



The Village, Oonoonba, Townsville Water Supply and Wastewater Master Planning

Prepared by Calibre Consulting
Prepared for Economic Development Queensland (EDQ)

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ORIGINAL
Water & Environment

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1 INTRODUCTION

Calibre Consulting (Qld) Pty Ltd has been engaged by Economic Development Queensland (EDQ) to undertake water supply and wastewater master planning in support of the proposed residential community 'The Village', located at Oonoonba, Townsville. Currently Stages 1 – 6 of the development north of Riveredge Boulevard have commenced, with the balance of the developable area (Stages 7-20) situated on Lot 9000 on SP264450, Lot 9001 on SP275839 and Lot 6000 on SP243806.

Refer to **Appendix A** for the proposed master plan layout.

This report identifies the water supply and wastewater infrastructure required to service the proposed master plan area. The objective of this report is to demonstrate that the proposed development can be supported by the existing and/or proposed infrastructure and that the development is compliant with the Townsville City Council guidelines.

2 SITE LOCALITY

The site is located approximately 3km south of the Townsville central business district. The site is located within the suburb of Oonoonba in the Townsville City Council local government area. The site is bound by Riveredge Boulevard to the south, Abbott Street to the east and Ross River to the west and north. The balance site has a total area of approximately 51.5ha and is comprised of the following real property titles:

- Lot 9000 on SP264450;
- Lot 9001 on SP275839; and
- Lot 6000 on SP243806.

Figure 2-1 outlines the approximate location of the site.

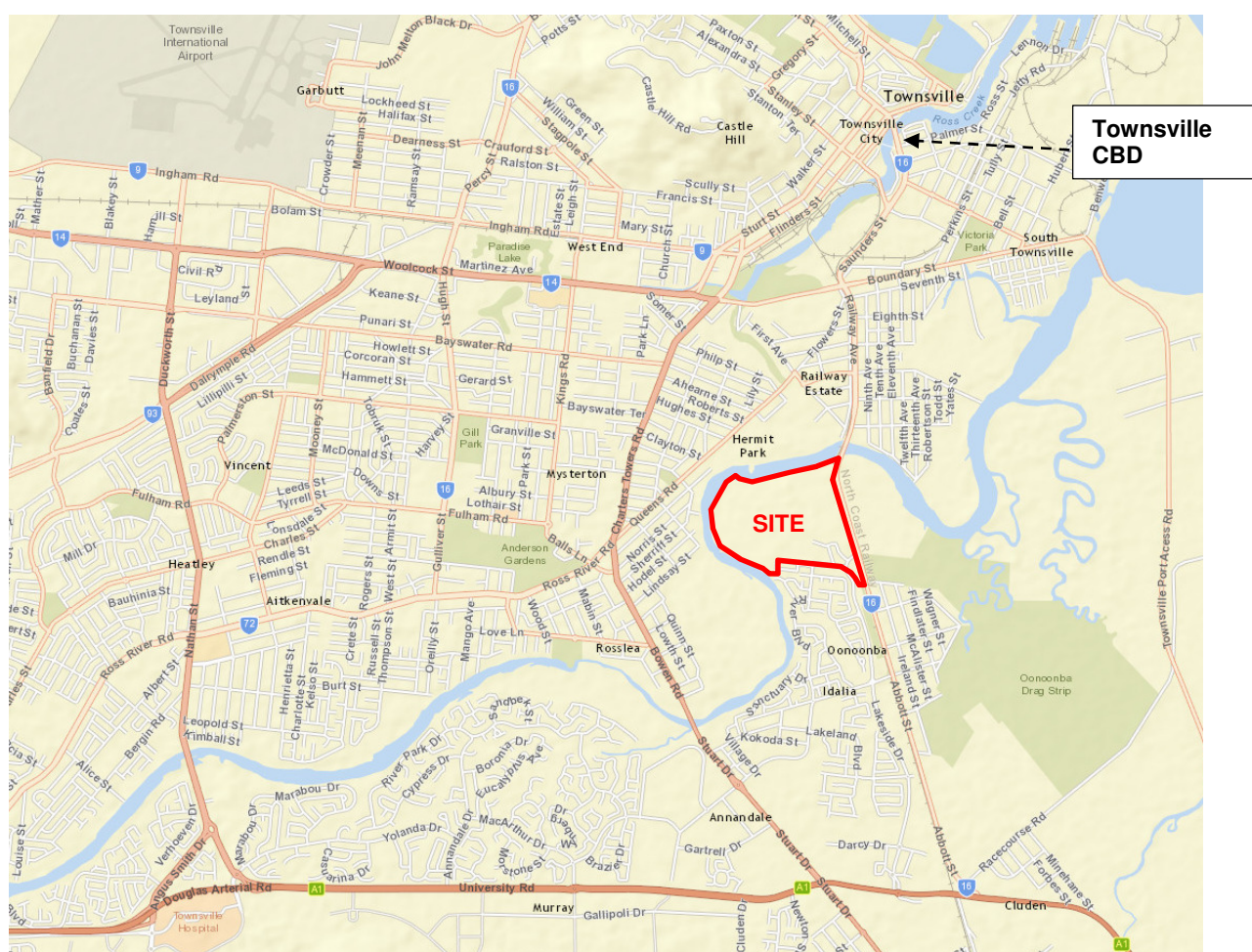


Figure 2-1: Site Locality (Source: Bing Maps)

3 ASSUMPTIONS

This section provides detail of the key assumptions made in developing the water and wastewater service strategies proposed to support The Village Master Plan area.

3.1 PREVIOUS INVESTIGATIONS

The following investigations have been previously completed for The Village Master Plan area and are relevant to the current application:

- DPM Water Pty Ltd (Apr. 2011), ULDA Oonoonba Residential Development – External Water Supply Planning Report; and
- UDP Consulting Engineers (Oct. 2012), Proposed Residential Development, The Village, Oonoonba – Water and Sewerage Master Planning, Report No. ULD100/R01.

3.2 DESIRED STANDARD OF SERVICE

Assessment was undertaken in accordance with *Section 6.4: Development Manual Planning Scheme Policy* of the *Townsville City Plan*. The key criteria from the adopted Desired Standards of Service (DSS) are as follows:

3.2.1 WATER SUPPLY

- Average Day Demand (AD): 1000 L/EP/Day;
- Mean Day Max Month Demand (MDMM): 1350 L/EP/Day;
- Peak Day Demand (PD): 1620 L/EP/Day;
- Peak Hour Demand (PH): 0.048 L/s/EP;
- Residential Fire Flow: 15L/s for 2 hours;
- Commercial Fire Flow: 30L/s for 2 hours;
- Minimum Residual Pressure (Peak Hour Conditions): 22m;
- Minimum Residual Pressure (Fire Flow Conditions): 12m; and
- Maximum Residual Pressure: 80m.

3.2.2 WASTEWATER

- Average Dry Weather Flow (ADWF): 230 L/EP/Day;
- Inflow / Infiltration (I/I): 163 L/EP/Day;
- Peak Wet Weather Flow (PWWF): 5 x ADWF + I/I; and
- Maximum depth of flow in new pipes: 70% depth at PWWF.

4 DEMAND ASSESSMENT

4.1 Equivalent Population Demand Projections

As discussed in **Section 1**, Stages 1 – 6 of The Village have already been developed. These stages consisted of 162 detached residential dwellings and 158 attached/terraced dwellings, with a yield of 738 EP.

The balance of The Village is proposed to occur across a further 14 stages (Stages 7-20) consisting of approximately 497 detached residential dwellings, 171 attached/terraced dwellings, a commercial area, a service station and open space land use. Further information regarding the site layout is presented in **Appendix A**.

For the purpose of this investigation, only the balance (or future Stages 7-20) of The Village will be incorporated within the water supply and wastewater master planning analyses. Stages 1-6 of The Village have been constructed and are considered to not be part of the updated master plan.

The design water supply and wastewater demands were determined generally in accordance with *Townsville City Plan Priority Infrastructure Plan, Part 4 Table 4.2.11.2.1 and Table 4.2.11.2.2*. The design Equivalent Person (EP) demands for both water and wastewater infrastructure of the proposed development are outlined within **Table 4-1** below.

Table 4-1 – Equivalent Population Demand Projections

Development Use	Quantity	Unit	Water	Wastewater	Water	Wastewater
			EP/Unit	EP/Unit	EP Projection	EP Projection
Detached Residential ¹	543	Single Dwelling	2.8	2.8	1520.4	1520.4
Attached Residential	171	Multiple Dwelling	1.8	1.8	307.8	307.8
Service Station ^{2, 5}	1,400 m ² GFA	Retail (100m ² GFA)	2.10	2.74	29.4	38.4
Local Retail ^{3, 5}	2,253 m ² GFA	Retail (100m ² GFA)	2.10	2.74	47.3	61.7
Child Care Centre ^{3, 5}	1,129 m ² GFA	Services (100m ² GFA)	1.35	1.86	15.2	21.0
			TOTAL		1920.1 EP	1949.3 EP

Notes: 1) Contingency factors have been applied to the residential development;
 2) EP demand projections for Service Station assumes GFA is 15% of total site area;
 3) EP demand projections for Local Retail and Child Care Centre assumes GFA is 75% of total site area;
 4) Dwelling and GFA rates adopted in accordance with Tables 4.2.11.2.1 and 4.2.11.2.2 of the Townsville City Plan; and
 5) Non-residential EP's will be confirmed when final building configurations are received.

As outlined in **Table 4-1**, the water supply and wastewater demand allowances adopted for preliminary design purposes are 1920.1 EP and 1949.3 EP respectively. These figures include contingency factors associated with different portions of the residential development. It is understood that these figures will be further refined as part of detailed design and subject to subsequent assessment by Council through a future application for Operational Works. **Figure 4-1** outlines the contingency factors allowed for each portion of the residential development.

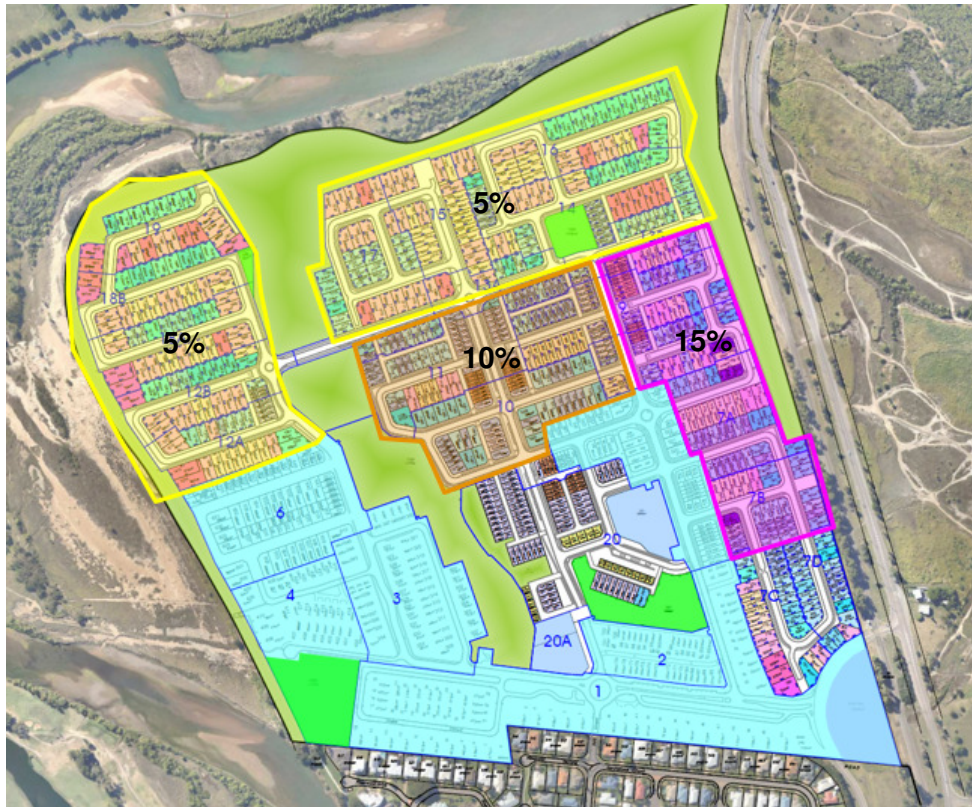


Figure 4-1: Site Contingency Allowances

5 WATER SUPPLY SERVICING

Assessment of proposed water supply master planning was undertaken to confirm that The Village can be serviced in accordance with *Section 6.4: Development Manual Planning Scheme Policy* of the *Townsville City Plan*. Assessment was undertaken for the ultimate population projection of 1920.1 EP. The following water service strategy is conceptual only and remains subject to detailed engineering design.

5.1.1 Methodology

The internal conceptual water network modelling was undertaken by Calibre Consulting with the use of WaterGEMS. Network infrastructure was assessed against the Townsville City Council desired standards of service outlined within the Townsville City Council Planning Scheme Policy SC6.4.3.21.2.

The initial modelling analyses were confirmed using Council's master model on 17 to 19 February 2016. The assumptions and projections, which were contained in Council's model, were adopted for the modelling analyses.

5.1.2 Existing Water Infrastructure

As previously outlined in **Section 3.1**, water supply master planning investigations were previously undertaken by DPM Water Pty Ltd (2011) for The Village along with the expected urban consolidation of the South Townsville, Railway Estate and Oonoonba suburbs. In order to service the greater structure plan area, it was proposed that a trunk main, approximately 3.14km in length, would be constructed from the Bottom City / Middle City Reservoir site south to within The Village development. This trunk water main has since been constructed generally in accordance with the proposed strategy outlined in the DPM Water Pty Ltd Master Planning Report. The DN600 main reduces in size as off takes are constructed to service other precincts in the structure plan area. The trunk water main is reduced to a DN375 water main before entering the site from the north. There is also an existing DN250 water main connection to service the initial stages of The Village.

Based on information obtained from a Dial Before You Dig (DBYD) search and available As-Constructed information, there is an existing water supply network connecting to the DN375 trunk main that has been constructed to service Stages 1-6 of The Village with provisions made for the ultimate development. The water supply network consists of existing DN200 and DN250 water mains in Darter Street and Riveredge Boulevard that supply internal OD63, DN100 and DN150 water reticulation mains.

5.1.3 Proposed Water Service Strategy

As outlined in Drawing No. **15-000745-GIS101** within **Appendix B**, it is proposed that the balance of The Village will be serviced via multiple connections to the aforementioned existing trunk main and water supply network that services Stages 1-6 of The Village. In addition to the existing DN250 water main that connects to the trunk main to service the initial stages, it is proposed that a second DN300 connection will be made to service the northern portions of The Village. Reticulation will be provided to the development in the form of DN250, DN200, DN150, DN100 and OD63 water mains.

It is proposed that the existing DN250 water main that traverses the proposed fuel site in the south-eastern corner of The Village, will be decommissioned and realigned south to within the existing drainage easement. It is considered that a shared easement is acceptable for the water main relocation. The water main is proposed to be offset 1m from the northern easement boundary and maintain standard offsets from the existing DN900 rising main and proposed stormwater drainage.

The following sections detail the water network analyses results achieved through the proposed service strategy.

5.1.4 Demand Assessment

Based on the design demand projections, a demand assessment was undertaken for Stages 7-20 of The Village in general accordance with the Townsville City Plan. **Table 5-1** outlines the projected water flow rates in accordance with the estimated ultimate EP.

Table 5-1 – Design Water Supply Demand Projections

Demand (EP)	Average Day Demand (L/s)	MDMM (L/s)	Peak Day (L/s)	Peak Hour (L/s)
1920.1	22.22	30.00	36.00	92.16

Notes: 1) Demand peaking factors adopted are in accordance with *Section 6.4* of the *Townsville City Plan*.

Fire flow demands of 15 L/s and 30L/s for two hours are required to service residential dwellings and commercial land uses respectively, as outlined in the *Townsville City Plan*.

5.1.5 Internal Water Network Assessment

The Townsville City Council WaterGEMS model was updated to include the proposed internal water supply network and the projected EP demands.

The following water supply network modelling results are in relation to the proposed service strategy outlined in **Section 5.1.3**.

To determine the impact of the proposed development, development demands were applied to the network model and assessed under PH and FF conditions during the 2018 and 2021 planning horizons. Fire flow conditions were assessed against DSS requirements with demands of 15 L/s for 2 hours applied to residential dwellings. **Table 5-2** outlines the minimum internal network pressures under PH and FF conditions during the 2018 and 2021 planning horizons.

Table 5-2 – Internal Network Modelling Results

Planning Horizon	Minimum Peak Hour Pressure (m)	Minimum Residual Fire Flow Pressure (m)
2018	35.1m	31.0m
2021	46.0m	44.2m

For the purpose of this assessment, concept bulk earthworks levels have been adopted. Water network modelling indicates that the minimum Peak Hour service pressure identified is 35m, which is above the Townsville City Plan minimum requirement of 22m. The minimum fire flow pressure was 31m, which is above the 12m minimum pressure requirement. Assessment of the proposed internal water network indicated that sufficient capacity is available to service Stages 7-20 of The Village as conceptualised in the development master plan.

The conceptual staging for water supply infrastructure, including corresponding peak hour and fire flow pressures are outlined in Drawings No. **15-000745-GIS101-102** within **Appendix B**.

6 WASTEWATER SERVICING

Assessment of the proposed wastewater network infrastructure was undertaken to confirm that The Village can be serviced in accordance *Section 6.4: Development Manual Planning Scheme Policy* of the *Townsville City Plan*. Assessment was undertaken for the ultimate population projection of 1949.3 EP. The following wastewater service strategy is conceptual only and remains subject to detailed engineering design.

6.1.1 Methodology

The internal conceptual wastewater network modelling was undertaken by Calibre Consulting with the use of SewerGEMS. Network infrastructure was assessed against the Townsville City Council desired standards of service outlined within the Townsville City Council Planning Scheme Policy SC6.4.3.21.3.

Master Planning has previously been undertaken by UDP for Stages 1-20 of The Village. It is proposed that wastewater from The Village will be conveyed to the existing sewage pump station (PS1), located on the northern side of Riveredge Boulevard. As outlined in **Section 3.3.2**, it is considered that PS1 and the downstream wastewater network have sufficient capacity to service the revised yields associated with Stages 7-20.

Assessment of the proposed wastewater infrastructure has been undertaken up to and including PS1 during PWWF conditions.

6.1.2 Existing Wastewater Infrastructure

As discussed in **Section 6.1.1**, there is an existing sewage pump station (PS1) located on the northern side of Riveredge Boulevard in which all loads from The Village will discharge to. PS1 then pumps wastewater approximately 4.7km east via a DN900 rising main to the Cleveland Bay Wastewater Treatment Plant (WWTP).

In accordance with the UDP Report (Oct. 2012) and As-Constructed information, there is an existing lift station adjacent to Darter Street that was constructed during Stage 5 works. This lift station discharges wastewater into an existing DN225 gravity main in Darter Street which conveys wastewater south-west to PS1. Existing DN150 and DN225 sewer gravity mains have also been identified within As-Constructed information from Stages 1-6 of The Village. Existing wastewater infrastructure is as outlined in Drawing No. **15-000745-GIS104** within **Appendix B**.

6.1.3 Proposed Wastewater Service Strategy

It is proposed that the development will be serviced via multiple connections to the wastewater infrastructure constructed during Stages 1-6 of The Village. The previous planning, prepared by UDP, indicated that Stages 7-20 of the Master Plan may require an additional two sewage lift stations, PS3 and PS4.

Calibre Consulting have optimised the earthworks to remove the need for the proposed PS3, which was to be located in the planned park reserve on the north-eastern portion of The Village. It is proposed that Stages 7-20 of The Village will be serviced via a new lift station, PS4, to be located in the large open drainage reserve traversing the site and servicing the north-western catchment. The remainder of Stages 7-20 will be serviced via approximately 370m of DN225 sewer main and approximately 5,765m of DN150 sewer main.

6.1.4 Demand Assessment

Based on the design demand projections, a demand assessment was undertaken for the proposed development in general accordance with the *Townsville City Plan* to evaluate the wastewater demands associated with the proposed development. The design wastewater loadings are outlined in **Table 6-1** below.

Table 6-1 – Design Wastewater Loading Projections

Demand (EP)	ADWF (L/s)	PWWF (L/s)
1949.3	5.19	29.62

Note: Wastewater flow projections calculated in accordance with Table SC6.4.3.21.5 of the Townsville City Plan.

An estimated ultimate PWWF of 29.62 L/s will be discharged to the existing wastewater network.

6.1.5 Internal Wastewater Network Assessment

Assessment of the internal wastewater network was undertaken to demonstrate that sufficient capacity is provided to service the ultimate development of 1949.3 EP. Preliminary concept design analyses have been undertaken to determine the indicative internal wastewater infrastructure requirement and remains subject to detailed engineering design during the operational works phase. The proposed internal wastewater network is as outlined on Drawing No. **15-000745-GIS104** within **Appendix B**.

6.1.5.1 Gravity Sewer Design

As detailed in **Section 6.1.3**, it is proposed that each of the sub-catchments will be serviced via an internal sewer reticulation network. **Table 6-2** and **Figure 6-1** outline the maximum depths of flows within the proposed internal wastewater network identified through network analyses.

Table 6-2 – Internal Gravity Network Capacity Summary

Nominal Pipe Diameter	Depth over Diameter (1:x)
150mm	0.49
225mm	0.57
300mm	0.41
375mm	0.20

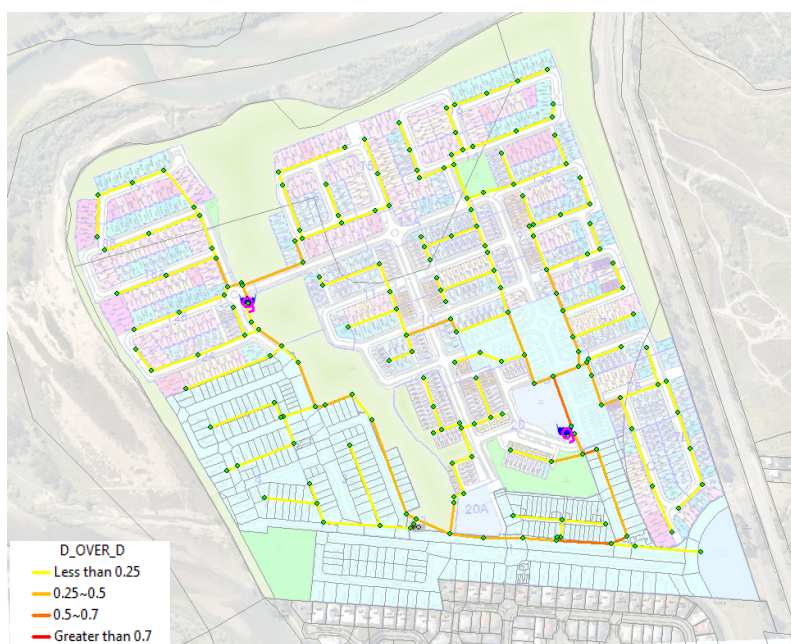


Figure 6-1: Internal Gravity Network Capacity (SewerGEMS Model)

The internal sewerage network has been planned with sufficient capacity to convey PWWF without exceeding 70% of pipe capacity. In support of a conservative internal network analysis the proposed reticulation mains have adopted minimum grade where achievable.

The proposed network configuration and alignment of the sewer network is indicative only and remains subject to detailed engineering design.

6.1.5.2 PS4 Lift Station Planning

Drawing No. **15-000745-GIS104** within **Appendix B** outlines the proposed location of the new PS4 lift station proposed to service the north-western catchment of The Village. **Table 6-3** outlines the design components for the proposed lift station which were included within the SewerGEMS network model.

Table 6-3 – Concept PS4 Operational Requirements

Catchment	Catchment PWWF	Incoming Sewer IL	Approx. Surface Level	Minimum Operational Storage Required	Wet Well Depth	Static Lift
403 EP	6.12 L/s	0.05mAHD	4.47mAHD	0.57m ³	6.2m	4.4m

Notes: 1) The wet-well invert was approximated as it is dependent upon the pumps nominated in detailed design.
2) Friction Losses have not been accounted for.

It is proposed that pumps will be provided to deliver a duty flow of 6.12L/s to service the ultimate catchment. It should be noted that the SPS design parameters are conceptual only and remain subject to detailed design.

6.1.5.3 PS2 Lift Station Planning

Drawing No. **15-000745-GIS104** within **Appendix B** outlines the location of the existing PS2 lift station. **Table 6-4** outlines the design components for the existing lift station which were included within the SewerGEMS network model.

Table 6-4 – Concept PS2 Operational Requirements

Catchment	Catchment PWWF	Incoming Sewer IL	Approx. Surface Level	Minimum Operational Storage Required	Wet Well Depth	Static Lift
1,226 EP	18.63 L/s	-0.80mAHD	4.87mAHD	3.35m ³	7.5m	5.8m

Notes: 1) Friction Losses have not been accounted for.

It is assumed that the existing lift station has pumps capable of operating at a duty of 18.63L/s, or will be upgraded as necessary. It is recommended that this assumption be confirmed prior to detailed design. It should be noted that the SPS design parameters are conceptual only and remain subject to detailed design.

6.1.5.4 PS1 Pump Station Planning

Drawing No. **15-000745-GIS104** within **Appendix B** outlines the location of the existing PS1 pump station. **Table 6-5** outlines the design components for the existing pump station which were included within the SewerGEMS network model.

Table 6-5 – Concept PS1 Operational Requirements

Catchment	Catchment PWWF	Incoming Sewer IL	Approx. Surface Level	Minimum Operational Storage Required	Wet Well Depth
1,949 EP	29.62 L/s	-0.09mAHD	4.34mAHD	5.33m ³	7.5m

Notes: 1) Friction Losses have not been accounted for.

It is assumed that the existing pump station has pumps capable of operating at a duty of flow rate of 29.62L/s, or will be upgraded as necessary. It should be noted that the SPS design parameters are conceptual only and remain subject to detailed design.

6.1.6 External Wastewater Network Assessment

The Townsville City Council SewerGEMS model was used to assess the development impacts. The range of pressures and flows in the common rising main system are outlined in Figures 6-2 to 6-7. Council's model included scenarios for the 2015 PWWF, 2031 PWWF and the 2031 ADWF.

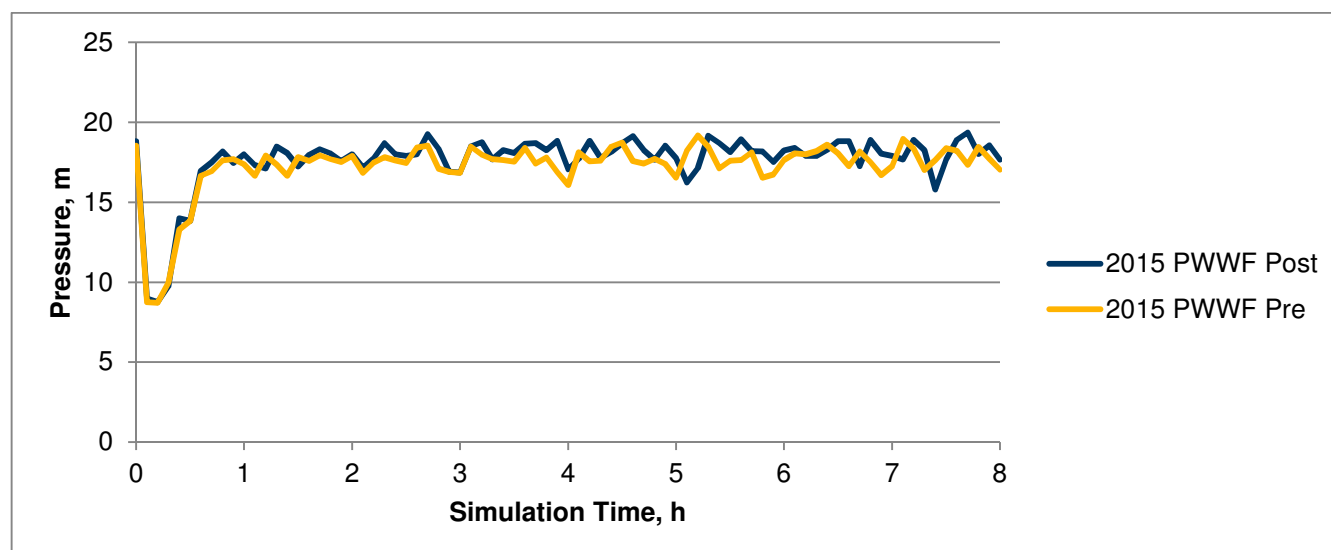


Figure 6-2: System Pressure in Common Rising Main at Proposed Connection Point, 2015 PWWF Scenario

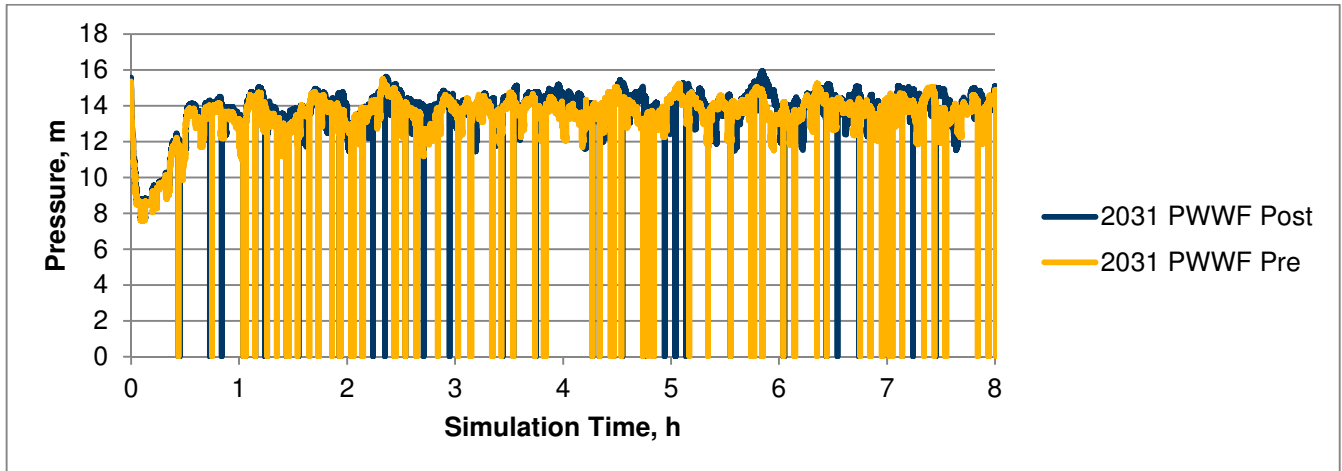


Figure 6-3: System Pressure in Common Rising Main at Proposed Connection Point, 2031 PWWF Scenario

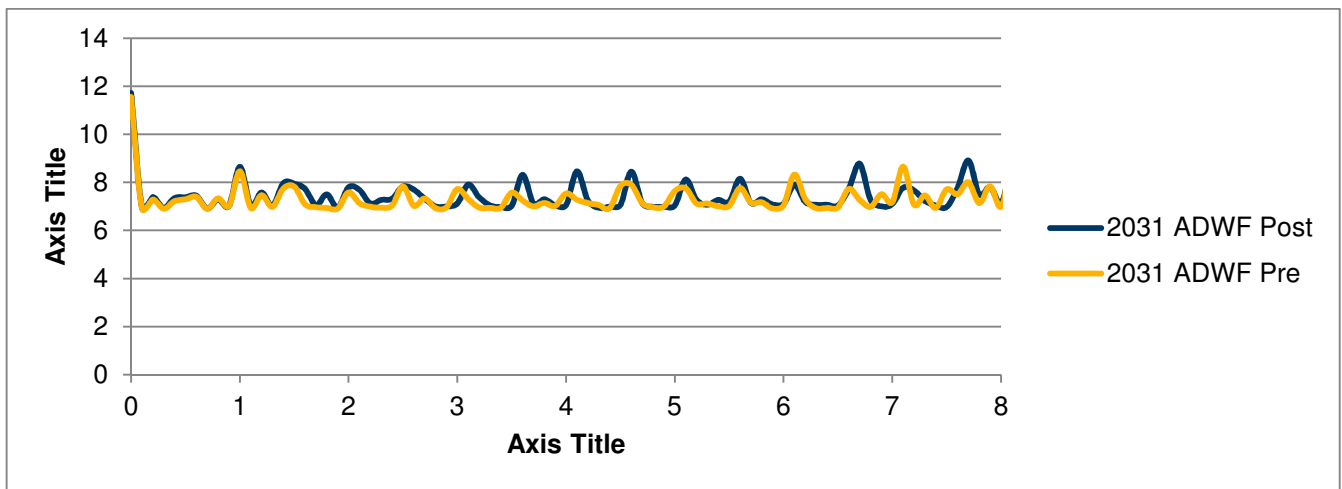


Figure 6-4: System Pressure in Common Rising Main at Proposed Connection Point, 2031 ADWF Scenario

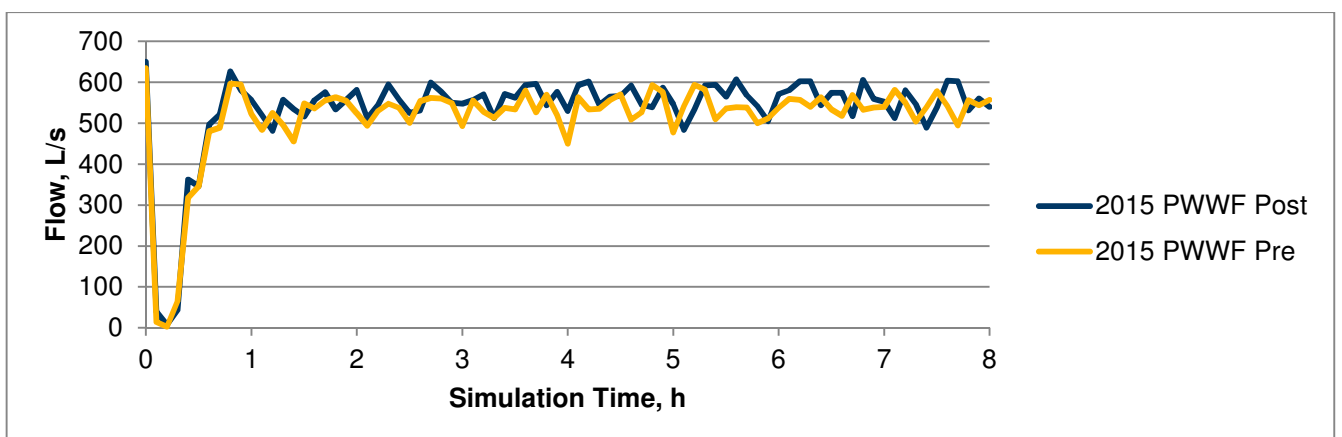


Figure 6-5: System Flow in Common Rising Main at Proposed Connection Point, 2015 PWWF Scenario

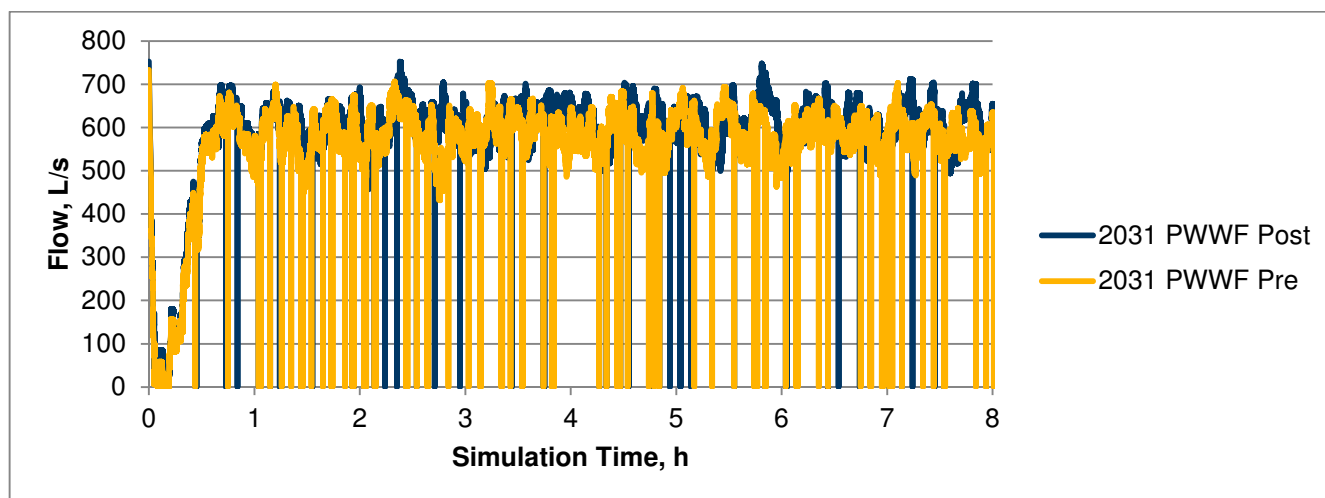


Figure 6-6: System Flow in Common Rising Main at Proposed Connection Point, 2031 PWWF Scenario

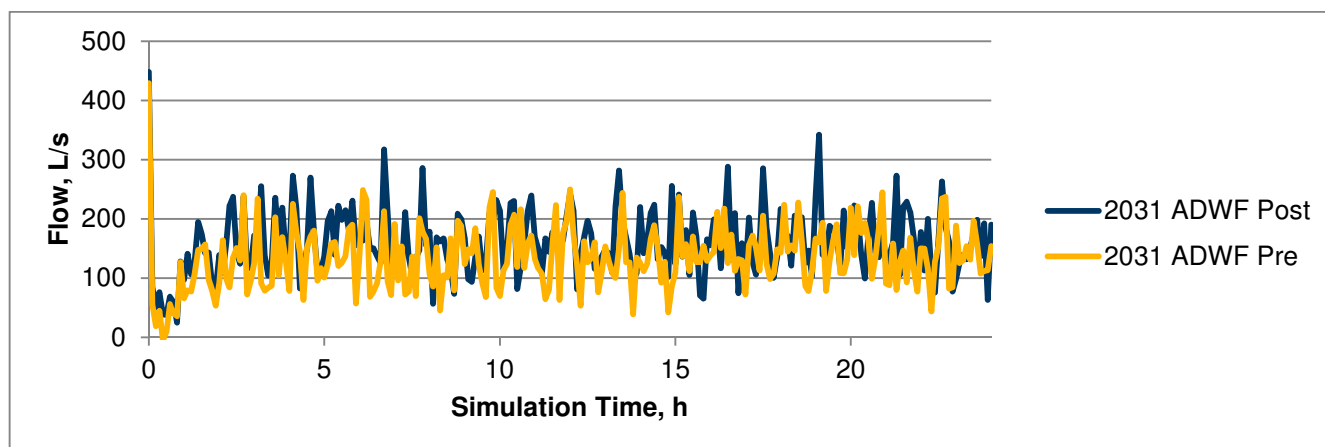


Figure 6-7: System Flow in Common Rising Main at Proposed Connection Point, 2031 ADWF Scenario

As outlined in Figures 6-2 to 6-4, the system pressures at the proposed connection point range from approximately 7 to 19m. It is recommended that the proposed PS1 pumps be capable of delivering the design PWWF, whilst injecting in to the common rising mains with a heads between less than 7m and greater than 19m. Some engineering judgement will be required to allow for safety factors outside of this range.

As outlined in Figure 6-5 to 6-7, the system flows just downstream of the proposed connection point range from approximately 50 to 700 L/s.

The impact of the addition of approximately 30 L/s from the proposed development is outlined as the differences between Pre and Post development scenarios on Figures 6-2 to 6-7. The hydraulic analyses did not consider the impact on external pump stations upstream of the proposed connection point.

Network modelling indicated that the loads associated with the proposed development have a negligible impact on the common rising main system. It is therefore considered that the existing network has sufficient capacity to service the development with negligible impact on the existing upstream pump stations.

7 CONCLUSION

Calibre Consulting (Qld) Pty Ltd has been engaged by Economic Development Queensland (EDQ) to undertake water supply and wastewater master planning in support of the proposed residential community 'The Village', located in Oonoonba, Townsville. For the purpose of this investigation, only the balance (or future Stages 7-20) of The Village were incorporated within the water supply and wastewater master planning analyses. Preliminary engineering analyses have confirmed the following outcomes:

- Stages 7-20 of The Village have a design demand of 1920.1 EP and 1949.3 EP for water and wastewater respectively. These figures include a contingency factor which has been applied to allow for minor changes in project planning;
- It is proposed that the development will be serviced via internal reticulation networks consisting of DN250, DN200, DN150, DN100 and OD63 water mains connecting to the existing water infrastructure that services Stages 1-6 of The Village;
- Water network modelling indicates that minimum pressure requirements can be satisfied under Peak Hour and Fire Flow conditions;
- It is proposed the development will be serviced via internal reticulation networks consisting of DN150 and DN225 gravity mains connecting to the existing trunk infrastructure that services Stages 1-6 of The Village;
- Network analyses have been undertaken up to and including the existing PS1 and common rising main system that is located on the northern side of Riveredge Boulevard. It is considered that the downstream infrastructure has sufficient capacity to service the revised development yields; and
- Internal wastewater infrastructure was conceptually designed in accordance with the Townsville City Plan requirements and input into the SewerGEMS network model.

Water and wastewater network analyses have indicated that the existing infrastructure has sufficient capacity to service The Village without negatively impacting existing network conditions. It is recommended that the development application be approved and the management strategies be incorporated into the future Operational Works detailed design. Detailed design may result in changes to the concept however the underlying design criteria will generally be followed.

8 DISCLAIMER

This report has been prepared on behalf of and for the exclusive use of Economic Development Queensland (EDQ) and is subject to and issued in accordance with the agreement between Calibre Consulting (QLD) Pty Ltd.

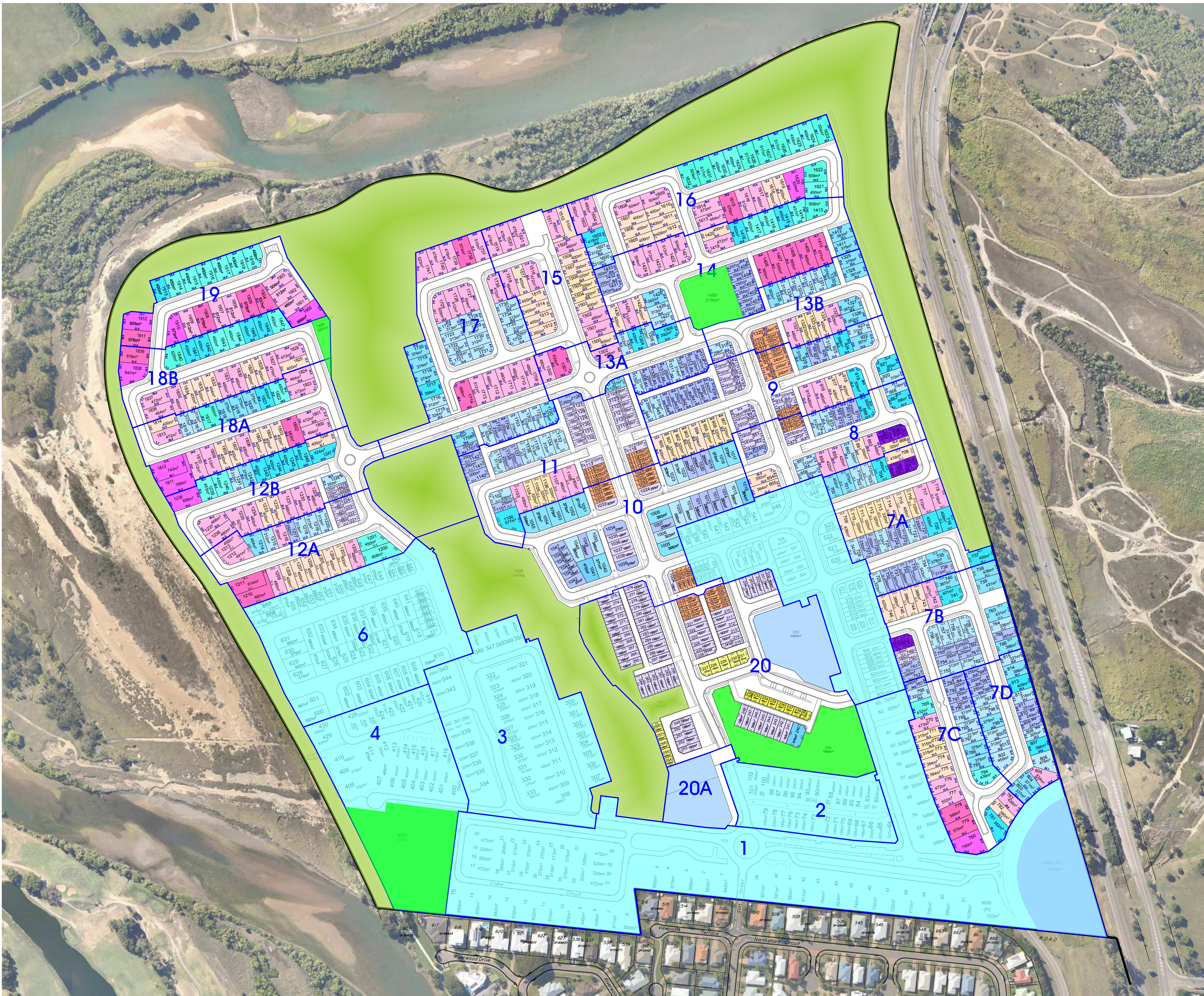
Our investigation and analysis has been specifically catered for the particular requirements of Economic Development Queensland (EDQ) and may not be applicable beyond this scope. For this reason, any other third parties are not authorised to utilise this report without further input and advice from Calibre Consulting (QLD) Pty Ltd.

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The investigation and analysis has relied on information provided by others. We accept no responsibility for accuracy of material supplied by others. The accuracy of the investigation, analysis and report is dependent upon the accuracy of this information.

APPENDICES

APPENDIX A SITE LAYOUT



Lot Type - Front Loaded	W x D	Area (m2)	Stg 7a	Stg 7b	Stg 7c	Stg 7d	Stg 8	Stg 9	Stg10	Stg 11	Stg 12a	Stg 12b	Stg 13a	Stg 13b	Stg 14	Stg 15	Stg 16	Stg 17	Stg 18a	Stg 18b	Stg 19	Stg 20a	Stg 20	Total
Premium Traditional 32	20 x 32	640			1							1	1				1		2	1	2			9
Premium Traditional 25	20 x 25	500													1		7		1	1				10
Traditional 32	18 x 32	576			2						2	2			5		1	2	1	1	5			19
Traditional 25	18 x 25	450			2	2					2	2			3		5		1	3	6			26
Premium Courtyard 32	16 x 32	512	2		1	1	1	1		1		1		1	5		3	6	2		5			30
Premium Courtyard 25	16 x 25	400	4	1		2	2	2				5			2		1	1	1	4	1			26
Courtyard 32	15 x 32	480		1	4		2	2		3	4	6	2	1	1	9	5	7	6	7	1			61
Courtyard 25	15 x 25	375	3	5	2	4		2	12	1	2	1	2	6	3			5	3			1		52
Premium Villa 32	12.5 x 32	400	4	4	3		3	4			6	3		1	3	10	8		6	6				61
Premium Villa 25	12.5 x 25	312.5	7	7	4	7	6	3	8	1	4	1	2	4	2		2	14	2					74
Villa 32	10 x 32	320	5		3		1	6		3				2		3								23
Villa 25	10 x 25	250	10	5	5	6	3	2	9	1	1				3									45
Urban (20)	7.5 x 20	150							6															6
Urban (15)	10 x 15	150	3	2			3																	8
Loft	7 x 10	70																						0
SoHo	10 x 10	100																					18	18
Multi Res																								0
Lot Type - Laneways																								0
Premium Villa 32 (Laneway)	12.5 x 32	400																						0
Premium Villa 25 (Laneway)	12.5 x 25	312.5						2		5		1	2				4							14
Villa 32 (Laneway)	10 x 32	320																						0
Villa 25 (Laneway)	10 x 25	250		2			1	6	2	6			6	1	6			3						33
Terrace 32 (Laneway)	7.5 x 32	240						3						1										4
Terrace 25 (Laneway)	7.5 x 25	187.5		2			5	10	7	14	4			1								63		106
5m Terrace 32 (Laneway)	5 x 32	160					3	2	12	8		3		3										5
5m Terrace 25 (Laneway)	5 x 25	125																				10		38
Total			38	29	27	22	30	47	56	43	25	24	15	21	34	22	33	42	25	23	20	0	92	668

Site Type				Total Area
Park:	Lot 291 = 4271m ²	Lot 293 = 7990m ²	Lot 1499 = 3150m ²	1.54 ha
Open Space:	1 = 10.03 ha	2 = 8875m ²	3 = 2.50 ha	13.81 ha
Commercial Site:	Lot 289 = 1500m ²	Lot 290 = 3004m ²	Lot 6000 = 9345m ²	1.35 ha

APPENDIX B CALIBRE CONSULTING DRAWINGS

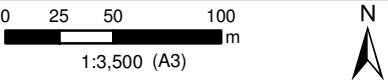
While every care is taken to ensure the accuracy of data sourced through third parties, Calibre Consulting (Aust) Pty Ltd makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which might be incurred as a result of the data being inaccurate or incomplete in any way and for any reason.



LEGEND
WATER SUPPLY MAINS

- PROPOSED OD63 WATER MAIN
- EXISTING OD63 WATER MAIN
- PROPOSED DN100 WATER MAIN
- EXISTING DN100 WATER MAIN
- PROPOSED DN150 WATER MAIN
- EXISTING DN150 WATER MAIN
- PROPOSED DN200 WATER MAIN
- EXISTING DN200 WATER MAIN
- PROPOSED DN250 WATER MAIN
- EXISTING DN250 WATER MAIN
- EXISTING DN250 TO BE DECOMMISSIONED
- PROPOSED DN300 WATER MAIN
- EXISTING DN375 WATER MAIN
- EXISTING LOTS
- 2021 PROJECTED LOTS

NOTES:
1. THIS DRAWING IS CONCEPTUAL ONLY AND HAS BEEN PRODUCED FOR DISCUSSION PURPOSES ONLY.



PROJECT:
THE VILLAGE, OONONBA

CLIENT:
ECONOMIC DEVELOPMENT QUEENSLAND

DRAWING TITLE:
CONCEPTUAL WATER SUPPLY SERVICE STRATEGY - 2021 PLANNING HORIZON

DRAWING NO: **15-000745-GIS101** ISSUE: **D**

ISS	BY	CHK	DATE	DETAILS
A	MAH	ABM	02.10.15	ORIGINAL
B	MAH	ABM	16.11.15	AMENDED ALIGNMENT
C	MAH	ABM	19.01.16	AMENDED SERVICE STRATEGY
D	MAH	ABM	29.02.16	AMENDED MODEL RESULTS

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H:\15\000745\GIS\Amended\15-000745-GIS102.mxd

Coordinate System: GDA 1994 MGA Zone 56 Datum: GDA 1994

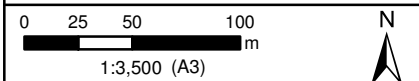


LEGEND

WATER SUPPLY MAINS

- FUTURE WATER MAINS
- PROPOSED OD63 WATER MAIN
- EXISTING OD63 WATER MAIN
- PROPOSED DN100 WATER MAIN
- EXISTING DN100 WATER MAIN
- PROPOSED DN150 WATER MAIN
- EXISTING DN150 WATER MAIN
- PROPOSED DN200 WATER MAIN
- EXISTING DN200 WATER MAIN
- PROPOSED DN250 WATER MAIN
- EXISTING DN250 WATER MAIN
- EXISTING DN250 TO BE DECOMMISSIONED
- EXISTING DN375 WATER MAIN
- EXISTING LOTS
- 2018 PROJECTED LOTS
- FUTURE LOTS

NOTES:
1. THIS DRAWING IS CONCEPTUAL ONLY AND HAS BEEN PRODUCED FOR DISCUSSION PURPOSES ONLY.



PROJECT:
THE VILLAGE, OONONBA

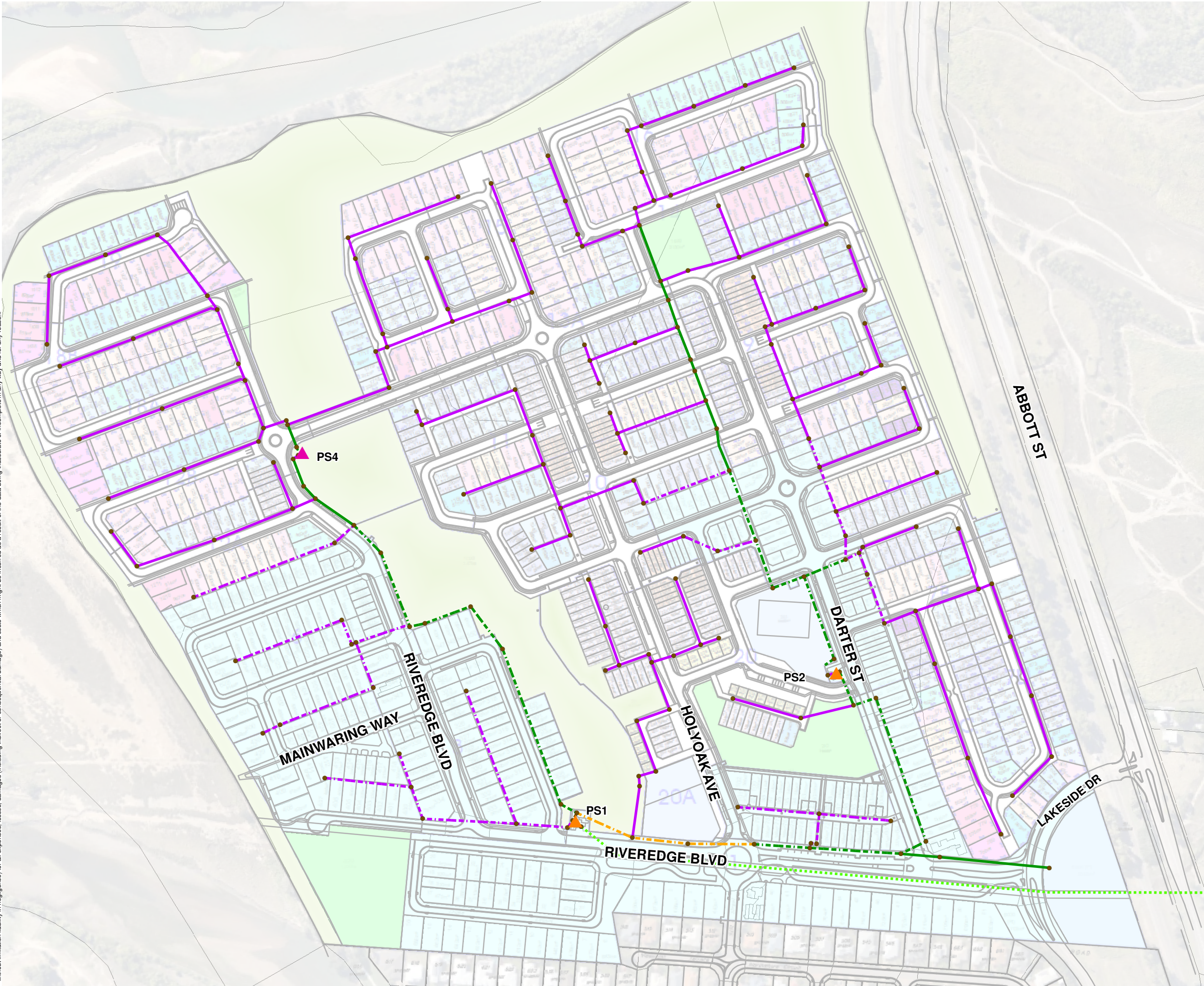
CLIENT:
ECONOMIC DEVELOPMENT QUEENSLAND

DRAWING TITLE:
CONCEPTUAL WATER SUPPLY SERVICE STRATEGY - 2018 PLANNING HORIZON

DRAWING NO: **15-000745-GIS102** ISSUE: **C**

ISS	BY	CHK	DATE	DETAILS
A	MAH	ABM	16.11.15	ORIGINAL
B	MAH	ABM	19.01.16	AMENDED MODEL RESULTS
C	MAH	ABM	29.02.16	AMENDED MODEL RESULTS

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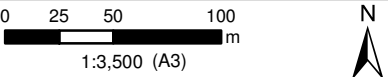


LEGEND

**WASTEWATER
INFRASTRUCTURE**

- EXISTING LIFT/PUMP STATIONS
- PROPOSED LIFT/PUMP STATIONS
- PROPOSED DN150 GRAVITY MAIN
- EXISTING DN150 GRAVITY MAIN
- PROPOSED DN225 GRAVITY MAIN
- EXISTING DN225 GRAVITY MAIN
- EXISTING DN300 GRAVITY MAIN
- EXISTING DN375 GRAVITY MAIN
- EXISTING RISING MAIN

NOTES:
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PROJECT:
THE VILLAGE, OONOONBA

CLIENT:
ECONOMIC DEVELOPMENT QUEENSLAND

DRAWING TITLE:
**CONCEPTUAL WASTEWATER
SERVICE STRATEGY**

DRAWING NO: **15-000745-GIS104** ISSUE: **C**

ISS	BY	CHK	DATE	DETAILS
A	MAH	ABM	19.01.16	ORIGINAL