



Flagstone Context Area 5

PEET Flagstone City Pty Ltd

Water and Wastewater
Precinct Network Plan

24-1082-PNP01

June 2026

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Executive Summary

This Precinct Network Plan (PNP) outlines the proposed potable water and wastewater servicing strategies required to support the development of Flagstone Context Area 5 (CA5) within the Greater Flagstone Priority Development Area (PDA). The assessment has been undertaken for PEET Flagstone City Pty Ltd and incorporates the latest available planning information, including the Logan City Council Water and Wastewater Master Planning investigations, the endorsed Monarch Glen Water and Sewer Infrastructure Master Plans, and recently completed precinct planning for adjacent developments within the Greater Flagstone growth corridor. The PNP establishes a coordinated infrastructure strategy that supports staged development while maintaining consistency with the long-term regional servicing framework.

Key Objectives

The PNP was developed to:

- Define servicing strategies that enable staged development of CA 5 from 2031-2036.
- Assess internal and downstream network capacity under current and ultimate planning horizons.
- Identify trunk infrastructure requirements, including timing and staging.
- Ensure compliance with Logan City Council Desired Standards of Service (DSS) and SEQ Code.
- Coordinate integration with neighbouring developments under the broader Flagstone PDA growth strategy.

Development Overview

CA 5 comprises 182 hectares, split between Northern and Southern development fronts, delivering:

- 5,120 residential EP
- 1,399 non-residential EP
- Majority residential land use ($\approx 79\%$), with supporting education, commercial and open-space areas.
- Development staged in two phases (2031–2036), commencing in the north and progressing south.

Water Servicing Strategy

The proposed potable water servicing strategy comprises a staged arrangement that transitions from an interim booster supplied network to the ultimate Flagstone regional water supply system.

Interim servicing is proposed via the Monarch Glen Booster Pump Station supplied from the Round Mountain Reservoir system. The development will be serviced through three pressure managed zones (DMA230, DMA231 and DMA232) incorporating approximately 12 km of internal water mains and three Pressure Reducing Valves (PRVs). Hydraulic modelling confirms compliance with minimum pressure and fire flow requirements throughout the staged development under both peak demand and fire flow operating conditions.

The assessment identified that:

- Stage 1 development can be accommodated through increased utilisation of the Monarch Glen Booster Pump Station.
- Ultimate development will require additional supply capacity through booster augmentation, a dedicated CA5 booster station, or future reservoir-based servicing solutions.

- The proposed network configuration has been designed to facilitate future integration with the Flagstone LLZ Reservoirs and Wyaralong Water Treatment Plant.

Wastewater Servicing Strategy

Approximately 13.3 km of gravity mains (DN150–DN450) required across both stages with gravity catchments discharge primarily to FPS_FC3, consistent with the Cedar Grove catchment strategy.

Downstream performance and modelling demonstrated:

- No additional trunk augmentation required as a result of CA 5 updated loading.
- In several cases, CA 5 redistributed catchment flows, reducing surcharge impacts under ultimate scenarios.
- Pump start rates and PWWF capacity remain compliant at FPS_FC3 and SPS152.
- Emergency Storage
 - A minor 2031 shortfall at FPS_FC3 ($\approx 20 \text{ m}^3$) can be resolved operationally by adjusting the high-level alarm (HLA) from 44 mAHD $\rightarrow$ 41 mAHD until 2036
 - No physical augmentation is required.

Recommendations

The key recommendations for the water network are to

- Continue refinement of PRV settings and DMA boundaries during detailed design as finished levels and precinct layouts are finalised.
- Coordinate delivery of booster station upgrades and regional water infrastructure with adjoining developments and future Flagstone supply works.
- Progressively increase and stage the Monarch Glen Booster Pump Station to meet increasing flow and head requirements as development advances, including allowance for fire flow demand, in line with previously determined pump staging
- Water Booster Pump Station SCADA programming to be reviewed to ensure network performance across both stages.
- Monitor interim system performance, particularly booster suction pressures and fire flow performance, to manage operational risks until the ultimate network is in place.

The key recommendations for the wastewater network are to:

- Implement recommended HLA adjustments at FPS_FC3 for 2031 operation.
- Proceed with internal gravity trunk mains as staged; no external upgrades required beyond those already programmed in the Monarch Glen IMP.
- Maintain ongoing network monitoring as DSS criteria evolve.

The following tables provide the network infrastructure staging for water and sewer to service the proposed CA5 Development.

Table 0-1: CA5 Trunk Water Infrastructure Summary

Infrastructure Item (Nodal Plan refer to Appendix A)	Infrastructure Details	EP Trigger	Timing
Trunk Water Main Node A - C	DN250 mm diameter trunk water main from Homestead Drive to Monarch Glen Booster	1 EP Monarch Glen P101-102	2026
Node A	Monarch Glen booster pump Duty (Max Flow at 75 L/S at 64m head)	1 EP Monarch Glen P101-102	2026
Node A-B-G	DN250 mm diameter trunk water main from Monarch Glen Booster to PRV 1 (DMA231) & PRV 2 (DMA230)	1 EP CA5 North	2031
Node G	PRV 1 (DMA231)	1 EP CA5 North	2031
Node G-E-D	DN200 to DN100 Reticulation from DMA 231 PRV offtake connection	1 EP CA5 North	2031
Node G	PRV 2 (DMA230)	1,634 EP CA5 North	2033
Node G-M-N	DN200 Reticulation from DMA 230 PRV offtake connection	1,634 EP CA5 North	2033
Node F-H	DN250 mm diameter trunk water	2,762 EP CA5 South	2035
Node G-I	DN200 Main connection from DN250 mm diameter trunk water main from Monarch Glen Booster to PRV 3 (DMA232)	2,762 EP CA5 South	2035

Infrastructure Item (Nodal Plan refer to Appendix A)	Infrastructure Details	EP Trigger	Timing
Node I	PRV 3 (DMA232)	2,762 EP CA5 South	2035
Node J-I L	DN200 Reticulation from DMA 232 PRV offtake connection	2,762 EP CA5 South	2035
Node J-K-I	DN200 Reticulation from DMA 232 PRV offtake connection	2,762 EP CA5 South	2035

Table 0-2: CA5 Development Trunk Sewer Infrastructure Summary

Infrastructure Item (Nodal Plan refer to Appendix B)	Infrastructure Details	EP Trigger	Timing
Sewer Pump Station (Node Y)	Maximum operating duty at 146 L/s conveying 144 L/s PWWF	1 EP Flagstone Town Centre	2026
DN450 Trunk Sewer Main (Node N-X)	~Convey ultimate PWWF of 88.5 L/s for demand of 9,735 EP at downstream connection point. ~Approx. 600 m in length	1,634 EP CA5 North	2031
DN300 Trunk Sewer Main (Node AE-N)	~Convey ultimate PWWF of 31 L/s for demand of 2,718 EP at downstream connection point. ~Approx. 780 m in length	1,634 EP CA5 North	2031
DN200 Trunk Sewer Main (Node Z-X)	~Convey ultimate PWWF of 10.6 L/s for demand of 1,104 EP at downstream connection point. ~Approx. 1 km in length	2,426 EP CA5 North	2033
DN300 to DN375 Trunk Sewer (Node E-N)	~Convey ultimate PWWF of 50.3 L/s for demand of 4,387 EP at downstream connection point. ~Approx. 1 km in length	2,762 EP CA5 South	2035

Infrastructure Item (Nodal Plan refer to Appendix B)	Infrastructure Details	EP Trigger	Timing
DN225to DN300 Trunk Sewer (Node C-A)	~Convey ultimate PWWF of 63.4 L/s for demand of 5,476 EP at downstream connection point. ~Approx. 650 m in length	2,762 EP CA5 South	2035

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Appendices

Appendix A Water Infrastructure Plans

Appendix B Trunk Sewerage Infrastructure Plans

Appendix C Monarch Glen Booster Pump Station Details

Appendix D Flagstone Development Water DMA Draft 09/04/2026

1. Introduction

Colliers Engineering & Design have been engaged by PEET Flagstone City PTY Ltd (PEET) to prepare the Water and Wastewater Precinct Network Plan (PNP) for the proposed development located at Greater Flagstone. This report has been prepared to document the sewerage and water supply infrastructure requirements and strategies to service the Flagstone Context Area (CA) 5 development.

1.1. Development Site Location

The proposed development is part of Flagstone City, a multi-phased development proposed to cover approximately 1,500 hectares (ha). The entire city, including the town centre, will be managed through overarching master-planned strategies. The Flagstone City site shares a boundary with Monarch Glen to the southwest, and future development sites to the north. Figure 1-1 shows the location and extents of the CA 5 development within the greater Flagstone City development area.

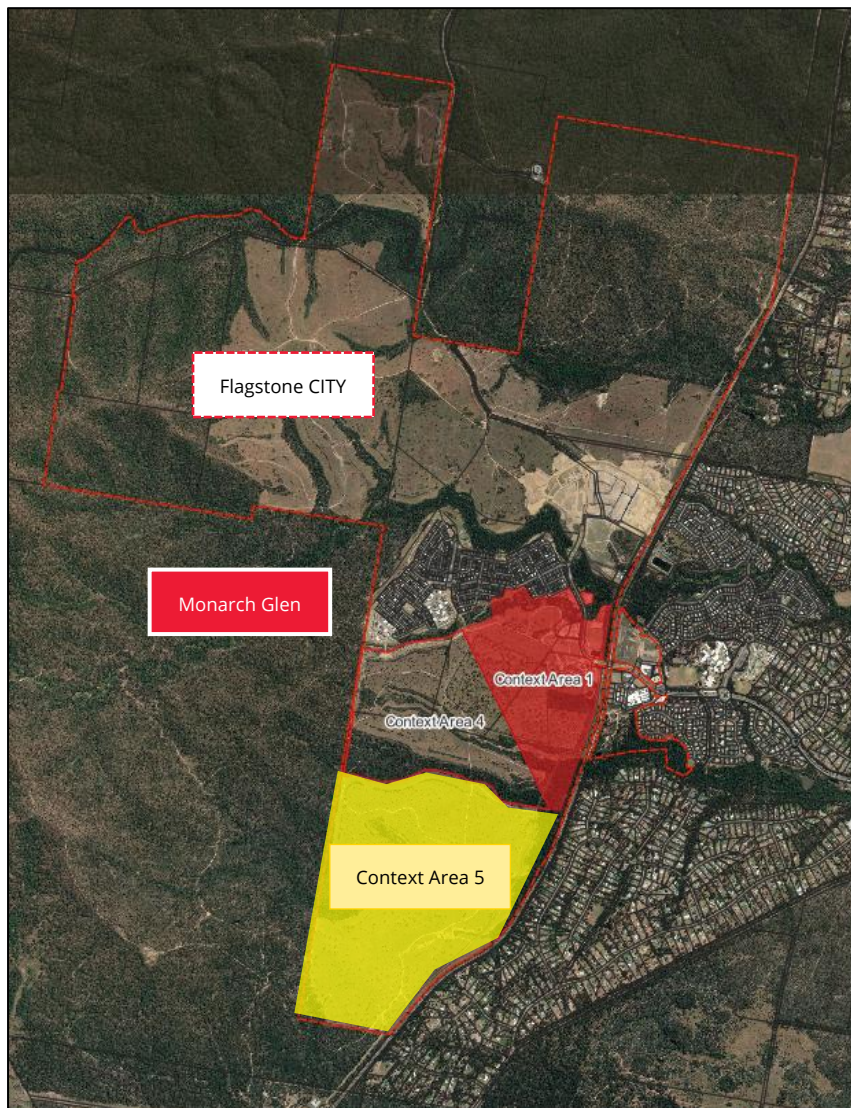


Figure 1-1: Proposed Context Area 5 development

1.2. Precinct Network Plan Objectives

The Water and Wastewater Precinct Network Plan (PNP) aims to present the overall water and wastewater servicing strategy for the proposed development, through the following primary objectives:

- Identify the proposed development and associated land for which this water and wastewater strategy applies,
- Assess feasibility of existing and proposed downstream infrastructure to service the development site,
- Investigate trunk infrastructure requirements necessary to facilitate development of the site,
- Develop infrastructure servicing strategies for the proposed development site,
- Investigate infrastructure requirements and determine necessary provisions for upstream contributing catchments,
- Identify the major infrastructure required to develop the proposed site and determine the phase of development with which the associated major infrastructure will need to be delivered,
- Investigate trunk infrastructure servicing alignments and identify alternative alignments required to enable development of the site independent of neighbouring development sites,
- Identify preferred trunk infrastructure locations and alignments to secure servicing strategies.

1.3. Report Structure

The remainder of this report is divided into seven sections and concludes with a summary and recommendations.

Table 1-1: Report Structure

Section Reference	Content
Section 2	Discusses previous investigations that have been conducted that relate to the development of the proposed site, summarises their relevant critical findings and details how these prior investigations inform and influence this Precinct Network Plan.
Section 3	Describes the various planning assumptions and criteria that were used as a basis for the preparation of this report.
Section 4	Summarize demand conversion proposed lot configuration, land use and appropriate unit rate as per based on Logan Water Alliance available guidelines
Section 5	Outlines the water servicing requirements for the Flagstone City (CA 5) to include required infrastructure and corresponding timing for the proposed infrastructure as determined in the ongoing DWS Monarch Glen Water IMP.
Section 6	Describes the wastewater servicing strategy for the Flagstone City (CA 5) to include required infrastructure and corresponding timing for the proposed infrastructure as determined by the ongoing DWS Monarch Glen Sewer IMP.
Section 7	Provides a summary of the critical infrastructure of preferred strategy, conclusions and recommendations.

2. Previous Investigations

This PNP seeks to further define the preferred servicing strategies for the CA 5 development and summarize previous investigations as a basis for development of the overall strategy. Downstream proposed sewerage networks have additionally been assessed for their suitability to service the development. The following investigations have been undertaken in support of the development of greater Flagstone City and the CA 5 development site:

- Logan City Council, 2021 Water Master Planning (IP0021), August 2022
- Monarch Glen Water Infrastructure Master Plan (DWS), September 2025 (Endorsed 22/09/2025)
- Logan City Council, 2021 Wastewater Master Planning (IP0022), August 2022
- Monarch Glen Sewer Infrastructure Master Plan (DWS), September 2025

The following sections summarise the servicing strategies of these investigations, as they relate to the proposed CA 5 development site.

2.1. 2021 Water Master Planning (IP0021), Southern Water Planning Area

The Flagstone Priority Development Area (PDA) in the Southern WPA is a major growth front in Logan City which drives a significant increase in water demand and infrastructure requirements. The Flagstone PDA which is delineated as Flagstone Low Level Zone (LLZ) and Flinders High Level Zone (HLZ) accounts for 30% of the Southern WPA's ultimate demand at 69,015 and 27,496 EP respectively. A schematic of the supply strategy for the Ultimate Planning scenario for Flagstone is shown in Figure 2-1.

2.1.1. Water Infrastructure Requirements

The list below provides the summary and corresponding planning year for the water network infrastructure to service the Southern WPA which impacts the Flagstone PDA.

2.1.1.1. Mains:

- Flagstone LLZ: 193 km of potable water mains from DN100 to DN600 (by 2026 till 2066)
- Flinders HLZ: 33 km of potable water mains from DN100 to DN450 (by 2036 till 2066)

2.1.1.2. Reservoirs:

- Flagstone LLZ: Two 5 ML tanks by 2036, one 6 ML tank by ultimate
- Flinders HLZ: Two 3.5 ML tanks by 2066

2.1.1.3. Pump Stations:

- Flinders HLZ PS 1 by 2036
- Flinders HLZ PS 2 by 2066

2.1.1.4. Other Zones:

- Silverbark Ridge HLZ: Two 1 ML tanks by 2041
- Round Mountain HLZ: Two 1 ML tanks by 2036

2.1.2. Water Supply Strategy

The Flagstone PDA is envisioned to be supplied from proposed Wyaralong Water Treatment Plant (WTP) via the Round Mountain and Future Lower Flagstone reservoirs. Below is the indicative staging of the Wyaralong WTP as per SEQWater.

- Stage 1 (30 ML/d): 2028/29
- Stage 2 (75 ML/d): 2036–2046
- Stage 3 (120 ML/d): Post-2046

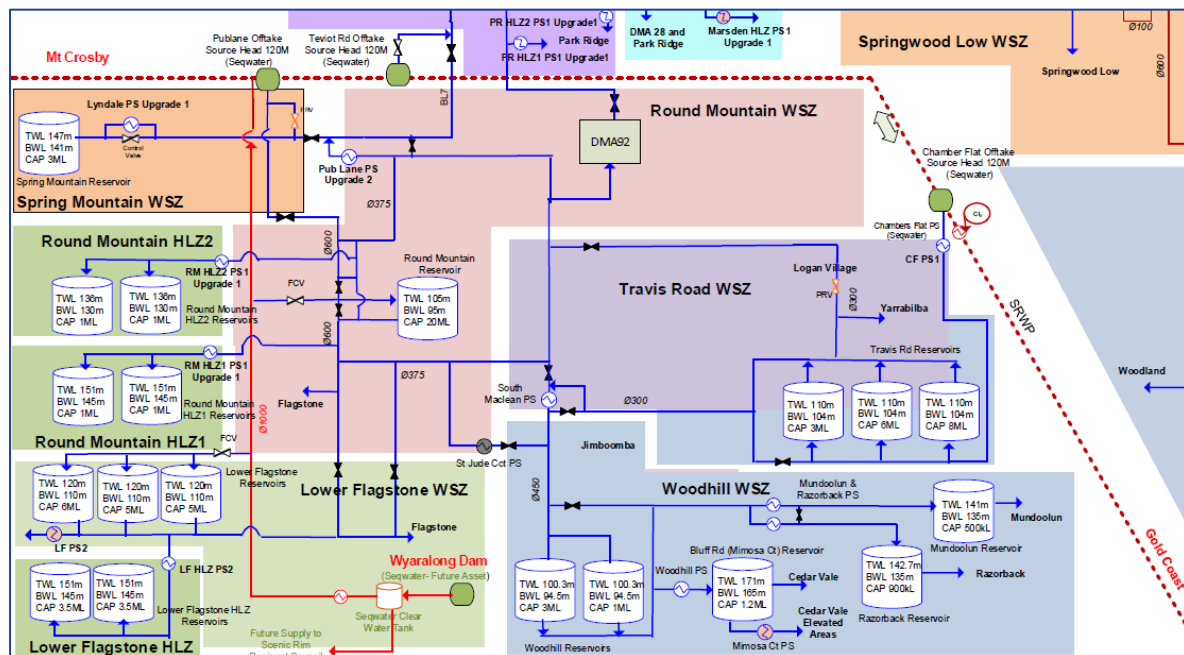


Figure 2-1: Supply Strategy for the Ultimate Network for Flagstone (Master Planning Review – Network Schematic)

2.2. Monarch Glen Water Infrastructure Master Plan (IMP) September 2025 (Endorsed 22/09/2025)

The endorsed IMP Outlines the Flagstone Reservoirs are central to the ultimate water supply strategy for the Monarch Glen development, transitioning from interim supply via the Round Mountain Reservoir. These reservoirs are planned within the Monarch Glen boundary and will be commissioned alongside the Wyaralong Water Treatment Plant (WTP), expected by 2031/32.

2.2.1. Water Infrastructure Requirements

A summary of the endorsed Water IMP which relates to Greater Flagstone PDA is enumerated below:

2.2.1.1. Reservoir Configuration

- Ultimate capacity: Two reservoirs with a combined volume of 16 ML (10 ML + 6 ML).
- Top Water Level (TWL): 120 m AHD.
- Served population: Up to 62,951 Equivalent Persons (EP).
- Supply source: Dual 450 mm trunk mains from the Wyaralong WTP, branching off a new 1,000 mm trunk main.

2.2.1.2. Staging and Performance

- 2036: Initial Flagstone reservoir (10 ML) comes online, servicing 14,859 EP.
- 2041: Same reservoir services 18,442 EP.
- Ultimate (2061): Full 16 ML capacity services 62,951 EP.
- Reservoir performance modelling confirms adequate capacity and pressure across planning horizons.

2.2.1.3. Network Integration

- The Flagstone and Silverbark reservoirs will:
 - Replace Round Mountain Reservoir as the primary supply source.
 - Support both Monarch Glen and Flinders developments.

- Replace Water Booster Pump Stations for areas above 88 m AHD upon reservoir connection.
- Trunk infrastructure includes:
 - Dual 450 mm mains to Flinders.
 - Multiple outlet mains (e.g., WMN-1010 to WMN-1014) to service surrounding developments.

2.2.1.4. Initial Supply Strategy

- Supply via Round Mountain Reservoir (TWL 105 m).
- Booster pumps are required for high elevation areas (>70 m AHD).
- Interim upgrades include:
 - A 250 mm Eastern Supply Main.
 - Upsizing of 200 mm mains downstream of booster stations.

2.2.2. Water Supply Strategy (Contingency Planning)

The Flagstone PDA is envisioned to be supplied from proposed Wyaralong Water Treatment Plant (WTP) via the Round Mountain and Future Lower Flagstone reservoirs and if Wyaralong WTP is delayed:

- Additional precincts (106 and 107) can be serviced via extended booster pump operations. Refer to Section 5.2.2 Water Supply for details.

Pump station staging is proposed to accommodate phased development.

2.3. 2021 Wastewater Master Planning (IP0022), Cedar Grove Catchment

The Logan South Wastewater Network includes the Cedar Grove sewer network catchment which services the Jimboomba (as shown in Figure 2-2) and the Greater Flagstone Priority Development Area (PDA) with Flagstone being the primary growth driver in this catchment.

The wastewater loads are projected to increase from ~7,500 EP in 2021 to ~210,000 EP by ultimate development with Cedar Grove catchment requiring an estimated capital cost of approximately \$677 million (2021 dollars) to maintain service standards, 90% attributed to growth in Greater Flagstone PDA.

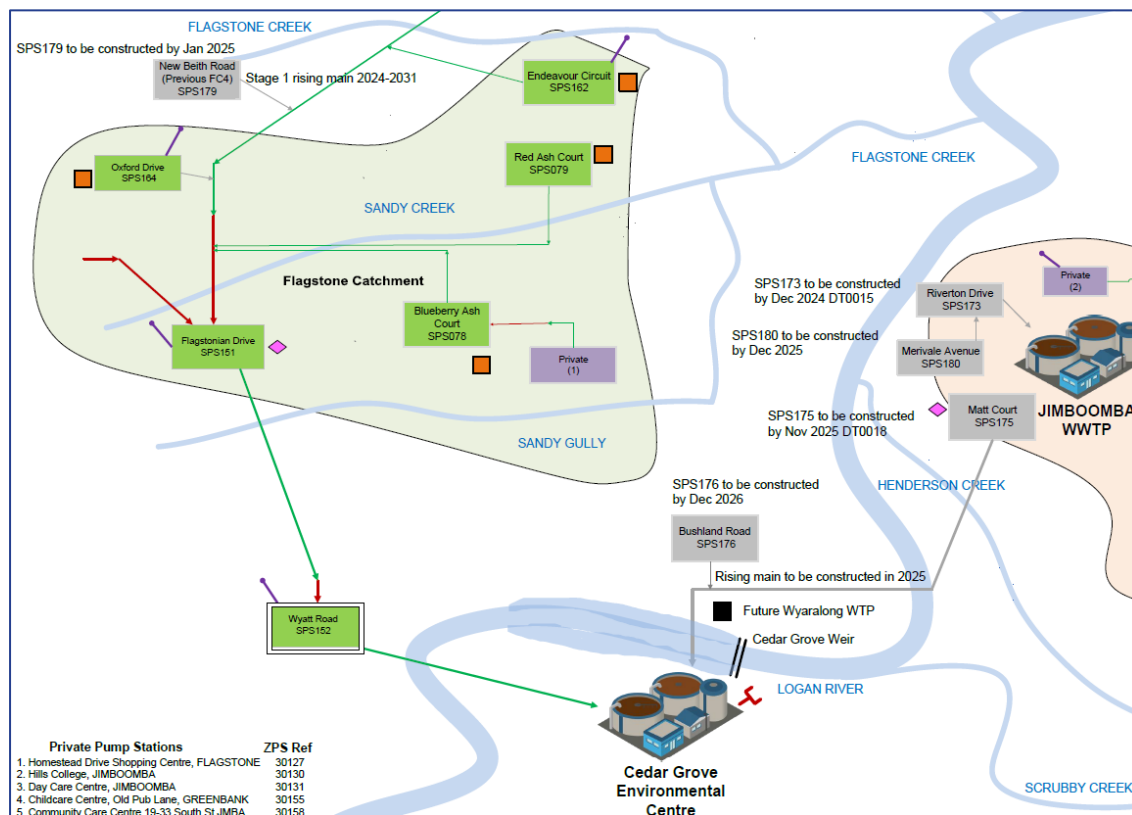


Figure 2-2: Cedar Grove (South Logan) Catchment – Pump Stations and network schematic

2.3.1. Sewer Infrastructure Requirements:

A summary of the draft Wastewater IMP which relates to Flagstone is enumerated below:

2.3.1.1. Waste Water Treatment

- Stage 1 of the Cedar Grove WWTP completed in 2020 (20,000 EP capacity).
- Stage 2 planned for 2026, driven by Flagstone growth and Jimboomba WWTP diversion.
- Stages 3–5 will follow, with ultimate WWTP capacity reaching 210,684 EP (34.8 ML/day ADWF).

2.3.1.2. Key Augmentations

- Sub-regional transfer infrastructure:
 - Stage 1 (Greenbank to Cedar Grove WWTP) completed in 2020.
 - Stage 2 includes duplication of rising mains, required between 2036–2066.
- Connections to growth areas (Northern Flagstone, Flinders, Riverbend, North Maclean) mostly needed by 2026.
- Jimboomba WWTP decommissioned by 2026, flows redirected to Cedar Grove.

2.3.1.3. Effluent Management

An estimated \$55.3 million is allocated for Flagstone PDA (2020 dollars), covering:

- Constructed wetlands
- Nutrient offset projects
- Agricultural reuse
- Irrigation and land disposal

2.4. Monarch Glen Sewer Infrastructure Master Plan (IMP) September 2025 (Endorsed 22/09/2025)

The Monarch Glen Sewer IMP demonstrated an updated sewerage servicing based on updates to the Monarch Glen development layout (previously known as Undullah) and the Logan City Council's Desired Standards of Service (DSS) revisions. The 3 sewer catchments (Northern, Eastern and Southern) combined is approximately 1,000 ha of development area with internal flow discharges transported (combination of gravity and pumping network) and treated at the Cedar Grove WWTP located southeast development.

2.4.1. Sewer Infrastructure Requirements

This summary below outlines the key augmentations and improvements proposed in the Sewer Infrastructure Master Plan for Monarch Glen, which includes the size and timing of gravity main upgrades, pump station augmentations, network optimisations, development staging and recommendations.

It is important to note (as per section 6 paragraph 2 of the IMP) *"that some infrastructure in the LCC supplied model (Original model) was already non-compliant with the latest DSS. It has been assumed that non-compliances present within the Original model that are external to the site are not required for augmentation to permit development of the Monarch Glen site."*

2.4.1.1. Gravity Main Augmentations

The augmentations are mostly to address PWWF surcharge compliance.

- DN225 approximately 125m (2031)
- DN225 and DN300 approximately 125m and 972m respectively (2036)
- DN375 and DN450 approximately 1,920m combined length (Ultimate)

2.4.1.2. Pumps Station Augmentations

- **SPS152**
 - Emergency storage non-compliance in 2036 & 2041; pump capacity issue in 2031.
 - Planned storage augmentation for 2041 to be brought forward to 2036.
 - Pump augmentation planned for 2036 to be brought forward to 2031.
- **FPS_FL1**
 - Exceeds allowable pump starts per hour in 2051 (7 starts/hour vs. max 5).
 - Augmentation required for 2051.
- **FPS_FC3**
 - Emergency storage non-compliance in 2041.
 - Wetwell retention time exceeds 2 hours in 2036.
 - New augmentation needed for 2041.
 - Augmentation required for 2051.

2.4.1.3. Network Optimisations

Though not directly identified as the downstream of the Flagstone Town Centre, it is worth noting that a total of approximately 3.2 km of DN225 initially proposed gravity mains were optimised to DN150 which were primarily driven by the revised development loading allocation for the Monarch Glen.

2.4.1.4. Development and Infrastructure Timing

- Development Period: 2026–2057
- Precinct Build Rate: ~240 Equivalent Tenements/year

- Precinct Completion: Sequential from Precinct 101 (2026–2028) to Precinct 602 (2057)
- Infrastructure Timing: Aligned with precinct staging; sewer mains constructed just-in-time to support development.

2.4.1.5. Recommendations

- Adopt revised sewer servicing strategy.
- Monitor and revise plan as development progresses.
- LCC to update Cedar Grove catchment strategy.
- Apply diurnal patterns for PDWF modelling.

3. Planning Criteria and Standards of Service

This section outlines the planning assumptions and key criteria summarize in developing the water and wastewater strategies for the proposed development.

3.1. Cedar Groove WWTP

For the purpose of the wastewater network assessment, it has been assumed that the downstream Cedar Grove Wastewater Treatment Plant (WWTP) has sufficient capacity to service the proposed development considering the proposed increased capacity requirements identified in the 2021 Wastewater Master Planning (IP0022) discussed in the earlier section of this report. Assessment of available treatment capacity has not been undertaken as part of this investigation.

3.2. Demand Factors

The following Equivalent Person (EP) conversion factors (Table 3-1) have been adopted in accordance with Logan Infrastructure Demand Model (IDM) Conversion Rates (source Logan Water c/o J.Thomas 15 Aug 2025).

For this assessment, which is predominantly residential, a 2.8EP/Dwelling or Lot was applied considering 10% contingency.

Table 3-1: Adopted Demand Factors

Land Uses	EP/GFA	
	Water	Wastewater
RETAIL	55.9	50.31
HEALTH	226.5	203.85
COMMERCIAL	55.9	50.31
COMMUNITY USE	20	20
RETAIL GROUND	55.9	50.31
RESIDENTIAL	2.8 EP/Dwelling	2.8 EP/Dwelling

Note: Gross Floor Area (GFA) in Hectares (Ha)

3.3. Development Density

The CA 5 total site area accounts for a total of 182 Ha (approximately 12% of the total Flagstone City), with majority of the CA 5 development allocated for residential use (approximately 79%) followed by conservation (approximately 12% which splits the development to North and South) with the rest for education, district sport and recreation park and open space.

The development details for the CA 5 are further discussed in Section 4 Development Demand Assessment.

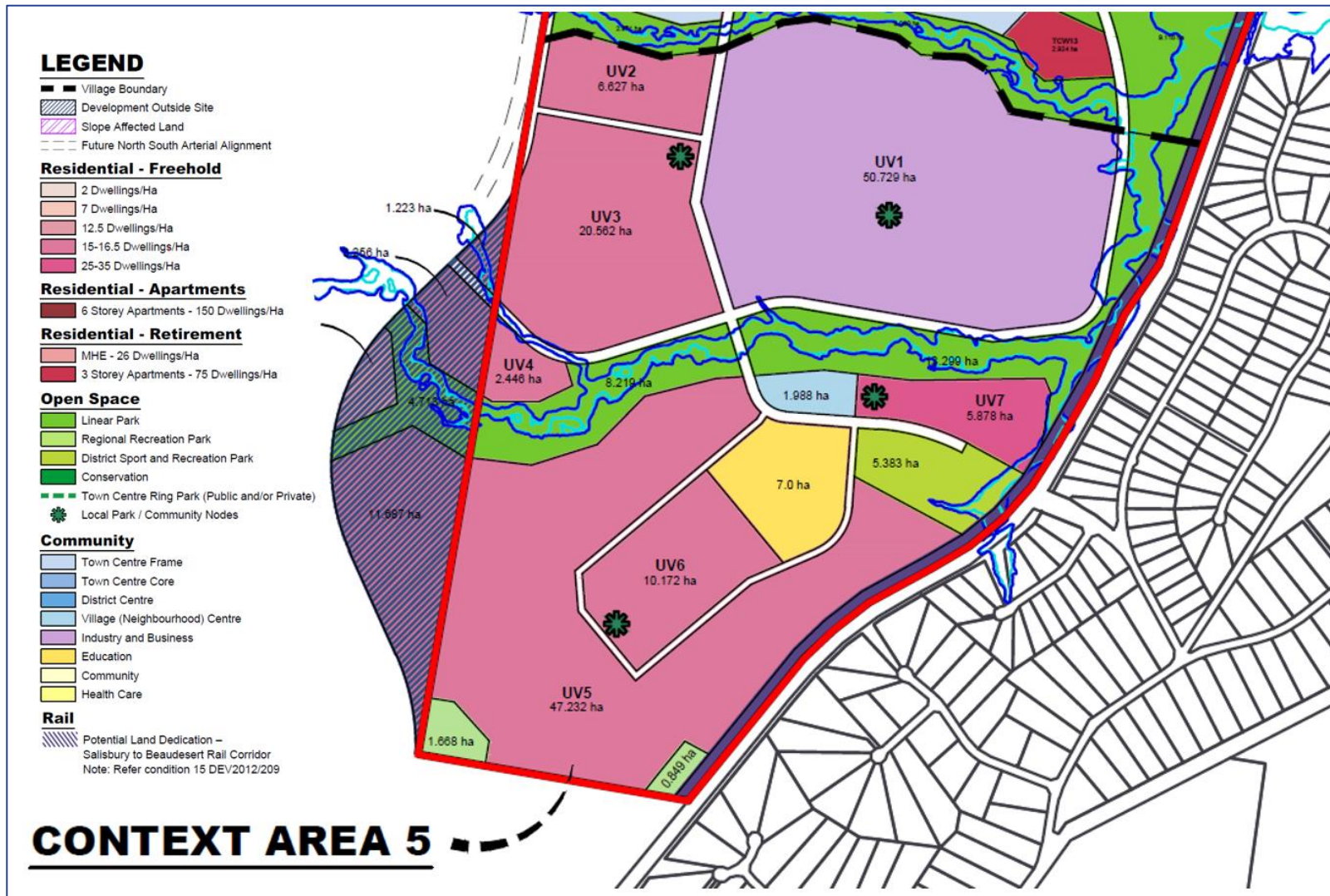


Figure 3-1: Context Area 5 (source – Flagstone Structure Plan - 110056-293U STRUCTURE PLAN_BEST CASE - NO DCOP SCHOOLS – RPS 01 November 2023)

3.4. Desired Standards of Service

The following is a summary of the Desired Standards of Service (DSS) adopted for the proposed development. The water supply and wastewater design criteria have been adopted in accordance with the design criteria outlined within Table 4-1 for water and Table 10 for sewerage of the Southeast Queensland Water Supply and Sewerage Design & Construction Code (design criteria) (May 2025). Key adopted demand and performance-based design criteria are summarized below.

Infrastructure has been sized to meet the below listed performance-based design criteria where possible. For the CA 5 developments, lots without detailed apportionments such use undivided blocks (mostly for the southern portion on the development and Northeast part (which is planned for business/commercial developments) the EPs calculated are based on these criteria include a 10% contingency allowance for the sizing of infrastructure.

Some proposed assets are required to service significantly smaller flow rates in earlier years in comparison to flow rates under Ultimate development (> 50 years' time). Sizing of some trunk assets to achieve the maximum head loss criteria of 3 m/km at Ultimate was, in some places, identified to introduce water quality risks in earlier planning horizons. In these instances, performance over whole of life has been considered and achieving customer servicing requirements such as minimum pressure and fire flow has been summarized in respect to Ultimate performance.

3.4.1. Water Supply Demand Based Standards

Table 3-2: Adopted Water Standards

Parameter		Value			Source*
Water Supply Demand Based Standards					
Average Day (AD)		165 L/EP/Day			Table 4.1 A1
Estimated Non Revenue Water (NRW)		25 L/EP/Day			Table 4.1 A2
Peaking Factors	Residential (Attached)	Commercial	Industrial		
Mean Day Max Month (MDMM) / AD	1.3	1.2	1.2	Table 4.1 A3	
Peak Day / Average Day	1.6	1.3	1.3	Table 4.1 A3	
Peak Hour / Peak Day	2.6	2.0	1.7	Table 4.1 A3	
Water Supply Performance Based Standards					
Min Pressure		22 m (Reservoir at MOL – 15% Storage Height)			Table 4.1 A4
Max Pressure		80 m			Table 4.1 A4
Target Max Operating Pressure		55 m			Table 4.1 A4
Min Res.w/ Fire Flow		12 m at flowing hydrant 6 m to other customer connections Positive pressure in network			Table 4.1 A4

Fire fighting capacity	7.5 L/s - Rural Residential	Table 4.1 A5
	15 L/s - Rural Commercial / Industrial	
	15 L/s - Residential	
	30 L/s - Commercial & Industrial	
	Special risk / hazard - to be advised by Logan City Council (LCC)	
Maximum velocity	2.5 m/s	Table 4.1 A9
Max head loss	5 m / km $\leq$ DN150 mm	Table 4.1 A9
	3 m / km $\geq$ DN200 mm	
Friction Losses – Colebrook White k values (mm)	0.6 - "Plastic (UPVC, MDPE, Hobas, etc.)" 0.3 – MSCL/DICL	Table 4.1 A9
Reservoir Storage	3 x (PD – MDMM) + emergency storage of 4 hours of MDMM demand or 0.5ML	Table 4.1 A6
Transfer Pump Station	MDMM over 20 hours	Table 4.1 A7
Transfer Pipeline	MDMM over 20 hours	Table 4.1 A7

* SEQ WS&S D&C Code

3.4.2. Wastewater Standards

Table 3-3: Adopted Wastewater Standards

Parameter		Value	Source*
Gravity Sewer Network			
Average Dry Weather Flow (ADWF) –		165 L/EP/Day	Table 10 D2
C2		$C2 = 4.7 \times (EP)^{-0.105}$	Table 10 D3
Peak Dry Weather Flow (PDWF)		C2 x ADWF	Table 10 D3
Peak Wet Weather Flow (PWWF)	Residential	1000 L/EP/d (6.1xADWF)	
	Non-residential	840 L/EP/d (5xADWF)	
	High density residential (minimum 3 storey development)	PDWF+0.2 L/s/Ha	
	Common Effluent Drainage	660 L/EP/d (4xADWF)	
Max Depth at PWWF (proposed)		75%	Table 10 D8
Max Depth at PWWF (existing)		60%	
Max Velocity (All)		3 m/s	
Min Shear (>DN300)		1.6 Pa	

Shear Stress	$\rho \times g \times \text{grade (\%)} \times \text{Hydraulic Radius}$	
Colebrook White k	1.5mm	
Sewer Pump Station and Rising Main		
Operating Storage	0.9 x Q / N	Table 10 D5
Starts / hour	N = 12 (≤ 15 kW) N = 8 (15-200 kW) N = 5 (> 200 kW)	Table 10 D5
Min Pump Capacity	Greater of PWWF	Table 10 D5
Pump Arrangement	PWWF < 20 L/s (Duty / Standby) PWWF > 20 L/s < 200 L/s (Duty / Duty Assist)	
Emergency Storage	2 hours at PDWF	
Sewer Rising Mains		
Colebrook White k	0.6mm	
Minimum Velocity	Minimum Velocity to be based on: • achieving an absolute minimum self-cleansing shear stress of 1.6 Pa at single pump flow • achieving slime stripping shear stress of 3.85 Pa at the greater of PWWF or maximum pump station pumping capacity • If slime stripping shear cannot be met with single pump flow a regular flushing regime is required to prevent slime build up.	
Maximum Velocity	3 m/s	Table 10 D7
Max detention time	Maximum time of detention in pressure main and SPS wet well is 6 hours [2 hours in wet well and 4 hours in rising main] (based on daily average flows) to minimise potential for odour / hydrogen sulfide generation. Where high retention times are likely to occur, odour / sulfide control measures will be required to the satisfaction of Logan City Council. (Refer WSA 07-2007-1.1 section 3.15)	

4. Development Demand Assessment

The development assessment for CA 5 is split into the Northern and the Southern as detailed in this section as part of the development staging strategy and to account for proposed the interim water supply. The assumptions considered the ongoing Monarch Glen IMP and the Flagstone Town Centre PNP.

4.1. Northern CA 5

Available information for the Northern CA 5 allowed for a detailed lot count for the residential developments (West side as shown in Figure 4-1 below) with the remaining considered to be developed as business/commercial in nature which is yet to be finalized on division of specific lots, road network alignment and finished levels. For the non-residential component assumptions based on existing development with possible similar development types were visually inspected for the potential Gross Floor Area considering internal road network, detention basins, park/open space etc. An indicative GFA/GSA (plot ratio) were derived from the recent Flagstone Town Centre information which are predominantly non-residential in nature indicated a 36%, having a GSA of 64 Ha and a total GFA of 23 Ha. For the CA 5 a plot ratio of 40% is applied to business/commercial and approximately 30% is applied for education.

4.2. Southern CA 5

In comparison, the establishment of the demands primarily aligned with the Flagstone Structure Plan (RPS dated 01 November 2023) capturing the indicative dwelling densities, with residential leaning towards the highest possible yield. At the time this report is written, southern part of the development is yet to be finalized on division of specific lots, road network alignment and finished levels. Similarly, the derive plot ratio (in the Northern CA 5) to derive the non-residential EP was used for the Southern CA 5.

4.3. Development Staging

Two development site staging is proposed to begin with the Northern CA 5 and be completed with the Southern CA5. In addition, the staging assumes that the Monarch Glen booster pump (interim supply) is established to supply Monarch Glen, Flagstone Town Centre and the proposed CA5.

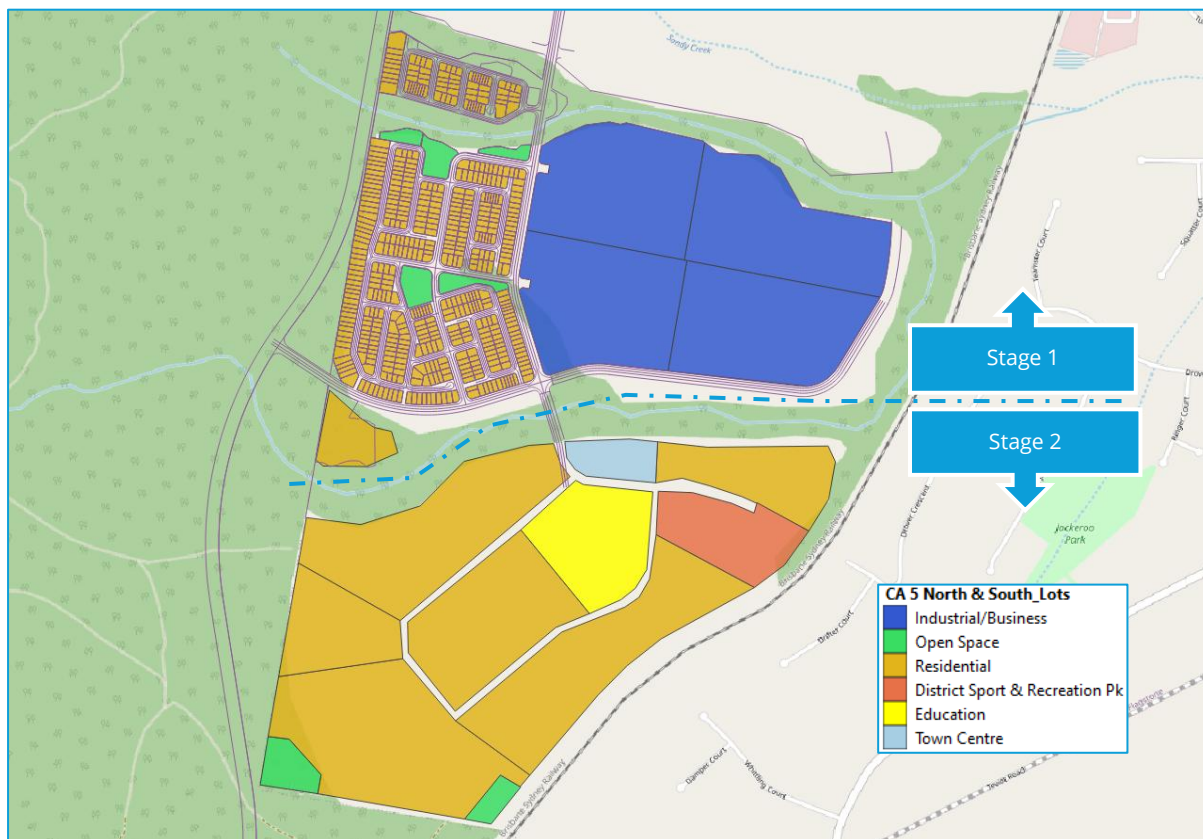


Figure 4-1: CA 5 (Stage 1 and Stage 2)

4.4. Projected Development EP Distribution by Stages

The projected growth distribution and phasing was developed based on proposed water supply for the CA 5 (North and South) incorporating the Monarch Glen interim booster pump station servicing developments for the Monarch Glen and Flagstone Town Centre and the wastewater network implementation discussed in the later section of this report. The anticipated development phasing as shown in Table 4-1 with relevant land uses converted to Equivalent Persons (EP) based on demand factors described in Section 3.3.

It is assumed that both stages will be implemented within the 2031 to 2036 planning years commencing from Northern towards Southern CA 5. In comparison to the Logan City Master Planning and base model, this development strategy is found to begin as part of the 2036 future EP projections with majority of Northern stage forecasted in 2051 and with the Southern envisioned for ultimate planning year.

Table 4-1: CA 5 Proposed Development Staging

STAGE	Residential EP	Non-Residential EP
CA 5 North	1,608	1128
CA 5 South	3,512	271
Total	5,120	1,399

5. Water Supply Infrastructure Assessment

The strategic implementation of CA 5 considers the adjacent Flagstone Town Centre network which is to be supplied via the interim Monarch Glen booster pump as detailed and shown in Figure 5-1. The following subsections provides further information of the proposed network configuration.

The Info Works WS Pro model **Monarch_Glen_IMP_Water_Model_Final-20250808.wspt** (DWS August 2025 Monarch Glen IMP) was used to develop and assess the potable water network of the proposed development incorporating the recently assessed network enumerated below with corresponding location highlighted and shown in Figure 5-1 below:

- Flagstone Town Centre
- Monarch Glen P101 & P102 (ROL04)
- Monarch Glen P103 & P104 (ROL05)

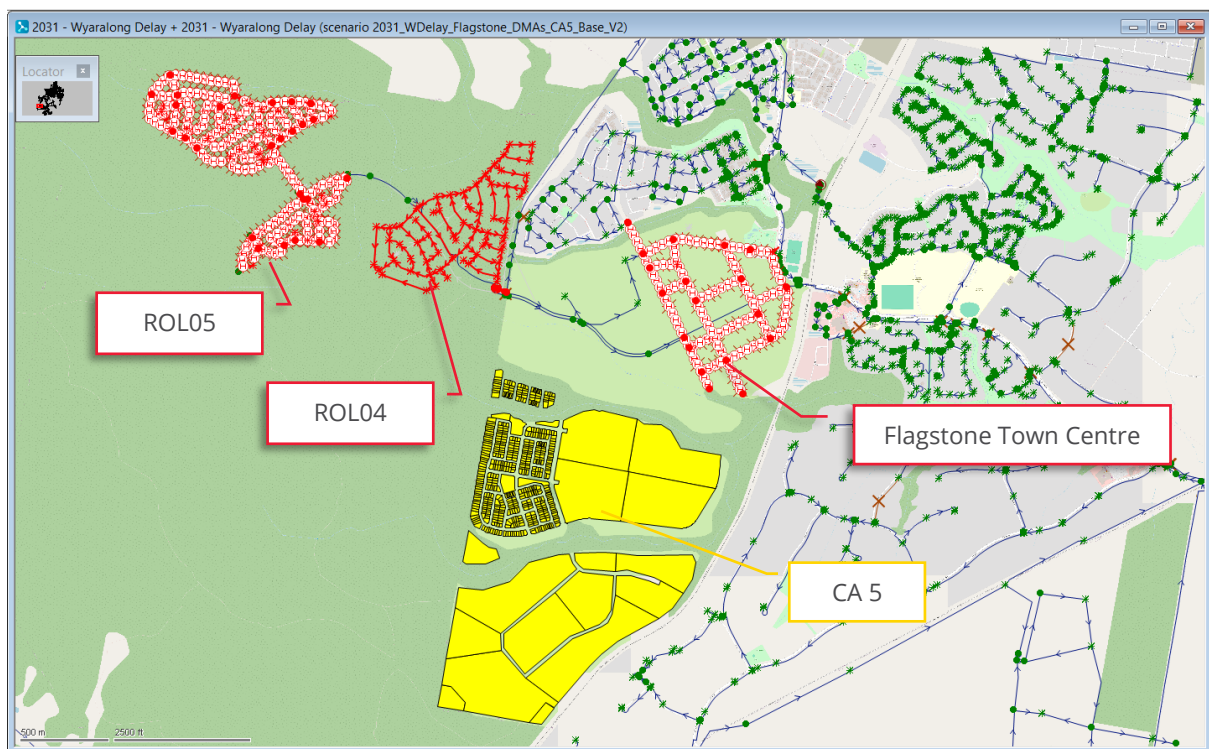


Figure 5-1: Updated Monarch Glen IMP Model Final (Infoworks WS Pro) with proposed development (2031 Wyaralong Delay)

Note: Based on the recent ROL05 PNP (CED, 19/06/2026), any additional demands serviced beyond the ROL05 and ROL04, with the DN250 Homestead Drive Trunk main (without the LCC master planned DN600 along Monarch Glen) limits the supplying capacity of the Monarch Booster Pump Station due to significant reduction on the available upstream/suction pressure with the additional 30 L/s fire flow conditions. At this point the modelling exercise for the CA5 will consider the proposed upstream DN600 and DN450 (Figure 5-11) to test the extent of the servicing capacity of the designed Monarch Booster Pump Station and, moving forward, develop options to service CA5.

5.1. Water Network Modeling Methodology

Utilising the information discussed in the earlier sections, the water network modelling was undertaken for the proposed CA 5 development site to determine the necessary servicing requirements utilising the following methodology:

- Define the required staging of the development
- Develop the internal water network and apply the derived water EP projections accordingly
- Assess the water network demand flows and develop/size the water network to achieve service standards
- Determine the required staging of any proposed water network
- Assess the water supply network for any shortfalls (failing standards) induced by the proposed development and identify minimum required network augmentations considering the Ultimate planning required sizing is achieved, unless specified as an interim.
- Existing inefficiencies (within the supplying network) prior to the implementation of the proposed development will be communicated and included in the findings.

5.2. Network Upgrades and Trunk Infrastructure Provision

The following subsections provides the details of the network assessment approach to include the findings based on the network modelling results and proposed staging/network strategies for the proposed development.

5.2.1. CA 5 North and South

This section provides the details on the network staging implementation for the proposed CA 5 development and corresponding network performance. Note that the staging implementation is envisioned to be completed within the 2031 and 2036 planning year. In addition, the proposed development staging takes into consideration the Flagstone Development Water DMAs (09/04/2026 Draft) configuration.

5.2.1.1. Stage 1 (CA 5 North)

The Stage 1 (CA 5 North) development is planned to be dual fed with PRV 1(Stage 1a) supplying the Western side (mostly residential) and PRV 2(Stage 1b) supplying the Eastern which is planned for commercial or non-residential. The PRVs are supplied via the proposed DN250 from the outlet of the Monarch Glen Booster running towards East (shared main with Flagstone Town Centre) along Homestead Drive and extends South towards CA5 as shown in Figure 5-2 and Figure 5-3 below. It is noted that the DN250 from the PRV site extends East as this is planned to be another supply point for the development upon the activation of the future Flagstone LLZ reservoirs (combined 16 ML capacity).

It should be noted that the network for the Eastern side of the Stage 1 (mostly business/commercial development in nature) adapted a similar alignment to the original LW/LCC future planning information, at the time this report is being developed the precinct level required information for this part of the development is still being developed and finalized which includes finished levels, lot breakdown, final road alignment, etc.

Note: The proposed interim Monarch Glen booster PS has been updated to reflect the required duty to service the stage 1 CA 5 added demand flow (whilst taking into account maintaining the Monarch Glen HLZ minimum required residual pressure requirements). Details of the required duty per stage is discussed in the following section 5.2.2 *Water Supply*.

In addition, the resulting network performance for the entire CA5 are included in the next section to incorporate complete network performance including the PRV sizing.



Figure 5-2: Stage 1 (CA 5 North)

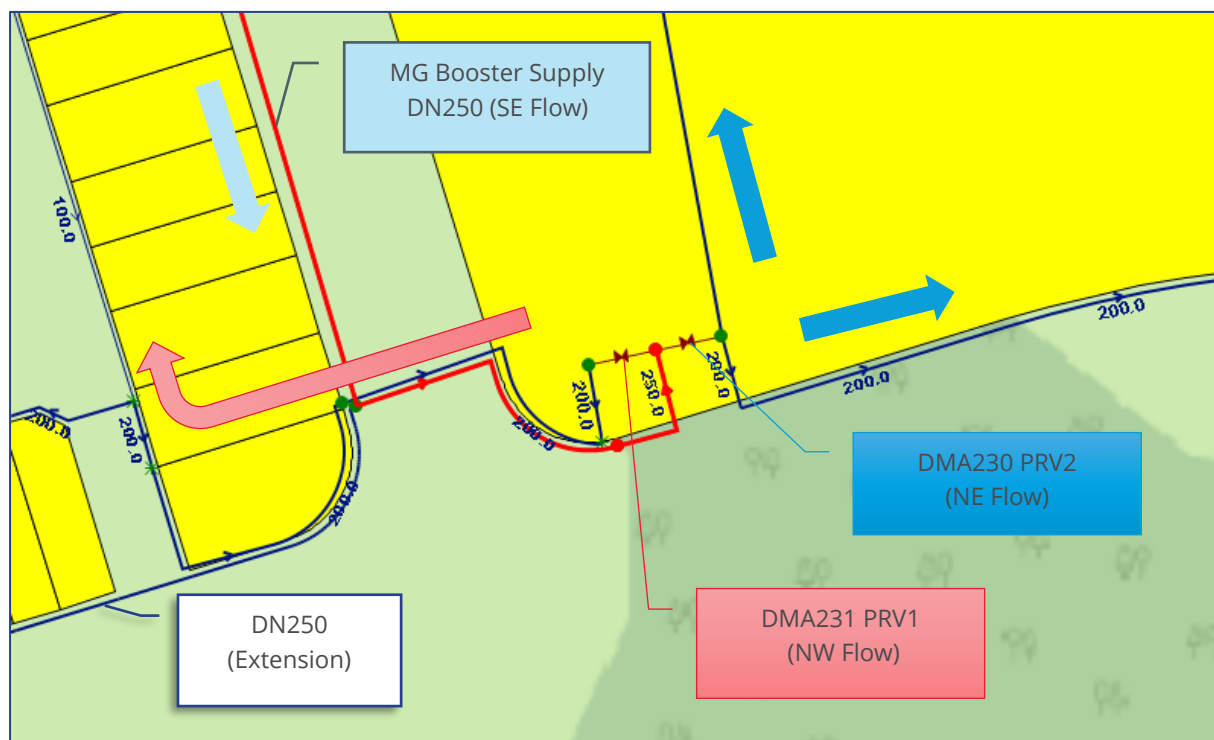


Figure 5-3: Stage 1 (CA 5 North) PRV DMA configuration

5.2.1.2. Stage 2 (CA 5 South)

Moving forward to stage 2, the proposed DN200 main extends south from Stage 1 connecting to the DN250 and continued as the main supply for the CA 5 South DMA 232 (with PRV) network as shown in Figure 5-4 and Figure 5-5. Like the Eastern portion of Stage 1, the network for the CA 5 South adapted the original LW/LCC future planning information, as precinct level required information is still being developed and finalized at the time this report is being developed.

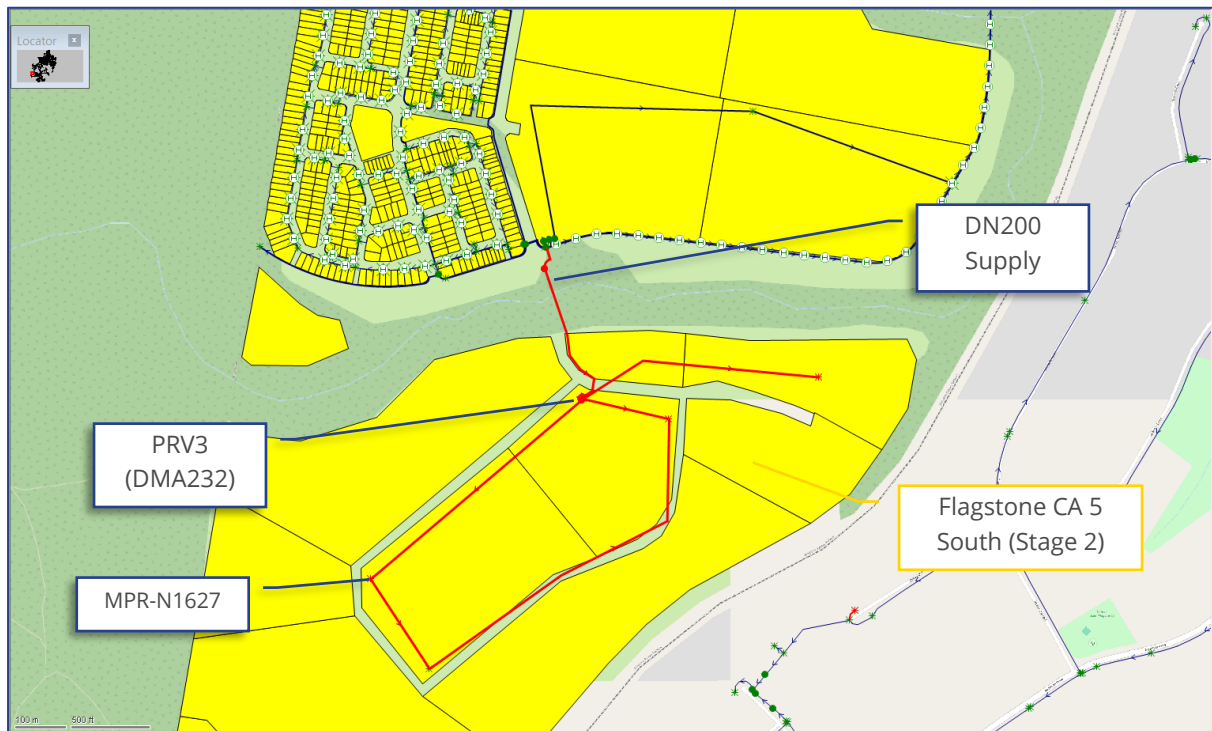


Figure 5-4: Stage 2 (CA 5 fully developed)

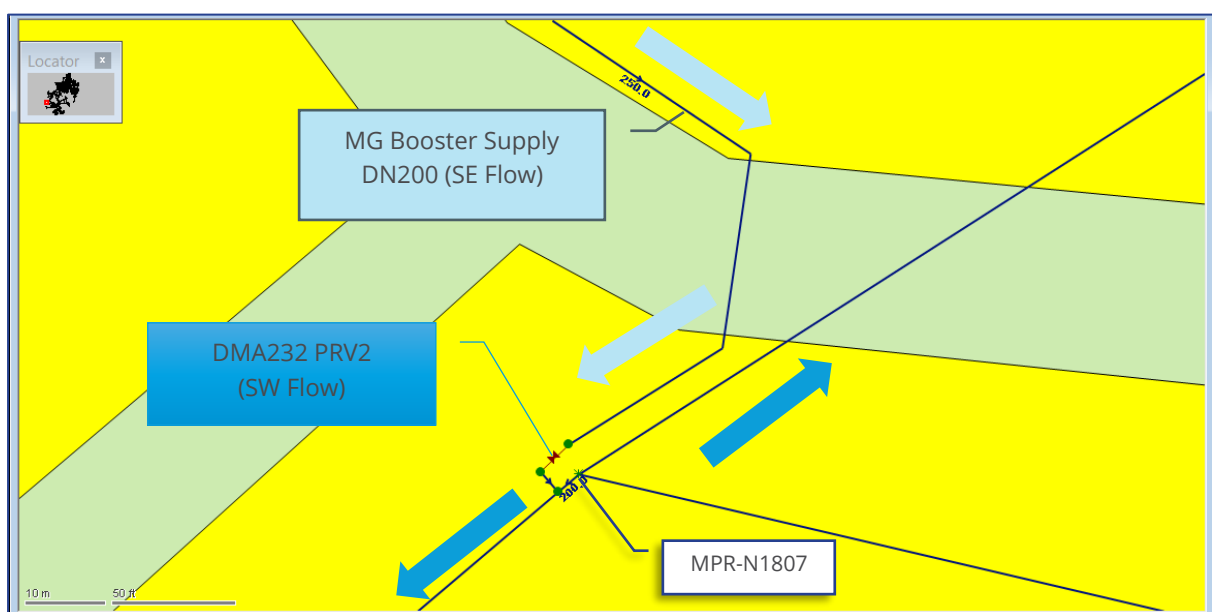


Figure 5-5: Stage 2 (CA 5 South) PRV DMA configuration

5.2.1.3. Pressure Reducing Valve Sizing

The table below provides the specific details of the proposed PRV based on the effective modelled min and maximum flow rates and the pressure reduction requirements. Table 5-1 and Table 5-2 provide the proposed PRV specification based on the resulting model flows and upstream pressure shown in Figure 5-6 to Figure 5-10.

Though PRV selection will be confirmed during detailed design to include fire flow, the proposed PRVs are rated to have a maximum flow of 65 L/s (as per Challenger Valves), which is sufficient to allow peak flows with additional fire flow when needed.

Table 5-1: Proposed PRV and Model Peak Day Flows

DMA	RPV Model and Size	Model Flows (L/s)		Pressure Setting (m)	
		Min	Max	MNF*	Peak
DMA230	Cla-Val DN150 (Model 690-01 Globe)	1.14	10.40	45.5	45.5
DMA231	Cla-Val DN150 (Model 690-01 Globe)	0.96	3.57	30	30
DMA232	Cla-Val DN150 (Model 690-01 Globe)	2.73	22.35	26	26

Table 5-2: Proposed PRV sizing and specifications

PRV SPEC	DMA 231	DMA 230	DMA 232
PN16 MIN	Yes	Yes	Yes
PRV TO BE FAIL OPEN	Yes	Yes	Yes
PRV DIAMETER	150	150	150
PRV SET POINT	45.5m / 101m HGL	30m / 85.5m HGL	26m / 90m HGL
DSS MIN PRESSURE	22m	22m	22m
FLOW THRU PRV WITH LOW FLOW SYSTEM	N/A	N/A	N/A
UPSTREAM MAX PRESSURE	86.9	86.9	78.4
UPSTREAM MIN PRESSURE	79.7	79.7	70.8
MAXIMUM FLOW	10.4 L/s	4.68 L/s	22.35 L/s
MINIMUM FLOW*	1.14 L/s	1.29 L/s	2.73 L/s

*Minimum Night Flow values are model results and may not reflect actual flow performance especially during initial development stages with less occupancy/usage.

Note: Model 690-01 Globe max rated flow @ 65 L/s with minimum required @ 0.25 L/s – considering 2/3PH +30 L/s Fire flow

Note 2: Challenger Valves (or any accredited Cla-Val Valve supplier specified by the client) to provide technical assistance on proper sizing and assurance on PRV performance.

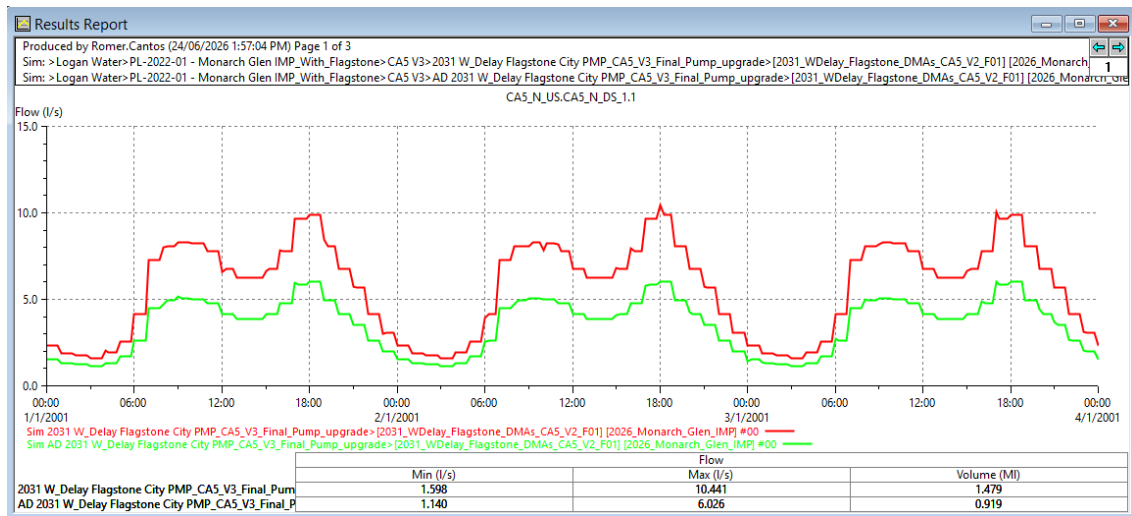


Figure 5-6: CA5 PRV 1(DMA231) Model Flow (AD and PD)

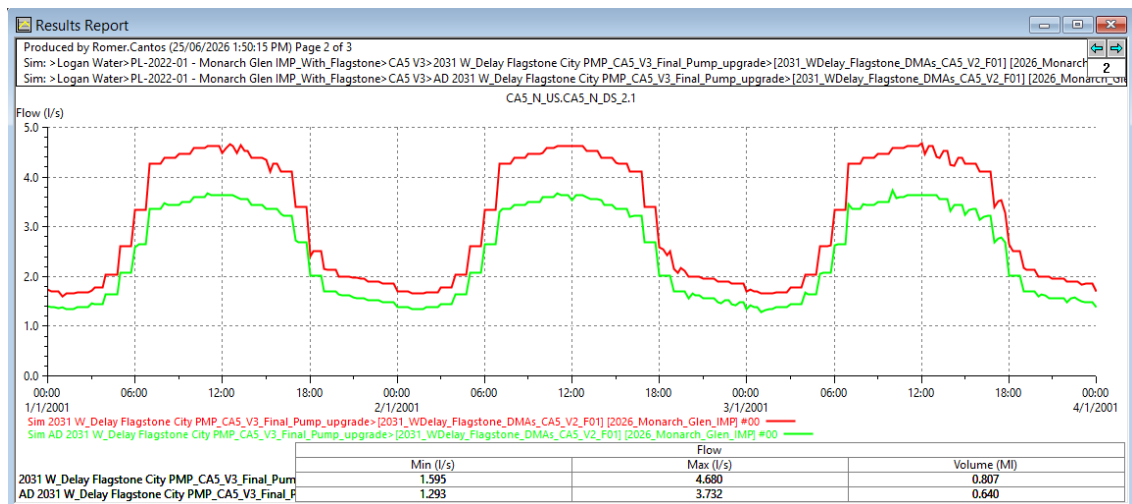


Figure 5-7: CA5 PRV 2(DMA230) Model Flow (AD and PD)

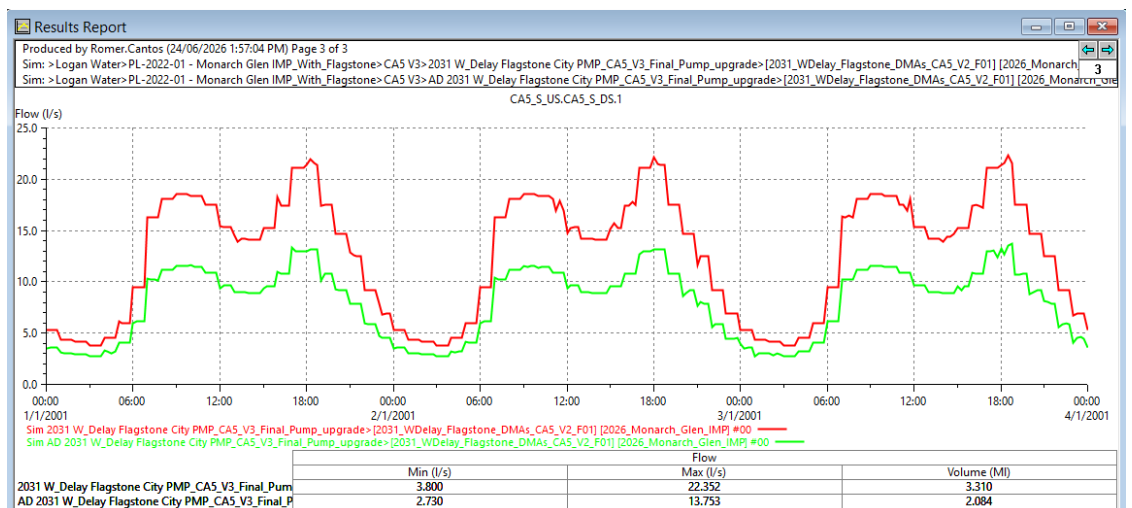


Figure 5-8: CA5 PRV 3(DMA232) Model Flow (AD and PD)

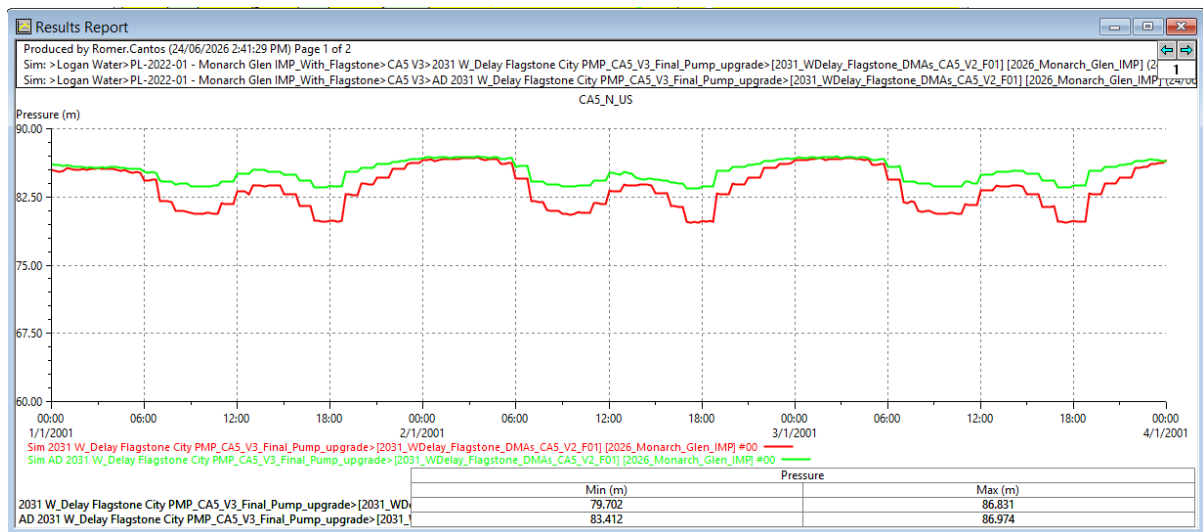


Figure 5-9: CA5 PRV 1(DMA230) and PRV 2(DMA231) U/S Pressure (AD and PD)

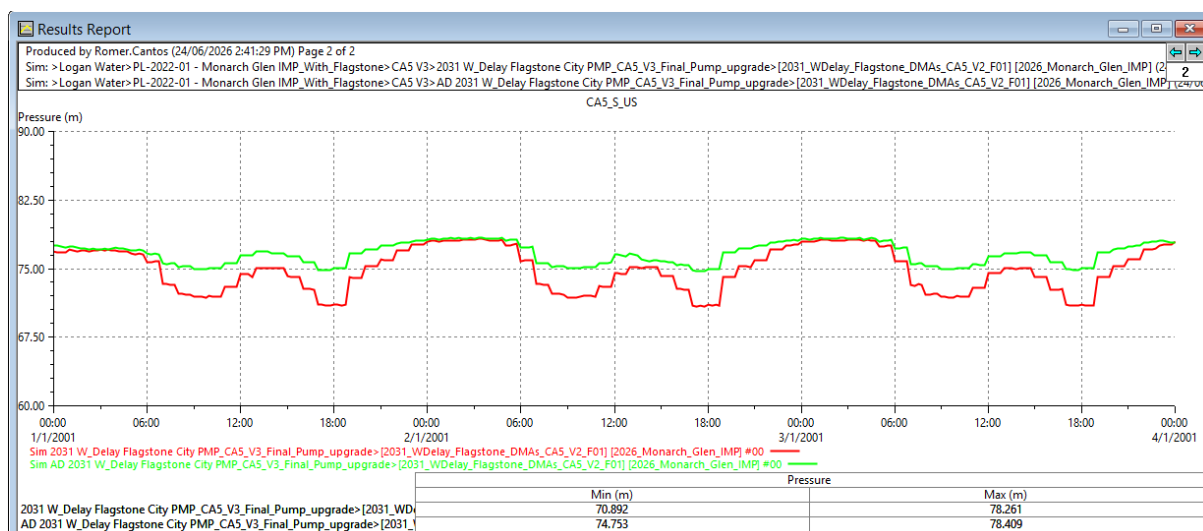


Figure 5-10: CA5 PRV 3(DMA232) U/S Pressure (AD and PD)

The network performance within the Monarch Glen Booster pump supply and the downstream CA5 PRVs demonstrated compliance to meet the minimum residual pressures for both PH and during fire flow.

A summary of the most disadvantaged part of the CA 5 (Per DMA) development network is detailed in Table 5-3 to Table 5-5, with location/s indicated in Figure 5-2 and Figure 5-4 above.

Table 5-3: CA 5 DMA 231 Network Performance 2031 (refer to Figure 5-2 for location)

Simulation	Flow (L/s)	CA 5 (DMA 231 PRV 45.5m D/S setting)		Elevation (mAHD)
		Pressure (m)	Node ID	
Peak Day (PH Flow)	10.4	22	Hyd_530_PIPE_FS_CA5_N_1320	77.29
Fire Flow (Residential) (2/3 PH Residential + FF)	21.9264	20.77	Hyd_920_PIPE_FS_CA5_N_1520	76.33

Table 5-4: CA 5 DMA 230 Network Performance 2031 (refer to Figure 5-2 for location)

Simulation	Flow (L/s)	CA 5 (DMA 230 PRV 30m D/S setting)		Elevation (mAHD)
		Pressure (m)	Node ID	
Peak Day (PH Flow)	3.57	22	Hyd_10_PIPE_FS_CA5_N_2004	57.58
Fire Flow (Non-Residential) (PH Residential + FF)	33.57	15.81	Hyd_10_PIPE_FS_CA5_N_2004	57.58

Table 5-5: CA 5 DMA 232 Network Performance 2031 (refer to Figure 5-4 and Figure 5-5 for location)

Simulation	Flow (L/s)	CA 5 (DMA 232 PRV 26m D/S setting)		Elevation (mAHD)
		Pressure (m)	Node ID	
Peak Day (PH Flow)	22.35	22	MPR-N1627	64.05
Fire Flow (Residential) (2/3 PH Residential + FF)	29.8851	20.23	MPR-N1627	64.05
Fire Flow (Non-Residential) (PH Residential + FF)	52.35	22	MPR-N1807	64.05

Note: Non-Res assumes PH for localised Commercial/industrial or 2/3 PH for water supply zone.

5.2.2. Water Supply Strategy

This section describes the possible network configuration to support the demands of CA 5, considering recent developments and network planning activities described in the earlier sections.

5.2.2.1. CA 5 Water Supply Option 1

This Option 1 considers tapping into the spare capacity of the Monarch Glen Booster Pump station with the primary intent unlock the developments, in this case the DMA231 which has elevations reaching 77m AHD and predominantly residential Northwest of CA 5.

The Monarch Glen booster pumps were updated to provide additional supply flows towards CA 5 (which is not initially planned for) and considers the IP0021 Water Master Plan, Southern Water Planning Area's proposed trunk network for 2031 as shown in Figure 5-11 below.

Noting the findings in the recent ROL05 PNP (v06,19/06/2026 CED - detailed in Figure 5-12: ROL05 (MG Booster Flow and U/S Pressure) with 30 L/s at model Node Hyd_110_PIPE_FS_ROL05_25 (2026)), it has been found that any further additional flows beyond the 50 to 60 L/s at the booster pumps poses a considerable risk on the available upstream pressure at the Monarch Glen (MG) Booster Pump Station, which is primarily/only supplied via the proposed DN250 trunk main along Homestead Drive.

This network planning for the CA 5 assumes that the DN600 and DN450 trunk mains (Figure 5-11) are in place, which then supports in maintaining net positive suction at the Monarch Glen Booster Pump Station and allow for full duty operation/maximum design flow of 75 L/s as shown in Figure 5-12 below.

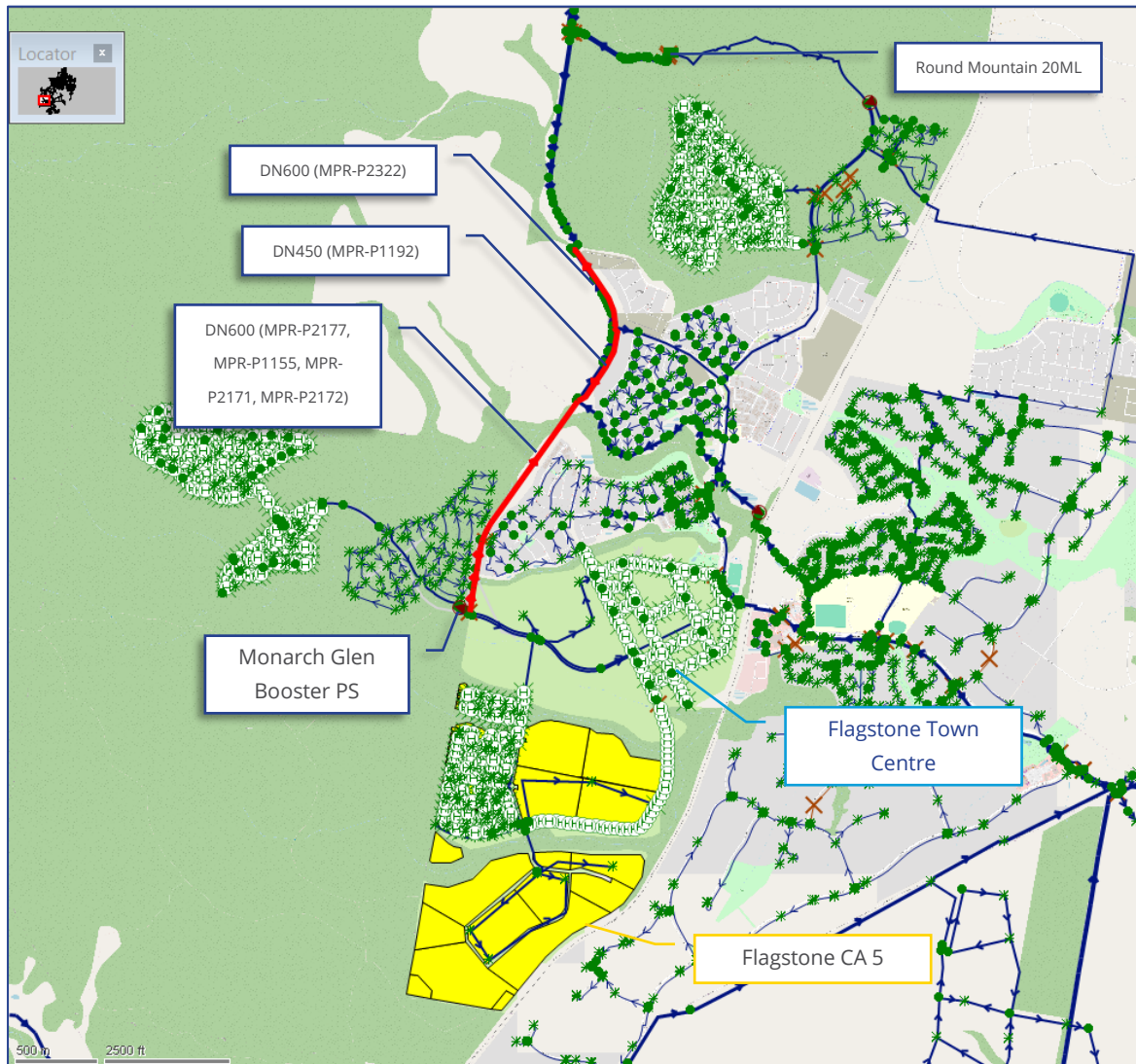


Figure 5-11: IP0021 Water Master Plan, Southern Water Planning Area's proposed trunk network for 2031

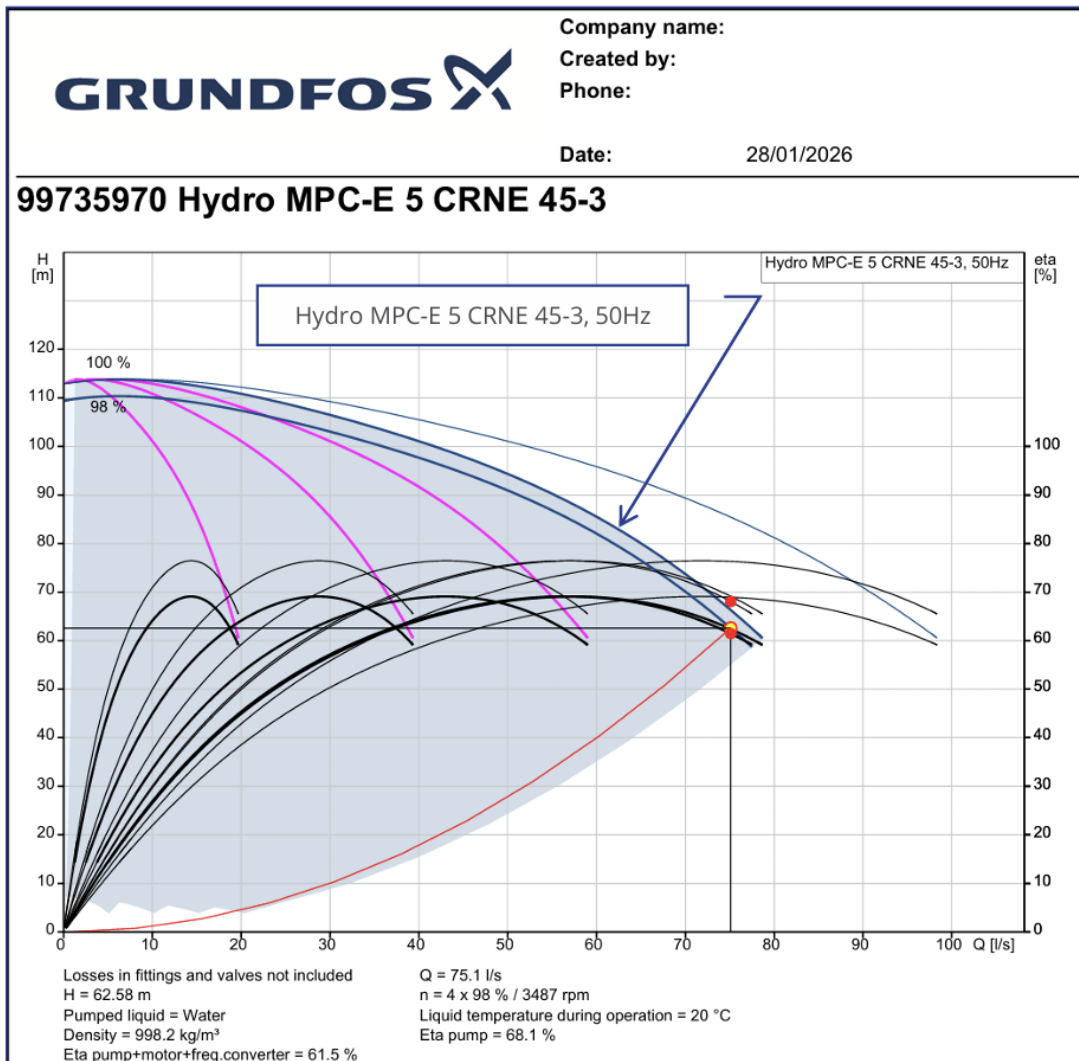


Figure 5-12: MG Booster Pump Duty Hydro MPC-E 5 CRNE 45-3 by Aquatec 07/01/2026

The resulting discharge flows from the MG Booster Pump station, staged starting from the DMA231 followed by DMA230 and with final DMA232 demonstrates exceedance of the maximum duty flow beyond Stage 1 (DMA231 and DMA230) at peak day (PD) demand conditions as shown in Figure 5-13. For reference the modelled operation using the MG design duty for Stage 1 (DMA231 and DMA230) are demonstrated in Figure 5-16 and Figure 5-17 and for the full development (with duty exceedance) demonstrated in Figure 5-18.

Conditions accounting for additional fire flow for the Stage1a (DMA231), as shown in Figure 5-13, has the potential to allow the current duty to provide enough supply for DMA231 assuming 2/3PH (Non-Res at Water Supply Zone) = $(58 \times \frac{2}{3}) + 30$ L/s, approximately arriving at 69 L/s.

It can be observed that the inclusion of the DN600 and DN450 upstream trunk mains significantly improved the available upstream pressures (Figure 5-14), and comparing these with varying levels (per DMA staged implementation) at Round Mountain 20ML reservoir (Figure 5-15) indicates that majority of the reduction on the available upstream pressure are mostly driven by the static component or reservoir levels available at Round Mountain.

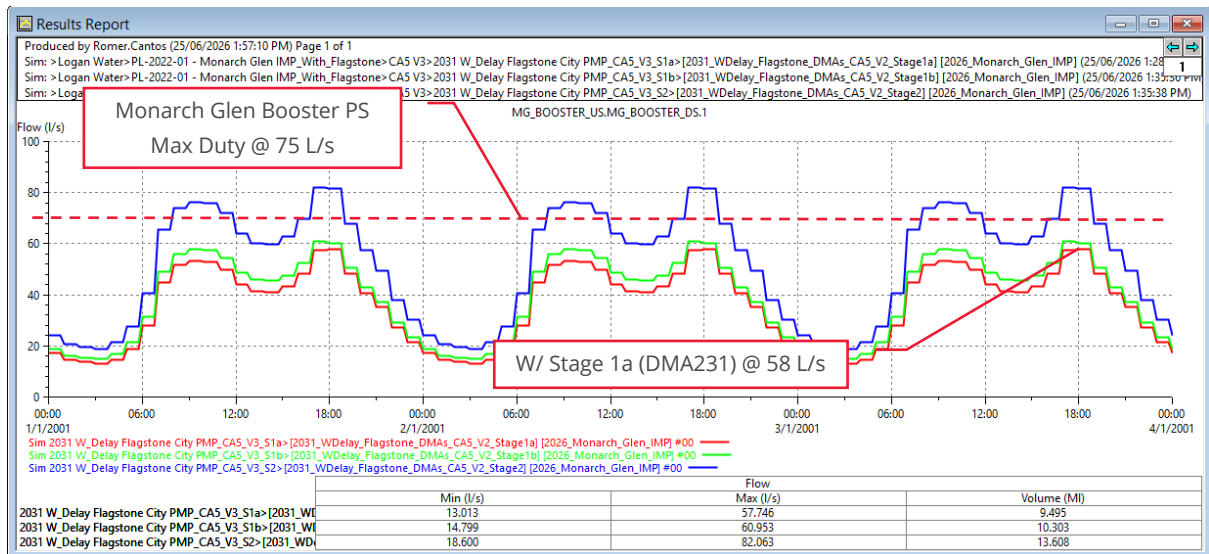


Figure 5-13 Monarch Glen Booster Pumps discharge flows (2031 PD) (With additional CA5 development staging)

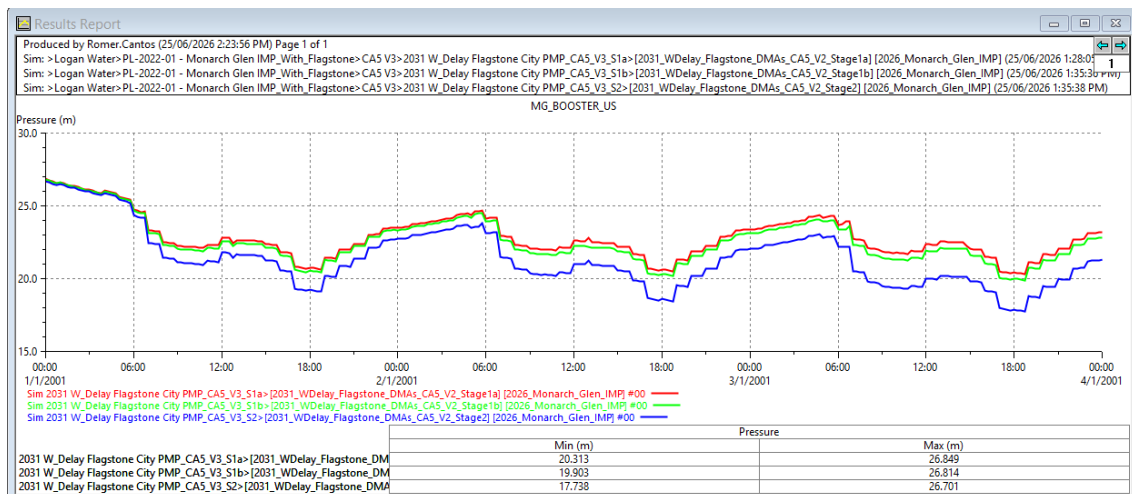


Figure 5-14 Monarch Glen Booster Pumps upstream pressure (2031 PD)

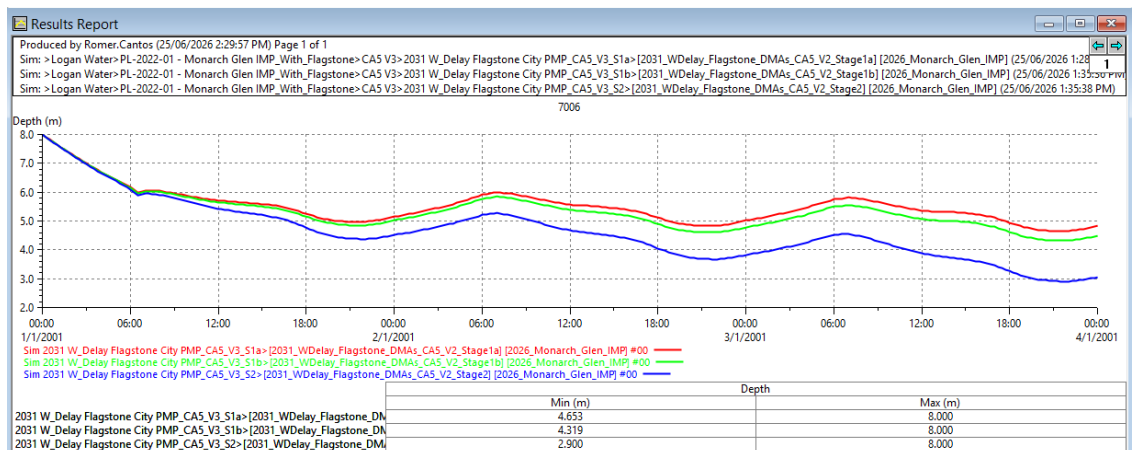


Figure 5-15 Round Mountain 20ML reservoir levels (2031 PD)

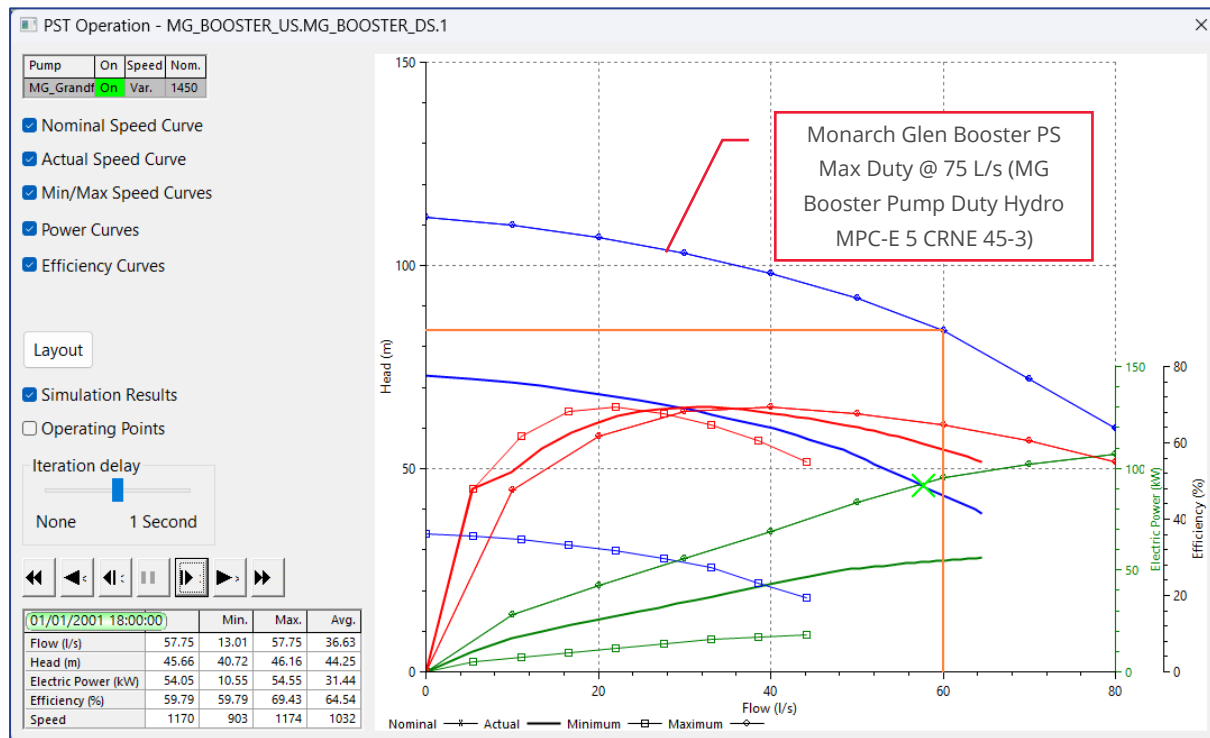


Figure 5-16 Monarch Glen Booster Pump Duty (w/ DMA231 - CA 5 Stage 1a)

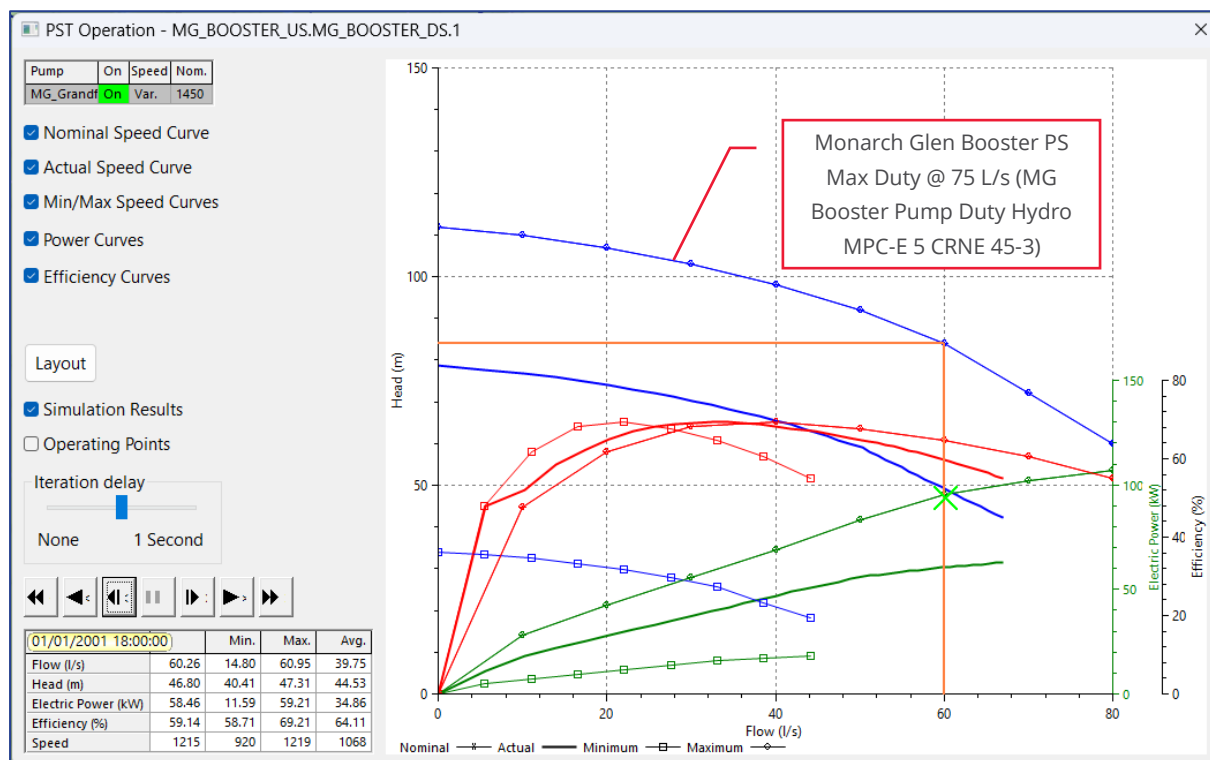


Figure 5-17 Monarch Glen Booster Pump Duty (w/ DMA231 & DMA230 - CA 5 Stage 1b)

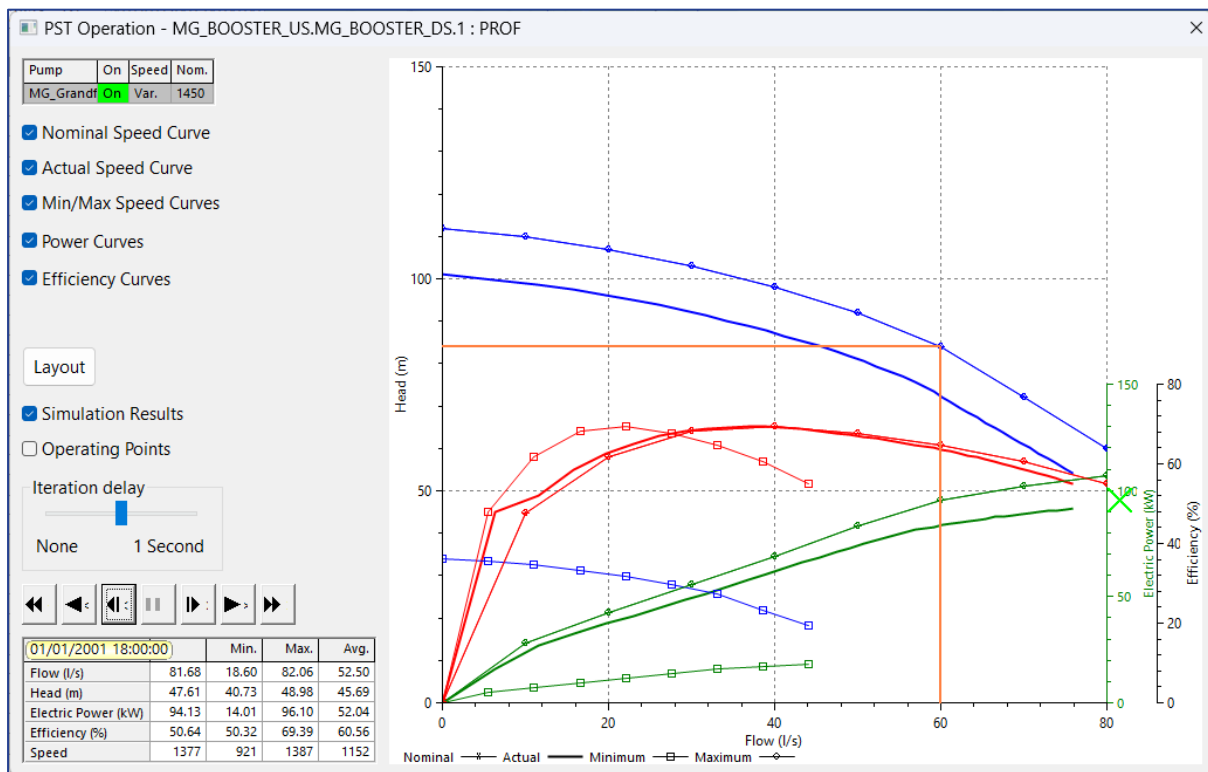


Figure 5-18 Monarch Glen Booster Pump Duty (Full development - CA 5 Stage 2)

5.2.2.2. CA 5 Water Supply Option 2

This Option 2 considers supplying the CA5 full development with the required booster upgrade at Monarch Glen earlier discussed in Option 1.

As per the results in the earlier section a combined duty of 112 L/s (PH of 82 L/s plus 33 L/s Fire Flow) or an upgrade of 37 L/s (on top of the 75 L/s max duty) to the existing will allow full coverage to include the CA5 full development.

5.2.2.3. CA 5 Water Supply Option 3

This Option 3 considers the implementation of a separate booster pump station dedicated to only service the CA5 development. As shown in Figure 5-19, the new booster station shares the upstream network with the Monarch Glen Booster and extends a dedicated DN250 main along Homestead Drive (approximately 475 m in length) before extending south and configured to have a new boundary valve (BV) for ultimate network configuration. The required duty derived to service the full development for peak demand conditions is 35 L/s Flow at 15 m Head or 65 L/s at 15m Head full duty incorporating 30 L/s FF as shown in Figure 5-20.

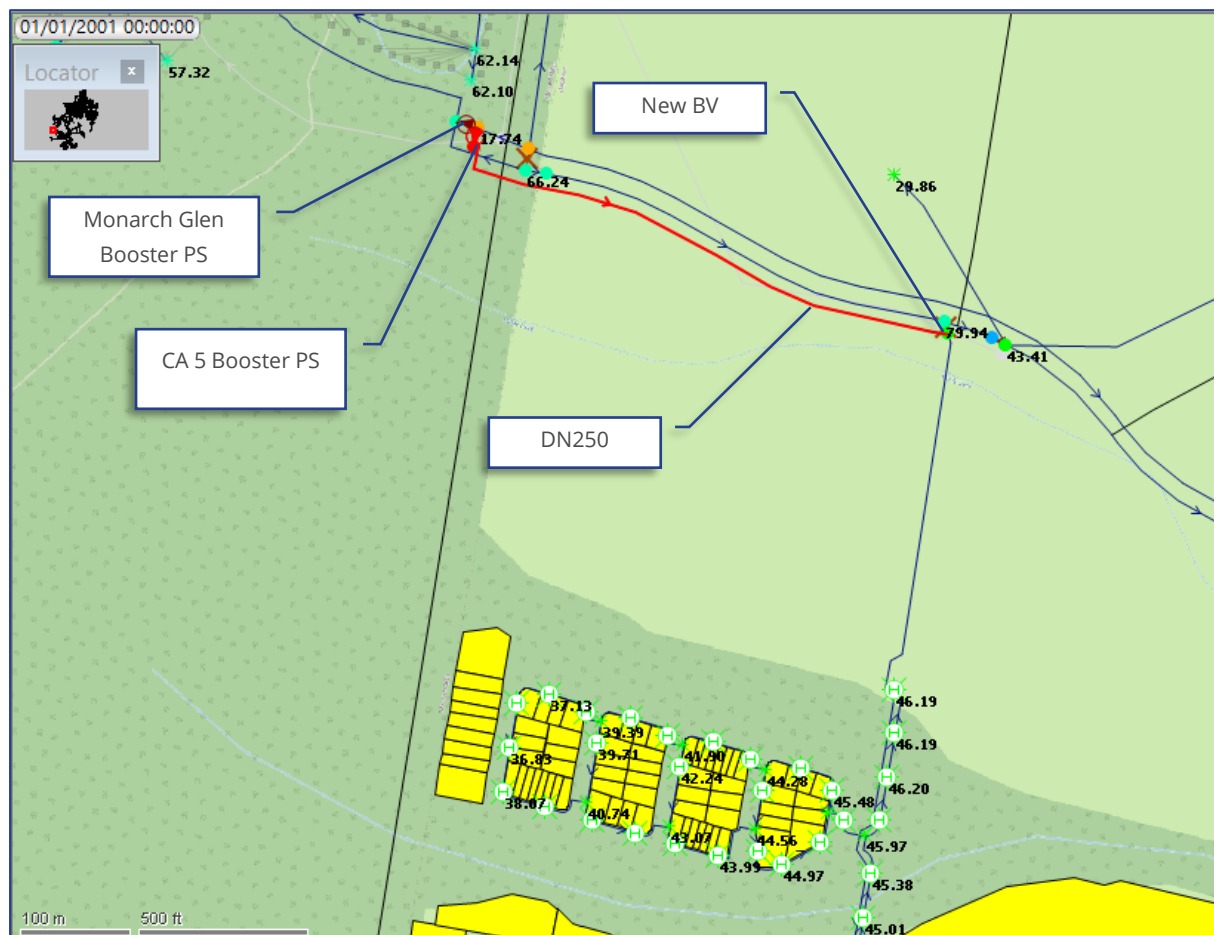


Figure 5-19 Option 3 – Dedicated CA5 Booster setup

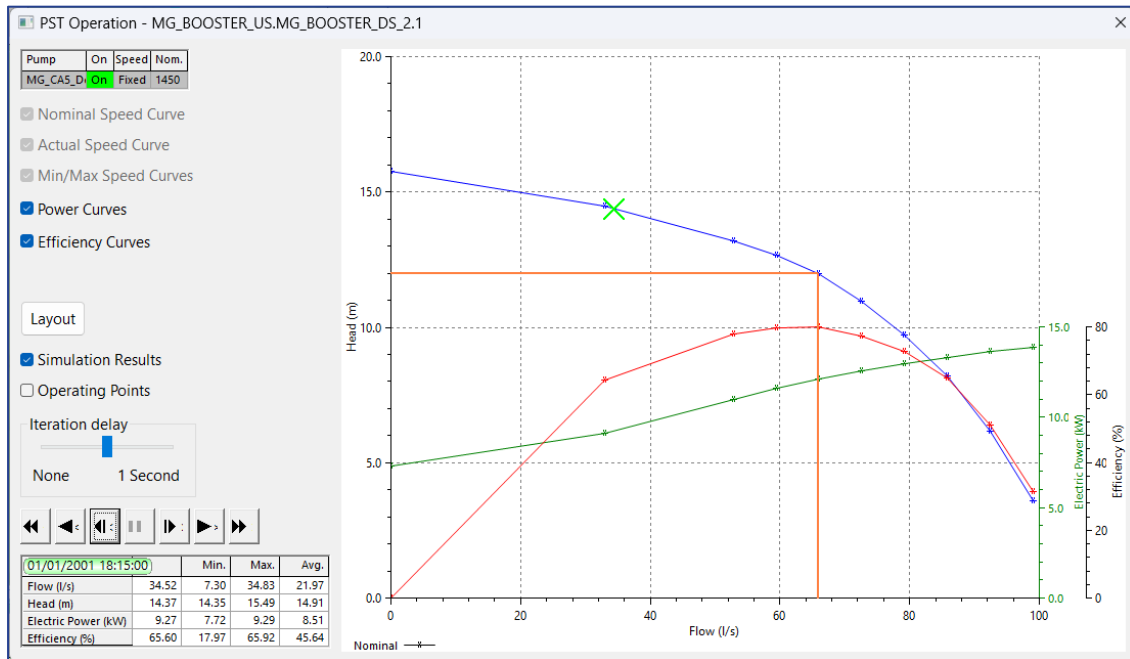


Figure 5-20 Option 3 – Dedicated CA5 Booster setup Pump Station Performance (PD supply without FF)

5.2.2.4. CA 5 Water Supply Option 4

This Option 4 considers bringing forward the implementation of the Silverbark 4.5/5 ML reservoir with the intent of transferring the ROL04 and ROL05 demands under the reservoir zone which then unloads the Monarch Glen Booster Pump station to be able to supply the CA5s full development. The network consists of a 4.5ML reservoir, 5 km (approx.) of DN300 and a pumpstation with a minimum duty of 15 L/s at 50 m head as shown in Figure 5-21 and Figure 5-22. It is noted that the future developments will be serviced via the Silverbark Reservoir and the ultimate duty (upgrade) for the supply pump station will be required.

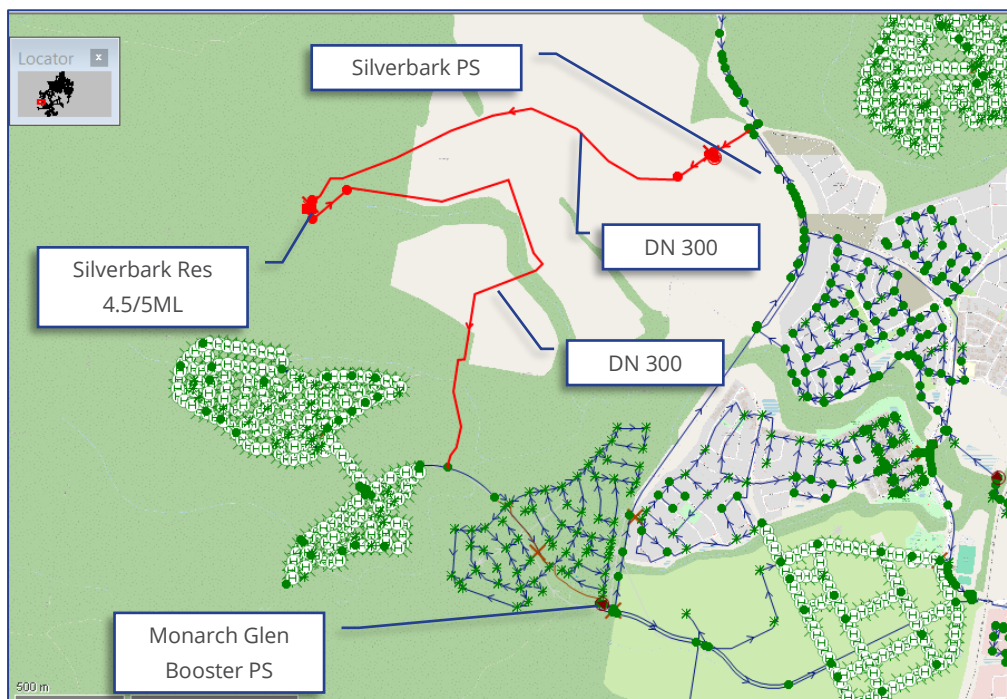


Figure 5-21 Option 4 – Silverbark Reservoir (to divert demand flow from Monarch Glen Booster pumps)

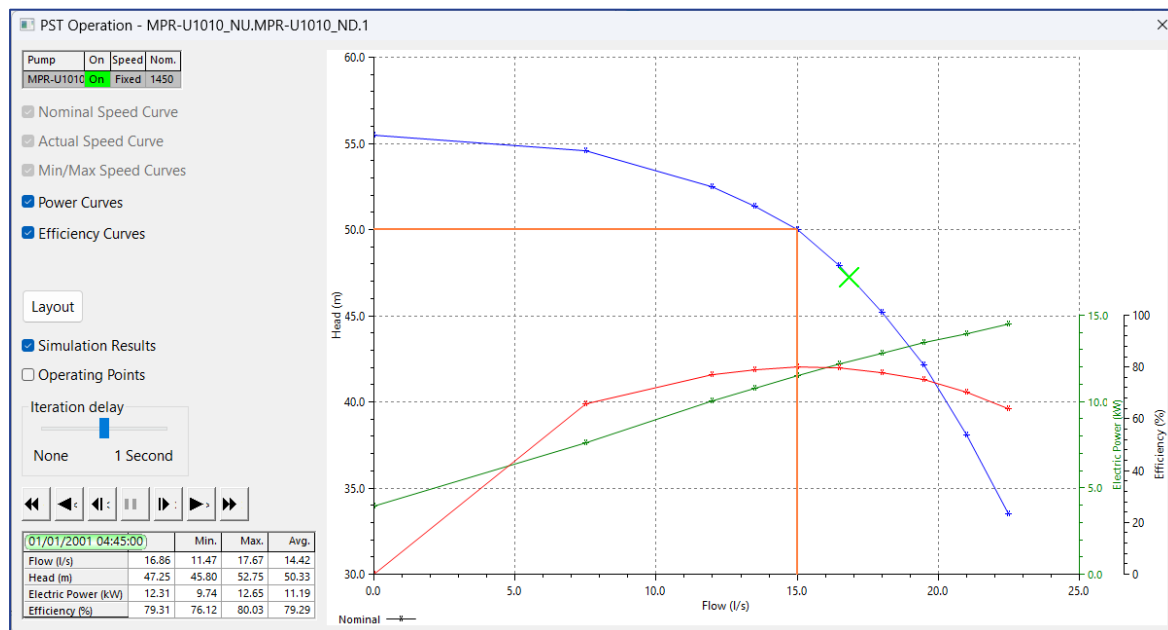


Figure 5-22 Option 4 – Silverbark PS minimum duty to supply reservoir (to service ROL04 and ROL05 demand)

5.3. Water Infrastructure Summary

The summary of the proposed water network infrastructure to service the CA 5 is included in the following sections.

5.3.1. CA 5 Network (Internal)

Table 5-6 below provide the details for the CA 5 internal water pipe network infrastructure which includes a total of approximately 12 km of potable water main and 3 PRVs. The network staging below is assumed to be delivered within the 2031 and 2036 planning year.

Table 5-6: Proposed Internal water network infrastructure

Stage	Type	Diameter (mm) / kW	Length (m)
Stage 1 (DMA230 &DMA 231)	Pipe	100	5,467
	Pipe	200	3,994
	Pipe	250	71
	PRV (DMA230)	150	TBC
	PRV (DMA231)	150	TBC
	Booster Pump* (Option 3)	12kW (65 L/s @ 15 m duty)	TBC
Stage 2 (DMA232)	Pipe	200	2,448
	PRV	150	TBC

Total Length

11,981

* Assumes 80% pump efficiency

5.3.2. CA 5 Network (External/Shared)

As proposed in the interim strategy, the Monarch Glen booster pump station is envisioned to partially provide supply towards the CA5 (based on the maximum actual duty 75 L/s Grundfos duty *Figure 5-12*) via the shared DN250 outlet network towards CA5 and Flagstone Town Centre which will then be augmented to have a total duty of 112 L/s (with additional 37 L/s flow to increase capacity) discussed in section 5.2.2.1. In conjunction with the Monarch Booster is the implementation of the upstream DN450 and DN600 trunk mains, details provided in *Table 5-7* and *Table 5-8* below.

Table 5-7: Monarch Glen Booster Pump Station

Stage	Flow	Head	kW	Comments
Stage 1: Monarch Glen Booster (Hydro MPC-E 5 CRNE 45-3)	75	62.58	74.86	Supply to Monarch Glen HLZ, Flagstone Town Centre, CA5 DMA231 (Stage 1)
Stage 2: Monarch Glen Booster (Augment Duty)	37	62.58	28.4 ¹	Supply to Monarch Glen HLZ, Flagstone Town Centre, CA5 DMA230, DMA231 & DMA232

¹Assumes 80% Efficiency w/ VSD to meet increased duty for the fire flow requirement.

Table 5-8: Proposed external water network infrastructure

Stage	Type	Diameter (mm)	Length (m)	Comments
Stage 1	Pipe	250	4,082	Combined inlet and outlet main Monarch Booster Pump
	Pipe	450	529	IP0021 Water Masterplan
	Pipe	600	2,006	
Total Length			6,617	

5.3.3. Commentary

The supply network for the 2031 and 2036 to service the proposed CA5 demonstrates multiple options designed to tie in the ultimate network configuration for the Flagstone Development Area. The existing system via the Round Mountain 20ML reservoir and associated outlet trunk infrastructure was identified to require further network augmentations to overcome increase dynamic head losses to maintain minimum residual pressures to service the existing and future development in Flagstone and Monarch Glen.

The staging of the supply options such as the Silverbark 4.5/5ML reservoir has the potential to maximise the use of the Monarch Glen Booster with the possibility of deferring the supply pumps and supply main from New Bieth Road towards the reservoir therefore operating the Monarch Glen Booster as a supply pump.

The optimisation of the proposed supply configuration will be highly dependent on the selected development precincts and the sequencing of their implementation. Consequently, the preferred supply arrangement should be refined iteratively as precinct development staging and delivery timeframes become more defined.

6. Wastewater Servicing and Infrastructure Assessment

Similar to the water assessment approach from earlier sections and to provide evidence-based wastewater network assessment, the Infoworks ICM model **J0000345_IMP_WW_Monarch-Glen.icmt** (DWS August 2025 Monarch Glen IMP) was used. The model provides a baseline and identifies possible increases in flows contributed by the proposed CA 5 internal sewer discharges and the implications on the initially proposed receiving trunk network and incorporating the recently assessed network enumerated below with corresponding location highlighted and shown in Figure 6-1 below:

- New Beith Precinct A & B & C
- Flagstone City
- Monarch Glen 101 & 102

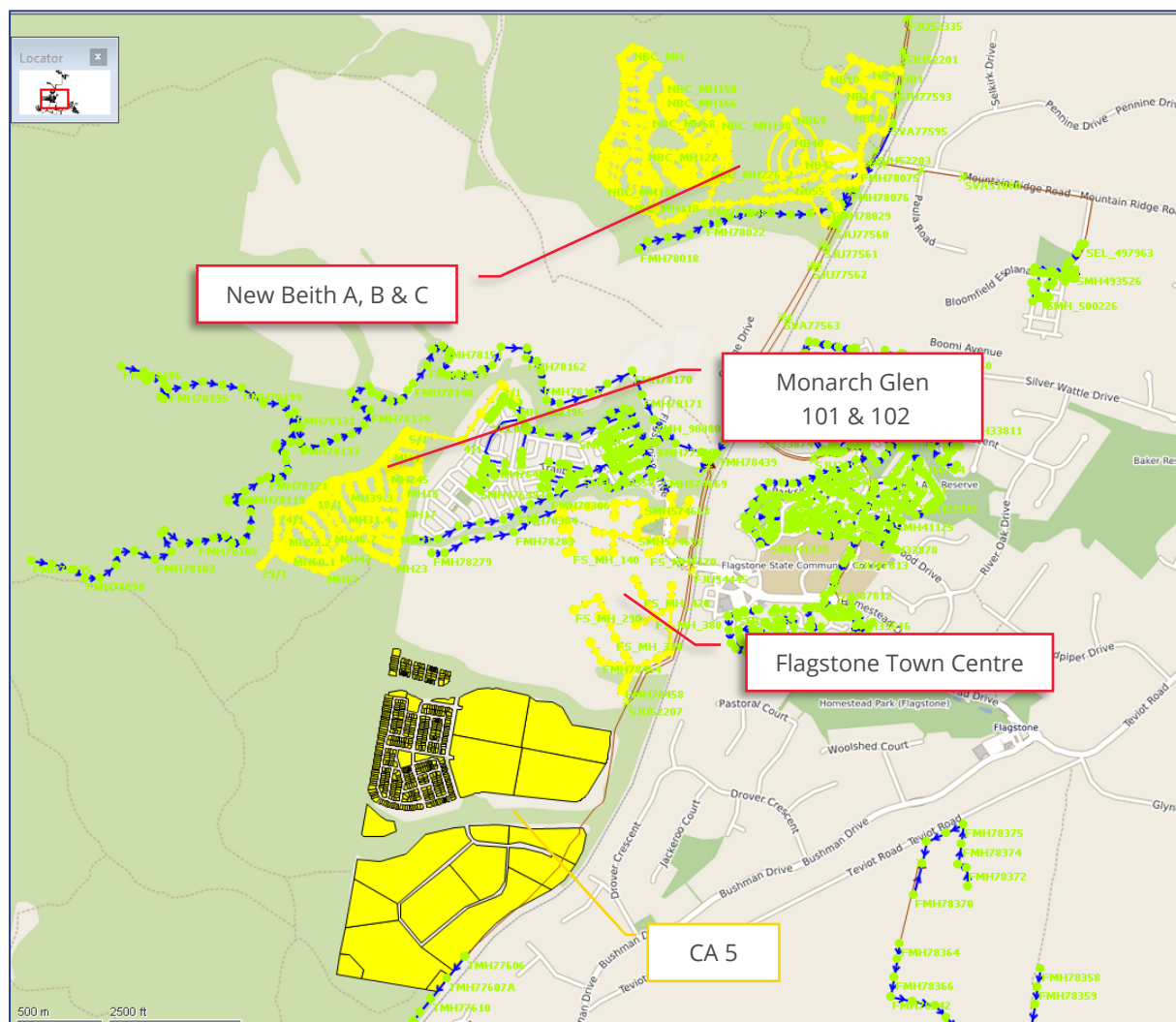


Figure 6-1: Monarch Glen IMP Model Final (Infoworks ICM) with New Beith Precinct A & B and Flagstone Town Centre (2031)

The following section provides further information of the proposed wastewater infrastructure required to internally service the CA 5 development site.

6.1. Wastewater Network Methodology

Utilising the information discussed in the earlier sections, the wastewater network modelling was undertaken for the proposed CA 5 development site to determine the necessary servicing requirements utilising the following methodology:

- Define gravity catchments and determine internal wastewater reticulation network alignments based on natural site topography and environmental constraints,
- Apply the projected wastewater flow loading throughout each catchment/site in accordance with defined EP projections,
- Assess the projected development wastewater flow loading and size the network to facilitate servicing of the development in accordance with SEQ Code design standards,
 - Emergency storage calculation (theoretical approach) using the updated $PDWF = C2 \times ADWF$ in conjunction with storage model tool provided by LCC (30/09/2025) is applied as the method of choice for this PNP.
 - Previous emergency storage parameter applied in the recent Monarch Glen IMP applied the d factor
- Determine the required staging of proposed wastewater infrastructure within the proposed development site which aligns with the potable water network assessment in the earlier section.
- Existing inefficiencies (downstream) prior to the implementation of the proposed development will be communicated and included in the findings.

6.2. Wastewater Model Network

Network modelling of the proposed development was undertaken to assess the level of service in accordance with the LCC DSS and SEQ Code. Similar to the potable water network, the implementation of sewer network is envisioned to begin from the Northern and towards South with the exemption that the modelled network for each planning year reflects completed network.

Further details are included in the sub sections below:

6.2.1. Sewer Loading Development

To distribute the projected EPs for each proposed site development, available lot informatio, road alignment, finished levels on a precinct level (mostly for the Northeast part of CA 5) and structure plan information were captured.

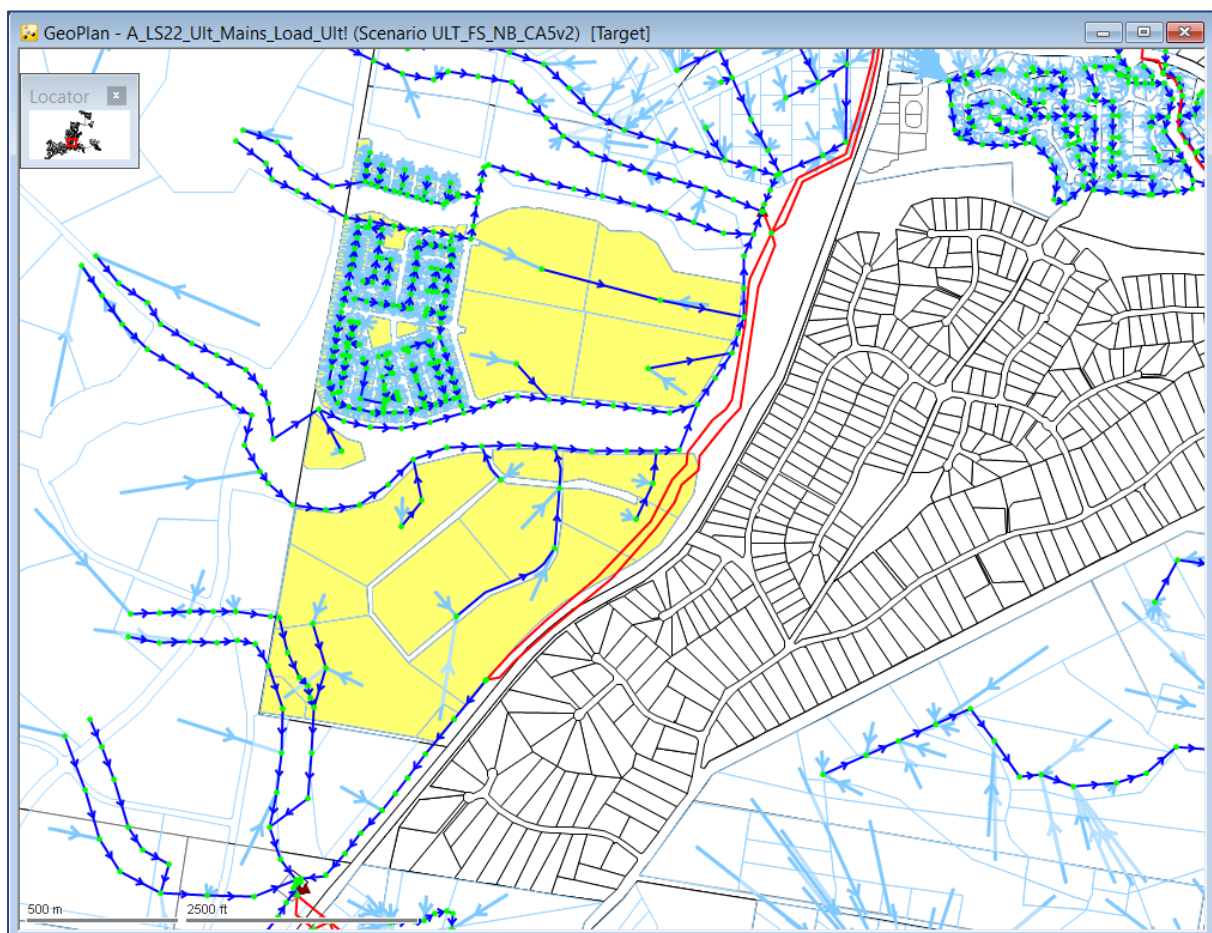


Figure 6-2: Context Area 5 Ultimate Sewer Network (Load Allocation)

6.2.2. Existing Network Deficiencies

As indicated in the draft Monarch Glen IMP (August 2025), the development of network augmentations for the Monarch Glen IMP using the base LCC supplied model (Original Model) was found to have already been non-compliant based on the latest DSS. Similar to the recent Flagstone Town Centre PNP, the CA 5

assumes that non-compliance is present within the Monarch Glen model (being now the base model) that is external to the site is not required for augmentation to permit development of the CA5 site.

A pre and post network assessment is conducted to identify if there are further deficiencies triggered by the proposed CA 5 development.

6.2.2.1. Commentary (Emergency Storage and Pump Start Rate)

Further to the discussion on non-compliance in the base model, August 2025 Monarch Glen IMP indicated deficiencies in both pump starts and emergency storage requirements upon updates on the LCC DSS. The inclusion of Monarch updated demands, increase in the deficiencies were experienced primarily on the emergency storage parameter as shown in Figure 6-3 below. A similar approach for this CA5 PNP to compare base network performance with the updated CA 5 network is conducted and is detailed in the following sections below:

TABLE 6-2 EMERGENCY STORAGE ASSESSMENT					
Horizon	Pump ID	Emergency Storage Available (m ³)	Emergency Storage Required - Original Model (m3)	Emergency Storage Required – Updated Model (m3)	Increase %
Ultimate	FPS_FL1	248.5	632.7	681.3	8%
	SPS152	1487.7	1928.0	2327.3	21%
	FPS_FC3	56.8	145.3	201.8	39%
	SPS151	795.4	1099.3	1299.7	18%
2051	FPS_FL1	38.7	179.67	250.3	39%
	SPS152	743.85	1075.5	1597.7	49%
	FPS_FC3	56.8	83.5	154.1	85%
	SPS151	795.43	820.83	1032.0	26%
2041	FPS_FC3	56.8	29.7	73.1	146%
	SPS151	795.43	544.67	765.2	40%
	SPS152	743.9	661.8	1038.5	57%
2036	SPS152	672.6	531.2	747.8	41%
	SPS151	795.43	441.17	658.5	49%
2031	SPS152	672.60	360.4	495.5	37%
	SPS151	286.40	321.8	453.3	41%
2026	SPS152	672.60	185.7	230.6	24%
	SPS151	286.40	179.3	224.4	25%

Figure 6-3: Emergency Storage Assessment (source Monarch Glen Wastewater IMP, August 2025)

6.2.3. Network Under Investigation

For this precinct network plan assessment, network performance is tested in the following segments enumerated below.

Note: Performance comparison includes recent development update for Flagstone Town Centre(Colliers CED), New Beith Precinct A & B(H2One) and New Beith Precinct C (CED).

6.2.3.1. Segment 1 (Leg 1- Leg 4 towards FPS_FC3_Wet_Well)

This part of the sewer network captures majority of CA 5 catchment internal discharges with the receiving downstream future trunk gravity converging to the proposed FPS_FC3 wet well (IP0022) as shown in Figure 6-4 and Figure 6-5 below. These receiving gravity network is proposed to be required for 2036 based on the LCC IP0022 Wastewater MP.

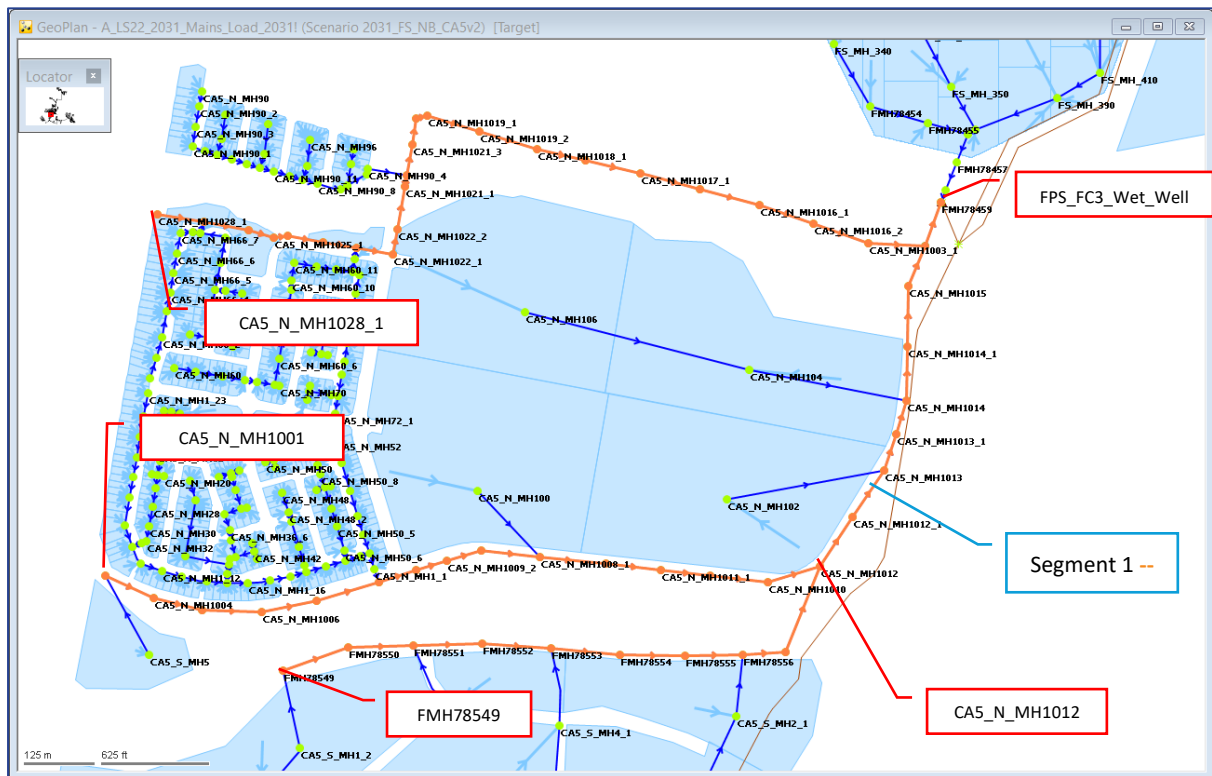


Figure 6-4: Segment 1 Sewer Network (with 4 branches/legs) terminating at FPS_FC3 Wet Well

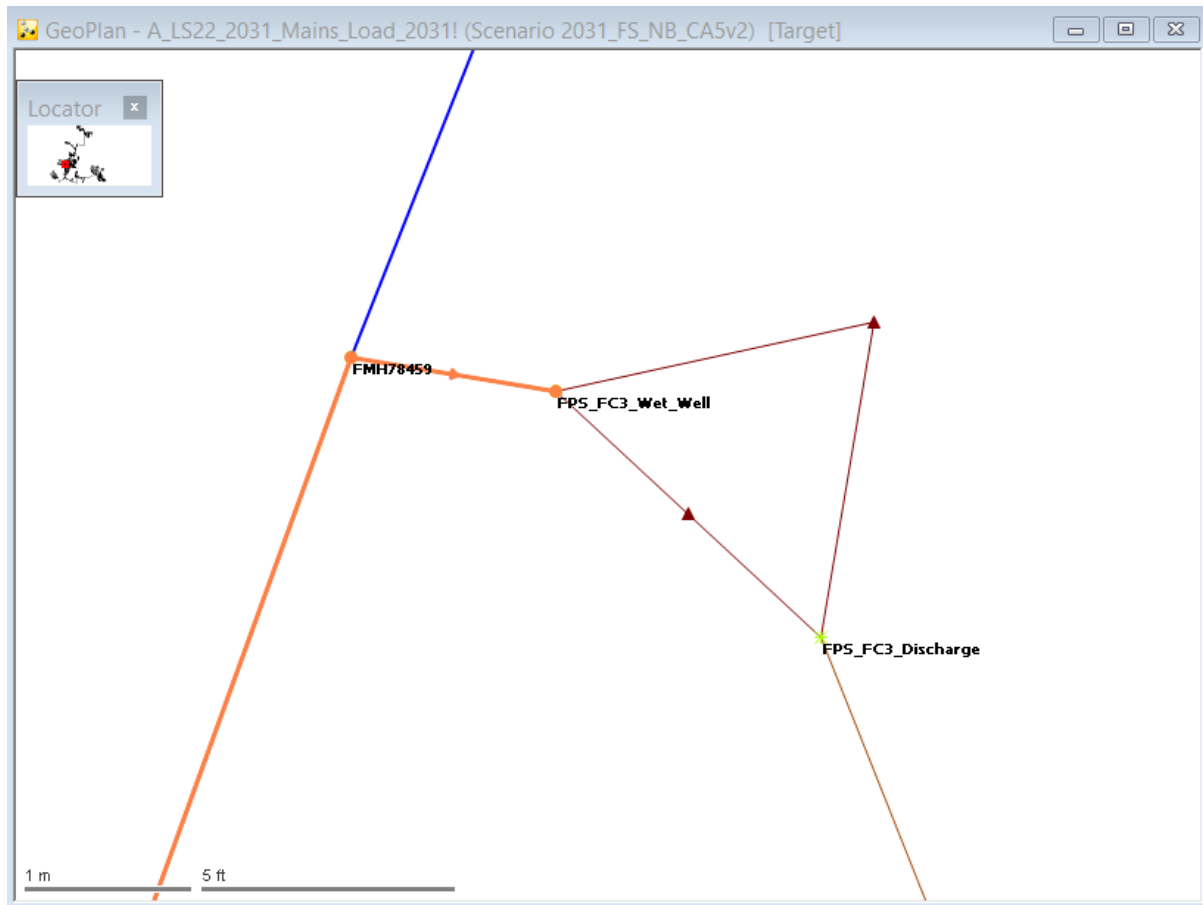


Figure 6-5: Receiving Wet Well at FPS_FC3

6.2.3.2. Leg 5 (FPS_FC3 Rising Main – SPS152 Wet Well)

This part of the sewer network covers the proposed injector point from FPS_FC3 and proceeds southerly along the existing DN500 force main (approximately 1.8 km in length) and discharges to the existing gravity main (approximately 940m in length with size ranging from DN600, DN750 and DN850) from MH TMH77606 to the receiving SPS152 wet well as shown in Figure 6-6 below.



Figure 6-6: Leg 5 Sewer Network (2031 Planning year)

6.2.3.3. Leg 6 (FMH78590 - SPS152 Wet well)

This part of the sewer network covers the future gravity network, proposed to be required for 2051 based on the LCC IP0022 Wastewater MP raving from DN225 to DN450, approximately 680m in length towards the existing wet well at SPS152 as shown in Figure 6-7.

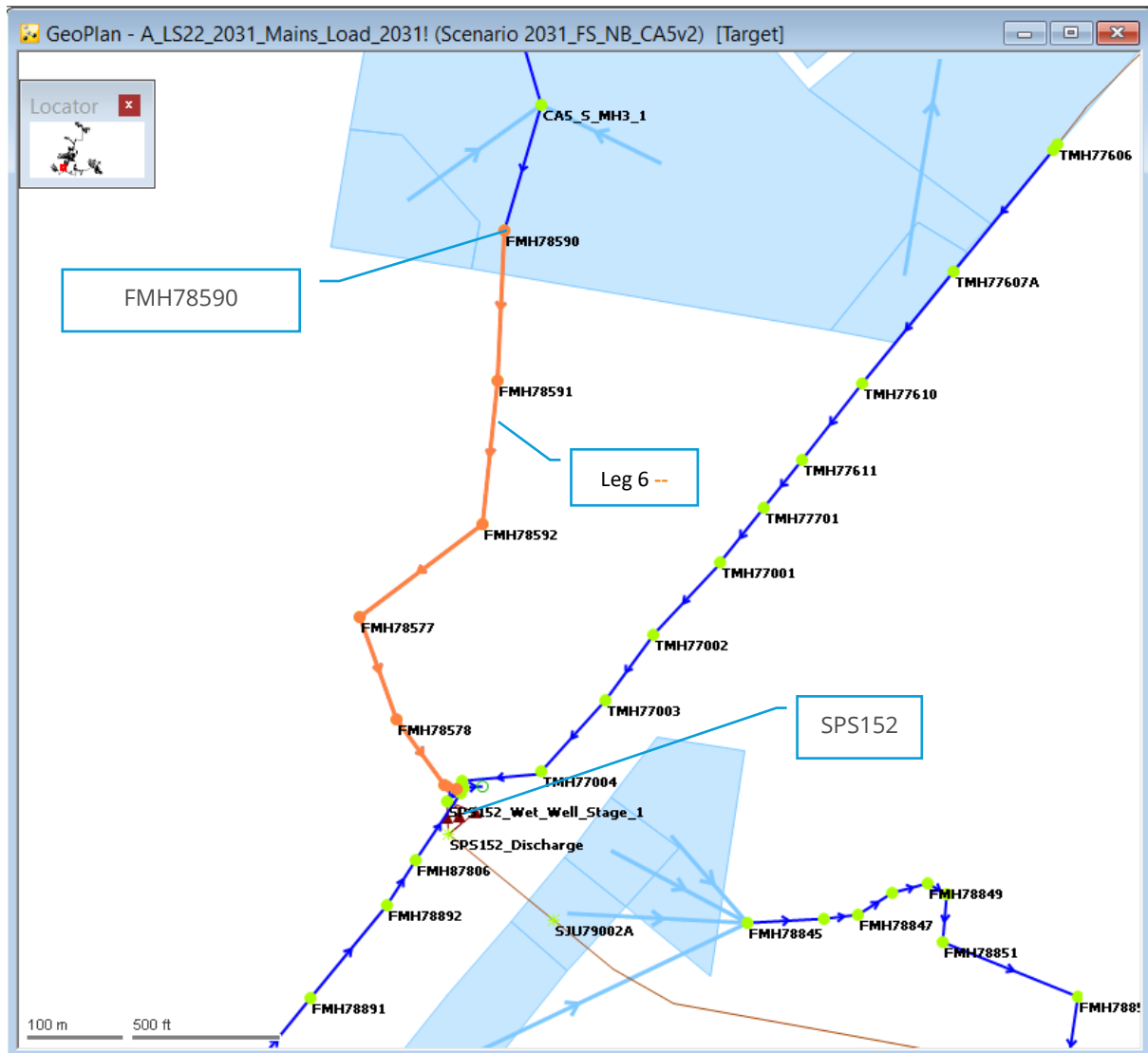


Figure 6-7: Leg 6 Sewer Network (Receiving Wet Well at SPS152)

6.2.4. CA 5 (2031)

In this assessment it is assumed that CA 5 will be developed within the 2031 and 2036 planning year which is accelerated compared to the LCC Wastewater IMP. Table 6-1 below provides the expected sewage discharge based on the provided DSS discharge factors. It can be noted a decrease on the total EPs for the projected site (IDM vs PEET) were identified noting also that a 10% contingency on the CA 5 EPs have been applied for this PNP.

Table 6-1: Context Area 5 Equivalent Population – Sewage discharge (L/s) rate

Projections (Ultimate)	Residential EP	Non Res EP	ADWF(L/s)	PDWF(L/s)	WWF(L/s)
IDM LW CA5	6,884	0	13	25	80
PEET CA 5	5,120	1,237	12	23	71
Increase	-1,764	1,237	-1	-2	-8
Increase%	-34%	Above 100%	-8%	-8%	-12%

6.2.4.1. Segment 1 Network Assessment (Leg 1 – Leg 4)

It has been observed that no additional network non-compliance (comparing Table 6-2 and Table 6-3) was induced by CA5 development. It can be noted that in Ultimate planning the surcharge failure has been improved/eliminated mainly due to the updates of the local catchment boundary and network load distribution at the development site.

Table 6-2: Leg 1 Pre CA 5 Performance

PRE	Surcharge (max 65%)		Velocity (max 3 m/s)	
	Max Surcharge %	Number of Failures	Max Velocity (m/s)	Number of Failures
2031	11%	-	0.64	0
Ultimate	64%	3.00	3.38	1

Table 6-3: Segment 1 (Leg 1-4) With CA 5 Development Network Performance

POST	Surcharge (max 65%)		Velocity (max 3 m/s)	
	Max Surcharge %	Number of Failures	Max Velocity (m/s)	Number of Failures
2031	41%	-	2.36	0
Ultimate	59%	-	3.38	1

6.2.4.2. Leg 5 Network Assessment

Similarly, it has been observed that no additional network non-compliance (comparing Table 6-4 and Table 6-5) was induced by the CA 5 development.

Table 6-4: Leg 5 Pre CA 5 Development Network Performance

PRE	Surcharge (max 65%)		Velocity (max 3 m/s)	
	Max Surcharge %	Number of Failures	Max Velocity (m/s)	Number of Failures2
2031	518%	4	4.61	3
Ultimate	82%	10	5.77	10

Table 6-5: Leg 5 With CA 5 Development Network Performance

POST	Surcharge (max 65%)		Velocity (max 3 m/s)	
	Max Surcharge %	Number of Failures	Max Velocity (m/s)	Number of Failures
2031	519%	4	4.61	3
Ultimate	81%	10	5.76	10

6.2.4.3. Leg 6 Network Assessment

As expected the receiving Leg 6 has been observed to have 2 additional network non-compliance in 2031 for surcharge (comparing Table 6-4 and Table 6-5) induced by the CA 5 development which is mainly due to the backing up of surcharge on the existing network prior to the CA 5 development. For comparison it can be noted that the maximum surcharge % level was reduced at Ultimate planning year with CA 5.

Table 6-6: Leg 6 Pre CA 5 Development Network Performance

PRE	Surcharge (max 65%)		Velocity (max 3 m/s)	
	Max Surcharge %	Number of Failures	Max Velocity (m/s)	Number of Failures2
2031	385%	1	2.44	0
Ultimate	67%	2	3.36	1

Table 6-7: Leg 6 With CA 5 Development Network Performance

POST	Surcharge (max 65%)		Velocity (max 3 m/s)	
	Max Surcharge %	Number of Failures	Max Velocity (m/s)	Number of Failures
2031	746%	3	2.32	0
Ultimate	64%	2	3.36	1

6.2.5. Emergency Storage Assessment

The resulting emergency storage capacity relevant to the proposed development (pre and post CA 5) are provided in Table 6-8 below. It is observed that the implementation of the developments did not increase the availability of emergency storage, which is primarily driven by the developed network at a reasonable topography compared/in relation to the FPS_FC3 wet well level.

Both identified deficiencies can be addressed with operational adjustment of the pump high level alarm (HLA) setting. At 2031, a reduction of the HLA by approximately 3m (from 44m to 41m AHD) provided approximately 161 m³ of emergency storage volume which can service till 2036.

The EP projections and derived C2 factors used for the emergency storage assessment is detailed in Table 6-9 below.

Table 6-8: CA 5 Emergency Storage Assessment (Required Vs Available storage volume in m³)

Catchment	Required (m3) 2 HRs PDWF		Available (m3)		Deficiency (m3)	
	SPS FPS_FC3		SPS FPS_FC3		SPS FPS_FC3	
Planning Year	Base	CA 5	Base	CA 5	Base	CA 5
Ultimate	302	310	44	37	257.46	273.16
2051	218	308	46	36	172.21	271.29
2041	109	229	46	35	63.51	194.03
2036	46	173	46	35	0.53	138.58
2031	44	173	15	35	28.82	138.58

Table 6-9: CA 5 Emergency Storage Assessment (EP to C2 factor SPS FPS_FC3 catchment)

Catchment	EP Projections		Derived C2 Values	
	SPS FPS_FC3 (EP)		SPS FPS_FC3 (C2)	
Planning Year	Base	CA 5	Base	CA 5
Ultimate	12,574	12,967	1.74	1.74
2051	8,751	12,857	1.81	1.74
2041	4,047	9,239	1.96	1.80
2036	1,551	6,777	2.17	1.86
2031	1,471	6,777	2.19	1.86

6.2.6. Pump Station Assessment

6.2.6.1. Pump Start Rate Per Hour

Network performance observation on the maximum allowable pump starts per hour rate comparison was conducted for the affected pump stations FPS_FC3 which are relevant for the CA 5 development/s demonstrated passing the set criteria for Max 8 per hour.

Table 6-10: Pump Starts per hour modelled results

Pump Station	Planning Year	Max Start Rate Per Hour	
		Base	New Beith
FPS_FC3	Ultimate	7	7
	2051	6	7
	2041	3	6
	2036	2	5
	2031	1	5

6.2.6.2. Pump Capacity

The network performance under the peak wet weather flow (PWWF) conditions for all the planning year and modelling scenarios demonstrated no flooding which indicates sufficient pump capacity to service the updated CA 5 development.

6.2.7. Network Augmentations

The sewer network performance assessment demonstrated the level of capacity with the inclusion of the proposed CA 5 development site (initially programmed for 2036 LW MP) for the system for all the planning years with the exemption of 2031 (Emergency Storage). It has been demonstrated that the inherent capacity of the modelled sewer system was, at specific planning parameters and corresponding years, found to be non-compliant prior to the implementation of the proposed CA 5 development. The level/magnitude of failures identified between the base MG IMP (with Flagstone Town Centre) model and the CA 5 PNP model were found marginal with some even demonstrating reduction due to improved demand distribution at the development site.

No additional network failures driven by the CA5 development was triggered to introduce additional network augmentation,

The following sections below provide the details of external augmentation required to service the proposed CA 5 development and exclude the proposed network augmentations enumerated in the recent Monarch Glen IMP.

6.2.7.1. Emergency Storage Augmentation

For the 2031 emergency storage shortfall induced by the implementation of the CA5, it is proposed that the HLA setting of at the future FPS_FC3 be adjusted (HLA to 41 mAHD) to alleviate the shortfall in 2031 and reverted to original (HLA 44 m AHD) in 2036 when additional storage are built to also service other upstream developments.

6.2.7.2. Gravity Sewer Augmentation

No additional gravity sewer augmentation is found necessary as demonstrated in sections 6.2.4.1 to 6.2.4.3 Leg 1 to Leg 3 Network Assessment.

6.2.7.3. Sewer Pump Station and Rising Main

There is no identified non-compliance for the pump station FPC_FC3.

6.3. Wastewater Infrastructure Summary

6.3.1. New Beith Precinct C1 & C2

Table 6-11 below provides the summary for the wastewater network infrastructure to include timing. Note that the list includes the share gravity trunk mains (sizes above DN200). Approximately 13 km of sewer gravity mains will be required to service the proposed CA 5.

Table 6-11: Sewer Pipe Network Summary

Stage	Type	Material	Diameter (mm)	Length (m)
CA 5 Stage 1	Gravity Main	PE	150	6,700
	Gravity Main	PE	200	1,011
	Gravity Main	PE	225	490
	Gravity Main	PE	300	779
	Gravity Main	PE	450	679
	Gravity Main	PE	600	5
CA 5 Stage 2	Gravity Main	PE	150	890
	Gravity Main	PE	200	731
	Gravity Main	PE	225	455
	Gravity Main	PE	300	1,072
	Gravity Main	PE	375	161
	Gravity Main	PE	450	13

6.3.2. CA 5 (External/Shared)

Included in the table above provides the share gravity sewer network. In addition, no material change was identified based on the modelling of the proposed CA 5 which impacts the receiving network discussed in this report. Note that the no changes on the future FPS_FC3 duty and wet well specification was implemented in this report as is found compliant in the report and is required to be implemented in conjunction with Stage 1 above.

7. Conclusion and Recommendations

7.1. Water Servicing Conclusions

The potable water network assessment demonstrates that the proposed CA5 development can be serviced through a staged water supply strategy that integrates with the broader Greater Flagstone and Monarch Glen servicing framework. Hydraulic modelling confirms that the proposed network configuration can achieve the required minimum pressure and fire flow performance criteria under both interim and ultimate servicing scenarios. The strategy has been developed to support staged development while maintaining compatibility with the future Flagstone Low Level Zone (LLZ) reservoirs and Wyaralong Water Treatment Plant (WTP) supply system.

Key findings of the assessment include:

- CA5 can be serviced through three pressure-managed supply zones (DMA230, DMA231 and DMA232) supplied via a staged network arrangement incorporating approximately 12 km of internal water mains and three Pressure Reducing Valves (PRVs).
- The proposed network achieves Logan City Council and SEQ Code servicing requirements, with hydraulic modelling demonstrating compliance with minimum pressure and fire flow standards across all development stages.
- Interim supply is proposed via the Monarch Glen Booster Pump Station and shared DN250 trunk main, supplied from the Round Mountain Reservoir system. This arrangement allows the northern precincts of CA5 to be developed prior to establishment of the ultimate regional water supply infrastructure.
- Stage 1 development can be accommodated through an increase in booster station capacity, however full CA5 development will require additional supply capacity through booster augmentation, a dedicated CA5 booster station, or implementation of future regional infrastructure solutions.
- The proposed network has been configured to support future integration with the Flagstone LLZ Reservoirs and Wyaralong WTP, minimising future reconfiguration requirements and providing a clear transition from the interim supply arrangement.
- Hydraulic assessment identified isolated DN200 and DN250 trunk main sections exceeding the preferred headloss gradient criteria under interim operating conditions; however, these assets form part of the future DMA boundary configuration and are expected to achieve compliance upon implementation of the ultimate Flagstone supply network.
- No immediate trunk main upsizing is considered necessary, subject to Logan City Council acceptance of the interim operating performance and recognition of the ultimate network configuration.
- The preferred servicing solution will ultimately depend on development sequencing, precinct staging and regional infrastructure delivery timeframes, and should therefore be refined through future planning and detailed design phases.
- Progressively increase and stage the Monarch Glen Booster Pump Station to meet increasing flow and head requirements as development advances, including allowance for fire flow demand, in line with previously determined pump staging
- Water Booster Pump Station SCADA programming to be reviewed to ensure network performance across both stages.
- Monitor interim system performance, particularly booster suction pressures and fire flow performance, to manage operational risks until the ultimate network is in place.

Overall, the proposed water servicing strategy provides a technically feasible, flexible and cost-effective approach to servicing CA5, while maintaining consistency with the long-term water supply objectives for the Greater Flagstone Priority Development Area

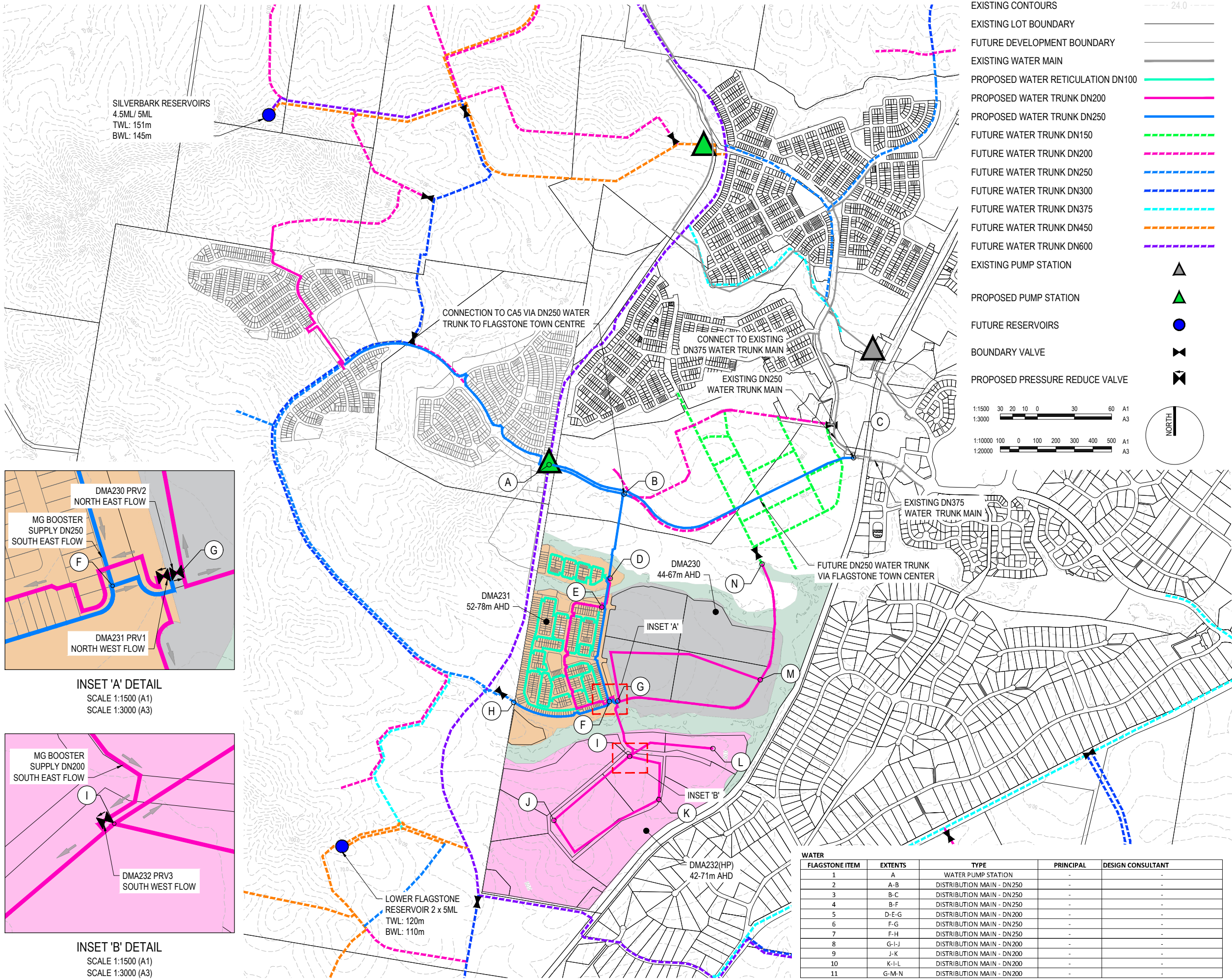
7.2. Wastewater Servicing Conclusions

The wastewater network assessment detailed in the report provides the extent of the required reticulation and required future/planned trunk network infrastructure to service the proposed development. The findings in this report indicated compliance with the necessary parameters, except for the emergency storage requirements, based on the LCC desired standards and SEQ Code within the FPS_FC3 pump station catchment which services the development. The identified non-compliance comparison (emergency storage) demonstrates that the CA 5 does not materially impact the external network proposed in the Monarch Glen IMP.

Appendices

Appendix A

Water Infrastructure Plans



DRAFT FOR DISCUSSION
PURPOSES ONLY

CLIENT

PEET

PROJECT

FLAGSTONE CA5

FLAGSTONE CONTEXT AREA 5
QLD 4280

WATER NODAL PLAN

AMENDMENTS:	DATE:
A ISSUE FOR INFORMATION	22.05.2026
B ISSUE FOR INFORMATION	29.06.2026

DESIGNED: RC	DATE:
DRAWN: JD	DATE:
SCALE: AS SHOWN	1 OF 1

IMPORTANT NOTES:

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This plan remains subject to, but not limited to, authority approval, detail design and final survey.

The total number of lots shown on this plan is approximate only.

No relevance should be placed on the information on this plan for any financial dealings involving the land.

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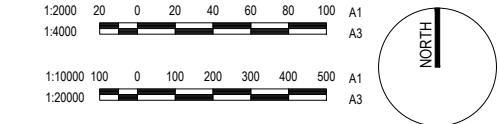
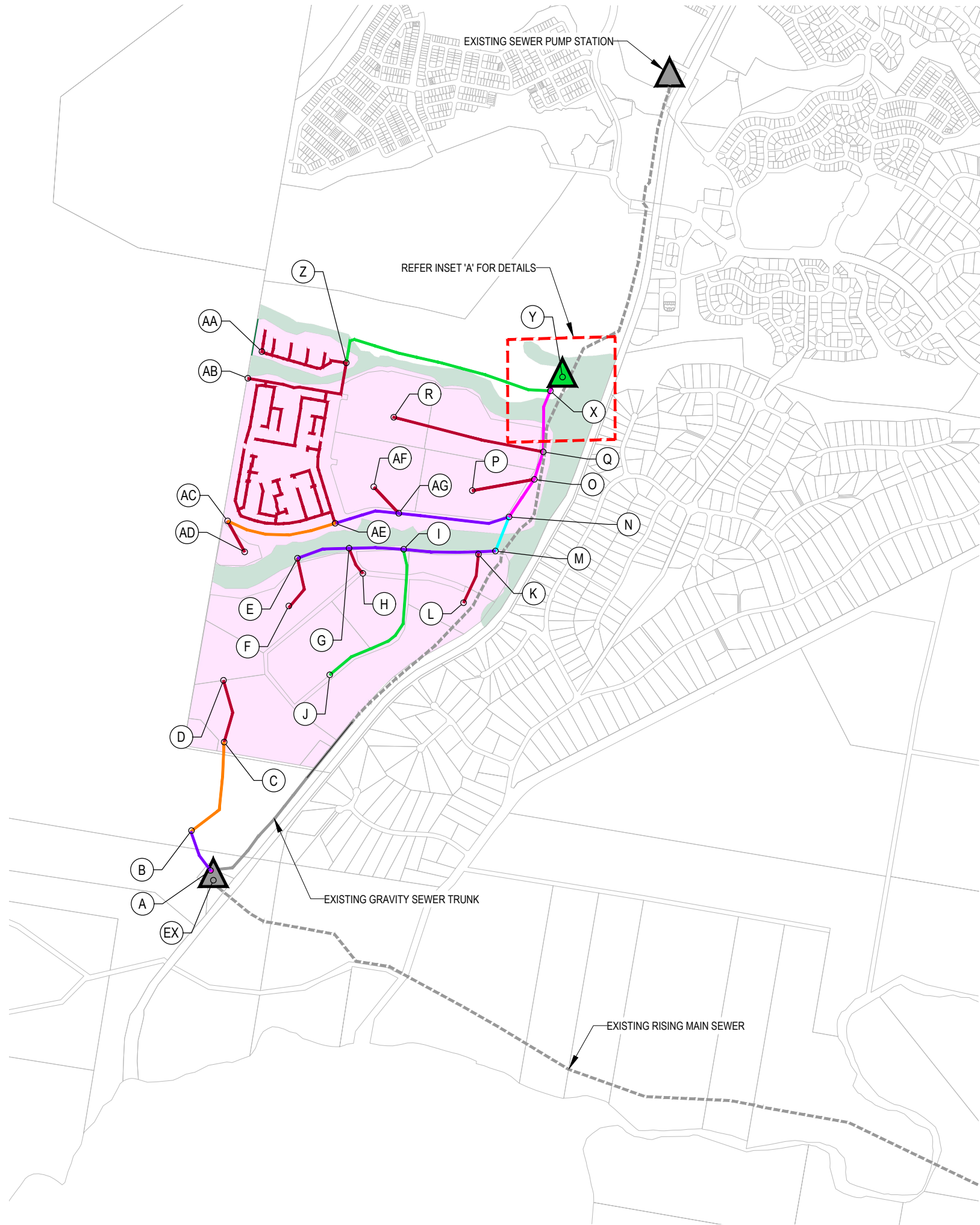
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24-1082-MP-650	B

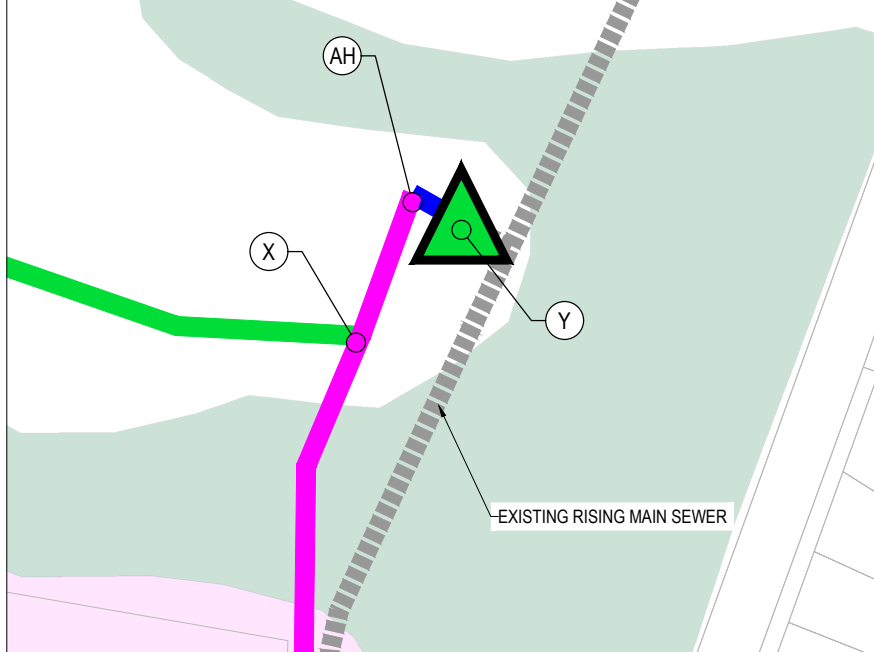
FLAGSTONE ITEM	EXTENTS	TYPE	PRINCIPAL	DESIGN CONSULTANT
1	A	WATER PUMP STATION	-	-
2	A-B	DISTRIBUTION MAIN - DN250	-	-
3	B-C	DISTRIBUTION MAIN - DN250	-	-
4	B-F	DISTRIBUTION MAIN - DN250	-	-
5	D-E-G	DISTRIBUTION MAIN - DN200	-	-
6	F-G	DISTRIBUTION MAIN - DN250	-	-
7	F-H	DISTRIBUTION MAIN - DN250	-	-
8	G-I-J	DISTRIBUTION MAIN - DN200	-	-
9	J-K	DISTRIBUTION MAIN - DN200	-	-
10	K-L-L	DISTRIBUTION MAIN - DN200	-	-
11	G-M-N	DISTRIBUTION MAIN - DN200	-	-

Appendix B

Trunk Sewerage Infrastructure Plans



- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- EXISTING RISING MAIN
- EXISTING GRAVITY MAIN
- PROPOSED SEWER GRAVITY DN150
- PROPOSED SEWER GRAVITY DN200
- PROPOSED SEWER GRAVITY DN225
- PROPOSED SEWER GRAVITY DN300
- PROPOSED SEWER GRAVITY DN375
- PROPOSED SEWER GRAVITY DN450
- PROPOSED SEWER GRAVITY DN600
- POSSIBLE DEVELOPMENT AREA
- CONSTRAINED AREA



SEWER				
FLAGSTONE ITEM	EXTENTS	TYPE	PRINCIPAL	DESIGN CONSULTANT
1	EX	EXISTING SEWER PUMP STATION	-	-
2	EX-A	GRAVITY SEWER - DN450 PE	-	-
3	A-B	GRAVITY SEWER - DN300 PE	-	-
4	B-C	GRAVITY SEWER - DN225 PE	-	-
5	C-D	GRAVITY SEWER - DN150 PE	-	-
6	E-F	GRAVITY SEWER - DN150 PE	-	-
7	E-G-I	GRAVITY SEWER - DN300 PE	-	-
8	G-H	GRAVITY SEWER - DN150 PE	-	-
9	I-J	GRAVITY SEWER - DN200 PE	-	-
10	I-K-M	GRAVITY SEWER - DN300 PE	-	-
11	K-L	GRAVITY SEWER - DN150 PE	-	-
12	M-N	GRAVITY SEWER - DN375 PE	-	-
13	N-O-Q	GRAVITY SEWER - DN450 PE	-	-
14	N-AG-AE	GRAVITY SEWER - DN300 PE	-	-
15	O-P	GRAVITY SEWER - DN150 PE	-	-
16	O-Q-X	GRAVITY SEWER - DN450 PE	-	-
17	Q-R	GRAVITY SEWER - DN150 PE	-	-
18	Q-X	GRAVITY SEWER - DN450 PE	-	-
19	X-Z	GRAVITY SEWER - DN200 PE	-	-
20	Y	INTERIM SEWAGE PUMPING STATION	-	-
21	Y	ULTIMATE SEWAGE PUMPING STATION	-	-
22	Z-AA	GRAVITY SEWER - DN150 PE	-	-
23	Z-AB	GRAVITY SEWER - DN150 PE	-	-
24	AC-AD	GRAVITY SEWER - DN150 PE	-	-
25	AC-AE	GRAVITY SEWER - DN225 PE	-	-
26	AF-AG	GRAVITY SEWER - DN150 PE	-	-

DRAFT FOR DISCUSSION PURPOSES ONLY

CLIENT

PEET

PROJECT

FLAGSTONE CA5

FLAGSTONE CONTEXT AREA 5
QLD 4280

SEWER NODAL PLAN

AMENDMENTS:	DATE:
A ISSUED FOR INFORMATION	22.05.2026
DESIGNED: TW	DATE:
DRAWN: JD	DATE:
SCALE: 1 in 10000 (A1) & 1 in 2000 (A1)	1 OF 1

IMPORTANT NOTES:

This note is an integral part of this plan. This plan may not be reproduced without this note.

This plan was prepared for discussion purposes only and is conceptual only. This plan should not be used for any other purposes.

This plan remains subject to, but not limited to, authority approval, detail design and final survey.

The total number of lots shown on this plan is approximate only.

No relevance should be placed on the information on this plan for any financial dealings involving the land.

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ISO 9001
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AS/NZS 4801
GLOBAL CERTIFICATION PTY LTD

Colliers

DRAWING NUMBER:	ISSUE:
24-1082-MP-600	A

Project: Monarch Glen WBPS
Document: Inline Booster Pump Station Hydraulic Design
Document No: 22055-BPS-HY-CAL-001
Revision: A (For Review) - Stage 4 as Ultimate



DATE: 7/01/2026

Design Summary

Parameter	Value	Unit	Notes
Design Duty (Stage 4 Max)	75.10	L/s @ 62.58 m	
Design Duty (Stage 1 Min)	1.20	L/s @ 38.13 m	
Static Head	7.73	m	
Duty mode	Duty / Standby		
Discharge Manifold dia.	200	mm	
Discharge Manifold type	316 SS	PN SCH10	
Rising main 1 dia.	280	mm	
Rising main 1 type	PE100	PN 16	

Design References

Parameter	Value	Unit	Ref
Discharge flow rate (Stage 4 Max)	75.10	l/s	Charlie Resolved email received: 10.10.2025
Discharge flow rate (Stage 1 Min)	1.20	l/s	Charlie Resolved email received: 10.10.2025
Suction Pressure (Stage 1)	7.60	m	Charlie Resolved email received: 10.10.2025
Delivery Pressure (Stage 1)	38.00	m	Charlie Resolved email received: 10.10.2025
Suction Pressure (Stage 4)	19.30	m	Charlie Resolved email received: 10.10.2025
Delivery Pressure (Stage 4)	62.50	m	Charlie Resolved email received: 10.10.2025
Rising main length	690.00	m	Assumed based on CAD file: 25-0521_X_Contours Design_251204; Received: 09.12.2025
RM discharge IL	86.00	m	Assumed based on CAD file: 25-0521_X_Contours Design_251204; Received: 09.12.2025
Pump Station FSL	78.50	m	Bulk Earthworks Layout Plan Sheet 1 of 15; Drawing No. 0120; Rev: 1; Dated: 02.12.2025
Incoming Suction pipe IL	78.50	m	Bulk Earthworks Layout Plan Sheet 1 of 15; Drawing No. 0120; Rev: 1; Dated: 02.12.2025
Incoming Suction pipe size	TBC	mm	To be confirmed

Note: The design has been performed based on the latest info provided referenced above, any change or update to the info above shall be reported to the designer.

Project: Monarch Glen WBPS
Document: Inline Booster Pump Station Hydraulic Design
Document No: 22055-BPS-HY-CAL-002
Revision: A (For Review) - Stage 4 as Ultimate

DATE: 7/01/2026
Designer: CT
Reviewer: IA



HL method: Hazen Williams

Mode: Duty / Standby

Flow Rate Estimation

Target flow rate = 75.1 l/s

Minimum Pipe Internal Diameter

Minimum ID = 178.49 mm

Pipe selection & Scour stripping constraints

	Disch. Manifold	RM 1
Nominal Diameter (mm)	200	280
Material	316 SS	PE100
PN Class (bar)	SCH10	16
Internal Diameter (mm)	211.58	228
Internal Area of the main (m ²)	0.0352	0.0408
HW Coefficient (C)	130	130
Length of RM (m)	4	690
Volume of RM (m ³)	0.14	28.18
Fittngs & Valves HL K _f	6	3
Avg. Velocity (m/s)	2.14	1.84

Rising main total length = 694.0 m
 Maximum velocity (m/s) = 3

Head Loss Calcs

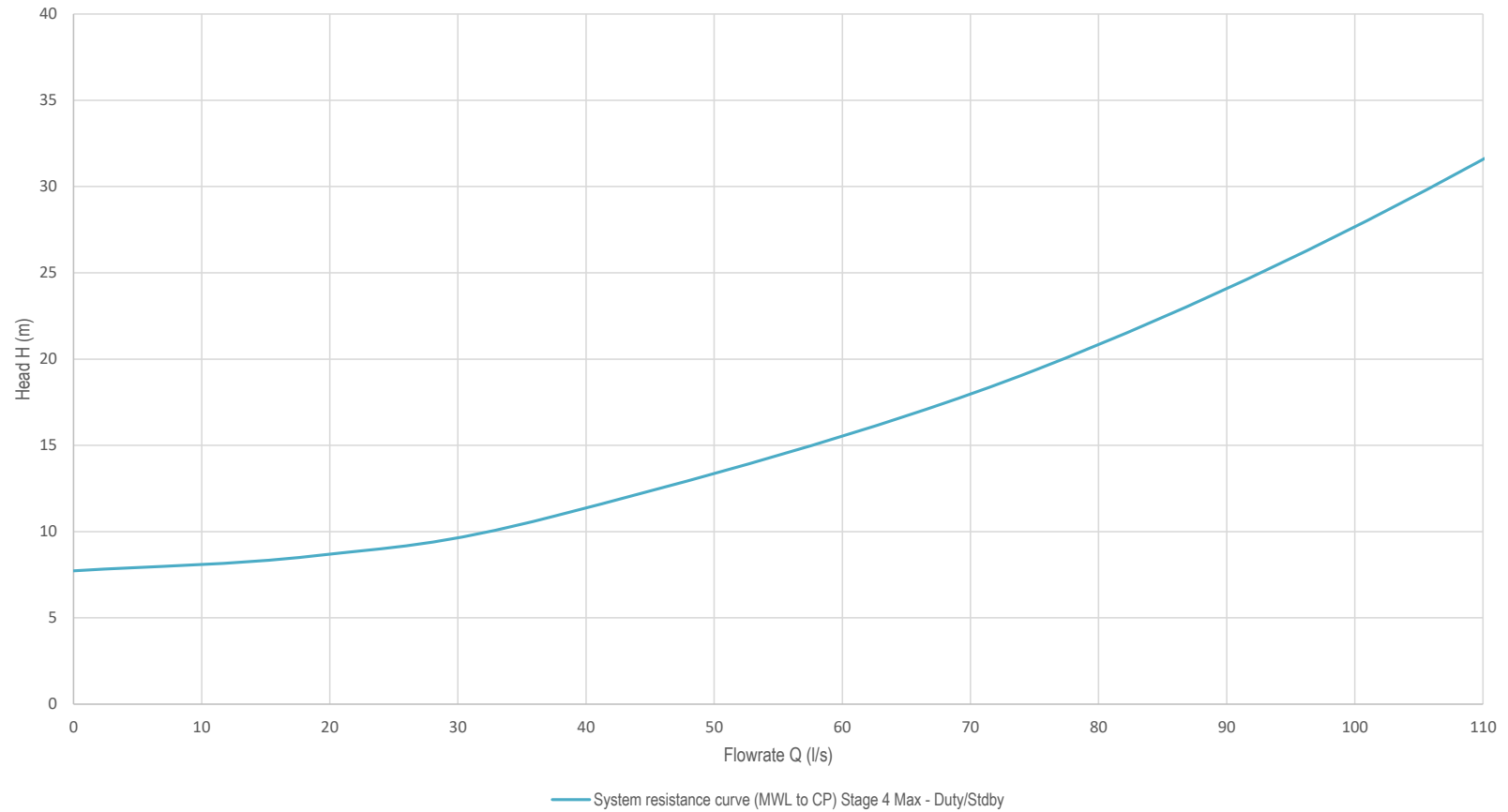
Suction Line RL	=	78.5 m	CP
Discharge RL / High Point	=	86 m	
Static Lift (from MWL)	=	7.73 m	
Loss due to pipe and fittings	=	11.65 m	
Suction Pressure (Stage 1)	=	7.6 m	
Delivery Pressure (Stage 1)	=	38 m	
Suction Pressure (Stage 4)	=	19.3 m	
Delivery Pressure (Stage 4)	=	62.5 m	
Total Mean Head (Min Flow)	=	38.13 m	
Total Mean Head (Max Flow)	=	62.58 m	

Minimum, Maximum & Selected Flow

Minimum flow Q _{p(min)}	=	1.2 l/s
Maximum flow Q _{p(max)}	=	122.53 l/s
Selected Flow (Max)	=	75.1 l/s
Selected Flow (Min)	=	1.2 l/s

Project: Monarch Glen WBPS
Document: Inline Booster Pump Station Hydraulic Design
Document No: 22055-BPS-HY-CAL-001
Revision: A (For Review) - Stage 4 as Ultimate

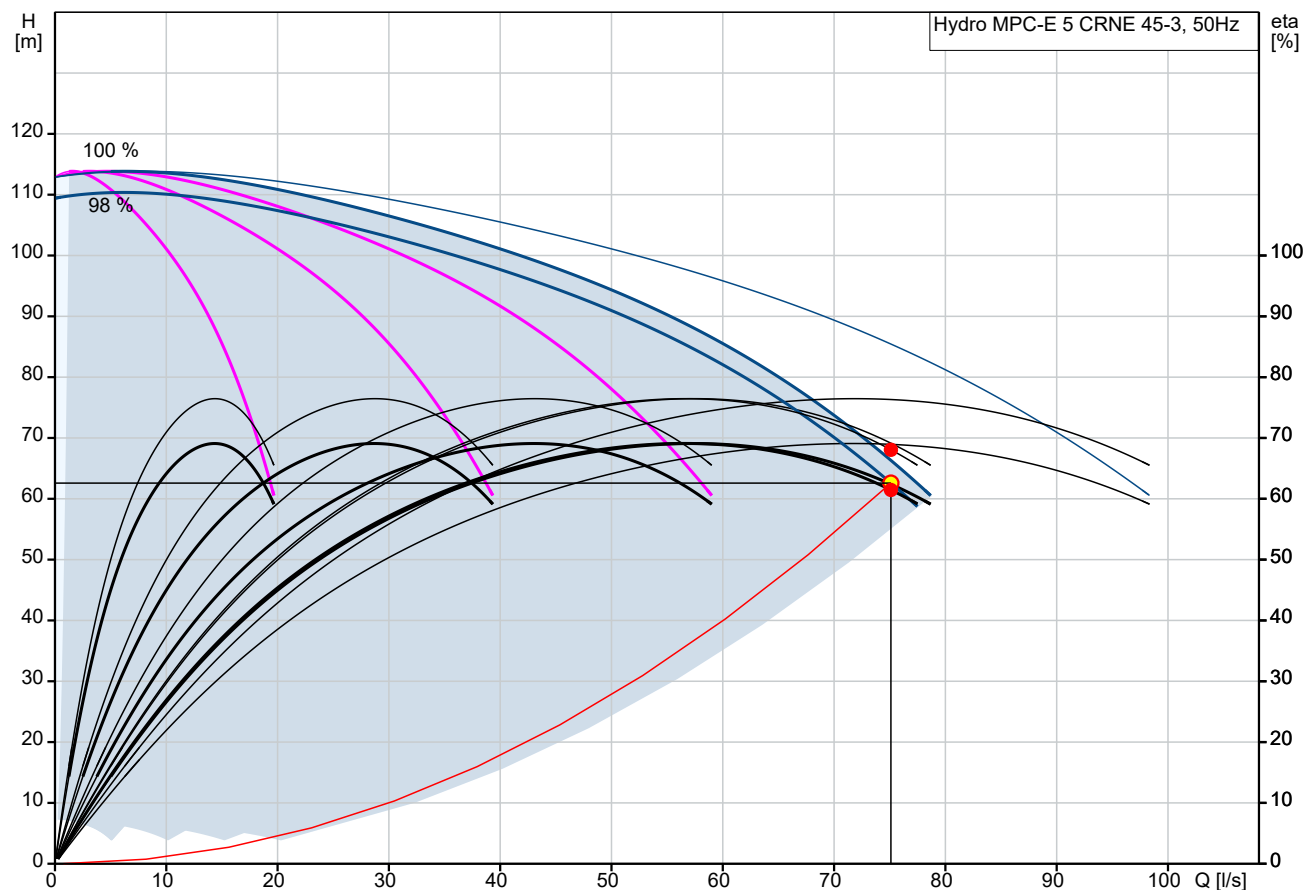
DATE: 7/01/2026
Designer: CT
Reviewer: IA



Qty.	Description
1	Hydro MPC-E 5 CRNE 45-3  Note! Product picture may differ from actual product Product No.: 99735970 The Grundfos Hydro MPC-E packaged pump system is a complete pump set with pumps, valves, inlet and outlet manifolds mounted on a common base. The pump system includes an operating panel designed to Grundfos specifications. The pressure booster system is supplied as a compact assembly according to DIN standard 1988/T5 • Hydro MPC-E maintains a constant pressure through continuous speed adjustment of the pumps, irrespective of flow rate. • System performance is adapted to the demand by starting and stopping the required number of pumps and through parallel control of the pumps in operation, that is, cascade. • Pump changeover is automatic and depends on load, time and fault. The Grundfos Hydro MPC-E boosting package comprises the following components: • Pump: Parts in contact with the pumped liquid are manufactured in stainless steel EN DIN 1.4401. Pump bases and heads are of stainless steel (CRN). The pumps are equipped with a service-friendly cartridge shaft seal, HQQE (silicon carbide/silicon carbide/EPDM). Pumps are fitted with Grundfos MGE IE5 premium-efficiency permanent-magnet motors to 11kW and high-efficiency IE3 MGE motors to 15-22 kW. • Manifolds: Two manifolds of stainless steel EN DIN 1.4571 with screwed BSP connections 2–2½ and stainless-steel loose-ring inlet/outlet flanges to DIN DN80-DN350. • Modular base frame: Pumps are mounted to a common base frame (five and six-pump packages may be split) manufactured in either folded and welded stainless steel or hot-dip galvanised fabricated mild steel (system size dependant). • One non-return valve (POM) and two isolating valves for each pump. Non-return valves are certified according to DVGW, isolating valves according to DIN and DVGW. Pumps up to 50 N.B will have screwed 316SS ball valves. Pumps of 65 N.B and over will be fitted with isolation butterfly valves with 316 stainless-steel disk and spindle. Isolating valves will be fitted on both sides of each main booster pump. 316SS non-return valves will be fitted to the inlet or outlet side of each main booster pump. • Adapter with isolating valve for connection of diaphragm tank. • Pressure gauge and pressure transmitter (analogue output 4-20 mA). • Grundfos CU 352 pump controller in a powder-coated steel cabinet, IP 54, including main switch, all required fuses, motor protection, emergency switches, operating light in panel door, switching equipment and microprocessor-controlled by the CU 352. Dry-running protection and diaphragm tank are available according to the list of accessories. Pump operation is controlled by Control MPC with the following functions: • Intelligent multipump controller, CU 352. • Constant-pressure control through continuous variable speed adjustment of each individual pump. • PID controller with adjustable PI parameters (Kp + Ti). • Constant pressure at setpoint, independent of inlet pressure.

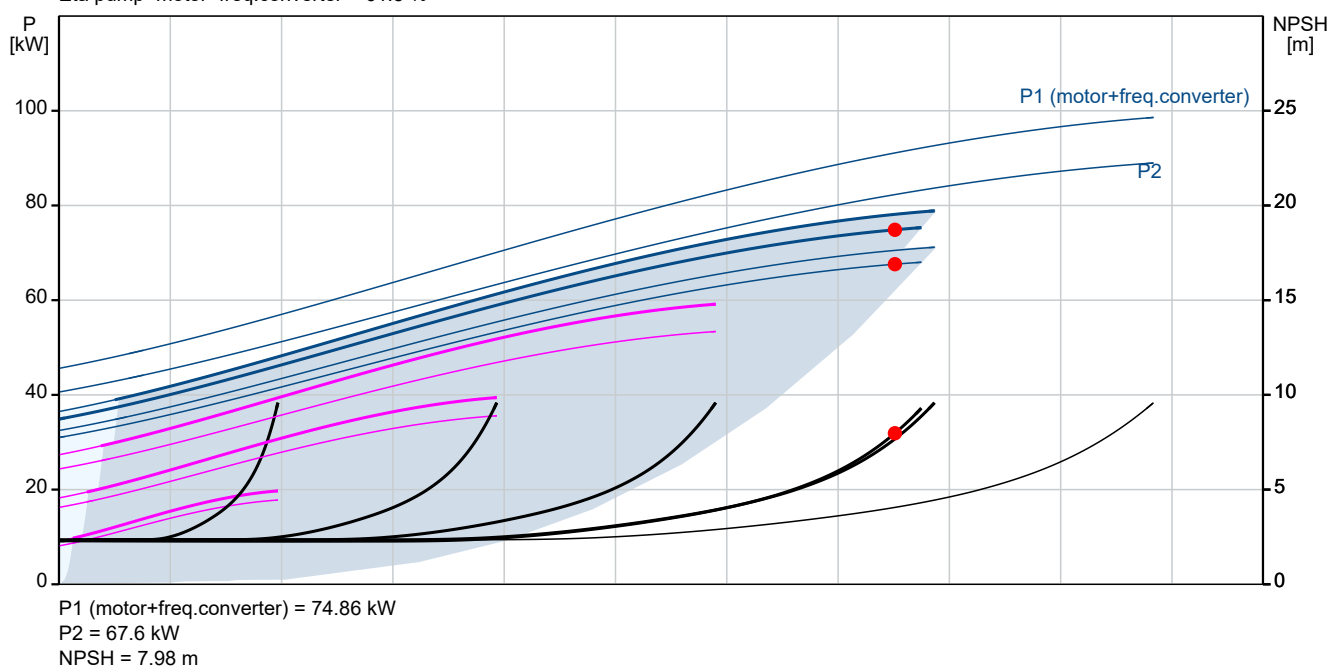
Qty.	Description														
1	• On and off operation at low flow. • Automatic cascade control of pumps for optimum efficiency. • Selection of min. time between start and stop, automatic pump changeover and pump priority. • Automatic pump test function to prevent idle pumps from seizing. • Possibility of standby pump allocation. • Possibility of backup sensor (redundant primary sensor). • Manual operation. • Display of individual pump run hours. • Soft pressure build-up. • Internal time clock-based operation. • Possibility of external setpoint influence. • Log function. • Setpoint ramp. • Possibility of digital remote-control functions: • System on and off. • Max., min. or user-defined duty range. • Up to 6 alternative setpoints. • Digital inputs and outputs can be configured individually. • Pump and system monitoring functions: • Minimum and maximum limits of current value. • Inlet pressure. • Motor protection. • Sensors and cables monitored against malfunction. • Alarm log with the previous 24 warnings and alarms, time and date stamped. • Display and indication functions: • Colour screen display. • Green light for operating indications and red light for fault indications. • Potential-free changeover switches for operation and fault. • Grundfos bus communication options via Grundfos CIM. • Optional Grundfos Remote Management (GRM). Booster system includes panel door-mounted system emergency stop button and the additional IP602 panel that includes the following features: • Easy navigation via intuitive pushbuttons. • Individual pump operating and fault LEDs. • System alarm LED. • Multifunction pump liquid temperature display. • Input facility to connect optional pump liquid temperature sensors. • Pump liquid temperature protection, if optional sensors connected. • Phase failure indication when optional phase failure protection is included. • Alarm reset and mute of audible alarm button. There are options to upgrade the pressure boosting system. <table> <tr> <td>Flow media:</td><td>Water</td></tr> <tr> <td>System pressure max.:</td><td>16 bar</td></tr> <tr> <td>Flow (Plant):</td><td>97.22 l/s</td></tr> <tr> <td>Flow (Pump):</td><td>75.1 l/s</td></tr> <tr> <td>Head:</td><td>62.58 m</td></tr> <tr> <td>Nom. current of plant:</td><td>180 A</td></tr> <tr> <td>Nominal power:</td><td>18.5 kW</td></tr> </table>	Flow media:	Water	System pressure max.:	16 bar	Flow (Plant):	97.22 l/s	Flow (Pump):	75.1 l/s	Head:	62.58 m	Nom. current of plant:	180 A	Nominal power:	18.5 kW
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Nom. current of plant:	180 A														
Nominal power:	18.5 kW														

99735970 Hydro MPC-E 5 CRNE 45-3

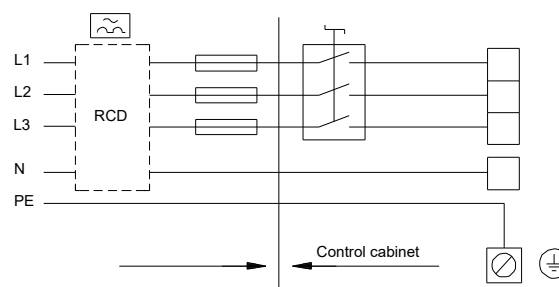
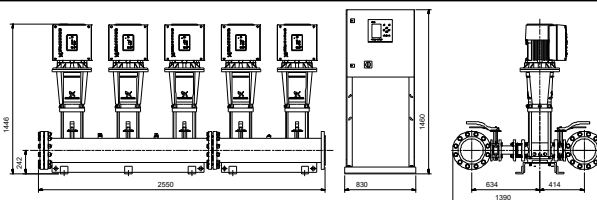
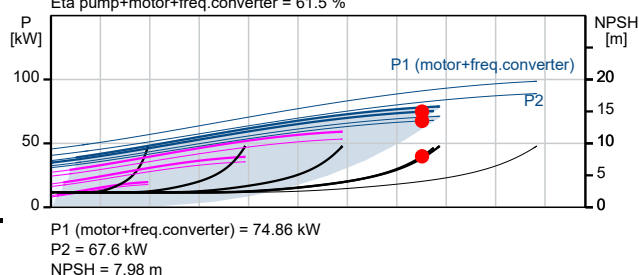
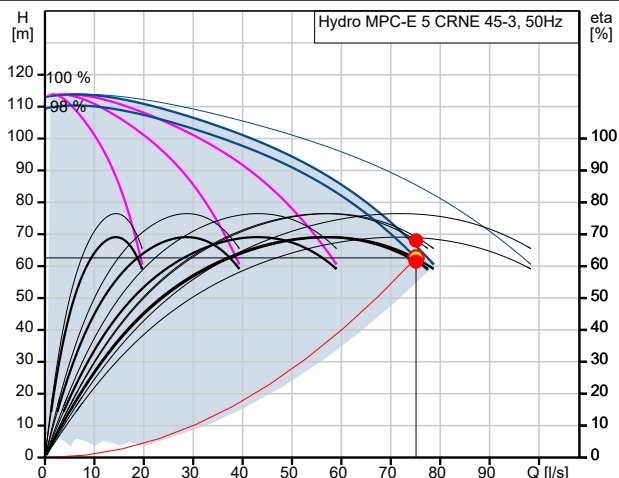


Losses in fittings and valves not included
H = 62.58 m
Pumped liquid = Water
Density = 998.2 kg/m³
Eta pump+motor+freq.converter = 61.5 %

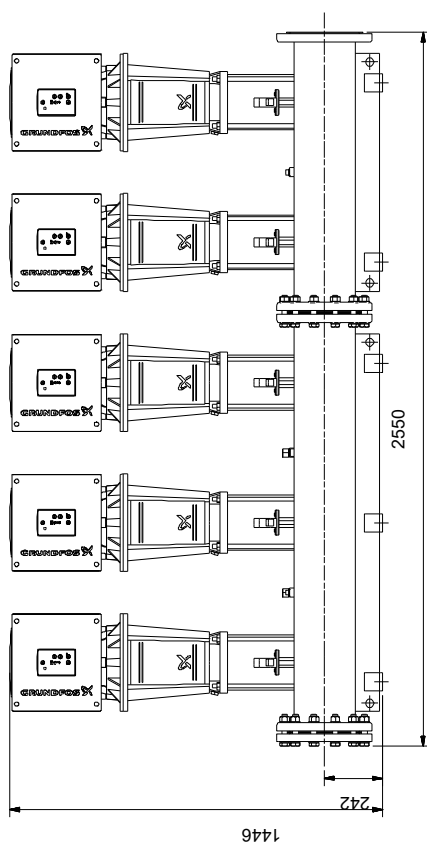
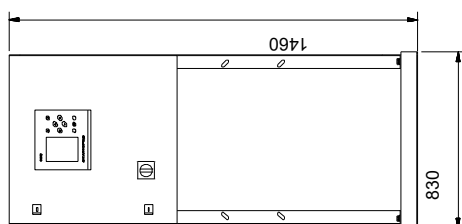
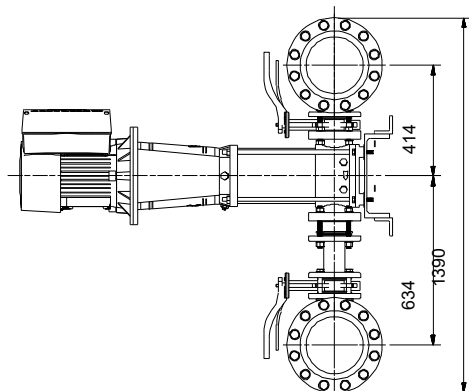
Q = 75.1 l/s
n = 4 x 98 % / 3487 rpm
Liquid temperature during operation = 20 °C
Eta pump = 68.1 %



Description	Value
General information:	
Product name:	Hydro MPC-E 5 CRNE 45-3
Product No:	99735970
EAN number:	5713833574420
Price:	
Technical:	
Actual calculated flow:	75.1 l/s
Max. flow:	97.22 l/s
Resulting head of the pump:	62.58 m
Max. head:	110 m
Main pump name:	CRNE 45-3
Main pump No:	96123438
Number of pumps:	5
Materials:	
Manifolds:	EN/DIN 1.4571/ AISI 316 Ti
Installation:	
Range of ambient temperature:	5 .. 40 °C
Maximum operating pressure:	16 bar
Manifold inlet:	DN200
Manifold outlet:	DN200
Pressure rating:	PN 16
Earth connection:	N, PE
System design:	D
Liquid:	
Pumped liquid:	Water
Liquid temperature range:	5 .. 60 °C
Selected liquid temperature:	20 °C
Density:	998.2 kg/m ³
Electrical data:	
Power (P2) main pump:	18.5 kW
Mains frequency:	50 / 60 Hz
Rated voltage:	3 x 380-415 V
Rated current of system:	180 A
Start. method:	Variable frequency drives
Enclosure class (IEC 34-5):	IP54
Radio interference supression:	EMC DIRECTIVE(2014/30/EU)
Number of phases of main pump:	3
Controls:	
Control type:	E
Dry running protection, mechanical:	NONE
Tank:	
Tank volume:	18 l
Diaphragm tank:	Yes
Others:	
Net weight:	2020 kg
Gross weight:	2280 kg
Sales region:	Australia
Config. file no. pump:	95139531
Config. file no. Control MPC:	98271949
Config. file no. Hydro MPC:	98272018

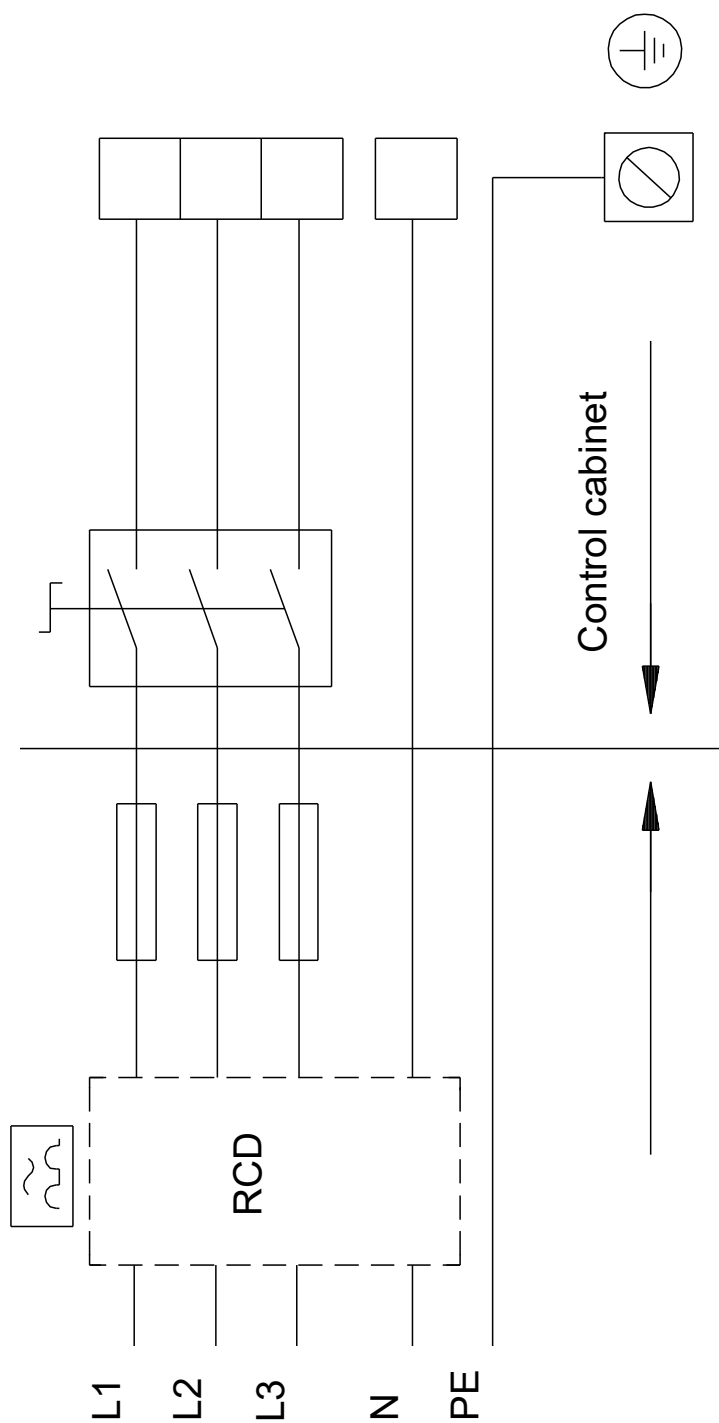


99735970 Hydro MPC-E 5 CRNE 45-3



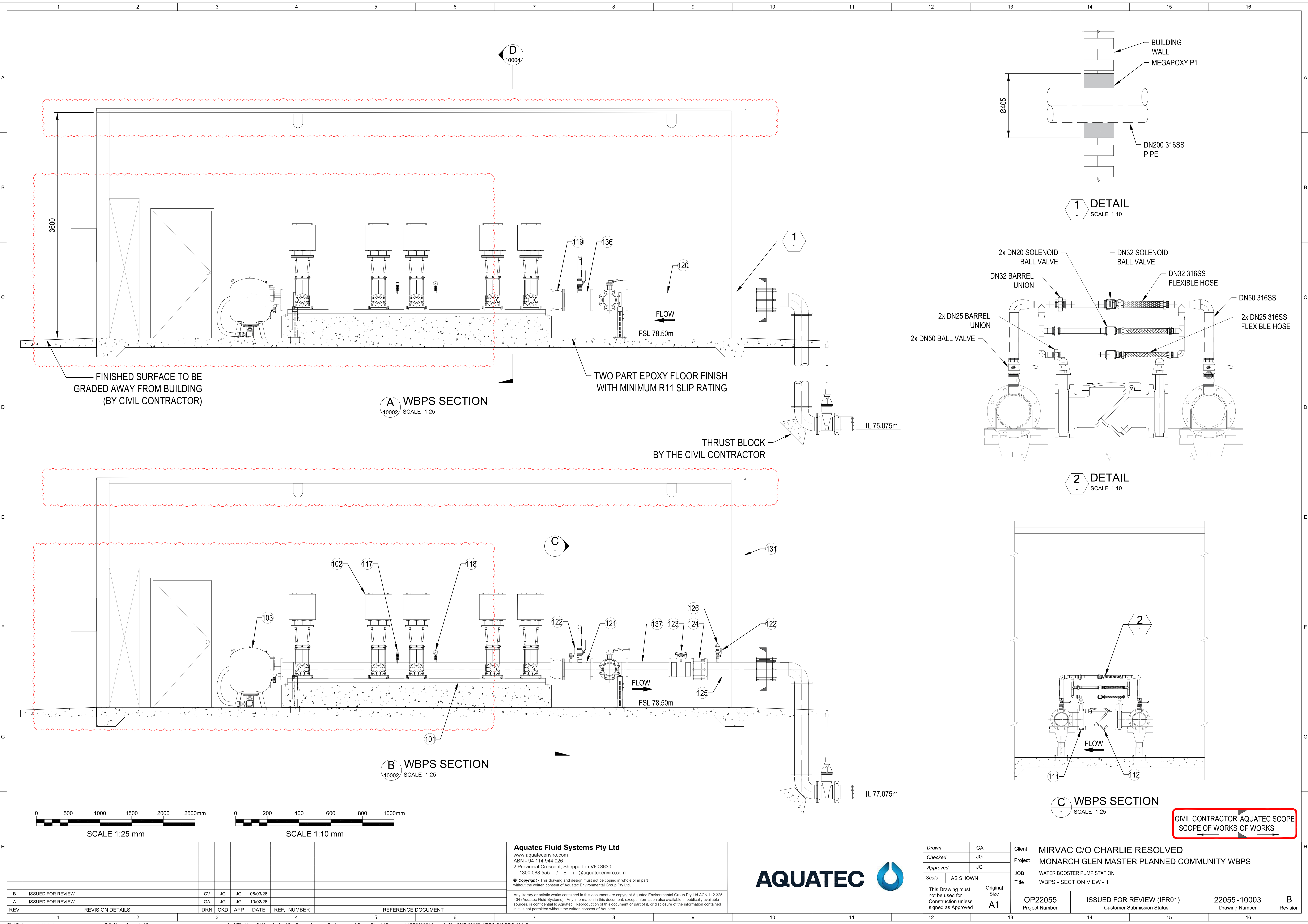
Note! All units are in [mm] unless others are stated.
Disclaimer: This simplified dimensional drawing does not show all details.

99735970 Hydro MPC-E 5 CRNE 45-3



Note! All units are in [mm] unless others are stated.

[illegible]



B				ISSUED FOR REVIEW	CV	JG	JG	06/03/26								
A				ISSUED FOR REVIEW	GA	JG	JG	10/02/26								
REV				REVISION DETAILS	DRN	CKD	APP	DATE	REF. NUMBER				REFERENCE DOCUMENT			
1									4				5			
2													6			
3													7			
4													8			
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Plot Date: 06/03/2026

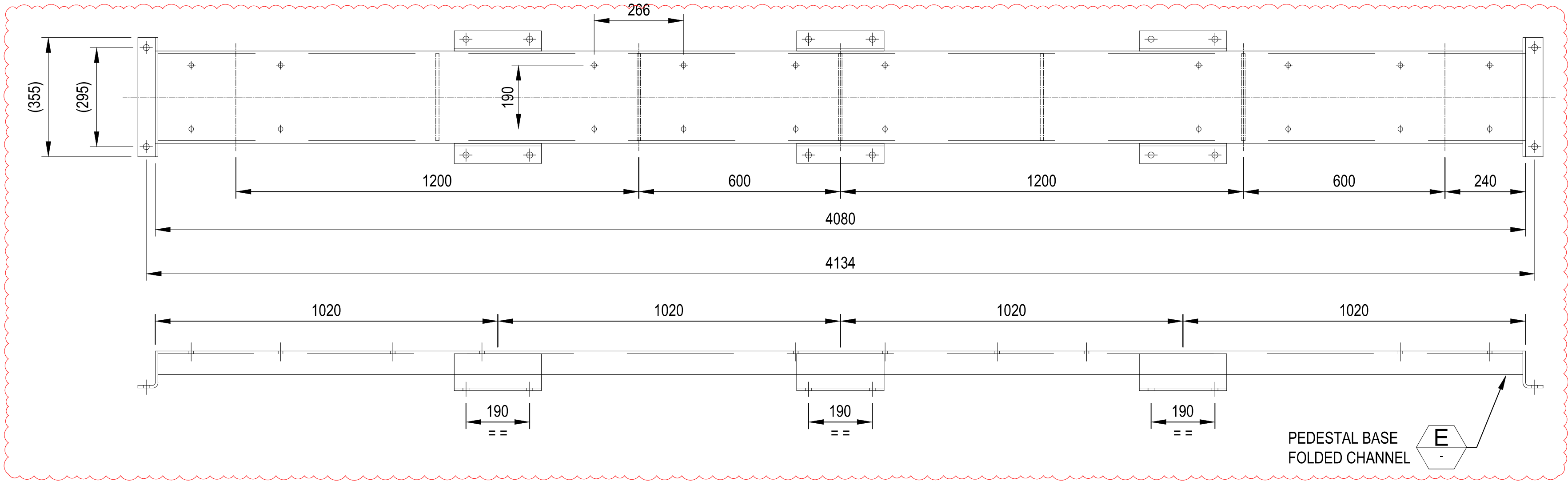
Plotted by: Conrado Viray

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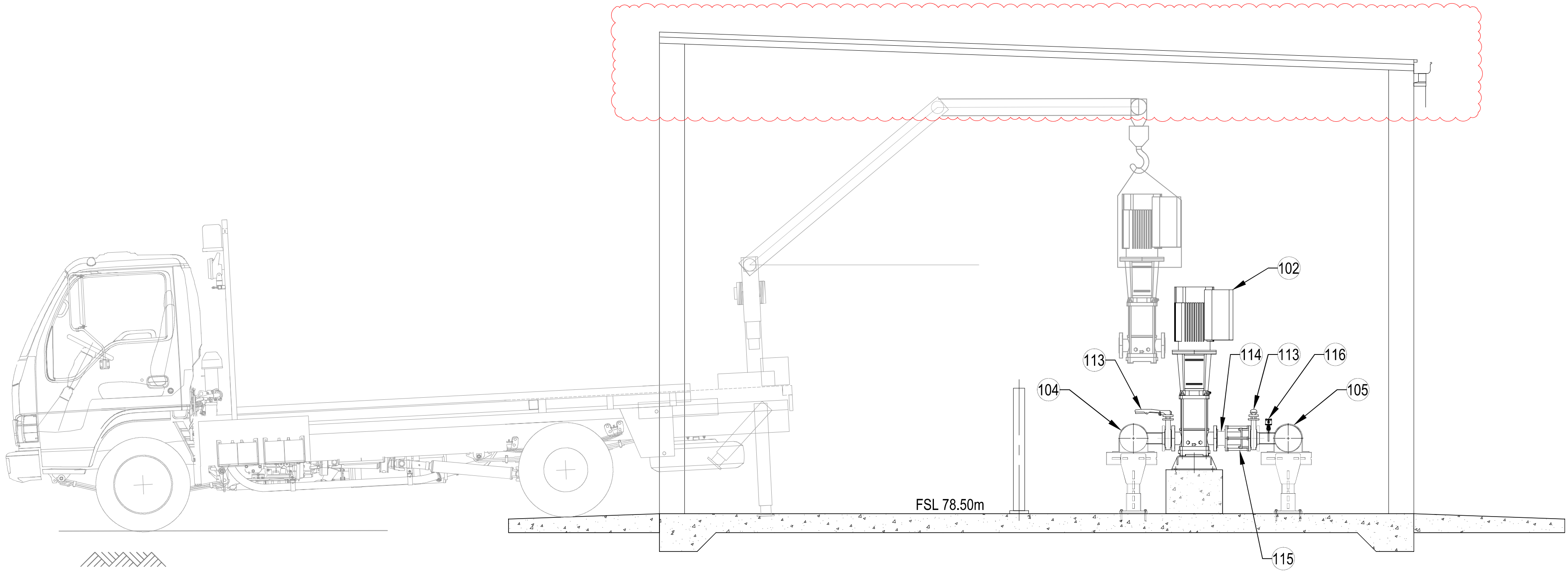
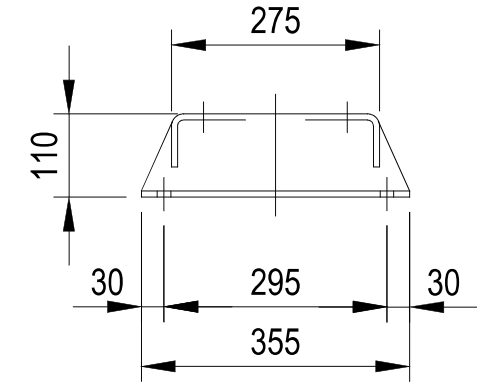
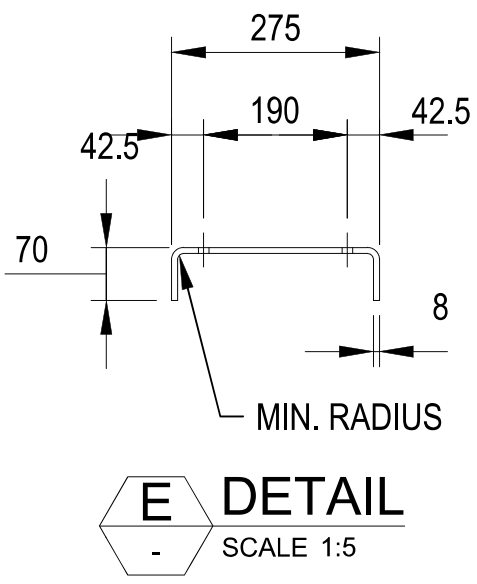
Aquatec Fluid Systems Pty Ltd
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2 Provincial Crescent, Shepparton VIC 3630
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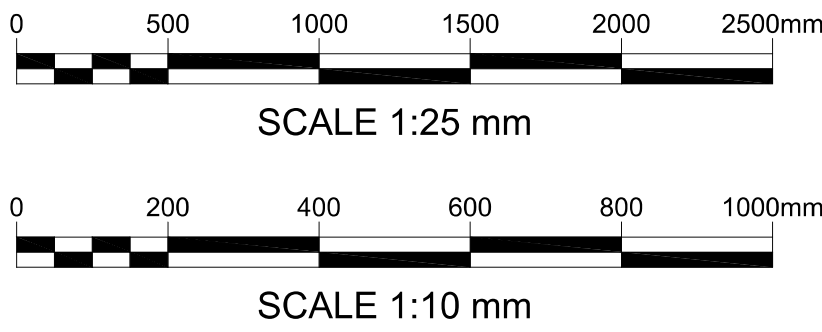
Drawn	GA	Client	MIRVAC C/O CHARLIE RESOLVED			
Checked	JG	Project	MONARCH GLEN MASTER PLANNED COMMUNITY WBPS			
Approved	JG	JOB	WATER BOOSTER PUMP STATION			
Scale	AS SHOWN	Title	WBPS - SECTION VIEW - 1			
This Drawing must not be used for Construction unless signed as Approved	Original Size A1	OP22055	ISSUED FOR REVIEW (IFR01)	22055-10003	B	
		Project Number	Customer Submission Status	Drawing Number	Revision	



PUMP BASE
SCALE 1:10

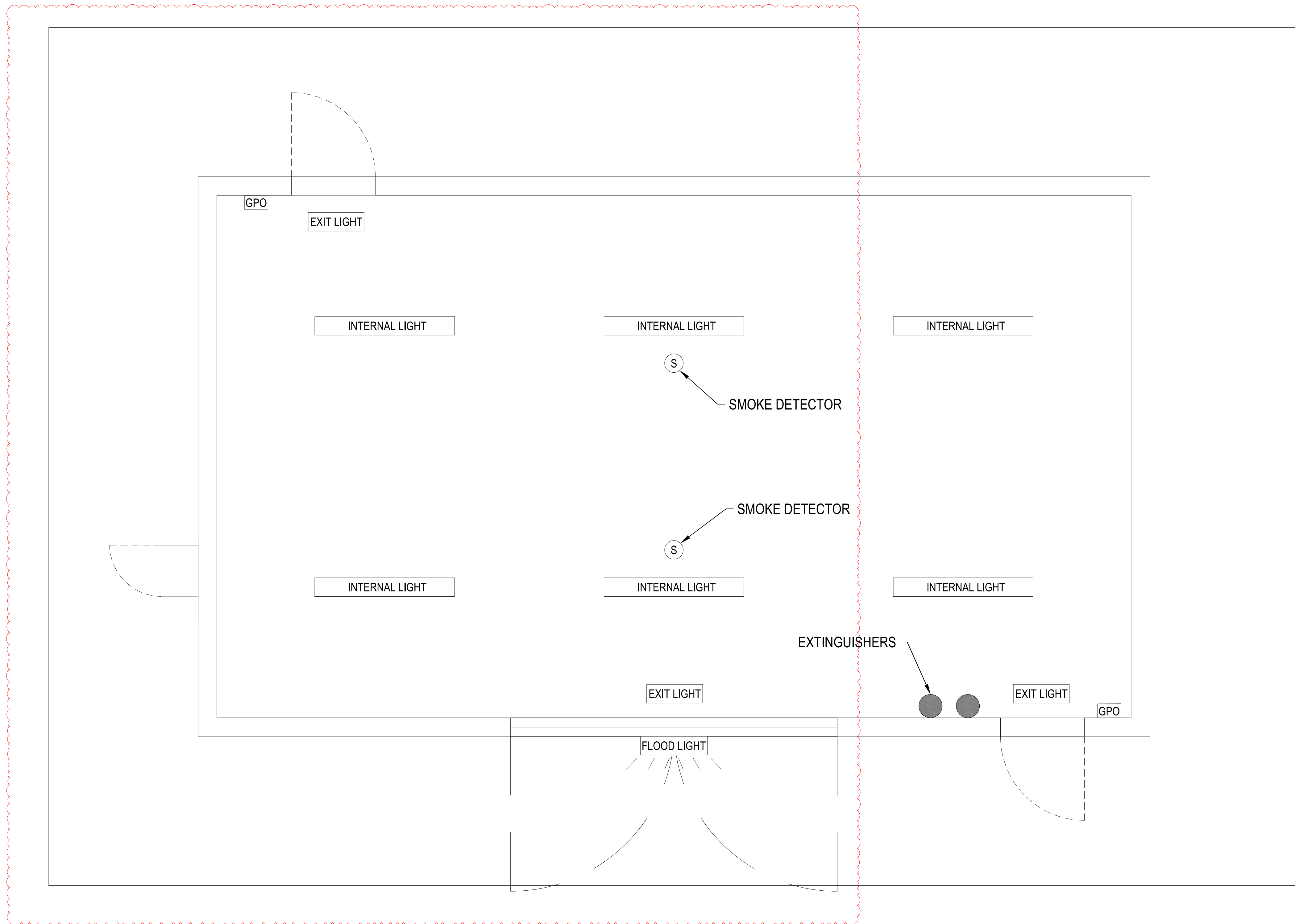


D WBPS SECTION
10003 SCALE 1:25



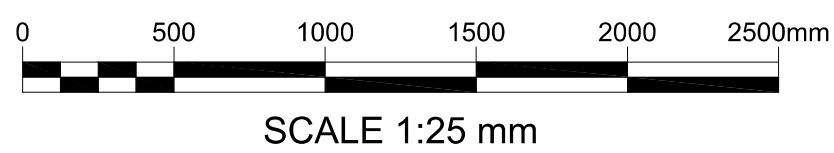
CIVIL CONTRACTOR AQUATEC SCOPE OF WORKS OF WORKS

										Aquatec Fluid Systems Pty Ltd www.aquatecenviro.com ABN - 94 114 944 026 2 Provincial Crescent, Shepparton VIC 3630 T 1300 088 555 / E info@aquatecenviro.com © <i>Copyright</i> - This drawing and design must not be copied in whole or in part without the written consent of Aquatec Environmental Group Pty Ltd. Any literary or artistic works contained in this document are copyright Aquatec Environmental Group Pty Ltd ACN 112 325 434 (Aquatec Fluid Systems). Any information in this document, except information also available in publicly available sources, is confidential to Aquatec. Reproduction of this document or part of it, or disclosure of the information contained in it, is not permitted without the written consent of Aquatec.										AQUATEC 										<table><tr><td>Drawn</td><td>GA</td></tr><tr><td>Checked</td><td>JG</td></tr><tr><td>Approved</td><td>JG</td></tr><tr><td>Scale</td><td>AS SHOWN</td></tr><tr><td colspan="2">This Drawing must not be used for construction unless signed as Approved</td></tr><tr><td>Original Size</td><td>A1</td></tr></table>				Drawn	GA	Checked	JG	Approved	JG	Scale	AS SHOWN	This Drawing must not be used for construction unless signed as Approved		Original Size	A1	<table><tr><td>Client</td><td colspan="3">MIRVAC C/O CHARLIE RESOLVED</td></tr><tr><td>Project</td><td colspan="3">MONARCH GLEN MASTER PLANNED COMMUNITY WBPS</td></tr><tr><td>JOB</td><td colspan="3">WATER BOOSTER PUMP STATION</td></tr><tr><td>Title</td><td colspan="3">WBPS - SECTION VIEW - 2</td></tr><tr><td>OP22055</td><td colspan="2">ISSUED FOR REVIEW (IFR01)</td><td>22055-10004</td></tr><tr><td>Project Number</td><td colspan="2">Customer Submission Status</td><td>Drawing Number</td></tr><tr><td></td><td></td><td></td><td>B</td></tr><tr><td></td><td></td><td></td><td>Revision</td></tr></table>				Client	MIRVAC C/O CHARLIE RESOLVED			Project	MONARCH GLEN MASTER PLANNED COMMUNITY WBPS			JOB	WATER BOOSTER PUMP STATION			Title	WBPS - SECTION VIEW - 2			OP22055	ISSUED FOR REVIEW (IFR01)		22055-10004	Project Number	Customer Submission Status		Drawing Number				B				Revision
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Plot Date: 06/03/2026										Plotted by: Conrado Viray										Cad File No: C:\Users\lcviray\OneDrive - Aquatec Environmental Group Pty Ltd\Documents\OP22055 Monarch Glen\WIP\22055-WBPS-CM-DRG-001_B.dwg																																																													



PLAN VIEW - SERVICES LAYOUT

SCALE 1:25



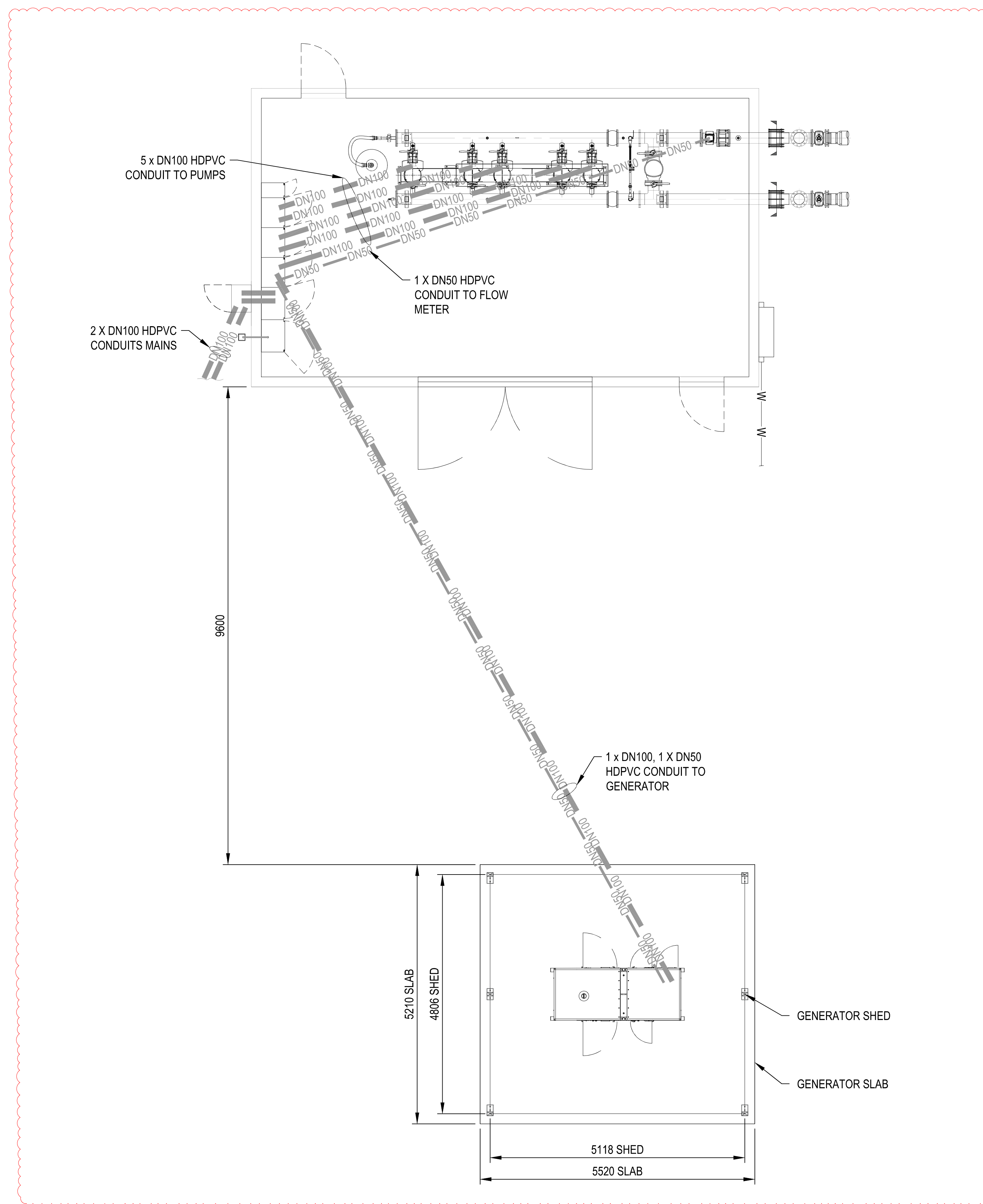
GENERAL NOTES:

1. INTERNAL LIGHTING LOCATIONS ARE INDICATIVE ONLY
2. ADDITIONAL FLOOD LIGHTING CAN BE ADDED DEPENDING ON SITE LIGHTING REQUIREMENTS
3. FEATURES REMOVED FOR CLARITY

CIVIL CONTRACTOR SCOPE OF WORKS	AQUATEC SCOPE OF WORKS
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[illegible]

Drawn		GA		Client MIRVAC C/O CHARLIE RESOLVED	Project MONARCH GLEN MASTER PLANNED COMMUNITY WBPS	JOB WATER BOOSTER PUMP STATION	Title WBPS - SERVICE LAYOUT
Checked		JG					
Approved		JG					
Scale	AS SHOWN						
This Drawing must not be used for Construction unless signed as Approved		Original Size A1					
OP22055 Project Number			ISSUED FOR REVIEW (IFR01) Customer Submission Status		22055-50001 Drawing Number	B Revision	



PLAN VIEW - CONDUIT LAYOUT
SCALE 1:50

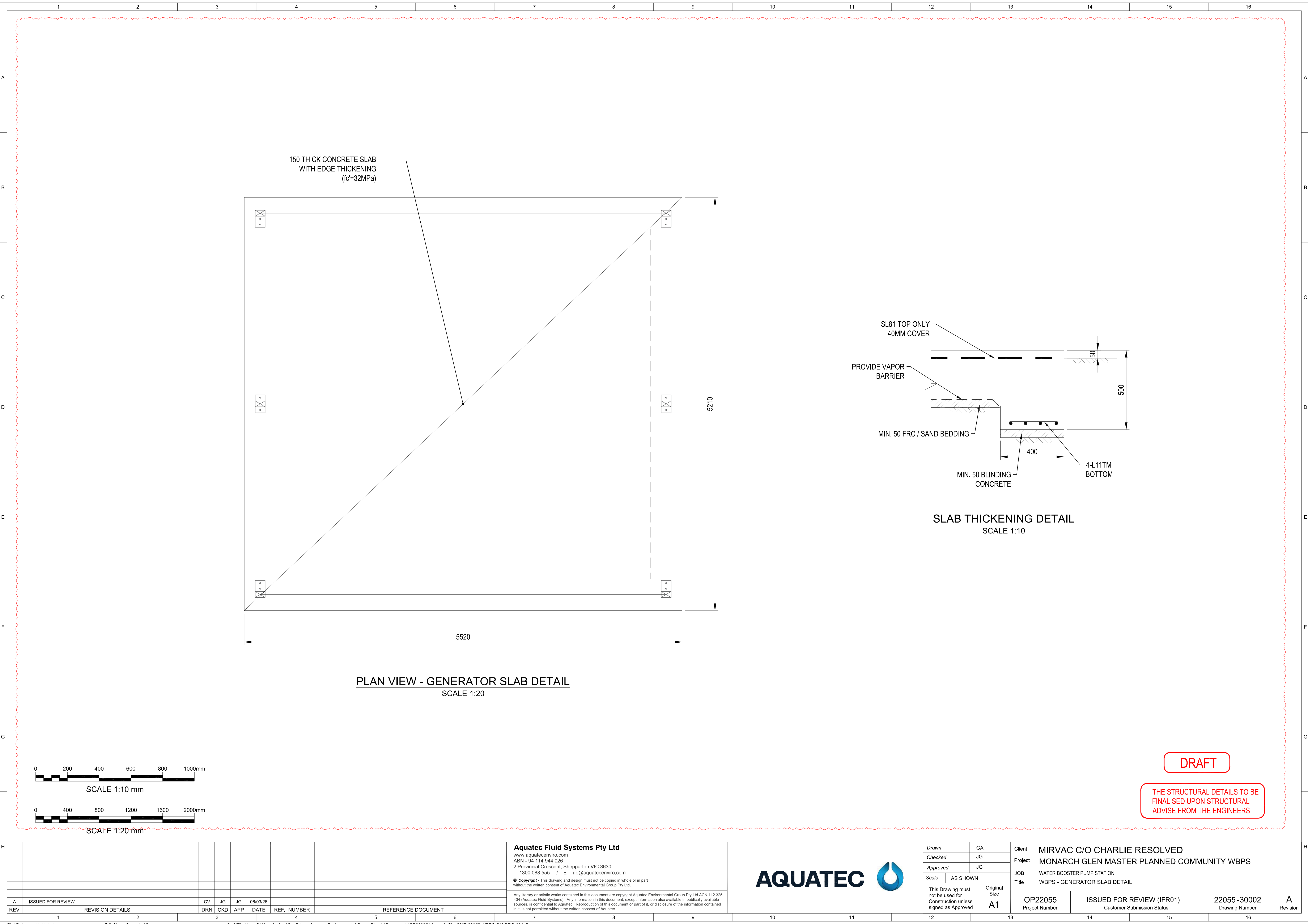


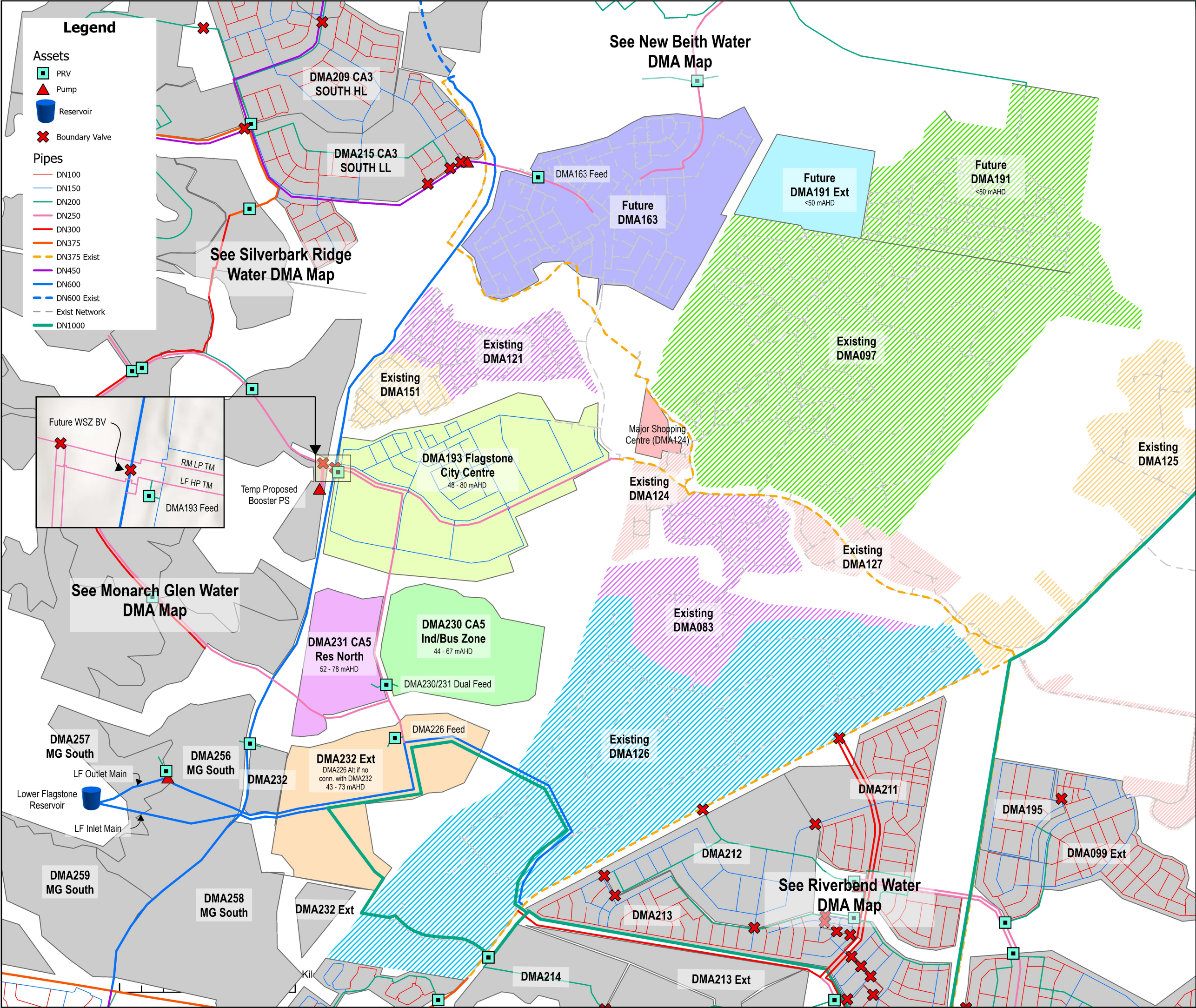
CIVIL CONTRACTOR SCOPE OF WORKS	AQUATEC SCOPE OF WORKS
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[illegible]

[illegible]





ISSUED FOR
INFORMATION
ONLY

Project
Flagstone Development
Water DMAs

Revision		Date
A		A 9/04/2026
B		
C		
D		
E		
F		
G		
H		
Designed:		JT
Draw:		NS
Scale: 1:20,000 @ A3		1 of 1

Notes

This nodal plan is a representation of the proposed DMAs and associated assets. It is provided for information/planning purposes only and is subject to change during further design development. This drawing must not be used as a basis for construction or procurement of assets as shown on the map.

For any questions regarding this nodal map, please contact the Logan Water Planning Team.



Map Projection : Universal Transverse Mercator
Horizontal Datum : Geocentric Datum of Australia 2020
Grid : Map Grid of Australia, Zone 56

Drawing Number	Revision
001	A



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