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Selwyn District Council

Variation to the Proposed District Plan
Rolleston Residential Rezoning

Land Constraints Assessment

Reference: 4612

(Issue 02)

Date: 16 June 2022

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GEOLOGICAL & ENGINEERING SERVICES

Selwyn District Council

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1 Introduction

The Council is preparing a variation to the Proposed District Plan (PDP) to include land subject to a Future Urban Development Area (FUDA) classification) that has not, to date, been subject to a private plan change request. These areas are located in Rolleston, as shown in Appendix 1. It is proposed that these areas would be rezoned to a medium density residential zoning, consistent with the intended zoning for the surrounding land.

The purpose of this report is to prepare an assessment of geotechnical, natural hazards and flooding constraints as input into the draft Outline Development Plan and support the Section 32 Evaluation. The assessment is to identify whether and to what extent any geotechnical or natural hazard constraints may affect any future residential development of the subject areas and hence the proposed rezoning.

This assessment is a desktop study. It relies in the main on the extensive geotechnical work and reporting that has been carried out in recent years in the Rolleston area for both subdivision and private plan changes.

1.1 Potential residential rezoning Area

There are six blocks of land which are proposed for rezoning, as listed in Table 1 and shown on the plan appended. Note that two other blocks of land initially included in Issue 01 (9 May 2022) report were withdrawn from the variation. Area 7 was replaced with a new block, but the initial numbering has otherwise been retained.

Table 1 Areas proposed for Rezoning

	Location / Address	Legal Title	Area (ha)
1	(withdrawn, now part of PC70)		
2	545 East Maddisons Road	Lot 1 DP326339 Blk II Leeston SD	4
3	890 Selwyn Road	Lot 1 DP355996 Blk III Leeston SD	4
4	Springston Rolleston Road	Lot 2 DP61162 Blk III Leeston SD	16
5	435 Springston Rolleston Road	Lot 2 DP82966 Blk III Leeston SD	11.5
6	Springston Rolleston Road	Lot 1 DP82966 Blk III Leeston SD	10.7
7	606 Selwyn Road	Pt Rural Sec 5192	1

Note: Area 1 (130 Dunns Crossing Road) was initially included in this variation but later withdrawn
Area 7 was initially land at the corner of Lincoln Rolleston Rd & Selwyn Rd but withdrawn and replaced with this block

1.2 Scope of Study

Geotech Consulting Ltd has access to geotechnical reports prepared over the last decade for subdivision and plan change applications. We have searched for reports close to the six areas to obtain overall conclusions with respect to ground conditions and natural hazards. The areas covered by these reports are shown shaded pink on Figure 1. For the most part the areas already reported on surround or bracket the land parcels being considered.

General geological conditions have been checked on published maps. Combined with the reports on adjacent land, this has been sufficient to confirm the overall consistency of the likely ground conditions.

Potential flood hazard has been considered separately by review of modelling carried out for SDC and Environment Canterbury, as viewable on the Canterbury maps website.

2 Geology

The Canterbury plains were formed from deposition of alluvial soils carried by the Rakaia and Waimakariri rivers from the glaciers in the Southern Alps. In the central plains the ground surface slopes at about 5m per kilometre from the mountains towards the coastline. Rolleston lies on this alluvial surface at an elevation of about 40 – 45m in the study area.

The geology maps show Holocene age (less than about 10,000 years old) river alluvium north east of a line passing approximately through the middle of areas 5 & 6, with quaternary age (between 10,000 and 20,000 years old) "brownish grey river alluvium" to the west and under all of areas 2,3 & 5. Both these soils are essentially gravel dominated alluvium laid down by the Waimakariri River, differentiated only by age. The gravels, interbedded with layers of sand and silt, are likely to extend for several hundred metres before some tertiary aged rock and then the greywacke basement rock is encountered.

Depths to groundwater generally range between about 8m and 15m in the Rolleston area with a gradient of about 1m per 300m in a south easterly direction. As this is flatter than the 1m per 200m ground slope, the depth increases to the north west of the town and decreases to the southeast.

In general terms, the dense gravel dominated soils from a shallow depth and the depth to groundwater make the geology and soil profile a "benign" geotechnical environment with minimal geotechnical natural hazard and suitability for normal shallow foundations for buildings and infrastructure.

3 Principal Reports referenced.

As shown on Figure 1, much of the land adjacent to the subject areas has had geotechnical reports completed for private plan change purpose. The level of site testing varies somewhat between reports, with some completed with additional testing to a level suitable to support subdivision consent, and others for rezoning only. All the reports have been peer reviewed and found to be of a standard suitable for their intended purpose.

Table 2 Principle reports relevant to the subject areas

Area	Year		Report
4	2014	ODP	Rolleston Residential Rezoning Outline Development Plan Areas 12 & 13, Geotechnical report, 22 April 2014, Geotech Consulting Ltd for SDC
3	2020	PC 70	*Geotechnical Summary Letter – Farringdon Far West, Rolleston*, 23 October 2020,for properties at 3/144, 108 & 92 Dunns Crossing Road & 597 East Maddisons Road & references geotechnical reports dated between November 2019 and October 2020, by Engeo Ltd, for Hughes Development Ltd.
	2021	PC 73	*Rolleston West Plan Change,Geotechnical Assessment Report,* 9 November 2020, Coffey Services (NZ) Ltd, for Rolleston West Residential Ltd

2 & 3	2021	RC 15485	*Geotechnical Summary Letter – Farringdon West, Rolleston, Christchurch*, for properties at 479, 503, 523, 533 & 583 East Maddisons Road, 844 Selwyn Road and 870 Goulds Road & references seven geotechnical reports dated between December 2017 and July 2019, Engeo Ltd, for Hughes Development Ltd.
5, 6 & 7	2021	RC 15485	*Geotechnical Summary Letter – Farringdon South East, Rolleston, Christchurch*, for properties at 417 Springston Rolleston Rd and 694, 700, 708, 710, & 728 Selwyn Road and references four geotechnical reports dated between December 2016 and October 2019; Engeo Ltd, for Hughes Development Ltd
7	2021	PC 78	*Geotechnical Investigation, Multiple Sites, Southeast Rolleston*, 9 December 2020, by Engeo Ltd, for Urban Estates Ltd

Nine other reports for subdivision of land close to the site areas have also been checked. In addition, land already either developed for residential use or is in the process of having subdivision infrastructure being constructed infills much of the remaining land as shown in figure 1.

4 Interpretation

All the reports referenced demonstrate that the land is suitable for residential development, with only minor caveats. The established residential areas also demonstrate the suitability of the land for development. Specific issues are summarised below.

4.1 Liquefaction

The site is underlain with silt soils over shallow gravel with the gravel extending for at least tens of metres. Given the shallow gravel and the depth to the ground water table, this area has no liquefaction hazard that could conceivably impact on standard residential development. A TC1 technical land category is appropriate.

4.2 Foundation suitability

The gravel soils below the topsoil are firm to very firm, and most of the area should comply with the good ground conditions in NZS3604. Standard shallow foundations should be suitable for all residential buildings of a standard type of construction.

4.3 Flood Hazard

Flood hazard has generally not been investigated in any depth in the geotechnical reports. A review of flood areas and depths as modelled by DHI (see Appendix 2) has been made to provide an overview of this potential hazard.

As shown in Figure 2.1, flooding is projected to occur in linear areas passing approximately northwest to south east. These are long abandoned former river channels of the Waimakariri river when the river was aggrading and building up the Canterbury plains. These topographically lower channels attract surface water from rainfall. Note that this flooding / ponding is of local origin on the plains, and is not fed from flooding from any rivers. Most of the areas have only shallow water, even for the large events modelled, but local parts of Areas 4 & 6 may have water in the 0.5m to 1m depth range. These local areas should be able to have the hazard mitigated by suitable design at subdivision stage, as has been done elsewhere in Rolleston.

4.4 RMA section 106

Section 106 of the Resource management Act allows a consent authority to refuse a subdivision consent if the land is subject to material damage by erosion, falling debris, subsidence, slippage or inundation. The flat land is free of any risk of falling debris, subsidence or slippage. There are no waterways in the vicinity such that the site has a very low risk of inundation or erosion.

The site is approximately 4km south of the Greendale Fault trace and there are no other known faults in the vicinity. It is concluded that there are no grounds from a geotechnical hazard perspective to decline the use of the subject areas for residential subdivision. The flood hazard is generally of minor extent and should be able to be mitigated with appropriate design and construction.

It is noted that the subject areas have not been subject to any site testing or site-specific inspection. There may be local areas where particular land related issues may be present, such as old pits backfilled with un-engineered fill, or atypical thickness looser surface soil / topsoil. Such issues should be able to be identified and mitigated during the normal subdivision process. Development must be subject to normal planning and building consent controls, but no site-specific rules or notations are anticipated to be necessary.

5 Conclusion

The deep gravels underlying the site almost to ground level provide a dense, low compressibility material to support building foundations and infrastructure. There is no liquefaction hazard or other geotechnical hazard that would materially affect the land and any development. Most of the area is likely to be consistent with “good ground” as defined in NZS 3604, and the land is equivalent to Foundation technical category TC1 in terms of potential seismic land damage. The flood hazard is generally of minor extent, and the local areas that show potentially damaging depths should be able to have the hazard mitigated by appropriate design. From a geotechnical perspective, all the subject areas 2 to 7 are suitable for residential development.

This desktop study is of a preliminary nature to demonstrate that there are no acute flooding, liquefaction or geotechnical hazards with the subject areas that would prevent or be a significant obstacle to residential development. Further investigation will be required at subdivision consent stage to verify the preliminary findings and provide additional information for the geotechnical design of infrastructure and building foundations.

Ian McCahon
Geotech Consulting Ltd
16 June 2022

Appendices

1 Map of Site Areas

2 Flood Maps

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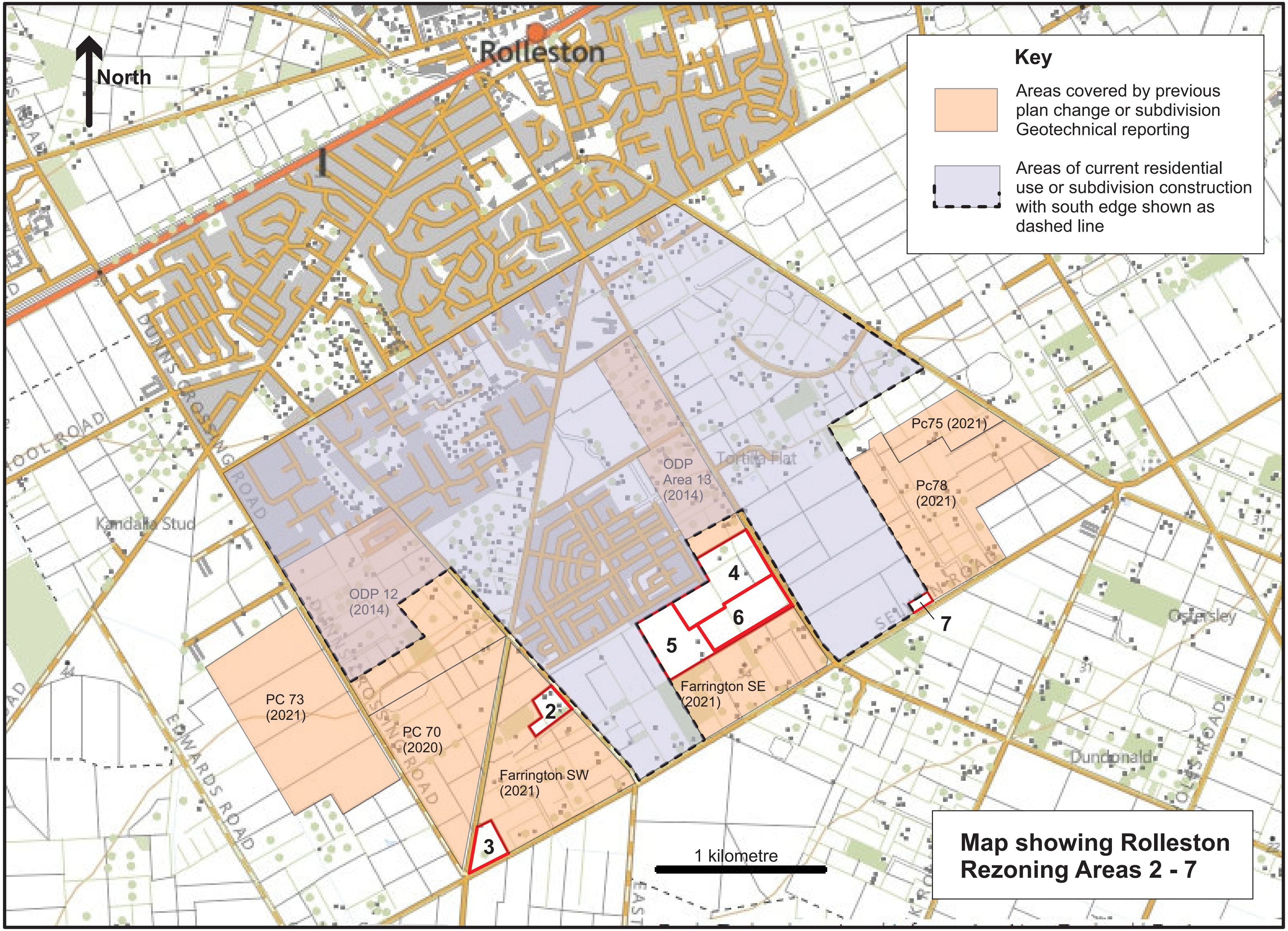
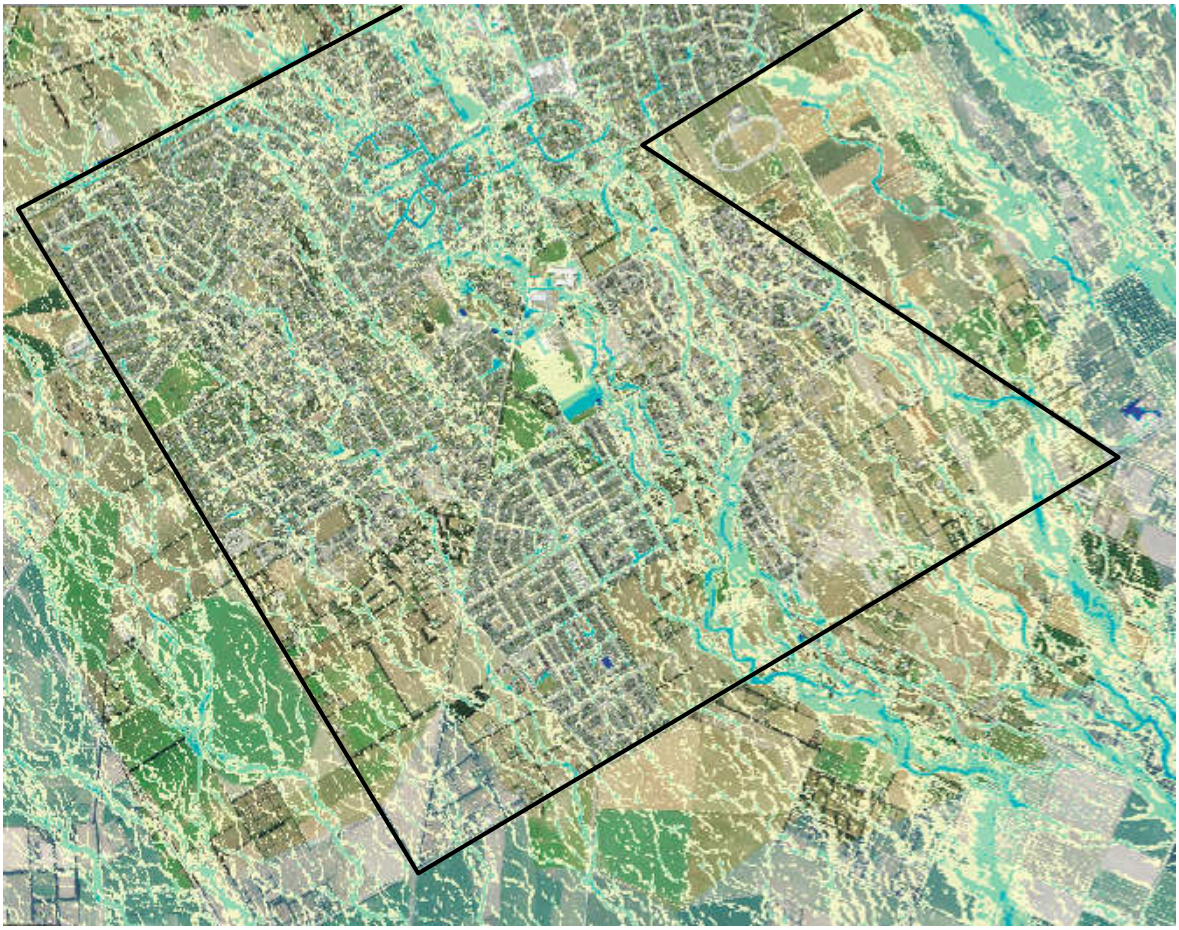

North
Rolleston
Key
Areas covered by previous plan change or subdivision Geotechnical reporting
Areas of current residential use or subdivision construction with south edge shown as dashed line
Pc75 (2021)
Pc78 (2021)
ODP Area 13 (2014)
Tortilla Flat
Kandalla Stud
ODP 12 (2014)
PC 73 (2021)
PC 70 (2020)
Farrington SW (2021)
Farrington SE (2021)
2
3
4
5
6
7
Ostersley
Dundonald
1 kilometre
Map showing Rolleston Rezoning Areas 2 - 7

2 Flood Hazard Maps

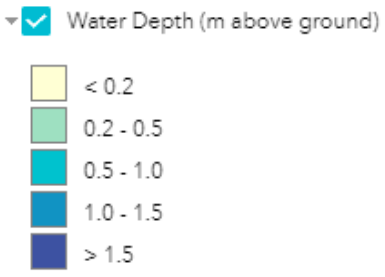
The following Figures are taken from the flooding map for Selwyn District Council:
https://apps.canterburymaps.govt.nz/SelwynNaturalHazards/
Background information is in the report *Regional Policy Statement Modelling for Selwyn District Council – District Plan*, DHI, 29 November 2019

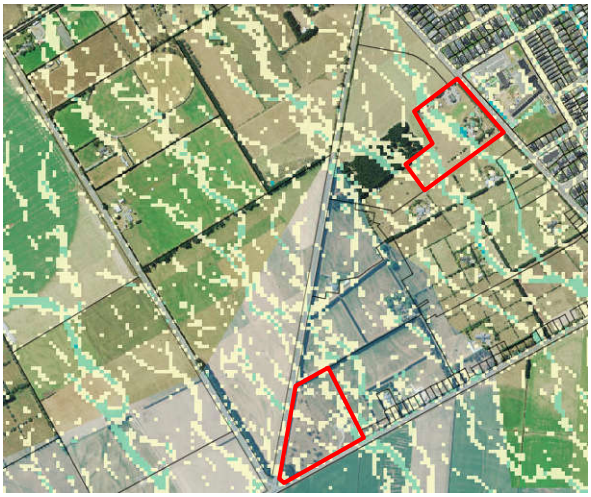


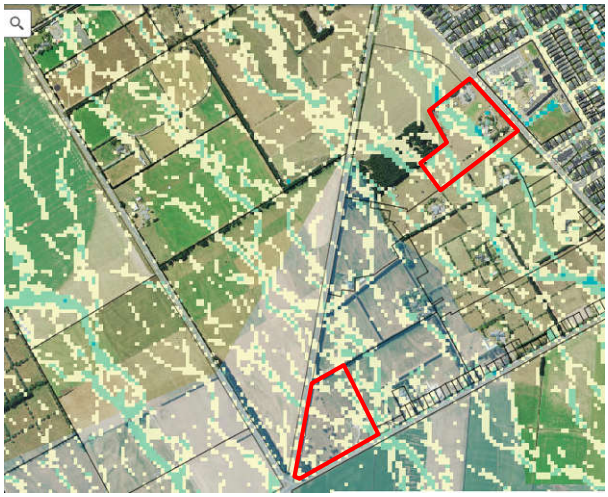
Black line denotes boundary to Rolleston town

2.1 Rolleston Town Flooding with 500 year ARI

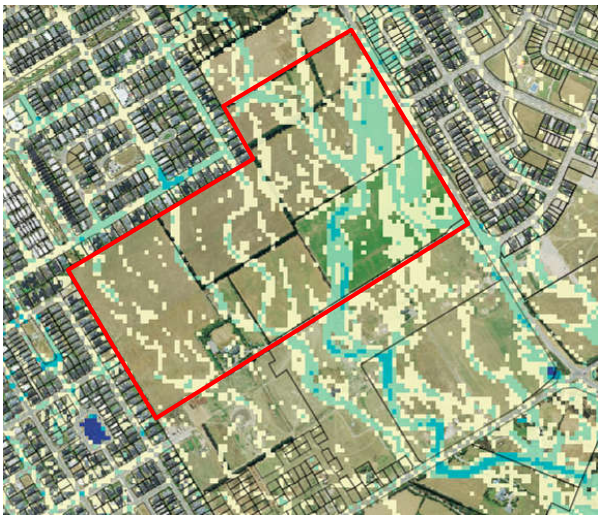
Key to water depths (for all Figures 2.1 – 2.4)

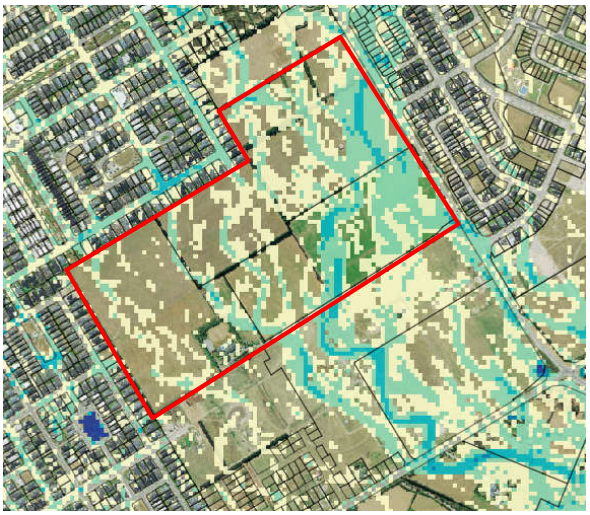






2.2 Areas 2 & 3 200 year ARI 500 year ARI





2.3 Areas 4, 5, 6 200 year ARI 500 year ARI

2.4 Area 7 200 year ARI 500 year ARI