Appendix A – Davie Lovell-Smith Infrastructure Report

URBAN ESTATES LTD

West Prebbleton – Selwyn

Infrastructure Report

Plan Change
20250-R0

October 2020

DAVIE LOVELL-SMITH

PLANNING SURVEYING ENGINEERING

Shaping the future since 1880

Revision History

Rev Number:	Prepared By:	Description:	Date:
R0	AJEH	Initial Report	

Document Control

Action:	Name:	Signed:	Date:
Prepared By	Andy Hall		28/10/20
Reviewed By	Ben Fox		28/10/20
Approved By	Andy Hall		28/10/20

Contents:

1. Introduction

This proposed Plan Change site is located on the western side of Prebbleton and directly against the current urban edge. The area is bounded by Trents Road, Shands Rd, Hamptons Road and the Sterling Park development. Not all properties in this area are part of the plan change application. Please refer to the attached Outline Development Plan (ODP) of the area showing the proposed plan change area but also attributes that extend out to the surrounding road network.

This proposal is for a Plan Change to create 820 new residential and rural residential house sites. It is recognised that the few areas outside of the formal application area should also be considered in the determination of infrastructure demands. The estimated total number of sites within the roading frame is approximately 1040 residential sites.

Davie Lovell-Smith (DLS) have held meetings with Strategic Planners and Infrastructure Engineers at Selwyn District Council (SDC), primarily Murray England with specific regards to servicing the proposal for water supply and sewer. It is the applicant's intention to construct infrastructure that will meet the demands of this project and also compliment the other land within this area. The proposed infrastructure will be integrated into the existing networks and all efforts will be made to ensure that the installations are complimentary to the current assets.

The applicant recognises the strategic approach towards the servicing of Prebbleton for additional water supply and further reticulation of wastewater back to Rolleston. It is hoped that this proposal provides some impetus to achieving those strategic goals. The applicant accepts that a partnering arrangement with Council will be required to deliver upgraded sewer and water supplies for the proposed plan change and potential other development in Prebbleton.

All proposed infrastructure will be designed and constructed in compliance with SDC Standards unless otherwise agreed. All infrastructure works will be designed in detail following subdivision consent and referred back to Council Engineers for approval prior to any construction being undertaken on site.

All sites will be serviced for sewage, water supply, telecommunications and power. Stormwater will be discharged to ground on-site. All sites will be earthworked to ensure drainage to the street or natural flow paths. All building platforms will be elevated above secondary flow paths and the 1 in 50 year critical storm event. The secondary flow paths will follow existing natural channels through the site and will be sized to ensure that any upstream flows will be accommodated.

There is no gas reticulation proposed for this development.

2. Sewer

It is intended that all new sites in the proposed plan change will be serviced by Gravity Sewer. A network of pipes will transfer wastewater to the existing Council Pump Station on Springs Road at the Meadow Mushrooms site.

The sewer demand for the proposal has been calculated using SDC Code of Practice. Please refer to the calculation below for the peak domestic demands.

If we include the current approved sites in this plan change, plus the other sites within the existing road frame, then there will eventually be a total of 1040 lots connecting to the existing pump station.

Average sewer flow
ASF = 1040 lots * 220 l/person/day * 2.7 people/lot

ASF = 618 m^3/day
ASF = 7.15 l/s

Peak wet weather flow

P/A ratio = 2.5	Part 6: Wastewater drainage SDC Code of Practice
SPF = 2	Part 6: Wastewater drainage SDC Code of Practice

MF = P/A ratio x SPF x ASF

MF = 2 x 2.5 x 7.15
MF = 35.75 l/s Overall peak flow

The eastern end of the ODP Area is just marginally higher than the SDC Pump Station on Springs Road. The site will not gravitate to the pump station and this will result in the area needing to be pumped. The estimated rising main size is a 200mm dia pipe:

Pipe Hydraulics Using Colebrook-White equation in simplified usage mode

Pipe diameter	200mm	
Gradient - 1 in	115	
Pipe Roughness – ks = 0.6mm		
Results for Full Bore Conditions:		
Velocities	1.128	m/s
Discharge	35.42	litres/sec

Alternatively, the pipe from the Springs Road Pump Station to the Pine Treatment Plan, runs along Hamptons Road, past the site. There is potential for the flow from this ODP to be pumped directly into this pipe.

The ODP area grades from an approximate level of 27.5 m.a.s.l. at Shands Road to a level of 22 m.a.s.l. at Sterling Park. Please refer to the attached LIDAR Plan. This produces a rough gradient of approximately 1 in 250. This gradient is too flat for the whole site to drain via pipework to a single

pump station location. It would be expected that at least two pump stations would be required on site. The potential location of these pump stations is shown on the LIDAR Plan.

The way in which these pump stations operate will dictate the way in which the site will be developed. For example; if the pump stations act in a lift station arrangement, then the eastern most pump would need to be constructed first, followed by lift stations as development moves towards the west. This is an unlikely scenario and we believe that it should be dismissed.

It would be far more likely that there would be two full pump stations on the ODP Area. They would either pump directly into the Pines Rising Sewer or to the Springs Road Pump Station.

The gravity sewer will be constructed to Council standards with laterals to individual lots.

All public sewer pipes over private land or reserves will be covered by appropriate easements in favour of SDC. The pump station is located on its own utility lot and is vested in SDC.

3. Water Supply

The proposed Plan Change and peripheral areas amount to 1040 lots. If we use Chart 1 from the Councils Code of Practice we can determine that the peak water supply flow per site will be approximately 0.13l/s. This amounts to an additional demand of 135.2l/s.

The SDC are currently developing an upgrading of the water supply for Prebbleton. A new bore is being located on Council land near the intersection of Shands Road and Blakes Road. The Council's intention is to lay a new trunk main from this location, south along Shands Road and then along the frontage of this ODP area in Trents Road.

At this stage the size and flows from this new bore are not known to us but it would be expected that the initial stages of the development of this area could be serviced from this new pipe. Due to the high peak demand determined here, it would be our expectation that a new bore would need to be located within the proposed development area. If the SDC were to install this bore then the expected cost of the new bore may be estimated at $600,000.00 along with say $400,000.00 of pipework. This is equivalent to perhaps $1000.00 per lot. This would be a very simple Development Contribution to be targeted at this area.

Full modelling of the water supply at subdivision consent stage will confirm the extent of the upgrade works.

The water supply will be designed in accordance with SDC specifications and SNZ PAS 4509:2008 New Zealand Fire Service Fire Fighting Water Supplies Code of Practice. The fire fighting water supply classification will be FW2.

All sites will be serviced by meters connected to a minimum 50mm ID submain, laid along the frontage of all new streets. Rear sites will be installed with 25mm pipes up the driveways and connected to water meters at the street boundaries.

All watermain construction will be completed to Council standards. All watermain pipes will be uPVC, with submains and lot connections in PE.

4. Stormwater

As discussed previously, the development will be designed around the retention of existing stormwater flow patterns across the site. Please refer to the attached plan in Appendix A. Existing drainage features will be retained and the development will be moulded around them. The natural sloping of the land is from northwest to south east. Runoff will be collected and discharged to ground. Secondary flow paths will be within reserves, and roads.

Please refer to Appendix B for a plan derived from the Selwyn District Flooding Hazards Web Site. This depicts significant flow channels through the site. The 1 in 200 year event reaches a depth of 0.96m. The main flow routes enter the site from Shands Road and flow through to Sterling Park. These channels will be diverted into the proposed road network and the flow maintained as part of the proposal.

It should be noted that any flow in these channels is extremely rare. An investigation onto the geology of the ODP Area has been undertaken by Engeo and the reporting is attached to this application. The underlying soils are gravel and groundwater is 7 – 9m deep.

Primary stormwater from the site will be discharged to ground. The soakholes on the individual sites will be constructed as part of the Building Consent process but the drainage and soakholes associated with the roads will be constructed as part of the subdivision and will be vested in SDC.

Consent or a certificate of compliance for stormwater discharge to ground from the development site will be obtained from Environment Canterbury (ECAN). All consenting from ECAN will be verified by SDC as being suitable for transfer to their ownership if required.

It is expected that all stormwater will be able to be permitted to discharge to ground without treatment with the exception of stormwater discharge during construction. Stormwater discharge during construction will comply with the Environment Canterbury (ECAN) Erosion and Sediment Control Guidelines. Erosion and Sediment Control Management Plans will be compiled for both ECAN and SDC approval.

This sustainable and environmentally sympathetic approach will also give the development a more interesting natural aspect rather than the usual earthworked and uniform contour associated with modern subdivision.

5. Power / Telecommunications / Street Lights

Power and telecommunications will be provided to all sites to utility company and industry standards. All cables will be placed underground and all kiosks will be constructed on separate individual lots. The kiosk sites will be forwarded to Council for approval following the power design.

Street lights will be provided to the roading and reserves to SDC standards. The applicant will also provide a street light style to SDC for approval.

Full appraisals will proceed once Subdivision Consent has been obtained.

6. Roading

The proposed subdivisions will be serviced with a road connection from the existing urban area with connections at two locations into Sterling Park as well as strategic connection points onto Trents Road and Hamptons Road. There will not be any direct road connections onto Shands Road other than the existing house entrances.

It is expected that the ODP area will be traversed with two collector routes connecting Trents to Hamptons Road. All other roads will be designed to meet normal council requirements. For the most part, roads will follow low areas in the natural terrain so as to replicate the natural secondary stormwater flow paths.

It is understood that Council will be upgrading the intersections of Shands with Trents and Hamptons with roundabouts to improve safety and efficiency. In addition, frontage of Trents Road and Hamptons Road will be upgraded to an urban standard as part of development works. Council are expected to develop upgraded intersections onto Shands Road and these will be incorporated into the overall development.

New roads will be designed and constructed to Council Standards. The underlying geology is considered “good ground” and the construction of pavements should not prove to be onerous.

All stormwater off the roading network will be treated prior to infiltration to ground.

Footpaths and cycle routes will be provided through the ODP area to Council standards. All routes will be lit to Council Standards. All landscaping of routes will be to Council standards.

Reference should also be made to the Abley Traffic Report in the application.

7. Earthworks and Clearing

As discussed previously, the ethos of the development relies on the maintenance of natural land form, and therefore will result in only minor earthworks. The earthworks will generally be restricted to the construction of road subgrades and adjustments to the existing overland drainage network.

Existing levels across the majority of sites will be maintained. Specific depths of excavation and fill are not known at this stage as detailed design has not been undertaken. It is estimated at this stage that the total volume of works will be between 50,000 and 100,000m3.

All topsoil will be retained and replaced on the land immediately following bulk earthworks to a depth of up to 400mm. All disturbed topsoil will be re-sown with Council specification grass seed mixes. A balance of cut and fill will be maintained on site and removal of material from site will be minimised.

Sediment discharge from the development site will be controlled as per Council requirements. The basis of the sediment control will be the ECAN Guidelines and the discharge during construction will be dealt with in association with the overall discharge consent or certificate of compliance.

All dust created on the site will be controlled by water cart or other such approved methods.

All bulk filling will be compacted in accordance with NZS 4431:1989. All fill testing will be carried out by an independent laboratory.

A geotechnical appraisal of the ODP area is attached to this application. This appraisal found the site as not being susceptible to earthquake and liquefaction damage, and has determined that the land can be considered to be equivalent to the Ministry of Business, Innovation, and Employment (MBIE) Technical Category 1 (TC1). Based on this assessment no land remediation is required, however the site may still not be considered good ground in terms of NZS 3604. Further testing may be required for future building consent applications for foundations.

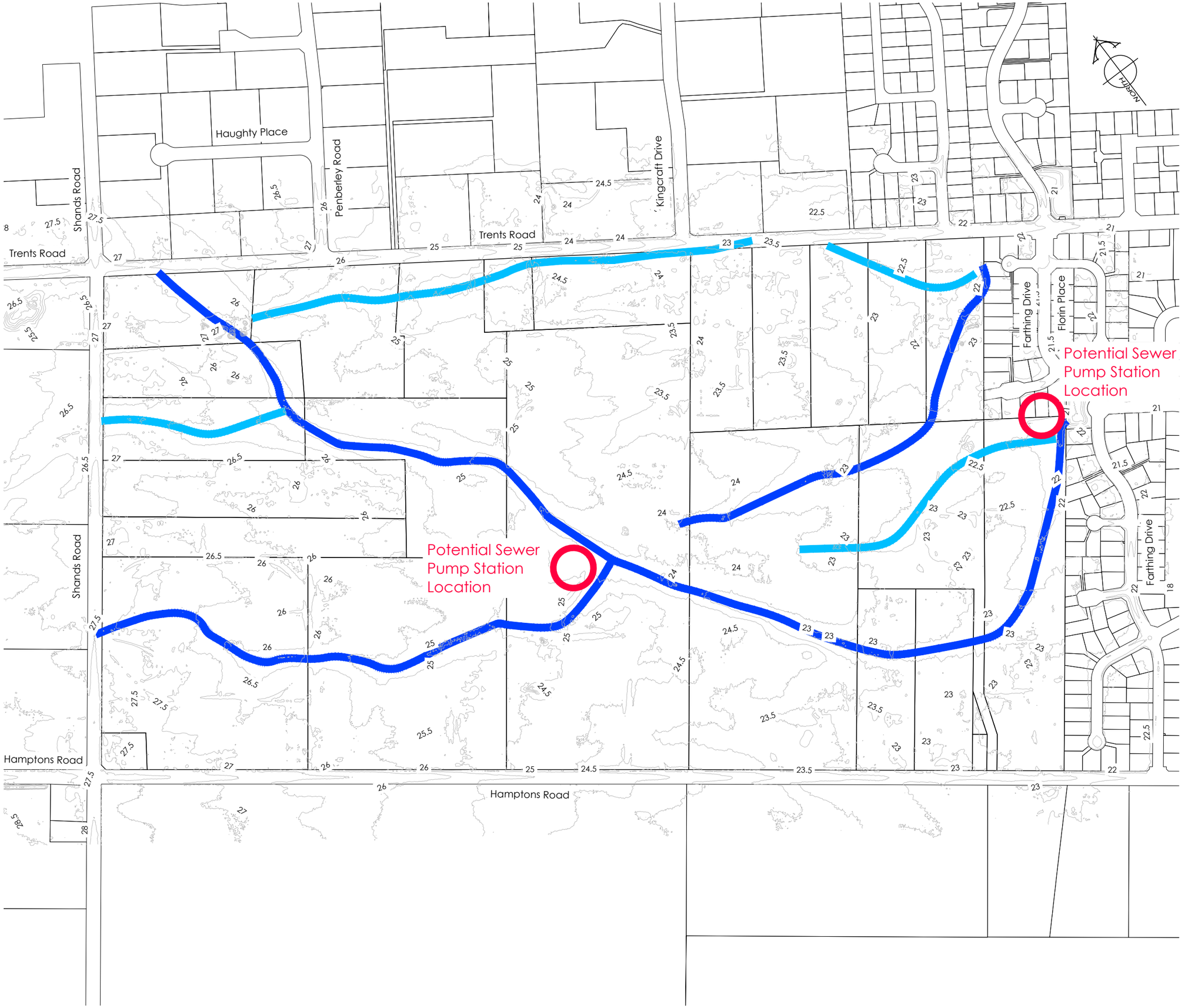
Andy Hall

Chartered Professional Engineer

Davie Lovell-Smith Ltd

Oct 2020

Appendix A – Contour and Stormwater Channels



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

1 in 200 Year Storm Event

Major Flow Channel

Minor Flow Channel

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JOB TITLE :

Prebbleton West Plan Change

SHEET TITLE :

Stormwater Channels

DRAWING STATUS

For Information

SCALE : 1:5000@A3	DATE : October 2020	
CAD FILE : J:\20250\ODP\LIDAR\SW Channels R1.dwg		DRAWN : GC
DRAWING No : **E20250**	SHEET No : 1	REVISION :

Appendix B – Selwyn Flood Mapping

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

Legend

200-year ARI rainfall flood depth (m)

- < 0.2
- 0.2 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- > 1.5

200-year ARI Selwyn River flood depth (m)

- < 0.2
- 0.2 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- > 1.5

Major Flow Channel

Minor Flow Channel

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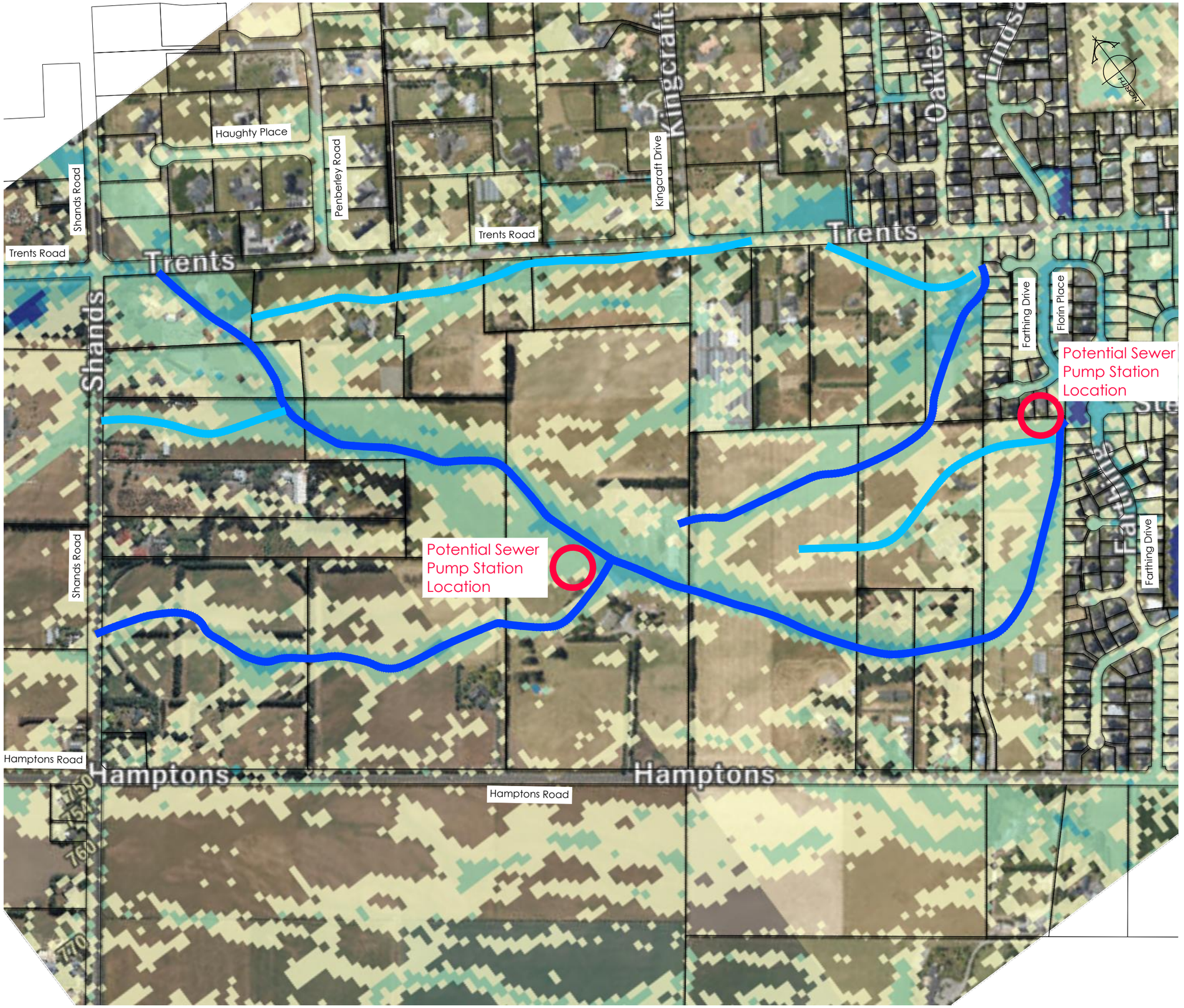

AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

Legend

- 500-year ARI rainfall flood depth (m)
  - < 0.2
  - 0.2 - 0.5
  - 0.5 - 1.0
  - 1.0 - 1.5
  - > 1.5
- 500-year ARI Selwyn River flood depth (m)
  - < 0.2
  - 0.2 - 0.5
  - 0.5 - 1.0
  - 1.0 - 1.5
  - > 1.5
- Major Flow Channel
- Minor Flow Channel

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1 in 500 Year Storm Event

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