

Infrastructure Report

John Paterson Drive • Christchurch

Urban Estates Ltd

Proposed Residential Subdivision

21189

November 2025



DAVIE LOVELL-SMITH

PLANNING SURVEYING ENGINEERING



Shaping the future since 1880

Version Control

Version	Date	Details
R0	November 2025	Initial Submission to Urban Estates Ltd

	Name	Signed	Date
Compiled By:	Fergus Matla		November 2025
Checked By:	Andy Hall		November 2025
Approved By:	Andy Hall		November 2025

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1. Site Description

The proposed site is made up of several neighbouring blocks of land centred on John Paterson Drive in Halswell, Christchurch. The land is currently zoned as Rural Urban Fringe land. The subject site has various legal descriptions and has an approximate area of 37.7296ha.

Lot 2 DP 81077	3.2243ha	Off Marsh's Road
Section 16 SO 480694	6.3947ha	
Lot 6 DP 318764	4.4595ha	
Lot 7 DP 318764	4.324ha	
Section 10 SO 480694	3.8123ha	
Lot 4 DP 318764	4.4635ha	
Lot 3 DP 318764	4.0ha	
Section 1 SO 560474	3.0488ha	
Lot 2 DP 318764	4.0025ha	



The site is located to the south of the Christchurch Southern Motorway is bordered by industrial zoned land to the west as well as residential properties to the east. The site is generally flat pastured land with John Paterson Drive running centrally through the site and Knights Stream running alongside the southeastern corner of the site. There are several existing houses located on the site. There is a narrow frontage to Marshs Road that abuts a Christchurch City Council Stormwater Treatment wetland.

To the northeast of the site there has been a noise attenuation bund constructed to protect the land from motorway noise. Some additional noise attenuation will be required. Please refer to the Acoustic Report included in the application.

North of the bund is a large stormwater basin that receives stormwater from the motorway. This basin discharges to a drain that flows along Richmond Ave and then John Paterson Drive before flowing into the head of Knights Stream. This drain will be maintained.

A Preliminary Site Investigation into the soil contamination has been completed by Momentum Environmental Ltd. Momentum has identified a number of potential contamination sites within the proposed development area as shown in the image below. A Detailed Site Investigation will be carried out prior to any subdivision application.



A preliminary geotechnical investigation has been completed by Landtech Ltd. The report is attached to the application. Please refer below for an executive summary of their findings:

Project	Address	John Paterson Drive, Halswell, Christchurch
	MBIE Technical Category	N/A - Rural and Unmapped
	Mapped Liquefaction Vulnerability	Possible
Preliminary Site Assessment	Site Subsoil Classification	Class D - Deep or Soft Soil Sites
	Static Settlement Assessment	<25mm
	Geotechnical Hazard Assessment	Subsidence/slippage hazard as per TC2, potential for parts of the site to be TC1
	Depth of unsuitable materials on site (Topsoil/Fill)	0.2m to 0.3m
	Groundwater Depth	3.0m+
Preliminary Geotechnical Recommendations	Ultimate Bearing Capacity within underlying natural soils	200kPa
	Potential Foundations	TC1 and TC2 slabs.
	Additional Considerations and Further Geotechnical Input	Additional shallow and deep testing required prior to development stages. Development setbacks from Knights Stream to be further assessed.

The site can generally be described as flat pastureland broken into lifestyle blocks with a number of pine tree windbreaks.

It is proposed to develop the site into approximately 512 residential sites. Please refer to Appendix A for a preliminary subdivision layout.

2. Servicing

2.1 Earthworks

Earthworks will be carried out on the site to ensure that all future sites will drain towards the new roads at a grade of at least 1/300.

All topsoil on site will be stripped, stockpiled and replaced on the land immediately following bulk earthworks. All disturbed topsoil will be re-sown with Council specification grass seed mixes.

The site earthworks will be balanced to ensure all cut materials will be used as fill on site. The main areas of cut on the site will be for the stormwater facilities to the south of the site and the dig out of the pavements. Further cutting of the site will be required on site for the trenches to install the sanitary sewer and stormwater pipes. This cut will be used on site to elevate the house sites above the 1 in 200yr flood event.

Sediment runoff within the site will be controlled as per Council requirements. The basis of the sediment control will be the Environment Canterbury Guidelines and the stormwater discharge during construction will be undertaken either under Christchurch City Council's overall discharge consent or in accordance with Environment Canterbury rules. All dust created on the site will be controlled by water cart or other such Council approved methods. An erosion, sediment and dust control plan will be compiled and submitted to both local and regional council for approval.

All bulk Earthfill will be compacted in accordance with NZS 4431:2022. All fill testing will be carried out by an independent laboratory.

The expected volume of earthworks is estimated at 114,000m³.

2.2 Access and Roothing

The current access to the site is from John Paterson Drive, a very long cul-de-sac. Future access to the site will be maintained from John Paterson Drive and a further connection will be made directly to Richmond Avenue to ensure the area has two entry points. Please note that access directly to Springs Road is not achievable due to the road being elevated above the site as a motorway flyover.

In reference to the proposed Outline Development Plan provided in Appendix B, future road connections will be made to the southwest. Connections will eventually be made to Marsh's Road and Springs Road.

Pedestrian and cycle connections will also be made through the site including to the north and the east crossing Knights Stream providing cycle and pedestrian routes to the nearby Knights Stream School and playing fields. A particular cycle connection will be maintained from the northern end of John Paterson Drive, out onto the cycleway associated with the motorway and the cycle connection to Prebbleton. This is a significant connection to the region's main cycle routes.

Streetlights will be provided along the roading corridor as per Christchurch City Council Standards.

Intersection upgrades may be required on Richmond Avenue, and a roundabout is expected to be included at the existing bend in John Paterson Drive. All new roads will be constructed to Christchurch Council Standards.

All existing roads will be upgraded to a full urban standard.

Please refer to the Traffic Report provided by Abley's as part of the application.

2.3 Water Supply

Currently the land is serviced for water by a 63mm dia PE connection to Springs Road. This connection will eventually be abandoned in favour of new connections to the existing Christchurch City Urban water supply network.

Please refer to the attached water supply concept plan in Appendix C.

Using the Christchurch City Council Infrastructure Design Standard, the water supply demand can be calculated as follows:

512 new residential lots applied to Chart 1 results in a peak residential demand flow of 0.14l/s/connection. Over 512 lots, that amounts to a domestic demand of 71.68l/s peak flow.

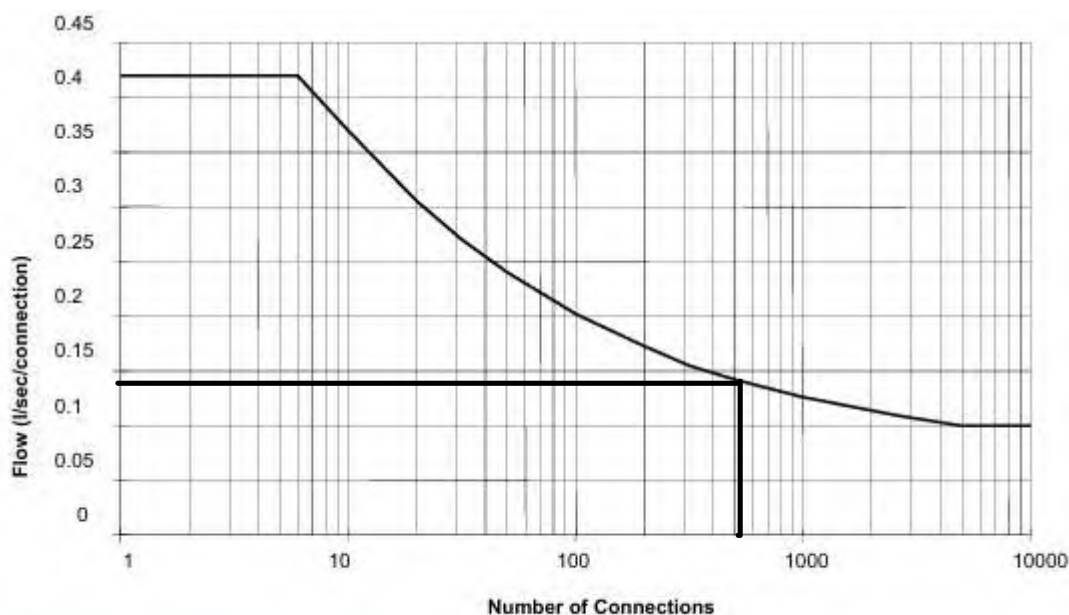


Chart 1 Peak residential design flow rates

The allocated firefighting water supply classification for the development area is FW2. Fire hydrants will be spaced to ensure sufficient flow in compliance with NZS4509:2008. The flow required for fire fighting under FW2 amounts to an additional 25l/s.

The combined peak demand and fire flow amounts to 95.68l/s.

The primary water supply connection to the site will be to the existing 150mm dia pipework at the corner of Richmond Ave and John Paterson Drive. The pipes in this location are expected to be extended further along their respective roads and into the development area. Subject to modelling, the 150mm existing pipes may need to be upgraded.



Watermains at the intersection of Richmond Ave and John Paterson Dr

A connection may also be made under Knights Stream and into the 100mm main on Tongariro Street.

Together, these connections will not be adequate to provide water supply to the proposed development area. A further connection will need to be made to the 560mm PE100 trunk main that runs along the northeast boundary. This trunk main connects to the site directly to the Wilmers Road Reservoir. The length of pipe that has been laid under the southern motorway is yet to be commissioned but Council has advised that work is imminent and will not hamper the water supply to the proposed development.

Christchurch City Council has confirmed that water supply is not an impediment to this land being zoned residential.

2.4 Sewer

Communications with Christchurch City Council have confirmed that the proposed development can connect to the existing Christchurch City wastewater network at manhole WwAccessID 43468 located at the corner of Tongariro and Harz Streets. The outlet from this manhole is a 225mm uPVC gravity pipe. Council have supplied a memo detailing the downstream network as far as PS115 has spare capacity for 585 additional lots. Please refer to Appendix D. for the CCC memo.

The CCC memo does make a proviso that that the pumps in PS115 would need upgrading and that would be the responsibility of the applicant. Council also notes that the network downstream from PS115 would also require some investigation and we request as part of this application that Christchurch City Council progress with this assessment.

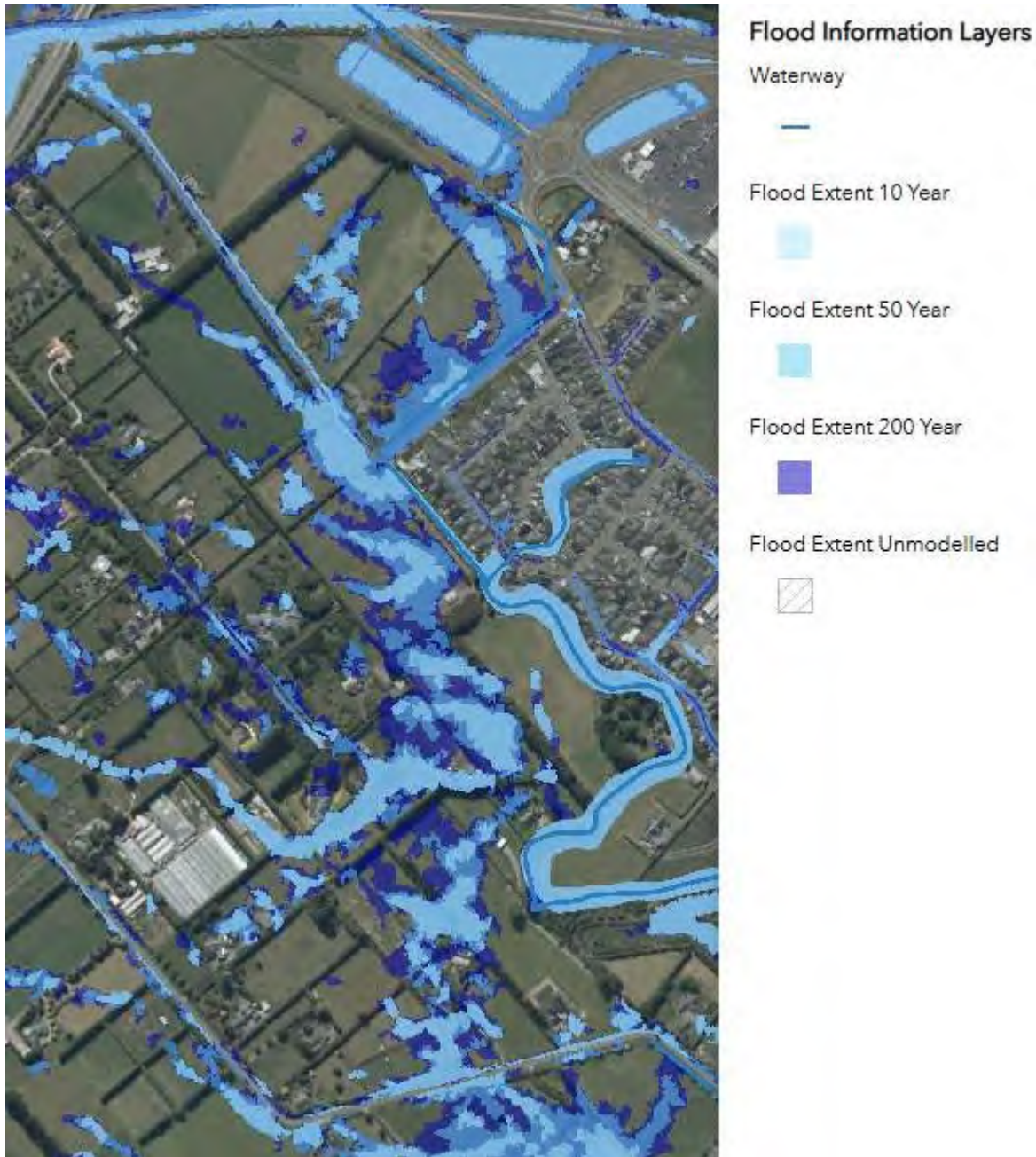
The proposed development will not be able to gravitate to the receiving manhole. A new pump station will need to be installed in the proposed development and all wastewater would need to be pumped under Knights Stream to Harz Street.

Please refer to the attached plan of the proposed wastewater concepts in Appendix C.

The sanitary sewer pipes in the new streets will be a gravity network and designed and sized to Council standards. At this juncture, the availability of wastewater capacity does not appear to be an inhibitor for development of this land.

2.5 Stormwater and Flooding

The Christchurch City Council Flood model has been investigated and is shown in the image below.



The flood model shows the channelisation of flood water in natural depressions across the site and along existing streets. Flow follows the direction of the contour being towards the southeast and into Knights Stream.

Flood inflow onto the proposed development area appears to originate from the Motorway basins to the northeast and a major flow channel from 15 Busch Lane. Both of these inflows will be maintained as part of any future development. The flows from the basins will be restricted to the future road network and the flows from 15 Busch Lane can flow directly into the future adjacent stormwater reserve.

The site is not affected by any Flood Management Areas as dictated by the Christchurch District Plan.

Stormwater discharge will eventually be discharged into Knights Stream which ultimately discharges into the Halswell River. Discharge will be permitted under the CCC global consent CRC252424. Runoff from roads will require treatment and storage, this will occur in stormwater basins to be constructed by the developer in the southern portion of the site as marked on the attached ODP. The stormwater facilities will be sized in accordance with the CCC's WWDG, and to ensure the conditions of the global consent are met the facilities will also be designed in accordance with the Huritini Halswell Stormwater Management Plan. A preliminary stormwater treatment plan and sizing of the facilities have been undertaken and is attached as Appendix E.

Stormwater will initially drain to a first flush basin with a four-day detention time. Flows from the first flush basin will drain to a wetland prior to being discharged to Knights Stream. There is potential for the existing adjacent Council Wetlands to be extended. The flows exceeding the first flush basin will overtop to a detention basin.

Further investigations will be made into the direct discharge of roof water to ground. This will only be able to be achieved in areas of gravel and where the water table is at least 3m deep. The geotechnical report provided as part of the application shows that these areas are available but further investigation will be required prior to a full delineation of the suitable conditions. The volume of roof water draining to ground will reduce the size of the stormwater treatment and storage facility.

Stormwater has the ability to be dealt with on site and will not be an inhibitor for development of this land.

2.6 Power and telecommunications

Orion has been contacted to confirm that their network has capacity for this proposal.

Enable has also been contacted to confirm the capability of fibre broadband for the proposed subdivision.

All cables will be placed underground, and all kiosks will be constructed on separate individual lots.

Both Power and Telecommunications are expected to be made available and will not be an inhibitor for development of this land.

Appendix A. Preliminary Subdivision Layout



AMENDMENTS:		
AMENDMENT	DATE	DESCRIPTION
NOTES:		
1. Areas and dimensions are approximate only and are subject to final survey and deposit of plans.		
2. Service easements to be created as required.		
3. This plan has been prepared for so any other parties.		

Density Area = 32.782 ha
Number of Lots = 502
Density = 15.31 hh/ha



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116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:
John Paterson Drive

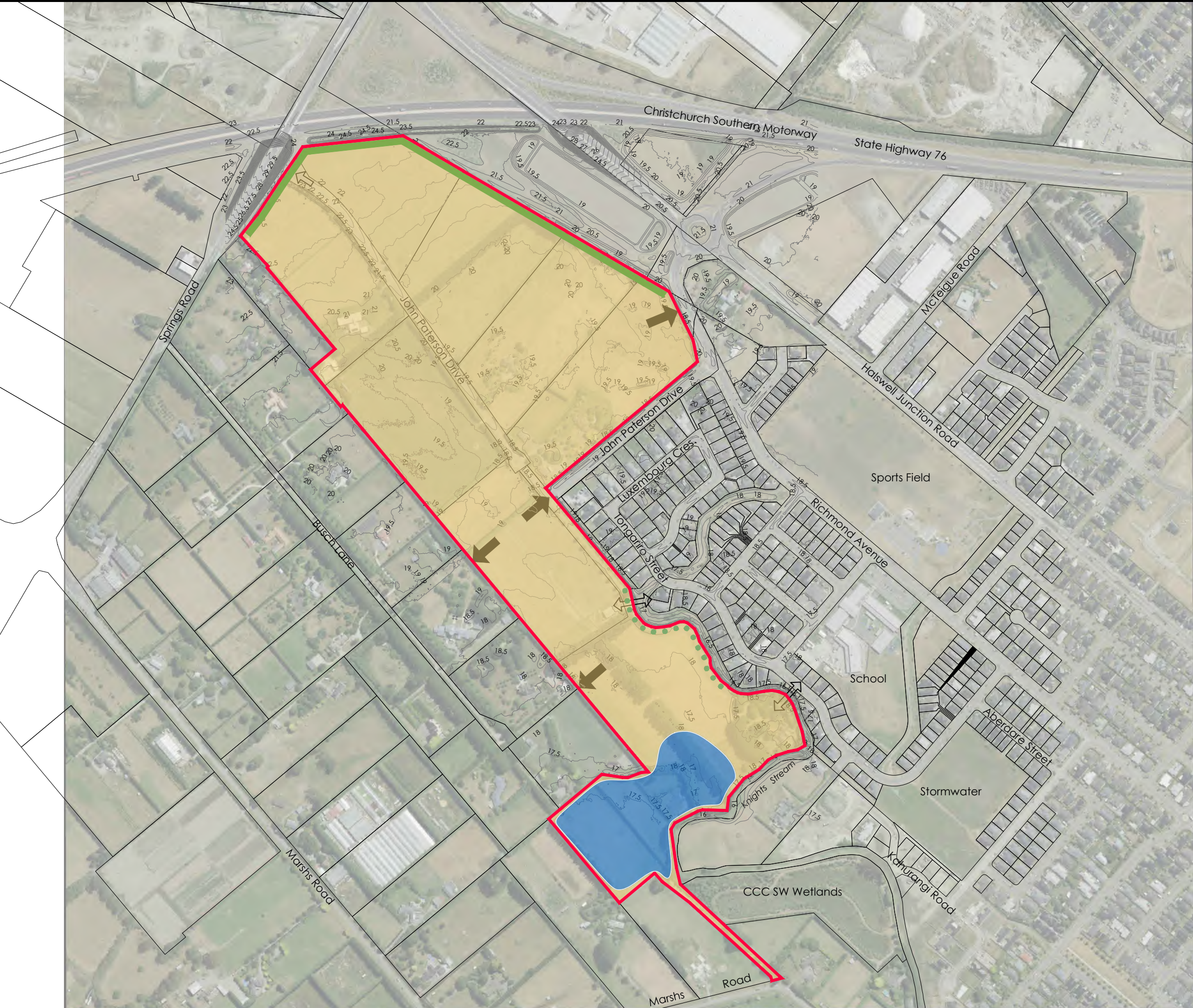
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**Development Site Plan
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Lot 2 DP 318764, Section 10 SO
480694, Lot 9 DP 318764, Lot 3 DP
318764, Lot 4 DP 318764, Lot 7 DP
318764, Lot 6 DP 318764, Section
16 SO 480694)**

DRAWING STATUS:
For Discussion Purposes

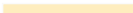
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DRAWING No: E21189	SHEET No: 1 OF 1
	REVISION: R1

Appendix B. Outline Development Plan

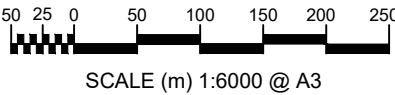
Outline Development Plan - John Paterson Drive



KEY

-  **ODP Boundary**
-  **Road Connection Point**
-  **Pedestrian & Cycle Connection Point**
-  **10m Riparian Margin**
-  **Acoustic Boundary Treatment**
-  **Stormwater Facility**
-  **Medium Density Residential Zone**

Contours shown are from LINZ Data at 0.5m Contour Intervals and interms of LINZ Vertical Datum 2016.



Appendix C. Engineering Concept Plans



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LEGEND :	
EXISTING SERVICES	PROPOSED SERVICES
WATER	WATER



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JOB TITLE:
John Paterson Drive

SHEET TITLE:
Concept Water Supply

DRAWING STATUS:
For Discussion Purposes

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AMENDMENTS :		
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LEGEND :

EXISTING SERVICES

SANITARY SEWER

PROPOSED SERVICES

SANITARY SEWER STD. MH



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Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

John Paterson Drive

SHEET TITLE:

Concept Sewer

DRAWING STATUS

For Discussion Purposes

SCALE: 1:1600@A1 1:3200@A3

DATE: January 2026

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DRAWN : JS

DRAWING No: E21189

SHEET No: 2 OF 5

REVISION : R1



AMENDMENTS:		
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LEGEND:	
EXISTING SERVICES	PROPOSED SERVICES
STORMWATER	STORMWATER
	MH



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Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:
John Paterson Drive

SHEET TITLE:
Concept Stormwater

DRAWING STATUS:
For Discussion Purposes

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	REVISION: R1



AMENDMENTS:		
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JOB TITLE:
John Paterson Drive

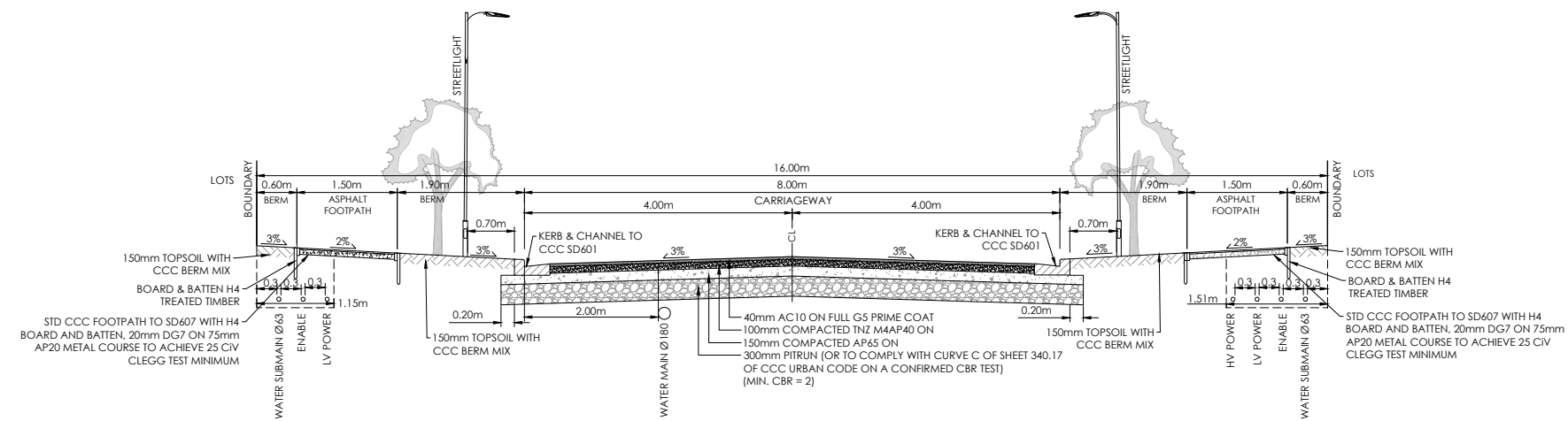
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DRAWING STATUS:
For Discussion Purposes

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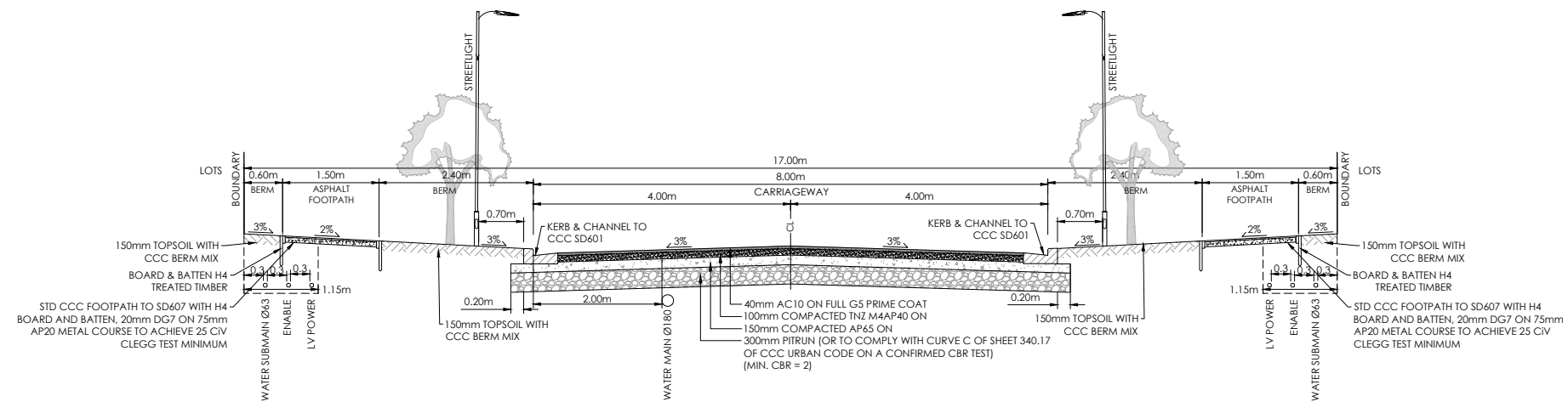
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DRAWING No: **E21189** SHEET No: 4 OF 5 REVISION: **R1**



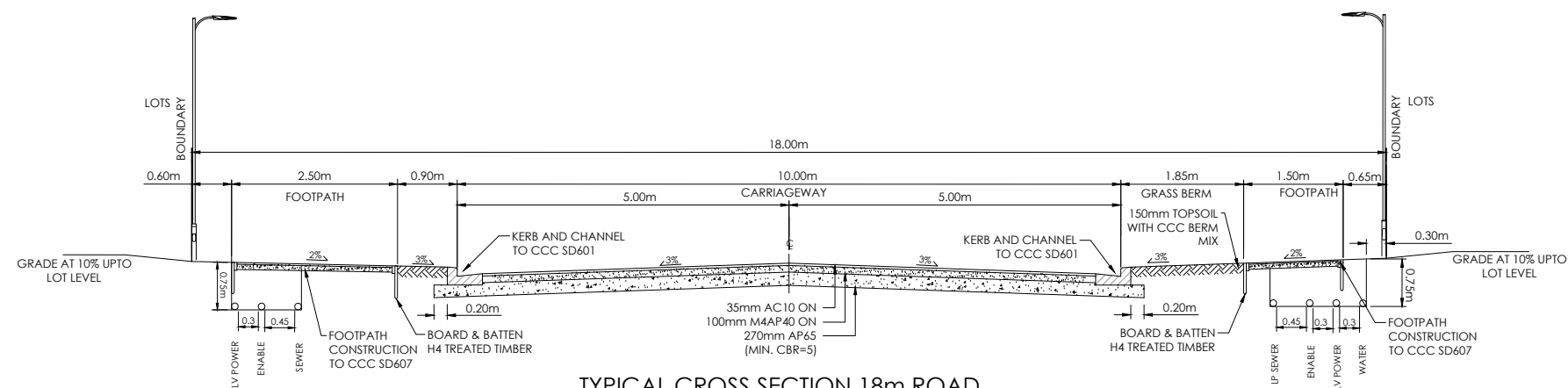
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TYPICAL CROSS SECTION 17.0m

SCALE 1:50@A1
1:100@A3



TYPICAL CROSS SECTION 18m ROAD

SCALE 1:50@A1
1:100@A3

AMENDMENTS :		
AMENDMENT	DATE	DESCRIPTION

- NOTES :
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 - 3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purposes.



116 Wrights Road P O Box 679 Christchurch 8140, New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:
John Paterson Drive

SHEET TITLE:
Roading Cross Sections

DRAWING STATUS
For Discussion Purposes

SCALE : AS SHOWN DATE : January 2026

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DRAWING No : E21189	SHEET No: 5 OF 5
REVISION :	R1

Appendix D. CCC Wastewater Memo

Memo

Date: 07 August 2024
From: Ramolin Naidoo
To: Michele McDonald
Cc:
Reference: FOLDER18/1095 – 24/1369114

Capacity Review of Wastewater Pumping Station PS115

1. PURPOSE OF THIS MEMO Te take o tēnei Pānui

The following content relates to the existing wastewater pumping station identified as PS 115: (Longhurst) which is located on the corner of Caulfield Avenue and Hamill Road in Halswell, Christchurch City. The report covers only the capacity review of PS 115 and PS 83 and does not cover any further analysis of downstream pumpstation capacities where PS 115 would be discharging into. The objective of the report is to make a high level assessment of the capacity of the pumping system including:

- Identifying and understand the existing and future growth potential of the remaining catchment.
- Reviewing the availability of capacity at the station to accommodate existing and future growth (especially the impact of the proposed Urban Estate Development request).
- Providing recommendations and summary actions for consideration.

2. UPDATE He Pānui

2.1 Background of the station and catchment

The pumpstation was constructed in 2012 for the Christchurch City Council and is operated by City Care Water. PS 115 currently receives a combined flow from the surrounding gravity catchment of PS 115 as well as pumped flow from PS83 . The combined outflow is pumped from PS115, through a 4300m long pressure main to a discharge point inside the Wigram PS 105 catchment. Wastewater is then conveyed into the Southern Relief and Western Interceptor and then into CCC main treatment works (Refer Appendix Figure 9).

Both PS 115 and PS 83 catchments (including open spaces) were evaluated in GIS to be approximately 162 ha i.e. 145.4ha and 17 ha resp. The development areas were compared with the CCC Hydraulic Model 2020 and confirmed a good match with a negligible variance of 3%.

It has been estimated that both stations currently service approximately 90% of the existing catchments wastewater flow. The remaining 10% equates to approximately 15.5 ha of land, which 12.8 ha is zoned for residential development. A small portion is earmarked for future commercial development and the potential wastewater contribution from this sector has been included. There was no further development potential identified within the PS 83 catchment for any of the sectors of demand.

3 TECHNICAL FINDINGS FOR GROWTH, FLOW RATES AND PUMPING CAPACITIES

3.1.1 Review of growth inside and surrounding catchment

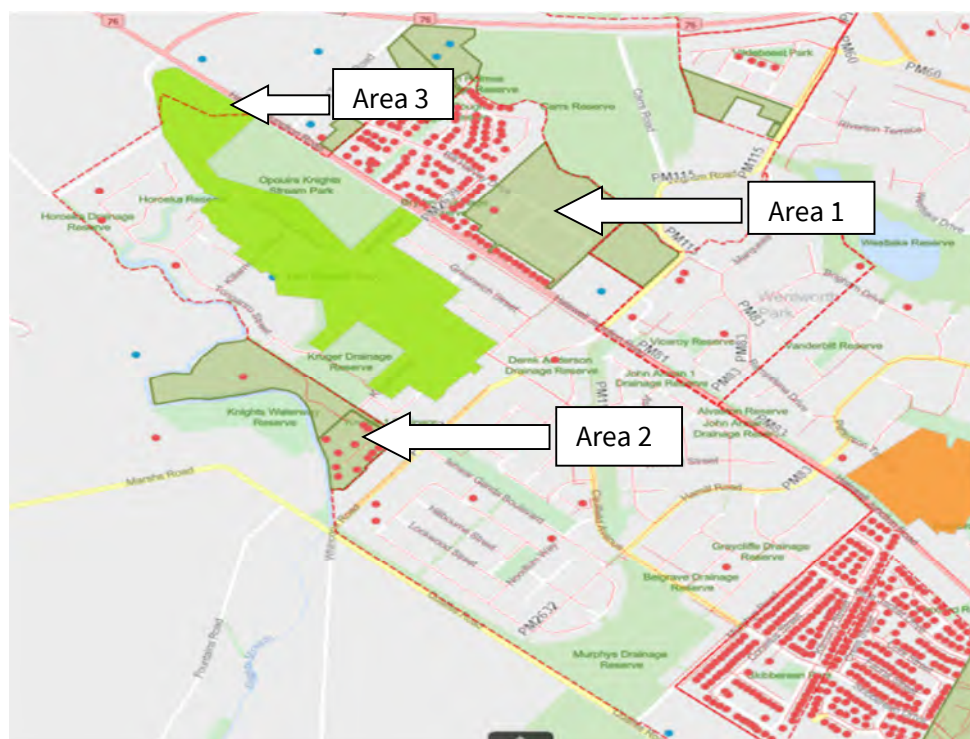


Figure 1: Growth points identified for review.

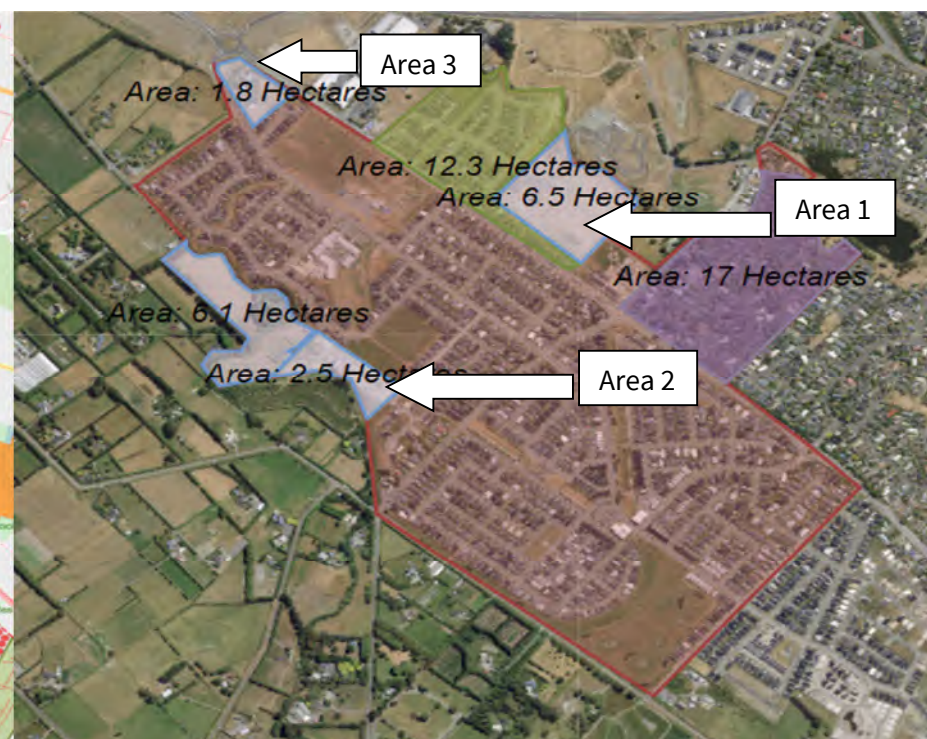


Figure 2: Existing catchment areas for development from CCC GIS.

The land to the northwest of the PS 115 (off Halswell Junction Drive) accounts for approximately 6,5ha (Area1) and can accommodate a minimum of 97 medium density lots. Further to the west of PS 115 (along Ishwar Ganda Drive), more residential development is taking place (Area 2) which is approximately 8,5 ha in extent and accounts for 130 medium density residential lots. There is a small land parcel zoned for commercial development at the top of the catchment which is 1.8ha (Area 3). Development is already taking place in some of these identified areas and all are envisaged to be serviced and completed within 2 years to 5 years of this report. As referenced in Table 1 below, the current density factor in the existing catchment are in order of RNN (15hh/ha) and further development beyond this factor could trigger a request for an upgrade (illustrated in figure 4 below).

The Urban Estate proposed housing development is situated outside the existing District Plan catchment boundaries. The development has been identified for predominantly the residential market. The proposed tie point into an existing sewer junction is located at Tongariro Street (MH 4478) which is along a 225mm UPVC branch pipeline to PS 115. No upgrade of the pipeline is envisaged (refer to section 3.3. below for details).

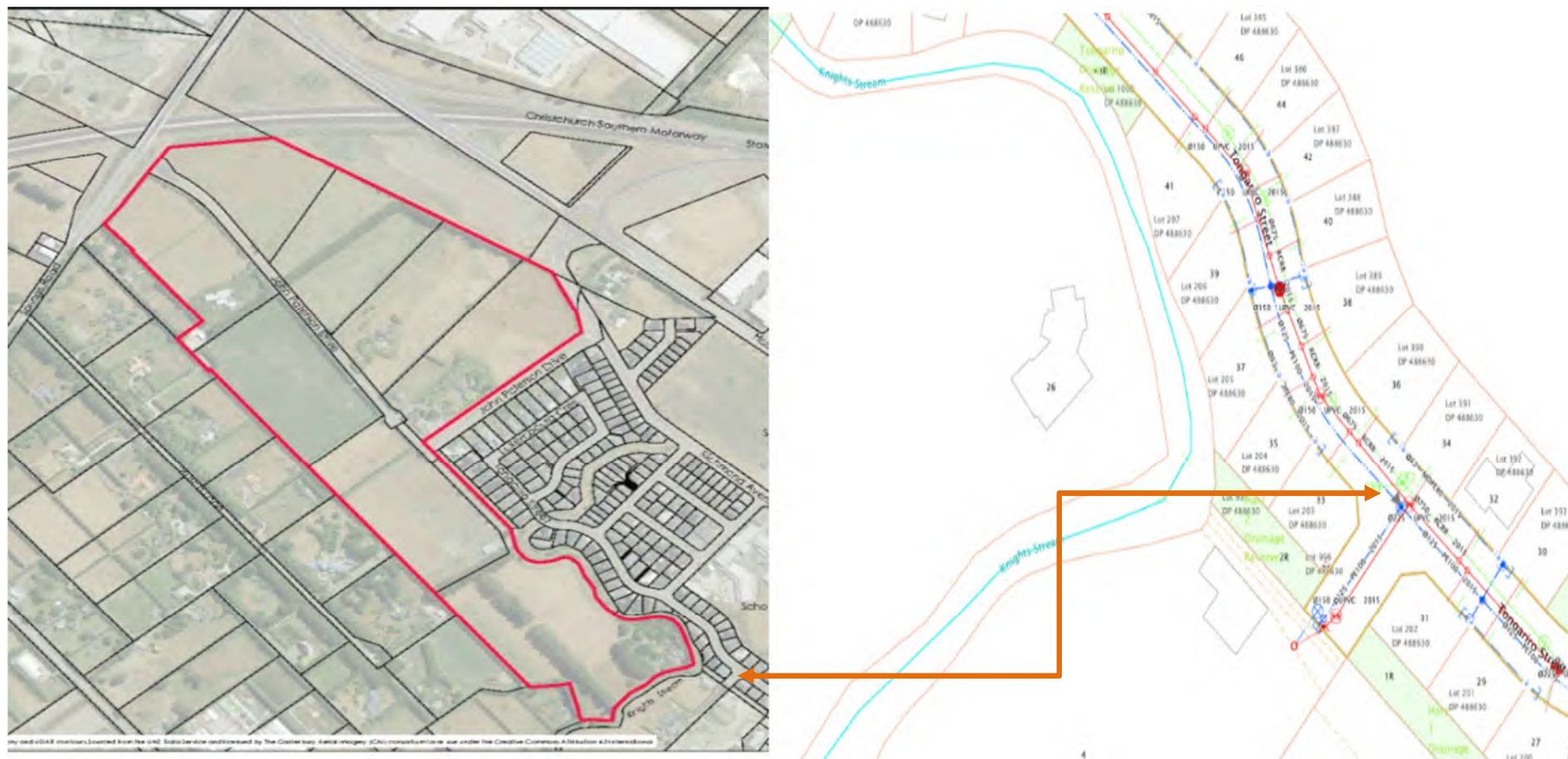


Figure 3: Image from Developer request for households with the proposed new development catchment (red) and location and tie in point to MH 44785 on Tongariro Street indicated by the arrow. Location of development is outside of planned catchment area for PS 115 (highlighted in red).

Table 1: Calculation of Residential lots versus residential count

2	Calculation of the Residential lots		(RNN) - 15hh/ha	(RSDT) - 22.5 hh/ha	(RMD) - 30 hh/ha	HHDF - 40 hh/ha
2.1	Lots counted inside catchment-residential existing	no.	1750			
2.2	Lots developed in existing catchment (IDS).	no.	1732	2598	3464	4619
2.3	Lots provisioned to be developed in existing catchment.	no.	1923	2885	3847	5129
2.4	Lots available to be developed within catchment- as per resource consents (2.3-2.2)	no.	191	287	383	510
2.5	Lots to be developed outside catchment-future.	no.	585	878	1170	1560
2.6	Lots in revised catchment- future (2.3+2.5)	no.	2508	3763	5017	6689

An initial residential count (1750 lots highlighted in green) was compared to the count of the existing catchment by using factors from tables in the IDS specifications (1732 lots highlighted in blue). The density assumptions and parameter are contained in Appendix 1 Table 2. A variance of 1% between the numbers indicates that the current household density factor can be allocated to the **low density factor (RNN = 15hh/ha)**. The existing catchment has only a further 191 households left to be developed. Higher densification factors were applied to the remaining portions of the catchment to determine the impact on pumping infrastructure. These have been illustrated in figure 4 below. The request for development by Urban Estate (dated 02 May 2024) earmarks areas **outside the existing PS115 catchment boundary** and would contribute approximately a further 585 households of wastewater flow directly into PS115 station.

3.1.2 Catchment flow rates

The average sewerage flow (ASF) for the developed and undeveloped residential and commercial portions within the approved planned catchment was calculated to 12.07 l/s (Refer to App.2 Table 2). The 2020 CCC Hydraulic model indicates a flow of 17.51 l/s for the current flow. Comparing the IDS calculated figures with that of the model output, it was decided to use the **model data values** and undertake a comparison of the maximum sewerage flows together with other development scenarios for the future portions and compare them against the pumping capacity.

Table 2: Calculation of maximum sewerage flows with various densification factors.

Description of maximum sewerage flow (MSF) and thresholds for pumping capacity in litres per second.	(MSF) of existing developed areas together with undeveloped areas with various densification factors from (IDS).				
	RNN 15hh/ ha	(RNN) + RSDT 22.5 hh/ha	(RNN) + RMD 30 hh/ha	(RNN) + HHDF 40 hh/ha	Pump @ 10% degradat ion
Developed flow from CCC model output data(L/s)	76.94	76.94	76.94	76.94	63.00
Undeveloped flow IDS (L/s)	25.60	38.60	54.85	75.15	63.00
Total of revised catchment (L/s)	102.54	115.54	131.79	152.09	63.00
Variance relative to the pumping capacity (L/s)	-39.54	-52.54	-68.79	-89.09	63.00
% Variance relative to pumping capacity	-63%	-83%	-109%	-141%	63.00

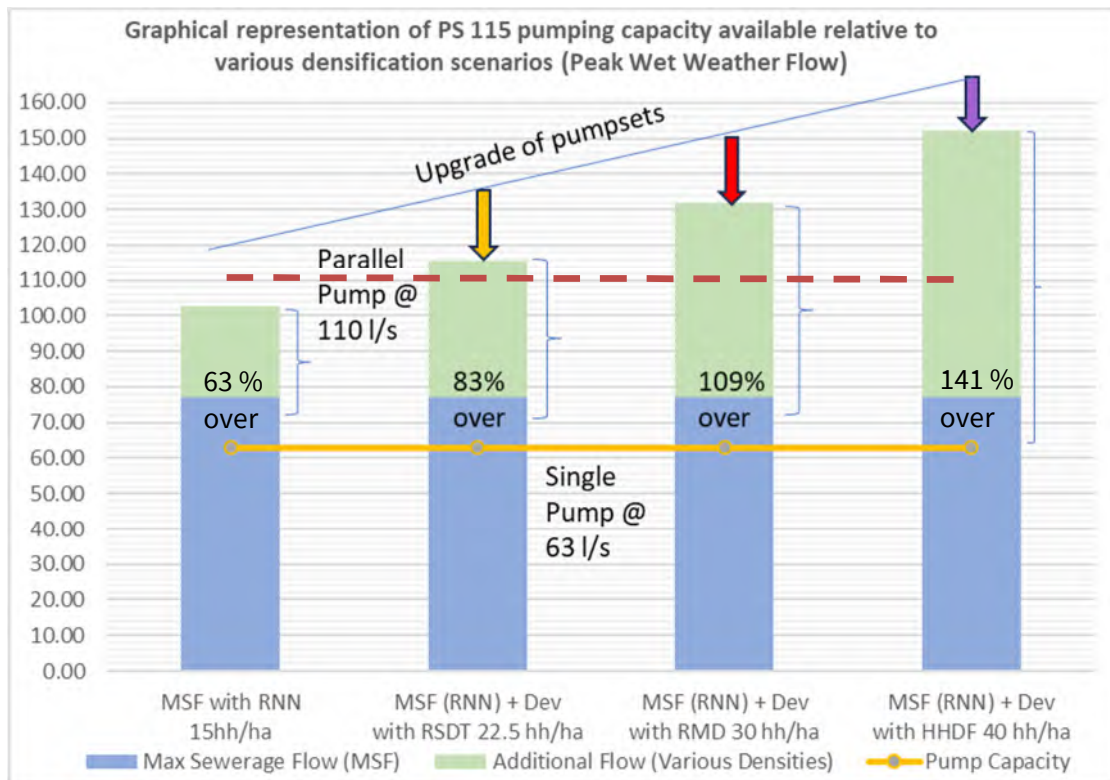


Figure 4: Graphical representation of pumping constraints for various densification factors.

From the above graphical representation, we can see that the current pumpstation capacity's lowest threshold for a single pump is 63l/s (@ 10% degradation rate). This capacity cannot accommodate the existing wet weather events without the second pumpset P2 assisting. Currently, during peak wet weather events, both pumpsets are operational and have a pumping limit of 110 l/s. This limit is further expanded in Table 8 below.

Any further development to include areas outside of the catchment boundary may reduce any remaining redundancy in the system and will lead to overflows at the pumping station. Should the new development proceed, the existing pumpstation will require an increase in pumping capacities with possible modifications to the pump wet well , internal station pipework as well as the existing instrumentation (VSD's) at the station. Table 8 in the section below contains more information related to pumpstation upgrading requirements.

3.2 Pumping Station Capabilities

The pumpstation was designed to operate in a duty/standby configuration with one pump sized to accommodate a maximum anticipated flow rate of 117 l/s (at a 41m total head). An allowance of 20% was provisioned inside the flows for pump degradation.

The pump supplier (Xylem: Craig Gilmore) confirmed that the serial numbers issued to the contractor (Fulton Hogan) in 2013 correspond to motor serial No: N3301 HT 456. The pumpsets issued have an installed pumping capacity of 70l/s (at a 41m head) and rated power of 55kw each. This indicates that the pump station is operating at **40% less capacity than initially designed**.

The highest wet weather flow (WWF) from the station was recorded on 22 July 2023 @ 20:05 pm (103.6l/s). This event coincided with the highest recorded rainfall for the year taken at the Spark Road Station (58mm). According to maintenance records, the main pumpset in the station (P1) has failed twice in the past 2 years

each time due to a damaged impeller. One of the failure events resulted in an overflow event being recorded at the station (26 July 2023).

At the time of the recent site visit (June 2024), some cavitation was noticed on Pump 1 during drawdown to low level cut off points. Pump 2 was also assessed and it was determined that it requires an impeller replacement as well. An instruction was issued by Ronald Klok to CCC Network Operations to adjust the pump cut off level which has resulted in better performance from P1. A work order has been issued for the acquisition of a new impeller for P2 (lead time September 2024).

In its refurbished state and with constant monitoring, it is anticipated that the station has the capability to meet on the existing planned catchments flows (@RNN densification factor). The operation regime would now be considered duty/assist to accommodate peak wet weather inflows. Any further inflow into the station in the magnitude of the Urban Estate Development will definitely lead to overflows during excessive wet weather events.

Table3: Pump station review of capacity serial **No: N3301 HT 456**

No.	Description of Activity	Flow rate	unit
1.1	Actual pumping capacity installed as per pump test (two parallel pumps)	110.00	l/s
1.2	Actual pumping capacity installed as per pump test (one duty pump)	70.00	l/s
1.3	Peak Wet Weather flows – existing catchment (CCC model 2020)	76.94	l/s
1.5	Peak Wet Weather Flows from new development (IDS)	20.13	l/s
1.6	Peak Wet Weather flows fully developed with additional new development	97.07	
1.7	Pumping capacity of new pumpset if pumpstation was upgraded (including minimum 20% loss factor).	116.40	l/s

Installing a larger pumpset may be viable and would provide adequate redundancy to accommodate future flows (117 l/s inclusive of degradation). As mentioned previously, the upgrade depends on the space constraints of the pump station to accommodate a larger pumpset and shift pipework inside an already constrained wet well. The variable speed drives would also need to be assessed for panel upgrades. It is imperative that the station be monitored and maintained prior to wet weather events.

3.3. Pipeline capacity assessments

The connection point for the new development to tie in is located at MH 4346 located on the corner of Harz street and Tongariro street. The pipeline collects effluent at the top of the catchment (from Luxembourg Crescent) and eventually transitions into a larger 225mm trunk main as it gets closer to PS 115. The pipeline closer to the tie in segment was assessed for adequacy of available capacity to accommodate an increase flow into the pipeline and found to accommodate approximately 30 l/s ($d/D = 1$) which is sufficient capacity to accommodate the existing average flows and the additional lots. Should the development proceed, consideration would need to be taken of the manhole tie-in depth and the impact of maintaining adequate pipe slopes of future pipework in the development to transition into the manhole.

The existing rising main is approximately 4000m long and was upsized to a 355mm OD UPVC pipeline. The pipe eventually discharges into the gravity network on Wigram Road before reaching PS105. During parallel pumping during excessive wet weather events, the pipeline would be most likely be subjected to an increased velocity of approximately 1.05 m/s to 1.15 m/s which is still within acceptable pumping velocities for a rising main. An increase in pumping capacity would only need to give consideration to an air valve sizing re-check and the capacity of downstream gravity pipework at the point of discharge.

4 CONCLUSION WHAKAKAPINGA

4.1 Recommendations

Pumpstation 115 has an installed pumping capacity which is below the original design capacity. The station is currently experiencing problems with Pump 1 as it is cavitating and has a tendency to fail during the wet weather periods. Pump 2 was inspected and found to require an impeller replacement.

The existing pump station can accommodate the remaining growth in the existing catchment provided the developments are constrained. Any additional flows from outside the catchment boundary would require an upgrade to the PS115 pump station (including pipework and electrical instrumentation). The existing trunk main identified for the tie-in has adequate capacity to convey additional flows from the existing developments and the proposed new development. The capacity of pipework downstream of PS 115 would need to be reviewed should a plan change request proceed.

4.2 Actions and instructions

- Confirm if Citycare has ordered and installed Pump 2 impeller and recommission a drop test of the station to update the pump test sheet.
- Update the Operations and Maintenance Manuals for the station new set levels settings.
- Undertake a review of the available pump sizes on the market to fit inside the existing wet well.
- Undertake a high level review of the available power supply and electrical installation at the station to confirm power limitations and MCC panel limitations (specifically the VSD's).

Attachments Ngā Tāpirihanga

There are no attachments to this memo.

Signatories Ngā Kaiwaitohu

Authors	Ramolin Naidoo
Approved By	x

**APPENDIX 1: FLOW DATA
CATCHMENT AREAS, FLOW DATA (IDS), MODEL DATA (2020)**

Appendix 1: Table 1

No	Description of Catchment areas of extent in relation to developed and undeveloped	Unit	Quantity	Other Outputs Reference numbers	Reference
1.1	PS 115-Open Spaces and drainage areas		14.4		
1.2	PS 115-Residential-existing catchment	ha	111.2		
1.3	PS 115-Commercial-existing catchment	ha	4.5		
1.4	PS 115-Schools and Hospitals - existing	ha	15.2		
1.5	Total extent of PS 115-(with open spaces)1.1.1 to 1.1.4	ha	145.4	148.0	Smart Map
1.6	Total extent of PS 115- (without open spaces) 1.1.2 to 1.1.4	ha	131.0	125.3	Model
1.7	PS 83-Open Spaces and drainage areas				
1.8	PS 83-Residential-existing catchment	ha	17.0	17.9	Model
1.9	PS 83-Commercial-existing catchment	ha	0.0		
1.10	PS115 and PS 83 existing catchments- (1.1.5+1.1.6)	ha	148.0	143.21	Model
1.11	PS 115-Residential-existing catchment (developed)	ha	98.5		
1.12	PS 115-Commercial existing catchment (developed)	ha	1.8		
1.13	PS 83-Residential-existing catchment (developed)	ha	17.0		
1.14	PS 83-Commercial existing catchment (developed)	ha	0.0		
1.15	PS 115-Schools and Hospitals - existing (developed)	ha	15.2		
1.16	PS115 and PS 83 existing catchments- (developed)	ha	132.5	90%	of existing
1.17	PS 115-Residential-existing catchment (undeveloped potential)	ha	12.8		
1.18	PS 115-Commercial existing catchment (undeveloped)	ha	2.7		
1.19	PS 83-Residential-existing catchment undeveloped	ha	0.0		
1.20	PS 83-Commercial existing catchment (undeveloped)	ha	0.0		
1.21	PS 115-Schools and Hospitals - existing catchment (undeveloped)	ha	0.0		
1.22	PS115 and PS 83 existing catchments- undeveloped 1.9+1.14	ha	15.5	10%	of existing
1.22	PS115 Residential- new request (outside catchment boundary)	ha	39.0	26%	of existing
1.23	PS115 and PS 83 new catchments (after approval of plan change request)	ha	187.0		
1.24	Original detailed design catchment (2012)	ha	187.0		

Memos

Appendix 1: Table 2

			(RNN) - 15hh/ha	(RSDT) - 22.5 hh/ha	(RMD) - 30 hh/ha	HHDF - 40 hh/ha
3.1	Average Sewerage flow (ASF) - DEVELOPED PS 115 and PS 83					
3.1.1	Residential developed (l/s)	l/s	11.91	17.86	23.82	31.76
3.1.2	Commercial developed (l/s)	l/s	0.16	0.27	0.81	1.36
	Total of 3.1	l/s	12.07	18.13	24.63	33.11
3.2	Average Sewerage flow (ASF)- UNDEVELOPED PS 115 and PS 83					
3.2.1	Residential undeveloped within catchment(l/s)	l/s	1.31	1.97	2.63	3.51
	Residential undeveloped outside catchment(l/s)	l/s	4.02	6.03	8.04	10.73
3.2.2	Commercial undeveloped within catchment (l/s)	l/s	0.24	0.41	1.22	2.03
	Sub-total of 3.2		5.58	8.41	11.89	16.26
	Total of ASF		17.65	26.54	36.52	49.37
3.3	Peak Dry Sewerage flow (PDSF)- DEVELOPED PS 115 and PS 83					
	Residential developed existing (l/day)	l/day	1,852,068.24	2,778,102.36	3,704,136.48	4,938,848.64
3.3.1	Residential developed (l/s)	l/s	21.44	32.15	42.87	57.16
	Commercial existing (l/day)	l/day	25,334.21	42,223.68	126,671.04	211,118.40
3.3.2	Commercial developed (l/s)	l/s	0.29	0.49	1.47	2.44
	Sub-total of 3.3		21.73	32.64	44.34	59.61
3.4	Peak Dry Sewerage flow (PDSF)- UNDEVELOPED PS 115 and PS 83					
	Residential undeveloped within catchment (l/day)	l/day	204,484.50	306,726.75	408,969.00	545,292.00
3.4.1	Residential undeveloped within catchment(l/s)	l/s	2.37	3.55	4.73	6.31
	Residential undeveloped outside catchment(l/day)	l/day	625,482.00	938,223.00	1,250,964.00	1,667,952.00
	Residential undeveloped outside catchment(l/s)	l/s	7.24	10.86	14.48	19.31
	Commercial undeveloped within catchment (l/day)	l/day	37,791.36	62,985.60	188,956.80	314,928.00
3.4.2	Commercial undeveloped within catchment (l/s)	l/s	0.44	0.73	2.19	3.65
	Sub-total of 3.4	l/s	10.04	15.14	21.40	29.26
	Total of PDSF	l/s	31.77	47.78	65.74	88.87
3.50	Maximum sewerage flow (MSF)- DEVELOPED PS 115 and PS 83					
	Residential existing (l/day)	l/day	5,148,749.71	7,723,124.56	10,297,499.41	13,729,999.22
3.5.1	Residential developed (l/s)	l/s	59.59	89.39	119.18	158.91
	Commercial existing (l/day)	l/day	70,372.80	117,288.00	351,864.00	586,440.00
3.5.2	Commercial developed (l/s)	l/s	0.81	1.36	4.07	6.79
	Sub-total of 3.5		60.41	90.75	123.26	165.70
3.6	Maximum sewerage flow- UNDEVELOPED (MSF) PS 115 and PS 83					
	Residential undeveloped within catchment (l/day)	l/day	368,072.10	552,108.15	736,144.20	981,525.60
3.6.1	Residential undeveloped within catchment(l/s)	l/s	4.26	6.39	8.52	11.36
	Residential undeveloped outside catchment (l/day)	l/day	1,738,839.96	2,608,259.94	3,477,679.92	4,636,906.56
3.6.2	Residential undeveloped outside catchment(l/s)	l/s	20.13	30.19	40.25	53.67
	Commercial undeveloped within catchment (l/day)	l/day	104,976.00	174,960.00	524,880.00	874,800.00
3.6.3	Commercial undeveloped within catchment (l/s)	l/s	1.22	2.03	6.08	10.13
	Sub-total of 3.6	l/s	25.60	38.60	54.85	75.15
	Total of MSF	l/s	86.01	129.35	178.10	240.85

Appendix 1: Table 3

Item No	Description	Unit	Factors (Table 2 and Table 3)				Reference
			RNN	RSdT	RMD	HIGH	
(i)	The average number of lots/ha is equal to	no.	15	22.5	30	40	(I.D.S. 6.4.3) Table 2
(ii)	Peak to Average Ratio (P/A)	no.	1.80	1.80	1.80	1.80	(I.D.S. 6.4.1)
(iii)	Usage- Residential (l/p/d)	no.	220.00	220.00	220.00	220.00	(I.D.S. 6.4.3)
(iv)	Storm peak factor	no.	2.78	2.78	2.78	2.78	(I.D.S. 6.4.2)
(v)	No. of persons per lot	no.	2.7	2.7	2.7	2.7	(I.D.S. 6.4.1)

Appendix 1: Table 4

PumpStatio	CatchArea	Max Foul flow (l/s)		Max Trade flow (l/s)		Base flow (l/s)		Max Total DWF outflow (l/s)		Max Runoff (l/s)		Max Groundwater inflow (l/s)		Max Total WWF Outflow (L/s)	
		2020 Model	2068 Growth	2020 Model	2068 Growth	2020 Model	2068 Growth	2020 Model	2068 Growth	2020 Model	2068 Growth	2020 Model	2068 Growth	2020 Model	2068 Growth
PS0083	17.90062	2.53	2.72	0	0	0.03	0.03	2.61	5.21	0.01	0.01	1.04	1.04	3.5	3.7
PS0115	125.31273	17.51	26.25	0	1.96	0	3.49	17.51	39.53	3.51	46.82	11.28	11.3	28.46	73.24

**APPENDIX 2: PUMP STATION
SITE VISIT, MAINTENANCE DATA AND PUMP DATA**

The site layout comprises a 2550mm internal diameter precast concrete wet well with a depth to invert level of 6550mm, a valve chamber (2800 x 1900mm), inlet chamber (1050mm dia.), Flowmeter chamber (1050mm dia.), outlet chamber (1050mm dia.), a pressure bypass chamber, site drain, control kiosk, green dome odour filter and water supply outlets are also provided within the pump station boundaries. The operating levels in the station are (1) low level P1 cut off is 17,7m (2) start level P1 is 19,8m (3) optional P2 low level start (4) high alarm is 22,58m (5) overflow alarm is 22,78m.

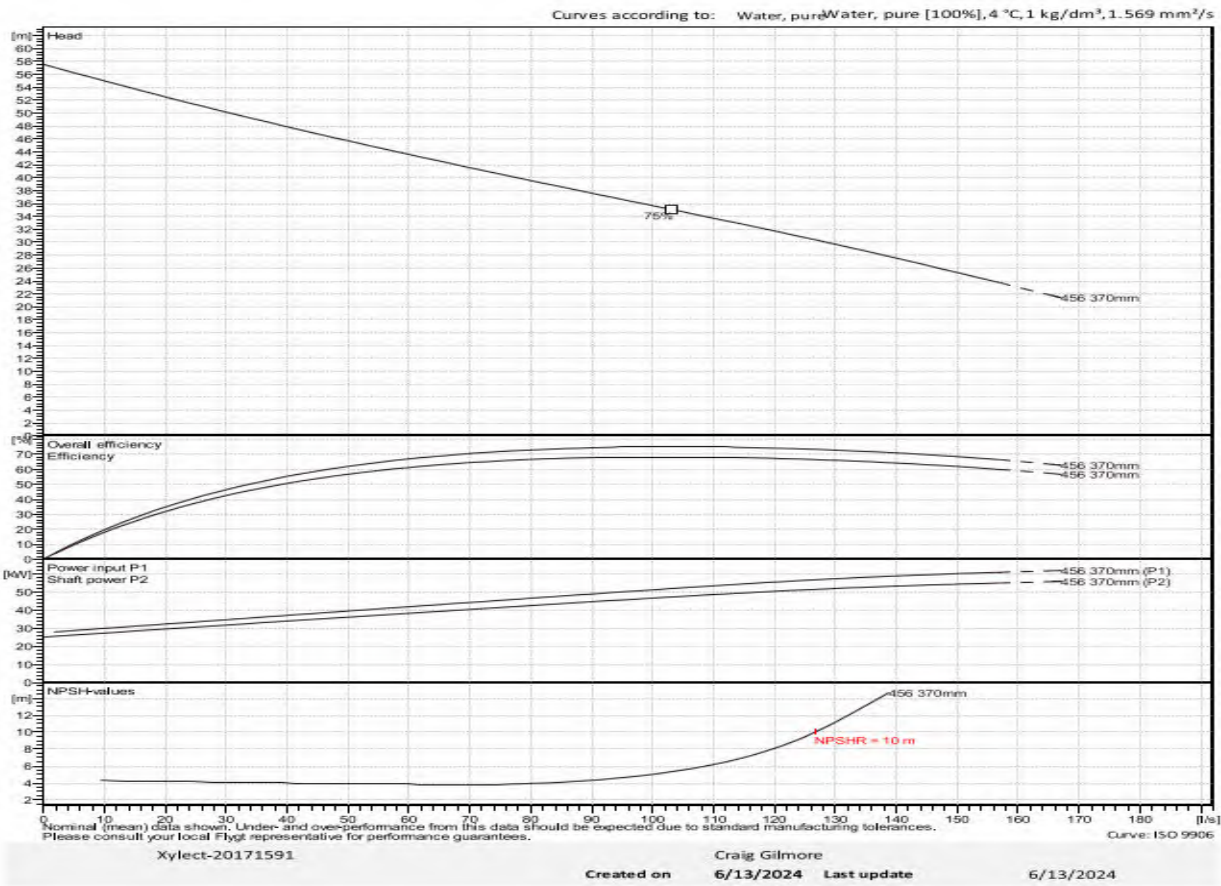
The pump types chosen for this application are Flygt submersible pumps (Serial No. 3315.180 HT pump curve 53-455-00-1150) with both pump having a maximum installed pumping capacity of 117 l/s and a maximum power rating of 105kw (Refer to Fulton Hogan Land Development Design Report April 2012).



Figure5: Pumpsets located in wetwell.



Figure 6: Pump no.1 damaged impellor replaced with new impellor and bolt.



APPENDIX 3: GENERAL RAINFALL DATA, MAINTENANCE DATA AND PUMP DATA



Figure 7: Highest rainfall event (22 July 2023) reviewed for inflow and infiltration values.

Table 9: Pipeline velocities for varying flow rates

Flow rate Q (l/s) after considering pump degradation	Velocity in pipeline	Flow rate difference(l/s)	% increase in flow
93.6	0.95	0	0%
99.6	1.01	0	6%
104.0	1.05	0	11%
108.0	1.10	14.4	15%
112.0	1.15	18.4	20%
118.7	1.20	25.1	27%
123.7	1.25	30.1	32%
128.6	1.30	35	37%
133.6	1.35	40	43%
135.6	1.35	42	45%
138.5	1.40	44.9	48%
143.5	1.45	49.9	53%
148.4	1.50	54.8	59%
153.4	1.55	59.8	64%
158.3	1.60	64.7	69%



Figure 8: Outline of existing PS 115 (Pink) and PS 83 catchment

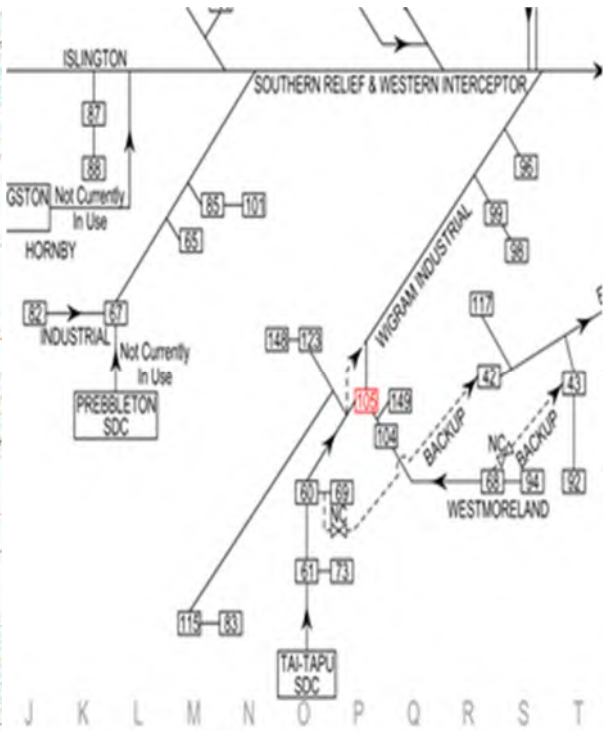


Figure9: Schematic outline of waste pumpstations

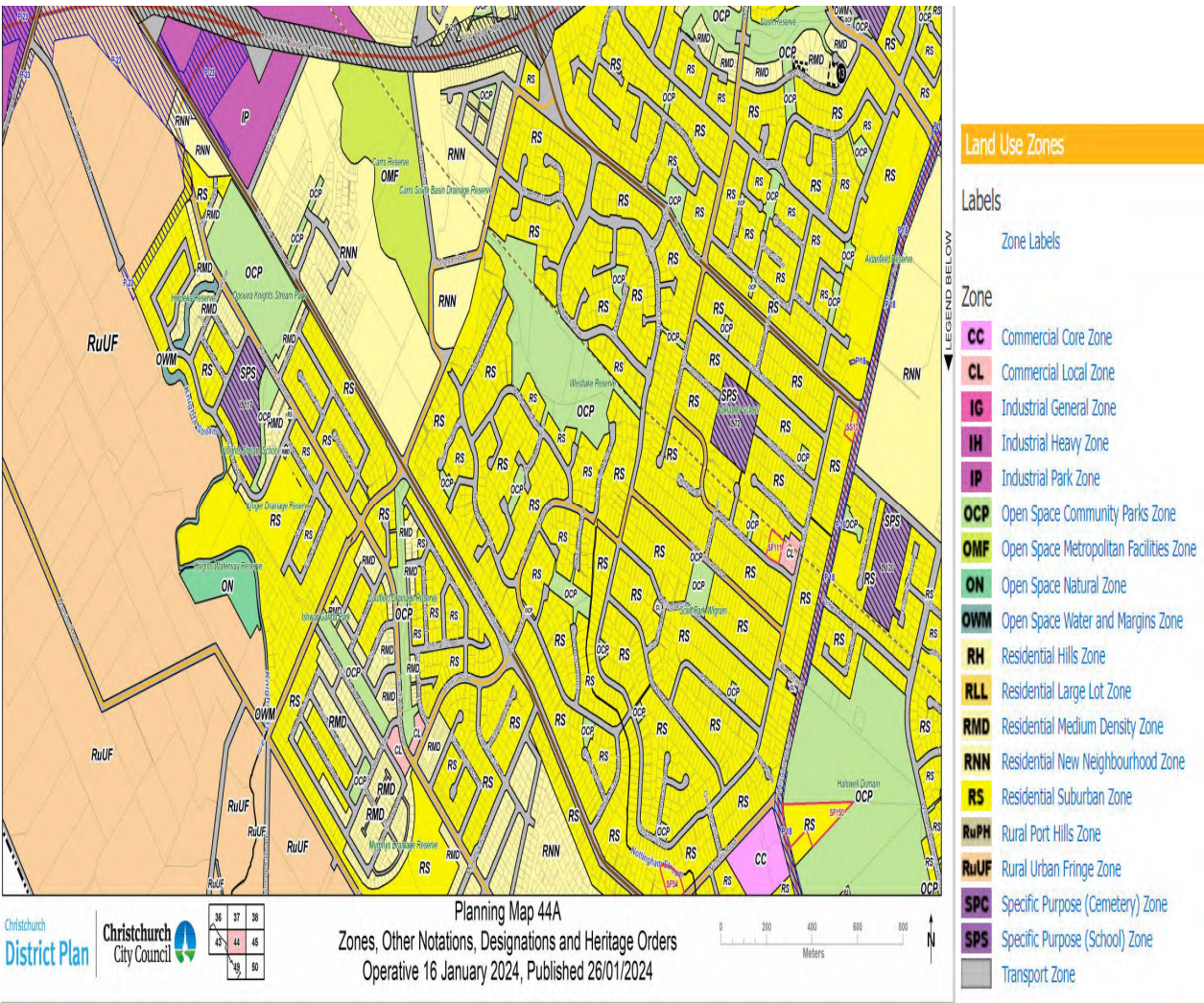


Figure 3: City Council District Planning Map 44 showing land uses inside PS 115 catchment.

Appendix E. Preliminary Stormwater Calculations

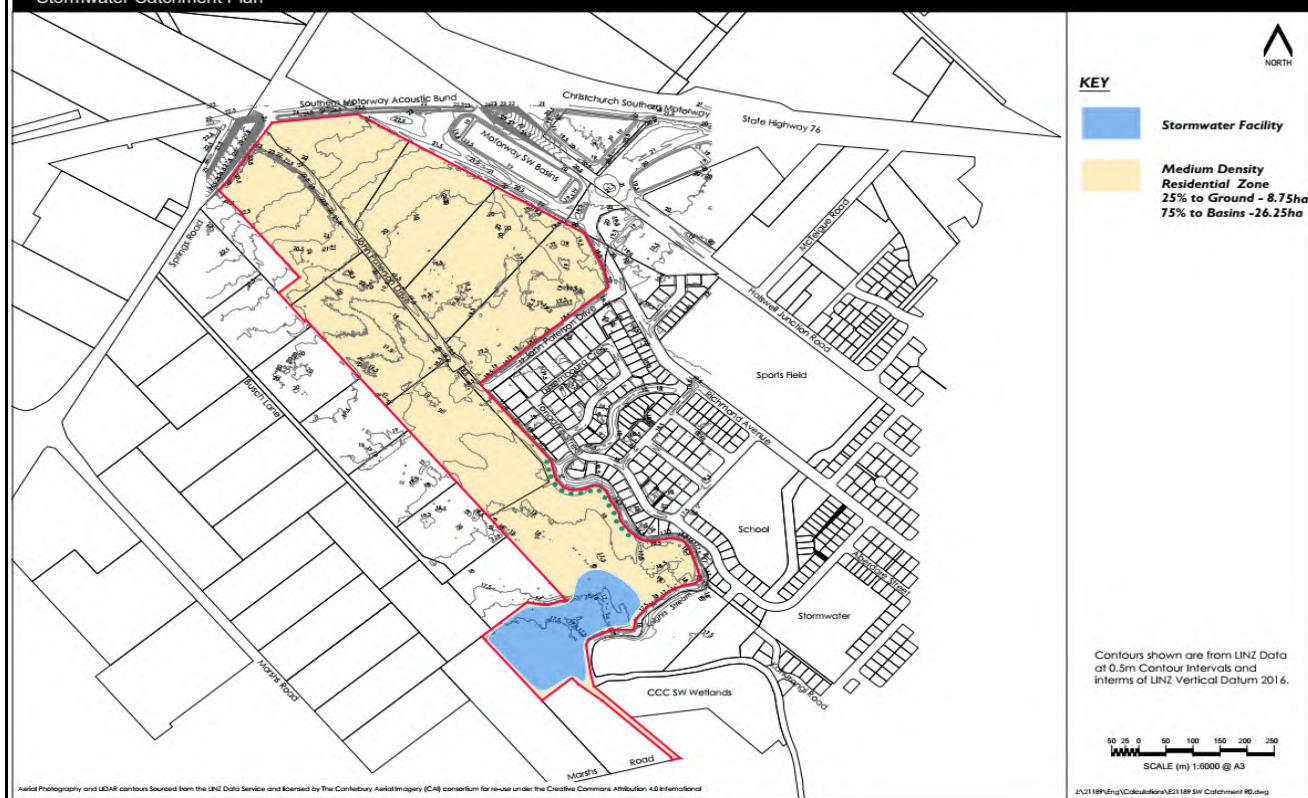
John Paterson Drive Stormwater Basin Design

Ref: CCC IDS
Ref: CCC WWDG Part B
Ref: Catchment plan attached
Ref: CCC Global Consent CRC252424
Ref: Huritini-Halswell River SMP

Job Number: 21189
Calculated by: Andy Hall
Checked by: Fergus Matla
Date: Jan-26

R1

Stormwater Catchment Plan



1. 2% AEP Pre-Development Peak Flows

Using Rational Method

$$Q = 2.78 * C * i * A$$

Where:

Q is the flow in l/s
C is the Runoff Coefficient
i is the rainfall intensity in mm/hr
A is the catchment area in hectares

A (Total Catchment Area) =

26.25 ha

Notes that a portion of the site will drain directly to ground. Estimated at 8.75ha. TBC

I (rainfall intensity) is taken from the attached HIRDS data for the RCP 8.5 (2081-20100)

Critical duration for the Halswell River Catchment is 60hr 2% Storm Event

Runoff Coefficients to be taken from the WWDG

C= 0.3

Using Rational Method

$$Q = 2.78 * C * i * A$$

Q = 64.25 l/s
Q = 0.06425 m³/s

2. Post-Development Flows

Using Rational Method

$$Q = 2.78 * C * i * A$$

A (Total Catchment Area) =

26.25 ha

I (rainfall intensity) is taken from the attached HIRDS data for the RCP 8.5 (2081-20100)

Critical duration for the Halswell River Catchment is 60hr 2% Storm Event

Runoff Coefficient to be taken from the WWDG
Table 21- 5 from WWDG Part B Chapter 21

C= 0.65

I (rainfall intensity) is taken from the attached HIRDS data for the RCP 8.5 (2081-20100)
Critical duration for the Halswell River Catchment is 60hr 2% Storm Event

Storm Duration	Intensity	Q	Q	Pre Q	Volume required
Mins	mm/hr	l/s	m ³ /s	m ³ /s	m ³
10	102.0	4838.2	4.84	2.23	1,563
20	70.9	3363.1	3.36	1.55	2,173
30	57.4	2722.7	2.72	1.26	2,639
60	39.8	1887.9	1.89	0.87	3,660
120	27.0	1280.7	1.28	0.59	4,965
360	14.0	664.1	0.66	0.31	7,724
720	8.9	422.6	0.42	0.20	9,831
1440	5.5	262.8	0.26	0.12	12,225
2880	3.4	160.3	0.16	0.07	14,918
3600	2.9	139.2	0.14	0.06	16,192

3. First Flush Basin

Determination of first flush basin volume
Using equation 6-2 from WWDG Part B Chapter 6
 $V_{ff} = 10 * C_{ff} * A * d_{ff}$

Where: V_{ff} is the first flush volume in m³
 C_{ff} is the composite first flush runoff coefficient (taken from table 6-10)
A is the catchment area in hectares
 d_{ff} is the first flush rainfall depth (25mm)

Residential C_{ff} = 0.63
A = 26.25 ha
 d_{ff} = 25 mm
 V_{ff} = 4,134 m³

Discharged over a 4 day period = 11.96 l/s

4. Wetland

Determination of Wetland Area
Using equation 6-24 from WWDG Part B Chapter 6
 $A_s = (Q * t) / (y * n)$

Where: A_s is the area of the wetland in m²
Q is the average flow rate through the wetland in m³/day
t is the hydraulic residence time in days
y is the water depth in the wetland in m
n is the effective water space left or porosity

Q= FF Vol/4 days = 1,034 m³/day
t = 2 days
y = 0.25 m
n = 0.75
 A_s = 11,025 m²

Added volume in the wetland with 0.5m storage
Vol = 5,513 m³

5. Storage

Total storage required 16,192 m³
Storage from FF 4,134 m³

Storage from Wetland	5,513 m ³
Additional storage required from detention basin	6,545 m ³

5. Areas	
Area of Wetland required	11,025 m ²
Area of FF basin assuming 1.0m average depth	4,134 m ²
Area of Detention Basin assuming 1.0m average depth	6,545 m ²
Total Area of SW Facilities	21,705 m ²

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	60h	72h	96h	120h
1.58	0.63	29.6	21.4	17.7	12.7	8.9	4.9	3.2	2.1	1.3	1.2	1.0	0.8	0.7
2	0.5	33.9	24.4	20.1	14.4	10.1	5.5	3.6	2.3	1.5	1.3	1.1	0.9	0.8
5	0.2	50.0	35.7	29.2	20.7	14.4	7.7	5.0	3.2	2.0	1.7	1.5	1.2	1.0
10	0.1	63.5	45.0	36.7	25.8	17.8	9.4	6.1	3.9	2.4	2.1	1.8	1.4	1.2
20	0.05	78.7	55.3	45.0	31.4	21.5	11.3	7.3	4.6	2.8	2.4	2.1	1.7	1.4
30	0.03	88.4	62.0	50.3	35.0	23.9	12.4	8.0	5.0	3.1	2.7	2.3	1.8	1.5
40	0.03	95.7	66.9	54.2	37.6	25.6	13.3	8.5	5.3	3.2	2.8	2.4	1.9	1.6
50	0.02	102.0	70.9	57.4	39.8	27.0	14.0	8.9	5.5	3.4	2.9	2.5	2.0	1.7
60	0.02	107.0	74.3	60.0	41.5	28.2	14.5	9.3	5.8	3.5	3.0	2.6	2.1	1.7
80	0.01	115.0	79.9	64.4	44.4	30.1	15.4	9.8	6.1	3.7	3.2	2.7	2.2	1.8
100	0.01	122.0	84.2	67.9	46.7	31.5	16.2	10.3	6.3	3.8	3.3	2.8	2.3	1.9
250	0	151.0	103.0	82.9	56.6	37.9	19.2	12.1	7.4	4.4	3.8	3.2	2.6	2.1

