

25 November 2025
Job No: 1094732.1000.

Warkworth RV Limited
Floor 15, 29 Customs Street West
Auckland 1010

Attention: s 9(2)(a)

Dear s 9(2)

**Geotechnical Assessment and Groundwater take/diversion Letter for Fast Track
Approvals Act 2024 Referral Application Rev 2
Warkworth Residential Development - Matakana Road, Warkworth 0985**

1 Introduction

Tonkin + Taylor Ltd (T+T) has been engaged by Warkworth RV Ltd to provide a geotechnical referral letter for the proposed Warkworth Residential Development of the current site at Matakana Road, Warkworth 0985. The site currently comprises the following parcels; Lot 2 (DP 375478), Lots 3&4 (DP 76450) and Section 19 (SO 588806). Warkworth RV Ltd is proposing to subdivide this site into 3 superlots (Lots 1-3), in addition to two parcels (Lots 100-101) to be vested as roads.

This letter is intended to support an application for referral to use the Fast track process and is based on a combination of available geotechnical investigation data, published geological information, site walkovers and our professional judgement and knowledge of the area. In particular, this letter provides a commentary on the anticipated geotechnical risks, considerations and recommendations to enable the proposed development. Further geotechnical investigations and analysis will be required to support detailed design stages across the sites.

Prior to this letter, T+T have undertaken investigations and analysis for the Lot 2 site. This included a limited number of investigations on the northern boundary of the property (alongside Matakana Road) within Lot 3. T+T have also undertaken a walkover inspection and desk study analysis of proposed Lots 1 and 3.

2 Site Layout and Proposed Development

Warkworth RV Limited own the site (described in Section 1 above) in Warkworth north located on the opposite side of the Matakana Road to an existing residential development. The site comprises 54 ha of land, approximately 1 km north of Warkworth township. The Warkworth RV Limited Land holding (the site) is bounded to the north and west by Matakana Road, to the east by Warkworth Golf Club and to the south by an active limestone quarry and adjacent rural residential properties. The site has a single access point off Matakana Link Road. The landform is generally undulating, with a series of hills and gullies/streams present across the site.

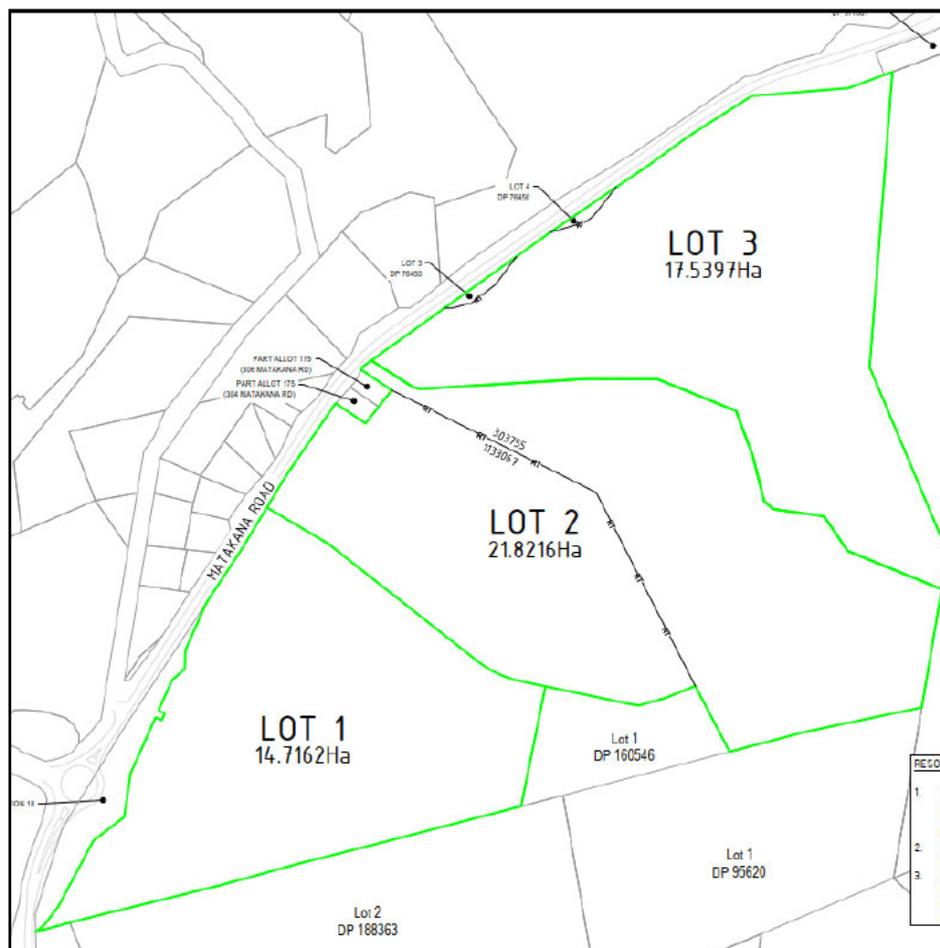


Figure 2.1: The Site

As presented on the Scheme Plans provided to us by Chester Consultants (Refer Appendix A and Figure 2.1 above), an integrated residential development is proposed on the site. To the north adjacent to the Warkworth Golf Club boundary (Lot 3) larger size sites of predominantly 2,500m² are proposed to accommodate approximately 54 residential dwellings. Adjacent to these sites, and south of the watercourse is a proposed 198 villa retirement village with a Club House and a Care facility (Lot 2). To the south of the retirement village a comprehensive designed residential development of approximately 264 residential sites and 4 super lots (which will accommodate circa 30 dwellings), is proposed.

The development involves enabling works and interim onsite servicing solutions for Lots 2 and 3.

We understand that earthworks will involve significant volumes of cut and fill to create building platforms, with retaining walls and engineered fills as required. The proposed development is designed to integrate across lot boundaries, with concurrent earthworks planned. A balanced cut-fill approach will be taken to minimise material import and export. Any excess material will be disposed of at an appropriate off-site facility.

The Civil Engineering and Servicing Assessment by Chesters outlines the water supply servicing strategy in detail. The Assessment considers the development will be able to connect to the public water supply network but provides options for interim self-servicing if there are capacity constraints at the time of development. If required, Lots 1 and 3 and Stages 1 – 6 of the retirement village on

Lot 2 can be self-serviced for water supply. For Stages 1 – 6 of the retirement village, it is proposed for water to be supplied from a bore located on site. A water take consent is required to draw up to 100m³ / day (36,500 annually) for the water take from the ground water aquifer to provide onsite water supply for potable and firefighting purposes.

3 Existing Information

T+T have previously undertaken geotechnical investigations at Lots 2 and 3. T+T have also reviewed historic investigation at the site undertaken by s 9(2)(a). A summary of the investigation data available for across Lots 2 and 3 is presented below:

- 10 No. Machine Boreholes undertaken by T+T and s 9(2)(a), with 3 boreholes including a piezometer.
- 16 No. Test Pit investigations undertaken by s 9(2)(a)
- 24 No. CPT investigations undertaken by T+T and s 9(2)(a)
- Laboratory testing comprising Moisture Contents, Atterberg Limits, Compaction tests and 1D consolidation tests undertaken across a number of samples.

T+T have also undertaken a detailed site walkover of Lot 1, 3 and 4 on 24th October 2025 by a principal engineering geologist.

4 Published Geology and Anticipated Ground Conditions

The geology beneath the site is illustrated in published 1:250,000 geological map of the Auckland area (Edbrooke S. W., 2001)¹. The published geology shows that three major geological units are expected to straddle the surface of the site. These are:

- 1 The Pakiri Formation of the Waitemata Group. This is described as an “Alternating thick-bedded, volcanic-rich, graded sandstone and siltstone”.
- 2 Sheared mudstone of the Mangakahia Complex of the Northland Allochthon. This is described as “Closely fractured to sheared, light or dark coloured, siliceous and sometimes calcareous mudstone, with micaceous sandstone, siltstone, green and brown shale and some muddy limestone”.
- 3 Mahurangi Limestone of the Motatau Complex. This is described as “Blue-grey to white, micritic, coccolith foraminiferal, muddy limestone, commonly with thin glauconitic sandstone beds: commonly closely shattered. Rare crystalline limestone.”

The results of the site investigations undertaken are generally consistent with the GNS geological map of the area, with the following exceptions:

- Observation of Tauranga Group Alluvium (being primarily present within gulleys) which is not shown on the published geological maps.
- No obvious signs of the thrust fault separating the two main geological units was observed in our investigations.

Groundwater was observed in our investigations to be typically shallow (0.7–6.0 m bgl), with perched water in residual soils and generally higher groundwater levels near gullies. Seasonal fluctuation of the groundwater profile is to be expected.

¹ Edbrooke, S.E. (compiler) 2001. Geology of the Auckland area(external link). Institute of Geological & Nuclear Sciences 1:250 000 geological map 3. Lower Hutt, New Zealand. Institute of Geological & Nuclear Sciences Limited. 1 sheet + 74 p.

5 Key Geotechnical Considerations and Effects

The key geotechnical considerations and effects that need to be considered and managed for this proposed development are presented below.

5.1 Site Seismicity and Liquefaction Susceptibility

Warkworth is generally considered to be a low seismicity area and as such we do not expect seismicity to limit the development of the site (subject to the design guidelines from MBIE Module 1 being adopted).

Liquefaction occurs when loose, saturated, low cohesion soils are subjected to strong earthquake shaking. The strong shaking causes loose soil particles to contract resulting in the generation of excess pore pressures and the loss of shear strength. Liquefaction can result in bearing capacity yield or failure, vertical settlement, and/or horizontal movement of the soil mass (lateral spreading).

A preliminary liquefaction assessment was undertaken for the upper 10 m of soils (at Lot 2) in order to understand the liquefaction induced effects at the surface of the natural soil profile. This assessment indicated that No liquefaction triggering was expected under SLS conditions, with only “Mild” effects under the ULS conditions (described as “Limited excess pore water pressures; negligible deformation of the ground and small settlements”). On the basis of the above, we consider the effects of liquefaction at the site to be very low to insignificant.

5.2 Slope Stability

Based on a review of the available information (including investigations, aerial imagery, site walkover etc) and our preliminary stability assessments for Lot 2, we have presented a summary of the slope stability conditions and recommendations below:

- A review of the Auckland Council geomaps indicates that the site has low to very low susceptibility to large scale landslides. The site also is shown to have mostly low to very low susceptibility to shallow landslides. However, there are some areas that are indicated as moderate to high risk. Engineer designed slope stability mitigation solutions will be required to address these potential instabilities. A landslide hazard risk assessment for the proposed development, including the proposed engineer designed mitigation solutions, will be undertaken in accordance with the Plan Change PC120 requirements.
- No obvious signs of large-scale instability were identified in our investigations, walkovers or review of aerial imagery. Some localised shallow failures have been observed local to steeper gully's adjacent to streams, however these can be addressed through design.
- Due to the presence of Northland Allochthon material and areas of significant cut and fill earthworks to develop the required scheme, engineer designed slope instability mitigation solutions will be required to ensure factors of safety meet or exceed Auckland Council requirements (FoS \geq 1.5 static, \geq 1.3 transient, \geq 1.0 seismic).
- These instability risks can be managed through design and construction of conventional geotechnical solutions such as retaining/MSE walls, engineered fill, shear keys, subsoil drainage and in-ground palisade walls, or a combination thereof.

5.3 Settlements

Due to the extents of the proposed filling at the site, settlement of the underlying soils is expected to occur, especially in areas where the fill overlies softer materials. We understand that the proposed earthworks to enable the development of the site comprise up to about 10.5m of fill being

placed across low lying areas of the site. We have undertaken a preliminary review of settlements (based on our investigations and our settlement analysis for Lot 2) and have presented a summary of our settlement conditions and recommendations below:

- Settlements of between 50mm and 600mm may be anticipated across the site in the various fill areas, depending on location and fill heights.
- Settlements can be managed through conventional geotechnical solutions such as pre-loading and surcharge or the use of wick drains to achieve the required settlement prior to housing development.
- Differential settlements are generally expected to be low, outside of areas where a steep cut to fill transition occurs. These can be managed through earthworks, settlement monitoring, foundation design and staged construction.

5.4 Groundwater Diversion

Due to the nature of the proposed earthworks at the site, a consent for groundwater diversion is required. A technical assessment of groundwater diversion should be undertaken in accordance with E7.8.1(6) in the Auckland Unitary Plan (AUP) for the wider development.

T+T have undertaken a preliminary groundwater diversion analysis for Lot 2 of the site (where the majority of the earthworks and risk of groundwater diversion exists). Based on this preliminary assessment, and subject to a detailed assessment of this site, we consider that the conditions of the AUP can be met through prudent measures to avoid, mitigate or remedy these effects through the detailed design process.

5.5 Groundwater Take for Water Supply

As outlined in Section 2 above, a groundwater take may be required to service the Lot 2 (retirement village) development.

T+T have prepared a technical report comprising a hydrogeological assessment for the purposes of providing sufficient information to support a resource consent application for the installation of a production bore to provide a potable water supply for the Lot 2 site.

The assessment considers the feasibility of a 250 m deep bore, expected to take water from the Mahurangi Limestone. There is currently groundwater allocation in Mahurangi Waitemata Aquifer Management Area for a groundwater take consent for at least 10 years.

The technical report includes assessment of the potential environmental effects of the proposed bore and groundwater take on:

- Recharge to overlying aquifers, and aquifer consolidation and ground settlement which are assessed as negligible.
- Shallow groundwater and surface water resources, and terrestrial and freshwater ecosystem habitat are assessed as negligible due to the depth of the proposed take and the limited hydraulic connection with shallow groundwater.
- Nearby groundwater users (at other bores) are assessed as being able to continue taking their existing lawful water supply and are unlikely to be adversely affected by the proposed groundwater take.
- Saltwater intrusion is unlikely and this has been assessed as negligible.

The technical report and work completed to date indicates that a water supply at Lot 2 is feasible subject to further investigation; i.e. drilling of the bore and field testing with monitoring to determine the actual bore yields and to confirm that the predicted assessed drawdown effects from

the proposed take are as per the technical report. This additional testing is required to reduce the residual project risks.

6 Suitability for Proposed Development

We consider the site to be suitable for the proposed Warkworth Residential Development. Some of the geotechnical considerations outlined in this report will need to be addressed through detailed design. However, these considerations can be suitably managed through conventional and commonly adopted geotechnical engineering solutions.

Some additional investigations will need to be undertaken, in particular for Lots 1 and 3 to help inform the design and extent of the geotechnical solutions to achieve the proposed development. This is common.

On the basis of the preliminary groundwater diversion assessment undertaken for Lot 2 we consider that the conditions of the AUP can be met through prudent and commonly utilised measures to avoid, mitigate or remedy these effects through the detailed design process.

We consider that the proposed groundwater take for water supply is feasible subject to further investigation, field testing and to confirm that the predicted assessed drawdown effects from the proposed take are acceptable, as per the technical report. Detailed analysis will be provided through the next stage of detailed design.

7 Applicability

This report has been prepared for the exclusive use of our client Warkworth RV Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for a Fast Track resource consent.

Tonkin & Taylor Ltd

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:

s 9(2)(a)



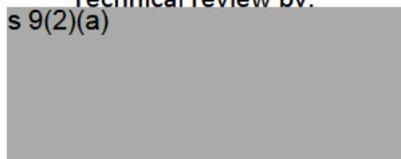
Principal Geotechnical Engineer

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Project Director

Technical review by:

s 9(2)(a)



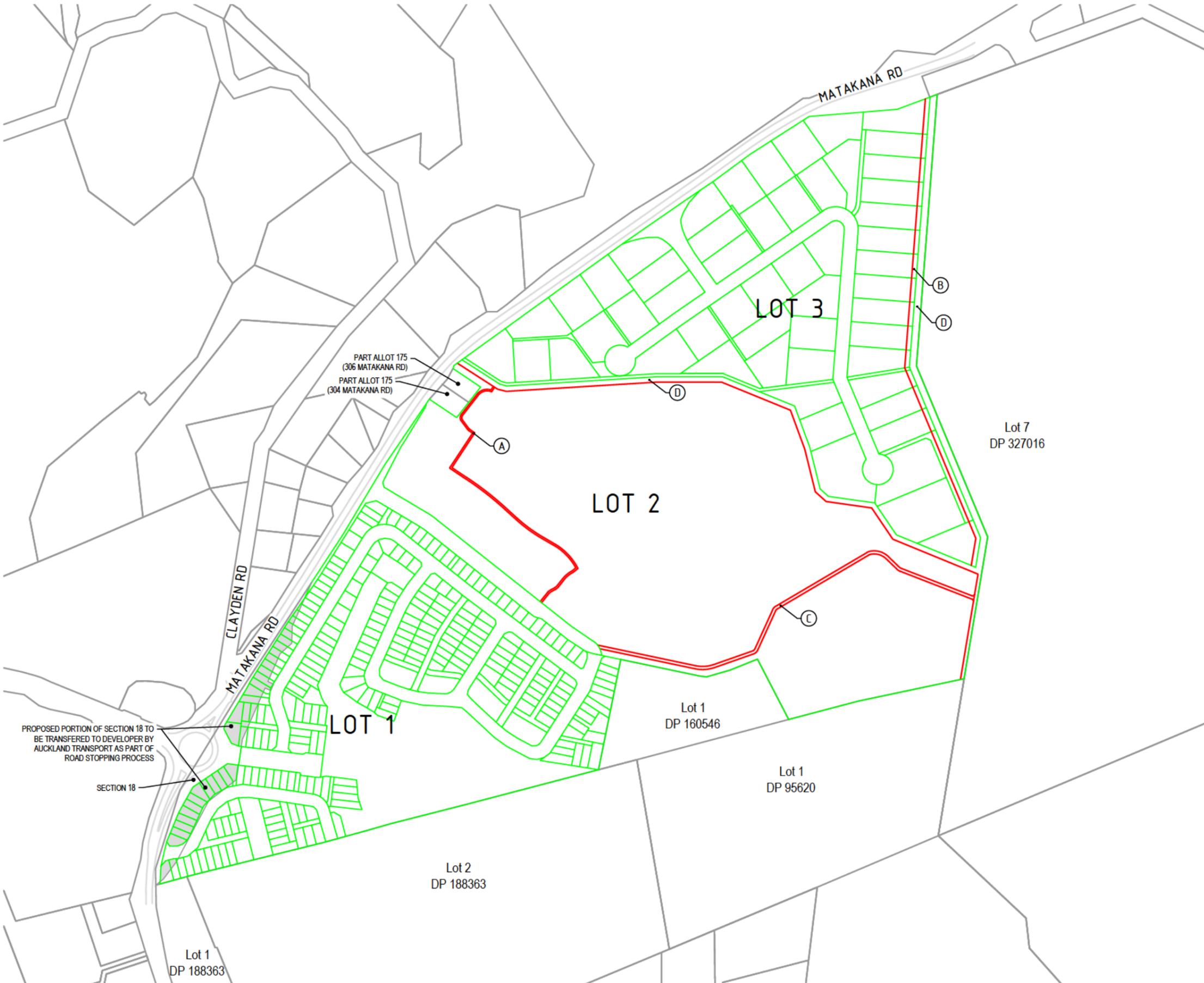
Technical Director

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25-Nov-25

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Appendix A Development Scheme Plans



SITE DESCRIPTION:
 TERRITORIAL AUTHORITY: AUCKLAND COUNCIL
 ADDRESS: PADDISON FARM, MATAKANA ROAD, WARWORTH, AKL
 APPELLATION: LOT 2 DP 375478 & SECTION 19 SO 588806
 ZONING: RURAL
 RECORD OF TITLE: 1133067, 303755, NA54D/1378 & NA54D/1379
 AREAS:
 LOT 2 (DP 375478) - 29.3367Ha - 303755
 SECTION 19 (SO 588806) - 24.5866Ha - 1133067
 LOT 3 (DP76450) - 956m² - NA54D/1378
 LOT 4 (DP76450) - 743m² - NA 54D/1379.
 TITLE (TOTAL) - 54.0932Ha
 PLAN AREAS (TOTAL) - 54.0775Ha

MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	BENEFITED LAND (DOMINANT TENEMENT)
LANDSCAPING	B	LOT 3 HEREON	LOT 2 HEREON

MEMORANDUM OF EASEMENTS IN GROSS - TEMPORARY EASEMENT			
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE
RIGHT OF WAY (WALKING & CYCLING)	A	LOT 2 HEREON	AUCKLAND COUNCIL

MEMORANDUM OF EASEMENTS IN GROSS			
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE
RIGHT OF WAY (WALKING & CYCLING)	D	LOT 2 HEREON	AUCKLAND COUNCIL
RIGHT OF WAY (WALKING & CYCLING)	C	LOT 2 HEREON	AUCKLAND COUNCIL

TEMPORARY EASEMENT NOTE:
 EASEMENT 'A' IS TEMPORARY AND IS TO BE REMOVED ONCE MATAKANA ROAD UPGRADES HAVE BEEN COMPLETED AND EASEMENT 'D' CAN CONNECT TO THE PUBLIC ROAD PEDESTRIAN FACILITIES.

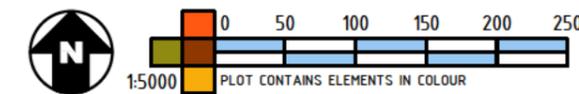
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 Designer: J PHILIPS Client: ARVIDA LIMITED
 Checker: J PHILIPS Address: MATAKANA ROAD, WARKWORTH 0985
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 Project: 15175
 Issue: INFORMATION



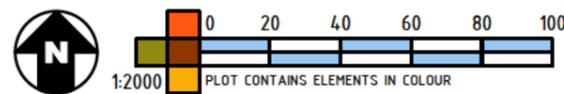


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PROPOSED PORTION OF SECTION 18 TO BE TRANSFERRED TO DEVELOPER BY AUCKLAND TRANSPORT AS PART OF ROAD STOPPING PROCESS

SECTION 18



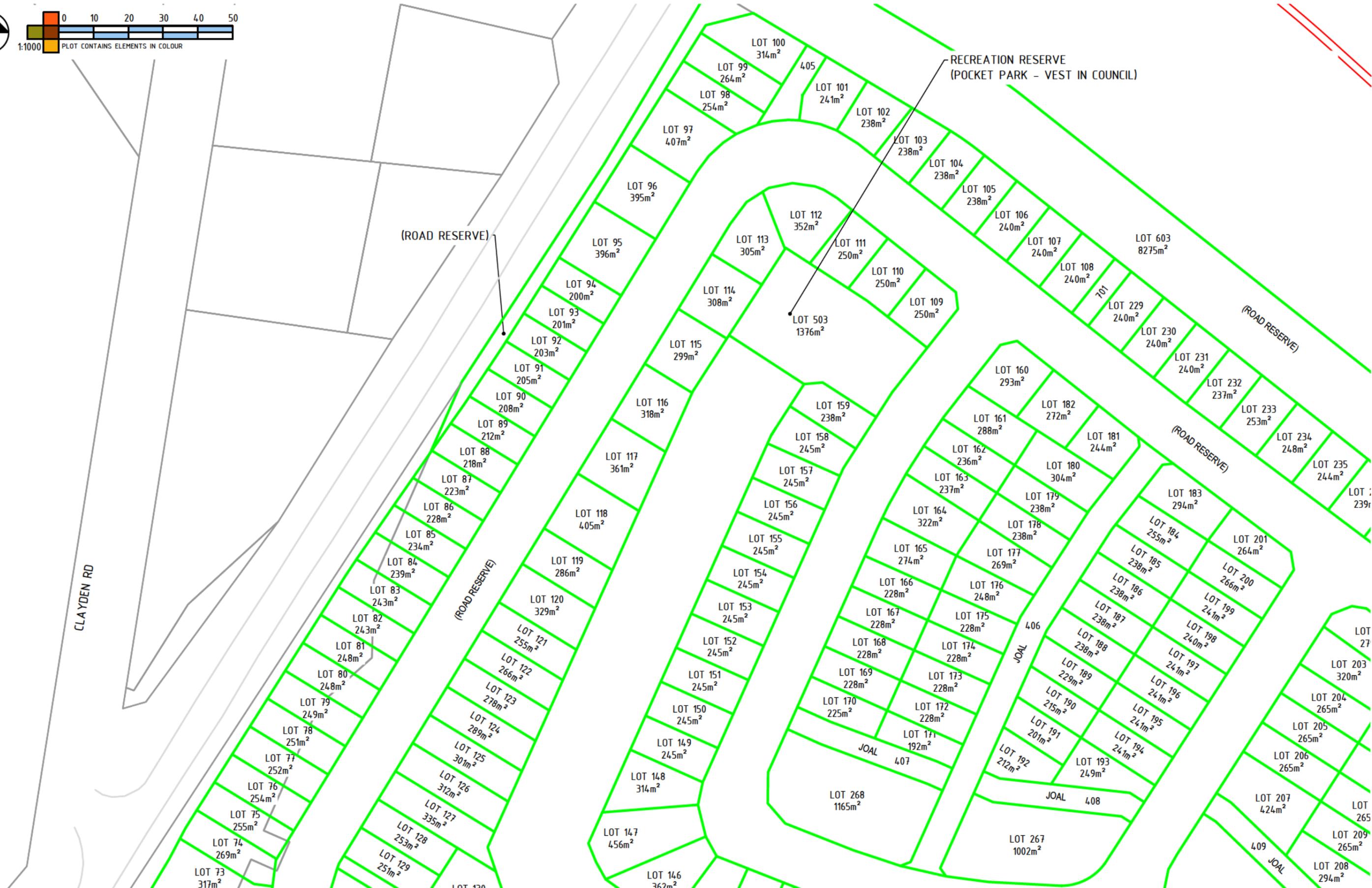
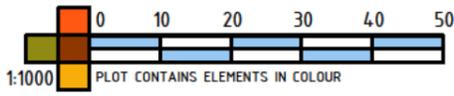
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 Checker: J PHILIPS Address: MATAKANA ROAD, WARKWORTH 0985
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 Issue: INFORMATION



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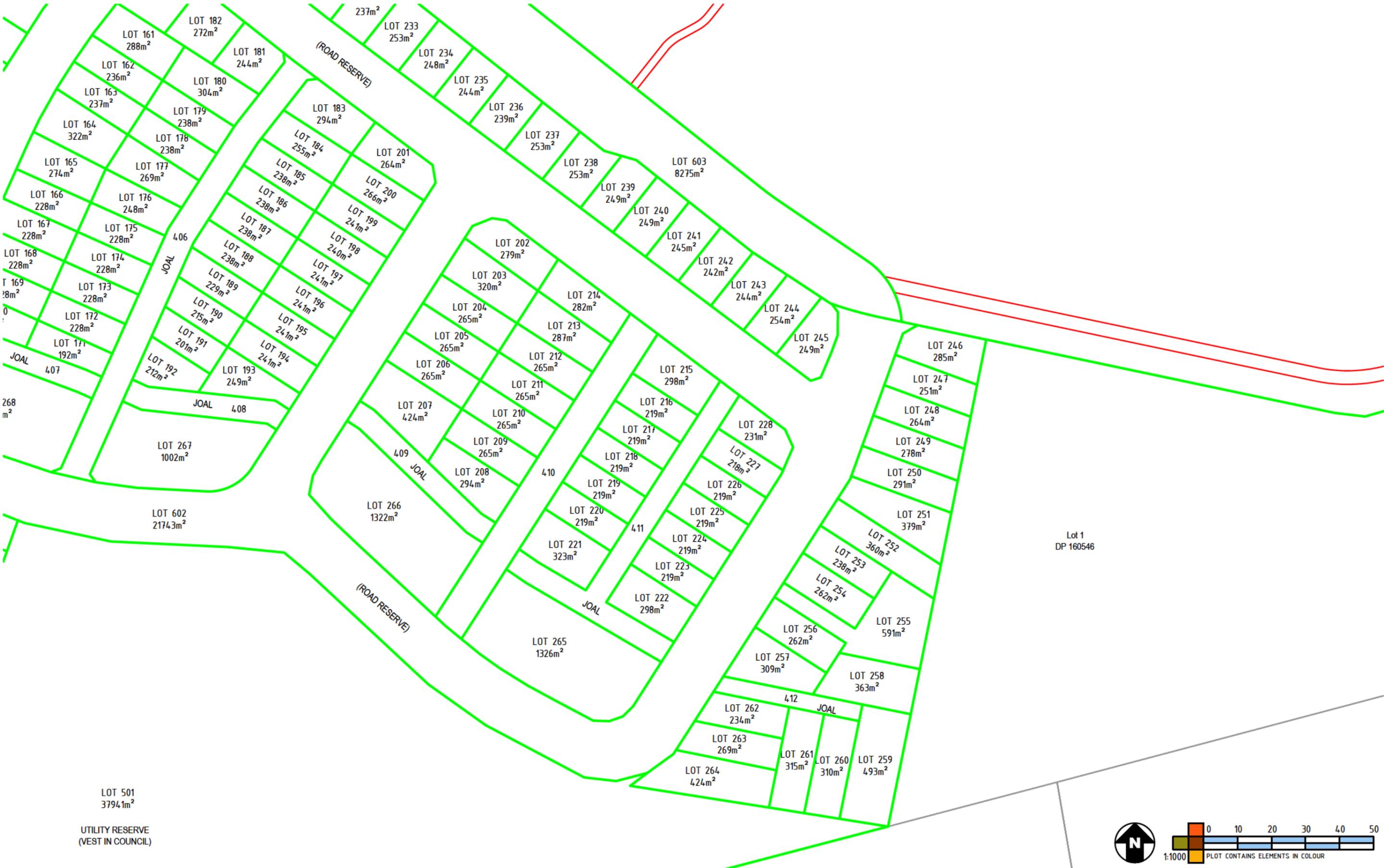
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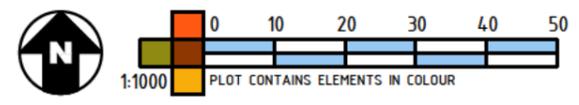
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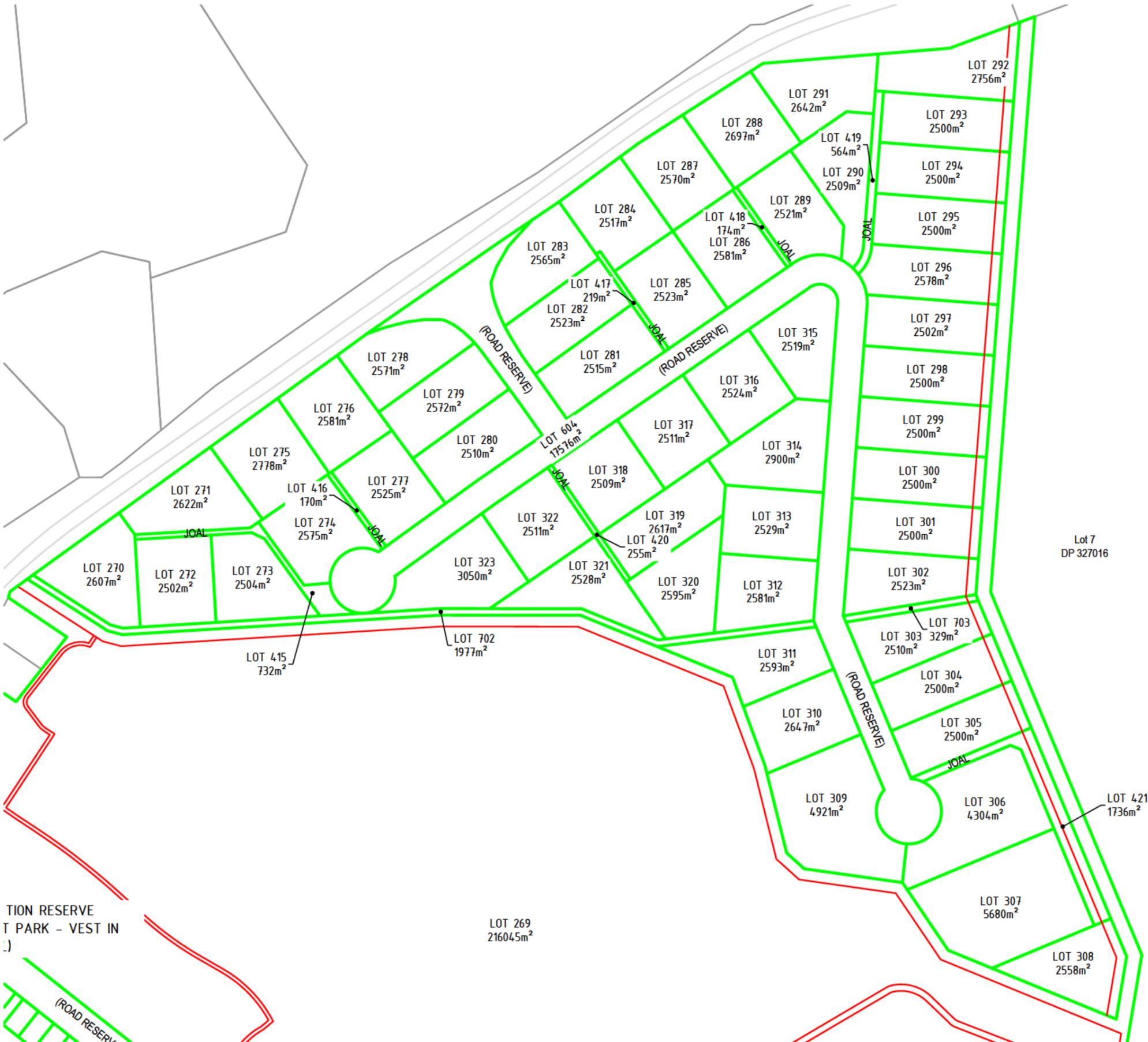


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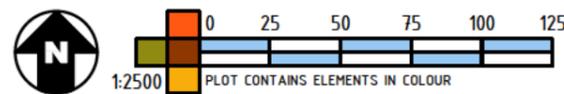


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 Designer: J PHILIPS
 Checker: J PHILIPS
 Date: 20/11/2025

Job Title: WARKWORTH RESIDENTIAL DEVELOPMENT
 Client: ARVIDA LIMITED
 Address: MATAKANA ROAD, WARKWORTH 0985
 Drawing Title: SCHEME PLAN - FINAL - ENLARGEMENT 05

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