

JFP URBAN CONSULTANTS

WATER NETWORK ANALYSIS REPORT

Proposed 233 Lot Manufactured Home Site at
25 Tall Oak Drive, Cotswold Hills



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Proposed 233 Lot Manufactured Home Site at
25 Tall Oak Drive, Cotswold Hills

M3267E_WNM – Revision B

21st July 2026

For GemLife

JFP Urban Consultants Pty Ltd

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Approved by: Haydn Watson (RPEQ 6200)



Revision History

Revision	Date	Details
A	15/08/2025	Issue for Toowoomba Regional Council approval.
B	21/07/2026	Updated layout include Lot 3 SP338483

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1 INTRODUCTION

JFP Urban Consultants Pty Ltd was engaged to carry out a water network analysis and prepare a report to accompany a Toowoomba Regional Council (TRC) water connection application for a proposed 233 lot manufactured home site with a club house building at 25 Tall Oak Drive, Cotswold Hills on Lots 1 SP330786 and 3 SP338483.

A Site Layout Plan is shown in Figure 1. A Master Plan Drawing No. **BP1495/1.01 Issue Z3** by Virage Architects is provided in Appendix A.

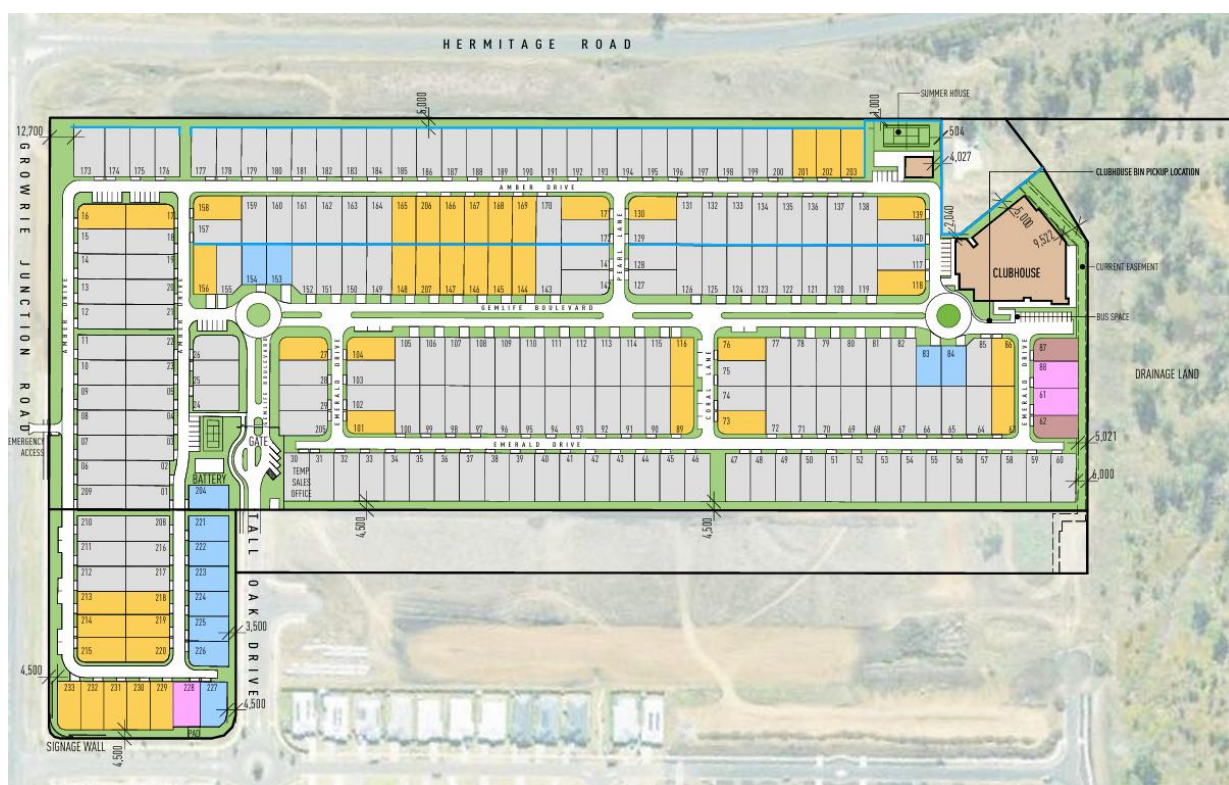


Figure 1: Proposed Home Site Layout Plan

The proposed home site water demand estimate was calculated based on TRC's Local Government Infrastructure Plan (LGIP) *Water Supply Network Extrinsic Material Report* and created in a new water hydraulic model simulating the network pressure at an identified network connection point. The analysis determined residual capacity in the external network and/or augmentations required to cater for the proposed home site to ensure that TRC's standards of service are maintained in the network during operational Peak Day (PD) scenario and a fire flow demand scenario.

2 BACKGROUND

2.1 SITE LOCALITY

The proposed development site covers 15.70 ha and ranges in elevation from 516m AHD in the north-east corner to 530m AHD in the south-west corner. Figure 2 shows an aerial view of the site with contours. The site generally falls south to north. The site is currently vacant land. The site is adjoined by Hermitage Road to the north, a stormwater reserve and sewage pump station allotment (904 SP263388) to the east, residential allotments and Tall Oak Drive to the south and Gowie Junction Road to the west. The site is located within the TRC Water Services Catchment Boundary.

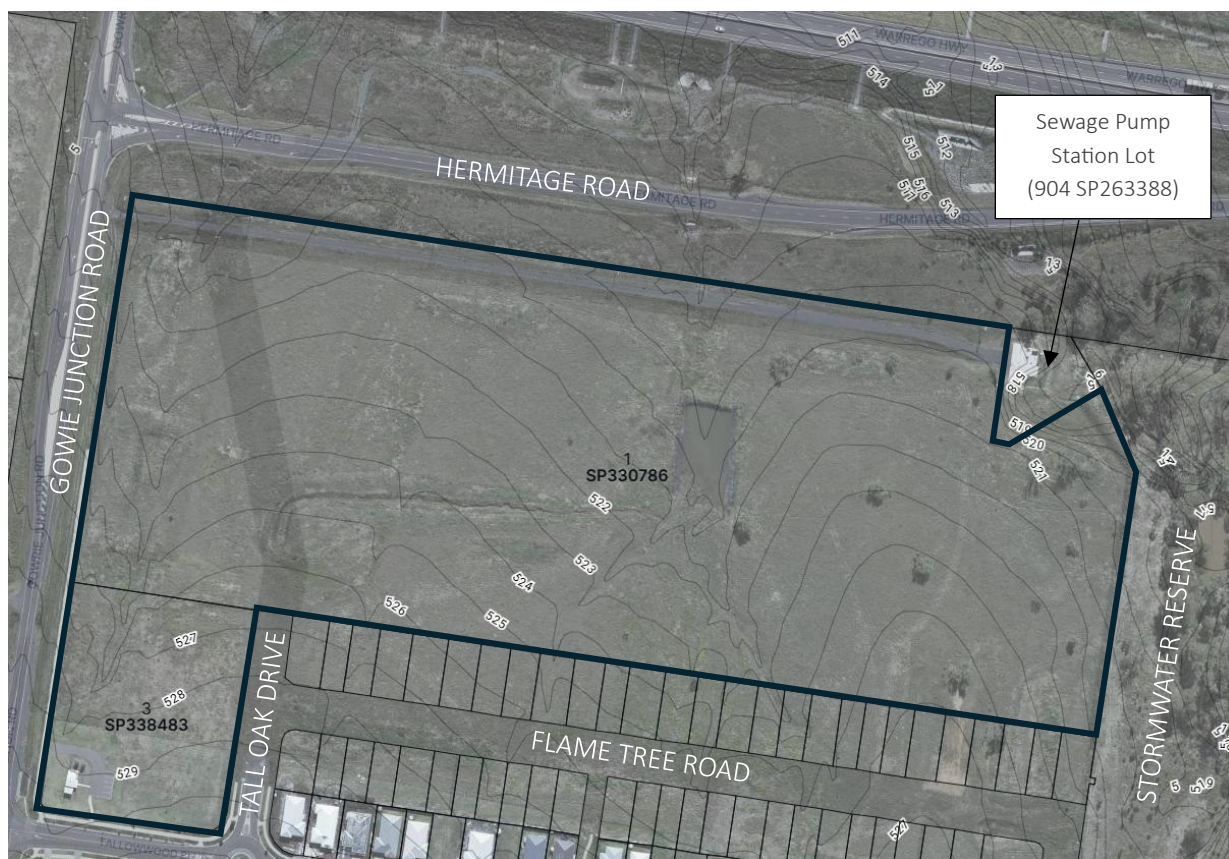


Figure 2: Proposed Home Site Aerial View with Contours

2.2 EXISTING WATER NETWORK

The proposed development is located in the Greater Western Toowoomba Water Supply Network which is supplied by the Mt Kynoch Water Treatment Plant (WTP). Within this network, the proposed development is in the Koorunga pressure reduced zone. The zone is fed by three PRV's located at Ryans Drive (PRV9), Cotswold Hills Drive (PRV10) and Nugent Punch Road (PRV11). The PRV settings are set so that the zone has a static Hydraulic Grade Line (HGL) of 617.15m AHD. Figure 3 shows a snippet of the pressure zone and Table 1 shows a summary of the PRV feeds.

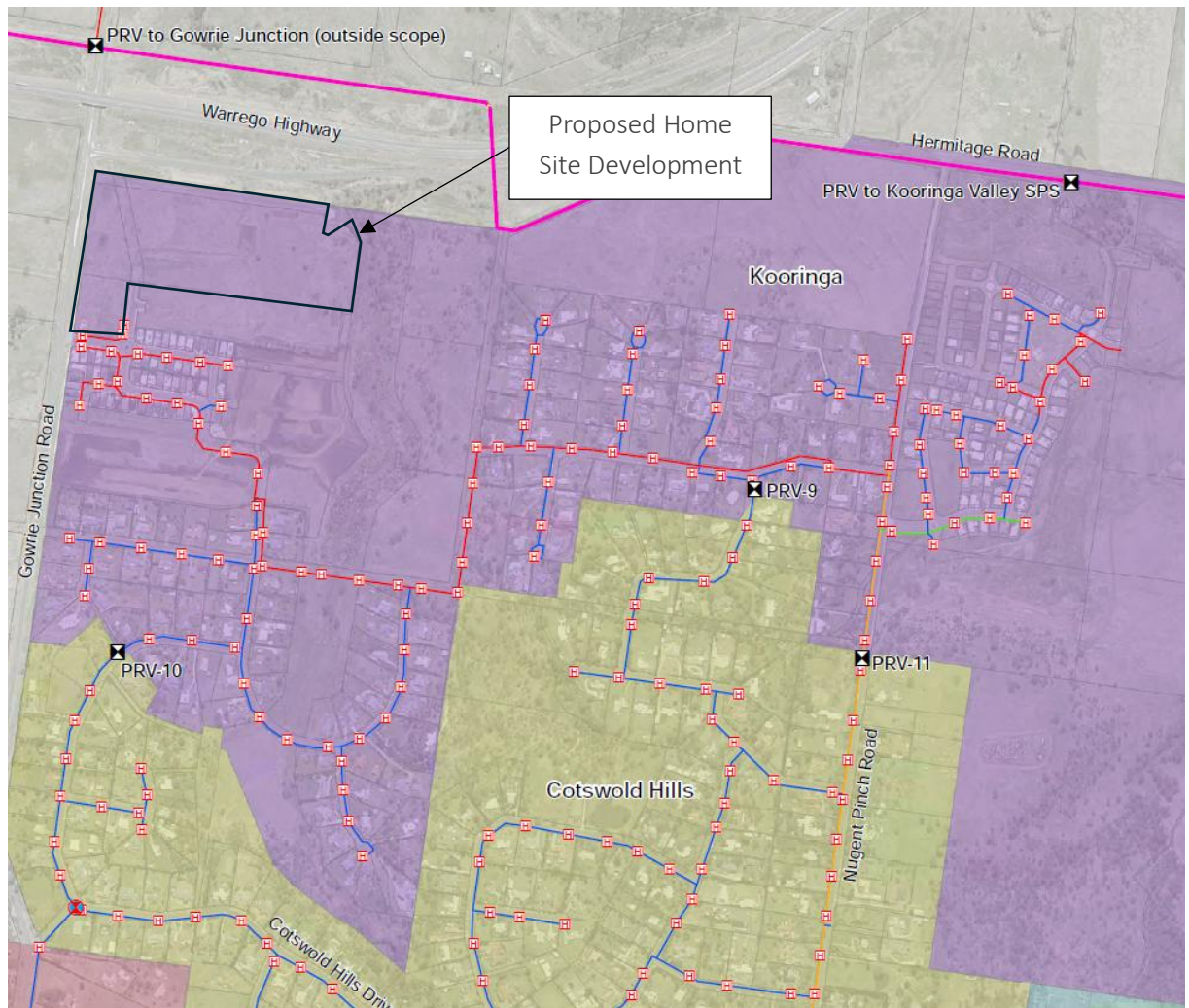


Figure 3: Snippet of Koorunga Water Supply Pressure Zone (purple zone)

Table 1: Summary of Koorunga Pressure Zone PRV Feeds

PRV ID	PRV Name	Zone	Elevation (mAHD)	Setting (m)	Zone Static HGL (mAHD)
PRV-9	Ryans Dr	Koorunga	576.94	36.7	617.15
PRV-10	Cotsowod Hills Dr	Koorunga	564.11	38.7	617.15
PRV-11	Nugent Pinch Road	Koorunga	570.25	46.9	617.15

2.3 WATER NETWORK CONNECTION

The water network reticulation mains near the site are shown on Figure 4. The home site will have a single water meter and service connection to existing DN150 water mains that extend to the site entrance at Tall Oak Drive also shown on Figure 4.

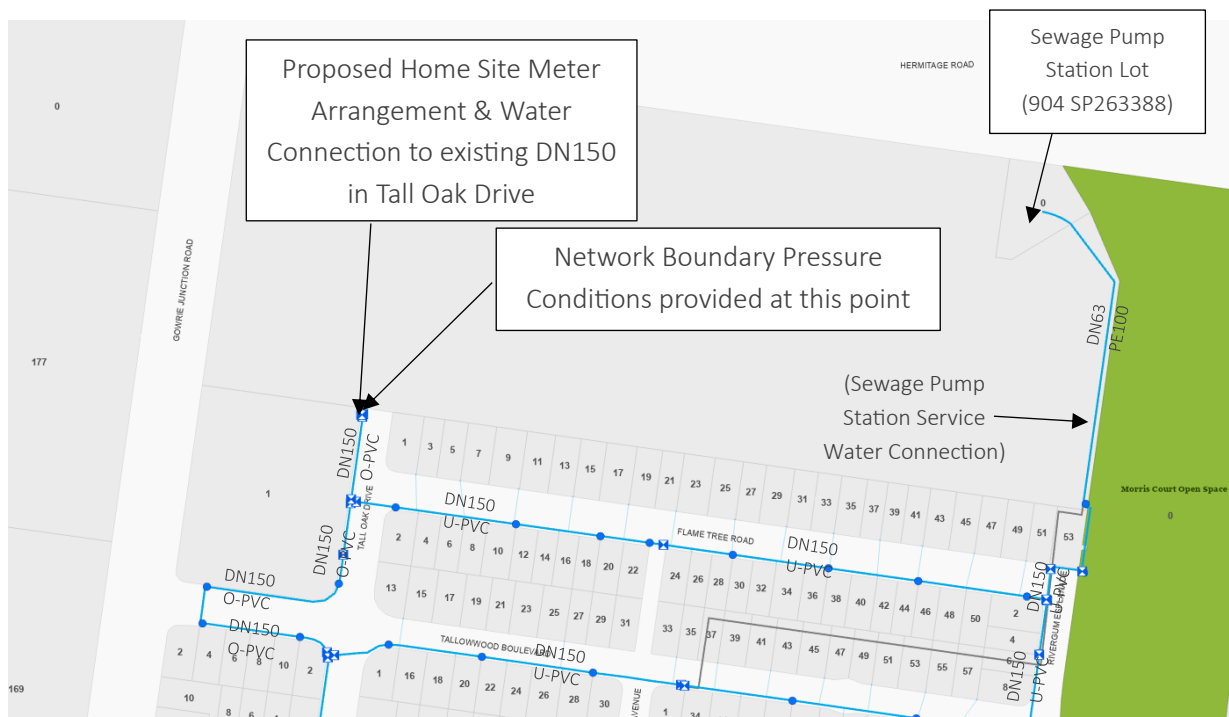


Figure 4: Water Network Reticulation Mains & Water Connection Point

2.4 PLANNED WATER NETWORK AUGMENTATIONS

TRC's Boundary Conditions response referred to the Greater Wester Toowoomba Water Supply Study Planning Report (2023) as the up-to-date planning study for the catchment. There were no relevant augmentations to the zone, however PRV changes were identified as below:

- 2026 Planning Horizon Koorunga Pressure Zone PRV Feeds change from providing 617.2m AHD to 607m AHD static HGL to the zone.

The water network analysis and network boundary conditions provided by TRC considered all planned augmentations and PRV changes to be in place.

3 WATER DEMAND ESTIMATE

Equivalent Persons (EPs) was used as the base unit to determine the expected water demand of the proposed development. The TRC LGIP Water Supply Extrinsic Material Report Section 3 specified EP to be derived from location specific occupancy ratio or EP / Equivalent Tenement (ET) ratio as per the Australian Bureau of Statistics (ABS) website.

The ABS website at July 2025 specified a current Occupancy Rate of 2.44 EP per residential dwelling and did not have exclusive data for manufactured home sites. 2.2 EP per home site was adopted based on there being only a retired couple or single person living in a home.

For the Clubhouse, 4 EP per 100m² Gross Floor Area (GFA) was adopted as per Table A in the DEWS Planning Guideline for commercial premises.

Table 2 summaries the EP calculation for the proposed home site adopting the above figures.

Table 2: Summary of Proposed Home Site Water EP Estimate

Development Description	No.	EP Demand	Type	EP
Home Site Allotment	233	2.2 EP per Home Site	Res	512.6
Club House	1,500m ² GFA	4 EP per 100m ² GFA	Non-Res	60
Total Res EP				512.6
Total Non-Res EP				60
Proposed Development Total EP				572.6

The water network hydraulic model critical boundary pressures were requested from TRC at the network connection point shown on Figure 4. TRC provided a response dated 6th August 2025. Pressures from the Greater Western Toowoomba Water Supply Study (2023) hydraulic model were provided and are summarised in Table 3. 2026 Post-Development Planning Horizon was adopted as existing conditions. A copy of the response is attached in Appendix B.

Table 3: Summary of Network Boundary Node Pressures

	2026 Pre-Development		2026 Post-Development		2061 Post-Development	
	PD	Fire Flow	PD	Fire Flow	PD	Fire Flow
Node EP	0		503		503	
Development Flow	0 l/s	15 l/s	4.6 l/s	33 l/s	4.6 l/s	33 l/s
Min. Pressure	75.8m	69.6m	75.1m	48.7m	75m	48.4m
Max. Pressure	77.1m	-	77.1m	-	77.1m	

4 WATER NETWORK DESIGN CRITERIA

The water network connection point and preliminary internal water layout was modelled in accordance with TRC's 2.03 Water Infrastructure Policy and incorporated updated figures within the Great Toowoomba Water Supply Study Planning Report (2023). A summary of the relevant design parameters is listed below:

Operational Pressures

- Design Average Day (AD) Demand = 200 L/EP/day
- Peak Day (PD) Factor = 1.7 x AD
- Minimum Pressure (res) = 22m
- Preferred Minimum Pressures (res) = 30m
- Minimum Pressure (non-res) = 25m
- Preferred Minimum Pressure (non-res) = 35m
- Maximum Pressure = 80m
- Maximum Velocity = 2.5 m/s
- Residential & Commercial Diurnal Pattern = Adopted per Planning Study Report

Fire Fighting Requirements

- Residential Fire Flow = 15 l/s for 2 hours
- Commercial/Industrial Fire Flow = 30 l/s for 4 hours
- Minimum Residual Pressure = 12m
= 6m elsewhere
- Background Demand = 2/3 x PH

Based on the above and for the purposes of the water analysis, the overall manufactured home site is considered consistent with residential use. A 30 l/s fire flow was nominated at the connection point due to the commercial element of the club house.

A preliminary internal water main layout and internal fire-fighting residual pressures are presented for information purposes. A 20 l/s fire flow was adopted at the club house and 10 l/s for all other areas in accordance with the figures below based on Table 2.2 from AS2419.1 Fire Hydrant Installations.

Fire Fighting (Internal Plumbing – Building Code)

Fire Flow residential class building = 10 l/s
Minimum Residual Pressure = 20m

Fire Flow commercial class building = 20 l/s
Minimum Residual pressure = 20m

Note: the hydraulic consultant is responsible to ensure that the internal pipework and hydrant locations are appropriately designed to meet the requirements of AS2419.1 Fire Hydrant Installations. Classification of the building and fire flow requirements are to be confirmed by the hydraulic consultant as part of the plumbing design under the building application.

5 WATER HYDRAULIC MODELLING

The proposed home site water connection and an internal water reticulations layout plan with DN100 water mains was created in a new InfoWater hydraulic model. The DN150 water main in Tall Oak Drive was extended to the site frontage and a fixed head reservoir was used to simulate the boundary network pressure results. An analysis of the development water connection and internal water mains was undertaken for 2026 PD Scenario. A 75.1m residual pressure was adopted at the fixed head reservoir to assess minimum pressures and 77.1m for maximum pressures in accordance with the boundary information provided by TRC. Fire flow demand used the nominated 48.7m boundary pressure. Table 4 summarises the added EP demands and fire flow demands. Figure 5 shows the nodes and pipes

Table 4: Node EP Demands and Fire Flow Demands

Node ID	Node Elevation (m AHD)	No. of Lots	EP	Diurnal Pattern	Fire Flow Demand (l/s)
D1	526	0	0	RES	10
D10	525	12	26.4	RES	10
D11	526	5	11	RES	10
D12	523	10	22	RES	10
D13	521	10	22	RES	10
D14	520	8	17.6	RES	10
D15	522	15	33	RES	10
D16	524	14	30.8	RES	10
D17	520.5	14	30.8	RES	10
D18	519	12	26.4	RES	10
D19	519	12	26.4	RES	10
D2	525	7	15.4	RES	10
D20	520	12	26.4	RES	10
D21	520	2	4.4	RES	10
D22	523	6	13.2	RES	10
D23	525.5	10	22	RES	10
D24	521.5	4	8.8	RES	10
D25	523	8	17.6	RES	10
D26	522.5	6	13.2	RES	10
D27	529	14	30.8	RES	10
D28	529	8	17.6	RES	10
D3	525	6	13.2	RES	10
D4	522	5	11	RES	10
D5	521	4	8.8	RES	10
D6	520	8	17.6	RES	10
D7	523	7	15.4	RES	10
D8	523	4	8.8	RES	10
D9	523	10	22	RES	10
DCLB (Clubhouse)	522	0	60	COM	20
DCON (Meter)	527	0	0	-	30
Total		233	572.6		

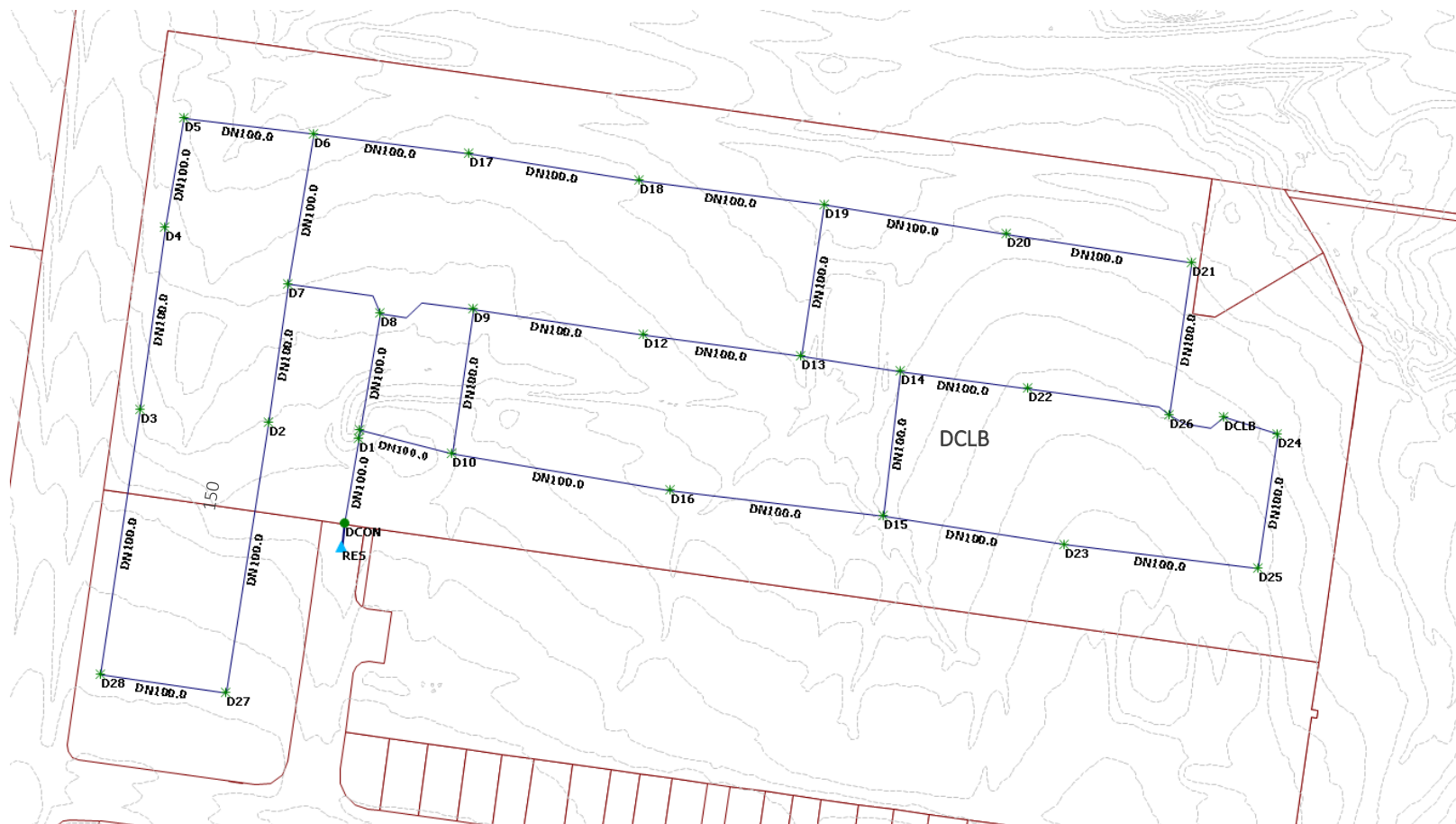


Figure 5: Proposed Development Node IDs and Pipe Diameters

5.1 2026 WATER MODELLING RESULTS

Figure 6 shows the residual pressure profile for the development nodes during 2026 PD scenario with new demands added and network connection set to the minimum 75.1m residual pressure. Minimum pressure at the meter connection will be 75.09m which is above the minimum network design criteria of 25m.

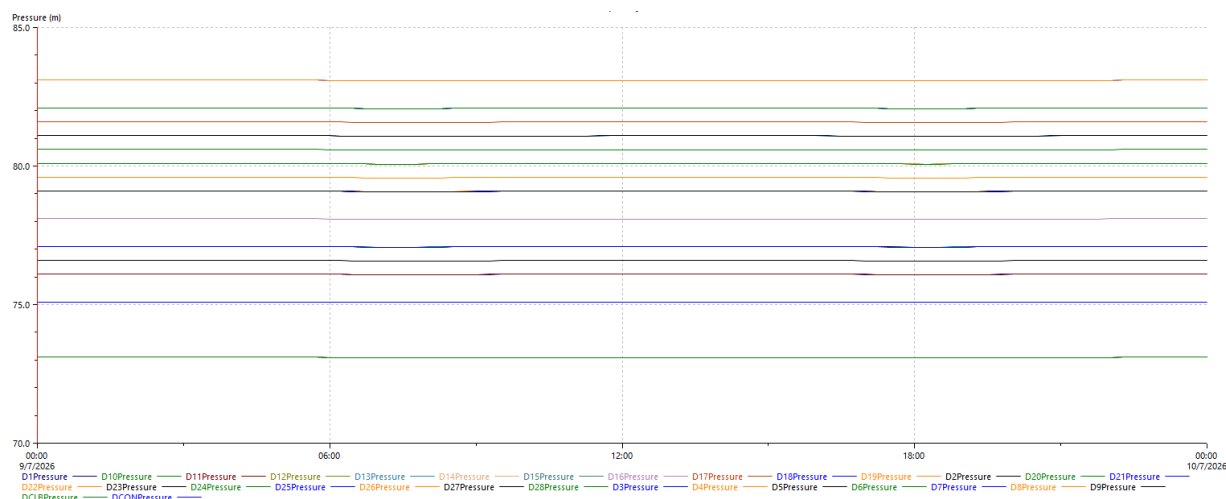


Figure 6: Development Node Residual Pressures – 2026 PD Scenario – Connection Point Minimum Setting 75.8m

Figure 7 shows the residual pressure profile with the connection set to the maximum 77.1m residual pressure. Maximum pressure at the meter connection will be 77.1m which is below the maximum network design criteria of 80m. Internally pressures will range from 75.1m to 85.1m. Internal areas of the development exceed 80m due to their lower elevation. A plan of the maximum node pressures is shown in Figure 8. The hydraulic consultant will be required design the internal pipework, hydrants and pressure reduction methods to maintain maximum 80m internally.

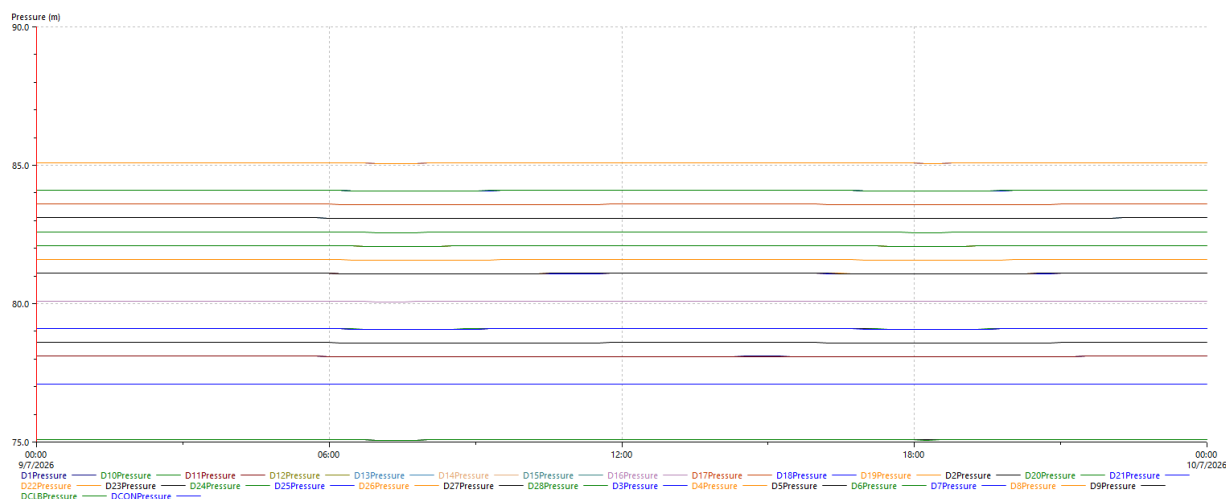


Figure 7: Residual Pressures at Nodes – 2026 PD Scenario – Connection Point Maximum Setting 77.1m

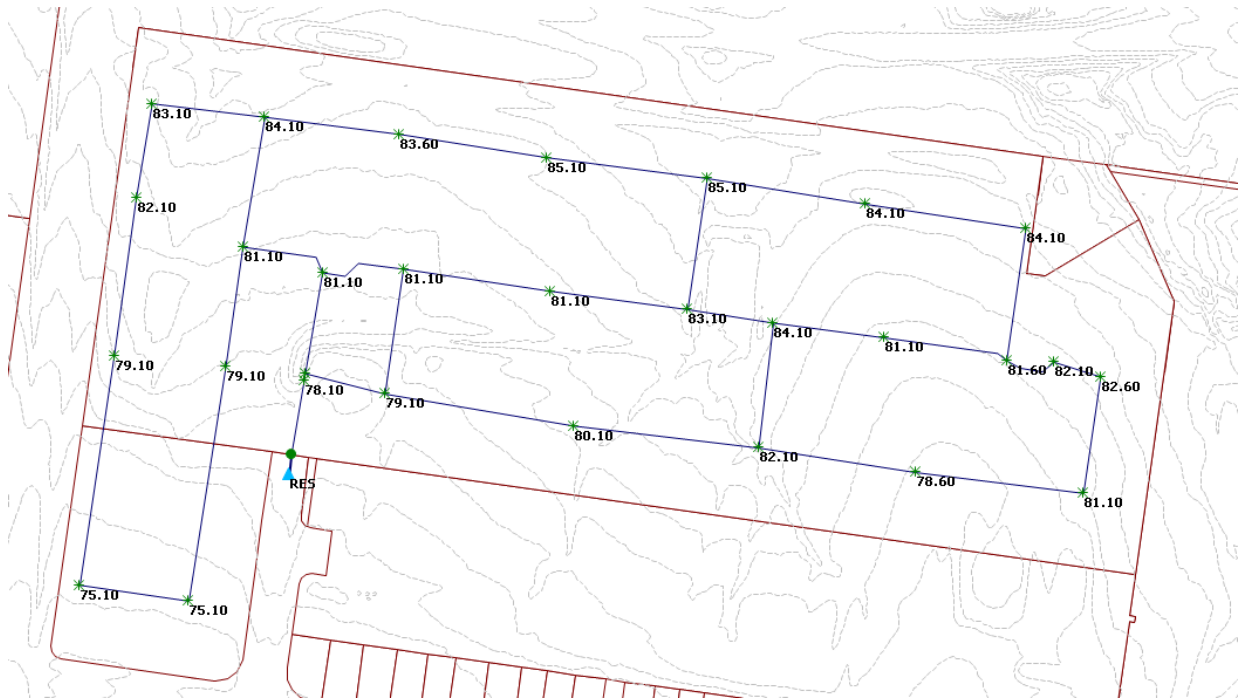


Figure 8: Residual Pressures at Nodes – 2026 PD Scenario – Connection Point Maximum Setting 77.1m

Table 5 shows the node residual pressures under a fire flow demand at 2/3 background (19:30) demand PD scenario. The network boundary connection pressure was set to 48.7m in accordance with the TRC results. The table shows that the minimum residual pressure will be 43.41m at the connection point and internally will range from 41.39m to 51.37m which satisfies the minimum required network design criteria of 12m.

Table 5: Development Node Residual Pressures – 2026 PD Fire Flow Demand Scenario – Connection Point FF Setting 48.7m

Node ID	Fire-Flow Demand (l/s)	Residual Pressure (m)
DCLB	30	48.39
DCON	20	43.41
D27	10	41.39
D28	10	41.39
D1	10	44.4
D11	10	44.4
D23	10	44.89
D3	10	45.39
D10	10	45.4
D2	10	45.4
D16	10	46.4
D22	10	47.39
D25	10	47.39
D12	10	47.4
D7	10	47.4
D8	10	47.4
D9	10	47.4
D26	10	47.89

Node ID	Fire-Flow Demand (l/s)	Residual Pressure (m)
D15	10	48.39
D4	10	48.39
D24	10	48.89
D13	10	49.39
D5	10	49.39
D17	10	49.89
D14	10	50.39
D20	10	50.39
D21	10	50.39
D6	10	50.39
D18	10	51.39
D19	10	51.39

The TRC network boundary pressures for 2061 PD scenario show a less than 1m pressure difference in the network pressure to 2026 PD scenario. Based on the 2026 PD scenario pressures results, network design criteria are not expected to be exceeded in 2061. This is correlated in the TRC network boundary pressure response which states the following:

“A total of 312.50 EP has been previously allowed for in the model in to 2026 planning horizon. An increased of demand as a result of the proposed development was found to have no detrimental impact on the existing water supply network.

The existing and future pressures at the connection point fall within Council’s pressures service standards (80m), and the proposed development does not trigger the need to bring forward any augmentations.”

6 CONCLUSIONS AND RECOMMENDATIONS

JFP Urban Consultants Pty Ltd was engaged to carry out a water network analysis and prepare a report to accompany a Toowoomba Regional Council (TRC) water connection application for a proposed 233 lot manufactured home site with a club house building at 25 Tall Oak Drive, Cotswold Hills on Lot 1 SP330786 and 3 SP338483.

The analysis determined residual capacity in the external network and/or augmentations required to cater for the proposed home site to ensure that TRC's standards of service are maintained in the network.

The conclusions and recommendations of the water network analysis are listed below:

- The proposed development site is located within the TRC Water Services Catchment Boundary.
- The proposed development is located in the Greater Western Toowoomba Water Supply Network which is supplied by the Mt Kynoch Water Treatment Plant (WTP). Within this network, the proposed development is in the Koorunga pressure reduced zone. The zone is fed by three PRV's located at Ryans Drive (PRV9), Cotswold Hills Drive (PRV10) and Nugent Punch Road (PRV11).

There are no relevant augmentations to the zone, however PRV feed changes are expected in 2026 to change the static HGL to the zone from 617.2m AHD to 607m AHD.

- The home site will have a single water meter and service connection to existing DN150 water mains that extend to the site entrance at Tall Oak Drive.
- Equivalent Persons (EPs) was used as the base unit to determine the expected water demand of the proposed development. 2.2 EP per home site was adopted based on there being only a retired couple or single person living in a home. For the Clubhouse, 4 EP per 100m² Gross Floor Area (GFA) was adopted as per Table A in the DEWS Planning Guideline for commercial premises.

The proposed development represents a total 563.8 EP based on the above figures.

- The overall manufactured home site is considered consistent with residential use. However, a 30l/s fire flow was nominated at the connection point due to the commercial element of the club house.
- The proposed home site water connection and an internal water reticulations layout plan with DN100 water mains was created in a new InfoWater hydraulic model to assess Peak Day (PD) pressures. A 2026 PD Scenario was assessed based on network boundary pressure information provided by TRC.



The modelling results show network design criteria minimum 25m and maximum 80m residual pressure will be satisfied at the connection point as well as 12m minimum residual pressure during a fire flow demand during 2026 PD Scenario. Similar network performance is expected at 2061 due to marginal difference in external network pressure from 2026 to 2061.

Based on the modelling results, there no new external network augmentation required to accommodate the proposed development up to 2061 and no changes to planned augmentations are required.

It is recommended that the proposed home site water connection be approved based on the conclusions of the water network analysis above.



7 APPENDICES

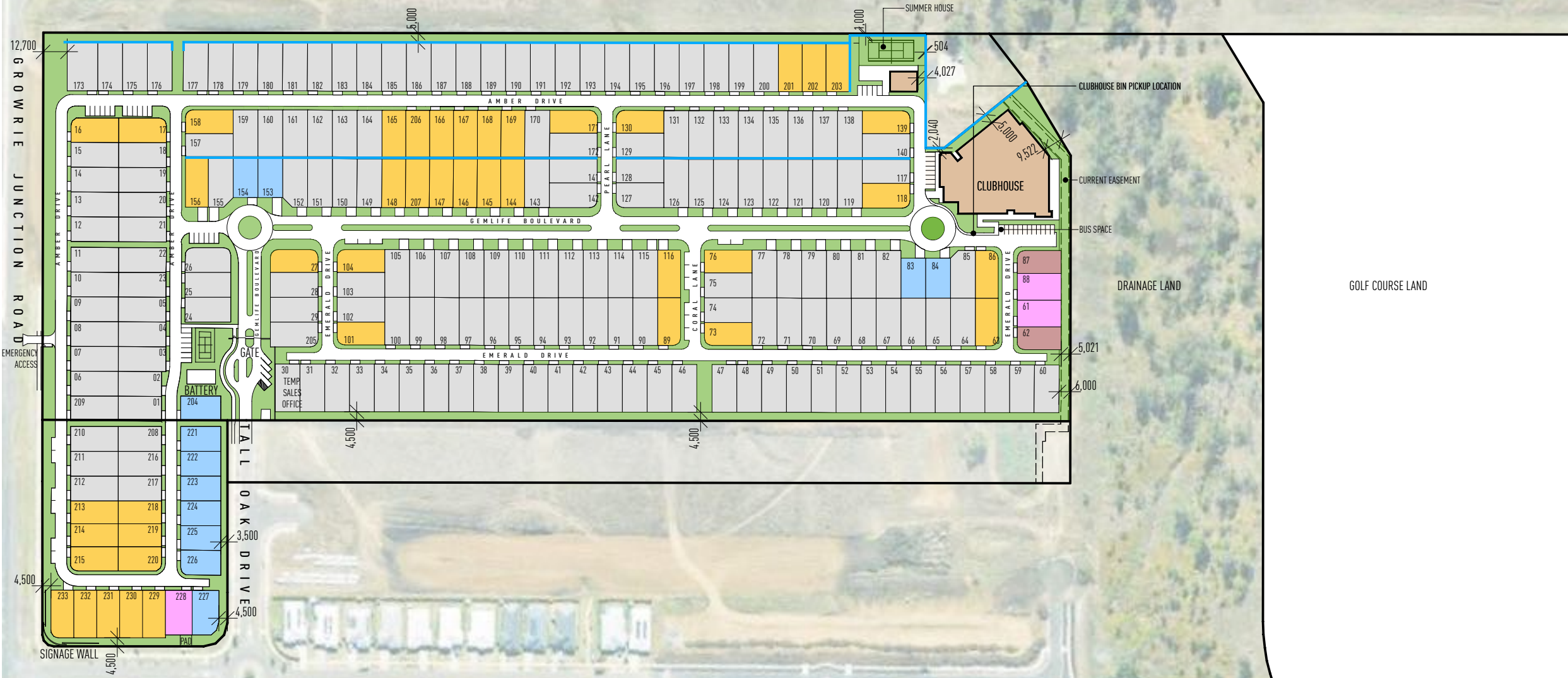
APPENDIX A: DRAWING NO. BP1495/1.01 ISSUE Z3

1.01 Architectural Drawings

Master Plan

TOOWOOMBA BYPASS

HERMITAGE ROAD



SITE 1

TOTAL NUMBER OF LOTS	229
COMMERICAL	1500m2 (4 lots)

LOT SIZE YIELD

13.0m x 25.0m STANDARD LOTS	175
12.0m x 25.0m SMALL LOTS	41
13.0m x 21.0m SMALL LOTS	12
12.0m x 23.0m SMALL LOTS	2
14.0m x 23.0m SMALL LOTS	3
ACOUSTIC FENCE (REFER STATEMENT OF LANDSCAPE INTENT)	

STATISTICS

VISITOR CAR PARKING	69 + 1 MINI BUS SPACE
---------------------	-----------------------

VIRAGE ARCHITECTS

LEVEL 1 33 ELKHORN AVENUE
SURFERS PARADISE, QLD. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, QLD. 4217

TEL 07 5527 5300
EMAIL INFO@JPD.COM.AU
WEB WWW.JPD.COM.AU

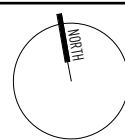


33	11.05.26	Master plan updated
32	27.04.26	Master plan updated
31	30.03.26	Master plan updated
30	23.03.26	Master plan updated
29	23.02.26	Master plan updated
28	10.02.26	Master plan updated
27	19.01.26	Master plan updated
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PROJECT Proposed New Development

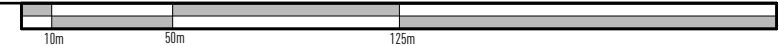
Tall Oak Drive Cotswold QLD

CLIENT GemLife



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DRAWING TITLE BP1495/1.01



SCALE 1:2500 @ A3
Master Plan





APPENDIX B: COUNCIL NETWORK MODEL BOUNDARY PRESSURES RESPONSE

HYDRAULIC MODEL PRESSURE & FLOW RESULTS

DA:	MCUC/2020/1802/C
Location:	25 Tall Oak Drive, Cotswold Hills
Lot/Plan:	Lot 20 SP330786
Development Type:	Residential + Community Facilities
Zoning:	Emerging Community
Connection Point:	Node H-3059: Tall Oak Drive
Water Supply Zone:	Kooringa
Node Elevation:	Node H-3059: 607.02 mAHD

The application is for a 205 lot Retirement Home subdivision on Tall Oak Drive, Cotswold Hills. The proposed development site falls within the Kooringa pressure zone, which forms part of the Greater Western Toowoomba study area. The Kooringa zone is a pressure reduced zone supplied from the Mt Kynoch Water Treatment Plant.

The assessment has been completed using the *Greater Western Toowoomba Water Supply Study* model completed in 2023, with the 2026 planning horizon taken as existing conditions.

The demands used in the assessment are summarised in the table below based on information provided by JFP Urban Consultants.

Scenario	Lots	Residential EP	Non- Res EP
2026	205	451	52

Results:

The following pressure and flow results have been provided for the requested connection point off the existing DN150 PVC main on Tall Oak Drive. A non-residential fireflow of 30 L/s has been applied in the assessment.

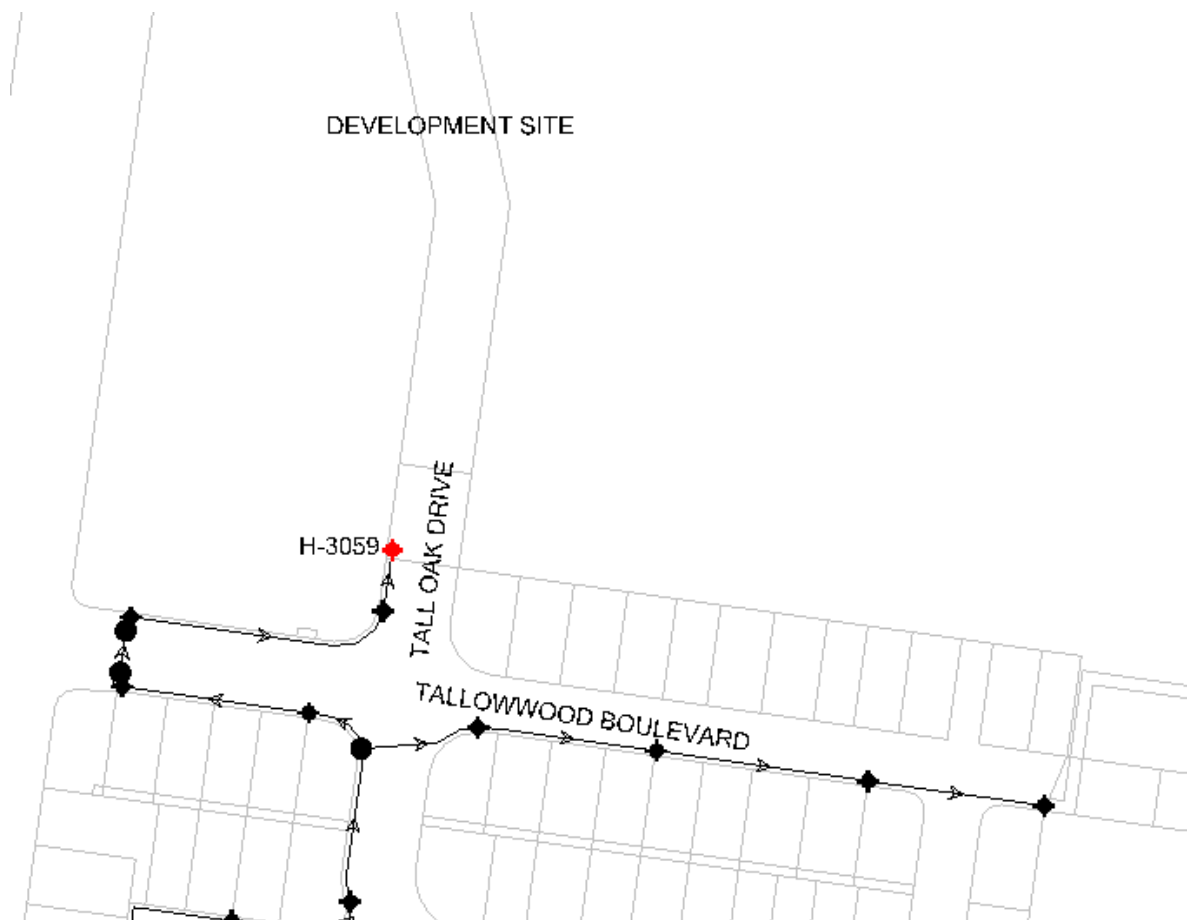
	2026 Pre-Development		2026 Post-Development		2061	
	PD	Fireflow	PD	Fireflow	PD	Fireflow
Node H-3059: Tall Oak Drive						
Node EP:	0		503		503	
Max Development Flow	0 L/s	15 L/s	4.6 L/s	33 L/s	4.6 L/s	33 L/s
Min Pressure	75.8 m	69.6 m	75.1 m	48.7 m	75 m	48.4 m
Max Pressure	77.1 m	-	77.1 m	-	77.1 m	-

The 2026 results assume that all 2021 & 2026 Planning Horizon augmentations identified in the *Greater Western Toowoomba Water Supply Study* that impact the development area have been completed. The 2061 results assume all augmentations proposed in the report have also been completed.

A total of 312.50 EP has been previously allowed for in the model in the 2026 planning horizon. An increase of demand as a result of the proposed development was found to have no detrimental impact on the existing water supply network.

The existing and future pressures at the connection point fall within Council's pressure service standards (80m), and the proposed development does not trigger the need to bring forward any augmentations.

Existing Water Network:



Comments:

- Results based on design rate of 200 L/EP/d
- Peak Hour (PH) = 07:00
- Fireflow modelled at 2/3 PH (19:30 on 3rd consecutive Peak Day).
- Fireflow results are the residual pressure and flow taken at the maximum flow needed to meet fireflow requirements and background demand.
- Results are taken from a Peak Day (PD) scenario as maximum flow and minimum pressure occur during PH.
- Maximum pressure results provided are representative of static pressure with a minimum baseline flow.

- Full demand for the development is 503 EP as per advice provided by JFP Urban Consultants.
- 2026 has been used as the existing planning horizon from the *Greater Western Toowoomba Water Supply Study* (2023).

The information provided is based on the best available information at the time of publication and is subject to variation over time.

Network models are verified with limited data and conditions in the field may vary from modelling assumptions.

Field investigations and inspections should be undertaken to satisfy the user that the data is suitable for its intended purpose. Users relying on hydraulic modelling information do so at their own risk.

Assessed By:	P Tamang
Reviewed By:	T Millikan
Date:	6 August 2025