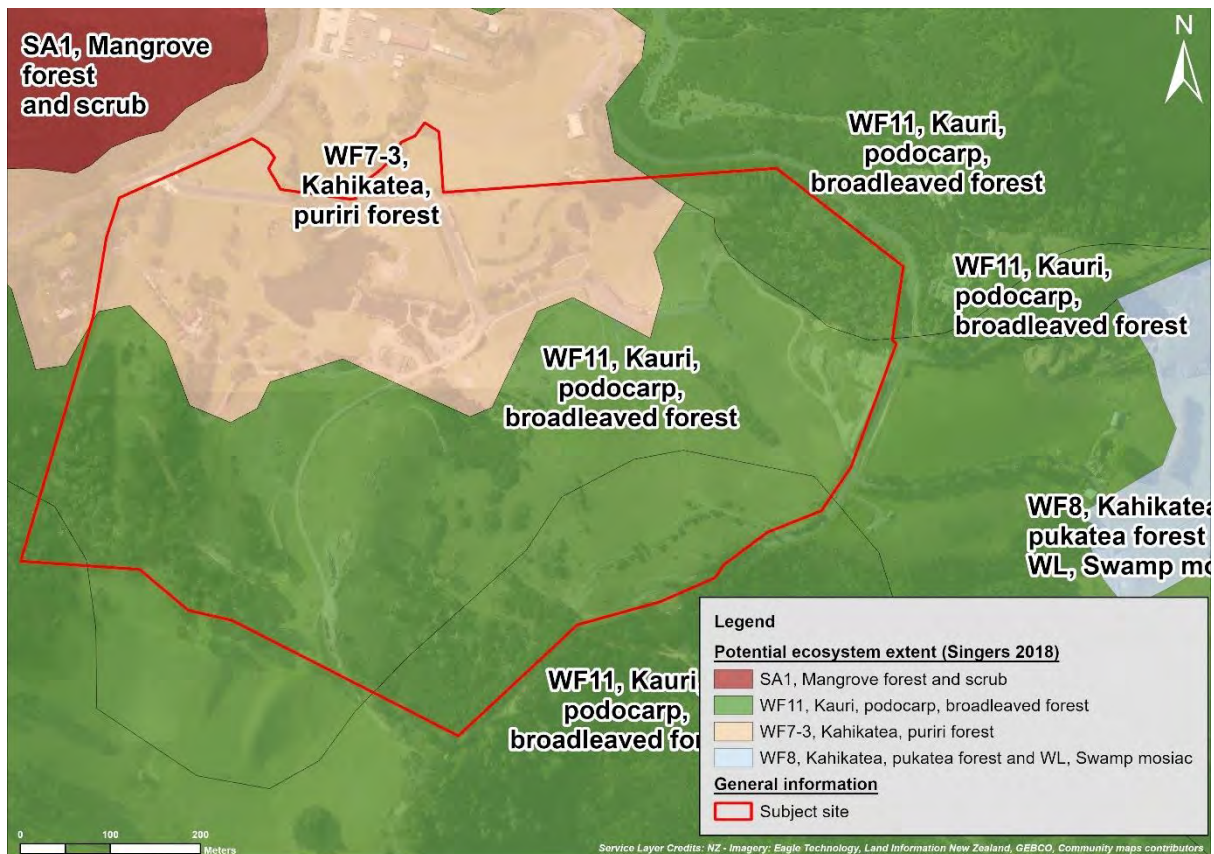


Figure 3: Northland potential ecosystem classification (Singers 2018)

In the earliest available historic aerial imagery (Retrolens) from 1951 (Figure 4), large tracts of vegetation appear to cover the subject site. Based on aerial photography it appears that the area is likely to have been dominated by a secondary type of forest such as kanuka scrub, given the lack of identifiable large primary forest trees. Distinctive drainage patterns can be observed draining the site through its central aspect in a northerly direction towards Orongo Bay. Vegetation clearance in the lower, more accessible northern aspect of the site can be observed likely for farming activities.

Between 1951 and 1972, it is possible that the site had been left in fallow, as vegetation cover appears to increase on site, albeit signs of exotic plantation forestry having established in the area are evident and some evidence of either plantation or wilding pines can be seen dotted throughout the southern aspect of the site. Vegetation clearance within the immediate surrounds indicate intensified agricultural use of the area (Figure 5).

Sometime between 1982 and 2000 (Figure 6) it appears that exotic pine forest was either planted or wilding pines had established over the southern and central aspect of the site. The majority of these pine trees have been recently (May to August 2024) cleared on site (including where they were scattered within the primarily indigenous species dominated forest areas).

It is apparent that the northern aspect of the site sometime between 2000 and 2020 has been developed into golf tees (Figure 7) with a number of artificial ponds and watercourses established for landscaping purposes. The remainder of the existing vegetation on site does not appear to have changed, with the southern aspect maintaining both some scattered indigenous vegetation cover, which is primarily limited to the less accessible steeper slopes and gullies.

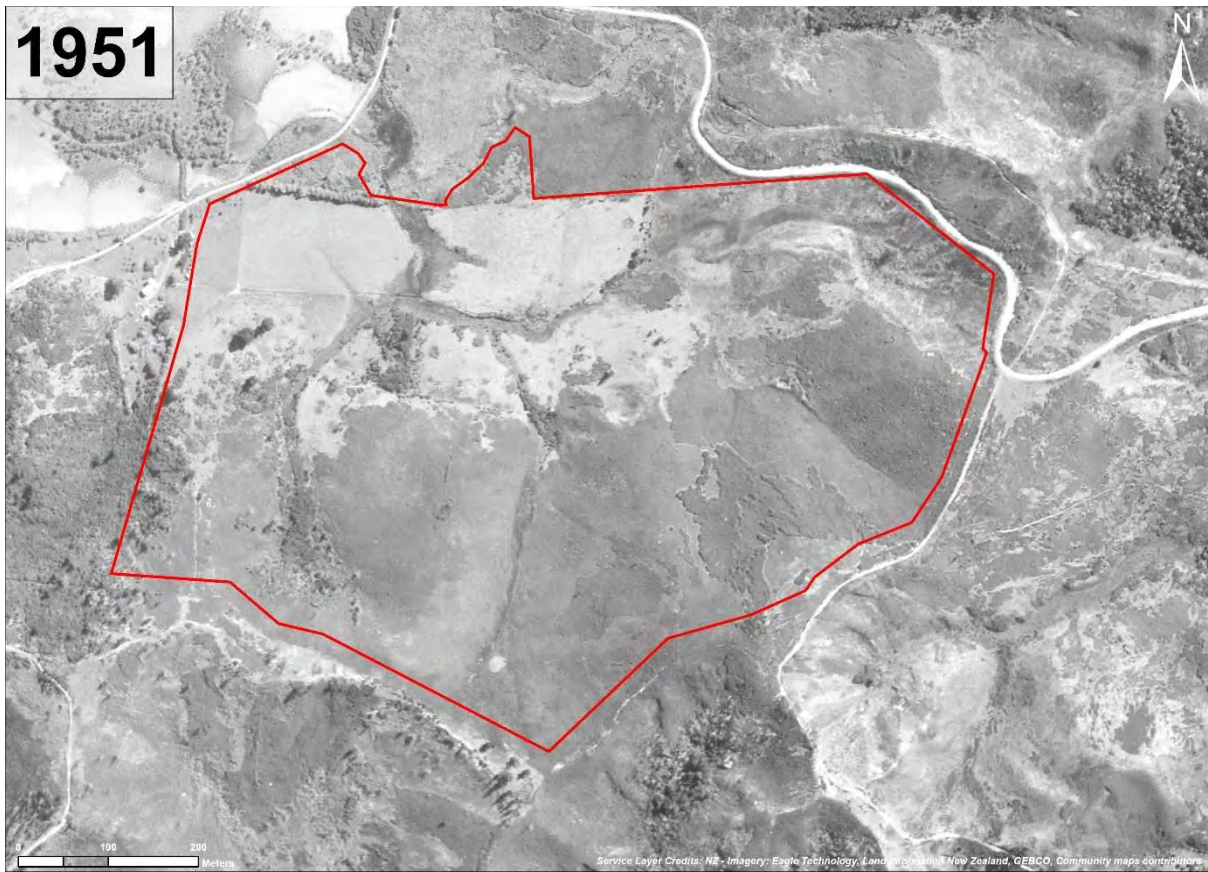


Figure 4: Showing the site and surrounds in 1951 (Source: Retrolens)

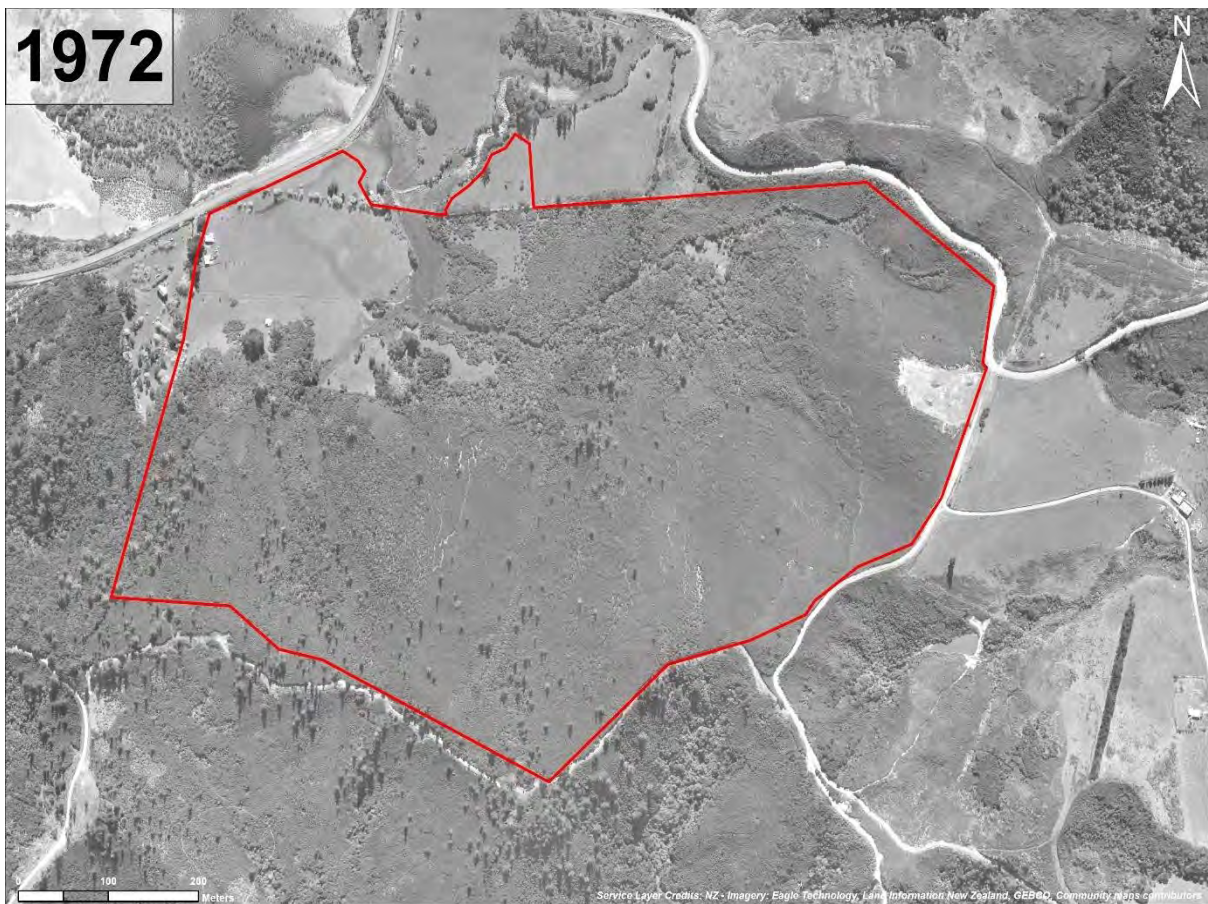


Figure 5: Showing the site and surrounds in 1972 (Source: Retrolens)



Figure 6: Showing the site and surrounds in 2000 (Source: LINZ)



Figure 7: Showing the site and surrounds in the most recent aerial imagery for Northland 2020 (Source: LIDAR)

3.3. Site characteristics

3.3.1. General

The site generally has a rolling topography and falls roughly in a northerly direction from the site's southern aspect towards Orongo Bay estuarine environment. The geology of the site is characterised by Waipapa Composite Terrane Rock of volcanoclastic sandstone and argillite with tectonically included basalt, chert and siliceous argillite (GNS 2024).

A mixture of fluvial recent (RF), yellow ultic (UY) and albic ultic (UE) soil extends over the site (Figure 8). Recent fluvial soils extend along the northern aspect of the site. The soils have variable soil texture, with common stratification of contrasting materials, and spatial variability is high. They are generally deep rooting and have high plant-available water capacity. Ultic soils extend over the more elevated central and southern aspect of the site and are strongly acidic with low nutrient reserves, consisting of clayey subsoils with slow permeability which tend to have dispersible surface horizons susceptible to livestock treading damage, prone to erosion and typically have impeded drainage (Landcare Research 2024).

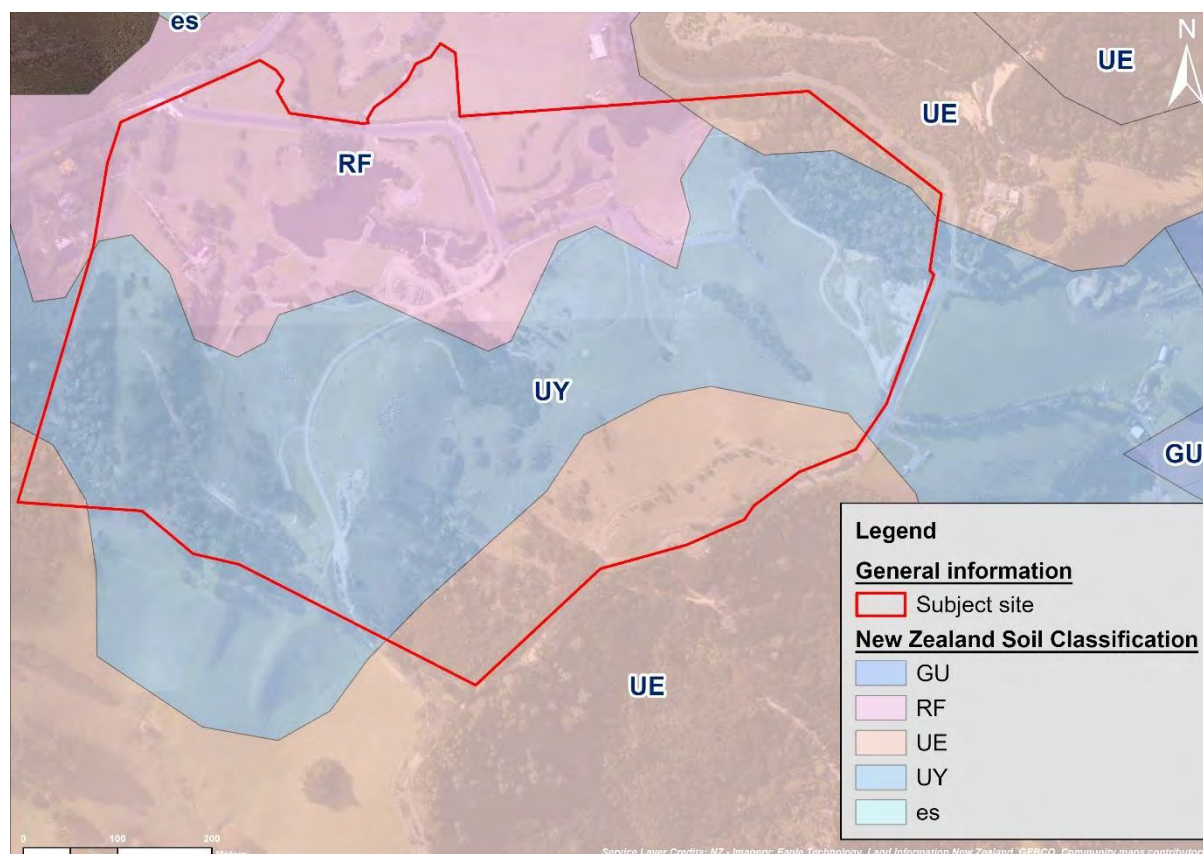


Figure 8: The site generally consists of albic ultic soils which are typically prone to erosion

Land Use Capability (LUC) inventory was analysed to assess whether the site contains any soils classified as highly productive land (defined as LUC Class 1-3 soils within the National Policy Statement for Highly Productive Land 2022 (NPS-HPL)). The site is primarily classified as LUC Class 4 and Class 6 land (Figure 9). Class 4 generally has low arable cropping suitability, and moderate pastoral grazing suitability (Landcare Research 2010). Class 6 land which is unsuitable for pastoral and cropping use. No soils on the site have been identified as highly productive land as defined under NPS-HPL (2022).

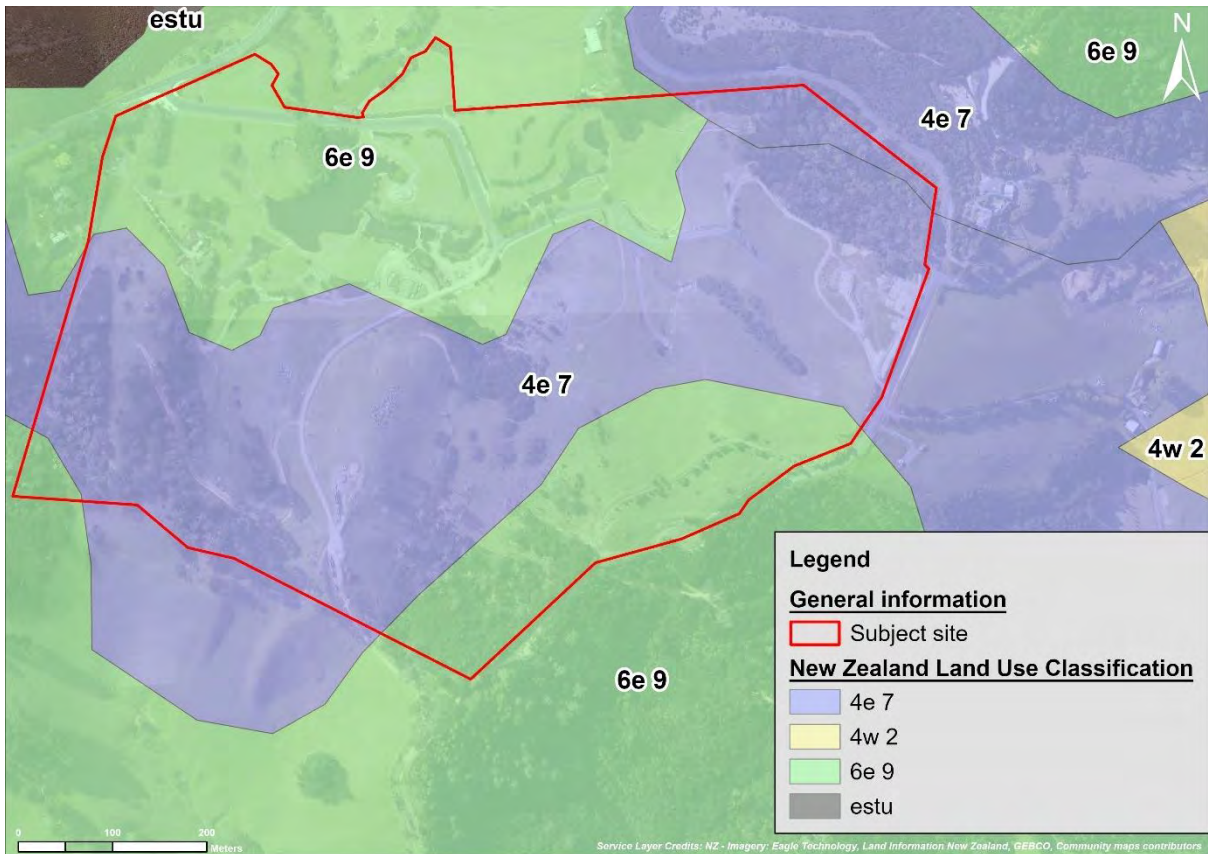


Figure 9: Showing the LUC classification for the site

3.3.2. Vegetation

The indigenous vegetation on site is primarily limited to regenerating pockets of kanuka scrub/forest (VS2) dominated by regenerating kanuka (*Kunzea ericoides*) 8m-12 m in height. Multiple scattered wetland areas are present within natural depressions in topography, generally contained in areas of pasture and areas with existing sparse vegetation cover. Within pasture areas the wetland vegetation cover (wetland areas W3, W5 and W6) can be best described as novel *Juncus* sp. rushland/grassland habitat types dominated by exotic hydrophytic species such as soft rush (*Juncus effusus*) interspersed with Mercer grass (*Paspalum distichum*) and Yorkshire fog (*Holcus lanatus*) which are representative of the actively farmed pasture these small wetland pockets are encompassed in. Some wetland areas within existing bush areas or areas with sparse indigenous vegetation cover (W1, W2 and W4) contained more representative wetland species such as orange nut-sedge (*Machearina rubiginosa*), swamp millet (*Isachne globosa*) and kauri sedge (*Schoenus tendo*) which are representative examples of the historic vegetation cover in this area.

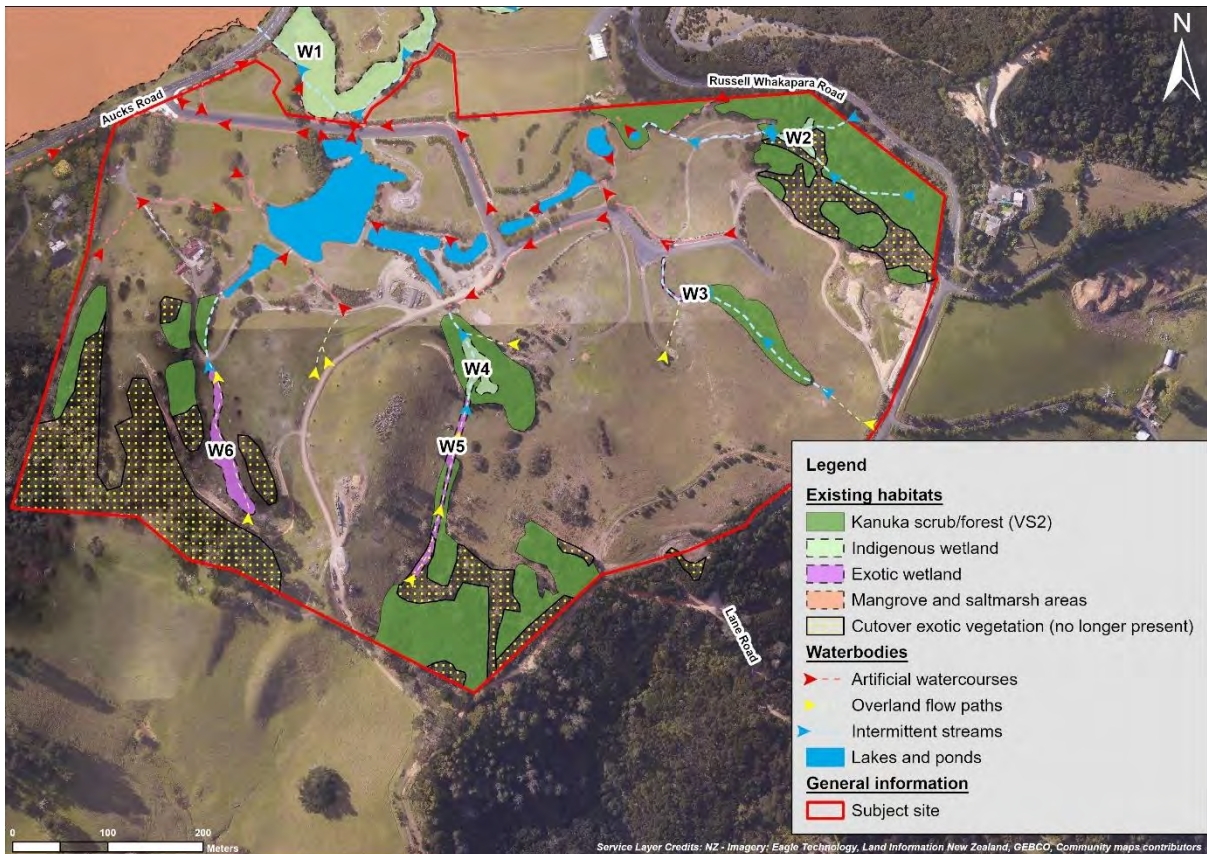


Figure 10: Showing the general hydrological patterns and natural features as observed on site during site field visits

3.3.3. Aquatic

The watercourses on site include a myriad of overland flow paths and intermittent streams catchment draining the site generally draining the site in a northerly direction (Figure 11). The natural drainage patterns within the northern aspect of the site have been significantly modified through the establishment of artificial drainage channels and artificial ponds and lakes within the golf course area. While some of these features would have once formed part of the natural drainage of the site, at current day these contain no natural portions and are managed as artificial watercourses within a golf course setting. These watercourses generally divert flows towards the site’s northern boundary where they discharge into a large freshwater wetland area before entering the Orongo Bay estuarine environment. Large part of the northern aspect of the site encompassing the extensive artificial pond system is mapped by NRC as a Coastal Flood Hazard Zone 10, 50 and 100-year extent (Figure 11). These areas are potentially susceptible to coastal flooding in a 10% AEP / 10Yr ARI, 2% AEP / 50Yr AR and 1% AEP / 100Yr ARI + CC (climate change) respectively.

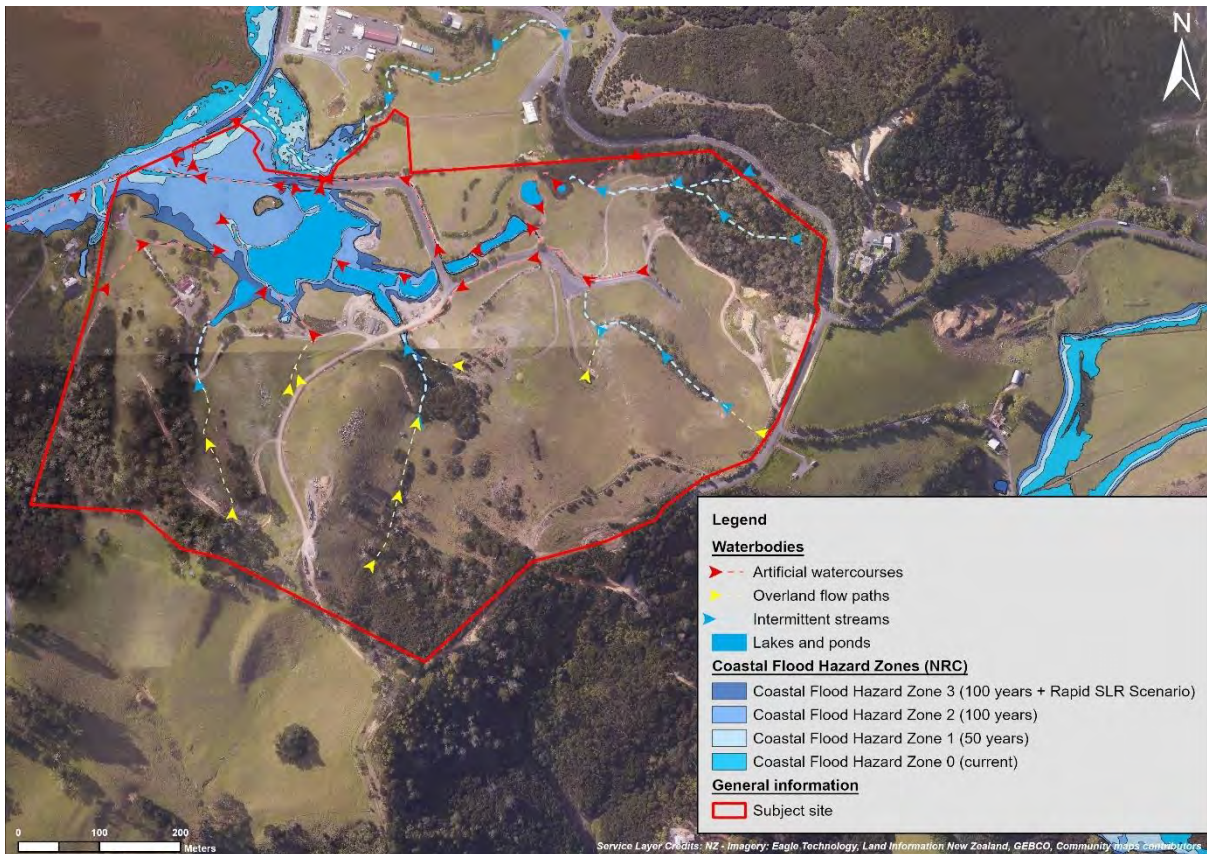


Figure 11: Showing the general hydrological patterns and NRC Coastal Flood Hazard Overlay for the site

3.3.4. Wider ecological context

The site is situated within the Whangaruru Ecological District. A small pocket of the existing kanuka bush on the sites southern boundary is classified as a Protected Natural Area (PNA) Edwards Tikitikioure Coastal Habitat (Q05/004) (Figure 12). Q05/004 is described by Booth (2005) as a mosaic of forest age classes ranging from seral shrubland to cut-over forest and wetlands, sometimes adjoining estuarine associations. The site supports a number of 'At Risk' flora and fauna including, but not limited to NI brown kiwi, pateke, NI weka, grey duck, NI fernbird, banded rail, long-fin eel, banded kokopu, inanga, giant bully and others. This description by Booth is reflective of the characteristics of the habitats recorded on site extending to the south, east and west of the site. Edwards Tikitikioure Coastal Habitat (Q05/004) is in the process of being reclassified as a Significant Natural Area (SNA) – Edwards/ Tikitikioure Coastal Habitat (FNO82). The proposed SNA (FNO82) encompasses a wider area of existing vegetation within the site boundaries than the existing PNA mapping, noting that the proposed SNA extent appears to at least partly extend over exotic vegetation which has been cleared as part of the site preparation for ecological enhancement planting.

The site is also located nearby PNA Q05/001 'Eastern Bay of Islands Estuary,' which is located directly north of the site. Q05/001 forms an extensive estuarine habitat and has been renowned for its importance to indigenous shorebirds. This site contains the most extensive examples of saltmarsh/mangrove within the Bay, with the least modified riparian margin. Over 90 km (or 88%) of riparian margin within these two inlets adjoins significant terrestrial and/or estuarine vegetation. In many instances, freshwater wetlands adjoin their saline counterpart. Q05/001 features one of the best examples of unbroken gradients, from old-growth hill forest to tidal flats,

found anywhere in Northland, with extensive riparian cover sometimes adjoining freshwater/brackish wetlands (Booth 2005).



Figure 12: Showing the existing PNA and proposed SNA overlays on site and immediate surrounds

Under Land Environments of New Zealand (LENZ) the majority of the site and immediate surrounds is contained within the 'Category 2 and 3 Threatened Land Environment', where there is 10%–30% indigenous cover left (Figure 13). Indigenous biodiversity in these 'At Risk' environments is under protected with many areas of indigenous vegetation being contained within farmland, and thus are more at risk of loss and decline if little of the environment has formal protection.

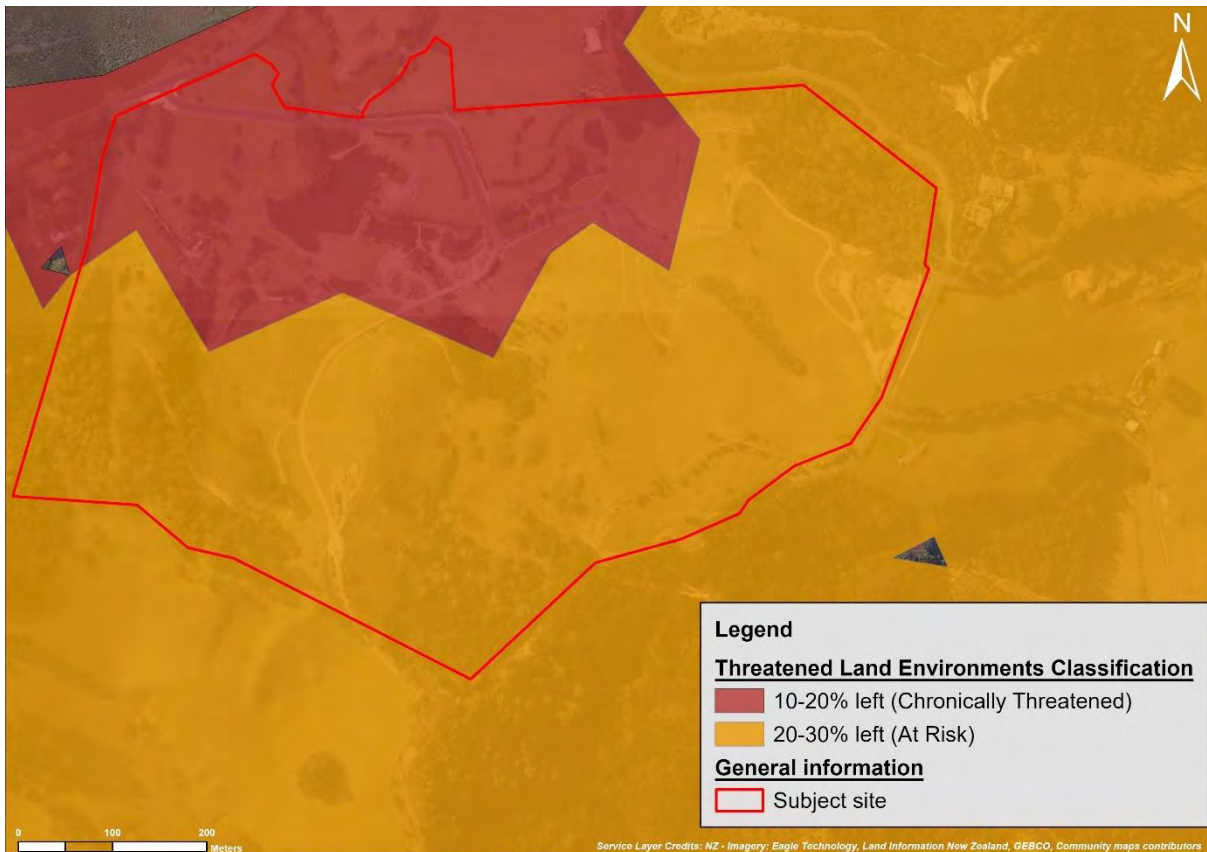


Figure 13: Showing the site and Threatened Environment Classification for New Zealand (2012)

The analysis above indicates that the site and its surroundings have been significantly altered from their original ecosystem due to human land use practices. Large areas of native vegetation have been cleared, initially for agricultural production and more recently for intensified lifestyle developments. The ecological structure and functionality of the site have been historically diminished. The site's proximity to the inner Orongo Bay provides an opportunity to enhance and protect this sensitive transitional ecotone as part of the subdivision proposal. Implementing measures like excluding livestock and planting native vegetation around water bodies and steep, erodible slopes will improve the health of stream and river ecosystems across the catchment and reduce sediment input from agricultural land into Orongo Bay.

4.0 ECOLOGICAL SURVEY RESULTS

4.1. Terrestrial

Field surveys were conducted in November 2022 and July 2024 to assess the onsite vegetation, and the vegetation cover directly adjacent to the east, west, and south of the site. Habitats identified both on and adjacent to the site are shown in Figure 14 below. A general description of the species present within these areas is provided in the following sections. It should be noted that the extent of vegetation onsite was reassessed during the July 2024 visit, as exotic pine clearance and pest weed control had been carried out between May and July 2024 and is understood to be ongoing. As a result, the baseline imagery may depict more extensive vegetation than is currently present on site. Most of the removed vegetation was exotic (classified as cutover exotic vegetation in Figure 14), though some indigenous vegetation may have been cleared to facilitate access for the pine clearance or weed control operations.

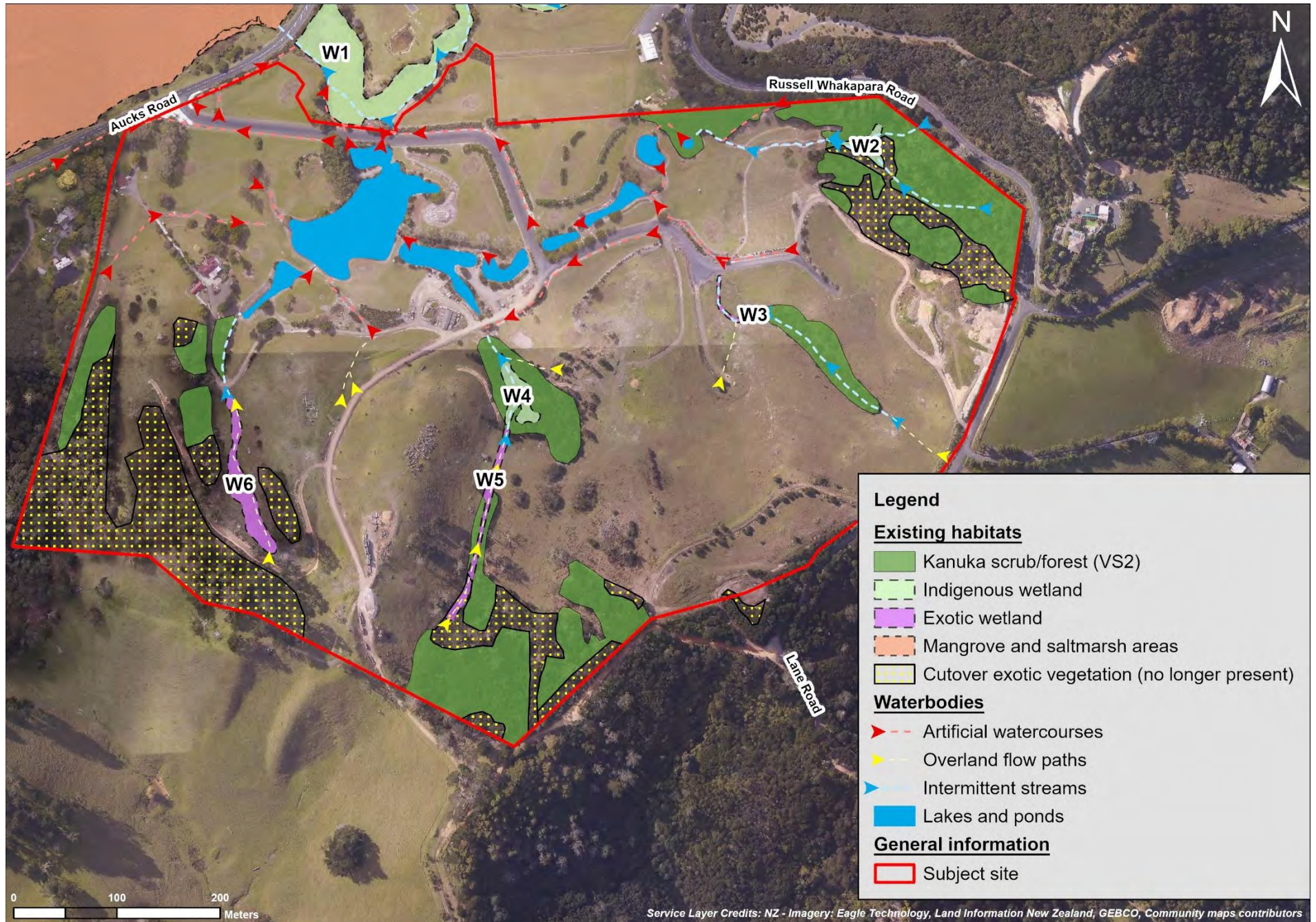


Figure 14: Showing general habitat types noted during field surveys in July 2024

4.1.1. Kanuka scrub/forest (VS2)

The site contains multiple scattered areas of secondary regenerating kanuka forest (Figure 15) characterised by kanuka (*Kunzea robusta*) with emergent tanekaha (*Phyllocladus trichomanoides*) and scattered towai (*Weinmannia silvicola*). A thick understory and shrub layer was developing, dominated by species such as ponga (*Cyathea dealbata*), twiggy coprosma (*Coprosma rhamnoides*), hangehange (*Geniostoma ligustrifolium*), mahoe (*Meliccytus ramiflorus*), mapou (*Myrsine australis*), putaputaweta (*Carpodetus serratus*), ti kouka (*Cordyline australis*), kumarahou (*Pomaderris kumeraho*), soft mingimingi (*Leucopogon fasciculatus*) and lancewood (*Pseudopanax crassifolius*) (Figure 15). While likely historically cleared, it is considered that this habitat type is representative of a regenerating forest ecosystem with a trajectory to reach kauri, podocarp forest (WF11) ecosystem type in the future should it be protected in perpetuity.

It is noted that during a site visit in November 2022 some of the kanuka scrub/forest areas contained a high incidence of weedy species such as gorse (*Ulex europaeus*), pampas (*Cortaderia selloana*), gum (*Eucalyptus* sp.), black wattle (*Acacia mearnsii*), Chinese and tree privet (*Ligustrum* sp.), woolly nightshade (*Solanum mauritianum*), willow leaved hakea (*Hakea salicifolia*), Taiwan cherry (*Prunus campanulata*) and wilding pine (*Pinus* sp.). It is understood that the exotic pines and weedy pest plants had been controlled sometime between May 2024 and July 2024 (Figure 16) in preparation for the site wide ecological restoration effort. Weed control within these areas have left significant canopy gaps which will be revegetated using indigenous species.



Figure 15: Showing general composition of regenerating kanuka forest on site – note heavy incidence of pest weeds (Photo: November 2022)

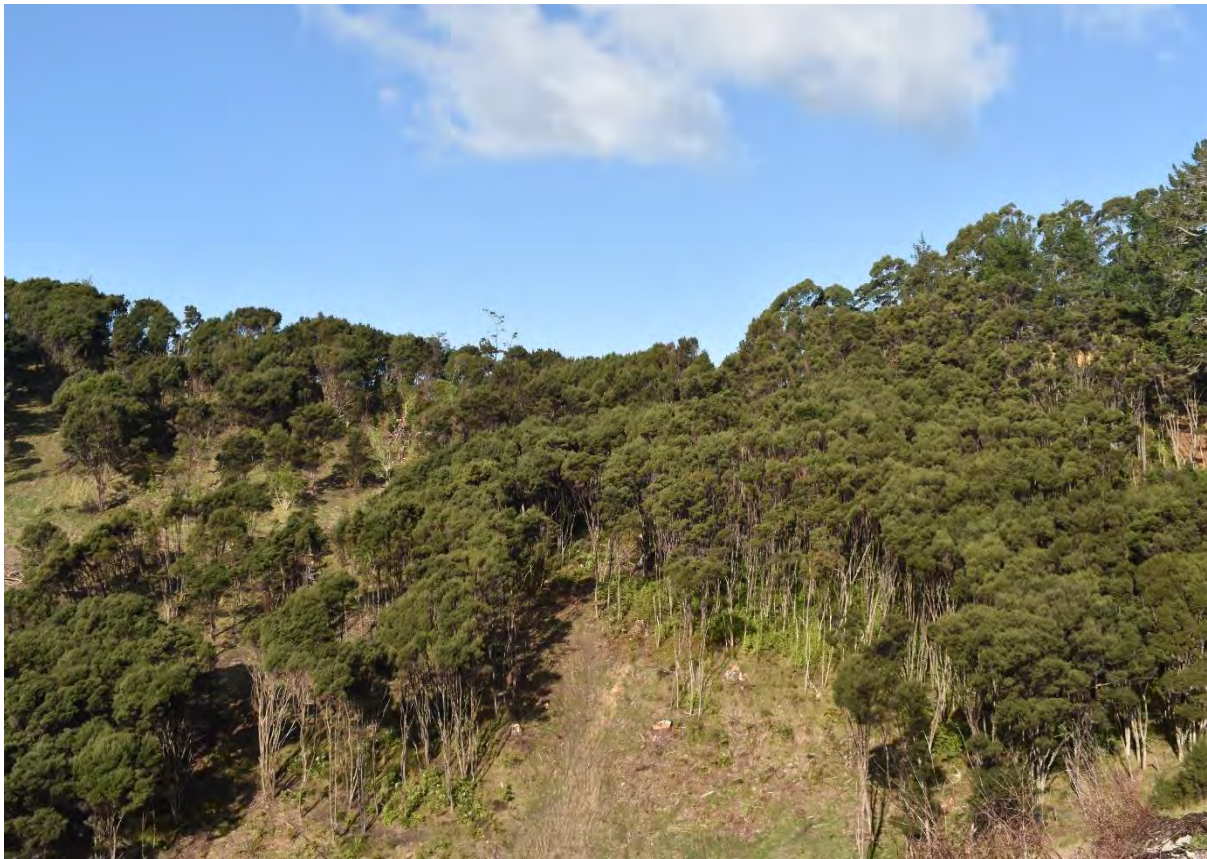


Figure 16: Post pine removal and weed control (Photo: July 2024)

4.1.2. Wetlands

The site contains or directly adjoining a number of both indigenous and exotic species dominated wetland areas. These have been briefly described under Table 1 and in the following sections.

Table 1: Wetland description and identifiers

Identifier	Type	Dominant vegetation type	Size
W1 (outside site boundaries)	Indigenous	<i>I. globosa</i> , <i>C. secta</i> , <i>C. lessoniana</i> , <i>M. rubiginosa</i> , <i>C. ustalatus</i> , <i>E. acuta</i>	1,16 ha
W2	Indigenous	<i>I. globosa</i> , <i>G. dicarpa</i> , <i>P. minus</i> , <i>E. spachelata</i> , <i>A. adenophora</i>	733 m ²
W3	Exotic	<i>J. effusus</i> , <i>P. distichum</i> , <i>H. lanatus</i> , <i>A. stolonifera</i> , <i>R. repens</i>	244 m ²
W4	Indigenous	<i>I. globosa</i> , <i>S. tendo</i> , <i>G. dicarpa</i> , <i>P. minus</i> , <i>E. spachelata</i>	1,192 m ²
W5	Exotic	<i>J. effusus</i> , <i>P. distichum</i> , <i>H. lanatus</i> , <i>A. stolonifera</i> , <i>R. repens</i>	1,143 m ²
W6	Exotic	<i>J. effusus</i> , <i>P. distichum</i> , <i>H. lanatus</i> , <i>A. stolonifera</i> , <i>R. repens</i>	2,054 m ²

4.1.2.1. Exotic wetlands

A number of small, scattered exotic species dominated wetland areas are scattered throughout the site (identified as W3, W5 and W6 under Figure 14) primarily encompassing stream margins. The key vegetation type across all wetland areas (Figure 17) was relatively uniform and was dominated by exotic grassland/rushland species including the 'facultative wetland' soft rush (*Juncus effusus*) along with common exotic pastoral species such as 'facultative wetland' creeping bent (*Agrostis stolonifera*), mercer grass (*Paspalum distichum*), and 'facultative' Yorkshire fog (*Holcus lanatus*), Lotus (*Lotus pedunculatus*), and buttercup (*Ranunculus repens*). Several 'upland' species were also noted growing within the wetland area being kikuyu (*Cenchrus clandestinus*), dallas grass (*Paspalum dilatatum*), cocksfoot (*Dactylis glomerata*) and clover (*Trifolium repens*), which are reflective of the exotic pasture area the wetland areas are encompassed by. While these wetlands are of low existing ecological value and are unlikely to support any 'Threatened' or 'Regionally Significant' species, they are recognized for their intrinsic value as natural inland wetlands under the NPS-FM (2020).



Figure 17: Showing exotic species dominated wetland area W6

4.1.2.2. Indigenous wetlands

Two indigenous species dominated wetland areas (identified as W2 and W4 under Figure 14) are present on site, primarily contained within existing bush remnants or along riparian margins. An extensive indigenous wetland area extends to the north of the subject site (W1).

W2 and W4 were dominated by swamp millet (*Isachne globosa*), tangle fern (*Gleichenia dicarpa*), swamp kiokio (*Parablechnum minus*), *Baumea articulata*, kauri sedge (*Schoenus tendo*) and

Eleocharis sphacelata. Exotic species were contained throughout and included Mexican devil (*Ageratina adenophora*), soft rush and mercer grass.



Figure 18: Showing indigenous wetland area W2

W1 (Figure 19) is dominated by swamp millet (*Isachne globosa*), interspersed with purei (*Carex secta*), rautahi (*Carex lessoniana*), orange nut sedge (*Machaerina rubignosa*), giant umbrella sedge (*Cyperus ustulatus*), sharp spike sedge (*Eleocharis acuta*), kuawa (*Schoenoplectus tabernaemontani*), harakeke (*Phormium tenax*), manuka (*Leptospermum scoparium*), tangle fern ti kouka (*Cordyline australis*), wheki (*Dicksonia squarrosa*) and kiokio (*Parablechnum novae-zelandiae*). Bindweed (*Calystegia sepium subsp. roseata*) was common. Along its northernmost terminus the wetland merges into a saltmarsh wetland dominated oioi (*Apodasmia similis*) interspersed saltmarsh ribbon wood (*Plagianthus divaricatus*).



Figure 19: Showing indigenous wetland W1 directly adjoining the site to the north

4.1.3. Mangrove and saltmarsh areas (outside site boundaries)

An extensive ecotone transitional area extends along the Orongo Bay interface with the site and Aucks Road which can be best described as mangrove forest and scrub (SA1). The upper areas of the saltmarsh were dominated by oioi (*Apodasmia similis*) interspersed with swards of sea rush (*Juncus kraussii* subsp. *australiensis*) and saltmarsh ribbon wood (*Plagianthus divaricatus*), merging with manawa (*Avicennia marina* subsp. *australasica*).

4.2. Aquatic

4.2.1. Freshwater habitats

The watercourses on site (Figure 20) comprise of overland flow paths, intermittent streams and extensive network of artificial watercourses and artificial pond/lake system. The water generally flows from south to north towards the extensive pond and lake system extending along the sites lower lying northern aspect. Eventually all onsite watercourses discharge into Orongo Bay.

While there are a number of natural watercourses on site, these are primarily contained within the less accessible bush areas, with their lower catchments significantly altered. The extensive alteration of the site through land drainage, along with further drainage activities or the re-routing of existing channels, has resulted in a highly degraded and modified environment. Currently, the primary function of these drains seems to be water conveyance rather than serving any specific ecological purpose, and these features are all actively dredged, deepened, kept free of vegetation and otherwise maintained to allow for the effective drainage of the site. This has led to the loss of natural habitats and reduced biodiversity, as the drainage

infrastructure prioritizes managing water flow over supporting wildlife or maintaining ecological integrity.

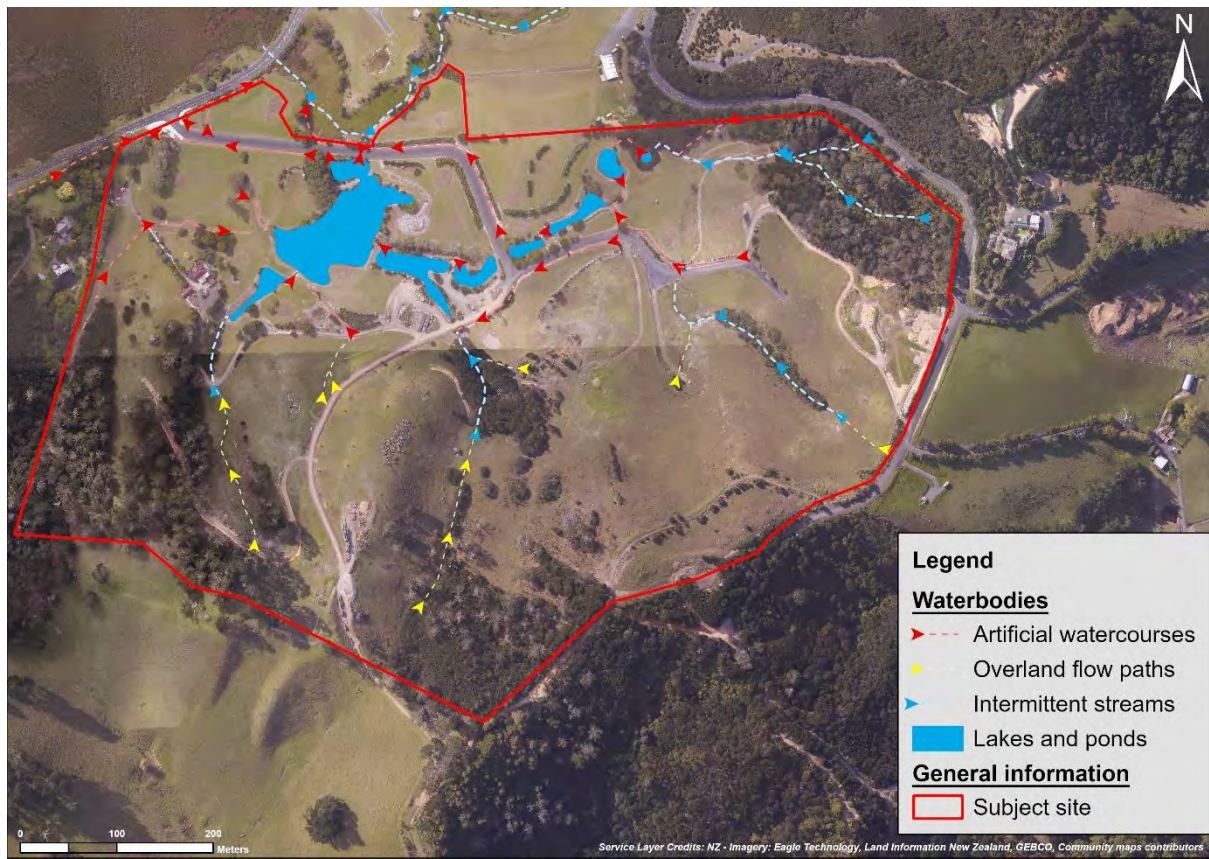


Figure 20: Showing the general hydrological patterns of the subject site



Figure 21: Intermittent stream flowing through the central aspect of the site



Figure 22: Site has been historically extensively modified through the establishment of an artificial pond/lake system extending along the northern low-lying aspect of the site

4.2.2. Aquatic diversity

An aquatic diversity survey was undertaken utilising minnow and henaki traps as well as through eDNA surveys utilising WilderLab test kit for multi-species analysis by DNA metabarcoding (WilderLab 2022) during a site visit in November 2022. The combined results of the aquatic diversity survey can be found in Table 1.

Short-fin eel were recorded within the central lake only, but are likely present within the wider pond system on site. No other indigenous fish species were recorded in the onsite streams, whether artificial or intermittent. This is likely due to modifications made on site through the establishment of the artificial pond/lake system which has likely created barriers that prevent or restrict fish passage, compounded by ongoing clearance of artificial drains. Notably, gambausia and goldfish were found in the central lake on site, as well as in the wetland and stream system to the north of the site. This indicates that both species are a catchment-wide issue, not confined to the site itself.

Table 2: Freshwater fish and invertebrate species recorded within the wider stream catchment (results from fish and eDNA survey carried out in November 2022)

Scientific name	Common name	Conservation status	Recorded via
<i>Anguilla australis</i>	Shortfin eel	Endemic and Not Threatened	eDNA & fish survey
<i>Anguilla dieffenbachii</i>	Longfin eel	Native & Declining (At risk)	eDNA & fish survey
<i>Carassius auratus</i>	Goldfish	Exotic pest fish species	eDNA
<i>Galaxias fasciatus</i>	Banded kokopu	Endemic and Not Threatened	eDNA & fish survey
<i>Gambusia affinis</i>	Gambusia	Exotic pest fish species	eDNA & fish survey

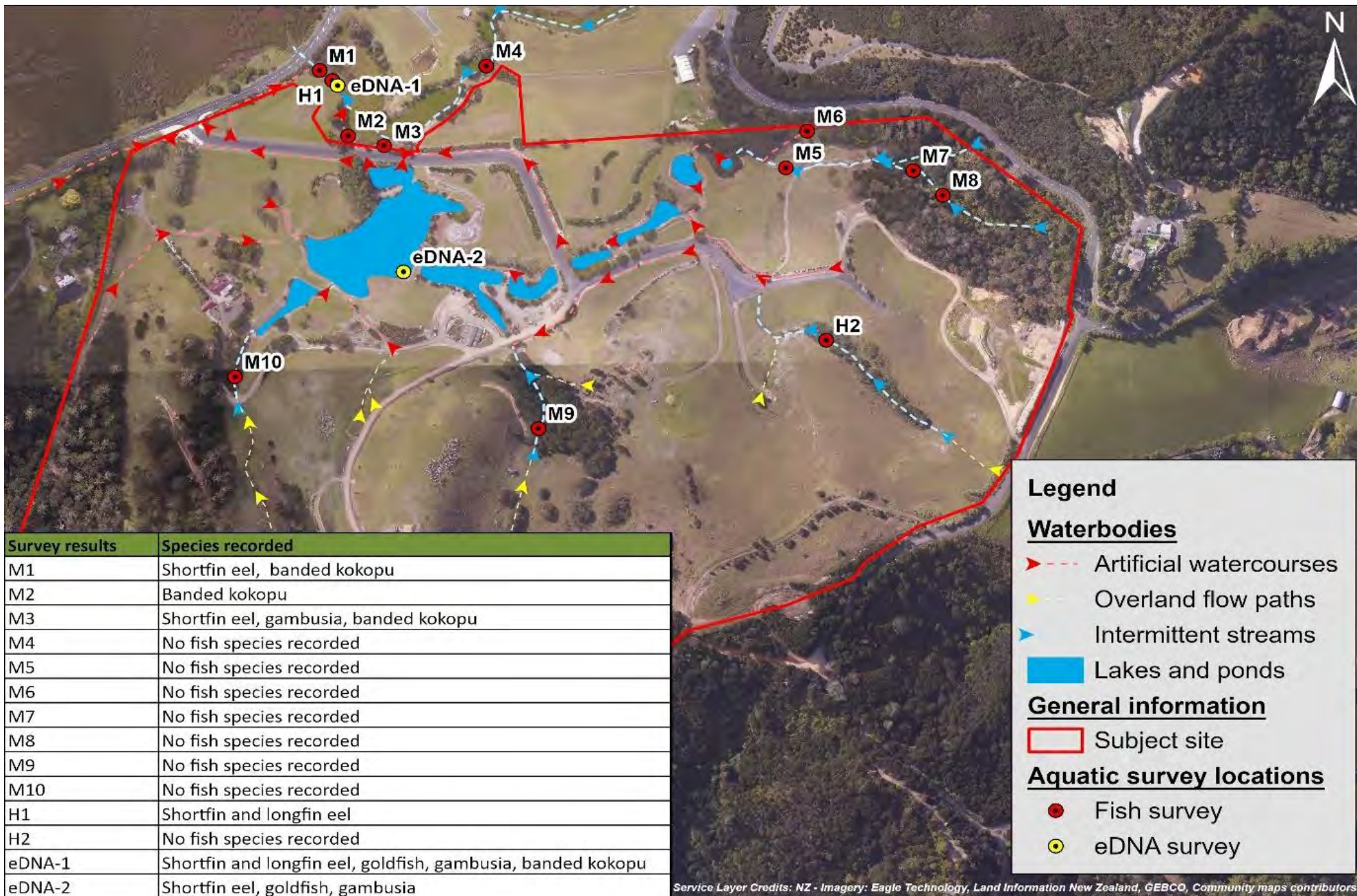


Figure 23: Showing aquatic survey locations and resulting species recorded – please note that none of the stream systems within the site boundaries itself contained any fish at the time of the surveys in November 2022

4.3. Avifauna

Avifauna species were observed on the site via opportunistic observations during site visits in November 2022 and July 2024, and deployment of a passive acoustic recorder (SongMeter SM4) for 12 hours between 8th and 9th of November 2022 with a comprehensive bird species list outlined in Table 4. Overall, the diversity of birds observed/recorded was moderate, with 13 native/endemic and 4 introduced species.

The birds observed on site are representative of the modified estuarine ecotone transitional area with some common bird species such as New Zealand fantail (*Rhipidura fuliginosa*), sacred kingfisher (*Todiramphus sanctus*), pukeko (*Porphyrio melanotus*), paradise shelduck (*Tadorna variegata*) observed on site. Mallard (*Anas platyrhynchos*) and their young were observed within the wetland area on site. Red billed gulls (*Chroicocephalus novaehollandiae*) and swamp harrier (*Circus approximans*) were observed flying overhead. NI fernbird (*Poodytes punctatus vealeae*) were recorded and observed within the wetland area (W1) extending to the north of the site. NI weka (*Gallirallus australis*) were recorded to the north of Aucks Road, near Orongo Bay saltmarsh margins.

Table 3: Bird species recorded on the site during site visits in November 2022

Scientific name	Common name	Conservation status
<i>Acridotheres tristis</i>	Myna	Introduced & Naturalised
<i>Anas platyrhynchos</i>	Mallard	Introduced & Naturalised
<i>Bowdleria punctata subsp. vealeae</i>	Fernbird	Native & At Risk–Declining
<i>Carduelis carduelis</i>	European goldfinch	Introduced & Naturalised
<i>Chrysococcyx lucidus</i>	Shinning cuckoo	Native & Not Threatened
<i>Circus approximans</i>	Swamp harrier	Native & Not Threatened
<i>Chroicocephalus novaehollandiae</i>	Red billed gull	Native and Declining
<i>Gallirallus australis</i>	NI weka	Endemic & Not Threatened
<i>Gerygone igata</i>	Grey warbler	Endemic & Not Threatened
<i>Hirundo neoxena</i>	Welcome swallow	Native & Not Threatened
<i>Passer domesticus</i>	House sparrow	Introduced & Naturalised
<i>Porphyrio melanotus</i>	Pukeko	Native & Not threatened
<i>Rhipidura fuliginosa</i>	New Zealand fantail	Endemic & Not Threatened
<i>Tadorna variegata</i>	Paradise shelduck	Endemic & Not Threatened
<i>Todiramphus sanctus</i>	Sacred kingfisher	Native & Not Threatened
<i>Vanellus miles</i>	Spur-winged plover	Native & Not Threatened
<i>Zosterops lateralis</i>	Silvereeye	Native & Not Threatened



Figure 24: NI fern bird was recorded within the wetland area to the north of the site

The site occurs within a designated high density kiwi zone (Figure 25), and North Island brown kiwi (*Apteryx mantelli*) have been previously recorded in the wider area. While not recorded on site during site surveys, kiwi use of the bush area and riparian corridors within the site boundaries and immediate surrounds is likely. Russell area is a known to be a stronghold of the Northland kiwi population due to the extensive forest habitat present in the area and extensive pest control operation, with kiwi regularly being observed within adjacent residential areas.

The majority of avifauna recorded on site is deemed as common, however the presence of NI fernbird indicates that the wetland area immediately adjacent to the north is utilised by at least one 'At Risk' avifauna species. While not recorded during site visits, given that the site abounds extensive saltmarsh and estuarine ecotone transitional area, it is possible that banded rail (*Gallirallus philippensis*), Australasian bittern (*Botaurus poiciloptilus*) may periodically be present within the on-site wetland areas and adjoining saltmarsh.

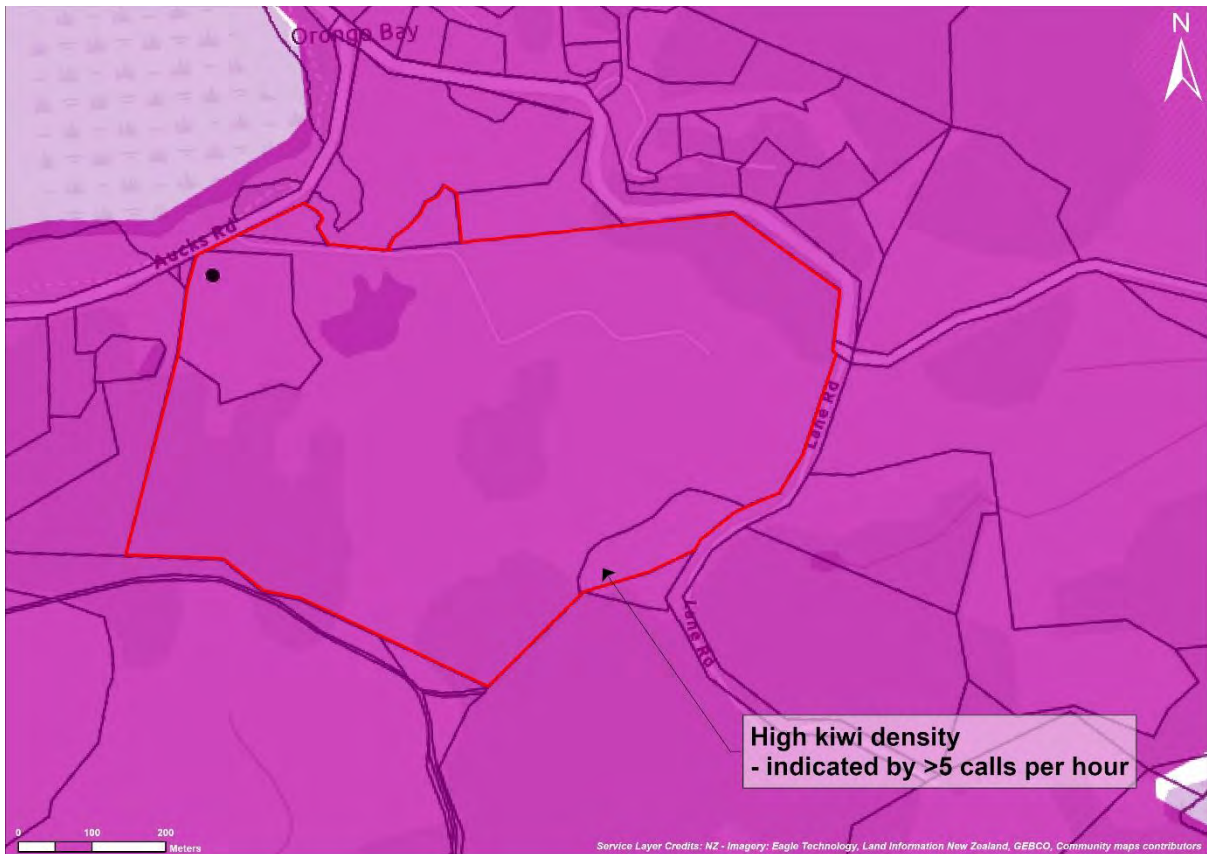


Figure 25: Showing the kiwi density map overlay (Source: Far North District Council Maps)

Concentrating the proposed development in areas that has been historically cleared, implementing domestic pet controls, enhancing habitat connections through revegetation planting, and protecting these through conservation covenant provisions will ensure that the habitats inhabited by these species are permanently protected. The proposed pest animal control to be established within the proposed ecological protection areas will positively support their potential utilisation of the on-site habitats and the wider Orongo Bay estuarine habitats the site abounds.

4.4. Lizards

A visual inspection and habitat suitability assessment of areas likely to be utilized by native lizards for sheltering or foraging (e.g., beneath logs, boulders, and manmade objects) was conducted during site visits November 2022. Good quality habitat for indigenous lizards is present on site, and albeit no lizard species were observed on site at the time of survey visits in November 2022, it is likely that the onsite kanuka scrubland areas provide good habitat for species such as elegant gecko (*Naultinus elegans*) or Northland green gecko (*N. greyii*) and copper skink (*Oligosoma aeneum*).

Figure 26 and Table 4 below outline the species likely to occur within the wider area and their corresponding conservation status. The current ecological value of on-site habitats for native lizards is considered to be moderate-high due presence the quality and quantity of suitable habitat and the number of 'At-Risk' species that are potentially present.

Table 4: Herpetofauna likely to be present with the surrounding area, including latest Threat Status (Hitchmough et al. 2021)

Common name	Latin name	Threat status	Suitable habitat on site or adjacent?
Pacific gecko	<i>Dactylocnemis pacificus</i>	Not threatened	Suitable habitat in the nearby Eastern Bay of Islands Estuary Q05/001
Rainbow/plague skink	<i>Lampropholis delicata</i>	Unwanted organism	Likely present on site and surrounds.
Yellow-lipped krait	Sea <i>Laticauda colubrina</i>	Vagrant	Suitable habitat in the nearby Eastern Bay of Islands Estuary Q05/001
Green and golden bell frog	<i>Ranoidea aurea</i>	Exotic species	Likely present on site and surrounds
Forest gecko	<i>Mokopirirakau granulatus</i>	At Risk - Declining	Suitable habitat on site within the kanuka scrubland areas
Elegant gecko	<i>Naultinus elegans</i>	At Risk - Declining	Suitable habitat on site within the kanuka scrubland areas
Northland green gecko	<i>Naultinus greyii</i>	At Risk - Declining	Suitable habitat on site within the kanuka scrubland areas
Copper skink	<i>Oligosoma aeneum</i>	At Risk - Declining	Suitable habitat on site within the kanuka scrubland areas
Ornate skink	<i>Oligosoma ornatum</i>	At Risk - Declining	Suitable habitat in the nearby Eastern Bay of Islands Estuary Q05/001
Moko skink	<i>Oligosoma moco</i>	At Risk - Relict	N/A – unlikely to be present on site and surrounds
Shore skink	<i>Oligosoma smithi</i>	At Risk - Declining	Suitable habitat in the nearby Eastern Bay of Islands Estuary Q05/001
Raukawa gecko	<i>Woodworthia maculata</i>	Not threatened	Suitable habitat in the nearby Eastern Bay of Islands Estuary Q05/001

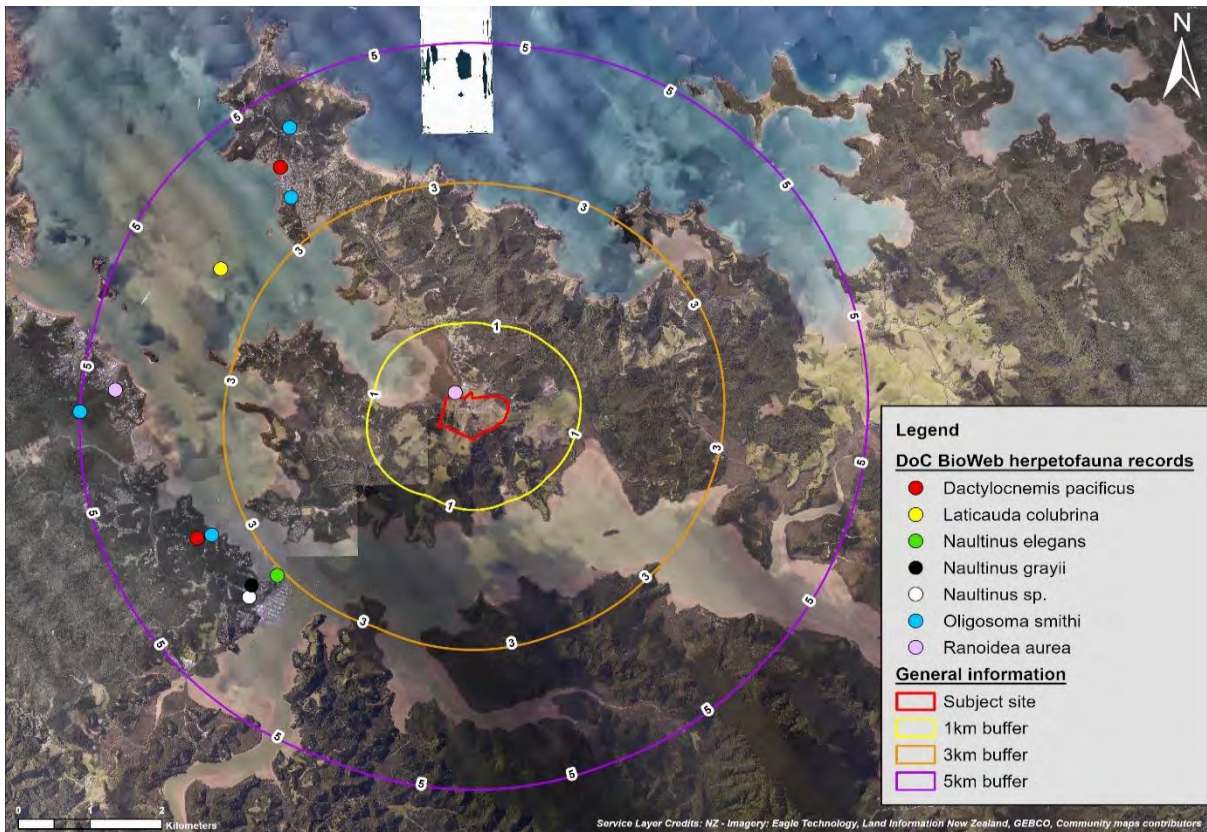


Figure 26: Showing DoC BioWeb database records for herpetofauna within 5-km radius from the subject site

4.5. Bats

New Zealand has two native bat species, being the long-tailed bat (*Chalinolobus tuberculatus*: Threatened-Nationally Critical) and the lesser short-tailed bat (*Mystacina tuberculata*: Threatened-Nationally Vulnerable). Native bats are ‘absolutely protected’ under the Wildlife Act (1953).

A search of DOC BioWeb (2024) database shows that the closest confirmed long-tailed and short-tailed bat records are located approximately 30 km at a site near Oheawai, with a known population stronghold throughout nearby Puketi Forest. Bats are highly-mobile fauna and can travel up to 20km or more in a single night. They have large territories and are listed on the NPSIB’s highly mobile fauna list.

During the site visit in November 2022, a visual assessment for potential roost sites was undertaken. Trees on site were assessed for their potential to support bat roosts, which comprised of a ground based visual inspection using binoculars to identify any features potentially suitable for roosting bats. Such features may include holes, frost cracks, deadwood, knot holes and limb wounds.

A brief, preliminary acoustic survey using the SongMeter Mini Bat Acoustic Sound Recorder was undertaken. The Acoustic Sound Recorder was set on the subject site between November 8th and 9th, 2022. The sound recorder was set up to record bats with a sampling time of 12 hours, set to start 15 minutes before dusk. The overnight weather was cool (minimum 10°C).

The results of the survey did not record any long-tailed bat activity during the survey period. However, given the proximity of known presence (<30km), and the highly mobile and transient nature of bats, long-tailed bat presence on site cannot be discounted.

No indigenous mature trees are proposed to be removed as part of the proposal, so bat roost potential on site will not be affected. While it is recommended that any residual wilding pines within the existing kanuka bush areas on site are controlled, it is recommended that drill & fill technique is used to avoid any potential impacts on any roosting bats. This will allow for the pine trees to decay over time, retaining and creating new deadwood habitat for bat species.

The nature of the site development proposal is unlikely to have any effect on any potential bat populations utilising the area. It is deemed that bat foraging habitat will in fact be enhanced through the protection, enhancement and restoration of the kanuka scrub/forest area, and provide a protected linear landscape corridor for movement and navigation to the wider area.

4.6. Summary of values

Method 12.2.5.6 of FNDP requires that in assigning ecological significance to habitats and species noted on site, the ecological matters of Representativeness, Rarity/Distinctiveness, Diversity and Pattern, and Ecological Context have to be considered. This is based on criteria outlined under Appendix 5 of Regional Policy Statement for Northland. Table 5 below outlines the ecological values assigned to the identified ecological features on site.

The overall existing ecological significance is 'moderate' for the regenerating kanuka scrub/forest, 'moderate-high' for the indigenous wetland habitats and 'low' for the exotic wetland habitats identified on site. While the exotic wetland habitats have been assigned a low ecological significance, it is important to acknowledge their intrinsic value as natural inland wetlands. Consequently, the proposed development has been carefully designed to avoid any direct impacts on these features, ensuring their protection throughout the process.

Table 5: Assessment of significance of habitats contained within the site boundaries based on Appendix 5 of RPS for Northland

Criteria	Regenerating kanuka shrubland	Indigenous wetland areas	Exotic wetland areas
(a) whether the area contains critical, endangered, vulnerable or rare taxa, or taxa of indeterminate threatened status (in the context of this clause, taxa means species and subspecies);	Likely support a number of 'At Risk' lizard species and keystone avifauna such as NI weka, NI brown kiwi.	W2 and W4 are representative of an early regenerating stage of manuka, tangle fern scrubland and fenland (WL12) which is a 'Critically endangered' ecosystem type under (Singers <i>et al.</i> 2017).	Exotic wetland areas W3, W5 and W6 are generally dominated by common exotic grasses and forbs. These areas are common within agricultural landscapes and were not observed to contain any 'At Risk' or 'Threatened' flora or fauna.
(b) whether the area contains indigenous or endemic taxa that are threatened or rare in Northland;	No endemic flora or fauna was noted within this habitat type, albeit it is not discounted that species such as Northland green gecko (<i>Naultinus grayii</i>) may be present within the bush area.	No endemic flora or fauna was noted within this habitat type.	No endemic flora or fauna was noted within this habitat type.
(c) whether the area contains representative examples in an ecological district of a particular habitat type;	Representative of its habitat type.	Representative of its habitat type.	Habitat has been heavily impacted by ongoing land use and does not contain any features that could be considered as one of the best representative examples of its particular habitat type.
(d) whether the area has a high diversity of taxa or habitat types for the ecological district;	The site supports the expected habitat types and faunal diversity associated with the range of habitat types present on site.	The site supports the expected habitat types and faunal diversity associated with the range of habitat types present on site.	The site supports the expected habitat types and faunal diversity associated with the range of habitat types present on site.
(e) whether the area forms an ecological buffer, linkage or corridor to other areas of significant vegetation or	This habitat type has not been included within the existing PNA overlay but has been included within the proposed SNA overlay (not operative).	W2 has been included within the proposed SNA overlay (not operative), while W4 is deemed to be of SNA quality.	This habitat type has not been included in any existing or proposed ecological overlays and therefore at current day generally consists of low-quality exotic wetland vegetation.

significant habitats of indigenous fauna;			
(f) whether the area contains types that are rare in the ecological district;	This habitat type is common in the ecological district.	This habitat type is not classified as rare in the ecological district, however freshwater wetlands are considered nationally important.	This habitat type is common in the ecological district.
(g) whether the area supports good populations of taxa which are endemic to the Northland or Northland-Auckland regions;	No endemic flora was noted within this habitat type on site. Likely supports 'At Risk' lizard species which may include the endemic Northland green gecko.	No endemic flora was noted within this habitat type on site. North Island fernbird was recorded within this habitat type.	No endemic flora or fauna was noted within this habitat type on site.
(h) whether the area is important for indigenous or endemic migratory taxa;	No indigenous migratory taxa were recorded within this habitat type. However, it is likely that species such as NI brown kiwi utilise the site and immediate surrounds for movement within the wider landscape.	No indigenous migratory taxa were recorded within this habitat type.	No indigenous migratory taxa were recorded within this habitat type.
(i) whether the area supports viable populations of species, which are typical of that type of habitat within an ecological district and retain a high degree of naturalness	The site was observed to support taxa which are typical of regenerating kanuka shrubland however it does not retain a high degree of naturalness due to historic vegetation clearance. Elegant gecko and Northland green gecko favour this habitat type.	Supports viable population of flora and fauna typical of its habitat type and assessed as maintaining moderate degree of naturalness.	This habitat type was observed to support taxa which are typical of regenerating exotic wetlands, however it does not retain a high degree of naturalness due to historic vegetation clearance and land use practices.
Overall	Moderate (i.e. Significant)	Moderate-High (i.e. Significant)	Low (i.e. Not significant)

5.0 ECOLOGICAL ENHANCEMENT PROPOSAL

5.1 Ecological management and enhancement

The existing onsite indigenous terrestrial and wetland vegetation in addition to extensive revegetation planting areas (Figure 27) are to be managed in accordance with a site-specific Ecological Management Plan (EMP) which is to be prepared as a condition of consent. The EMP will apply to the areas identified as 'proposed ecological enhancement areas' as presented under Figure 27. The total area proposed for ecological management is approximately 16.90 ha. This includes extensive revegetation planting throughout the site connecting and expanding upon existing features to create a protected corridor network throughout the site while also retiring steeper, erodible areas, thereby facilitating potential fauna movement throughout the site and its wider surroundings. Extensive buffer areas will be established to enhance habitat connectivity, protect sensitive ecological features, and support biodiversity by providing refuge and movement pathways for various fauna species.

For any revegetation planting within the 20-meter setback from the proposed building platforms, only indigenous species with low flammability have been selected. This choice is intended to reduce fire risk while maintaining ecological integrity. These species have been carefully chosen to not only minimize fire hazards but also to enhance biodiversity, support local wildlife, and provide long-term ecological stability within the area. The use of low-flammability native plants helps create a natural buffer that aligns with fire safety objectives while promoting the restoration of indigenous ecosystems.

The following sections provide general guidance on how to successfully manage the proposed ecological management areas in the future. Integral components of this will include pest animal and plant control, biosecurity and disease management, and maintenance. A more in-depth description is to be provided within the associated Ecological Management Plan, which is to be prepared as a condition of consent.

Please note that additional indigenous revegetation planting is proposed for landscape mitigation and amenity purposes. This has been detailed in the reports and plans prepared by Littoralis Landscape Architecture and is not included within the body of this report.

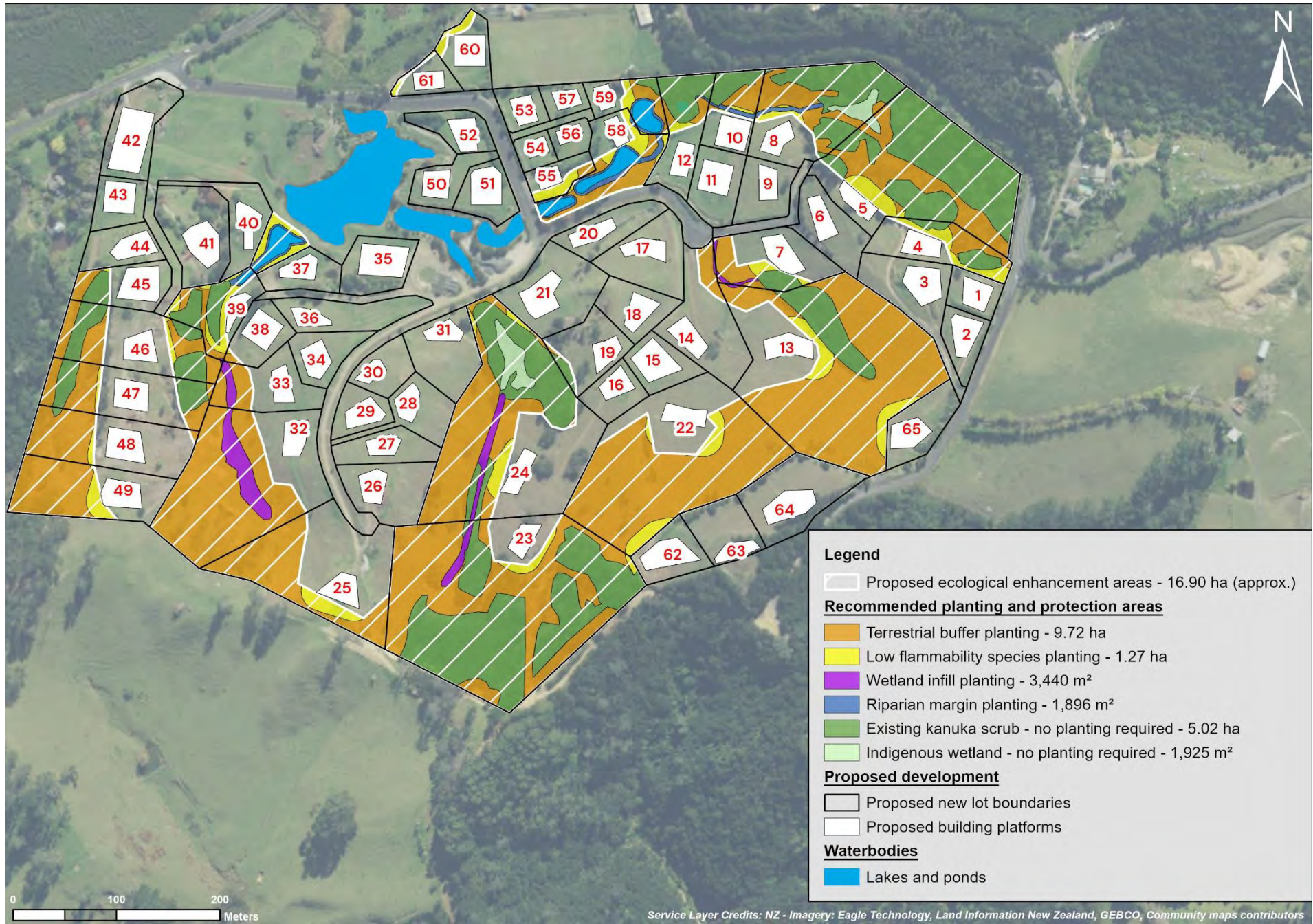


Figure 27: Proposed ecological protection and enhancement areas

5.1.1 Revegetation planting

Of the 16.90 ha of total ecological protection area approximately 11.5 ha will be revegetated utilising indigenous pioneer species mix. This includes extensive revegetation planting throughout the site connecting and expanding upon existing features to create a protected corridor network throughout the site while also retiring steeper, erodible areas, thereby facilitating potential fauna movement throughout the site and its wider surroundings (Figure 28). Additionally, it is proposed to enhance the existing exotic species dominated wetland areas on site through infill planting (Figure 30). It is noted that only non-flammable plant species are to be planted within 20m from any proposed new building platform on site.

Generally, the planting will utilise tight spacing between 0.75 m for wetland areas and 1.4m of pioneer revegetation terrestrial species mix to ensure canopy cover is achieved within 3-5 years (Table 6). This spacing is aimed at ensuring that suitable ground coverage is achieved through dense planting, which will aid weedy species suppression, manage soil erosion by providing some surface stability through vegetation cover and soil binding roots and enhance the natural character and ecological values of the site.

The specific details regarding the final revegetation planting plan will be elaborated upon in the Ecological Management Plan (EMP), which will be prepared as a condition of consent. This plan will outline the planting methodologies, species selection, and ongoing maintenance strategies to ensure successful ecological restoration and management, including staging of works, if necessary.



Figure 28: Terrestrial buffer planting will expand and connect existing onsite terrestrial features and stabilise the steeply sloping land extending throughout the site



Figure 29: Any planting within 20m setback from the proposed building platform locations is to be low flammability planting only



Figure 30: Showing wetland area W6 to be infill planted with appropriate indigenous wetland species

Table 6: Proposed revegetation planting species detail

Proposed revegetation planting										
Eco-sourcing region	Whangaruru ED									
Stakes required	Recommended – alternatively if stakes not used more frequent ongoing plant releasing required									
Planting timeframes	April–September									
Fertiliser required	Recommended									
Irrigation	Only should planting occur within shoulder season (i.e. March/October)									
		Terrestrial buffer planting – 9.72 ha			Wetland infill planting – 3,440 m ²			Low flammability planting – 1.27 ha		
Scientific name	Common name	% mix	Grade	% mix	Grade	Spacing (m)	Spacing (m)	Grade	Spacing (m)	Spacing (m)
<i>Carex lessoniana</i>	Rautahi				20%	0.5L	0.75m			
<i>Carex virgata</i>	Pukio				20%	0.5L	0.75m			
<i>Carex secta</i>	Purei				20%	0.5L	0.75m			
<i>Carpodetus serratus</i>	Putaputaweta							15%	0.5L	1.4 m
<i>Corposma lucida</i>	Shiny karamu							10%	0.5L	1.4 m
<i>Coprosma robusta</i>	Karamu	10%	0.5L	1.4m				15%	0.5L	1.4 m
<i>Cordyline australis</i>	Ti kouka	10%	0.5L	1.4m	5%	0.5L	1m			
<i>Cyperus ustulatus</i>	Giant umbrella sedge				5%	0.5L	0.75m			
<i>Geniostoma ligustrifolium</i>	Hangehange							15%	0.5L	1.4 m
<i>Griselinia lucida</i>	Akapuka							15%	0.5L	1.4 m
<i>Kunzea robusta</i>	Kanuka	25%	0.5L	1.4m						
<i>Leptospermum scoparium</i>	Manuka	10%	0.5L	1.4m	5%	0.5L	1m			
<i>Machaerina articulata</i>	Jointed twig rush				5%	0.5L	0.75m			
<i>Machaerina rubiginosa</i>	Orange nut sedge				5%	0.5L	0.75m			
<i>Melicytus ramiflorus</i>	Mahoe	10%	0.5L	1.4m						
<i>Myrise australis</i>	Mapou	10%						15%	0.5L	1.4 m
<i>Phormium tenax</i>	Harakeke	10%	0.5L	1.4m	5%	0.5L	1m			
<i>Podocarpus totara</i>	Totara	5%	1L	1.4m						
<i>Pseudopanax arboreus</i>	Five finger							15%	0.5L	1.4 m
<i>Typha orientalis</i>	Raupo				10%	0.5L	0.75m			
<i>Veronica stricta var. stricta</i>	Hebe	10%	0.5L	1.4m						

5.1.2 Staging of ecological protection and planting

It is understood that the proposed subdivision may be carried out in stages, and therefore it is crucial to ensure that all ecological actions—including protection of existing natural features, revegetation planting, weed control, pest animal control and stock exclusion—are implemented concurrently with all applicable ecological enhancement works completed prior to 224(c) certification for each proposed subdivision stage. This approach will ensure that ecological management and enhancement measures are not only initiated promptly but also maintained consistently throughout the development process.

The Ecological Management Plan (EMP), to be prepared as a condition of consent, will detail the staging approach, outlining specific timelines and actions required at each stage. By synchronizing the implementation of ecological actions with the subdivision's progression, we can effectively mitigate potential impacts on indigenous habitats and ensure the integrity of ecological functions throughout the site. This will support the creation of a cohesive and resilient ecological network that can thrive alongside the new development.

Moreover, establishing robust ecological practices from the outset will facilitate ongoing monitoring and management, allowing for adaptive responses as the subdivision progresses. This proactive strategy will not only enhance the ecological values of the site but also contribute positively to the surrounding environment.

5.1.3 Pest plant management

The indigenous vegetation contained within the proposed ecological covenant areas contains some pest plant species or weedy species that will be required to be controlled. It should be noted that exotic pine clearance and pest weed control has already been carried out between May and July 2024. As a result, the site contains only a low number of pest plants which will require to be controlled, including brush wattle, black wattle, Sydney golden wattle, ginger, Radiata pine, pampas, willow-leaved hakea, needle-leaved hakea, Taiwan cherry, Woolley nightshade, Sod's balsam, gladiolus and gorse. Management efforts to control these species within the existing kanuka scrub forest areas to participable minimum density are recommended. Ongoing vigilance for any weedy species incursions will take place.

Pest plants and weedy species observed within the proposed ecological management areas are briefly summarized under Table 7 below. Some of the pest plants noted on site have been designated as Sustained Control Plants as classified within Northland Regional Pest and Marine Pathway Management Plan (NRPMPMP) (2017-2027).

An Ecological Management Plan (EMP) is to be prepared as a condition of consent to act as a practical management document which can be utilised by the landowner or their contractor to carry out the recommended ecological management actions. The EMP will outline specific management actions and detail species identification and control of the weeds, and ongoing maintenance and monitoring requirements that weedy species are controlled to a practicable minimal density.

Table 7: Pest plants and weedy species recorded within the proposed ecological management areas, their designation and abundance (A = Abundant, C = Common, O = Occasional, S = Sparse)

Latin name	Common name	Designation within NRPMPMP	Abundance/location
<i>Acacia longifolia</i>	Sydney golden wattle	Sustained Control Plants	A
<i>Acacia mearnsii</i>	Black wattle	Not listed	A
<i>Asparagus scandens</i>	Climbing asparagus	Not listed	A
<i>Cortaderia selloana</i>	Pampas	Not listed	A
<i>Gladiolus undulatus</i>	Gladiolus	Not listed	C
<i>Hakea sp.</i>	Willow leaved hakea and needle-leaved hakea	Sustained Control Plants	A
<i>Hedychium flavescens</i>	Wild ginger	Sustained Control Plants	C
<i>Impatiens sodenii</i>	Sod's balsam	Not listed	A
<i>Ligustrum sp.</i>	Tree privet and Chinese privet	Sustained Control Plants	A
<i>Pinus radiata</i>	Radiata pine	Not listed	C
<i>Prunus campulata</i>	Taiwan cherry	Sustained Control Plants	C
<i>Rubus fruticosus</i> agg.	Blackberry	Not listed	C
<i>Solanum mauritianum</i>	Woolly nightshade	Sustained Control Plants	C
<i>Ulex europaeus</i>	Gorse	Sustained Control Plants	C
<i>Zantedeschia aetioipica</i>	Arum lily	Not listed	O

5.1.4 Pest animal management

While not directly observed during site visits, the site likely supports a full suite of exotic mammalian pest animal species, including possum (*Trichosurus vulpecula*), rats (*Rattus rattus* and *R. norvegicus*), stoats (*Mustela erminea*), and hedgehogs (*Erinaceus europaeus*). These pests are known to have adverse ecological effects on native flora and fauna, including avifauna and lizards, and their browsing can interfere with indigenous plant growth and natural regeneration, harming plant health and survival.

A comprehensive control and monitoring program is to be developed within the body of an Ecological Management Plan (EMP).

5.1.5 Stock exclusion and covenant demarcation

It is recommended that a no-stock covenant is imposed on the proposed development boundaries and that stock-proof fencing is established along the external boundaries of the

parent site, where such fencing typology does not already exist. This is to prevent stock entry from the immediately adjacent properties from roaming into the proposed development areas and subsequently into the ecological and landscape planting management areas.

It is recommended that internal boundaries of the proposed ecological covenant areas are physically demarcated using demarcation posts. The demarcations posts must be no less diameter wooden posts than No. 3 posts installed with a minimum height of 800mm above the ground and at a maximum separation distance of 10 metres and at each change in direction of the boundary. Alternatively, the proposed ecological management areas will need to be fenced to an appropriate stock-proof standard (7-wire post and batten minimum).

The final fencing and demarcation layout and typology are to be confirmed within the body of the EMP.

5.1.6 Maintenance

Ongoing maintenance including revegetation plant releasing and replacement (where required), weed control and pest animal control within the proposed ecological management areas is to take place for 5 years following the completion of the initial revegetation planting effort, the first round of pest weed control and establishment of a pest animal control network. Pest animal bait stations/trap network should be serviced monthly, where feasible and practicable. Planting maintenance and weed control should be carried out bi-annually during Years 1-3 and annually during Years 4 & 5 for a minimum period of five years in spring and late summer.

Ongoing maintenance and monitoring will be described in more detail under an EMP which is to be prepared as a condition of consent.

5.1.7 Monitoring

For this ecological management proposal to be successful, keeping up to date records of pest plant and animal control efforts are key to determine the success of ecological management efforts.

Upon completing the first round of physical ecological works, the consent holder must submit an Ecological Works Completion Report from a qualified ecologist to the Council. This report should follow the implementation of the initial revegetation planting effort, pest weed and animal control measures and stock exclusion. The Council will conduct inspections as needed to ensure compliance, and all work must meet the satisfaction of the Compliance Monitoring Officer or a similar authority.

Example monitoring forms are to be provided within the body of the EMP which can be used by the Applicant or their engaged suitably qualified contractor to keep up to date maintenance/monitoring records for any maintenance including replanting, pest weed, and pest animal control works carried out on site during the 5-year maintenance and monitoring period.

6.0 POTENTIAL ECOLOGICAL EFFECTS AND MITIGATION

The following sections describe potential ecological effects based on the general layout and location plan and associated services as shown within the proposed Scheme Plan prepared by Maven. The proposed development areas have been selected in consultation with Wild Ecology to ensure that development footprint is contained, as far as feasible and practicable, within areas that are relatively free of ecological constraints and thus potential effects are localised and minimised. A brief assessment of potential ecological effects and mitigation measures is provided under Table 8.

Generally, the potential adverse effects associated with the site development on ecological values are:

- Potential loss of habitat for indigenous fauna;
- Potential for injury / mortality to indigenous fauna;
- Potential introduction of plant pathogens;
- Increased presence of pet animals on site;
- Change in flow regime due to increased site imperviousness.

Overall, the actual or potential adverse effects on ecological values that may result from the proposed development will be generally 'low' provided works are carried out in a manner that gives effect to the expert reporting and recommendations prepared for the proposal. It is therefore deemed that the development can be carried out in a manner that will not adversely affect the ecological values on site.

The development is anticipated to yield positive biodiversity outcomes that serves multiple functions, including ecological enhancement, open space, and recreational opportunities. Collectively, this will improve both the structural and functional connectivity of the onsite indigenous habitats. Additionally, the inclusion of pedestrian footpaths within the proposed ecological covenant areas will allow the site residents to enjoy and engage with these natural areas, fostering a greater appreciation for local biodiversity and providing recreational and educational opportunities.

Table 8: Magnitude and level of impact for proposed development before and after mitigation

Effect/activity	Potential habitat or species impacted	Ecological value	Magnitude of effect (no mitigation)	Comment	Recommended mitigation/management measures	Level of effect (with management in place)
Earthworks and sedimentation, smothering bed	All aquatic habitats	High	High	Earthworks associated with the active development of the site have the potential to result in sediment runoff into the on-site and adjacent watercourses and wetland areas.	The ecological effect associated with earthworks is assessed as low should these be carried out in accordance with Auckland Council Guideline Documents 2016/005: Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region as required under Section C.8.3 of the NRC Proposed Regional Plan for Northland (February 2024).	Low
Recontouring and/or diversion of artificial watercourses	Artificial watercourses and lakes	Low	High	<p>Some recontouring and/or diversion of artificial watercourses (such as drains and ponds) on site will be required. During these works, partial or full dewatering may be necessary to temporarily lower water levels in the artificial systems, allowing for the safe and efficient execution of recontouring activities.</p> <p>This could lead to temporary habitat loss for aquatic species, as well as potential changes in water quality due to sediment disturbance.</p>	<p>If partial dewatering is implemented, the area to be infilled should be isolated from the pond by carefully installing rocks or sandbags. This will ensure that some water remains available for fish to take refuge in.</p> <p>Should full dewatering of the ponds be required, indigenous fish and other indigenous aquatic species should be salvaged and relocated to nearby suitable habitats during the course of the works. Pest fish species should be humanely euthanised and disposed of to avoid risk of release into the wider environment.</p> <p>Appropriate sediment control measures (e.g., silt fences, sediment traps) should be installed to prevent sedimentation in downstream areas.</p> <p>Once recontouring is complete, water should be reintroduced gradually, allowing the re-established habitats to stabilize and support wildlife. Pond margins</p>	Low

Effect/activity	Potential habitat or species impacted	Ecological value	Magnitude of effect (no mitigation)	Comment	Recommended mitigation/management measures	Level of effect (with management in place)
					should be replanted with appropriate native riparian species.	
Pest weed/exotic vegetation clearance	Terrestrial	Low	Low	Exotic pest plants are to be controlled on site as per recommendations made within the body of this report and associated EMP.	Weed control has been ongoing since at least May 2024 and is continuing in preparation for habitat enhancement for revegetation planting. Wider terrestrial habitat is to be improved through revegetation planting, pest plant and pest animal control and permanent stock exclusion from indigenous habitats on site.	Positive
Stormwater infrastructure and management	Aquatic habitats	High	High	The development of pasture into additional dwellings and servicing can result in alteration to natural drainage patterns and increased catchment imperviousness that can alter hydrology and water quality in the downstream environment.	The proposed stormwater infrastructure construction, management, and dispersal are not expected to adversely affect the hydrology, habitat quality, or water quantity of the aquatic habitats on site and in the immediate surroundings, provided they are constructed and maintained in accordance with recommendations made within the associated expert reporting prepared for the proposed development.	Low
Wastewater infrastructure and management	Aquatic habitats	High	High	On-site wastewater disposal will be required for the development. Due to site size constraints, the indicative wastewater fields for proposed Lots 45 and 39 have been placed within the proposed covenant areas.	All wastewater infrastructure and dispersal fields will be designed by a qualified engineer in accordance with best practices. Wherever feasible and practicable, the design will adhere to the setback requirements outlined in the PRPN (February 2024). If these setback requirements cannot be met, alternative distances will be established through consultation with the Northland Regional Council (NRC). It is recommended that primary wastewater fields are planted with low-growing native species to enhance	Low

Effect/activity	Potential habitat or species impacted	Ecological value	Magnitude of effect (no mitigation)	Comment	Recommended mitigation/management measures	Level of effect (with management in place)
				<p>In proposed Lots 37, 40, 60, and 61, the indicative wastewater fields cannot meet the required 15-meter setback from waterbodies.</p> <p>To address the above, the proposal includes minor recontouring of the pond areas on site to increase the distance between the proposed wastewater infrastructure and the open water features, thus mitigating the risk of wastewater contaminating nearby water features, thereby protecting water quality and aquatic habitats.</p>	<p>system performance, promote nutrient absorption, and help manage surface water flow.</p> <p>Due to potential non-compliance with the standard 15-meter setback from waterbodies on proposed Lots 37, 40, 60, and 61, these lots are to be serviced by advanced tertiary wastewater dispersal systems, placed no closer than 10 meters from any surface water. This requirement will also apply to proposed Lots 55, 58, and 59 if the proposed recontouring of the pond area does not achieve the required 15-meter setback.</p> <p>In proposed Lots 45 and 39, where wastewater fields are to be installed within covenant areas, only surface-laid systems with minimal maintenance requirements will be permitted to ensure that the integrity of the proposed covenant areas is not compromised.</p> <p>Provided the wastewater disposal systems are installed and maintained according to the recommendations in the associated technical reports and those outlined above, no adverse effects on freshwater habitats from the new effluent disposal fields are anticipated.</p>	
Impacts on natural inland wetland areas	Wetland habitats	High	High	No natural inland wetlands are to be reclaimed or adversely affected on as part of the proposal.	Where any earthworks are required to take place within a 100m setback of a natural inland wetland appropriate sediment and erosion controls are to be implemented	Positive

Effect/activity	Potential habitat or species impacted	Ecological value	Magnitude of effect (no mitigation)	Comment	Recommended mitigation/management measures	Level of effect (with management in place)
				No earthworks, vegetation clearance or stormwater discharges will be required to take place within a 10m setback of natural inland wetland(s).	in accordance with Proposed Erosion and Sediment Control Overall Plan produced by Maven. All onsite wetland areas and their margins are to be enhanced as part of revegetation planting, pest plant and pest animal control and permanent stock exclusion.	
Introduction of additional pet animals on site	Terrestrial and aquatic habitats	High	High	Given the likely presence of NI kiwi, NI fernbird and weka on site or directly adjacent (and likely presence of other avifauna and lizard fauna), it is recommended that a ban on pet cats and exotic pest animals (including turtles, rodents, exotic fish, exotic birds, mustelids etc.) for the new development is proposed. To manage the presence of pet dogs, secured containment measures such as electronic pet fences or dog runs should be required to prevent dogs from roaming freely and disturbing sensitive habitats.	To safeguard native wildlife and ensure the long-term protection of biodiversity on the site following development, specific restrictions on pet animals will be implemented. These restrictions will include: <ol style="list-style-type: none"> 1. Prohibition of Certain Pets: The keeping of pet cats, mustelids (such as ferrets and weasels), exotic fish, turtles, and birds will be strictly prohibited. This measure aims to eliminate the risks these species pose to local fauna and habitats. 2. Secure Containment for Dogs: All pet dogs must be contained securely within designated areas to prevent them from roaming freely. This containment will reduce potential disturbances to wildlife and help maintain ecological balance. 3. Avian Awareness Training: Any pet dog(s) brought onto the site will be required to undergo avian awareness training. Owners must provide a completion certificate to the Council before keeping their dog on the property. This training is designed to educate dog owners about the importance of protecting 	Low

Effect/activity	Potential habitat or species impacted	Ecological value	Magnitude of effect (no mitigation)	Comment	Recommended mitigation/management measures	Level of effect (with management in place)
					avian species and minimizing disturbances to their habitats.	
Fire risk	Terrestrial habitat	High	High	Introduction of new buildings near/in the bush area has the potential for increasing fire risk	Revegetation planting within a 20m setback of all dwellings is to be native low-flammability species only to form a buffer between the dwellings and the existing more flammable kanuka dominated habitats. Ongoing flammable weed management (e.g. gorse) within a 20m setback of all dwellings to ensure fire risk is minimized.	Low
Introduction of artificial lighting	Terrestrial habitats	High	High	The potential adverse effects from artificial light on the surrounding habitats and species using these areas pose some low-level risk to the fauna species moving through the site. Artificial lights are known to play a role in influencing bat behaviour, with activity negatively correlated with street-light density. Many New Zealand avifauna, herpetofauna and insects are fully or partially nocturnal.	<p>The potential impacts of the effects of artificial lighting can be significantly minimised through the following:</p> <ul style="list-style-type: none"> • Exterior lights should be cowed (shielded) and or low-level downward directional, to reduce light spill and direct lighting only where required. • Exterior lights are to be on a short (1min) timer, set to automatically switch off when not in use. • No flood lights within areas facing forest vegetation. <p>Any external lighting should be LED, narrow spectrum, with minimum Ultraviolet spectrum. Should be warm spectrum avoiding white and blue light spectrum.</p>	Low
Construction and use of pedestrian footpaths	Terrestrial and aquatic habitats	High	Moderate	The construction of pedestrian footpaths within the proposed ecological covenant areas has the potential to disturb both terrestrial and aquatic habitats, particularly in areas	To mitigate these effects, it is recommended that footpath construction be completed prior to any revegetation planting. This approach ensures that newly planted areas remain undisturbed and protected during construction activities.	Low

Effect/activity	Potential habitat or species impacted	Ecological value	Magnitude of effect (no mitigation)	Comment	Recommended mitigation/management measures	Level of effect (with management in place)
				<p>where vegetation removal or soil disturbance may be necessary.</p> <p>The use of the pedestrian footpaths post construction may result in disturbance to fauna which may have extended their habitat as a result of the indigenous vegetation planting.</p>	<p>Additionally, best practice sediment control measures, such as silt fences, sediment traps, and buffer zones, should be implemented to prevent sediment runoff into nearby water bodies.</p> <p>To minimize impacts associated with the ongoing use of the proposed footpaths, careful management of pedestrian access and the design of footpaths should be considered. Pathways should be designed to avoid key habitat areas, pet dogs to be allowed to enter these areas on leads only, and signage could be used to encourage responsible footpath use.</p>	
Construction effects	Avifauna habitat	High	Low	The onsite or adjacent bush and wetland habitats provide habitat for NI kiwi, NI fernbird and weka. While no susceptible fauna was noted within the immediate development footprint itself, works should be minimized as far as feasible and practicable to reduce disturbance.	No adverse effect on avifauna anticipated as no vegetation clearance is proposed to take part of the development (apart from low level manual weed control efforts). Habitat is to be improved through revegetation planting, pest plant and pest animal control, domestic pet controls and permanent stock exclusion.	Positive
Construction effects	Lizard habitat	High	Low	Lizard habitat limited to the regenerating kanuka scrub/forest which will not be impacted on by the proposed development.	No adverse effect on herpetofauna anticipated as no vegetation clearance proposed as part of the proposal. Habitat is to be improved through revegetation planting, pest plant and pest animal control, domestic pet controls and stock exclusion.	Positive

Effect/activity	Potential habitat or species impacted	Ecological value	Magnitude of effect (no mitigation)	Comment	Recommended mitigation/management measures	Level of effect (with management in place)
Construction effect	Fish and aquatic invertebrates	Low	High	<p>Site is not deemed to contain optimal aquatic indigenous fauna habitat due to ongoing disturbance and management of all onsite waterbodies.</p> <p>The onsite lake was observed to contain shortfin eel as well as gambusia and goldfish. While shortfin eel is a native fish species, both gambusia and goldfish are exotic pest fish species.</p>	<p>Comprehensive sediment and erosion controls should be implemented as part of active site development works.</p> <p>As part of the pond and artificial watercourse recontouring works, should full dewatering be required, fish and other aquatic species should be salvaged and relocated to nearby suitable habitats. All exotic pest fish species should be euthanised to prevent their reintroduction into the wider aquatic environment.</p> <p>Where possible the potential spread of goldfish and gambusia within the wider catchment should be avoided, noting that their presence was already recorded within the extensive wetland area and associated intermittent stream to the north of the site.</p>	Low
Construction effect	Bat habitat	High	Moderate	<p>Previous long-tail bat records within 30km of the site. Site surveys utilising acoustic bat monitor recorded no long tail bat activity. Suitable foraging and roosting habitat is present on site so future use is not discounted.</p>	<p>No adverse effect on bats anticipated. Habitat is to be improved through revegetation planting, pest plant and pest animal control, domestic pet controls and stock exclusion.</p> <p>For wilding pine control within the kanuka scrub/forest, it is recommended that drill & fill technique is used to avoid any potential impacts on any roosting bats. This will allow for the pine trees to decay over time, retaining and creating new deadwood habitat for bat species.</p>	Positive

7.0 RELEVANT PLANNING CONSIDERATIONS

The following section summarises the ecological considerations in relation to local, regional and national policy statements and regulations associated with the preservation and mitigation of effects related to potential development of the site. In respect to the proposal, it is considered that the following are applicable:

- Far North District Plan (FNDP) (Operative) 2009 – Rule 12.7.6.1.1. and Rule 12.4.6.1.2
- National Policy Statement for Indigenous Biodiversity (NPS-IB) (2023)
- National Policy Statement for Freshwater Management (NPS-FM) 2020
- Resource Management (National Environmental Standards for Freshwater) Regulations (NES-FW) (2020)

Policies and regulations relating to each of the specific plans are further outlined in sections below.

7.1 FNDP Rule 12.7.6.1.1 – Setbacks from Wetlands

Rule 12.7.6.1.1 requires that any building and any impermeable surface must be set back 30m for any wetland of 1 ha or more in area. Given that wetland W1 which is located directly north of the site is approximately 1.1 ha in size, this setback is deemed applicable. This setback will be breached for proposed building platforms on Lots 60 and 61 which will be located within the 30m setback, but no closer than 10m to the wetland areas. It is noted that the immediate areas between the wetland area W1 and the building platforms within proposed Lots 60 and 61 will be revegetated with indigenous species to provide a terrestrial planted buffer between these features. It is also understood the wetland margins on the directly adjacent property are required to be planted as part of conditions of consent for the adjacent private development to the north.

From an ecological perspective, it is considered that subject to sufficient sediment, erosion and earthworks controls being imposed during construction the potential adverse effects on the identified wetlands areas will be minimal. The proposal includes buffer planting encompassing the existing wetland area W1, as well as ban on pet animals including cats, mustelids, exotic pet fish, pest birds and reptiles and secured containment for any pet dogs from the site, meaning that there is no additional threat to potential fauna present within the wetland area W1 from increased domestic pet presence on site.

Provided that these controls are abided by, adverse effects associated with the non-compliance with the required wetland setbacks on the identified wetland area would be low.

7.2 FNDP Rule 12.4.6.1.2 – Fire risk to residential units

Rule 12.4.6.1.2. requires that residential units shall be located at least 20m away from the drip line of any trees in a naturally occurring or deliberately planted area of scrub or shrubland, woodlot or forest. It is understood that a number of dwellings may be located within a 20m setback of the existing onsite kanuka scrub/forest or the proposed revegetation plantings. Any revegetation planting nearby 20m setback of all dwellings is to be native low-flammability species only to form a buffer between the dwellings and the existing more flammable kanuka dominated habitats. Ongoing flammable weed management (e.g. gorse) within a 20m setback of all dwellings is recommended to ensure fire risk is minimized.

7.3. National Policy Statement for Freshwater Management (2020)

New Zealand has historically lost most of its wetland extent. Those remaining are rare and valuable ecosystems. The core intent of the policies in the NPS-FM (2020) is to provide stronger protection for freshwater bodies and wetlands. It also places a statutory responsibility on territorial and consenting authorities to give effect to Te Mana o te Wai by prioritizing the health and wellbeing of our waterways. With respect to Te Mana o te Wai, the hierarchy of obligations for consenting authorities are;

1. first, to prioritise the health and well-being of water bodies and freshwater ecosystems;
2. second, the health needs of people (such as drinking water); and
3. third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

In relation to the proposed development of the site, the application demonstrates a commitment to upholding the hierarchy of obligations outlined in the NPS-FM (2020). The primary objective has been to avoid any potential adverse effects on the identified natural inland wetland areas located on the site and immediate surrounds. The development plan prioritizes the protection, enhancement and preservation of freshwater ecosystems by minimizing disruptions and preserving the ecological integrity of the wetland areas.

Through these efforts, the proposed development aligns with the NPS-FM 2020's emphasis on maintaining and improving the health and well-being of freshwater bodies, demonstrating a balanced approach to development and environmental stewardship.

7.4. National Environmental Standards for Freshwater Management (2020)

The proposed development (please refer to the RC Plan drawings prepared by Maven) has been designed with the input of the results of the habitat classification and delineation provided by Wild Ecology, with the proposed built development to be placed as far as practicable from sensitive receiving environments.

Having reviewed the proposed development plans, including stormwater, earthworks and wastewater management plan, it is understood that no earthworks, vegetation clearance or stormwater discharges shall take place within a 10m setback of an identified natural inland wetland areas (Figure 31). Wastewater discharges will be to land only (not water) and therefore do not require a consent under NES-FW. However, given the scattered nature of the wetland

areas on site, it is inevitable that at least some minor earthworks and stormwater discharges will occur within a 100m setback from the identified wetland areas. This is further discussed under Sections 7.4.1–7.4.3 below.

For any earthworks, water take, use, damming, or diversion activities occurring outside the 10m wetland setback but within the wider 100m buffer, mitigation measures have been recommended. These include the implementation of comprehensive sediment and erosion control measures to be implemented before and during construction. While the 100m setback acts as an extended buffer, it is anticipated that, with appropriate sediment and erosion controls in place, any construction or water diversion or discharge activities within a 100m wetland setback will avoid any adverse effects on the wetland ecosystem and will not lead to the complete or partial drainage of the natural inland wetland(s). The identified natural inland wetland areas and their associated margins shall be enhanced as part of the proposed ecological revegetation proposal for the site and incorporated into a well-functioning open space. With mitigation in place the overall effects associated with construction within 100m wetland setbacks are assessed as 'low'.

It should be noted that exotic pine clearance and pest weed control has already been carried out between May and July 2024 which may have taken place within or within a 10m setback of the identified natural inland wetland areas. It is considered that the exotic vegetation clearance and earthworks within the natural inland wetland area and/or within a 10m setback were conducted for wetland restoration purposes. These works are considered a permitted activity as it complies with the conditions outlined under Regulations 38(1) and 38(2). Specifically, the vegetation clearance and earthworks were for the purpose of natural inland wetland restoration and complies with Regulation 38(5)(d) which exempts the proposal from Regulation 38(4)(b) where the wetland area is greater than 500m². Accordingly, resource consent for these works was not required under Regulation 39(1)(a).

Based on the assessment, it is concluded that the proposed development, with the outlined mitigation measures and restoration initiatives, is appropriately designed to avoid significant adverse effects on natural inland wetlands. The proposal is consistent with the relevant regulatory requirements, and the overall ecological impacts are assessed as 'low'.

7.4.1 Stormwater management

According to Civil Engineering Report prepared by Maven it is proposed that stormwater control within the site will build upon the existing network of table drains, swales and culverts which direct stormwater from the formed accessways into the manmade pond and associated features. The stormwater network will convey and discharge flows via outlets to existing low lying points within topography (including roadside drains, artificial watercourses, natural watercourses and pond areas). It is understood that no earthworks associated with the stormwater network construction and management will be required to take place within a 10m setback of a mapped natural inland wetland.

It is considered that potential adverse effects on the identified natural inland wetland features can be minimized, mitigated, and managed effectively in accordance with Proposed Stormwater Plan prepared by Maven. The overall level of effect with mitigation in place is assessed as 'low.'

7.4.2 Building setbacks

All proposed building platforms are shown outside a 10m setback from the identified natural inland wetland areas (Figure 31). All onsite and any adjacent wetland areas and their margins will be enhanced through infill and buffer planting providing extensive buffer areas between the built and existing natural environment. For the purpose of this assessment, it is considered the site is able to accommodate building platforms and associated infrastructure without adverse effect on the wetland areas should sufficient sediment and erosion control measures be implemented during active earthworks on site.

7.4.3 Proposed pedestrian footpaths

The proposal includes pedestrian walkways extending through the proposed ecological covenant areas. While the exact location of these walkways is not yet finalized, the final design will be adjusted to fit the natural topography of the site and be compliant with NES-FW (2020) regulations.

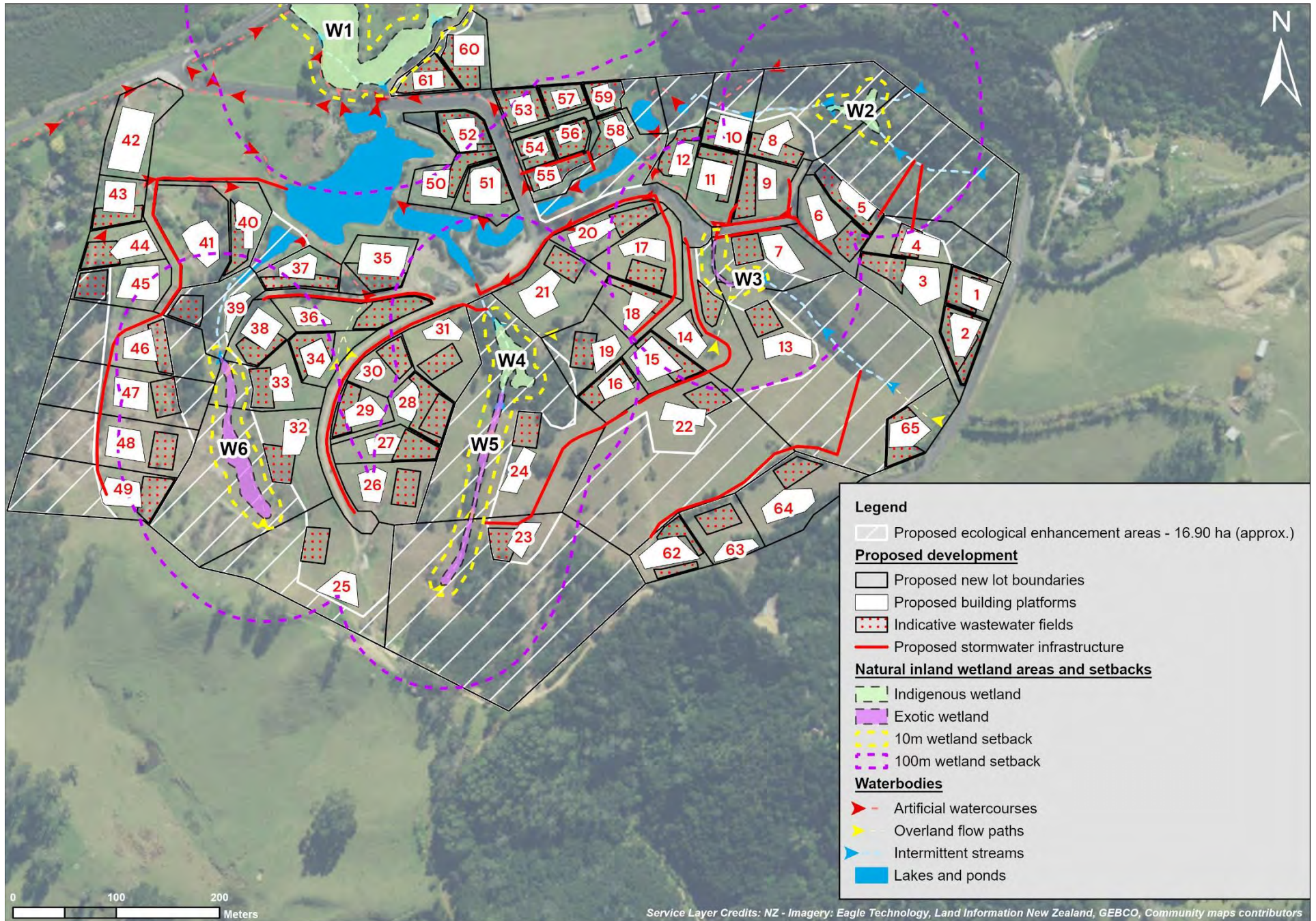


Figure 31: Showing the proposed development layout with onsite watercourse, natural inland wetland areas and associated 10m and 100m setbacks overlay

7.5. National Policy Statement for Indigenous Biodiversity (NPS-IB) (2023)

National Policy Statement for Indigenous Biodiversity (NPS-IB) came into force on August 4th, 2023 (commencement date) and applies to indigenous biodiversity in the terrestrial environment throughout Aotearoa New Zealand. The objective of NPS-IB is to maintain indigenous biodiversity across Aotearoa New Zealand so that there is at least no overall loss in indigenous biodiversity after the commencement date.

It is deemed that the proposal gives effect to the objectives and policies of NPS-IB through

- (a) Having been shaped by a careful design-led approach to development that integrates the necessary infrastructure of the proposal with the existing ecological and landscape context and demonstrates a strong commitment to sustainable development principles.
- (b) Applies the effects management hierarchy by avoiding or minimising potential adverse effects in the first instance through development design, and providing mitigation where adverse effects cannot be avoided in the first instance.
- (c) Maximising the environmental benefit that can be achieved from the site development works given that significant net area outside of the immediate development footprint is to serve as an ecological management or landscape planting areas.
- (d) Avoiding or mitigating potential adverse ecological effects through utilising previously cleared areas of vegetation (i.e. existing pasture or cleared areas) to facilitate access and site development. No indigenous vegetation clearance will be required to facilitate the site development.
- (e) Where any earthworks are to take place near sensitive terrestrial or aquatic environments, earthworks controls have been put in place to ensure that the feature is appropriately protected.
- (f) Illustrates how development and growth can be balanced with ecological restoration through complementing the existing ecological values of the site and wider area, while also ensuring that appropriate areas can be developed into high quality housing.

The proposal will ensure that potential adverse effects on indigenous biodiversity are avoided in the first instance through development design. No indigenous vegetation clearance will be required to facilitate the site development. Furthermore, the proposal includes ongoing management of the indigenous bush and wetland features on site through a site-specific Ecological Management Plan, which underscores a commitment to the restoration and enhancement of indigenous biodiversity. This plan promotes the integrated revegetation planting, pest animal and pest weed control to enhance habitat suitability and availability for a range of flora and fauna, contributing to the long-term ecological health and resilience of the area. Through these efforts, the proposal not only mitigates potential impacts but also actively supports the objectives of the NPS-IB 2023 by fostering a thriving and sustainable natural environment.

8.0 CONCLUSION AND RECOMMENDATIONS

The proposed development has been designed through a comprehensive ecological mapping process that identifies both opportunities and constraints. This approach has directed the development to areas within the site that possess lower ecological value and significance. By concentrating site development within these less sensitive areas, the proposal aims to facilitate the construction of high-quality housing, which is essential for meeting the needs of the local community. This strategy also minimizes potential adverse ecological impacts, which can be effectively managed and mitigated through well-defined ecological management principles.

The proposed management actions described within the body of this report will avoid or minimise potential adverse ecological effects associated with the development proposal on the habitats and species likely present on site and immediate surrounds. It is acknowledged that the onsite indigenous vegetation is of moderate-high ecological value, however any actual and potential adverse effects have been managed through development design and proposed mitigation measures outlined under Table 8 above. Provided that they are implemented successfully, adverse effects on the environment would be low, and would, in fact, allow for the ongoing enhancement and protection of indigenous habitat values within the site boundaries through the provisions of an Ecological Management Plan.

The following recommendations are made to ensure that potential adverse effects associated with the development proposal can be avoided, minimised or mitigated to the extent practicably feasible and that a robust net ecological benefit can be achieved as part of the site's development proposal:

1. Preparation of Ecological Management Plan (EMP)

A site-specific Ecological Management Plan (EMP) must be prepared for the site and submitted to the Council for approval prior to the commencement of any ecological works. The EMP shall ensure that the ecological management areas identified in Section 5 of the ecological report deliver an ecological benefit. The EMP shall, at a minimum, include:

- Details on revegetation planting, including species selection, size, number of plants required, and planting methodology.
- Measures for biosecurity and plant disease management.
- A schedule for ongoing maintenance and monitoring of ecological management areas.
- Pest weed and pest animal control plans for a minimum of five years following the implementation of ecological works.
- Provisions for covenant demarcation and stock exclusion.
- Pedestrian walkway location.

2. Implementation of Ecological Works

The consent holder shall implement the ecological management works as outlined in the approved EMP. An Ecological Works Completion Report, prepared by a suitably qualified

ecologist, shall be submitted to the Council upon completion of the works. The Council may conduct inspections to confirm compliance.

3. Covenants and Fencing

A no-stock covenant shall be imposed over the proposed development boundaries. Stock-proof fencing must be established along the external boundaries of each development site where such fencing does not already exist. Internal boundaries of the ecological management areas shall be physically demarcated using wooden posts (minimum diameter of No. 3 posts), installed with a height of at least 800mm above the ground and spaced no more than 10 metres apart, including at all directional changes.

4. Prohibition of Certain Pets

The keeping of pet animals, including cats, mustelids, exotic fish, birds, rodents, and turtles, is prohibited on the site to avoid adverse effects on indigenous fauna such as North Island brown kiwi, fernbird, North Island weka, banded rail, and Australasian bittern, as well as lizard species.

5. Management of Dogs on Site

Any dog kept on the site must be secured or contained to prevent roaming within the wider area. Secured containment may include a secure fenced area, dog run, or an electronic pet containment fence. Additionally, all pet dogs must undergo avian awareness training, with a completion certificate provided to the Council prior to their presence on-site.

6. Pest Plant Management

New lot owners shall comply with the Northland Plant Pest Management Strategy (NPPMS) and the National Pest Plant Accord (NPPA). All known pest plant species on-site must be excluded or controlled as necessary. No pest species shall be planted as part of landscaping. The dumping of green or garden waste into the ecological management areas will be strictly prohibited.

7. Maintenance and Monitoring

Regular maintenance and monitoring of the ecological management areas must be carried out annually for a period of five years following the Council's approval of the Ecological Works Completion Report. Monitoring shall be conducted by a suitably qualified ecologist or Council's appointed representative. Monitoring reports must address:

- Canopy closure of revegetation plantings.
- Presence, location, and density of weedy species.
- Pest animal presence and the condition of the pest animal trap network.
- Observations of breaches, such as green waste dumping or non-compliance with domestic pet restrictions.

8. Pedestrian Walkways

The proposal includes pedestrian walkways through the proposed ecological covenant areas. The final location of these walkways shall be designed to fit the natural topography of the site and comply with the National Environmental Standards for Freshwater (2020).

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**39 AUCKS ROAD, ORONGO BAY, NORTHLAND
PROPOSED SUBDIVISION**

**ASSESSMENT OF LANDSCAPE, NATURAL CHARACTER
AND VISUAL EFFECTS**



1 INTRODUCTION AND METHODOLOGY

This report has been commissioned by Willowridge Developments Ltd to inform a resource consent application to undertake a subdivision of its property situated at 392 Aucks Road, Orongo Bay, situated 3.5km from Okiato and 4.6km from Kororareka / Russell.

The property that the application applies to is composed of Lot 1 DP187577, Lot 1 DP542129, Lot 2DP 542129, , Lot 3 DP420232 and Lot 4 DP420232 (the Site) and has an area of 43.716ha. It lies within a Coastal Living Zone under the Operative Far North District Plan (OFNDP).

The proposal is for a subdivision to create 65 residential lots as a discretionary activity under the Management Plan provisions of section 13.9.2 of the OFNDP.

The Site lies considerably outside of any Outstanding Natural Landscapes as defined by the OFNDP and is also separated from any areas of recognised elevated natural character that are identified by the Regional Policy Statement for Northland (RPSN).

A comprehensive assessment of environmental effects which has been prepared by Barker Associates contains a full description of the proposal and includes detailed analysis against the OFNDP provisions and other relevant regulatory matters.

An equally detailed report prepared by Wild Ecology¹ (the Wild Ecology report) provides a comprehensive description of the ecological characteristics of the Site and its setting, along with a range of matters recommended to be addressed through

an Ecological Management Plan as a component of the wider Management Plan prepared under 13.9.2. *This* landscape-related assessment is intended to be read in close conjunction with the Wild Ecology report and defers to its detail of the ecology of the Site and its setting.

The assessment has been undertaken on the basis of the following methodology, with some of the initial steps going through an iterative process in formulating the proposal:

- Review background documents that inform an understanding of the Site and wider setting in terms of both physical characteristics and the regulatory framework.
- Undertake a walkover of the Site and mark each potential building location with a 900 x 600mm white corflute sheet mounted horizontally on stakes.
- Visit immediately adjacent, publicly accessible land-based areas that have a view to the Site, including the CMA of Orongo Bay.
- Photograph the Site – where visible – from these various locations and assemble the resulting images into accompanying attachments. Vantage-points were selected to capture the greatest exposure or “worst case” view from each locale.
- Describe and analyse the biophysical and land use characteristics of the Site.
- Broadly categorise the Site context based upon areas of contiguous landscape/urban character, with these areas being frequently determined

¹ Wild Ecology (November 2024) *Ecological Report – Proposed Subdivision of 39 Aucks Road, Russell*

by land use as the primary determinant.

- Assess the relationship between the Site and the various viewing audience groupings that are potentially affected by the proposal to consider visual amenity effects.
- Assess landscape effects in relation to the form of the proposal and its compatibility or otherwise with established characteristics, patterns and general structure of both the Site and its wider context.
- Identify and quantify natural character effects that may be imposed upon adjacent areas of coastal environment or waterbody.
- Relate the proposal to relevant provisions of the OFNDP.
- Provide summarising conclusions that draw together the main body of findings.
- This process is in broad accordance with the framework provided by Te tangi a Manu – Aotearoa New Zealand Landscape Assessment Guidelines.

SECTION A: DESCRIPTION OF THE SITE

The image on the cover of this report, replicated in Attachment One alongside several other oblique aerial views, highlights the approximate extent of the Site in relation to its wider setting. These images illustrate the way that the property occupies something of an amphitheatre that is associated with the head of Orongo Bay.

The Site lies within a broader belt of the coastal terrain that is zoned as Coastal Living by the OFNDP. It is not noted for having elevated landscape or natural character values by the OFNDP or the Regional Policy Statement for Northland.

2 EXISTING PHYSICAL CHARACTERISTICS

2.1 *Geology and soils*

GNS Science documents that the Site is divided into two geological types. The low-lying portion associated with inner Orongo Bay lies within the Tauranga Group, being poorly to moderately consolidated mud, sand, gravel and peat or lignite of alluvial, swamp and estuarine origin.

The larger, more elevated part of the land is founded upon geology derived from the Waipapa Group. This takes the form of greywacke described as being massive to thin bedded sandstone and siltstone, lithic volcanoclastic metasandstones and argillite, and tectonically enclosed basalt, chert and red and green salicaceous argillite.

According to the Landcare Research Soils Portal reveals that soil types reflect these underlying geologies. Rangiora Clay Loam and Silty Clam Loam (RAH and RA) lie across the elevated part of the Site and adjoining terrain. These soil types are found across a significant part of the steeper land on the eastern portion of Northland. They are well to moderately well drained and broadly known to be vulnerable to erosion.

The lowlands are characterised by Whakapara Silt and Clay Loam (WF), which is defined as being a soil of the flood plain which is moderately well drained.

2.2 *Landform*

Close inspection of the oblique image on the cover of this report and those in Attachment One reveals the broad structure of the Site and related parts of the

adjoining terrain, particularly the shoreline and Tikitikioure to the east. Attachment Two consists of a simple site analysis, which illustrates how the Site straddles two distinctive terrains.

Lowland flats extend in beyond Aucks Road from the intertidal shore of the very shallow Orongo Bay. That low-lying terrain is coloured green in Attachment Two.

Descending to those flats are dissected slopes that originate from a ridge that is generally associated with the course of the northern 500m of Lanes Road. That skyline ridge then swings west as it skirts the southern edge of the Site. As Attachment Two illustrates, the dissected flank (coloured fawn) that characterises the larger portion of the Site is structured around four distinct spurs that descend from the ridge that has just been described. Those spurs are numbered on Attachment Two from 1 (in the east) to 4 (in the west) to assist coming descriptions and orientation, so will be referred to as Spur 1, Spur 2 etc. Small, localised valleys lie between each of the spurs, as highlighted by the indicated water courses marked in blue on Attachment Two.

Haigh Workman Ltd² have established that the variable slopes of this flank reach gradients in the order of 20° to 25° at their steepest. This geotechnical assessment report identifies a few areas on the Site where historic slips have occurred, most typically in association with the “nose” of spurs as those landforms approach the lower terrain and steepen.

² Haigh Workman Civil and Structural Engineers Ltd (September 2024) *Geotechnical Assessment Report – Proposed Subdivision, 39 Aucks Road, Russell*

2.3 Hydrology

In its position bordering Orongo Bay, the lower part of the Site is thought to have had its natural drainage pattern considerably modified by a system of ponds and large drains that were created as part of extensive earthworks undertaken around 2003/04. This network is labelled with a P on the Landscape Integration Concept Overview sheet of Attachment Five. Figure 1 further below consists of an aerial image of the Site at that time which shows recent earthworks along the margins of these water elements that is understood to be related to their formation. The steep-sided and somewhat manicured format of the ponds and large drains reflects their envisaged role as an amenity feature.



Photograph 1: A portion of the main pond that sits amidst the lower part of the Site. Note steep-sided, denuded margins that prevail and would be replaced by heavily planted, shallower slopes that bring heightened habitat and amenity values. The central pond, seen most clearly in plan form in Attachment Five where it is highlighted in blue, is a considerable water body that serves as the gathering point of most of the overland flow from the Site. According to site investigations undertaken by Maven, this pond discharges to a small stream associated with a wetland on the property to the north (see Photograph 4) before continuing under a bridge to an outlet into Orongo Bay.



Photograph 2: A segment of the broad drain or canal that runs north from the main pond. The verge steep and terraced margins are proposed to be regraded to a shallower slope and intensively planted with indigenous riparian species.

Most of the other watercourses within the Site also exist in a much-modified state as they drain the small valleys that extend east and south towards the containing ridge.

Grazing use of the past has seen these largely defined as small depressions amongst grassland (some now mown) or very small channels. Scattered wetland species are growing amongst the exotic grass species that prevail in some of the dampest valley floors.

The most naturally intact watercourse/wetland sequence is found in the small valley to the north of Spur 1 and below Russell-Whakapara Road as it skirts that toe of the Tikitikioure slope. Here the terrain has been largely untouched by the wider Site modifications of recent decades and its steep slopes are clothed in a predominance of native vegetation that has protected that tiny catchment. The heightened values of this little stream and wetland are documented in the Wild Ecology report, alongside wider commentary on the ecological state of the other catchment elements of the Site.



Photograph 3: Looking down the minor valley between Spurs 1 and 2, where the intermittent watercourse flows through a shrubland belt in the mid-section of the landform. Note broad, swale like form on the upper portion of the flow path.

2.4 Vegetation

A scattered mix of vegetation associations exists across the Site, influenced particularly by the impact of past clearances, management regimes, the development of the lower parts of the land as a golf course, and partial development of a subdivision. The Wild Ecology report provides a very detailed description and analysis of the ecological characteristics of the land and that reporting should be read in conjunction with *this* assessment. The brief discussion that follows is intended to merely place some context for the consideration of landscape and natural character matters.



Photograph 4: The wetland belt that arcs across the neighbouring property to the north, lying in close proximity to the main pond in the Site.

As the historic photos contained in the Wild Ecology report illustrate, the Site has had a history being cleared from its original forest cover for pastoral use and was then allowed to colonise with kanuka and/or manuka seen in photographs from the early 1950's and 1970's.

More recently, much of the Site has been maintained in a more intensive manner, with large areas mown and the steeper slopes containing the majority of the indigenous vegetation cover. That vegetation ranges from pockets of reasonably intact, kanuka-dominant shrubland in the north-east and southern apexes of the Site, valley floor strips between Spurs 1 and 2, and between Spurs 2 and 3, along with small copses and scattered specimens on the hill slopes. A dense belt of semi-mature kanuka occupies the apex of the property to the south-east of proposed Lots 62-64, where it forms the skyline. The most coherent areas of native vegetation are mapped by Wild Ecology and are identified in that report and on the Landscape Integration Concept attached to *this* report.

Until recently, isolated specimens of a range of invasive exotic tree species, including *Acacia* species, *Eucalyptus* and what is thought to be Corsican pine (*Pinus nigra*) were scattered through the southern and western portions of the Site. Recent efforts to rid the Site of these sorts of competition has succeeded in almost entirely removing these species, along with others such as Taiwan cherry (*Prunus capanulata*). A likely abundance of seed in the soil profile means that management will need to be ongoing.

A dramatic change in vegetative character of the lowest part of the Site is reflective of the former golf course on that part of the land. A number of deciduous trees, particularly pin oak (*Quercus pallustris*), line parts of the primary access and are

clustered near the primary homestead. A few other exotic species also contribute to these pockets of amenity planting. A belt of substantial poplar (*Populus sp.*) near the main pond have recently been felled as part of the bid to rid the Site of problematic exotic species.

An unusual and somewhat incongruous feature of the lower Site is a series of linear mounds that have been intensively planted in two tiers of *Agave* species. These line a portion of the primary access corridor and define other spaces on the grassed flat. Photograph 9 provides a view of the combined presence of the agave and oaks. Overlapping this predominantly “introduced” theme are fingers of native vegetation that extend down the hillside valleys to project out into the southern margin of the lowland.



Photograph 5: Clumps of kanuka near the crest of the Site, with belts of kanuka seen dropping to the flat, where exotic amenity plantings are dominant.



Photograph 6: Kanuka-dominant belt in valley between Spurs 2 and 3, as seen from the top of spur 3.r



Photograph 7: The north eastern valley, where a wetland floor and varied vegetation associations bring a greater diversity than is found elsewhere within the Site.



Photograph 8: The kanuka canopy that reaches down to the toe of the valley alongside the former clubhouse / workshop

2.5 Land use

In 2001 the Site was subject to a resource consent to subdivide the property into 20 lots which was subsequently varied to create 12 lots. Another consent was granted for the creation of the central road corridor that is the backbone of the proposal under this application. A copy of the scheme plan for the consented (now lapsed) primary subdivision of the Site is found in the AEE, along with a fuller description of the Site's consenting history. The works undertaken to give effect to these earlier approvals have left a lasting legacy on the Site in the way that they influence the current character of the land and form part of the receiving environment.



Figure 1: Earthworks being undertaken in 2004, main pond barely visible due to its muddy brown colouring. Most of the scattered trees seen here were pines that were subsequently milled, with the balance having been recently removed and burnt. Source: Google Earth

Those works included the sealed primary access into the Site, initial formation of access to Spurs 1, 2 and 3, formation of several building platforms along with related rock retaining, and reticulation of power to many of the approved lots. The enduring building areas and related access drives display a comfortable fit with the terrain. The proposal that is the subject of this report has sought to utilise those established platforms and accessways wherever practicable, thereby avoiding undue further disturbance of the landform in those areas.



Photograph 9: The sealed road that runs from the Site entry into its lower core, with deciduous tree planting alongside and agave plantings on a mound at the junction to left.



Photograph 10: A low oblique overview of the lower part of the Site, showing the sealed road and ponds. The sports field can be seen to lower left and the former metal track running up Spur 3 is evident above the main pond.

There are four existing buildings of note, with these being labelled with a B on the Landscape Integration Concept Overview sheet of Attachment Five. The main residence occupies what is proposed to become Lot 41. This voluminous two storied building – seen in Photograph 11 - sits in the north-western sector of the Site and is complemented by a double storied garage set into the toe of the slope immediately across the through-drive from the house. This house can be briefly glimpsed from Aucks Road and Orongo Bay but is not widely imposing, despite its volume. The smaller dwelling pictured in Photograph 12 is situated alongside the boundary in the north-western corner of the Site on what is proposed to be Lot 42.



Photograph 11: The existing 2 storied homestead. Its double-storied garage is seen with its brighter red roof to the right-

A fourth building (Photograph 13) is positioned more centrally and in close association with the main pond. It appears that the upper floor of this structure was intended to be a clubhouse for the golf course and the ground floor (accessed from the north) devoted to maintenance equipment and a workshop. This is how the

ground floor is currently used. The application proposes that this building will become part of the communal assets and managed by the resident's society.



Photograph 12: The smaller house located in the north-west corner of the Site and occupying proposed Lot 61



Photograph 13: The building that is intended to be utilised as a community facility. Its basement would continue its current role as a workshop and for equipment storage.

SECTION B: CHARACTERISATION OF SETTING

3 DEFINING ELEMENTS / LANDSCAPE CHARACTER AREAS

The wider structure of the Orongo Bay hinterland can be categorised into a series of defining elements and landscape character areas. In general, these tend to be largely determined by relationships between housing and terrain, the influence of the bay and reasonably expansive vegetated terrain that are established in this variably developed area. Reference to the panoramic photographs contained in Attachment Four and single-framed images that follow will usefully inform reading of the following descriptions. The position of those photographing points for the panoramas is marked on the two sheets forming Attachment Three.

3.1 Orongo Bay and its intertidal margins

The first sheet of Attachment Three clearly illustrates the almost circular lobe that is the Bay, and how the containing landform defines and protects this shallow water body. It lies at the head of a convoluted inlet known as Pomare Bay that departs south-west from the very broad channel that lies between Paihia and Kororareka. Matauwhi and Uruti Bays are indented north from Pomare Bay, with the narrow headland that separates Oruti from Orongo seen to upper left in Attachment Three.

The coast of this broader inlet hosts a noticeable level of scattered housing, particularly on the flank served by Te Wahapu Road (which shares a Coastal Living zoning with the Site).

An oyster farm occupies a sizeable portion of the lower intertidal zone of Orongo Bay. The rectangular forms of the blocks of oyster racks are largely visible in Attachment Three. A processing facility lies on the shoreline in the northern margin

of the Bay and the small vessels used to manage the marine farm are moored immediately offshore when not in use.



Photograph 15: Looking east towards the head of Orongo Bay, with the elevated parts of the Site illuminated by the setting sun.

The considerable intertidal zone of the inner bay is, predictably, colonised by a belt of mangroves and, in parts, saltmarsh. This is particularly so in its north-eastern portion and running back towards the Site frontage to Aucks Road, where a PNA (Protected Natural Area) and area of High Natural Character recognises the elevated habitat values present in a broad belt of this marine vegetation. Aucks Road is closely associated with this sensitive area, as Attachment Three illustrates. A pedestrian boardwalk runs through its northern sector as part of a walking route extending from Okiato Point to Russell.

3.2 Coastal lowlands and foothills

Extending inshore from the tidal fringe of Orongo Bay is a margin of related, low-lying land that is skirted on its seaward edge by Aucks Road. This terrain is highly variable in its extent, ranging from a narrow strip that carries the road through to its most expansive at the Site and the neighbouring property containing the fuel station and sports ground, where it is in the order of 500m from the tide line.

A lesser lowland is found in the valley occupied by the Orongo Bay Holiday Park, a short distance to the north of the Site (and marked on the Attachment Three A). There, a stream running from further east and draining through that valley helps to explain the low-lying morphology of the terrain.



Photograph 16: Looking across the lowlands within the Site to the Orongo Special Area (mid left) and housing on the foothills beyond.

These low-lying areas are distinguished by their discrete geology and soils (see Section 2.1 earlier), which acknowledge an origin of floodplain, swamp or estuary.

A fringe toe slopes run down to the flats and are associated more with the lowlands than the contiguous hills that rise above and are described by the following segment. Here, the matrix of scattered housing, small pockets of lawn or other grassland, and fingers of native shrubland mark much of the Coastal Living zoned land associated with the Bay. This interface is evident in Attachment Three – A and in Panoramas 10 and 11 of Attachment Four.

3.3 Tikitikioure and related forested hill country

The spine of the Russell peninsula is marked by dissected elevated land that links almost continuously to the much larger block of hill country lying within Russell Forest further to the east. A continuous mantle of indigenous vegetation clads this raised ground and further distinguishes it from the fractured margins just described and, particularly, the extensive grassed hill slopes and flats identity of the Site.



Photograph 17: Tikitikioure's pyramidal form silhouetted against the sky and the related higher terrain that continues north and east seen to left. The foothills described in the preceding section are marked by the housing and pasture evident to the right of the image.

Most of the vegetative cover associated with this hilly terrain is relatively young, being dominated by kanuka that speaks of the dry slopes that it has colonised. Damper valleys (including two to the north of the Site) and more mature associations such as the block to the south-east of the Site, feature a far more diverse composition with a range of podocarp and broad-leaf species in its varied canopy. Those older areas serve as a reservoir of seed and spore that will progressively colonise out across the more uniform cover of the kanuka-dominated hills.



Photograph 18: Looking towards Tikitikioure from the opposite, southern direction from within the north east part of the Site. A strip of a few houses or titles occupy the foothill seen immediately across the valley and these are the properties most affected by the proposal.

Tikitikioure is a pronounced peak marking the south-east foot of Russell peninsula and standing as a landmark that stands over the Site and lower terrain to its west. The peak is largely clad in forest, its apex is capped with a cellular tower accessed by a track from the west. Another, historic track climbs from the south, but is largely grown over. Russell Quarry bites into the south-eastern foot of Tikitikioure about 600m from the Site.

3.4 Pastoral farmland

Whilst the majority of the wider setting of the Site is characterised by the kanuka-prevalent cover that has just been described, land bordering the Site to the east and south retains the pastoral grazing land use that was formerly more prevalent on the recovering steep slopes. Farmland to the east is partially low-lying and that flatter terrain is likely to have once been a wetland associated with the Waikare Inlet.



Photograph 19: pastoral farmland stretching east from the initial portion of Lanes Road.

A larger area of grazed land bounds the Site to the south and is more extensive and undulating, with much of it being quite steep. That block runs out to a point in the Waikare Inlet, interrupted by fingers of indigenous vegetation that inhabits the sharp valleys that are associated with that part of the property.

Other than a tiny fragment associated with the boundary or Lanes Road ridge, these farms are visually disconnected from the Site, with houses set lower and well away from the highest parts of the Site.



Photograph 20: The grazed property that bounds the Site to the south-west.

3.5 Commercial centre

The Orongo Bay Special Area occupies much of the land defined by the western part of the Site's northern boundary, Aucks Road to the west and Russell Whakapara Road up to its intersection with Aucks Road. Provisions of the Area provide for a wide range of commercial and minor industrial activities, along with the sports club building that exists. It currently contains a small commercial building, a works yard, a relocatable building and some small-scale storage facilities. It is also occupied by the "Gas" service station labelled on the second of the Vantage Point Locations Plan found in Attachment Three.



Photograph 21: The petrol station and a related small industrial building that mark the Orongo Special Area when seen from its north-western, Aucks Road, corner.

The purpose of the Special Area is to complement Russell settlement, where a combination of topography and heritage character limit capacity to accommodate commercial and light industrial land uses. In being positioned where it is, the Special Area provides for a very urban pocket amidst the Coastal Countryside belt of Orongo Bay, notwithstanding requirements for vegetative screening to the perimeter of the Area.

A recently approved subdivision of the Special Area provides for further formalising the that area through 8 developable titles, several of which already contain structures

³ Hawthorne Landscape Architects 13.12.2023
Landscape and Riparian Restoration Plan – Special Purpose Zone Overlay
Waitoto Developments Shts 1.0, 1.1,2.0, 2.1, 2.2 and 3.0

of varying scales. A common lot contains much of the wetland seen in Figure 1. A related esplanade reserve wraps along the edge of that wet area and around a portion of upper intertidal seabed that is alienated from the main bay by Aucks Road. A condition of the subdivision consent is that the esplanade be densely planted in accordance with a plan lodged with that consent³, which was subject to the guidance of an ecologist.

That planting will fully occupy the space alongside the wetland and effectively preclude future pedestrian access without varying the relevant consent condition. This most natural portion of the of the Special Area serves as a useful buffer to the Site and is complementary to the riparian restoration initiatives embodied in the proposal.

SECTION C: DESCRIPTION OF PROPOSAL

The application is to subdivide the Site into 65 residential lots, configured as an integrated development that reflects the spirit of the Management Plan provisions of the OFNDP and the characteristics of the Site and its setting.

Prior segments have analysed the Site and its context as a setting for the proposed subdivision. They also describe the nature of the previously consented subdivision and earthworks that occurred to provide for that development. Earlier descriptions also record the Site's topographic diversity, that it contains a number of minor watercourses, retains modest portions of relatively intact native vegetation and

includes areas that have a measure of landscape and visual amenity sensitivity in terms of the Site's relationship with Orongo Bay and surrounding viewing audiences.

The Site is also influenced by surrounding terrain, where large tracts of indigenous forest and shrubland strongly inform the character of the area, whilst also providing a cue for extending established landscape patterns, strengthening ecological connections and offering a valuable source of colonising seed and spores that could rapidly add considerable diversity to a well-conceived restoration effort.

Further influencing the Site and the proposal are past works and infrastructure installation that was undertaken to progress the earlier 2001 subdivision consent and related consents. The former golf course, with its amenity plantings and created water features, can be considered part of that earlier development. The manicured character of that lowland part of the Site extends somewhat onto the least severe of the slopes rising to the Lane Road ridge in the form of the regularly mown grass on that flank.

Alongside these natural and perceptual considerations, the Site already offers considerable spatial amenity, with scope for that pleasant environment to be further heightened for the benefit of potential future residents. The pond and "canal" waterbodies of the flats offer considerable potential to add ecological and visual richness to their margins and provided shared pedestrian access to those waterside edges.

⁴ Maven Associates (29/11/2024) *Civil Engineering Report (Revision A) – 39 Aucks Road, Russell, Northland*

This proposal recognises that much of the access and infrastructure provided by the partial implementation of the earlier, lapsed, subdivision consents, is well placed in terms of practicability and relationship with contour. That existing framework provides the core from which the proposal would extend.

These informing contextual and historic influences have strongly informed the configuration of the proposal and are reflected in the landscape integration concept for the Site (Attachment Five) and the related suite of drawings prepared by Maven Associates. These collectively illustrate the proposal at a spatial level. The Civil Engineering Report⁴ (the Maven Report) and a related volume of drawings provides further detail on the engineering works required to realise the proposal.

4.1 Site planning

The configuration of proposal is considerably shaped by the ecological and landscape patterns that have emerged from the scrutiny of those two disciplines. The intended, central role of vegetation in the shaping of the proposal is outlined in segment 4.4.

The lowland portion of the Site has very limited visual amenity and landscape sensitivity, due to its very limited exposure and level of existing modification from a natural state. Correspondingly, the even terrain provides for an ease of site development and subsequent building construction. The proposal acknowledges this combination when assigning some of the highest density of proposed allotments to the north-eastern portion of the lowlands and its southern margin.

When addressing the layout of the steeper parts of the Site, the position of potential building areas is informed by a combination of visibility and accessibility, coupled with the landscape and ecological framework that is central to the proposal. Proposed Lots 01, 02, and 62-65 are located along the eastern margin of the Site and in close proximity to the skyline ridge associated with the first part of Lanes Road. All but proposed 64 and 65 feature generous formed building areas courtesy of works associated with the earlier subdivision. The importance of a robust backdrop and foreground vegetation framework – as provided for by the proposal – is of particular importance to this strip of proposed building areas.

Existing kanuka in the order of 6-10m in height forms an existing backdrop to proposed Lots 62 to 64. That vegetation is expected to gain around 500mm in height per annum until achieving a semimature height of 15m.

Lot 65 sits below the ridge so benefits from a measure of topographic backdrop, coupled with an intention for planting to that eastern side. Lots 01 and 02 would also be subject to eastern planting to supplement the 3-m high belt of flax that currently sits atop a slight mound along that Lanes Road frontage. As such, there is an intention to ensure that these most elevated potential building areas lie in the lee of a vegetative backdrop.

Scrutiny of the Landscape Integration Concept shows that most building areas would also be subject to foreground planting that would see buildings set amidst a frame of vegetation, where recessive building finishes would effectively merge with that colour and tone above and below a future building. That same strategy has been applied to the less elevated building areas, which also lie against the topographic backdrop provided by the hill rising to the south.

The mid to upper slope building areas are generally situated in areas where the terrain eases, to make for less impactful site preparation. These are largely accessed from lower-order shared or individual driveways served by shared accessways running up each of the four spurs (with the exception of Spur 3, where a full road runs almost to the apex of the spur). These lots are arranged as four enclaves, each associated with a spur and separated by a frame of “unbuilt” terrain associated with the upper flank and the intervening valleys.

There has been a recognition from the outset of site planning that intensive planting initiatives and controls over building characteristics would need to apply to buildings on all but the lowest-lying terrain.

4.2 Roads and walkways

The road corridors defined for the lowland portion of the Site largely follow the existing formed accessways. The drive into the western part of the Site is realigned a little to the north to allow a better connection to the primary access as it meets Aucks Road.

Two roads split from the end of the sealed main access as it meets the toe of the sloping terrain. A northern branch continues to follow an existing sealed road to the toe of Spurs 1 and 2, where lower order private shared accessways peel off to serve the proposed titles that are positioned across the lower to mid sections of those two spurs.

The most substantial ascending road runs up Spur 3, following the alignment of a road consented in 2011, pushing it to the west of the spine of that spur and ending in a turning head near the south-western boundary of the Site.

Access to Spur 4 sidles close to the back of the garage of the existing main house. It transitions to a lesser shared private driveway partway up that slope as it crosses over the crest of the spur before running along the western shoulder of the spur en route to proposed Lot 49 at the top of this belt of allotments.

The enclave of five proposed titles in the south-eastern corner of the Site (Lots 01-04, 65) would be reached by individual private driveways, as would those at the apex of the Site, with Lots 62 and 63 sharing an existing track from Aucks Road as it swings to the south-east.

The design approach brought to the alignment design of the new, smaller access corridors has been to achieve a fit with the contour to run shallowly across or along the contour, rather in a perpendicular conflict with the natural terrain. This strategy serves to minimise the visibility of driveways and achieves a sense of the driveways “flowing” more compatibly with the natural topography. The access corridors are also configured to engender a low-speed traffic environment that empowers pedestrians, cyclists and other non-vehicular users.

It is proposed that access surfaces be surfaced in recessive materials, such as chipseal, asphalt or dark, black oxide coloured concrete.

As an acknowledgement of the semi-rural character of the Site and its Coastal Living context, there are no streetlights proposed.

A comprehensive, off-road walkway network is highlighted on the Landscape Integration Concept as a pale, cream line. In addition to the obvious recreational amenity offered by that path system, it is arranged to provide easy and efficient

pedestrian access to the central community facility on the edge of the ponds from most of the proposed allotment enclaves, thereby minimising vehicle use for trips within the Site. This utility means that people don't need to walk along the primary roads, notwithstanding the expectation that those roads will be pedestrian friendly, as mentioned above.

4.3 Retaining structures and slope armouring

The design of access alignments has sought to avoid the need for retaining to the maximum degree that is practicable, favouring instead the use of moderately graded cut and fill batters that can be planted or grassed.

In those areas where retaining is unavoidable, there will be preference to split the retaining between cut and fill faces to also reduce the height of each of those uphill and downhill structures.

As a general principle, rock armouring will be favoured over more structural retaining elements, as this utilises a locally available material and provides for vegetation to be established the armouring as well as at its crest and toe.

If a retaining structure is unavoidable, provision will be made for vegetation to cascade down over the retaining from above and for toe planting to rise to screen the structure. This will require adequate suitable ground to be left at the base. An anchoring or MSE method of retaining would allow for vegetation to also be established on the face. Finishes of any structural elements or exposed geotextile material used for retaining is intended to be dark and recessive to minimise any prominence prior to the establishment of vegetation.

Regardless of the methodology adopted, the intention is to fully conceal any retaining within vegetation that is visually compatible with the prevailing indigenous themes that are to be established across the wider site. Detailed design of retaining is to include information about proposed planting associated with that retaining and the measures incorporated in the design to optimise the survival and performance of that vegetation (such as incorporating growing medium). Planting plans for any retaining structures should be provided for as a condition of condition of consent.

4.4 Vegetation

Revegetation and allied integration planting would form a bold framework that, on one hand, seeks to provide protection to watercourses and wetlands, conserve and extend existing areas of indigenous vegetation and provide broad linkages through the valleys – extending from the Lanes Road Ridge (and established forest to its south) down to the waterside lowlands. The wider pattern also allocates much of the mid-slope of the Site's flank to further planting that then creates a cross connection between those broad valley belts.

The modest extent of established indigenous vegetation that exists, and is to be conserved within the development footprint, is denoted on the landscape integration concept, where the texture of that vegetation on the underlying aerial shows through. It is also highlighted by annotation on the drawing. This will be protected under the the provisions proposed by this application. Complementing and substantially expanding that scattered frame of existing vegetation is a broad indigenous planting initiative associated particularly with the steeper land that is found in the eastern and southern parts of the Site.

That planted vegetation would be divided into two types. For those areas that are well separated from future building sites, the Ecological Restoration Planting would consist of a limited suite of species selected to acknowledge the natural associations prevailing nearby, with some consideration of robustness to fulfill a colonising role. The abundance of seed found in the large, forested block to the south of the Lanes Road ridge (and recognised as an PNA) would then add progressive diversity, courtesy of birds transporting that seed. Spores and very light, windborne seed would also be carried into the shelter of the colonising planting. Simultaneously, selective herbicide management of grass species in those areas that have been mown or formerly grazed, would allow for the light-demanding seed of nearby kanuka to rapidly supplement the restoration planting.

The second type of broadscale vegetation is Mitigation/Amenity planting, as differentiated in the legend of the Landscape Integration Concept. This form of planting is intended to create an interface between the expansive areas of restoration planting and the proposed building areas and access corridors. Composition of that planting would seek to create a seamless phasing from the forest/shrubland of the restoration planting out into areas where functional requirements for sunlight, views and vehicular corridors need to be factored into the types of species involved, which would be predominantly or entirely indigenous.

In addition to this wider patterning role, the Mitigation/Amenity planting is frequently arranged to provide a coherent foreground, and often a background, to building areas.

A comprehensive programme of riparian and wetland planting is central to the proposal. The pond margins exist in a largely denuded and steepened state that

currently relies upon herbicide for management, as Photograph 22. It is intended that these margins would be regraded to create a very gentle interface that widens the riparian belt to create a more useful habitat and heighten amenity values. That initiative would also ease maintenance obligations once established.



Photograph 22: The steep, unvegetated margins that characterise much of the pond complex in its current state.

An enhanced wetland system not far from the Site at Uruti Bay Estate serves as an excellent demonstration of the sort of qualities that the proposal seeks to bring to the Site. Comparing Photograph 22, above, with Photograph 23 shows the considerable benefits that would be achieved. As the Wild Ecology report outlines, there is also a commitment to restore and enhance the narrow, linear wetlands that occupy the valley floors of the Site, bringing landscape and amenity enhancement as well as heightening ecological values.



Photograph 23: An example of a planted pond ecosystem found a short distance north near the entrance to Uruti Bay Estate and serving as a benchmark for what could be achieved at the Site.

A further consideration in the specification of planting is preventing spread of fire near future dwellings and accessways. Fire retardant vegetation will be required within 20m of a building or road. Planting within that offset would primarily fit within the Mitigation/amenity category, but some small portions of the Restoration planting may also need to be configured to contain fire.

The Management Plan prevents uncontained outdoor fires during all but winter months of June to August. This provision would also preclude any fireworks or flares being used.

4.5 Future houses and related site development

Previous commentary has highlighted the difference in sensitivity between the lowlands and least elevated of the terrain in the Site and the higher ground that runs up the four spurs to the containing ridgeline in the south and west. Whilst none of these more elevated areas of topography can be considered to have extreme sensitivity, they do carry the potential for poorly integrated development to generate heightened adverse effects.

In recognition of this circumstance, it is intended that all future buildings located on terrain that is of elevation of 15m R.L. or greater be subject to the following controls:

- **Height** – maximum 5m above finished ground level or natural ground level (whichever is the lesser) based upon the centre-point of the building area, established by the common junction point achieved by projecting a symmetrical inward line from each of the corners of the defined building area. Buildings are to be of single storey format.
- **Finishes and materials** – 30% maximum Light Reflectance Value (LRV) for applied finishes or dark, recessive natural materials of comparable LRV. Mirrored glazing is not allowed. Minor architectural elements such as flues and arials are excluded from this provision.
- **Blinds, curtains and other window coverings** - to be moderately dark with an LRV of no more that 40%.
- **Fences** - are to be avoided, other than visually permeable pool fences and privacy screens that are connected to or very closely related to buildings.
- **Planting** – hedges, shelterbelts and other linear or geometric patterns of planting are not permitted. Any planting within 20m of a building or accessway is to be composed of species that are recognised as having low flammability.

- **Exterior lighting** - to be subdued, using fittings that ensure that the source of light is not exposed to view from beyond the allotment that the building lies within (eg. Using downlights in soffits vs wall mounted lighting, avoiding landscape lighting). Floodlighting and spotlights are expressly prohibited.
- **Retaining walls** - to be subject to the same controls that are proposed for the road corridors.

The proposed lots that would be subject to these controls would be 01-06, 08-09 13-19, 22-34, 44-49, and 62-65 and the extent of the building areas for these lots needs to be fixed as they are shown by the application documents.

Those buildings below 15m RL have very limited capacity to generate wider adverse landscape or visual amenity effects. Accordingly, it is proposed that any structures on this lower lying terrain be subject only to those controls that apply within the Coastal Living zone, with the exception of the fencing control that would apply to the land above 150m RL and buildings being limited to a single storey. It is intended that this provision be in force across the entirety of the Site for the benefit of neighbourhood amenity. Planting will be promoted as an alternative technique to create boundary definition (where desired), shelter and privacy. For those allotments above 15m RL elevation, boundary demarcation is to be avoided.

4.6 Ownership and management

The lowland areas containing the ponds and shared facilities building, along with the primary road corridors, are to be held in shared ownership and jointly managed. This combined area is shown as Lot 200 on the Proposed Scheme - Overall Plan (drawing no. C160) and subsequent drawings in the Maven drawing set. The core of the

walkway network lies within the jointly owned area but departs into private titles climbing the sloping parts of the Site. Here, the path would lie within easements and be under shared management by the body representing all owners. Similarly, the most extensive and contiguous areas of Ecological Restoration Planting and Mitigation / amenity planting that occur on private land would be managed for weeds and pests by the joint body.

SECTION D: EFFECTS ASSESMENT

Preceding Sections A and B describe the characteristics of the Site and its setting. These are followed by a description of the anticipated development of the Site and its component parts. The purpose of *this* section of the report is to define the effects of the proposal upon the setting, to consider how the proposal would impact upon the experience of people viewing development that would result from the plan change from outside of the site, and to comment upon the resulting level of effect upon landscape character, visual amenity and natural character.

Adverse effects impact negatively on the landscape and result in landscape, natural character and/or visual amenity values being diminished. **Benign or neutral effects** are those in which a proposed change neither degrades nor enhances these values when considered in the whole. In circumstances where **positive effects** arise from a development, the changes that have been brought are deemed to be beneficial relative to the landscape state of the site prior to that change.

Effect ratings that will be used:

Very high: resulting in a dramatic or total loss of the defining landscape characteristics of the site/context, or visual amenity associated with that setting.

High: leading to a major change in the characteristics site or setting, or significantly diminishing key attributes, and/or comparable impacts upon visual amenity.

Moderate – high: an interim measure of effect in which impact of the development results in a change of some significance to the qualities or perception subject landscape.

Moderate: a self-explanatory magnitude in which effects sit midway between the extremes this spectrum of magnitude. Can also be considered as an “average” level.

Moderate – low: impacts on landscape characteristics and attributes are relatively contained. The threshold defining “minor” in relation to the S104D gateway test sits within this level of magnitude, typically towards the lower end of its spectrum.

Low: effects are generally very limited and do not result in compromising the characteristics of a landscape or perceptions of it in a more than subtle way.

Very low: negligible or imperceptible effects result upon the landscape and/ or perceptions of it.

5 VISUAL AMENITY EFFECTS

Viewing audiences / affected parties

To assist with predicting the level of visual and landscape effect that the proposal would generate, publicly accessible vantage points in the area were selected to be broadly representative of each of the following identified audience groups, selecting worst-case views wherever possible. Panoramic photographs for each vantage point are found in Attachment Four. These will be referred to in the following commentary.

The distribution of potential viewing audiences is telling, illustrating how the amphitheatre-like form of the Site exposes parts of it primarily to the north and north-west, but being almost entirely shielded from the spectrum spanning from the south-east through to the north-west.

The degree of adverse visual / landscape effect generated by a proposed change or development depends upon the character of the surrounding landscape (the context), existing levels of development on the application site, the contour of the land, the presence or absence of screening and/or backdrop vegetation, and the characteristics of the proposed development.

5.1 Travellers on Aucks Road

Panoramas VP01-03, 05 and 21 capture those few views to the Site that are available from Aucks Road. This road corridor is the primary access between the car ferry at Okiato Point and Russell, so is almost certainly the busiest of the local roads, particularly during summer. These panoramas illustrate the way that roadside vegetation acts strongly as a screen and filter, limiting views to discrete and fleeting glimpses of modest portions of the Site, rather than to the entirety of the property.

The planting intentions for the Site will find a commonality with the kanuka, manuka and understorey shrubs that characterise the roadside areas.

Whilst the development will be visible to this viewing audience as they travel past, the brief duration of views and limited contrast between buildings and surrounding vegetation, as it develops, will result in future buildings having a limited expression within the wider experience of moving along the road corridor. Accordingly, the visual amenity effects of the proposal upon users of Aucks Road are assessed as being *very low* and less than minor.

5.2 Travellers on Russell – Whakapara Road

There are three areas where travellers on this road may be exposed to the proposed development of the Site. VP11 illustrates the view to be had heading west past the entrance to Lanes Road, where proposed Lot 01 is currently exposed to view as the traveller rounds the bend at the intersection, whilst also passing over that brow in the road. Once again, this is a fleeting view and somewhat oblique to the direction of travel. It is a view that is unlikely to be had by anyone heading east, as the angle of outlook into the corner of the Site is at a much more oblique angle. Planting proposed under the Application will block this view of Proposed Lot 01 within 24 months of installation.

There are minor right-angled glimpses to the Site from the portion of the road marked with VP10 in Attachment Three - B. Those views are considerably limited by roadside vegetation, which is now likely to become more dense and consistent following recent removal of pest pines, *Eucalyptus sp.* and *Acacia sp.*, from that part of the Site. It is expected that the indigenous vegetation on that roadside slope will form an impenetrable screen to views into the Site from this area within two years.

The other place along this road corridor that has some exposure to the Site is in the dip near the sports club (see Panorama VP06). From here the view is up to the south-western sector of the Site and is at around 90° to the direction of travel, making it less prominent. Visual Amenity Strip planting and Riparian shrub planting required in this eastern apex of the Orongo Bay Special Purpose Zone is expected to create a screen that blocks views to the Site within 2-3 years.

In recognition of the limited views available from Russell Whakapara Road and the intention for planting to the eastern edge of Proposed Lot 01 and the Special Zone, visual amenity effects upon this travelling audience is assessed as being *very low*, and therefore less than minor once vegetation is established and buildings are completed. Prior to that point, the effect is assessed as being *low*.

5.3 Travellers on Lanes Road

As a local, dead-end road serving just a few properties, the metalled surface of Lanes Road carries a light load of traffic. For most of its length that borders the Site, established vegetation largely contains views to within the corridor on its north-western side, as Panoramas VP11 and VP13 demonstrate (putting aside the initial fleeting view to proposed Lot 01 that has just been discussed). Further planting intended as part of the proposal will supplement that existing vegetation to complete the visual screen, with the exception of very narrow views into private accesses.

The portion of Lanes Road associated with proposed Lots 62-64 sees a densely vegetated intervening slope serve to block any potential views up to future buildings on those planned titles.

After factoring the very small size of this passing viewing audience and the limited extent of exposure of the proposal as a result of existing and proposed roadside vegetation, visual amenity effects upon users of Lanes Road are assessed as being low initially and diminishing to very low within 2 years when planned planting gains in the order of 2m of stature.

5.4 Immediately neighbouring properties to the east

An unnamed private access leaves Russell Whakapara Road near the sports field and rises to a south-facing lower flank of Tikitikioure that sits immediately above the road below. This area is marked by Panoramas VP08-09 in Attachment Three B. It would appear that up to eight titles that have access to the private lane may be potentially affected by the proposal.



Photograph 8: The new house just constructed on the private lane to the north. The Site is to the left side of the building in this view.

Two of those titles (being Lots 15 and 16, DP403531) lie near the base of the slope and contain houses that have their outlook directed west towards the Site.

A recently developed house (see Photograph 8 and Panorama VP09) is situated further up the spur traversed by the private access. Whilst this building appears to orientate its major glazing to the panoramic Orongo Bay view to the west and to the solar gain offered on its northern face. The southern façade of the building also features a few large windows facing south toward the Site. This building sits on a title described as Lot 30 DP426505.

A neighbouring house recently established on Lot 29 DP426505 (seen in Panorama VP08) lies on the northern margin of the spur and is almost entirely divorced from views to the Site.

Lots 28, 30 – 32 and 38 of DP426505 exist as vacant land, but all appear to be exposed to views to the Site once clearance for a building is undertaken.

A further cluster of allotments is accessed from opposite the junction between Lanes and Russell Whakapara Roads, where they lie in association with the saddle that divides the Orongo Bay catchment from that which drains east to Waikare Inlet. Existing dwellings occupy Lots 1 and 2 DP181696, as well as Lot 3 DP187577.

If potential adverse visual amenity effects upon this collective audience were to be assessed as if the Site were a “greenfields” rural property – they would range from *moderate - low* to *moderate* levels, and above minor (with the exception of Lot 29, DP426505, which is barely affected). Such an assessment would be misleading though, as the “existing environment” that is present on the Site and influenced by the wider setting (as discussed in Section 3 of this report) is one where a pattern of

vehicle access is in place and a number of building sites formed, particularly in the north eastern part of the Site that is most closely related to this viewing audience.

Considered alongside those formed platforms and roading, the Coastal Living zoning of the Site, potentially expressed in part by the historically developed building areas that exist nearby, would be likely to result in a notable number of houses being developed under those provisions and to therefore generate a measure of heightened impact upon the titles identified here. That potential impact is likely to be amplified by less careful attention being given to siting, building characteristics and integration site development than would occur under the mantle of a Management Plan subdivision of the Site (as expressed by this application).

When this existing environment is conservatively brought into consideration whilst assessing the effects of the proposal upon this neighbouring viewing audience, the level of adverse visual amenity effect is predicted to be in the range of low to the lower end of the moderate-low spectrum and therefore no more than minor. Subject to the form and nature of a Coastal Living development (and based upon the theme set by adjacent Coastal Living development, there is a reasonable potential that the proposal would result in lesser adverse visual effects to be either a benign or positive effect based upon that comparison.

5.6 Immediately neighbouring properties to the west

A small cluster of houses lie to the west of the Site, as seen in Attachment Three. As some of the oblique images of Attachment One illustrate, there is an intervening, heavily vegetated spur that shields almost all of these properties from view to the Site.

Only one house in this sector appears to be exposed. A relatively new home that is perched atop this spur to the west of the Site on Lot 6 DP517271 takes in views to the east across the Site and appears to be open to views of proposed Lots 46-49 of the Willowridge proposal.

The discussion about the “existing environmental” of the Site in the preceding segment 5.5 applies also to the view of this neighbour on the opposite side of the Site, although acknowledging that there are no established building platforms or drive access associated with the crest of Spur 4. Development of that desirable terrain associated with proposed Lots 45-49 is a reasonable likelihood under a proposal for a Coastal Living use of the Site.

On the basis that this home will have chosen to focus much of its outlook and solar access to the north (taking in Orongo Bay) as its plan form suggests— and bearing in mind the preceding comment - initial adverse visual amenity effects are assessed as being *moderate-low* (and less than minor), diminishing to low as proposed planting on the Site builds stature over a period of 4-6 years.

5.7 Orongo Bay open waters and intertidal zone

As mentioned previously, Orongo Bay is a shallow waterbody that is expected to be lightly used by recreational boaters, but intensively occupied by those managing the extensive oyster farms in the inner bay.

Panoramas VP24-26 show representative views over distances ranging from 3.8km to 850m from the Bay edge of the Site. Whilst light conditions in these images are less than ideal, these three images emphasise two fundamental patterning matters; the contrast between the grassland of the Site and the native vegetation that extends to either side, and the prominence of existing housing established in the Coastal Living zones that span from the west through to the north. As such, the landward

view from the Bay is currently conditioned by the extent of the oyster racks in the CMA (in mid to low tide conditions) and the sense of settlement that surrounds the cove.

Taking account of the size and nature of the open waters of Orongo Bay, the visual amenity effects of the proposal are considered to be at the bottom of the *moderate-low* spectrum and minor.

Another audience within the Bay are those heading south along the boardwalk that forms part of a walking route from Okiato Point to Russell. The orientation of the boardwalk in the north-eastern margin of the Bay is oriented south-east and toward the Site, as seen in Panorama VP22.

The conditioning influence of adjacent, established housing is noteworthy. A further influence is the distance to those more elevated proposed building areas on the Site, equating to 1km or more. Over that distance, the combination of proposed planting measures and controls over building characteristic are predicted to result in buildings being dramatically less conspicuous than those seen in the left-hand portion of VP22. In light of these factors, the adverse visual amenity effect upon those using the boardwalk is also assessed as being at the bottom of the *moderate-low* spectrum and minor.

5.8 Lower northern slopes and foothills of Tikitikioure

A number of small roads reach into the lower foothills of Tikitikioure, including Tikitiki Lane, Toi Track, Lichen Grown, Brumby Lane and Te Akau Drive. Visibility towards the Site appears to be highly variable and shaped by a complex interplay of landform and native shrubland. As a result, most of the houses on these low western flanks are largely shielded.

Panoramas VP19-23 are representative of potential views, demonstrating that the exposure of the Site becomes increasingly diminished moving north along these foothills. Panorama VP19 from Tikitiki Lane shows that this enclave is more generally exposed to views of the Site, but that intervening vegetation continues to play a role in fragmenting that outlook. Once again, the current contrast between the current grassland cover of the Site and the native vegetation nearby is powerful.

Whilst the proposal will bring a change to the outlook of this audience to the north, that change will embody a positive dimension through the unification of landscape pattern that would serve to limit the potential adverse impact of the proposal upon this grouping of residents. For those in the northern sector of this audience, the adverse visual amenity effects are assessed as being *low* and less than minor in northern parts, and *moderate-low* and minor on Tikitiki Lane.

6 LANDSCAPE EFFECTS

Landscape effects are those impacts upon the structure, pattern and character of landscape that result from a development or change in land use.

In the case of this proposal, the context of the Site is influential in determining the magnitude of landscape effects arising from potential future buildings and related site development / enhancement.

As the oblique views in Attachment One and the various other attachments illustrate, the Site and its setting have a complex landscape identity on the margin of Orongo Bay and as part of a belt of Coastal Living zoned terrain that extends on around the Orongo Bay coastal hinterland in either direction. As mentioned initially, neither the

Site nor any of its related context has been identified as being an outstanding natural landscape. In the light of the considerably modified nature of the Site, this is predictable.

The landscape complexity of the Site results from its range and variability of its topography, a matrix of vegetation types and patterns, past land development activities, particularly those undertaken to give effect to previously approved subdivision consent/s, along with an ongoing management regime that sees parts of the site left largely to “natural” processes but considerable areas under a regular routine of tractor mowing. Overlying that current state is a comprehensive proposal for planting under the application that would, if anything, serve to considerably clarify and simplify the landscape identity of the Site as a future broadscale living environment.

After accounting for the current state and zoning of the Site and proposal’s provisions for widespread planting, weed and pest management, intended controls over building characteristics on the visually exposed portions of the Site, the magnitude of adverse landscape effects of the proposal upon the already compromised landscape values of the Site itself is considered to be at the bottom end of the *moderate-low* spectrum and no more than minor. It is important to emphasise that whilst this level of effect is assessed as being below the “minor” threshold. It is acknowledged that this finding does not suggest that the proposal will not result in a *change* to the landscape character of the Site and its immediate setting but that its landscape effects will be relatively contained.

7 NATURAL CHARACTER EFFECTS

Section 6(a) of the Resource Management Act (1991) states that the following matter of national importance shall be recognised and provided for:

“The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins and the protection of them from inappropriate subdivision, use and development.”

A working definition of natural character is derived from research undertaken for the Ministry of the Environment in relation to Environmental Performance Indicators (Boffa Miskell Ltd 2002). This states that:

“The degree or level of natural character within an area depends on the extent to which natural elements, patterns and processes occur; and the nature and extent of modifications to the ecosystems and landscape / seascape. The highest degree of natural character (greatest naturalness) occurs where there is least modification. The effect of different types of modification upon the natural character of an area varies with the context and may be perceived differently by different parts of the community.”

As the preceding extract indicates, natural character exists on a continuum that spans from totally modified at one extreme, to entirely natural at the other. The OFNDP does not map natural character values and so the Site has not been defined as having unduly heightened natural character by that current planning instrument. Under the RPSN, the closest are the intertidal mangrove / saltmarsh habitat found in the eastern lobe of Orongo Bay [id 08/23] - and dissected by the pedestrian boardwalk that cuts across that area - along with two pockets of kanuka-dominant

forest found at the heads of Tikitiki Lane and Lichen Grove [both id 08/24]. All three of these areas are defined as having High Natural Character rather than being outstanding.

In its current form, the Site has only a few buildings and, whilst quite managed and “cultured”, its grassland, pockets of indigenous cover and areas of exotic vegetation can be considered as being a product of nature and therefore natural, albeit not to the level created by a predominance of indigenous vegetation and intact ecosystems.

The proposal provides for extensive reintroduction of native vegetation and restoration of wetland and riparian areas, along with measures to improve habitat values more widely. It also makes provision for a relatively large number of buildings and related infrastructure, configured in a way that seeks to minimise prominence and intrusion.

When these influences are balanced, and the very modest natural character value contributed by the Site in its current form is also factored, it is considered that the resulting level of natural character effects of the proposal - when established – upon both the Site itself and its wider setting would be at a *low* level and therefore less than minor.

SECTION E: OPERATIVE FAR NORTH DISTRICT PLAN PROVISIONS

The following commentary relates to those provisions that have a particular bearing upon landscape values, natural character and visual amenity.

10 COASTAL ENVIRONMENT

Objective 10.3.2 To preserve and, where appropriate in relation to other objectives, to restore, rehabilitate protect, or enhance:

- (a) the natural character of the coastline and coastal environment;**
- (c) outstanding landscapes and natural features;**
- (d) the open space and amenity values of the coastal environment;**

Comment: The Site has limited natural character values in its present state. Whilst the proposal provides for the introduction of numerous houses, it also incorporates considerable areas of restoration planting and enhancement of riparian or wetland areas. These measures counterbalance to natural character effects of the development aspect of the proposal and are considered to contribute a small net gain to natural character values.

The Site does not contain any outstanding natural landscapes or natural features and those that do exist in the broad vicinity are so distant as to not bring any potential for compromise of their qualities by the proposal.

As it stands, the Site can be considered an open space (albeit privately owned) and provides a measure of amenity to its setting. The comprehensive

restoration and enhancement dimensions of the proposal are predicted to achieve greater coherence with the indigenous vegetation composition and patterns that are expressed in the immediate setting of the Site and to thereby enhance visual amenity values without compromises the spatial qualities of the broader coastal environment.

Policy 10.4.1 That the Council only allows appropriate subdivision, use and development in the coastal environment. Appropriate subdivision, use and development is that where the activity generally:

- (a) recognises and provides for those features and elements that contribute to the natural character of an area that may require preservation, restoration or enhancement; and**

Comment: The detailed ecological and landscape analysis underpinning the proposal has identified those parts and elements of the Site that are of heightened natural character or ecological value and made provision to both conserve and enhance them within a wider pattern of restoration that will serve to considerably expand those areas of initial value.

- (b) is in a location and of a scale and design that minimises adverse effects on the natural character of the coastal environment; and**
- (c) avoids, as far as is practicable, adverse effects which are more than minor on heritage features, outstanding landscapes, cultural values, significant indigenous vegetation and significant habitats of indigenous fauna, amenity values of public land and waters and the natural functions and systems of the coastal environment; and**

Comment: The Coastal Living zone that applies to the Site anticipates development as seen in terrain to either side of the Site and more generally when following

the coast north and south. Whilst not of that format, the Management Plan impetus applied to the proposal has informed a comprehensive examination and understanding of the elements that contribute to natural character values. The format of the proposal has therefore been shaped to minimise potential adverse effects upon natural character values (which are currently limited in relation to the Site).

Policy 10.4.6 That activities and innovative development including subdivision, which provide superior outcomes and which permanently protect, rehabilitate and/or enhance the natural character of the coastal environment, particularly through the establishment and ongoing management of indigenous coastal vegetation and habitats, will be encouraged by the Council.

Comment: The proposal is considered to exemplify the outcomes sought by this policy. By formulating the design of the development on the basis of the characteristics of both the Site and its informing (and receiving) spatial context, the proposal stitches together and landscape and natural character pattern where there is currently largely a void.

As a result of the analysis and spatial planning approach to this proposal under the Management Plan provisions, it is tailored to the specific nature of the land in a way that conventional Coastal Living development almost never is. Restoration of the indigenous vegetation cover of the inner coastal environment is a fundamental, unifying key to the proposal, along with initiatives to considerably restore the widely compromised wetlands and waterside margins of the Site. Collectively, these initiatives are considered to comprehensively serve Policy 10.4.6.

Policy 10.4.12 That the adverse effects of development on the natural character and amenity values of the coastal environment will be minimised through:

- (a) the siting of buildings relative to the skyline, ridges, headlands and natural features;***
- (b) the number of buildings and intensity of development;***
- (c) the colour and reflectivity of buildings;***
- (d) the landscaping (including planting) of the site;***
- (e) the location and design of vehicle access, manoeuvring and parking areas.***

Comment: The specific design approaches brought to the proposal address this collective of provisions. Whilst several of the proposed building areas are associated with the Aucks Road ridge, existing (largely) or proposed vegetation combined with height controls prevents future buildings from being set against the skyline.

Whilst relatively numerous, the building areas have been selected in relation to the natural contour or existing, formed platforms, and as a coordinated whole – in combination with broad landscape/ecological patterns to be established through extensive planting. This holistic approach allows the Site to successfully absorb that level of development in a way that is rarely achieved in conventional zoning-based development of land, and as anticipated by the Management Plan provisions.

Proposed controls manage the potential visual prominence of future buildings through LRV limits.

The proposal is founded around a substantial indigenous planting commitment that creates a framework within which development can sit in a subservient role. That planting also forms a bold pattern that relates the Site to its broader landscape setting in a manner that it currently fails to achieve.

Roading and access is already partially formed and is considered to fit comfortably with the natural contour of the Site. Further development of that access system is configured to continue that reference to topography to minimise impact. Controls are proposed over access surfacing characteristics and any unavoidable retaining. The defined building areas are generous enough to accommodate vehicular manoeuvring and parking, which would be addressed in detail at the time of formulating house designs.

Objective 10.4.6 That activities and innovative development including subdivision, which provide superior outcomes and which permanently protect, rehabilitate and/or enhance the natural character of the coastal environment, particularly through the establishment and ongoing management of indigenous coastal vegetation and habitats, will be encouraged by the Council.

Comment: The proposal is considered to represent a realisation of this objective.

As the body of this report and the Wild Ecology reporting outlines, the proposal is founded upon creating broad ecological and landscape patterns and systems that are reflective of those found in adjacent areas. Provisions for ongoing management and protection are central to the Management Plan for the proposal. These measures are predicted to deliver a superior outcome to a typical Coastal Living development that the land is zoned for and will serve to

restore natural character to the predominantly bare slopes that form this inland edge of the coastal environment.

Objective 10.7.3.1 To provide for the well-being of people by enabling low density residential development to locate in coastal areas where any adverse effects on the environment of such development are able to be avoided, remedied or mitigated.

Comment: In adopting a Management Plan approach, the proposal has sought to more efficiently develop the Site than is provided for under its zoning whilst containing potential adverse effects and creating many forms of positive benefit. In addition to embodying integrative and restorative initiatives, the proposal also offers heightened amenity to those who would live there, both through the environment that it would achieve and through facilities such as a walking trail network, commonly held open space and community facilities.

The Site's location at the base of the Russell peninsula and in proximity to Okiato places the Site in an area where there is very limited capacity for new housing and where the wider attractions of the locale make it an appealing place to live.

The topographic nature of the Site allows it to accommodate a moderate level of development through a thoroughly and sensitively resolved proposal such as this application. There are few, if any, other landholdings on the peninsula that offer comparable capacity to accept new residents whilst achieving landscape and ecology gains whilst minimising adverse effects so comprehensively.

Objective 10.7.3.2 To preserve the overall natural character of the coastal environment by providing for an appropriate level of subdivision and development in this zone.

Comment: The Coastal Living zone seeks to achieve this outcome through provision for a very modest density of subdivision. In common with typical zoning provisions, the zone provisions are a somewhat “blunt instrument” to achieving the preservation of natural character and many other characteristics. In following a more integrative Management Plan route, the proposal has adopted a broadscale approach to natural patterns and character through its proposed restorative and integrating planting pattern, which will serve to preserve, and arguably heighten, the natural character of the Site as part of a wider coastal environment. When considered in the context of that contribution to natural character, the level of subdivision and development that would be set within that restored indigenous setting are considered to be appropriate.

Policy 10.7.4.1 That the adverse effects of subdivision, use, and development on the coastal environment are avoided, remedied or mitigated.

Comment: As the response to the preceding provisions has outlined, the potential adverse effects of the proposal on natural character and the coastal environment would be comprehensively contained and minimised.

Policy 10.7.4.3 Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the zone in regards to s6 matters, and shall avoid adverse effects as far as practicable by using techniques including:

(a) clustering or grouping development within areas where there is the least impact on natural character and its elements such as indigenous vegetation, landforms, rivers, streams and wetlands, and coherent natural patterns;

Comment: The terrain of the Site, its current state, and previous, partial, development works facilitate an integrated approach to development where access and buildings are set in enclaves related to the spurs and lowland of the terrain and the valleys and upper flank are comprehensively planted as a frame and pattern. The limited watercourses and wetlands of the site are to be protected and enhanced, whilst the manmade ponds are also intended to be subject to comprehensive enhancement of their margins to optimise amenity and habitat. The proposal is considered to be an expression of the vision conveyed by 10.7.4.3 (a).

(b) minimising the visual impact of buildings, development, and associated vegetation clearance and earthworks, particularly as seen from public land and the coastal marine area;

Comment: The iterative “analysis and design” approach taken when formulating the proposal has been strongly influenced by the potential visibility and prominence of future buildings, amongst other matters. Consideration of visual amenity effects from areas outside the Site, both private and public, and including the CMA, has shaped the proposal and is addressed through the format of building areas, planting patterns and the suite of controls that seek to minimise potential prominence.