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Preliminary Services Design Report

1275 Tram Road (Block B), Swannanoa

Prepared for Andrew McAllister

15858

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Project number: 15858

Quality Control Certificate

Survus Consultants

survus.co.nz

Action	Name	Signature	Date
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Appendix A. Proposed Subdivision Scheme Plan

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1. Introduction

1.1. Purpose

This Preliminary Services Design Report has been prepared in support of a submission by Andrew McAllister for the rezoning of an approximate 21.2459 ha area of land from rural to residential, located at 1275 Tram Road, Swannanoa, as shown in Figure 1.

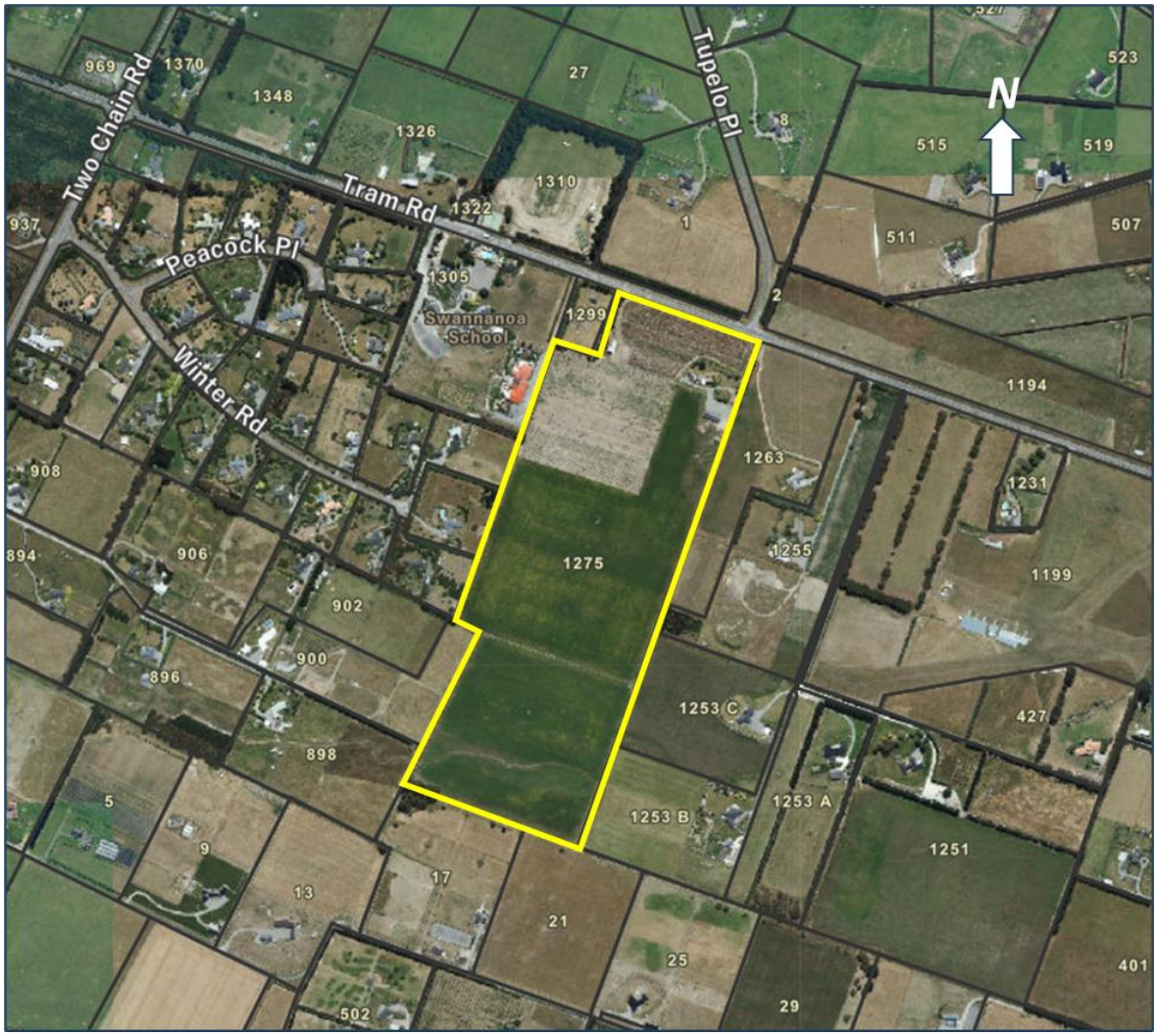


Figure 1. Plan Change Zone Boundary

1.2. Scope

This report addresses the servicing requirements for stormwater, wastewater, water supply and utility services (power and telecommunications).

The following information is provided within the Appendices.

Appendix A: Proposed Subdivision Scheme Plan.

Appendix B: Correspondence.

2. Site Description

2.1. Location and Surrounds

The proposed submission area is located at the address shown in Table 1.

Table 1. Proposed Submission Area Addresses

Legal Description	Owner	Adress	Area (ha)
Part RS 8183	Andrew John McAllister	1275 Tram Road, Swannanoa	21.2459 (surveyed)

The site is accessed off Tram Road to the north. The overall land area, within which the site is located, is bounded by Two Chain Road to the west, No 10 Road to the east and North Eyre Road to the south.

There is an existing residential dwelling located within the site northeast corner and a farm shed in the northwest corner. 1299 Tram Road (Part RS 8183) borders the site northwest corner.

The site is currently pasture and crops with some scattered shelterbelts along the boundaries.

2.2. Topography

The site is generally flat with a naturally sloping topography towards the east at an approximate grade of 1 in 140. There is an approximate 1 m to 1.2 m drop in elevation between the site southern boundary and Tram Road.

Figure 2 shows the site topography.

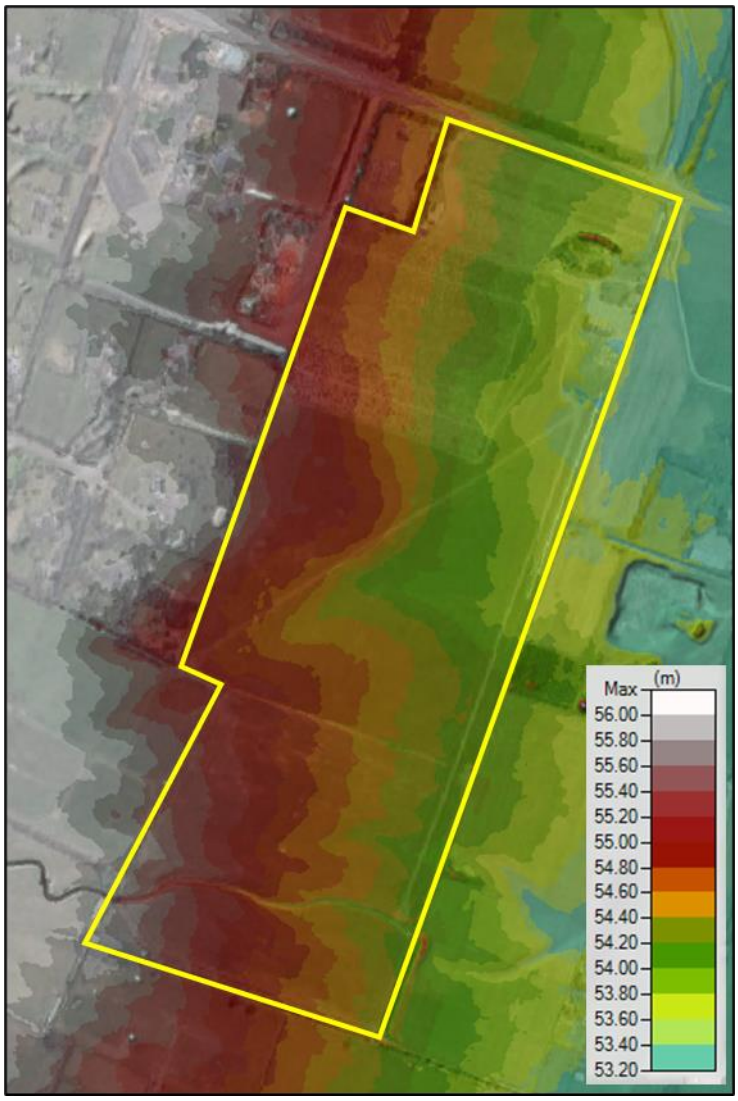


Figure 2. Site Topography (NZVD 2016)

2.3. Geology

Landcare Research Soil Maps (2023) describe the soils as an imperfectly drained and moderately well drained silt with the classification of mottled argillic pallic and typic argillic pallic soil.

Nearby bore logs (Canterbury Maps, 2023) suggest a topsoil, overlying silts and sandy gravels.

A geotechnical investigation would be required to confirm the exact soil types underlying the site.

2.4. Groundwater

2.4.1. Aquifer Type

The plan change area is located above the unconfined/semiconfined aquifer and piezometric contours indicate that groundwater generally flows to the east-southeast (Canterbury Maps, 2023).

2.4.2. Springs

Springs BW23/0493 and M35/7458 are located approximately 800 m to the east-southeast of the site. There are no other springs recorded in close proximity to the site.

2.4.3. Community Drinking Water Protection Zones

Community Drinking water supply wells M35/9021 and M35/18638 are located approximately 800 m to the west of the site (upstream in the direction of ground water flow).

Community drinking water supply well M35/5585 is located approximately 1.5 km to the east of the site (downstream in the direction of groundwater flow).

The site is not located within a community drinking water supply protection zone.

2.4.4. Groundwater Depth

There are no groundwater monitoring wells within close proximity to the site, the closest wells are:

- Groundwater monitoring well M35/0222, located 3 km to the north has a recorded ground water level fluctuation of between 4.59 m to >12 m below ground level (bgl).
- Groundwater monitoring well M35/11913, located 2.7 km to the south has a recorded ground water level fluctuation of between 1.13 m to >11.26 m bgl.

Other wells within close proximity to the site have the following groundwater level recordings:

- Well M35/3283, located within the plan change area has a recorded groundwater fluctuation of 3.3 m to 9.68 m bgl (recordings between Sept 1982 to May 1989).
- Well BW23/0468, located 160 m to the east, has a recorded groundwater level of 3.4 m bgl (Sept 2017).
- Well BW23/0764, located 370 m to the north) has a recorded groundwater level of 6.8 m bgl (Feb 2023).

A review of the Canterbury Map (2023) statistics of wells within a 500 mm radius of the site suggests a groundwater fluctuation of 2.75 m to 10.6 m bgl.

2.5. Surface Water

A water race is located approximately 260 m from the south boundary and flows in an easterly direction and up the eastern site boundary. A second water race flows in an eastern direction along the southern boundary.

Canterbury Maps (2023) shows an old stream channel located approximately 80 m from the southern boundary, however this stream has been diverted to the southernmost water race.

Figure 3 shows the two water races and the old stream channel.

Figure 3. Surface Water Locations within the Plan Change Area

2.6. Contamination

The site is not registered on the Environment Canterbury (ECan) Listed Land Use Register (LLUR) as having historical HAIL activities.

2.7. Flood Hazard

The site is shown in the Waimakariri District Council (WDC) Flood Hazard Maps as being subject to inundation during the 0.5% Annual Exceedance Probability (AEP). E2 Environmental have provided a Flood Risk Assessment as part of the plan change submission.

3. Wastewater

3.1. Existing Network

Swannanoa is within the Mandeville Area Wastewater Scheme which is a Septic Tank Effluent Pumping (STEP) system. Raw sewage is collected in private on-site septic tanks where it receives primary treatment and screening. The primary treated effluent is then pumped from the Bradley's Road pump station to the Rangiora Wastewater Treatment Plant for additional treatment and disinfection.

There is a 90 mm diameter MDPE (PE100) rising main within the southern berm of Tram Road outside the proposed plan change area. The rising main discharges to a nominal diameter (DN) 100 mm PVCU pressure main at the corner of Tram Road and No 10 Road (870 m to the southeast).

3.2. Wastewater Flows

The proposed wastewater network has undergone preliminary design calculations for confirmation of the discharge rate. Based on the WDC Engineering Code of Practice Part 6, the following discharge rates for the 37 Lot plan change area are expected.

- Average dry weather flow = 2.7 people/dwelling x 250 L/person/day x 37 dwellings = **0.289 L/s**
- Peak dry weather flow = 0.289 L/s x 2.5 = **0.723 L/s**
- Peak wet weather flow = 0.723 x 4 = **2.892 L/s**

3.3. Proposed Network

WDC will need to confirm that the existing wastewater network and treatment plant facility have capacity to cater for the additional wastewater flow that will be generated by a future subdivision, and this will have a bearing on the design of the internal sewer network (or any potential upgrades to the WDC external network).

It is considered there are four potential wastewater network design options as discussed in the following sections.

3.3.1. Option 1: STEP

This option is in line with the existing wastewater management scheme. Each property would have a privately owned septic tank and pump which would discharge to a pressure sewer main located within the street berm. The pressure main network would discharge to the 90 mm diameter rising main within Tram Road. The STEP systems also include electrical controllers that can incorporate telemetry if required.

3.3.2. Option 2: Low Pressure Sewer

Low Pressure Sewer (LPS) is a viable alternative network to a STEP system, as wastewater flows can be attenuated and discharged to the downstream network during off peak periods. LPS networks are similar to STEP, except do not provide primary treatment (solids settling). All wastewater passes through a grinder pump and discharges to the downstream network.

Residential dwellings would drain effluent via a gravity pipe to a pump unit (pump and chamber), located within each individual property boundary. Each pump unit would have at least 24 hours storage capacity and would be controlled by an IOTA OneBox control panel which allows for automation and external control of the pump. The pump unit would discharge effluent to a pressure sewer main located within the street berm.

At the time of subdivision construction, each residential dwelling would be provided with a boundary kit (containing valves and isolation points). The boundary kit would be located just outside the property boundary (within the road reserve services strip). A lateral (pipe) would extend from the boundary kit into each property for later connection of the pump unit.

3.3.3. Option 3: Gravity Sewer and Pump station

Potentially, each property could discharge to a gravity network within the future subdivision, which in turn would discharge to a pump station, prior to being pumped to the 90 mm diameter rising main within Tram Road.

Pump stations can also be used as an alternative to the LPS or STEP networks. Generally, the WDC Engineering Code of Practice requires that pump stations have 8 hours of storage for the average daily dry weather flow, the storage capacity also includes the upstream capacity of manholes and reticulation.

3.3.4. Option 4: Onsite Wastewater Disposal

Should the WDC reticulated network not have capacity to cater for a future subdivision, potentially onsite wastewater treatment and disposal could be utilised. This would require each site to have an advanced wastewater treatment unit and pressure compensating drip irrigation field. Due to the small Lot sizes a Resource Consent would need to be sought from Environment Canterbury. This option is the least favourable and would need to be discussed with Environment Canterbury. There is no guarantee that Environment Canterbury would grant consent as the area is mapped as being within a nutrient allocation zone were water quality outcomes are not met.

4. Stormwater

4.1. Existing Network

WDC service maps indicate there is no stormwater infrastructure within the vicinity of the proposed plan change area.

Well record data suggests the underlying soils types in the vicinity are possibly sandy gravels and the highest seasonal groundwater maybe around 3 m bgl. Therefore, potentially the existing properties in the area maybe discharging all stormwater into land via soakage systems.

Aerial images and goggle street view show two scruffy dome manhole chambers at the entrance to the Swannanoa School, which borders the plan change area to the west, and has an entrance of Tram Road. While it cannot be confirmed the manhole chambers appear to be soakage pit inlets.

Therefore, given the apparent local soils, reasonably deep groundwater and lack of known stormwater infrastructure, it is assumed that the primary method of stormwater disposal in the area is via soakage into land.

4.2. Proposed Stormwater Network

4.2.1. Option 1: Discharge of Stormwater into Land

Roof Stormwater

All stormwater runoff generated by roof areas would discharge into privately owned soakage pits sized with sufficient capacity to detain and discharge all rainfall runoff from all storm events up to and including the 2% AEP (50 Year) critical duration.

Road and Driveway Stormwater

All stormwater runoff generated by roads and driveways would be conveyed by kerb and channel, sumps and pipe reticulation to soakage pits (located within the road reserve e.g. under berms). The soakage pits would be sized with sufficient capacity to detain and discharge all rainfall runoff from all storm events up to and including the 2% AEP critical duration.

All sumps would have submerged outlets to enhance the capture of sediment and hydrocarbons. The piped network would be sized to convey the 2% AEP critical duration stormwater runoff flow.

4.2.2. Option 2: Discharge of Stormwater into Surface Water

Option 2 is only applicable should for any reason the use of soakage pits not be feasible.

Primary Conveyance Network

Stormwater runoff from residential Lots, reserves and roading would be conveyed by kerb and channel, sumps and pipe reticulation and/or swales.

Stormwater discharged from Lots would be to the kerb via a PVC kerb entry adaptor (or directly into swales).

The stormwater network would be sized to convey the 20% AEP storm (5 year) critical duration rainfall runoff in accordance with the requirements of the WDC Engineering Code of Practice Part 5 (Stormwater & Land Drainage).

The stormwater network would need to discharge to a Stormwater Management Area which will provide treatment and attenuation, prior to discharging to one of the surface waters (water race) that flow through the site.

Secondary Conveyance Network

Stormwater runoff flow rates beyond the pipe or sump capacities would discharge into the internal road network and would be conveyed within the road reserve to the Stormwater Management Area. The roading network would be designed to convey the 2% AEP runoff generated by the upstream catchment. If swales are utilised these would also convey the 2% AEP flow.

Stormwater Attenuation (Detention)

Overview

To ensure the downstream environment is not subject to increased inundation resulting from additional stormwater runoff from the future subdivision impervious areas (roof, roads, driveways and miscellaneous hardstand), stormwater detention would be provided to ensure that the post development runoff generated by the subdivision does not exceed the pre-development state (pasture) for all rainfall events up to an including the 2% AEP critical duration storm.

Roof Stormwater Detention

Stormwater runoff generated by all roof areas would discharge to an onsite detention storage tank, located within the boundary of each Lot. The tanks would be installed in accordance with the WDC Engineering Code of Practice Standard Drawing 600 Sheet 251. The detention tanks have a small bore orifice that restricts the discharge of stormwater back to pre-development runoff rates. The Christchurch City Council (CCC) recommends 5 m^3 of storage per 100 m^2 of roof area for attenuation of the 2% AEP storm.

Road & Driveway Stormwater Detention

All roading, driveways and right of way stormwater runoff would discharge to a Stormwater Management Area, where it will be detained within a detention basin, prior to being slowly released via a restricted orifice outlet, to an adjacent surface water (water race).

Stormwater Treatment

The bulk of contaminant loadings are to be found mainly in the water quality volume or flow, often referred to as the "first flush" which requires treatment prior to discharging into land or to a surface water. The site will be required to provide stormwater treatment for rainfall runoff generated during the first 25 mm rainfall depth (volume based treatment devices) or the 10 mm/hour rainfall intensity (flow based treatment devices).

Roof stormwater runoff is generally considered clean and it is recommended that it be directed to a detention storage tank which will have a restricted orifice outlet slowing the release of stormwater discharged to the downstream network. Therefore, treatment for the most part will only be required for driveway and road areas.

When determining the preferred treatment method, the type and concentration of expected contaminants, desired treatment outcome and site characteristic need to be taken into account. There are various treatment options available for the site and the four main types which are likely to be suitable are detailed below:

1. **Proprietary treatment devices:** These are manufactured package treatment plants that can be purchased from suppliers, such as hydrodynamic separators, cartridge filter units and biofiltration/bioretention units. The advantage of proprietary treatment units is that they have a small footprint, provide an acceptable contaminant removal and are easily maintained.
2. **First Flush Basins:** First flush basins are a grassed basin which provide primary treatment for stormwater runoff and are usually upstream of a secondary treatment device such as a wetland. However, in some instances Council may allow them to be used as the sole treatment.
3. **Swales:** Swales can be located adjacent to roads (next to a berm or foot path) and can be used for treatment and conveyance of stormwater.

It is recommended that the type of treatment be selected upon completion of a geotechnical investigation and during the conceptual and detailed design phases.

5. Water Supply

5.1. Existing Network

The plan change area is mapped as being located within the Mandeville-Fernside water supply scheme, which is a restricted supply. The supply is limited to each property by a restrictor unit and each connection is required to have a tank and pump to supply the property. Each property within the Mandeville Fernside scheme is limited to 2 m^3/day.

Within the southern berm of Tram Road is a DN50 UPVC water supply submain; within the northern berm is a DN150 UPVC water supply main.

5.2. Water Supply Demand

The proposed water supply network has undergone preliminary design calculations for confirmation of the firefighting and potable water supply demands.

- Assuming 2 m^3 is supplied to each future dwelling at a rate of 0.023 L/s. The total daily demand for 37 Lots will be 0.86 L/s.
- Firefighting demand (FW2) = 12.5 L/s within 135 m of a dwelling and 12.5 L/s within 270 m of a dwelling (25 L/s total demand).

Should for any reason the supply be changed to on demand (rather than restricted); the following demand for the 37 Lot development is expected.

- Peak potable residential demand = 0.10 L/s/dwelling x 37 dwellings = 3.7 L/s
- Peak demand (firefighting + 60% of the peak potable demand) = 27.22 L/s.

5.3. Proposed Network

WDC will need to confirm whether the existing infrastructure has sufficient capacity to supply an additional 37 Lots on the restricted supply scheme.

The point of supply for the future subdivision would be the DN150 UPVC water supply main within Tram Road. A new DN100 UPVC water supply main would be run within the subdivision internal roading to allow for the installation of appropriately spaced fire hydrants. 63 mm Outside Diameter (OD) PE submains would be run within the berm and would provide the restricted supply to each dwelling.

A 25 OD PE lateral connection would be taken of the submain up to a restrictor located within the road reserve services strip outside each property boundary. The restrictor unit limits the supply to each property and evenly distributes the supply over a 24 hour period.

Each property will be required to have an onsite potable water storage tank with sufficient capacity for 24 hours supply.

The potable water supply network would be designed in accordance with the WDC Engineering Codes of Practice and SNZ PAS 4509:2008 *New Zealand Fire Service Fire Fighting Water Supplies Code of Practice*. The firefighting water supply classification will be FW2 in keeping with a residential area and Fire hydrants would be placed at no more than 135 m intervals.

6. Utility Services

6.1. Power and Telecommunications

Power and telecommunications will be provided to service the site in accordance with utility company and industry standards at the time of development. All cables and ducts will be placed below ground, and kiosks will be placed within individual allotments.

MainPower and Chorus have provided confirmation that their networks have capacity to service the electrical and telecommunication needs of the plan change area. The capacity confirmation letters are located in **Appendix B.**

7. Conclusion

The site can be serviced for wastewater, stormwater, potable water, power, and telecommunications subject to preliminary and detailed design in conjunction with appropriate Council confirmations and consents being obtained. On this basis the submission for rezoning can be supported in respect of servicing capacity.

Disclaimer

This report has been prepared by Survus Consultants Limited (Survus) only for the intended purpose as a Preliminary Services Design Report.

The report is based on:

- Subdivision Plan.
- WDC Services Maps.
- Canterbury Maps.
- LiDAR.
- Information provided by service suppliers.

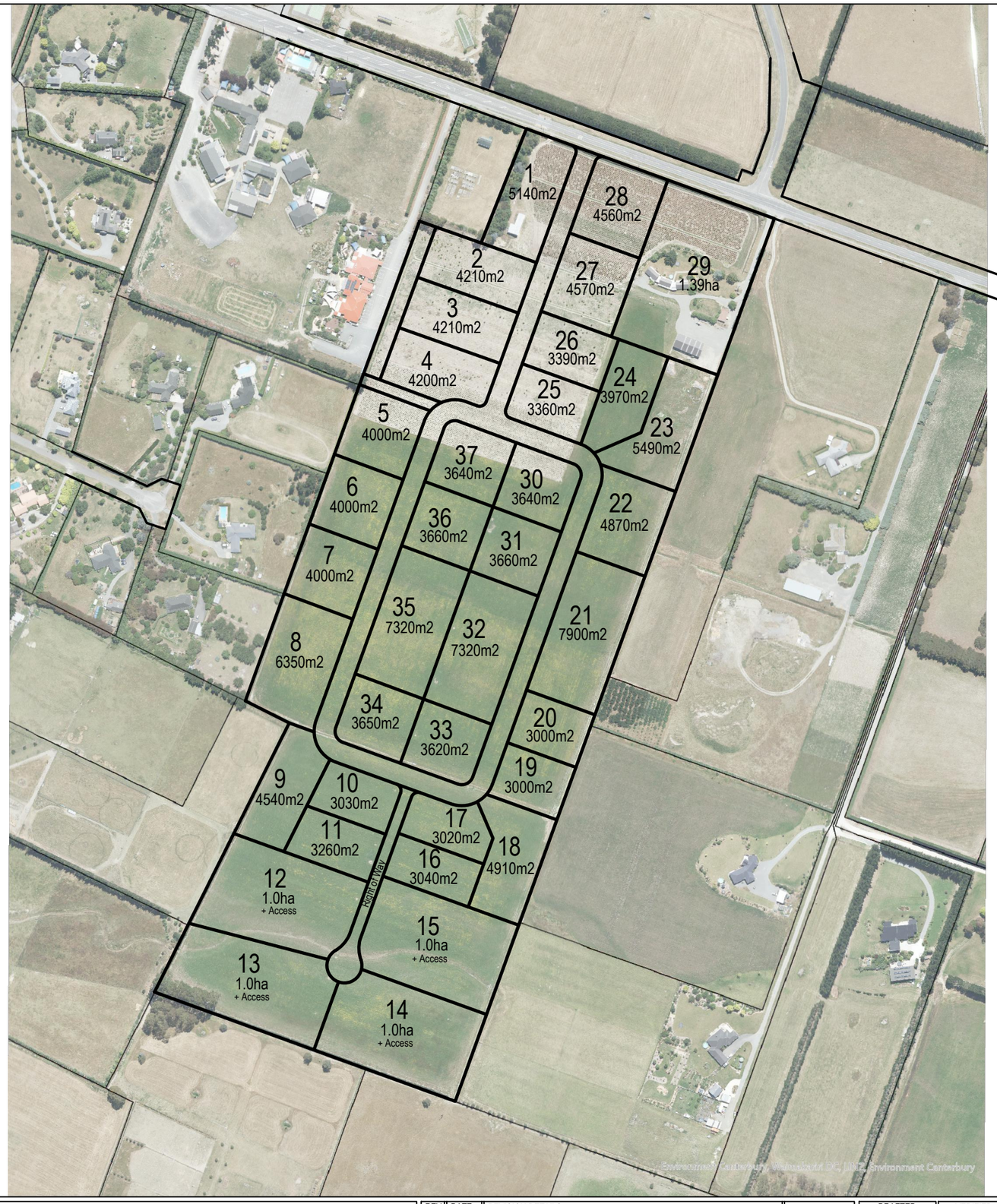
Where data supplied by Andrew McAllister or other external sources, including previously issued drawings or reports have been relied upon, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Survus for incomplete or inaccurate data supplied by other parties.

Whilst every care has been taken during our investigation and interpretation of available data to ensure that the conclusions drawn, and the opinions and recommendations expressed, are correct at the time of reporting, Survus has not performed an assessment of all possible conditions or circumstances that may exist at the site. Variations in conditions may occur between data sources and Survus has provided conclusions in this report based on the best available information at the time of writing. Survus does not provide any warranty, either express or implied, that all conditions will conform exactly to the assessments contained in this report.

The exposure of conditions or materials that vary from those described in this report may require a review of our recommendations. Survus should be contacted to confirm the validity of this report should any of these occur.

This report has been prepared for the benefit of Andrew McAllister and the Waimakariri District Council for the purposes as stated above. No liability is accepted by Survus or any of their employees with respect to the use of this report, in whole or in part, for any other purpose or by any other party.

Appendix A. Proposed Subdivision Scheme Plan



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REV	DATE	REVISION DETAILS	
C	05/10/23	SUBDIVISION LAYOUT	SRS
B	04/10/23	CONCEPT LAYOUT	SRS
A			SRS

DRAFTED SRS | VERIFIED

APPROVED
DATE

PROJECT
ANDREW Mc ALLISTER - 1275 TRAM ROAD, SWANNANOA

TITLE
POSSIBLE SUBDIVISION LAYOUT
SHEET 1 OF 1

INFORMATION ONLY

PROJECT NO 15858

SCALE 1 : 4000 (A3) | SIZE A3

DRAWING NO LAYOUT - 01 | REV C

Appendix B. Correspondence

10/10/2023- via email

Network Reference: 00056809

MainPower New Zealand Limited
172 Fernside Road, RD 1 Kaiapoi 7691
PO Box 346, Rangiora 7440
T. 0800 30 90 80

C Mars
Servus Consultants
PO Box 5558
Papanui 8542

Dear Cameron,

Re: Power Connection for Proposed Subdivision. CB10F/1046 1275 Tram Road Swannanoa

MainPower confirms that the High voltage Network in the vicinity of 1275 Tram Road Swannanoa has the capacity to supply the proposed subdivision.

This letter is to advise you that MainPower's network has the capacity for the proposed subdivision. This does not mean that there is an electrical supply to the boundary of the proposed lots.

Please do not hesitate to contact the MainPower NZ Ltd NSR Team on 03 311 8311 or NSR@mainPower.co.nz if you have any questions.

Yours sincerely,

Matthew Bate
Network Services Representative

Cameron Mars

From: Chorus Property Development Do Not Reply <npdnoreply@chorus.co.nz>
Sent: Tuesday, 10 October 2023 4:03 pm
To: npdnoreply@chorus.co.nz
Subject: Chorus 10619277 : We can service your development

Hi

Development address: 1275 Tram Road, Swannanoa, Waimakariri District, 7476

This email is to confirm that Chorus can provide our fibre network to your development. An indicative cost for the work we would need to do (noting that this excludes costs for any work you may be required to do inside the site boundary) is presented in the below notes:

A high level estimate to extend our fibre network to your development is $64,687.46 Incl. GST

If you would like this formalised into a quote, then please log in to your account and let us know. If you need to amend the connection numbers or provide updated plans, you can also do that via your account.

Chorus New Property Development Team

Please do not reply to this email as this inbox is not monitored. For any follow up queries please visit www.chorus.co.nz/develop-with-chorus or log in to your account. If you do not yet have an account with us, you will need to create an account to view your job progress and documentation.