

MEMORANDUM

Project:	2 Auckland Street, Ashley	Author:	Ian Lloyd
Job No.:	37211	Date:	V1 – 02/02/2024
Subject:	Flooding Assessment - 2 Auckland Street, Ashley		
Issued To:	Peter Glasson (Davis Ogilvie Ltd.)		
Copies To:	Alistair Cameron (property owner), Samatha Webb and Clem Maloney (Davis Ogilvie Ltd.)		

1.0 BACKGROUND

Mr Alistair Cameron owns an approximately semi-rectangular 8 ha property at 2 Auckland Street, Ashley, Legal Description: Lot 1 DP 394101. The property is largely undeveloped grassland and contains a relocated dwelling, a storage yard and various stockpiles of gravel and soil material. Mr Cameron wishes to develop the property into a residential subdivision. The property is within the Waimakariri District and is currently zoned Rural under the operative Waimakariri District Plan, but is zoned Rural Lifestyle Zone (RLZ) under the Proposed Waimakariri District Plan (PWDP). In his submission on the PWDP Mr Cameron seeks to change the proposed zoning from Rural Lifestyle Zone (RLZ) to Settlement Zone ("SETZ") which would allow a higher density of residential development.

The purpose of this memorandum is to provide a preliminary flood assessment for the property to support the rezoning request by Mr Cameron in his submission on the PWDP.

2.0 THE PROPERTY AND THE HYDROLOGICAL SETTING

The property (2 Auckland Street, Ashley) is located on the floodplain of the Ashley / Rakahuri River on the true left bank at the downstream (eastern) edge of the Ashley township (Figure 1). The active channel of the Ashley / Rakahuri River is approximately 320 m south of the site, and is separated from the site by a stopbank which is part of Environment Canterbury's Ashley / Rakahuri River Control Scheme and Lower Sefton Road. The property is generally flat to undulating, with a gentle overall slope towards the southeast. The site predominantly drains to Saltwater Creek with two unnamed tributaries / drains of Saltwater Creek present on the site (Figure 2). The northern of these two unnamed tributaries / drains has been diverted around the boundary of the property although some drainage still occurs via the old channel. A small area in the south-western corner of the site drains to an unnamed tributary / drain of the Ashley / Rakahuri River which flows via a culvert fitted with a flap gate, under the Ashley River stopbank (Figure 2).

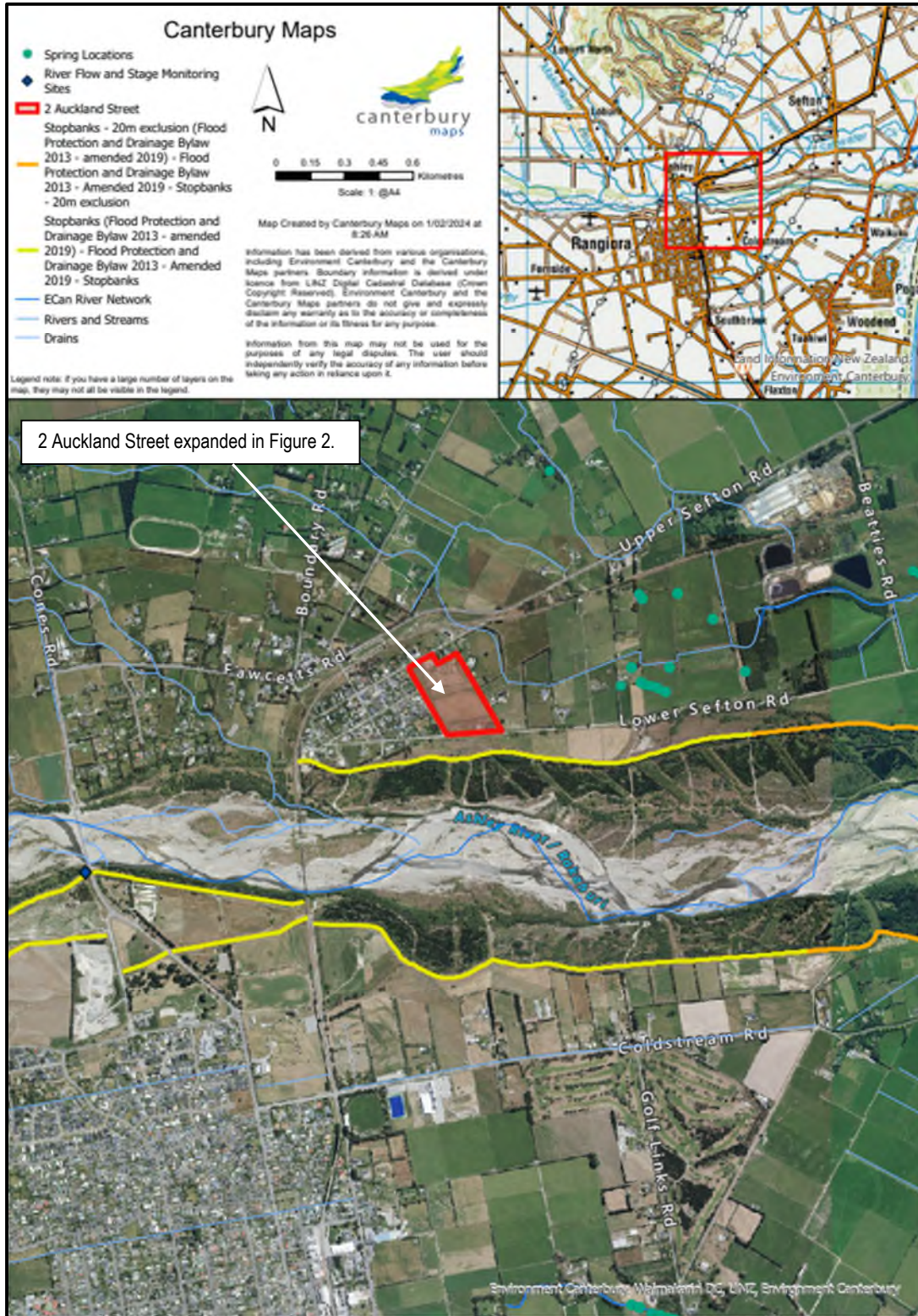


Figure 1: 2 Auckland Street, Ashley – location map showing key hydrological features.

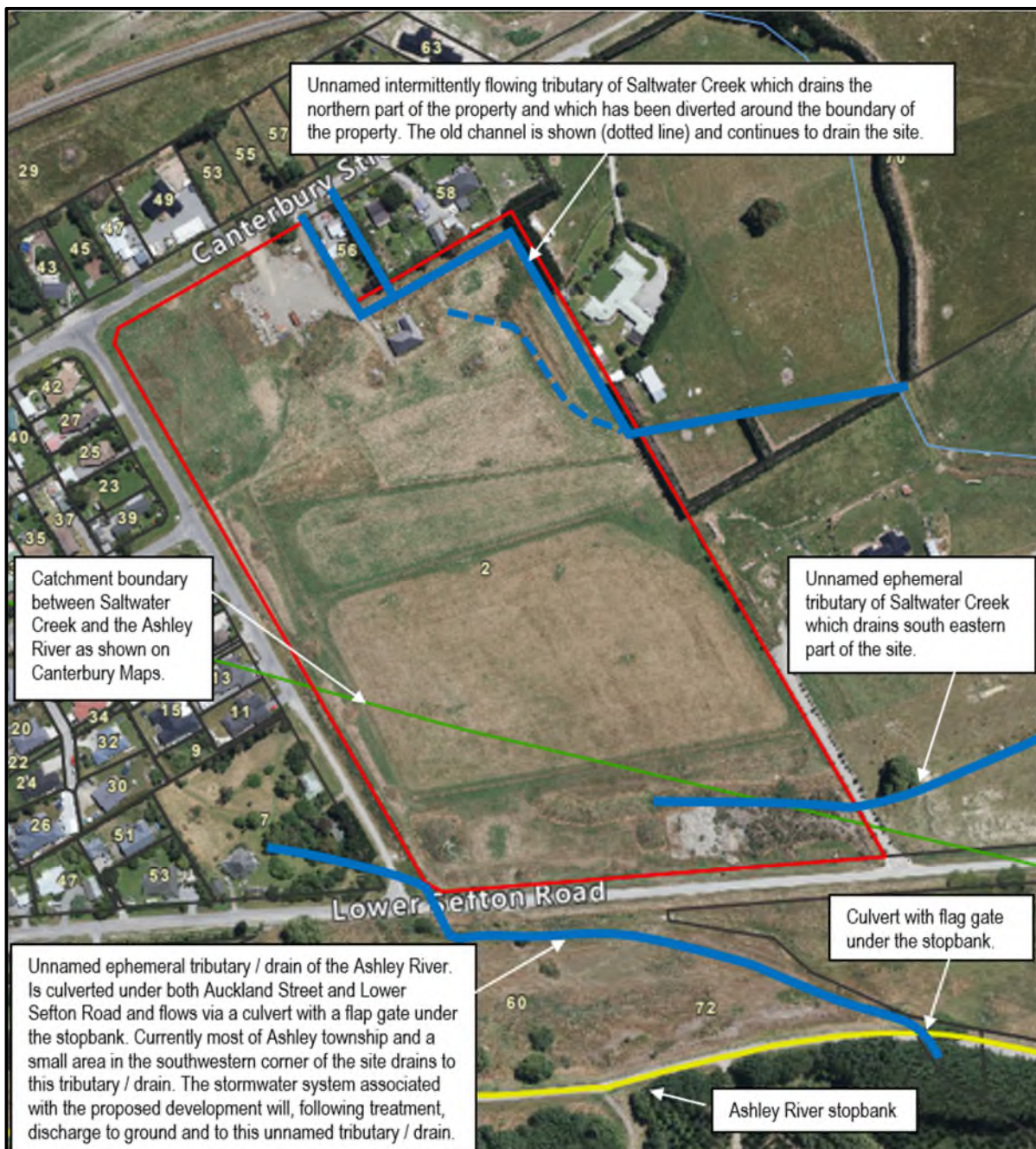


Figure 2: 2 Auckland Street, Ashley – onsite hydrological features.

3.0 FLOODING ASSESSMENT

When assessing flooding risk at 2 Auckland Street, Ashley there is need to assess both the potential for flooding from the Ashley / Rakahuri River and local flooding associated with the unnamed tributaries / drains that cross or border the site. Both of which are discussed in turn below.

3.1 Ashley / Rakahuri River flooding

Environment Canterbury operates the Ashley / Rakahuri River Control Scheme which includes stopbanks which run along both banks of the river in the vicinity of the site and are designed to protect Rangiora to the south and Ashley to the north from flooding from the Ashley / Rakahuri River. Numerous flood investigations have been undertaken for the Ashley / Rakahuri River floodplain the most recent of which was undertaken in 2016⁽¹⁾ and updated earlier work⁽²⁾.

A flood hazard assessment recently prepared by Environment Canterbury for 2 Auckland Street (copy in **Attachment A**) stated the following:

Environment Canterbury Rivers engineering staff have reviewed the Ashley / Rakahuri River control scheme at this location. This included consideration of overtopping and lateral erosion failures for events with an ARI of up to 500 years, including increases to flow from climate change. Based on currently available information, stopbank breaches which would affect the proposed development are possible, but have a less than 10% chance of occurring during 200 and 500 year ARI flood events.

The Environment Canterbury's flood hazard assessment concluded that:

Given the assessed standard of protection offered by the river control scheme at this location, the proposed development is not considered a high (flood) hazard area.

Waimakariri District Council (WDC) have completed flood modelling⁽³⁾ for all the district other than Lees Valley and the resulting flood and hazard maps are available at WDC's website <https://waimakariri.maps.arcgis.com/apps/instant/portfolio/index.html?appid=c6bc05f87d4f47ecae975e5241657913>. The map for flood depths during a 1:200 Year (0.5% AEP) Ashley Breakout scenario (Figure 3) indicates that the river is not expected to breach the stopbanks which protect Ashley township in the vicinity of the site. The modelling investigations indicated that breakouts through the stopbanks are more likely to occur to the south (towards Rangiora) or closer to the coast.

¹ Environment Canterbury, 2016. *Ashley River Floodplain investigation – 2016 update*. Environment Canterbury report number R16/36 prepared by T Oliver and M Wild, dated July 2016.

² Earlier work includes the following key investigations.

- Environment Canterbury, 2008. *Ashley Floodplain Hazard Risk Assessment*. Environment Canterbury report number R08/1 prepared by T Boyle and M Surman, dated January 2008.
- Environment Canterbury, 2008. *Waimakariri District flood hazard management strategy – Ashley River floodplain*. Environment Canterbury report number R08/23 prepared by T Oliver, dated June 2008.
- Griffiths, G; Pearson, C; McKerchar, A. 2009: *Review of Ashley River flood frequency at Rangiora Traffic Bridge*. NIWA Client report CHC2009-103, prepared for Environment Canterbury, dated July 2009.

³ Waimakariri District Council (WDC) 2015: *Localised flood hazard assessment 2015*. Project Delivery Unit (PDU) Project Number PD000362. Published July 2015. Document Number 150410056887.

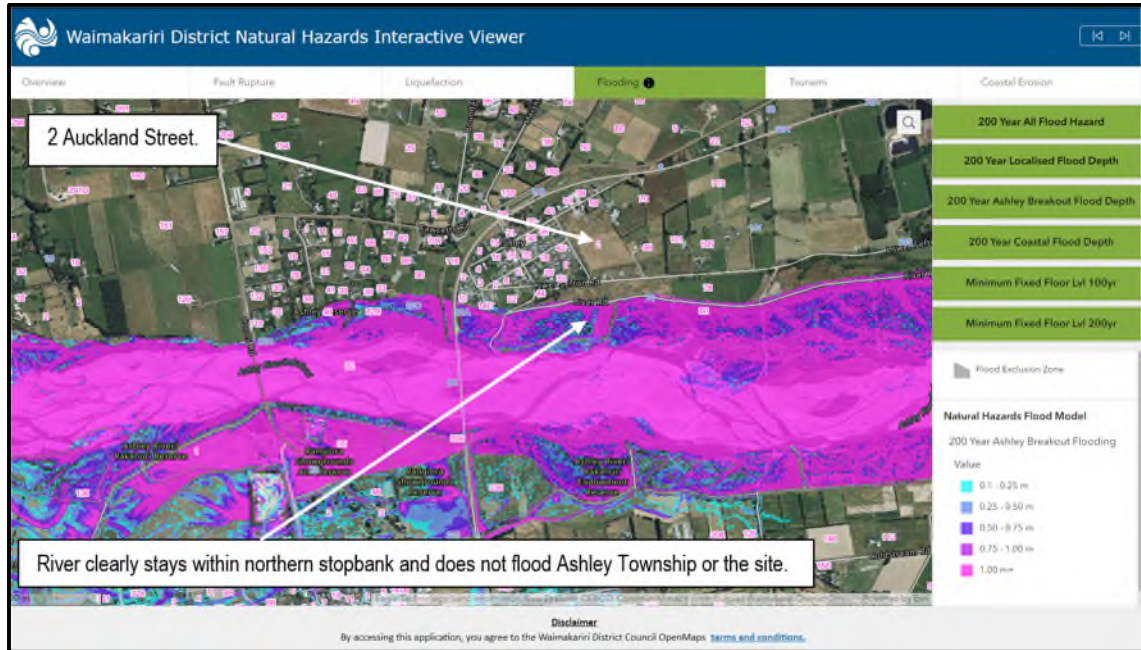


Figure 3: Waimakariri District Flood Map showing flood depth for a 1:200 Year Ashley Breakout scenario. (Base figure from WDC’s website sourced 1 February 2024.)

3.2 Local flooding from unnamed watercourses

As outlined above, three small tributaries / drains cross or border the site. Two drain to Saltwater Creek while the other drains to the Ashley River via a culvert under the stopbank. The stopbank culvert is fitted with a flap gate which will prevent flood waters in the Ashley / Rakahuri River from backing up through the culvert. When the flap gate is closed due to floods in the Ashley / Rakahuri River, local runoff will pond on the upgradient side of the culvert and stopbank. The area upstream of the stopbank culvert between it and Lower Sefton Road is undeveloped grazing land, the lower reaches of which are known to occasionally become inundated. LiDAR data⁽⁴⁾ indicates that from where the unnamed tributary / drain crosses Lower Sefton Road it falls approximately 1.3 m to the stopbank over a length of approximately 260 m.

Mr Cameron who has owned the property since 12 October 1995 (approximately 28 years) indicated that he was not aware of any flooding events or issues that have affected the site.

WDC’s 1:200 Year (0.5% AEP) Localised Flood Depth map which excludes a breakout from the Ashley / Rakahuri River indicates that the site is expected to experience limited flooding during a 1:200-year event with flooding expected to be limited to topographically low points across the site (Figure 4). Similarly, WDC’s 1:200 Year (0.5% AEP) All Flood Hazard map indicates that the majority of the site has a very low flood hazard with only a few small areas identified as having a low flood hazard (Figure 5).

⁽⁴⁾ Scaled off LiDAR Map supplied by Environment Canterbury and contained in **Attachment A**. Also checked using the elevation tool available on Canterbury Maps.

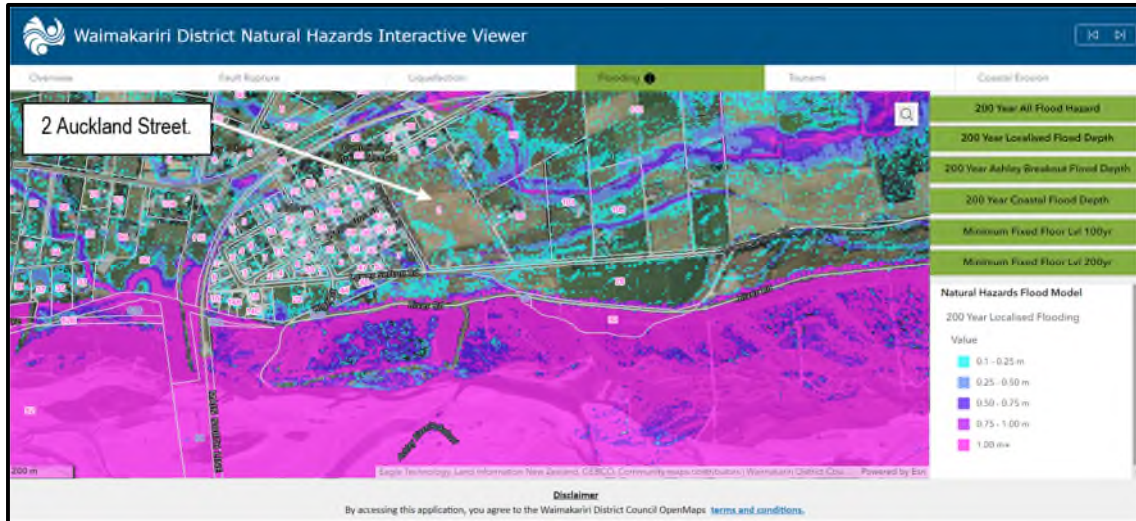


Figure 4: Waimakariri District Flood Map showing flood depth for a 1:200 Year Localised Flooding scenario. (Base figure from WDC’s website sourced 1 February 2024.)

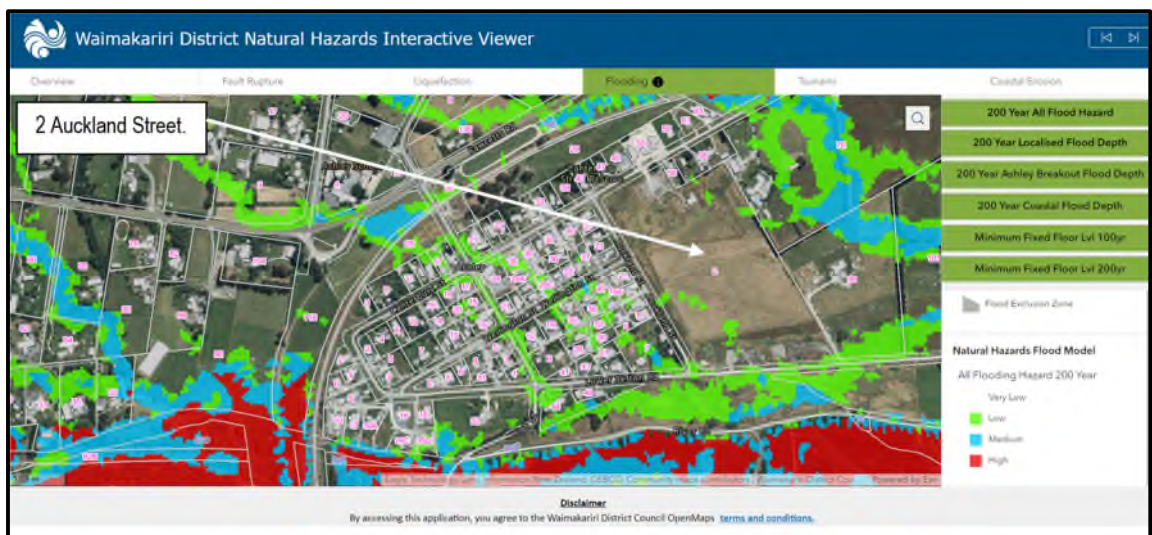


Figure 5: Waimakariri District Flood Hazard Map showing the 1:200 Year all Flood Hazard. (Base figure from WDC’s website sourced 1 February 2024.)

3.3 Floor Levels

During communications with WDC staff in July 2020 regarding floor level requirements for 2 Auckland Street, WDC staff indicated the following:

The minimum Finished Floor Level (FFL) for a proposed dwelling site at 2 Auckland Ashley (Lot 1 DP 394101) is to be set no lower than 400mm above undisturbed ground at any point intersecting the building footprint and outside Councils mapped 0.5 % AEP (1 in 200 year) Flood Hazard Areas.

Full communications with WDC are also included in **Attachment B**.

4.0 SUMMARY AND RECOMMENDATIONS

Ashley township including 2 Auckland Street lies on the floodplain of the Ashley / Rakahuri River. When assessing flooding risk at the site there is need to assess both the potential for flooding from the Ashley / Rakahuri River and local flooding associated with the unnamed tributaries / drains that cross or border the site.

Numerous flood investigations have been undertaken for the Ashley / Rakahuri River floodplain and there is a good understanding of the flood risk. Given the protection provided by the Ashley / Rakahuri River Control Scheme stopbanks the overall flood hazard risk for 2 Auckland Street, Ashley, is considered very low and no specific flood hazard mitigation measures are likely to be required when constructing dwellings on or servicing the property.

Current expectation is that finished floor level for any dwellings constructed on 2 Auckland Street, Ashley will need to be at least 400 mm above undisturbed ground around the dwelling footprint. It is recommended that finished floor level requirements are confirmed with Environment Canterbury and Waimakariri District Council during detailed design of the subdivision.

5.0 CONCLUDING COMMENT

We trust the above comments provide a suitable flood hazard assessment for 2 Auckland Street, Ashley. If you have any queries, please do not hesitate to contact the undersigned.

Yours faithfully,

DAVIS OGILVIE & PARTNERS LTD.



IAN LLOYD

Principal Water Engineer

MSc (Environmental Science), BE (Civil), BSc (Geology)

Email: ian@do.nz

ATTACHMENT A - Environment Canterbury's Flood Hazard Assessment letter for 2 Auckland Street, Ashley, dated 21 December 2023

ATTACHMENT B - Waimakariri District Council Email Communications regarding finished floor levels at 2 Auckland Street, Ashley, dated 30 July 2020

ATTACHMENT A

Environment Canterbury's Flood Hazard Assessment letter for 2 Auckland Street, Ashley, dated
21 December 2023

21st December 2023

Peter Glasson
peterg@do.nz

Dear Peter

LOT 1 DP 394101 – 2 AUCKLAND STREET, ASHLEY

Flood Hazard

The proposed development is on the floodplain of the Ashley River / Rakahuri and may also be susceptible to flooding from local rainfall runoff.

Enclosed is a LiDAR map showing ground levels across the property. LiDAR is an airborne laser system that surveys ground topography. When compared to known survey points, the data has an accuracy of ± 150 mm or better. The ground levels, surveyed in 2019, are presented in meters – NZVD2016.

Waimakariri District Council has completed rain-on-grid flood modelling for the majority of the district. This modelling includes 100, 200, and 500 year average recurrence interval (ARI) events. Results of this modelling shows some limited rainfall runoff flooding across the property. Mapped results of this modelling are available here:

<https://apps.canterburymaps.govt.nz/FloodModelResults/?extent=1566815.9098%2C5208014.1824%2C1569109.0207%2C5209054.4426%2C2193>

Environment Canterbury Rivers engineering staff have reviewed the Ashley / Rakahuri River control scheme at this location. This included consideration of overtopping and lateral erosion failures for events with an ARI of up to 500 years, including increases to flow from climate change. Based on currently available information, stopbank breaches which would affect the proposed development are possible, but have a less than 10% chance of occurring during 200 and 500 year ARI flood events.

Chapter 11 of the Canterbury Regional Policy Statement (CRPS) provides a framework for managing natural hazard risk in Canterbury. Policy 11.3.1 of this document seeks to avoid new subdivision, use, and development in 'High Hazard' areas. These are defined as areas where the water depth is greater than 1 m (or where the water depth (m) x velocity (m/sec) is greater than 1) in a 500 year ARI flood event. The primary aim of this policy is to minimise the risk to life associated with deep and/or fast moving floodwaters. Given the assessed standard of protection offered by the river control scheme at this location, the proposed development is not considered a high hazard area.

Policy 11.3.2. of the Canterbury Regional Policy Statement states that development should be avoided in areas subject to inundation in a 200 year ARI flood event unless a range of conditions are met. These include the requirement for new buildings to have floor levels above the 200 year ARI design flood level. While no onsite mitigation of river breakouts is necessary to meet the CRPS requirements, rainfall runoff and stormwater will still need to be considered. A combination of stormwater design, earthworks, and possibly raised floor levels will allow the CRPS requirements to be met.

When using the information provided in this letter, it is important that the following points are understood:

- The information is limited to what Environment Canterbury currently has available. The District Council or local residents may have further information about flooding at the property.
- Environment Canterbury's understanding of flooding at the property may change in the future as further investigations are carried out and new information becomes available.
- It is assumed that flood protection works will be maintained to at least their current standard in the future.
- Stopbank failure can occur at flows less than the design standard, and the location of bank failure/overtopping may affect flood depths/levels at the property.
- Flood flow paths and depths/levels can be affected by changes on the floodplain such as:
 - Earthworks, road alterations, and irrigation structures
 - Property development including buildings, fencing, and hedges
 - Blockages in culverts, drains, and bridges
 - Seasonal vegetation growth
 - Antecedent soil conditions

The prediction of flood depths/levels requires many assumptions and is not an exact science.

Yours sincerely



Callum Margetts

Scientist (Natural Hazards)

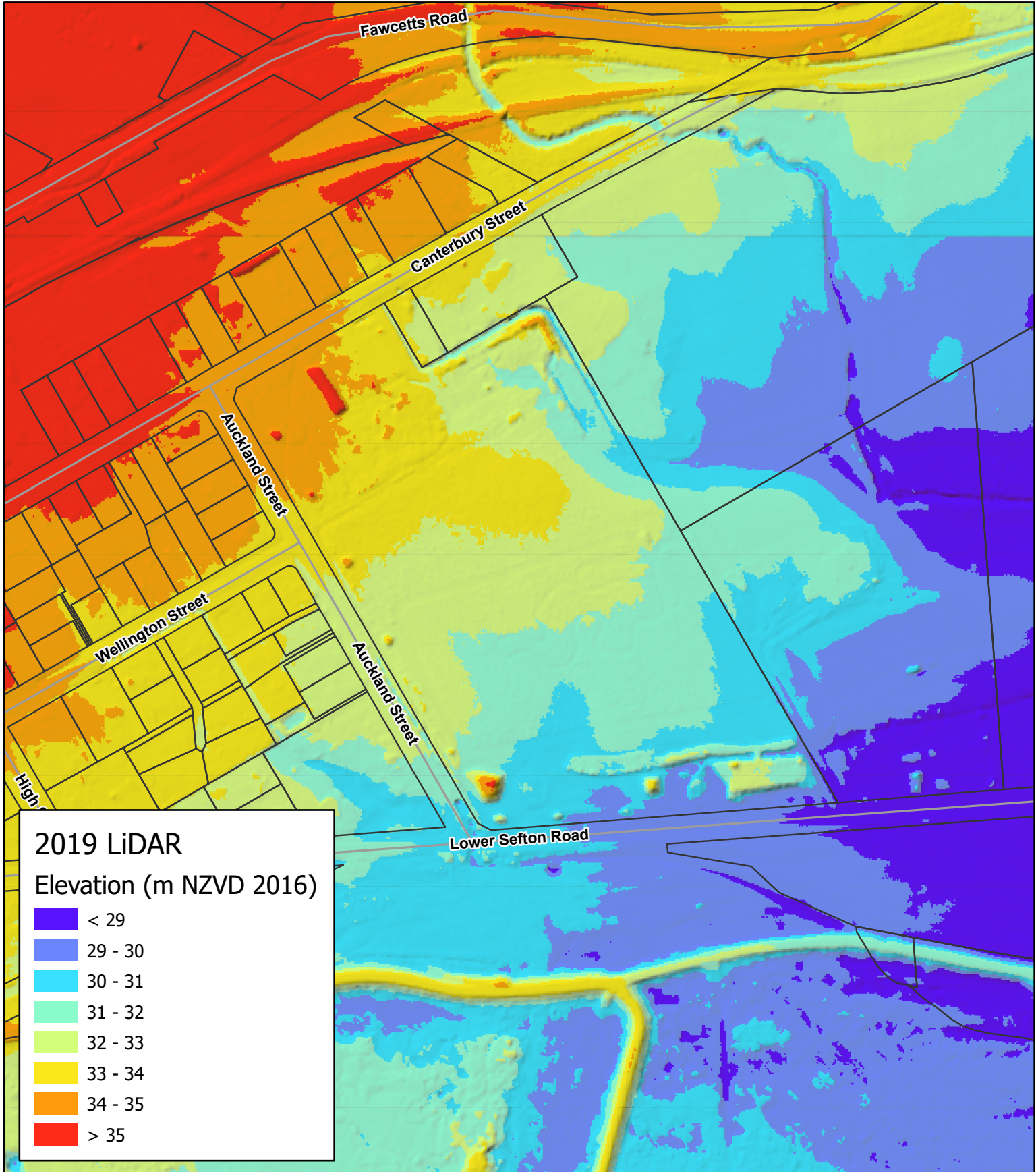
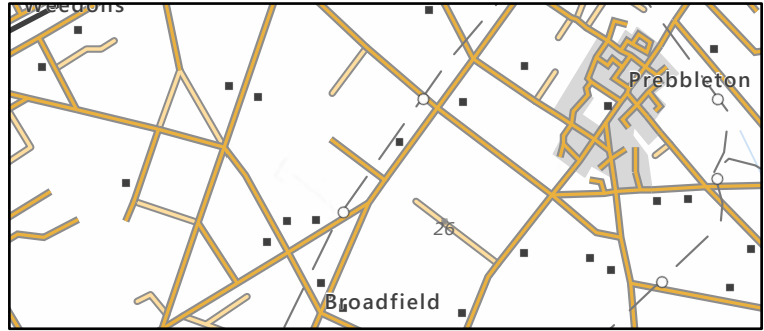
Encl. 2019 LiDAR Map

2 Auckland Street, Ashley - LiDAR Map

Legend

- Roads
- Rating Units

0 50 100 200
Metres



ATTACHMENT B

Waimakariri District Council Email Communications regarding finished floor levels at 2 Auckland Street, Ashley, dated 30 July 2020

From: Subdivision Eng <subdivisioneng@wmk.govt.nz>
Sent: Thursday, 30 July 2020 9:23 a.m.
To: Hamish Cattell
Subject: RE: SUBDIVENG 2 Auckland Street, Ashley (Lot 1 DP 394101) - Finished floor level requirements

Hi Hamish

Green = Low risk of inundation
Blue = Medium risk of inundation
Red = High risk of inundation

As a general rule of thumb, we work to 400mm above undisturbed ground in a “clear” area, 600mm above undisturbed ground in a green area, 900mm above undisturbed ground in a blue area, and we don’t really like people building in red area.

In reality – once we learn the location of a potential dwelling, we can work out the max flood depth and then, 400mm above max flood depth in Green areas and 500 above max flood depth in blue areas, although Council preference would be to avoid these areas if at all practicable.

If an area is identified as being subject to Ashley Breakout – we ask that the applicant gets a FFL from Ecan in the first instance, and we will work to either their level or Council level whichever is the greater.

Kind regards

Debbie Wilson | Land Development Officer

Project Delivery Unit

Phone: 0800 965 468 (0800 WMK GOV)

Mobile: 027 322 2338



From: Hamish Cattell <hamishc@do.nz>
Sent: Thursday, 30 July 2020 9:01 AM
To: Subdivision Eng <subdivisioneng@wmk.govt.nz>
Subject: RE: SUBDIVENG 2 Auckland Street, Ashley (Lot 1 DP 394101) - Finished floor level requirements

[THIS EMAIL IS FROM AN EXTERNAL SOURCE] DO NOT CLICK links or attachments unless you recognise the sender

Thank you.

Can you please confirm the hazard levels of the map colour contours (green, blue and red).

Thank you.

Hamish

HAMISH CATTELL / Engineering Geologist / hamishc@do.nz /

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From: Subdivision Eng [<mailto:subdivisioneng@wmk.govt.nz>]

Sent: Thursday, 30 July 2020 8:25 a.m.

To: Hamish Cattell

Cc: Subdivision Eng

Subject: SUBDIVENG 2 Auckland Street, Ashley (Lot 1 DP 394101) - Finished floor level requirements

Good Morning Hamish

Apologies for the delay in replying.

Please find attached the 1 in 200 year flood hazard mapping for 2 Auckland Street, Ashley.

Council Draft Technical Practice note requires the following as a guide to FFL.

The minimum Finished Floor Level (FFL) for a proposed dwelling site at 2 Auckland Street, Ashley (Lot 1 DP 394101) is to be set no lower than 400mm above undisturbed ground at any point intersecting the building footprint and outside Councils mapped 0.5& AEP (1 in 200 year) Flood Hazard Areas.

Hope this helps

Kind regards

Debbie Wilson | Land Development Officer

Project Delivery Unit

Phone: 0800 965 468 (0800 WMK GOV)

Mobile: 027 322 2338



From: Hamish Cattell <hamishc@do.nz>

Sent: Thursday, 30 July 2020 8:04 AM

To: Subdivision Eng <subdivisioneng@wmk.govt.nz>

Subject: FW: 37211 - 2 Auckland Street, Ashley - Finished floor level requirements

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Good morning,

Can you please provide me with the latest flood hazard information (and any finished floor level requirements) for 2 Auckland Street, Ashley.

Thank you.
Hamish

HAMISH CATTELL / Engineering Geologist / hamishc@do.nz /

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