Yarrabilba Precinct 6 ROL 2 Sub-Precinct Network Plan – Water and Wastewater Infrastructure

PREPARED FOR Lendlease | October 2023

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AMENDED IN RED

By: Gabrielle Shepherd

Date: 6 June 2024

Queensland Government

PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL

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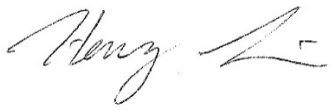
Revision schedule

Rev No	Date	Description	Signature of Typed Name (documentation on file)			
			Prepared by	**Checked by**	**Reviewed by**	**Approved by**
01	22/09/2023	Internal Draft	H Lin	H Lin	P Hall	P Flint
02	09/10/2023	Draft to EDQ	H Lin	H Lin	P Hall	P Flint

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1 Introduction

This report outlines the requirements for the water and sewerage network for Precinct 6 ROL 2 residential development located in the Yarrabilba development.

In accordance with the Yarrabilba Precinct 6 Context Planning Area Strategy (Precinct 6 CPAS) endorsed by Economic Development Queensland (EDQ), Precinct 6 ROL 2 is located to the east of existing Precinct 4 development (refer to Figure 1). This ROL comprises of 20 ha of residential (470 residential lots), various sizes of open space and parklands (refer to Appendix A).

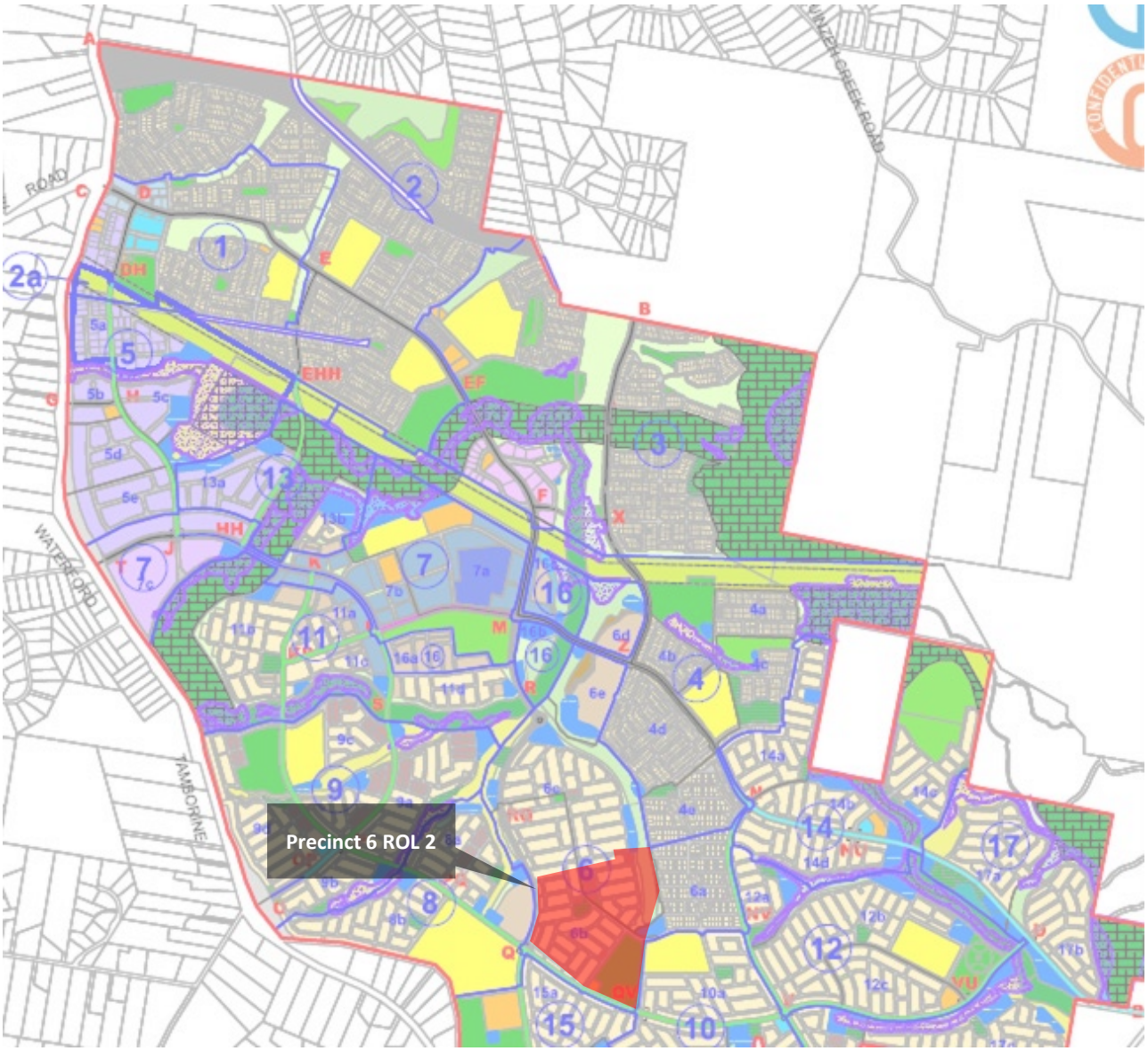


Figure 1: Locality of Precinct 6 ROL 2 Development

1.1 Previous Assessments

An infrastructure master plan (IMP) report entitled *Yarrabilba Water Supply and Sewerage – Infrastructure Master Plan 2017* was submitted to EDQ and endorsed by EDQ in August 2017 outlining the water supply and sewerage requirements for the entire Yarrabilba development area (it is noted that a 2023 IMP revision report will be also submitted to EDQ in September 2023). These works were based on an earlier proposed land use master plan with a total Yarrabilba equivalent persons (EP) of 46,869 EP) and 47,647 EP for water and sewerage respectively. EDQ and Logan City Council (LCC) also instructed that an additional 1,486 future detached residential dwellings or 4,162 EP external to Yarrabilba are also in the priority development area (PDA) and are to be considered in the water and sewerage infrastructure plan.

Following the IMP, Precinct Network Plan (PNP) reports were prepared for the Precincts 1 to 5. A PNP is a detailed planning document that identifies all trunk infrastructure to service the proposed Precinct both internal and external to the site. These PNP reports include both interim and ultimate solutions in accordance with the revised regional strategy agreed by both EDQ and LCC.

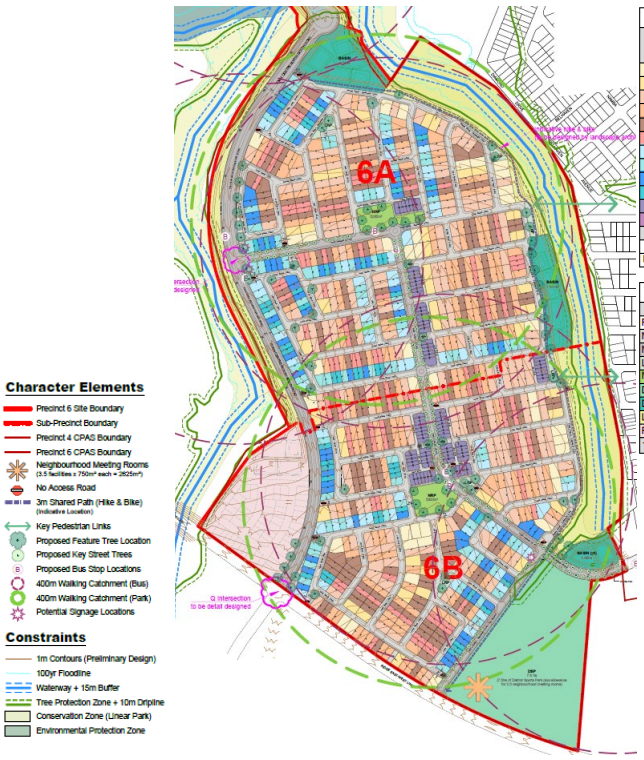
For the water infrastructure, the PNP includes details of all the water infrastructure required to deliver peak demand, fire flow and pressure management (as required), including layout plans, pipe sizes, and details of pressure reduction areas and equipment.

For the sewerage infrastructure, the PNP includes details of all the sewerage infrastructure required, including layout plans, pipe sizes, conceptual design of the new pump station, vertical alignment of controlling sewer, and conceptual design of interim servicing infrastructure required to address development staging and odour/corrosion control.

Three PNP reports were prepared for the Precincts 1 to 5 and this PNP report is proposed for the Precinct 6 ROL 2 development.

1.2 Precinct 6 ROL 2

There are 470 residential lots and open space and parklands of various sizes in the Precinct 6 ROL 2 (or named 6B in Figure 2) development area.



Yield Breakdown

Lot Code	Standard Dimensions	6A		6B		Overall Precinct 6 Yield	
T1	32 x 20.0	21	4%	18	4%	39	4%
T2	32 x 18.0	22	4%	19	4%	41	4%
C3	32 x 16.0	90	16%	77	16%	167	16%
C2	32 x 14.0	98	17%	75	16%	173	17%
FV	32 x 12.5	86	15%	79	17%	165	16%
V	32 x 10.5	56	10%	47	10%	103	10%
TCY3	25 x 16.0	35	6%	25	5%	60	6%
TCY2	25 x 14.0	52	9%	26	6%	78	8%
TPV	25 x 12.5	41	7%	28	6%	69	7%
TV	25 x 10.5	32	6%	20	4%	52	5%
TCR	25 x 7.5	29	5%	56	12%	85	8%
TCF	25 x 7.5	—	0%	—	0%	—	0%
Total		562	100%	470	100%	1032	100%
Average Lot Size		428 m²		422 m²		426 m²	
Estimated Population (@2.8ppl)		1574		1316		2890	

Land Use Budget

Area	6A		6B		Total	
Residential Allotments	24.07ha	43%	19.85ha	41%	43.92ha	42%
New Road - Local	9.73ha	17%	7.42ha	15%	17.15ha	16%
New Road - Trunk / Collector	6.74ha	12%	3.01ha	6%	9.75ha	9%
Local Recreation Park	0.31ha	1%	0.31ha	1%	0.62ha	1%
Neighbourhood Recreation Park	0.53ha	1%	0.53ha	1%	1.06ha	1%
District Sports Park	—	0%	7.83ha	16%	7.83ha	7%
Detention Basin	3.09ha	6%	0.68ha	1%	3.77ha	4%
Linear Park	11.42ha	20%	4.27ha	9%	15.69ha	15%
Future Precinct	—	0%	4.67ha	10%	4.67ha	4%
Total Site Area	55.89ha	100%	48.57ha	90%	104.46ha	96%

Figure 2: Precinct 6 ROL 2 Development Contents

1.3 Development Timeline

Lendlease advises that the Precinct 6 ROL 1 development is likely to start in 2024 and this study assumes that the entire Precinct 6 ROL 2 development would be completed throughout 2026.

2 Desired Standards of Service

The Desired Standards of Service (DSOS) adopted for this assessment are in accordance with the 2018 DSOS review report provided by LCC. The DSOS is provided in Appendix B and the key criteria are provided in the following sub-sections.

2.1 Water DSOS

An average day potable water demand (AD) of 165 L/EP/day plus an unaccounted for water (UFW) allowance of 25 L/EP/day was adopted. Adopted water supply peaking factors are summarised in Table 2-1.

Table 2-1: Potable Water Demand Peaking Factors

Peaking Factors	Residential Detached	Residential Attached	Commercial Education	Industry
Maximum Day (MD) / AD	1.7	1.6	1.3	1.3
Maximum Hour (MH) / AD	3.1	2.6	2.0	1.7
Mean Day Maximum Month (MDMM) / AD	1.3	1.3	1.2	1.2

The key water infrastructure sizing criteria applied to this study are outlined in Table 2-2.

Table 2-2: Potable Water Demand Peaking Factors

Parameter	Description
Minimum service pressure	22 m at the property boundary
Maximum service pressure	55 m
Fire flow demands	Residential: 15 L/s Non-Residential: 30 L/s
Residual pressure during fire flow event	12 m at the fire flow location
Background demand during fire	2/3 MH demand
Maximum allowable pipe headloss	5 m/km for diameter <= 150 mm 3 m/km for diameter > 150 mm

2.2 Sewerage DSOS

An average dry weather flow (ADWF) of 165 L/EP/day is adopted for this study in accordance with the 2014 LCC DSOS. As 'Reduced Infiltration Gravity Sewers' (RIGS) are utilised in the Yarrabilba development, the peak weather flow (PWWF) was calculated based on 1,000 L/EP/day. It is noted that gravity mains are designed to transfer PWWF of 1,000 L/EP/day with a depth of flow of 75% pipe depth and to meet self-cleansing velocities.

3 Population Development

3.1 Approach

Expected population growth and EP are assessed based on the proposed subdivision layouts (provided by Lendlease) and the occupancy rates/densities agreed with LCC.

The residential populations for Precincts 1, 2, 3, 4, 5 MIBA North, 6A, 6 ROL 1 and 6 ROL 2 were calculated using the following methodology:

- A lot count was performed for areas where the subdivision layout was complete and where the future layout was sufficiently detailed.
- Terrace houses and town houses were regarded as attached residential dwellings.
- Where the future layout was not detailed 11.2 % of the total number of residential lots was assumed to be attached residential dwellings

The projected yield for each village of future precincts (Precincts 5 to 17) of the Yarrabilba development was provided by Lendlease for use in the 2023 IMP revision report. The map of future precincts outlines the extent of future commercial, industrial, open space and varying densities of residential development within the study area. The projected number of dwellings for each of village was provided by Lendlease (YAR_CA_LL_220831.xlsx). The development staging plan provided by Lendlease is included in Appendix C. These documents form the basis of long-term population projection assessment.

3.2 Planning Densities and Occupancy Rates

The following planning density and occupancy rates were used for estimating the EP for Precincts 1 to 6:

- Residential occupancy rates:
    - Detached dwelling: 2.8 EP/dwelling
    - Attached dwelling: 1.78 EP/dwelling.
- Non-residential planning densities:
    - Commercial and Industrial: 30 EP/ha (water) and 37 EP/ha (sewerage)
    - Education state and private primary schools: 166 EP, as per the Precinct 2 Yarrabilba State School population (138 EP) plus 20% planning allowance.
    - Education state and private high schools: 187 EP, as per the Precinct 3 Yarrabilba State Secondary College population (156 EP) plus 20% planning allowance.
    - Toilet block: 1.1 EP/toilet.

3.3 Population Summary

Precinct 6 ROL 2 comprises of 414 detached residential lots and 56 attached residential lots. A total of 1,259 EP for water and sewerage was estimated for Precinct 6 ROL 2 in accordance with the planning densities in documented above.

A summary of the EP in both earlier Precincts and Precinct 6 ROL 2 is provided in Table 3-1 and Table 3-2. The development application of Precinct 4G is also included and assumed to be developed before 2026.

Table 3-1: Estimated 2026 Water EP for Precincts 1, 2, 3, 4, 5A, and 6 ROL1, ROL 2

Precinct / Village	Residential Detached	Residential Attached	Commercial Employment/Retail/ Community	Education	Total EP	Estimated 2026 EP*
1	1,658	110	375	101	2,244	2,244
2	5,432	320	0	392	6,144	6,144
3A	605	255	44	214	1,118	1,118
3B	1,249	59	0	0	1,308	1,308
3C	610	0	0	0	610	610
3D	0	0	317	0	317	317
4A	430	35	0	0	465	465
4B	405	33	0	133	571	571
4C	303	24	0	0	328	328
4E/6A	1,725	139	0	0	1,864	1,864
4D	1,021	82	0	0	1,104	1,104
5A MIBA North	0	0	393	0	393	393
6 ROL 1	1,492	52	0	0	1,544	1,544
6 ROL 2	1,159	100	0	0	1,259	1,259
4G (previously 5F)	325	0	0	0	325	325
Total	16,414	1,209	1,129	840	18,334	19,592

*: Based on development approvals up to and including 2026.

Table 3-2: Estimated 2026 Sewerage EP for Precincts 1, 2, 3, 4, 5A, and 6 ROL1 , ROL 2

Precinct / Village	Residential Detached	Residential Attached	Commercial Employment/Retail/ Community	Education	Total EP	Estimated 2026 EP*
1	1,658	110	460	101	2,329	2,329
2	5,432	320	0	392	6,144	6,144
3A	605	255	55	214	1,129	1,129
3B	1,249	59	0	0	1,308	1,308
3C	610	0	0	0	610	610
3D	0	0	390	0	390	390
4A	430	35	0	0	465	465
4B	405	33	0	133	571	571
4C	303	24	0	0	328	328
4E/6A	1,725	139	0	0	1,864	1,864
4D	1,021	82	0	0	1,104	1,104
5A MIBA North	0	0	484	0	484	484
6 ROL 1	1,492	52	0	0	1,544	1,544
6 ROL 2	1,159	100	0	0		
4G (previously 5F)	325	0	0	0	325	325
Total	16,414	1,209	1,386	840	18,852	18,852

*: Based on development approvals up to and including 2026.

4 Water Supply Network Assessment

Water supply to the Yarrabilba development Precinct 6 ROL 1 and ROL 2 is provided from the Travis Road reservoirs. In the interim, supply to Travis Road reservoirs is provided from the South Maclean pumping station with the long term plan for supply being provided through a new connection to the Southern Regional Water Pipeline (SRWP) at Chambers Flat.

4.1 Water Demand

The ultimate maximum day (MD) and mean day maximum month (MDMM) demands for Precincts 1, 2, 3, 4, 5A (MIBA North), 6A, 6 ROL 1 and 6 ROL 2 were calculated in accordance with the LCC DSOS stated in Section 2.1, and are summarised in Table 4-1. The sources of modelled population are:

- Precincts 1, 2 and 3A and 3B: Directly extracted from LCC water reticulation model, which includes the 2021 LCC infrastructure demand model (IDM) outcomes.
- Precincts 3C, 4, 5A MIBA North, 6A, 6 ROL 1 and ROL 2: Updated population (refer to Table 3-1) based on the development yields and layout provided by Lendlease.

Table 4-1: Yarrabilba Precincts 1, 2, 3, 4, 5A, 6A, 6 ROL 1 and 6 ROL 2 Demand Summary

Category	MD (ML/d)	MDMM (ML/d)
Detached residential	4.7	3.6
Attached residential	0.3	0.3
Commercial / education	0.3	0.3
Industry	0.1	0.1
Open space	0.0	0.0
Leakage/loss allowance	0.5	0.5
Total (ML/d)	5.9	4.7

In addition, fire flow was also considered at a requirement of 15 L/s for residential properties and 30 L/s for non-residential properties at a background demand of 2/3 peak hour.

4.2 Storage and Bulk Supply Assessment

The required reservoir volume to serve the Yarrabilba Precincts 1, 2, 3, 4, 5A (MIBA North), 6A, 6 ROL 1 and 6 ROL 2 plus 2026 Logan Village population (extracted from the LCC water reticulation model) was estimated as 4.9 ML. The existing Travis Road reservoir capacity is 9 ML. Hence there will be sufficient storage for Yarrabilba development until the end of Precinct 6 ROL 2 and Precinct 4G development.

LCC advised the timing of two sub-regional trunk mains for construction are as below:

- **600 mm diameter trunk main between the Seqwater SRWP and Travis Road reservoirs:** LCC advised that this trunk main will be delivered by the end of 2024.
- **600 mm diameter trunk main from the Travis Road Reservoir outlet on Camp Cable Road to the development:** LCC advised the schedule of this trunk main has been postponed and is constantly reviewed and monitored based on the real/operational demands growth from Logan Village and Yarrabilba. LCC has provided the hydraulic network model with the operation scenario to assist this study to access the need of this augmentation for the Yarrabilba Precincts 1, 2, 3, 4, 5A MIBA North, 6A, 6 ROL 1 and 6 ROL 2 development (refer to Section 4.4).

4.3 Proposed Precinct Water Supply Layout

Precinct 6 ROL 2 will be also served by the new DN300 mm trunk water main (refer to the Figure 4.3 Ultimate Yarrabilba Water Network in the 2023 IMP revision report) connected to the existing Yarrabilba Drive DN450 trunk water main in the Precinct 4 development. A DN250 mm reticulation main with a pressure reduce valve (PRV) teed off the new DN300 mm trunk mains are then connected to the proposed ROL 1 and ROL 2 reticulation mains as shown in Figure 3.

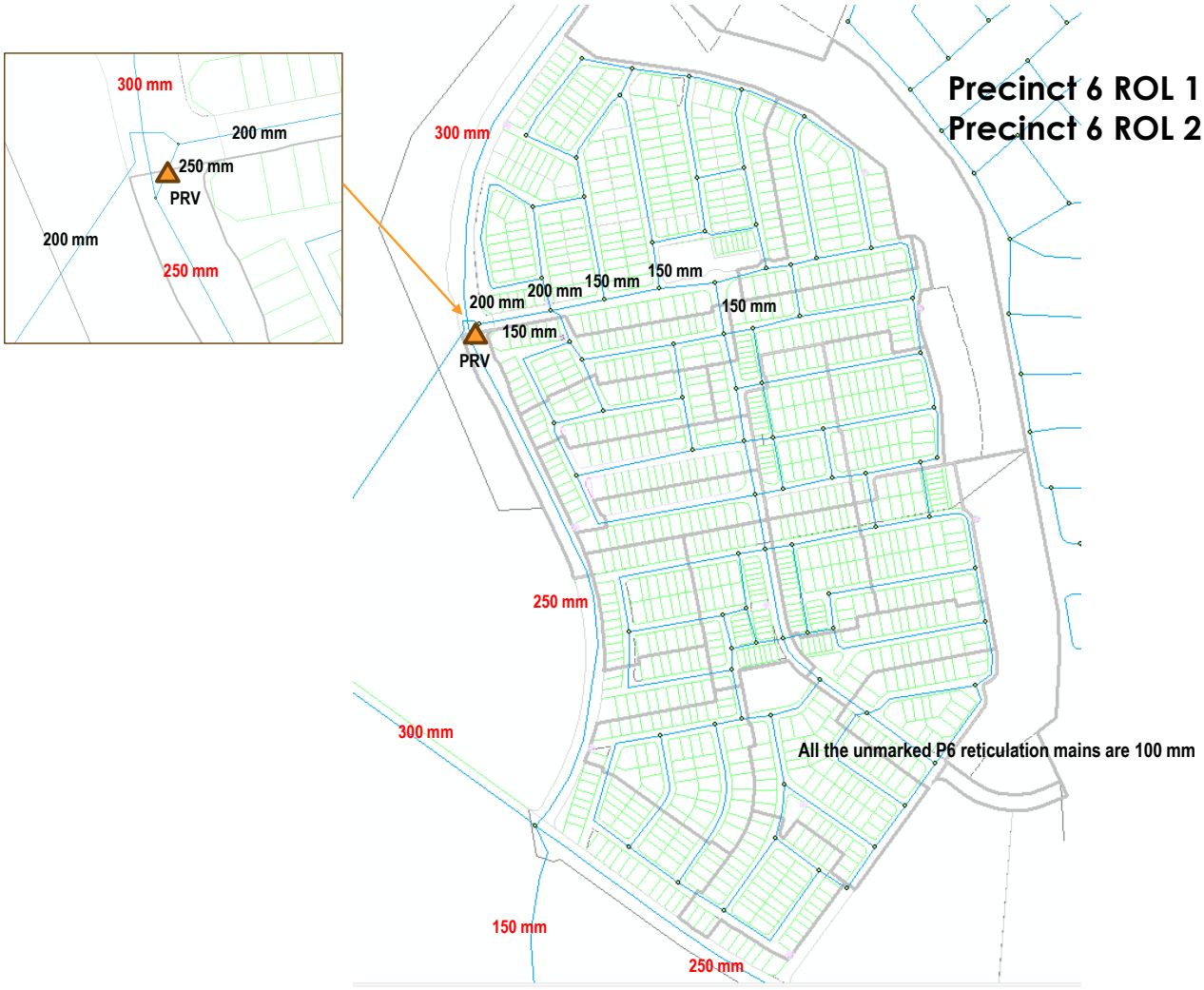


Figure 3: Proposed Precinct 6 ROL 2 Water Reticulation Mains

The preliminary elevations of the 470 lots in Precinct 6 ROL 1 range from 32 m AHD to 53 m AHD. By comparing with the top water level (TWL) of 110 m AHD at the Travis Road reservoirs to the development elevations it is proposed that a new demand management area (DMA) with a modulated PRV is required to comply with LCC DSOS.

The hydraulic performance of the network including Yarrabilba PMAs was assessed against the LCC DSOS with the forecast population in the ultimate planning horizon. Performance under the maximum hour (MH) demand scenario and the fire flow scenario were assessed, and the assessment outcomes are provided in Appendix D.

This study has updated the background future Yarrabilba population as 34,401 EP (the rest of Lendlease Precincts 5 to 17 plus four external lots in the Yarrabilba PDA) based on the projected yield of each village of future precincts (Precincts 5 to 17) of the Yarrabilba development provided by Lendlease.

4.4 Interim Solution Assessment

As the two sub-regional external trunk water main augmentations (refer to Section 4.2) have been postponed by LCC, LCC advised to use an operational model loaded with derived EP and demand patterns (LW_2022-01.mxd) to further review the actual needs of the identified network augmentations. It was agreed with LCC that the water model operational scenario 'OPER_MD' would be updated to include the 2026 connected village population including the Precinct 6 ROL 2 and Precinct 4G (refer to Table 3-1), for assessment of the interim network performance (without the use of PMAs) and the need for the two sub-regional trunk mains. The following changes to the provided model were carried out:

- Pipelines and demands for the villages to be connected by 2026 were included. These are villages 3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 4E, 4G, 6A, 5A MIBA North, 6 ROL 1, 6 ROL 2 and 4G. It is noted that the demands of these villages were modelled as the EP presented in Table 3-1. The population of other developed villages in Precincts 1 and 2 were modelled as per the LCC's model.
- The 600 mm diameter trunk main in Precinct 1 along Yarrabilba Drive is included.
- No Yarrabilba PMA boundary valves are active in the operational scenarios.
- The two 600 mm diameter sub-regional trunk mains outlined above were not included.

The initial 'OPER_MD_YB_P6 ROL' scenario modelled outcomes show that the modelled nodes with high elevations fail to meet the 22 m minimum residual pressure requirement at 8am (peak hour). Further investigations identified that the standpipe demands (HFP28 at the node WFH022306 and HFP01 at the node WFH020901) trigger the 8am modelled pressure failures. By removing demand at these two standpipes (scenario 'OPER_MD_YB_NO_HFB'), the modelled outcomes show that both the minimum pressure and fire-fighting residual pressure meet LCC's desire standards of service (DSOS). The modelled outcomes are provided in Appendix D and can be checked in the model 'LW_2022-01_YB_V04.mxd', which will be provided to LCC along with this report.

Connecting Yarrabilba villages 3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 4E, 4G, 6A, 5A MIBA North, 6 ROL 1, 6 ROL 2 and 4G to the existing network will not trigger the need to construct either of the 600 mm diameter trunk mains external to the development before the implementation of PMAs in the Yarrabilba development.

It is recommended that LCC confirm the flow rates attributed to the two standpipe sites mentioned above and take operational actions (e.g. introducing an orifice plate to mitigate flow at the site, time restrictions, or relocation) to mitigate the impacts.

The Ultimate PMA, network size and layout required for servicing early precincts were approved in the 2022 endorsed PNP report assessment, and therefore have not been reviewed in this report.

5 Sewerage Network Assessment

5.1 Overview of Sewerage System

Sewage from Precinct 1 and western portion of Precinct 2 are served by the existing pumping station SPS 084. Sewage from the eastern portion of Precinct 2 and western part of Precinct 3A are collected by the existing gravity sewers servicing Precincts 1 and 2 which deliver sewage to pumping station SPS 087. Pumping station SPS 087 transfers flow through the existing 200 mm diameter rising main to pumping station SPS 084. This pumping station transfers sewage via a 300/375 mm diameter rising main to LCC's Logan Village pumping station (SPS 081) and then to Chambers Flat and ultimately to the Loganholme sewerage treatment plant (STP).

Sewage from the eastern part of Precinct 3A, Precincts 3B, 3C, 3D, all villages of Precinct 4, Precinct 6 and Precinct 5A MIBA North will gravitate to the interim pumping station, SPS 153, located in the Precinct 3D area to the west of Yarrabilba Drive. The interim pumping station will be replaced in future by an ultimate regional pumping station PS 3, which is proposed to service approximately 50,000 EP. The interim pumping station SPS 153 transfers flows to SPS 084 and then to LCC's wastewater network at Logan Village.

The combined design flow for Precinct 6 ROL 2 lots are as follows:

- ADWF of 2.4 L/s; and
- PWWF of 14.6 L/s.

Sewage from Precinct 6 ROL 2 lots will be collected by the local DN150 reticulation network before being transferred by the DN375/DN525/DN600/DN675 trunk sewers to the pumping station SPS 153 (interim) or PS 3 (ultimate).

5.2 Sewerage Interim Solution Assessment

In Section 5.1 of the 2018 endorsed PNP report, it was agreed with LCC that pumping station SPS 084 along with the 2 ML storage and the downstream Logan Village/Chamber Flats trunk infrastructure can service a capacity of 12,729 EP from the Yarrabilba development. This capacity cap was revised by the 2021 LCC study 'Chambers Flat Road 2 SPS Strategy Review - IP0011'. LCC recently advised that the spare capacity for the Yarrabilba development between SPS 084 and the Chambers Flat 2 pumping station is between 20,420 EP and 25,000 EP assuming that a 2 EY (twice in one year) event containment standard is adopted. This revised capacity cap is higher than the total sewerage EP of 18,593 EP from the Yarrabilba Precincts 1, 2, 3, 4, Precinct 5A MIBA North, Precinct 6A, 6 ROL 1 and 6 ROL 2. A summary of the recent LCC capacity assessment is provided in Appendix E.

LCC latest assessment shows the SPS 153 'static' capacity is 6,869 EP, which equates to 79.5 L/s at 1,000 L/EP/day PWWF loading. The population contributing to SPS 153 has been higher than 6,869 EP after the MIBA North approval. As LCC adopts the dynamic containment standard for the SPS 153 catchment, and LCC is reviewing the SPS 153 dynamic capacity in 2023 / 2024. EDQ, LCC and Lendlease agreed the following actions/approaches are to be used for the 2023 / 2024 development applications, which include Precinct 6 ROL 1, ROL 2 and Precinct 4G:

- Lendlease is to provide the latest development rollout schedule to LCC.
- LCC is to revise the dynamic capacity of pumping station SP 153:
    - Lendlease is to undertake the field investigation to remove the possible sources of fast response components of rainfall induced inflow and infiltration (RDII) in the network.
    - LCC is to install the flow gauges in the Yarrabilba gravity sewer network and to calibrate the fully developed pumping station SPS 084 catchment.
    - LCC is to re-assess the dynamic capacity of pumping station SP 153 by applying the modelling parameters obtained from the pumping station SPS 084 catchment.
- LCC is to undertake the relevant option assessment between advancing the scheduled ultimate sub-regional sewerage infrastructure and local interim solutions (wet weather storage near SPS 153, larger SPS 153 pumps, or constructing and utilising the ultimate Yarrabilba PS3 rising main). The interim solutions will be at LCC's costs in accordance with the endorsed infrastructure agreement.

LCC also advised “if SPS153 capacity is exceeded before 2031, a pump upgrade is probably the best option that can be employed in the interim”.

6 Conclusions

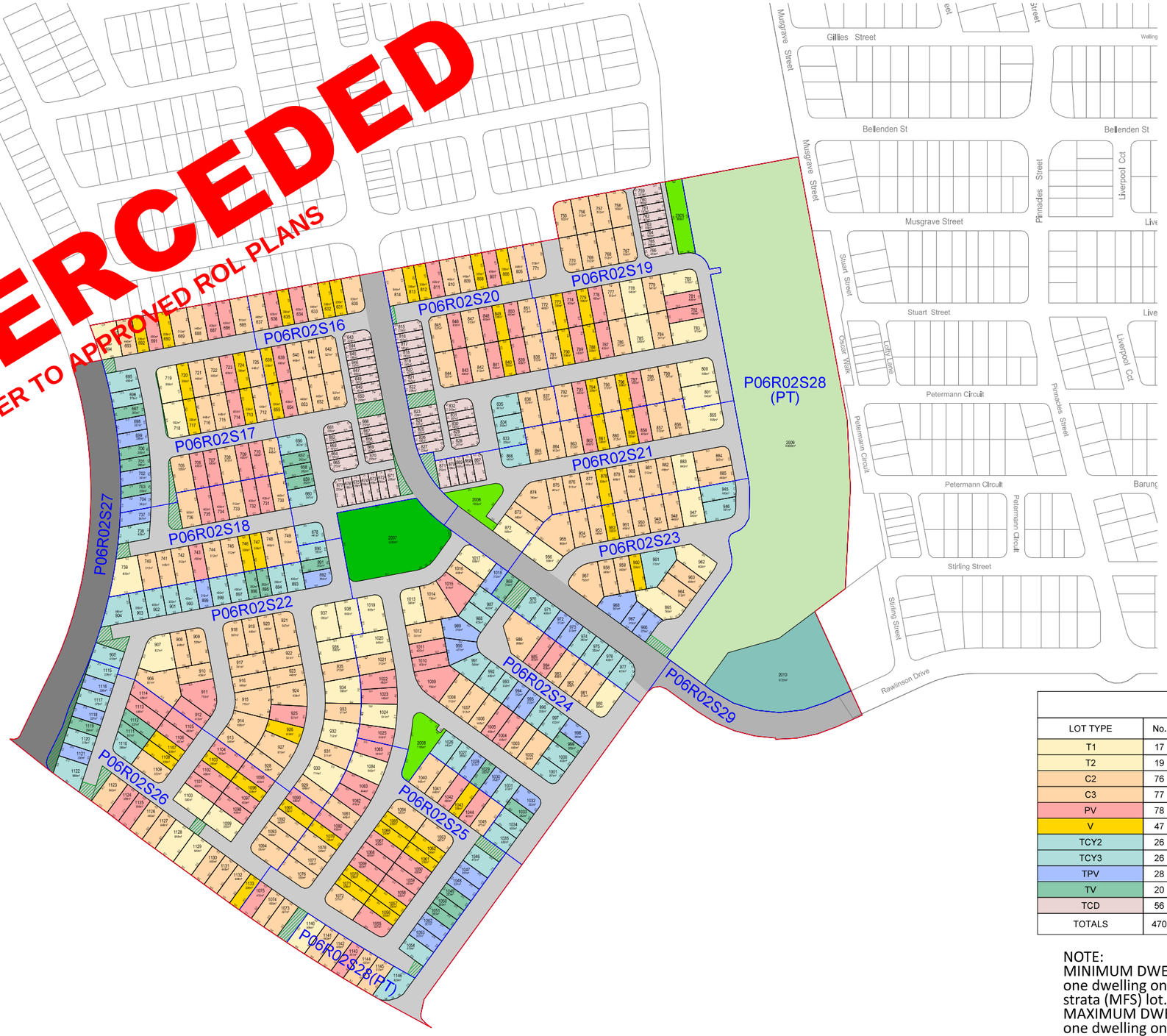
The following conclusions are drawn from the assessment of the water supply and sewerage network requirements for Precinct 6 ROL 2:

1. 1,259 EP were estimated for Precinct 6 ROL 2.
2. The estimated population of Precincts 1, 2, 3, 4, 5A MIBA North, 6A, Precinct 6 ROL 1 6 ROL 2 and Precinct 4G is 19,592 EP for water and 19,852 EP for sewerage.
3. A total of 4.9 ML of storage capacity is required to supply Precincts 1, 2, 3, 4, 5A MIBA North, 6A, Precincts 6 ROL 1, Precincts 6 ROL 2 and Precinct 4G plus the forecast Logan Village demand in the 2026 planning horizon. The existing Travis Road reservoir capacity is 9 ML. Hence there will be sufficient storage for Yarrabilba development until the end of Precinct 6 ROL 2 and Precinct 4G development.
4. The proposed water network layout, as outlined in Figure 3, can service the ultimate demands of Precincts 1, 2, 3, 4, 5A MIBA North, 6A, Precincts 6 ROL 1, Precincts 6 ROL 2 and Precinct 4G with the PMA arrangement outlined in the endorsed 2018 PNP report.
5. The design sewage flows for the combined Precinct 6 ROL 2 lots are ADWF of 2.4 L/s and PWWF of 14.6 L/s respectively.
6. Sewage from Precinct 6 ROL 2 lots will be collected by the local DN150 reticulation sewers and then transferred by the DN375/DN525/DN600/DN675 trunk sewers to the pumping station SPS 153 (interim) or PS 3 (ultimate).
7. Based on assessments using the methodology agreed with LCC, the 2026 development applications (Precinct 6 ROL 1, ROL 2 and Precinct 4G):
    a. Will not trigger the 600 mm diameter Travis Road reservoir SRWP connection main or the 600 mm diameter Travis Road reservoir outlet main under the interim operation (i.e. PMAs not implemented).
    b. Agreed actions provided in Section 5.2 are to be undertaken for the sewerage assessment.

Appendix A Precinct 6 ROL 2 Layout Plan and Population Development

SUPERCEDED

REFER TO APPROVED ROL PLANS



YARRABILBA

- PRECINCT SIX- APPLICATION TWO BOUNDARY
- STAGE BOUNDARY
- OPEN SPACE - LINEAR AND STORMWATER QUALITY BASIN
- OPEN SPACE - NEIGHBOURHOOD RECREATION PARK
- OPEN SPACE - LOCAL RECREATION PARK
- LOCAL STAGE ROAD
- PATHWAY CONNECTION
- VILLAGE ROAD
- MAJOR ROAD

LAND USE	AREA (ha)
Residential	19.833 ha
Open Space - Local	0.315 ha
Open Space - Neighbourhood	0.529 ha
Open Space - Linear	4.982 ha
Road - Major Road	1.035 ha
Road - Village Road	1.447 ha
Road - Local Road	7.968 ha
TOTAL	36.109 ha

MINIMUM RESIDENTIAL DENSITY - 30.09 ha, 470 dw, 15.62 dw/ha

MAXIMUM RESIDENTIAL DENSITY - 30.09 ha, 470 dw, 15.62 dw/ha

LOT YIELD BY LOT TYPE

LOT TYPE	No.	No.%	AREA	AREA%	MINIMUM	MAXIMUM	AVERAGE
T1	17	3.62%	11487.33m²	5.79%	640.00m²	826.58m²	675.73m²
T2	19	4.04%	11965.06m²	6.03%	586.20m²	804.92m²	629.74m²
C2	76	16.17%	35261.82m²	17.78%	437.93m²	850.59m²	463.97m²
C3	77	16.38%	42251.37m²	21.30%	512.00m²	899.37m²	548.72m²
PV	78	16.60%	32775.37m²	16.53%	389.13m²	754.39m²	420.20m²
V	47	10.00%	15873.82m²	8.00%	336.00m²	417.82m²	337.74m²
TCY2	26	5.53%	9934.03m²	5.01%	350.00m²	508.48m²	382.08m²
TCY3	26	5.53%	11836.38m²	5.97%	398.88m²	769.87m²	455.25m²
TPV	28	5.96%	9936.89m²	5.01%	312.50m²	591.02m²	354.89m²
TV	20	4.26%	5588.46m²	2.82%	262.50m²	336.81m²	279.42m²
TCD	56	11.91%	11421.99m²	5.76%	186.49m²	271.50m²	203.96m²
TOTALS	470	100%	198332.51m²	100%	186.49m²	899.37m²	421.98m²

NOTE:
MINIMUM DWELLINGS is based on the development of one dwelling on each single family and multi-family strata (MFS) lot.
MAXIMUM DWELLINGS is based on the development of one dwelling on each single family lot, and three dwellings on each multi family strata (MFS).

DENSITY calculations include the area of residential lots, local roads and credited park. The boundaries, roads and pathways shown hereon are subject to detailed engineering design, final survey and approval of subsequent development applications by the relevant authorities.

PRECINCT 06 - APPLICATION TWO RECONFIRGUATION OF A LOT

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0 40 80 120 160 200m

Scale 1:4,000 at A3

North

lendlease

File No. YAR-P06 Dgn No. YAR-P06-ROL2-POD-230825 SHT 1 OF 3 Date 25 SEPT 2023

SUPERCEDED

REFER TO APPROVED ROL PLANS

YARRABILBA

P06R02S16

P06R02S17

P06R02S18

P06R02S19

P06R02S20

P06R02S21

P06R02S22

P06R02S23

P06R02S27

P0

- PRECINCT SIX- APPLICATION TWO BOUNDARY
- STAGE BOUNDARY
- OPEN SPACE - LINEAR AND STORMWATER QUALITY BASIN
- OPEN SPACE - NEIGHBOURHOOD RECREATION PARK
- OPEN SPACE - LOCAL RECREATION PARK
- LOCAL STAGE ROAD
- PATHWAY CONNECTION
- VILLAGE ROAD
- MAJOR ROAD

LOT TYPE
TRADITIONAL (T1)
TRADITIONAL (T2)
COURTYARD (C2)
COURTYARD (C3)
PREMIUM VILLA (PV)
VILLA (V)
TOWN COURTYARD (TCY2)
TOWN COURTYARD (TCY3)
TOWN PREMIUM VILLA (TPV)
TOWN VILLA (TV)
TERRACE (TCD)

PRECINCT 06 - APPLICATION TWO
RECONFIGURATION OF A LOT

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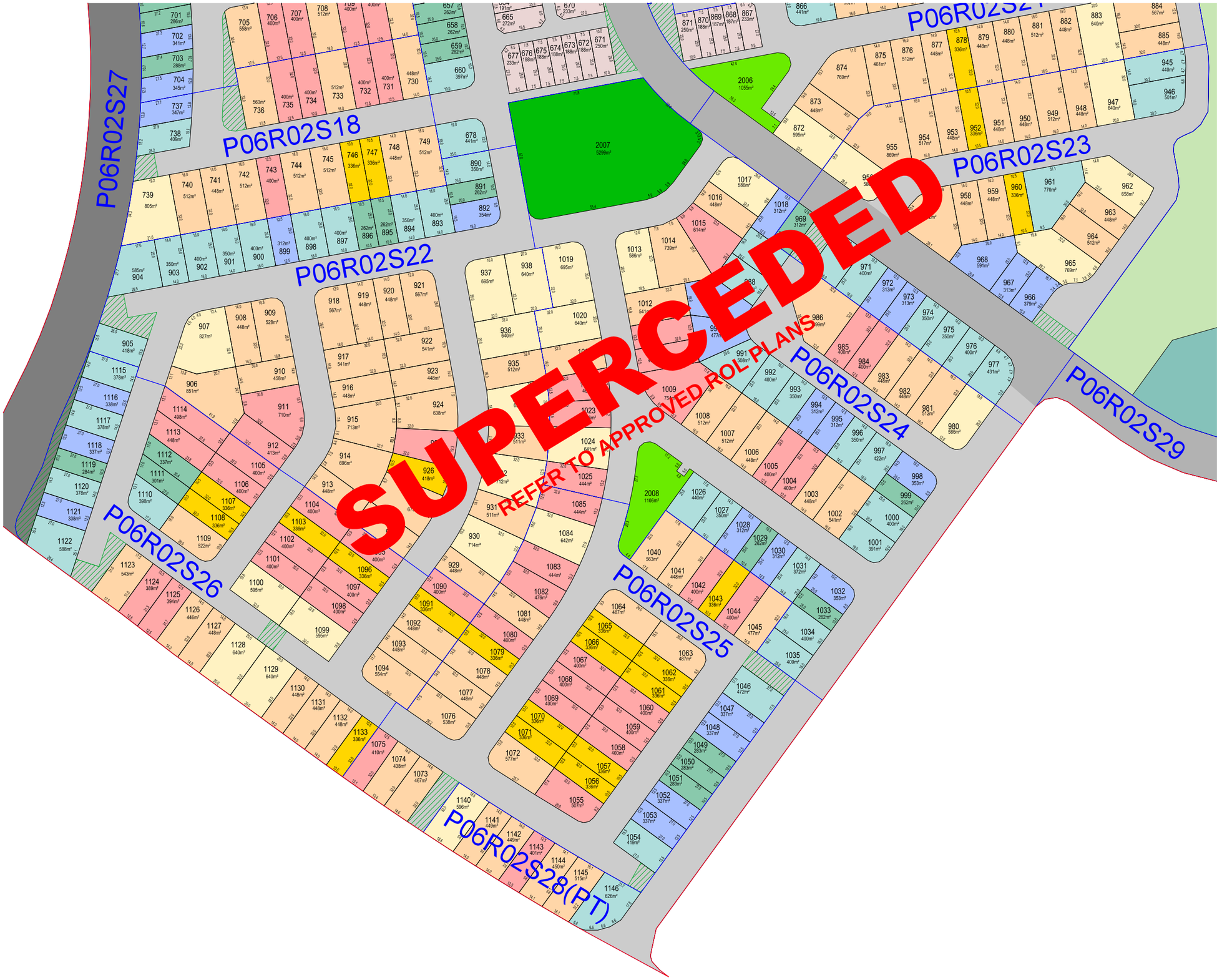
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Scale 1:4,000 at A3

North

lendlease

File No. YAR-P06 Dgn No. YAR-P06-ROL2-ROL-230825 SHT 2 OF 3 Date 25 SEPT 2023



YARRABILBA

- PRECINCT SIX- APPLICATION TWO BOUNDARY
- STAGE BOUNDARY
- OPEN SPACE - LINEAR AND STORMWATER QUALITY BASIN
- OPEN SPACE - NEIGHBOURHOOD RECREATION PARK
- OPEN SPACE - LOCAL RECREATION PARK
- LOCAL STAGE ROAD
- PATHWAY CONNECTION
- VILLAGE ROAD
- MAJOR ROAD

LOT TYPE
TRADITIONAL (T1)
TRADITIONAL (T2)
COURTYARD (C2)
COURTYARD (C3)
PREMIUM VILLA (PV)
VILLA (V)
TOWN COURTYARD (TCY2)
TOWN COURTYARD (TCY3)
TOWN PREMIUM VILLA (TPV)
TOWN VILLA (TV)
TERRACE (TCD)

PRECINCT 06 - APPLICATION TWO
RECONFIGURATION OF A LOT

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0 40 80 120 160 200m

Scale 1:4,000 at A3

North

lendlease

File No. YAR-P06

Dgn No. YAR-P06-ROL2-ROL-230825 SHT 3 OF 3

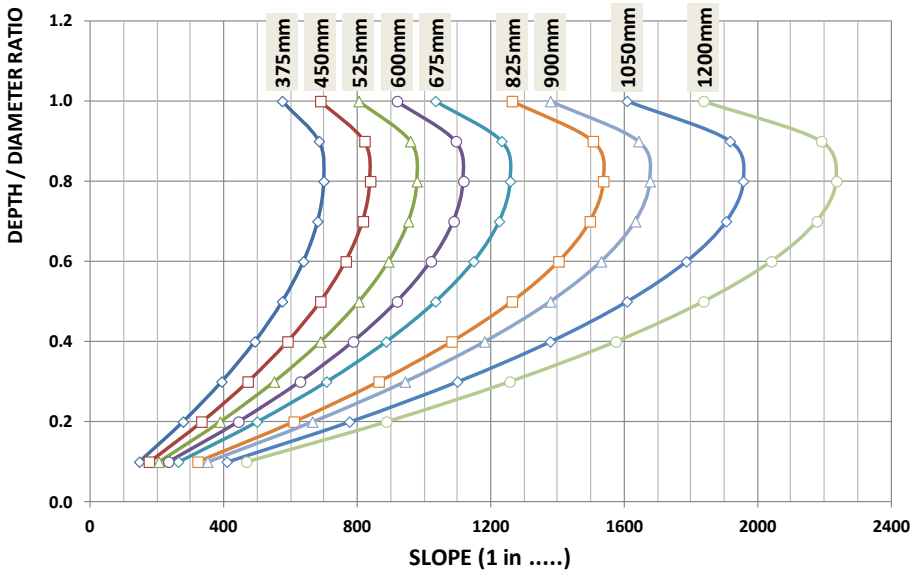
Date 25 SEPT 2023

Yield Breakdown									
Lot Code	**Standard Dimensions**	**6A (ROL 1)**		**6B (ROL 2)**		**Overall Precinct 6 Yield**		Target Mix (P4F)	
T1	32 x 20.0	21	4%	18	4%	39	4%	4%	
T2	32 x 18.0	22	4%	19	4%	41	4%	4%	
C3	32 x 16.0	90	16%	77	16%	167	16%	16%	
C2	32 x 14.0	98	17%	75	16%	173	17%	17%	-69%
PV	32 x 12.5	86	15%	79	17%	165	16%	17%	
V	32 x 10.5	56	10%	47	10%	103	10%	11%	
TCY3	25 x 16.0	35	6%	25	5%	60	6%	6%	
TCY2	25 x 14.0	52	9%	26	6%	78	8%	8%	
TPV	25 x 12.5	41	7%	28	6%	69	7%	7%	26%
TV	25 x 10.5	32	6%	20	4%	52	5%	5%	
TCR	25 x 7.5	29	5%	56	12%	85	8%	5%	
TCF	25 x 7.5	—	0%	—	0%	—	0%		
Total		562	100%	470	100%	1032	100%	100%	
Average Lot Size		428 m²		422 m²		426 m²			
Estimated Population (@2.8ppl)		1574		1316		2890			

	Detached Res Lot	Attached Res Lot	Detached Res EP	Attached Res EP	Total Res EP
6A (ROL 1)	533	29	1,492.4	51.6	**1,544.0**
6B (ROL 2)	414	56	1,159.2	99.7	**1,258.9**
Total	**947**	**85**	**2,651.6**	**151.3**	**2,802.9**
25% of 6B (ROL 2)	103.5	14	289.8	24.92	314.72

Appendix B LCC DSOS

WASTEWATER NETWORK DSS		
Parameter	**Criteria**	
Sewage load		
ADWF	165 L/EP/day	
PDWF	Use actual flow data; or *d x 165 L/EP/d or;* *d x 0.00191 x EP L/s* *Where:* *d = 0.01(log A)^4-0.19(log A)^3+1.4(log A)^2-4.66log A+7.57* *d = dry weather peaking factor* *A = gross plan area of development catchment, in hectares* *Refer to WSAA Sewerage Code of Australia; Part 1 Planning and Design*	
Overflow Frequency Standard for assessment of existing networks and planning and design of augmentations for existing networks This standard is only to be used by Council and their consultants	Master Planning; • Manholes: Maximum of 1 overflow per year • Sewer designated outlet: Maximum of 2 overflows per year Detailed Planning: • Acceptable network overflow frequency standard to be determined using a risk or effects based approach. The standard is to be determined in consultation with Council.	
PWWF For planning and design of wastewater networks servicing greenfield development This standard is to be used by developers, Council and their consultants	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)
Gravity sewer design		
Flow equation	Colebrook White to be used for all applications – design and modelling	
Pipe roughness general	Colebrook White k = 1.5mm	
Maximum velocity @ PWWF	3 m/s	
Depth of flow @ PWWF - Existing	Up to 1m below MH surface level and no spillage through overflow structures	
Depth of flow @ PWWF - Proposed/ new sewers	75% of pipe depth	
Depth of flow @ PDWF – Existing and new sewers	Maximum 60% of pipe depth	
Minimum shear stress	Minimum grades are to be based on achieving self-cleansing shear stress of 1.6 Pa at 75% of PDWF. Self-cleansing shear stress should be met within 5 years of constructing a pipeline in a greenfield area. The designer must consider the operational implications of not meeting self-cleansing shear over any timeframe.	

Slime Stripping shear stress		It is desirable where gradients permit to achieve slime stripping. A wall shear of 3.35Pa is required to achieve slime stripping. Slime stripping shear should be achieved at PWWF. Where gravity mains are constructed in greenfield areas, the operational implications of not meeting slime stripping shear in the early years of growth are to be considered.
Minimum grades for self cleansing	**Diameter (mm)**	**Grades (mm, 1 in X)**
	150	180 (80 in last section between last manholes or to an end)
	225	300
	300	400
	375 - 1200	Minimum Grades are to be based on achieving Self Cleansing Shear Stress of 1.6 Pa at 75% PDWF, refer formula and figure below. $$S_{min} = \frac{\tau}{\rho . g . R_p}$$ Where: S_{min} = Minimum Grade τ = Self Cleansing Shear Stress = 1.6 Pa τ = Slime Stripping Shear Stress = 3.85 Pa $\boldsymbol{\rho}$ = Density of Water = 1000 kg/m^3 g = Gravitational constant = 9.8 m^2/s R_p = Hydraulic Radius Partial Full Pipe (m) = Wetted Perimeter / Cross sectional flow area  Note: Depth/Diameter ratio is based on flow conditions at PDWF

Gravity sewer design	
Flow criticality	If the gradient of a pipeline creates super critical flow conditions consideration must be given to appropriate manhole design to ensure flow disturbances do not occur. Flow criticality is determined by the Froude number: Fr<1.0 sub critical Fr= 1.0 critical Fr>1.0 super critical Where $Fr = \frac{v}{\sqrt{g\ D}}$ v=velocity m/s g=gravity m^2/s D=hydraulic depth (m)
Sewerage pump stations	
Wet well operating requirements	V (kL) = 0.9 x pump rate (L/s) / N Where N is the acceptable number of starts per hour Pump Rate (L/s) = capacity of the largest duty pump N = 12 for motors <= 15 kW N = 8 for motors 15kW - 200 kW N = 5 for motors > 200 kW Control levels shall be based on Table 5.1 of WSA04-2005. The minimum depth between duty start and duty off is 100mm and ideally should be 300mm or greater.
Emergency storage	Emergency storage volume requirement to be based on containment of 2 hours of PDWF. Where actual measured flow data is available, then volume should be based on containing 2 hrs measured PDWF provided it takes into account any future growth. Except where otherwise specified to meet the requirements of the overflow risk assessment If there is an overflow pipe - storage in the system is measured between the high level alarm and overflow pipe invert level. If there is no overflow pipe - storage is measured between the high level alarm and 300mm below the lowest upstream manhole or top of wet well.
Pump capacity Guidance Note: As pump stations (PS) are typically categorised as trunk infrastructure this standard shall also apply to pump stations in RIGS networks.	If PWWF <20L/s, then 2 pumps (duty/standby arrangement) shall be provided, with each pump being capable of delivering PWWF. If PWWF >20L/s and <200L/s, then 2 pumps (duty/duty assist arrangement) shall be provided, with each pump being sized such that the two pumps running in parallel are capable of delivering PWWF. The minimum single pump capacity shall be not less than the calculated PDWF, where PDWF is a minimum of 2.5xADWF. If calculated PDWF has a peaking factor <2.5xADWF then 2.5 shall be used. All pump stations with a capacity greater than 200 L/s are to be designed on a case by case basis in consultation with Logan City Council. Pump stations that discharge directly to a WWTP are to be designed to minimise flow variability in wet and dry weather conditions.
NPSH	***Refer Clause 6.4 of WSA04-2005***

Rising mains	
Flow equation	Colebrook White to be used for all applications
Friction mains	For preliminary design a Colebrook White Roughness (k) of 0.6 mm is to be used. For detailed design, roughness shall be based on velocity and pipe roughness at end of pump design life. However, pumps should be able to operate (not necessarily meet design flow) for Colebrook White roughness's between manufacturers specified roughness for new pipes and 0.6 mm
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. The wall shear is to be calculated using the following equation: $\tau = \rho.g\ .(D/4)\ x\ (HL/L)$ Where: τ = Wall Shear Stress (minimum of 1.6 Pa required for self cleansing) HL =Frictional loss over main length of L based on Colebrook White (m) L =Length of main (m) ρ = Density of Water = 1000 kg/m³ g =Gravitational constant = 9.8 m²/s D =Internal Diameter of Pipe (m)
Maximum velocity	3.0 m/s proposed systems Manufacturer's specifications for new systems
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 sulphide generation. Where high retention times are likely to occur, odour / sulphide control measures will be required to the satisfaction of Logan City Council. ***(Refer WSA 07-2007-1.1 section 3.15)***
Reduced infiltration gravity sewers (RIGS) & NuSewers	
NuSewer	Are not permitted without Logan City Council approval
RIGS Design	Refer to ***SEQ WS&S D&C Code Section 6.7.2 Design Parameters***
Low pressure sewers / vacuum pumps	
Low pressure sewers / vacuum pumps	Are not preferred and will only be allowed subject to approval from Logan City Council.
Private pump stations and rising mains	
Private pump stations and rising mains	Private pump stations and rising mains are permitted for single users only and no connection or sharing will be permitted without approval from Logan City Council.
Common effluent drainage	
Common effluent drainage (CED)	Not permitted without approval from Logan City Council.

Water Network Desired Standards of Service (DSS)				
Parameter	**Criteria**			
Water demand				
Average Day Demand (ADD)	On demand areas - 190 L/EP/d. Based on 165 L/EP/d residential consumption + allowance for leakage/losses (25 L/EP/d).			
	Constant flow areas -190 L/EP/d. Based on 165 L/EP/d residential consumption + allowance for leakage/losses (25 L/EP/d).			
Peaking factors	**Category**	**MDMM/AD**	**MD/AD**	**PH/AD**
Guidance Note: Peaking factors are to be applied to the residential component of demand, i.e. 165 L/EP/d. Leakage /loss levels will remain constant throughout all demand categories and should only be appended after any peaking escalation has occurred.	Residential detached	1.3	1.7	3.1
	Residential attached	1.3	1.6	2.6
	Rural residential / Constant flow	1	1	1.5
	Commercial	1.2	1.3	2.0
	Industry	1.2	1.3	1.7
	Parks / Open space	1.2	1.3	1.7
System planning				
Bulk supply and reticulation	3 days of MDMM. Reservoirs to have a net positive inflow and capable of continuous operation and not fall below the emergency level. 3 days of MD. Reservoirs should not fall below the emergency level. 5 days of AD. Reservoirs should fill from empty to full.			
Service pressures				
Minimum operating pressure at PH	On demand areas – 22m at the property boundary based on reservoir at minimum operating level (MOL). MOL defined as 15% of storage height or top of emergency storage.			
	Constant flow areas – 10m at the property boundary based on reservoir at minimum operating level (MOL) MOL defined as 15% of storage height or top of emergency storage.			
Maximum operating pressure	80 m at the property boundary based on the reservoir at TWL			
Target maximum operating pressure	55 m at the property boundary based on the reservoir level at TWL			
Fire fighting				
System pressure	On demand areas	12 m minimum at property boundary		
	Constant flow areas	no fire service provided		
Fire flow	Constant flow areas	no fire service provided		
	Rural Residential	7.5 L/s for 2 hrs		
	Rural Commercial / Industrial	15 L/s for 2 hrs		
	Residential	15 L/s for 2 hrs		
	Commercial & Industrial	30 L/s for 4 hrs		
	Special risk / hazard	to be advised by Logan City Council (LCC)		
Background demand	2/3 PH (as per DEWS requirements)			
Reservoir level	Minimum Operating Level (MOL)			

<table>
<tr><td colspan="3">Water quality</td></tr>
<tr><td colspan="2">Drinking water quality</td><td>Drinking water to comply with the NHMRC Australian Drinking Water Guidelines</td></tr>
<tr><td colspan="3">Reservoir storage</td></tr>
<tr><td colspan="2">Ground level storage capacity</td><td>3 (MD - MDMM) + (Emergency storage)

Emergency Storage = 4 hr MDMM demand in zone or 0.5 ML whichever is greater.</td></tr>
<tr><td colspan="2">Elevated storage capacity

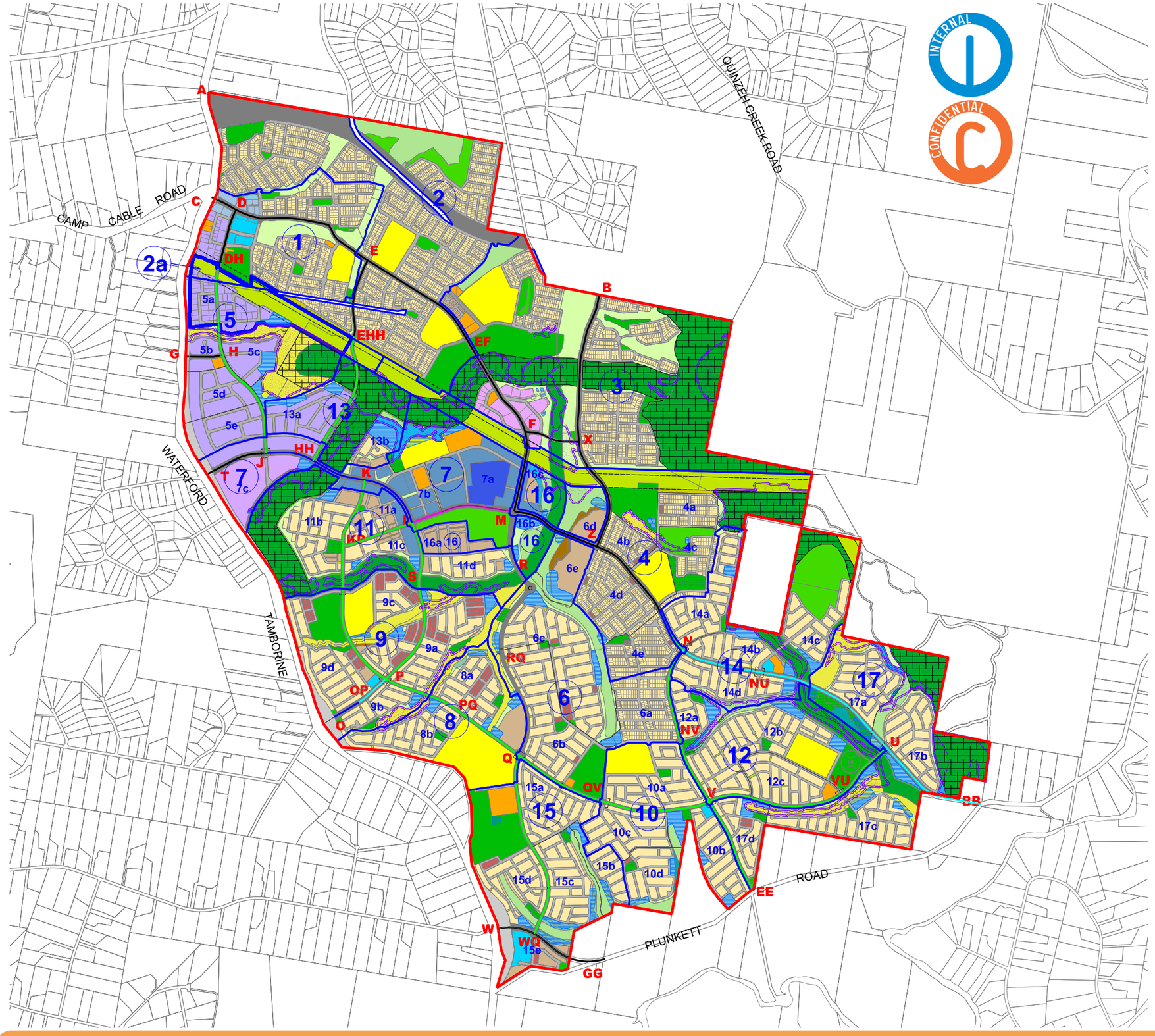
Guidance Note:
In-line pressure booster pumping without high-level storage shall be considered where satisfactory pressures can be provided by gravity flow during low demand periods or booster failure can be mitigated to an acceptable level (risk assessment required) and where there is no other feasible means of providing adequate pressure.</td><td>6 (PH - 1/12 MDMM) + minimum firefighting reserve.
Fire Fighting reserve =
> 4800EP:
• rural residential 0.11 ML
• industry 0.54 ML
• otherwise 0.22 ML
< 4800 EP:
• rural residential 0.05 ML
• industry 0.43 ML
• otherwise 0.11 ML</td></tr>
<tr><td colspan="3">Pumping capacity</td></tr>
<tr><td colspan="2">Pump supplying a ground level reservoir</td><td>MDMM over 20 hrs</td></tr>
<tr><td colspan="2">Pump supplying an elevated reservoir</td><td>(6PH – operating volume) / (6 x 3600)

Operating volume =
Elevated reservoir capacity - fire fighting reserve</td></tr>
<tr><td colspan="2">Standby pump capacity</td><td>To match duty, except where more than one duty pump or as determined by risk assessment.</td></tr>
<tr><td colspan="2">Reticulation booster pumps/pumped system</td><td>PH + fire flow</td></tr>
<tr><td colspan="3">Pipeline assessment & design</td></tr>
<tr><td>Main capacity</td><td colspan="2">Raw water mains & trunk feeding ground level reservoir:
MDMM for a gravity supply and MDMM over 20hrs for a pumped supply
Trunk Mains feeding elevated reservoir: capacity of pumps:
Reticulation Mains: PH + fire flow.</td></tr>
<tr><td rowspan="2">Mains size
Guidance Note:
New CF areas are not permitted by LCC.</td><td colspan="2">Constant flow areas - where mains terminate in short runs such as cu- de-sacs minimum sizes that may be acceptable are:
DN 63 up to 150 m from main
DN 80 up to 350 m from main</td></tr>
<tr><td colspan="2">On demand areas - minimum reticulation main 100mm in residential areas and 150mm in commercial and industrial areas.</td></tr>
<tr><td rowspan="2">Friction default value</td><td>Existing Infrastructure</td><td>Future Infrastructure</td></tr>
<tr><td>Colebrook White k values (mm)

<table>
<tr><th rowspan="2">Pipe Material</th><th colspan="3">Pipeline Age (years)</th></tr>
<tr><th>< 10</th><th>10 to 25</th><th>> 25</th></tr>
<tr><td>Asbestos Cement</td><td>0.15</td><td>0.3</td><td>0.3</td></tr>
<tr><td>Plastic (UPVC, MDPE, Hobas, etc)</td><td>0.06</td><td>0.06</td><td>0.15</td></tr>
<tr><td>MSCL/DICL</td><td>0.3</td><td>0.3</td><td>0.6</td></tr>
<tr><td>CICL</td><td>0.3</td><td>0.3</td><td>0.6</td></tr>
</table>
</td><td>The design shall be conducted to achieve less than the following head losses:
a) 5 m head/km for ≤DN 150 (CIOD) or ≤DN 180 (ISO).
b) 3 m head/km for ≥DN 200 (CIOD) or ≥DN 250 (ISO).
c) Head loss shall be calculated using computer models or hydraulic formulas.</td></tr>
<tr><td>Maximum velocity</td><td colspan="2">2.5 m/s
At peak hour for trunk mains and at peak hour including fire flow for reticulation.</td></tr>
</table>

Standpipe and Hydrant Filling Points	
Hydraulic model	**Planning Scenario** All designated and planned standpipes and hydrant filling points are to be modelled at either anticipated flowrates or recorded flows from SCADA or field test (hourly patterns).
	Operational Scenario Operational scenario to be modelled at 15 min time steps to highlight actual likely impacts on network.
Augmentation – In general significant network augmentations would not be considered prudent to support new hydrant filing points. Alternate strategies such as relocation or management of hydrant filing point flows (while maintaining suitable service levels) should be considered to maintain DSS. Suitable service levels should be agreed with Council's Water Business & Customer Management team.	

Appendix C Yarrabilba Development Rollout Plan



INTERNAL

CONFIDENTIAL

YARRABILBA

LEGEND

- YARRABILBA PROJECT SITE (WITHIN GREATER YARRABILBA STRUCTURE PLAN AREA)
- PROPOSED PRECINCT BOUNDARY
- RESIDENTIAL - STANDARD
- RESIDENTIAL - URBAN
- RESIDENTIAL - TERRACES
- RESIDENTIAL - RETIREMENT
- MAJOR ACTIVITY CENTRE - CORE
- MAJOR ACTIVITY CENTRE - FRAME
- COMMERCIAL MIXED USE
- COMMUNITY
- LOCAL RETAIL
- EDUCATION
- MIXED INDUSTRY AND BUSINESS
- MIXED BUSINESS / INFRASTRUCTURE
- OPEN SPACE - EPBC FAUNA CORRIDOR & ENVIROMENTAL PROTECTION
- OPEN SPACE - REMNANT VEGETATION OF CONCERN
- OPEN SPACE - CONSERVATION
- OPEN SPACE - DISTRICT AND MAJOR
- OPEN SPACE - LINEAR
- OPEN SPACE - NEIGHBOURHOOD PARK
- OPEN SPACE - LOCAL PARK
- OPEN SPACE - CIVIC
- OPEN SPACE - LAND UNDER Q100
- KOALA PROTECTION / WETLAND / BUSHFIRE AND ASSOCIATED BUFFERS
- ELECTRICITY EASEMENT AND BUFFER
- SOUTHERN INFRASTRUCTURE CORRIDOR
- MAJOR ROAD
- WATERFORD TAMBORINE ROAD WIDENING
- VILLAGE ROAD
- FLOOD DETENTION INCLUDING STORMWATER TREATMENT
- PRIMARY MOVEMENT NETWORK AS DESIGNED / APPROVED
- PRIMARY MOVEMENT NETWORK 40m
- PRIMARY MOVEMENT NETWORK 35m/33.5m
- PRIMARY MOVEMENT NETWORK 25.6m
- KOALA HABITIAT TO BE PROTECTED AND MANAGED (PLUS 10m BUFFER)
- EPBC OFFSET LAND - 195ha

THE CONTENTS OF THIS PLAN ARE CONCEPTUAL ONLY, FOR DISCUSSION PURPOSES. ALL AREAS AND DIMENSIONS ARE APPROXIMATE ONLY SUBJECT TO RELEVANT STUDIES, SURVEY, ENGINEERING AND DEVELOPMENT APPROVALS. THIS IS NOT A MASTERPLAN.

Yarrabilba Masterplan
Land Use Commercial Assessment

NOTE: This plan is indicative only, and specific uses, road alignment, boundaries, setbacks, and building layout shown may vary due to detailed design consideration. ©2023 Lend Lease Communities (Australia).
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0 300 600 900 1200 1500m

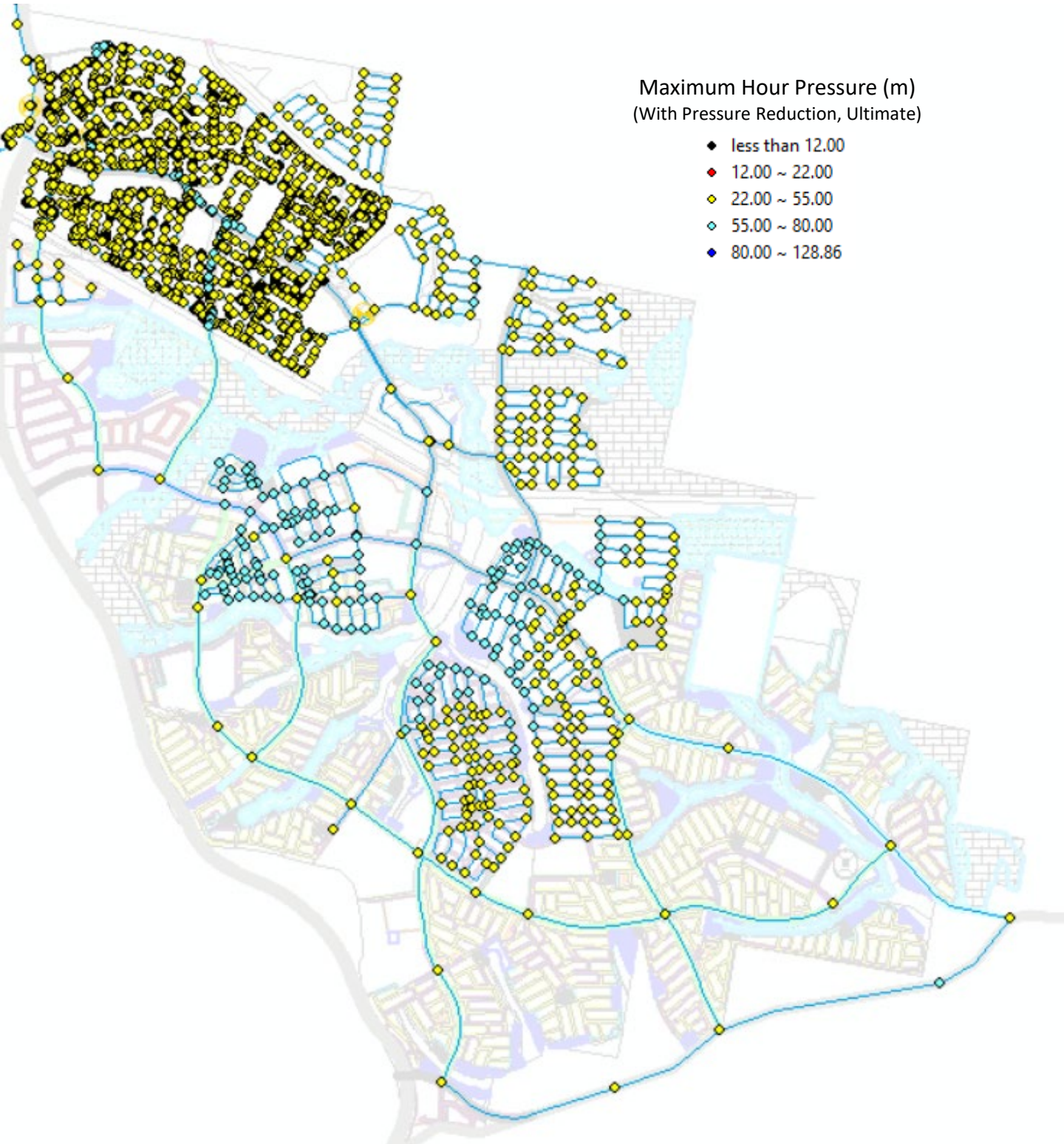
Scale 1:30,000 at A3

North

lendlease

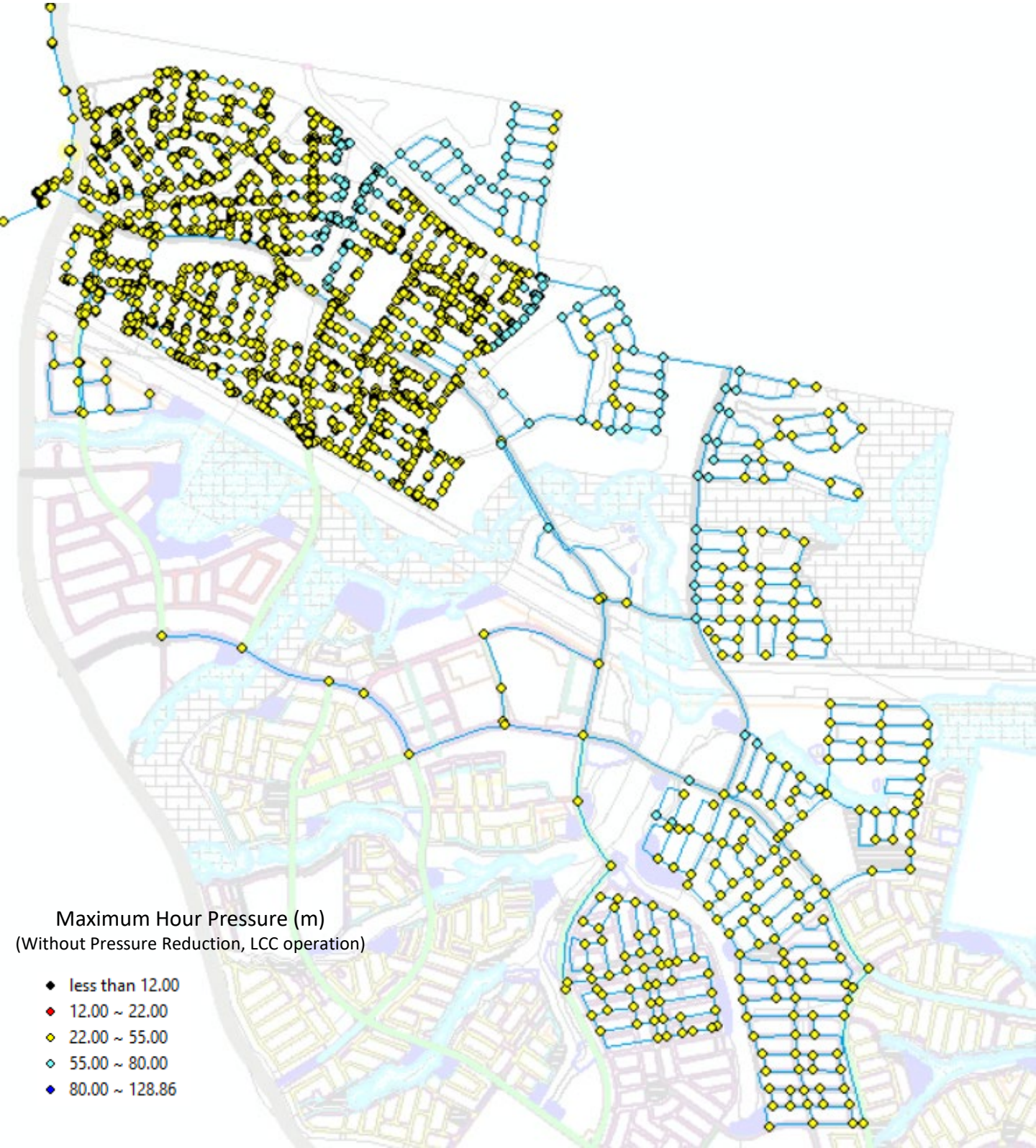
File No. F1.1 Dgn No. YAR-LUCA_230518 Date 18 MAY 2023

Appendix D Water Reticulation Hydraulic Performance Assessment Outcomes

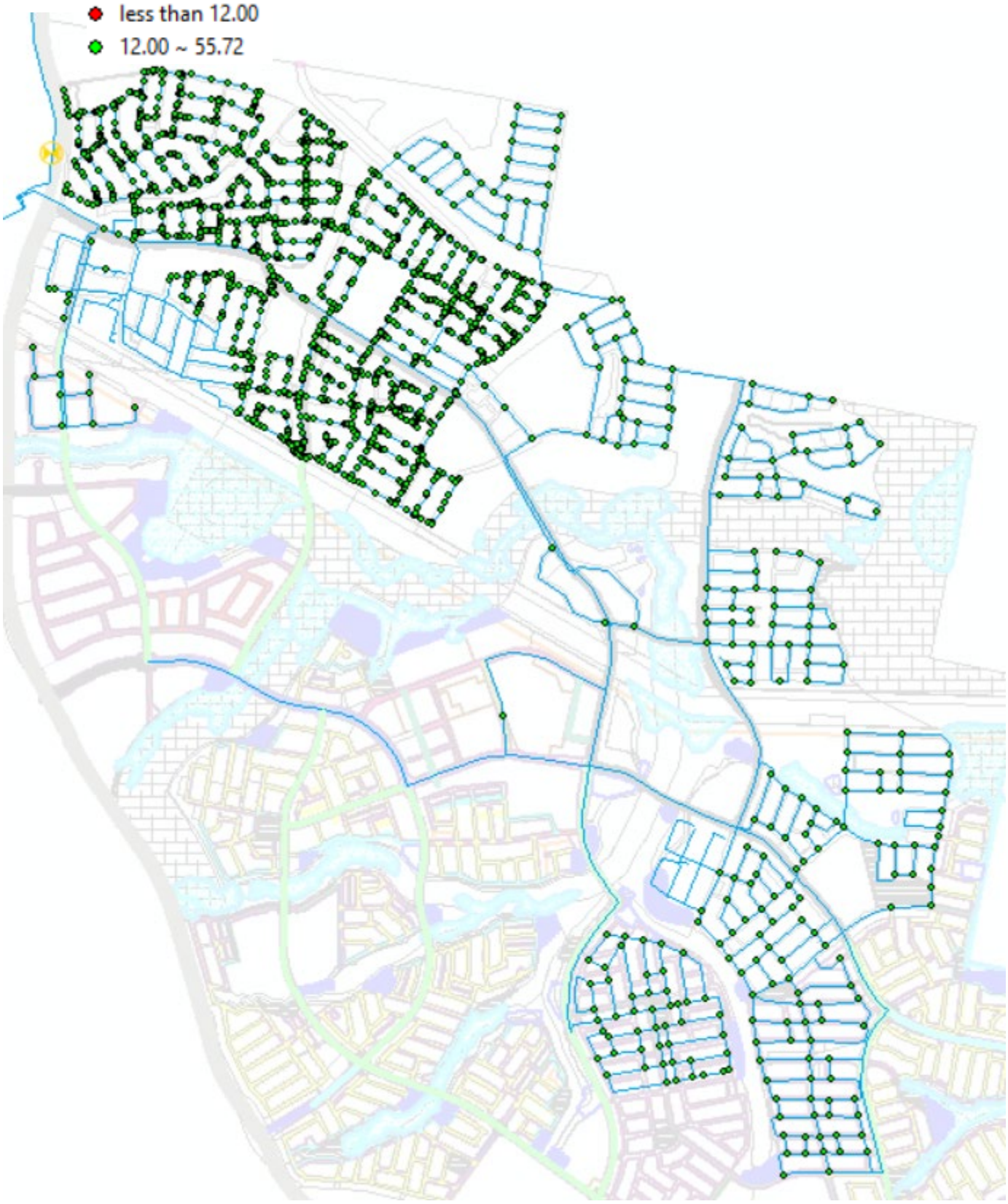

Maximum Hour Pressure (m)
(With Pressure Reduction, Ultimate)
less than 12.00
12.00 ~ 22.00
22.00 ~ 55.00
55.00 ~ 80.00
80.00 ~ 128.86

Fire Fighting Residual Pressure (m)
(With Pressure Reduction, Ultimate)




Maximum Hour Pressure (m)
(Without Pressure Reduction, LCC operation)
less than 12.00
12.00 ~ 22.00
22.00 ~ 55.00
55.00 ~ 80.00
80.00 ~ 128.86

Fire Fighting Residual Pressure (m)
(Without Pressure Reduction, LCC operation)



Appendix E LCC Yarrabilba Sewerage Spare Capacity Assessment Summary

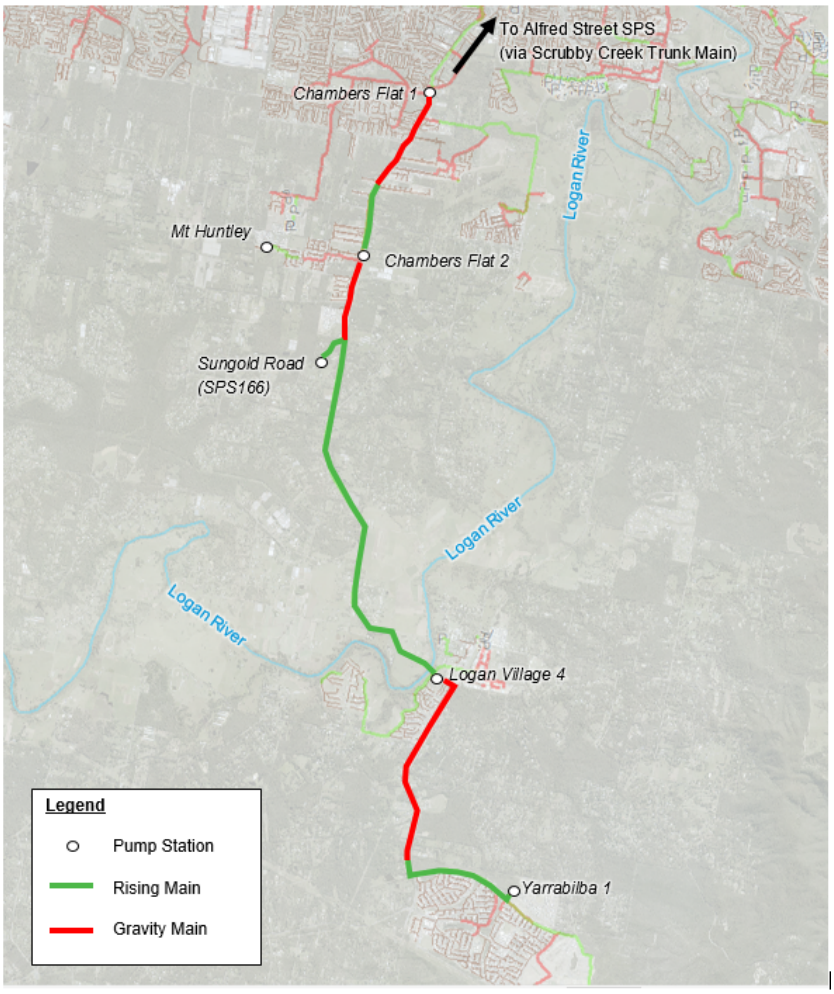
Lin, Henry

Subject: FW: Spare capacity for the Yarrabilba Development

From: Pollard, Matt <Matt.Pollard@wsp.com>
Sent: Wednesday, March 30, 2022 11:45 AM
To: Lin, Henry <Henry.Lin@stantec.com>; Pollard, Matt <MattPollard@logan.qld.gov.au>
Cc: WaterDA <WaterDA@logan.qld.gov.au>; DanielO'Brien@logan.qld.gov.au; Seymour, Michael <MichaelSeymour@logan.qld.gov.au>
Subject: RE: Spare capacity for the Yarrabilba Development

Hi Henry

A recent planning task undertaken by Logan Water (Chambers Flat Road 2 SPS Strategy Review - IP0011) has analysed the capacity of the existing system between Yarrabilba 1 and the Chambers Flat 2 SPS in detail. A map of this system is shown below:



The Task involved running the Loganholme calibrated model for this system for the 1EY and 2EY design storms. The model was calibrated based on flow data collected in 2019, which included 3 flow gauges within Yarrabilba. Conservative assumptions have been made for the wet weather response for future development / development not captured during the flow survey period.

For these runs, the adopted setting for the Yarrabilba 1 pump station was to limit pumped flows to 70 L/s at all times to minimise overflows in the downstream network and utilise the 2 ML storage. The outcomes for this assessment for different populations at Yarrabilba is shown in the following table.

		Option 2				
SPS		Yarrabilba (SPS084)			Logan Village 4 (SPS081)	Chambers Flat 2 (SPS082)
Yarrabilba Population	Event	Emergency Storage (% full)	Wet Weather Storage (% full)	Overflow Volume (m^3)	Overflow Volume (m^3)	Overflow Volume (m^3)
25,000 EP	2 EY	100%	100%	173	0	0
	1 EY	100%	100%	2,553	0	0
20,420 EP	2 EY	76%	76%	0	0	0
	1 EY	100%	100%	375	0	0
15,500 EP	2 EY	50%	0%	0	0	0
	1 EY	95%	95%	0	0	0

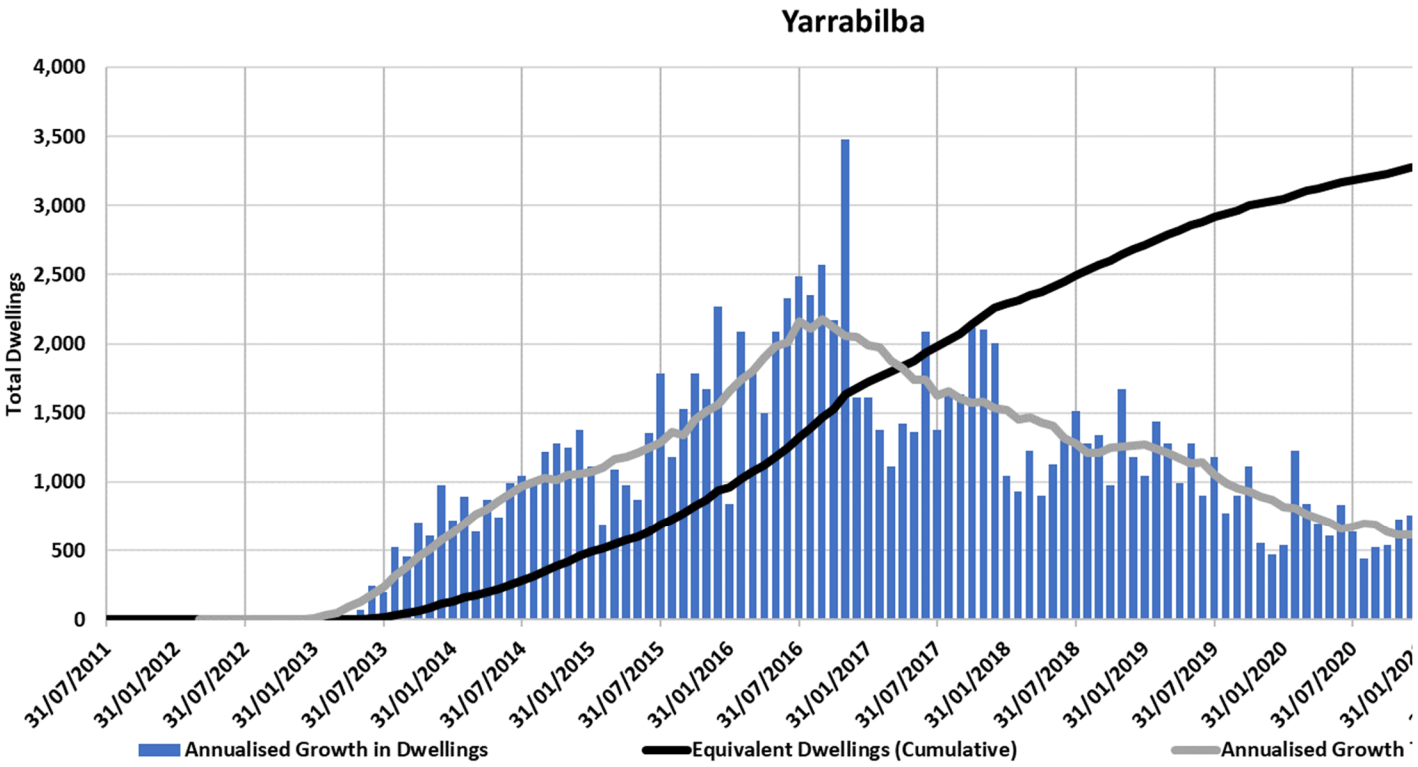
Logan Water stakeholders have agreed that for the Yarrabilba storage, the appropriate containment standard is the 2EY event and therefore the Yarrabilba population that the existing system can cater for is somewhere between 20,420 EP and 25,000 EP.

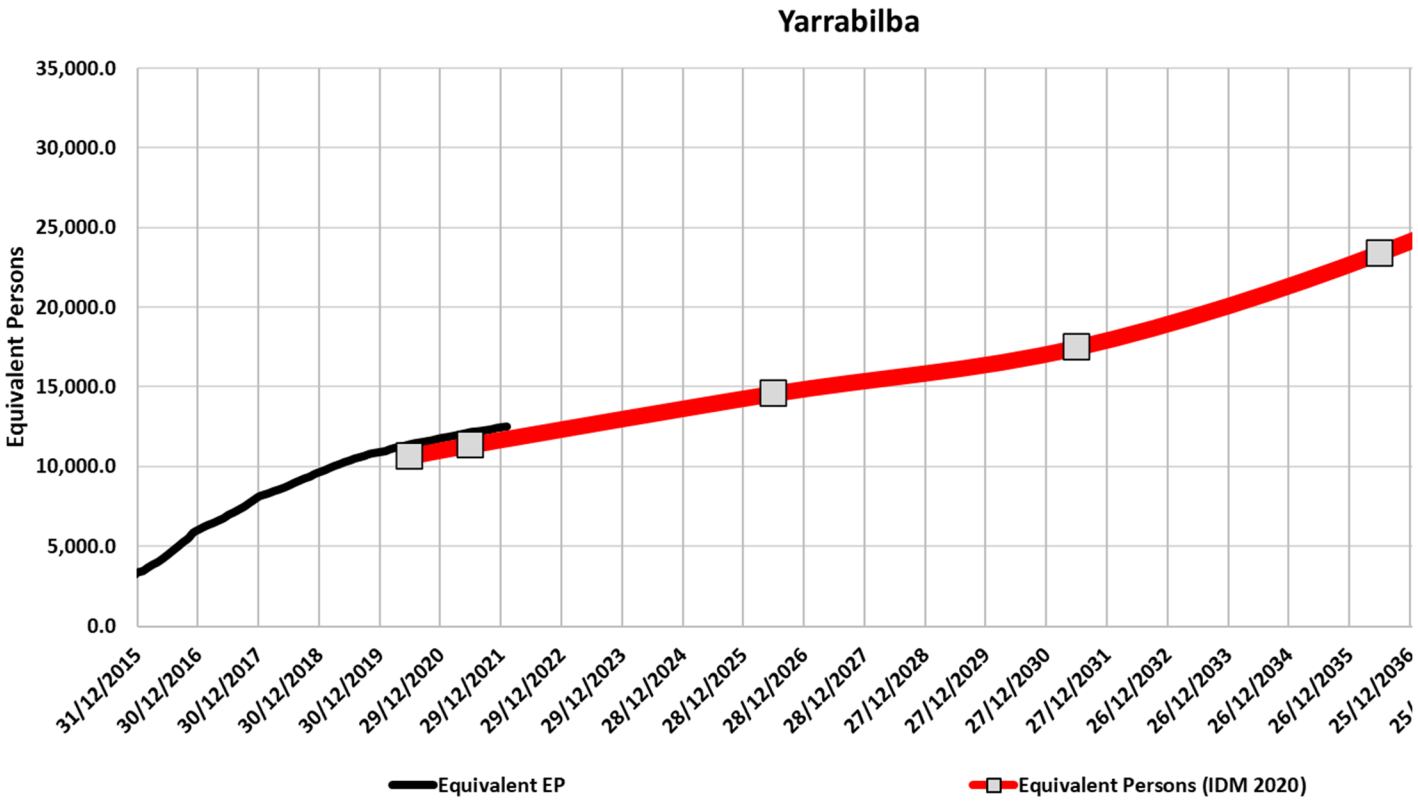
To achieve the performance outlined in the above table, works will be undertaken to upgrade the Chambers Flat 2 SPS. These works are included in the Subregional Infrastructure Program (SRIP).

Based on current growth rates, we expect that the existing system will have sufficient capacity to cater for Yarrabilba until sometime between 2033 and 2037 (refer graph below). If the recent increase in the rate of lot sales is sustained and converts to occupied dwellings that date may come forward.

I note that as at the start of February 2022, we are still not seeing the increased lot sales translate into occupied dwellings. The charts below are taken from residential Bin data extracted from Councils data base on the 9th of February.

That aside, should the growth rates increase and be sustained, Council has already progressed planning for the Yarrabilba 3 regional / transfer pump station and the Chambers Flat WWTP so that the long term servicing solution can be brought forward if required.


Yarrabilba
Total Dwellings
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
31/07/2011
31/01/2012
31/07/2012
31/01/2013
31/07/2013
31/01/2014
31/07/2014
31/01/2015
31/07/2015
31/01/2016
31/07/2016
31/01/2017
31/07/2017
31/01/2018
31/07/2018
31/01/2019
31/07/2019
31/01/2020
31/07/2020
Annualised Growth in Dwellings
Equivalent Dwellings (Cumulative)
Annualised Growth


Yarrabilba
Equivalent Persons
35,000.0
30,000.0
25,000.0
20,000.0
15,000.0
10,000.0
5,000.0
0.0
31/12/2015
30/12/2016
30/12/2017
30/12/2018
30/12/2019
29/12/2020
29/12/2021
29/12/2022
29/12/2023
28/12/2024
28/12/2025
28/12/2026
28/12/2027
27/12/2028
27/12/2029
27/12/2030
27/12/2031
26/12/2032
26/12/2033
26/12/2034
26/12/2035
25/12/2036
Equivalent EP
Equivalent Persons (IDM 2020)

Regards

Matthew Pollard
Principal Planning Engineer | Water Infrastructure Solutions

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Mattpollard@logan.qld.gov.au | 07 3412 0000 | 0420 755 900| Teams Call / Chat
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Logan City Council acknowledges the Traditional Custodians of the lands and waterways across the City of Logan. We pay our respects to Elders past, present and emerging.

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