Premise

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2016/768/63

Date: 1 August 2025

Queensland Government

MIRVAC

Everleigh

SEWERAGE INFRASTRUCTURE MASTERPLAN

Report No: MIR-0020/R01

Rev: B

27 May 2024

DOCUMENT AUTHORISATION					
Revision	**Revision Date**	**Report Details**			
A	13/10/23	Draft for Review			
B	27/05/24	For Submission			
Prepared By		**Reviewed By**		**Authorised By**	
Lawrence Mills		Nick Somerville		Patrick Brady	

CONTENTS

TABLES

APPENDICES

1. INTRODUCTION

Everleigh is located at Teviot Road, Greenbank and is part of the Priority Development Area (PDA) with EDQ being the assessing authority. The Everleigh master planned development is situated on a 481-hectare site that will ultimately comprise approximately 3,577 homes delivered to 10,000 residents over a period of 15 years.

The development was approved in June 2017 and was previously supported by a Water and Sewer Infrastructure Master Plan, prepared by MWH (Ver 5 dated 29 May 2017). The Water Supply Master Plan was reviewed in September 2020, producing the following document:

- Water Supply Network Model Investigation Report (Premise Rev B – 28 September 2020)

Since approval, development of the site has progressed, and it is appropriate that the Sewerage Infrastructure Master Plan also be updated to reflect changes occurring over time. This includes changes to Precincts 5, 6 and 7, which are collectively referred to as Reconfiguration of Lot (ROL) 13. One of the most significant changes to ROL 13, is the inclusion of a future high school. This report will provide a summary of the sewerage masterplan of the development, including the adopted sewerage design basis and servicing strategy.

2. BACKGROUND

The development is part of a major urban community under the control of Economic Development Queensland (EDQ). The development site is approximately 481 hectares and is situated in the Greenbank area of the Greater Flagstone PDA as declared under the Urban Land Development Authority (ULDA) Act (now superseded by the Economic Development Act 2012).

The development site is bounded to the east by Teviot Road and Greenbank Road to the south. There are existing developed lots located on the eastern fringe of development site (these being in the Wearing Park Area). Access to the development site is currently via Teviot Road on the west side. A further (future) access to the site will be provided via Greenbank Road on the southern side once development proceeds in that particular area.

The development will consist of a total of 3,577 residential dwellings, a primary school, a high school and a commercial site including a medical hub and a neighbourhood centre. 930 lots, the primary school site and AFL oval (Lot 804) have been delivered to date.

3. LEVELS OF SERVICE

The Levels of Service (LOS) adopted for the sewerage master planning are summarised in Table 1 and have been based on sources shown below. Note that there is some variance in the LOS adopted in this report compared to the previous MWH Master Plan and these differences are summarised in a later section of this report.

- Everleigh Estate Standards Manual (ESM) (August 2021)
- SRIA Guideline (refer correspondence dated 8th September 2023)
- SEQ Water Supply and Sewerage Design & Construction Code (February 2020)

Table 1 - Levels of Service

Parameters	Value	Comments
General		
Average Dry Weather Flow (ADWF)	200 L/EP/day	Based on SEQ Code for 'Reduced Infiltration Gravity Sewers' (RIGS)
Peak Dry Weather Flow (PDWF)	C2 X ADWF where C2 = 4.7 X (EP) $^{-0.105}$	Based on SEQ Code
Peak Wet Weather Flow (PWWF)	5 x ADWF 1000 L/EP/day	Based on SEQ Code for RIGS
Gravity Sewer		
Roughness Equation – Pipe Friction Coefficient	n = 0.0128 for uPVC pipe	Based on SEQ Code
Minimum Velocity for Trunk Sewers	0.7m/s at PDWF	Based on SEQ Code
Maximum Velocity	3.0m/s at PWWF	Based on SEQ Code
Maximum Depth of Flow	75% depth (at PWWF)	Based on SEQ Code
Rising Main		
Preferred Velocity	1.0 – 1.5 m/s	Based on SEQ Code
Minimum Velocity	0.75 m/s	Based on SEQ Code
Maximum Velocity	3 m/s	Based on SEQ Code
Pump Station		
Operating Storage	0.9 x Q / N Q = pump rate (L/s) of duty pump or Total Pump Capacity (L/s) if multiple duty pumps. However, Number of starts per hr are: N=12 for motors <100kw N=8 for 100-200kw N=5 of motors >200kw	Based on SEQ Code
Minimum Wet Well Diameter	As shown in the Sewer Pump Station Code (As amended) The wet-well diameter shall be a minimum of 2 m or as specified by the Water Agency	Based on SEQ Code
Emergency storage (new)	4hrs at ADWF	Based on SEQ Code
Single Pump Capacity	Min pump capacity for pump stations (duty & assist) = C1 x ADWF Where C1 = 15 x (EP) – 0.1587	Based on SEQ Code For duty assist operation each pump delivers C1 x ADWF and 2 pumps together deliver PWWF
Total Pump Station Capacity	PWWF	Based on SEQ Code

Table 2 - Minimum Sewer Pipe Grades

Nominal Bore (mm)	Minimum Grade	Percentage
100	House Connection Branch, one allotment only at 1:60	1.67%
150	House connection Branch and/or sewers for first 10 allotments: 1:100 Sewer after first 10 allotments 1:180 (see note 1)	1.00% 0.56%
225	1:300	0.33%
300	1:400	0.25%
375	1:550	0.18%
450	1:700	0.14%

4. SERVICING STRATEGY

The ultimate sewerage servicing solution for the site consists of collection of flows at a Regional Pump Station located on Ivory Parkway, which transfers flows from the development to the Cedar Grove WWTP. Flows are transferred from the site via a rising main, which connects to a shared rising main on Greenbank Road transferring flows from North Maclean Pump Station to Cedar Grove Wastewater Treatment Plant.

Additional flows to the development site are received via a rising main from the Covella Development along Teviot Road and are discharged into the gravity network along Everleigh Drive. Internal infrastructure for the site also consists of 4 local pump stations which transfer flows into the Regional Pump Station Catchment, as well as a Temporary Pump Station that services the school site during the initial stages of the development. The Temporary Pump Station transfers flows to the Regional Pump Station via a temporary rising main along Ivory Parkway.

The existing and under construction stages of the development consists of Precincts 1, 9 and 12, in addition to the school site. Precincts 1, 9 and 12 drain to the Regional Pump Station via gravity and the Temporary Pump Station services the school site. We note that Precincts 8 and 10 have recently been approved under Decision Notice DEV2022/1277.

Changes in the servicing strategy compared to the previous MWH Master Plan include the relocation of the regional and Temporary Pump Stations, as well as the additions of two local pump stations. An overview of the sewerage network layout and pump station locations is shown in Appendix A.

4.1 Population Assessment

An estimate of the equivalent population (EP) of the development was completed as per the conversion factors shown in Table 3.

Table 3 - Equivalent Population Conversion Factors

USES			CONVERSION FACTORS
Residential Uses	Pre 1 January 2016	detached dwelling	2.91EP/dwelling
		attached dwelling	1.83EP/dwelling
	On or after 1 January 2016 7 Ha	detached dwelling	2.8EP/dwelling
		attached dwelling	1.78EP/dwelling
Retail uses (excluding showrooms)			30EP/ha
Showrooms			30EP/ha
Commercial uses			30EP/ha
Industrial uses			30EP/ha
Service, community and other uses (excluding child care centre and educational establishment)			30EP/ha
Child Care Centre			0.25EP/pupil and staff
Educational establishment	Primary school		0.1EP/pupil and staff
	Secondary school		0.1EP/pupil and staff
	Any other educational establishment		0.1EP/pupil and staff
Sport, recreation and entertainment uses			30EP/ha
Tourism uses			30EP/ha
Rural uses			30EP/ha
Mixed use (being a development combining residential uses and any other use)			The conversion factor for the Residential uses and, if the mixed use includes a Child care centre or Educational establishment, the conversion factor for the Child care centre and Educations establishment (as applicable and as set out above) plus 15EP/ha
Any other uses			30EP/ha

An assessment of the ultimate population of the development is shown in Table 4, as per the site layout shown in Appendix A. The resulting ultimate population of 10,346 EP consists of 3,577 residential dwellings in addition to a commercial site, a primary and a secondary school. A total of 685 residential dwellings has been adopted for ROL 13, which is consistent with the ultimate development dwelling yield and includes an assumed 321 dwellings in Precinct 5.

Table 4 - Ultimate Population Estimate

	Conversion Factor	Unit Value	Total
Precinct 1			
Residential	2.8 EP per dwelling	365 detached dwellings	1,022 EP
Precinct 2			
Residential	2.8 EP per dwelling	226 detached dwellings	633 EP

Precinct 3			
Residential	2.8 EP per dwelling	359 detached dwellings	1,005 EP
Precinct 4			
Residential	2.8 EP per dwelling	557 detached dwellings	1,560 EP
Precinct 5			
Residential	2.8 EP per dwelling	321 Dwellings	899 EP
Precinct 6			
Residential	2.8 EP per dwelling	195 dwellings	546 EP
School – Primary and Secondary	0.1 EP per staff and pupil	Primary School – 1,400 pupils & 140 staff High School – 1,800 pupils & 190 staff	353 EP
Sports and Recreation Park			26 EP**
Precinct 7			
Residential	2.8 EP per dwelling	169 detached dwellings Lots	473 EP
Precinct 8			
Residential	2.8 EP per dwelling	286 detached dwellings	801 EP
Precinct 9			
Residential	2.8 EP per dwelling	423 detached dwellings	1,184 EP
Precinct 10			
Residential	2.8 EP per dwelling	280 detached dwellings	784 EP
Precinct 11			

Residential (attached dwellings))	1.78 EP per dwelling	253 attached dwellings	450 EP
Precinct 12			
Residential	2.8 EP per dwelling	143 detached dwellings	400 EP
Precinct 13			
Commercial Site	30 EP/Ha	7 Ha	210 EP
TOTAL			10,346 EP

Note that there is some variance in the population conversion factors and ultimate population estimate adopted in this report compared to the previous MWH Master Plan. These differences are summarised in the following section of this report.

4.2 Update from Previous MWH Sewerage Master Plan

The development was previously supported by a Water and Sewer Infrastructure Master Plan, prepared by MWH (Ver 5 dated 29 May 2017). A summary of the differences between the previous MWH Master Plan and this report are summarised below:

- The assumptions of the MWH Master Plan relating to sewerage design were based on the Logan City Council Desired Standards of Service. The levels of service adopted for this report have been sourced from:
  - Everleigh Estate Standards Manual (ESM) (August 2021)
  - SEQ Water Supply and Sewerage Design & Construction Code (September 2020)
- The MWH Master Plan adopted sewage loading rates of 165L/EP/day for ADWF and 1300L/EP/d for residential PWWF. These have been updated in this report to reflect the SEQ code and are now 200L/EP/day for ADWF and 1000L/EP/Day for PWWF (5 x ADWF).
- The estimate of total number of residential dwellings for the MWH Master Plan was 3,350, compared to 3,577 for this report. Additionally, the previous residential lot count included standard lots, eco lots and interface lots. This report has been primarily based off attached and detached dwellings.
- The MWH Master Plan adopted occupancy rates and residential planning densities as advised by Logan City Council at the time. These have been changed to reflect EDQ Guidelines and the changes are summarised below and discussed in more detail in the population assessment section of this report.
  - Total of 154 EP for the primary school, compared to 105 EP/Ha and 368 EP based on gross floor area (GFA). This report adopted a rate of 0.1 EP/pupil and staff and used design loading of 1,400 students and 140 staff.
  - 30 EP/Ha gross area and a total of 210 EP for the commercial site, compared to 73 EP/Ha GFA and a total of 183 EP. This site was also previously referred to as a Neighbourhood Centre.
  - The addition of a High School site in Precinct 6 comprising a total of 199 EP, based off a rate of 0.1 EP/pupil and design of 1,800 pupils and 190 staff.

- The ultimate population estimate for the MWH Master Plan for sewerage was 9,598 EP, compared to the ultimate EP estimate of 10,346 EP for this report. Additionally, it should be noted that the previous ultimate EP in the Logan South Wastewater Servicing Strategy was 10,995 EP.
- Ultimate design flows for the MWH Master Plan were 18.3L/s for ADWF and 111.1L/s for PWWF. Updated ultimate design flows in this report are 37.55 L/s for ADWF and 187.73 L/s PWWF. The difference in loads are a result of the changes discussed above and include adopted sewage loading rates, occupancy rates, planning densities and total population estimate.
- The MWH Master Plan highlighted that Mirvac raised concerns around the adopted growth rates in the Logan South Wastewater Serving Strategy, and strategy was amended to include the following sentence "it is intended that all demands on funding are reviewed on a regular basis and that best endeavours will be made by all parties to ensure that growth can be serviced".

4.3 Development Stages and Infrastructure Triggers

A summary of the site development stages in regard to the related active sewerage infrastructure is provided in Table 5. The active sewerage infrastructure in the table includes pump stations, rising mains and branch and trunk gravity sewer of diameter DN225 and larger. Nominal trigger EPs were determined as the capacity to be serviced by the previous stage.

Table 5 - Site Development Stages Sewerage Staging

Stage	Estimated Year Completion	Sewerage Infrastructure to be Active	Description	Servicing
Stage 1	Infrastructure currently active. Precinct 9 to be completed end of 2023	• Regional Pump Station and Rising Main • Temporary Pump Station and Rising Main • DN225 Teviot Road • DN300 Everleigh Drive • DN225 Emerald Parade • DN300 Ivory Parkway • DN375 Ivory Parkway • DN450 Regional Pump Station • DN225 Sport and Recreation Park to Ivory Park • DN225 Anderson Drive to Ivory Parkway • DN225 Anderson Road	Precinct 12, 9 and 1 drain to Regional Pump Station via gravity. Portion of Precinct 10 and 8 also form part of Regional Pump Station gravity catchment. Temporary Pump Station to service school site and limited number of lots from Precinct 8 and 6. Flows transferred to Regional Pump Station Catchment via rising main.	931 lots School site External flows
Stage 2	April 2026	• Pump Station C and rising main. • DN225 Pump Station C	Precinct 8, 10 and portion of 11 serviced by Pump Station C. Pump Station C transfers to Regional Pump Station catchment via rising main.	566 lots

Stage	Estimated Year Completion	Sewerage Infrastructure to be Active	Description	Servicing
Stage 3	February 2028	• Pump Station D and rising main	Precinct 11 and neighbourhood centre / commercial site serviced by Pump Station D. Pump Station D transfers to Regional Pump Station catchment via rising main.	177 lots Commercial site
Stage 4	November 2028	• Pump Station A (SPS001) and rising main. • Temporary Pump Station decommissioned. • DN225 Anderson Road extending into Pump Station A (SPS001). • DN300 Pump Station A (SPS001).	Temporary Pump Station decommissioned. Precinct 6, 7, 5 and Precinct 14 and school site serviced by Pump Station A (SPS001). Pump Station A transfers to Regional Pump Station catchment via rising main.	670 lots Primary School High School Commercial Site
Stage 5 / Ultimate	June 2034	• Pump Station B and rising main. • DN225 and DN300 from Pump Station B rising main to Pump Station A (SPS001).	Portion of Precinct 4 serviced by Pump Station B. Pump Station B transfers to Pump Station A (SPS001) catchment via rising main. Precinct 3 and portion of Precinct 4 drain to Pump Station A (SPS001) via gravity. Precinct 2 drains to Regional Pump Station via gravity.	1,001 lots

4.4 Pump Station Contributing EP Estimate and Sizing

An estimate of the contributing EP for each pump station is provided in Table 6 to Table 10 as per the conversion factors shown in Table 3 and the network layout and Pump Station Catchments as shown in Appendix A.

Table 6 - Pump Station A (SPS001) - Contributing EP

Category	Unit	Unit Value	EP per Unit	Total EP
Residential – P14, P6, P7 and LLC	Detached dwellings	693	2.8 EP per detached Dwelling	1,940
School	Pupils and Teachers	3,200 students and 330 teachers	0.1 EP	353 EP

SPS B			543	543
Precinct 3 and 4 - Gravity	lots	723	2.8 EP per detached Dwelling	2,024
Total				4,861

Table 7 - Pump Station B - Contributing EP

Category	Unit	Unit Value	EP per Unit	Total EP
Residential	Lots detached dwellings	194	2.8 EP per detached Dwelling	543
Total				543

Table 8 - Pump Station C - Contributing EP

Category	Unit	Unit Value	EP per Unit	Total EP
Residential	Detached dwellings	390	2.8 EP per detached dwelling	1,092
	Attached dwellings	117	1.78 EP per attached dwelling	208
Total				1,300

Table 9 - Pump Station D - Contributing EP

Category	Unit	Unit Value	EP per Unit	Total EP
Residential	Attached dwellings	136	1.78 EP per detached Dwelling	242
Commercial Site	ha	7	30	210
Total				452

Table 10 - Regional Pump Station - Contributing EP

Category	Unit	Unit Value	EP per Unit	Total EP
Residential	Detached dwellings	1,324	2.8 EP per detached Dwelling	3,707
Sports Facility		100%	26	26
Pump Station A (SPS001)		100%	4,861	4,861
Pump Station C		100%	1,300	1,300
Pump Station D		100%	452	452
External Flow		100%	5,875	5,875
Total				16,221

4.5 Existing Pump Stations and Rising Mains

4.5.1 TEMPORARY PUMP STATION

The Temporary Pump Station is currently active onsite and services the primary school site. The Temporary Pump Station currently receives its ultimate loading and will be decommissioned once Pump Station A (SPS001)

is commissioned, as shown in the development staging in Table 5. A summary of the ultimate loading associated with the Temporary Pump Station is shown in Table 11.

Table 11 - Temporary Pump Station - Ultimate Loading

Pump Station	EP	ADWF (L/s)	PWWF (L/s)
Temporary Pump Station	154	0.36	1.78 L/s

Details of the Pump Station as shown in the drawing set d2020.02.03 developed by Aquatec, dated 18/03/2020 and issued for construction are summarised in the tables below:

Table 12 - Temporary Pump Station – Wet Well Details

Description	Value
Top of Slab Level RL (m)	40
Discharge Pipe IL (m)	38.3
Sewer Inlet Pipe Diameter	DN150 (PVC DWV SN8)
Sewer Inlet Pipe Invert Level (m)	37.309
Wet Well Floor RL (m)	35.46
Q100 Level (m)	38.90

Table 13 - Temporary Pump Station - Operating Levels

Description	Value
Overflow RL (assumed) (m)	38.8
High Level Alarm (Float) RL (m)	36.61
Standby Start RL (m)	36.46
Duty Start RL (m)	36.31
Pump Stop RL (m)	36.11
Low Level (m)	36.01

Table 14 - Temporary Pump Station - Pump Details

Description	Value
Pump	Flygt Xylem
Model	MP 3127 HT 3 – 252 50Hz 7.4kW
Impeller Material	Grey Cast Iron
Impeller Type	Semi-Open Multi-Channel
Design Duty	2.90L/s @ 41.29m
Pump Operation	Duty/ Standby
Pump Discharge	DN50

Flows are transferred from the Temporary Pump Station via a PE100 PN16 DN63 rising main into the Regional Pump Station Catchment. Flows from the rising main are discharged into a DN300 main located on Ivory Parkway. A summary of rising main details is shown in Table 15. The PWWF of 1.78L/s results in a suitable velocity of 0.87 m/s in the rising main.

Table 15 - Temporary Pump Station - Rising Main Details

Parameter	Value
PWWF (L/s)	1.78
Length of SRM (m)	424.81
Pipe Type	PE100 PN16
Nominal Size	DN63
Internal Diameter (mm)	51
Area (m^2)	0.0204
Velocity (m/s)	0.87

4.5.2 REGIONAL PUMP STATION

The Regional Pump Station is currently active onsite and receives flows from Precincts 1, 9 and 12, in addition to the external Covella development. As development stages progress, the Regional Pump Station will receive all flows resulting from the development, with the local pump stations transferring flows into its gravity catchment. A summary of the ultimate loading associated with the Regional Pump Station is shown in the Table 16.

Table 16 - Regional Pump Station – Ultimate Loading

Pump Station	EP	ADWF (L/s)	PWWF (L/s)
Regional Pump Station	16,221	37.55	187.73

Details of the Regional Pump Station as shown in the Logan City Council as constructed drawings LS305-01-S dated 19/11/2020 are summarised in Table 17.

Table 17 - Regional Pump Station - Wet Well Details

Description	Value
Top of Slab Level RL (m)	41.75
Sewer Inlet Pipe Diameter	DN450
Sewer Inlet Pipe Invert Level (m)	38.88
Wet Well Floor RL (m)	36.44
Q100 Level (m)	41.00

Table 18 - Regional Pump Station - Operating Levels

Description	Value
Overflow RL (m)	40.76

High Level Alarm RL (m)	38.78
Standby Start RL (m)	38.48
Duty Start RL (m)	38.18
Pump Stop RL (m)	37.14

Table 19 - Regional Pump Station - Pump Details

Description	Value
Pump	Hidrostal
Model	H05K – S0R + HE130X4-XVEK1 + NE1B7VM-30
Impeller	S
Pump Operation	Duty/ Standby
Pump Discharge	DN125

It is noted the ultimate loading calculated for the Regional Pump Station as part of this report differ to the values as shown in the Logan City Council as constructed drawings. The ultimate EPs and values for ADWF and PWWF are summarised in Table 20. The resultant approximate maximum velocity in the Regional Pump Station Rising Main during PWWF is also shown, which occurs in the sections of the rising main consisting of OD450 PE100.

Table 20 - Regional Pump Station - Ultimate EP Variance

Regional Pump Station	Ultimate EP	ADWF (L/s)	PWWF (L/s)	Maximum Rising Main Velocity at PWWF (m/s)
Logan City Council Drawing	15,097	28.80	174.70	1.90
Sewerage IMP Update	16,221	37.55	187.73	2.04

Notably, the Logan City Council Drawings adopted an ADWF of 165 L/EP/day and a PWWF of 1300 L/EP/Day, whereas this report used updated sewerage loading rates in accordance with the SEQ code. Potential reasons for the difference in ultimate EP, are likely due to changes in the ultimate dwelling yield, the inclusion of a high school in ROL 13, and changes to occupancy rates, all described in Section 4.2 of this report.

Potential impacts of the difference may include:

- The increased ultimate loading may result in an increased number of pump starts and an increased period of pump operation with the existing pumps.
- The increased ultimate loading may result in less efficient operation of the Regional Pump Station due to variance from pump design duty points.
- The increased ultimate loading may result in an increased power consumption for the pump station with the existing pumps.

- An increased flow rate would increase velocity through the rising main, however it is noted that the maximum rising main velocity at PWWF shown in Table 20 for the larger ultimate EP calculated as part of this report was 2.18m/s and still compliant with the maximum velocity LOS of 3.0m/s

It should be noted that the ultimate EP for the Regional Pump Station Pump design occurs beyond 2050/51 and therefore the pump station will be operating with lower loads for approximately 30 years. As a result, there will be time to apply changes to the pump station if required to manage the potential impacts of variance in ultimate EP. It is recommended that the loading of the pump station be monitored as the stages of the development progress and that the pumps and switchboard be replaced if incoming flow increased beyond the design duty point of the pumps.

4.6 Proposed Pump Stations and Rising Mains

4.6.1 PUMP STATION C AND RISING MAIN

A summary of the wet well sizing for Pump Station C is shown in Table 21 from the approved Engineering Services Report of DEV2022/1277. The provided sizing of the pump station is indicative and will be reassessed during detailed design.

Table 21 - Pump Station C - Wet Well Details

Parameter	Value
Contributing EP	1,300
ADWF (L/s)	3.01
PWWF (L/s)	15.05
Operating Storage (m^3)	1.13
Emergency Storage (m^3)	43.33

A summary of the rising main sizing calculations is shown in Table 22 below. A DN180 PE100 DR11 pipe is recommended and will have a suitable velocity of 0.91 m/s with a PWWF of 15.05 L/s. The duty point of the pump station was calculated as 15.05 L/s at 17.45 m.

Table 22 - Pump Station C - Rising Main Details

Parameter	Value
Contributing EP	1,300
ADWF (L/s)	3.01
PWWF (L/s)	15.05
Length of SRM (m)	867.6
Pipe Type	PE100 DR11
Nominal Size	DN180
Internal Diameter (mm)	145
Area (m^2)	0.017

Parameter	Value
Velocity (m/s)	0.91
Hazen Williams Coefficient (C)	130
Friction Head (m)	5.76
Low point (Pump BWL) (m)	41.74
High point (Discharge) (m)	53.42
Static Head Requirement (m)	11.69
Total Pump Head (m)	17.45
Pump Duty Point	15.05 L/s at 17.45 m

4.6.2 PUMP STATION D AND RISING MAIN

A summary of sizing for Pump Station D is shown in Table 23 below. Preliminary design was not available for the Pump Station D sewer catchment and therefore sizing consisted only of an estimate of required operating and emergency storage. The provided sizing of the pump station is indicative and will be reassessed during detailed design. The details below are derived from the whole of site preliminary design, refer to Appendix C.

Table 23 - Pump Station D - Wet Well Details

Parameter	Value
EP	452
ADWF (L/s)	1.05
PWWF (L/s)	5.23
Operating Storage (m^3)	0.39
Emergency Storage (m^3)	15.07

A summary of the rising main sizing calculations for Pump Station D is shown in Table 24 below. The highpoint of the rising main was nominated as the discharge point with an invert level elevation of 69.92m and the low point was nominated as an approximate pump BWL of 35.56m. Pump BWL was approximated based on a surface level of 38.56m and a nominal 3m depth. These levels will need to be confirmed during preliminary design. A DN110 PE100 DR11 pipe is recommended and will have a suitable velocity of 0.84 l/s with a PWWF of 5.23 l/s. The duty point of the pump station was calculated as 5.23 L/s at 40.63 m.

Table 24 - Pump Station D - Rising Main Details

Parameter	Value
Contributing EP	452
ADWF (L/s)	1.05
PWWF (L/s)	5.23
Length of SRM (m)	619.47
Pipe Type	PE100 DR11

Parameter	Value
Nominal Size	DN110
Internal Diameter (mm)	89
Area (m^2)	0.0062
Velocity (m/s)	0.84
Hazen Williams Coefficient (C)	130
Friction Head (m)	6.27
Low point (Pump BWL) (m)	35.84
High point (Discharge) (m)	69.92
Static Head Requirement (m)	34.36
Total Pump Head (m)	40.63
Pump Duty Point	5.23 L/s at 40.63 m

4.6.3 PUMP STATION A (SPS001) AND RISING MAIN

A summary of sizing for Pump Station A (SPS001) is shown in Table 25. The provided sizing of the pump station is indicative and will be re-assessed during detailed design. The details below are derived from the whole of site preliminary design, refer to Appendix C.

Table 25 - Pump Station A (SPS001) - Wet Well Details

Parameter	Value
EP	4,861
ADWF (L/s)	11.25
PWWF (L/s)	56.26
Operating Storage (m^3)	4.22
Emergency Storage (m^3)	162.03

A summary of the rising main sizing calculations for Pump Station A (SPS001) is shown in the table below. The highpoint of the rising main was nominated as the discharge point with an invert level elevation of 41.70m and the low point was nominated as an approximate pump BWL of 25.57 m. Pump BWL was approximated based on a surface level of 34.27 m and a nominal 9 m depth. These levels will need to be confirmed during preliminary design.

Table 26 - Pump Station A (SPS001) - Rising Main Details

Parameter	Value
Contributing EP	4,861
ADWF (L/s)	11.25
PWWF (L/s)	56.26
Length of SRM (m)	560

Parameter	Value
Pipe Type	PE100 DR11
Nominal Size	DN250
Internal Diameter (mm)	203
Area (m^2)	0.032
Velocity (m/s)	1.74
Hazen Williams Coefficient (C)	130
Friction Head (m)	8.31
Low point (Pump BWL) (m)	26.59
High point (m)	41.70
Static Head Requirement (m)	16.11
Total Pump Head (m)	24.42
Pump Duty Point	56.26 L/s at 24.42 m

A DN250 PE100 DR11 pipe is recommended will have a suitable velocity of 1.74 m/s with a PWWF of 56.26 L/s. The duty point of the pump station was calculated as 56.26 L/s at 24.42 m. A larger diameter pipe could be justified for the rising main to reduce the friction head for the ultimate contributing EP however as the catchment of the Pump Station A (SPS001) involves different stages of development, including flow transferred from Pump Station B, the DN250 pipe will provide sufficient velocity during the initial stages of development of the catchment.

4.6.4 PUMP STATION B AND RISING MAIN

A summary of sizing for Pump Station B is shown in the table below. Preliminary design was not available for the sewer catchment and therefore sizing consisted only of an estimate of required operating and emergency storage. The provided sizing of the pump station is indicative and will be re-assessed during detailed design. The details below are derived from the whole of site preliminary design, refer to Appendix C.

Table 27 - Pump Station B - Wet Well Details

Parameter	Value
EP	543
ADWF (L/s)	1.26
PWWF (L/s)	6.28
Operating Storage (m3)	0.47
Emergency Storage (m3)	18.10

A summary of the rising main sizing calculations for Pump Station B is shown in the table below. The highpoint of the rising main was nominated as the discharge point with an invert level elevation of 35.24m and the low point was nominated as an approximate pump BWL of 34.10m. Pump BWL was approximated based on a surface level of 36.85m and a nominal 3m depth. These levels will need to be confirmed during preliminary

design. A DN90 PE100 DR11 pipe is recommended and will have a suitable velocity of 1.50 m/s with a PWWF of 6.28 l/s. The duty point of the pump station was calculated as 6.28 L/s at 10.72 m.

Table 28 - Pump Station B - Rising Main Details

Parameter	Value
Contributing EP	543
ADWF (L/s)	1.26
PWWF (L/s)	6.28
Length of SRM (m)	256.72
Pipe Type	PE100 DR11
Nominal Size	DN90
Internal Diameter (mm)	73
Area (m^2)	0.0042
Velocity (m/s)	1.50
Hazen Williams Coefficient (C)	130
Friction Head (m)	9.57
Low point (Pump BWL) (m)	34.10
High point (Discharge) (m)	35.24
Static Head Requirement (m)	1.14
Total Pump Head (m)	10.72
Pump Duty Point	6.28 L/s at 10.72 m

5. SEWERAGE MODELLING

A sewerage model was developed in SewerCAD to perform an analysis of network performance. The model includes sections of sewer that are constructed and in use, in addition to sections currently under design. The following assumptions were adopted to develop the model:

- The sewerage model was developed to include the branch and trunk gravity network of the development with sewers DN225 in diameter and greater.
- Demands were developed based on the lot layout in Appendix A. Demand loading in the model was applied at the points of connection between the reticulation, branch and trunk network.
- Levels of service were adopted as summarised in Table 1.
- Active network scenarios were developed as summarised in Table 5.
- Demand scenarios were developed to reflect a static analysis of ADWF, PDWF and PWWF.
- Asset IDs for manholes were adopted from details provided in drawings and labels for pipes were developed based on upstream and downstream manhole asset IDs.
- Network details such as manhole locations, main length, surface levels and invert level elevations were sourced from as constructed drawings, detailed design and preliminary design documents where

available. The sections of the network without sufficient design information relating to invert levels were interpolated between known points and adopted minimum grades depending on main diameter.

6. NEWORK ANALYSIS

An analysis of the gravity network was completed using the model developed in SewerCAD and the LOS shown in Table 1. The results of the network analysis have been summarised by sections of sewer.

6.1 Maximum Depth of Flow and Velocity

Table 29 shows a summary of maximum depth of flow and velocity during PWWF for the ultimate stage of the development. Results are shown only for the ultimate stage of the development as maximum flow and velocity in the network would be experienced during this stage. Depth of flow is reported as normal depth and as a percentage of total pipe depth. The results show that the maximum depth of flow during PWWF in the DN300 Everleigh Drive is slightly above the maximum 75% depth of flow LOS.

This sewer main was designed, approved, and constructed in accordance with the Great Flagstone ICOP at the time. Due to the catchment this pipe services, there is a very unlikely chance of failure, and we note that the next pipe size could be considered over designed for this application due to the relatively short lengths where the 75% cap is slightly exceeded.

Table 29 - Ultimate Stage PWWF - Maximum Depth of Flow and Velocity

Section	Diameter	Depth of Flow Max (%)	Velocity Max (m/s)
Teviot Road and Everleigh Drive	225	74.7	2.75
Everleigh Drive	300	77.9	2.45
Emerald Parade	225	53.8	0.87
Ivory Parkway DN375	375	67.9	1.43
Sport and Rec Park to Ivory Parkway	225	46.9	1.54
Anderson Drive to Ivory Parkway	225	73.1	2.01
Ivory Parkway DN300	300	48.6	2.08
Pump Station C DN225	225	42.5	1.07
Precinct 5 DN225	225	54.6	0.88
Precinct 4 DN225	225	55.9	0.72
Pump Station A (SPS001) DN300	300	70.8	1.17

6.1.1 EVERLEIGH DRIVE

A detailed summary of the results for the DN300 Everleigh Drive section of gravity sewer is shown in Table 30. The results show that the maximum depth of 75% was exceeded in two sections of sewer, manhole 11/T1 to 10/T1 and manhole 7/T1 to 6/T1. This section of sewer has been constructed and is currently active. The total PWWF of 73.44 L/s in this section results from 5.63 L/s from approximately 400 EP (143 detached dwellings)

from Precinct 12 and sections of Precinct 9, in addition to external flows from the Covella Development site equivalent to approximately 5,875 EP and 68L/s at PWWF.

The depth of this section of sewer ranges between approximately 4 to 4.5m, therefore any potential surcharge from the sewer into the manholes will likely mitigate the risk of overflow due to the resultant pressure. The maximum depth of flow LOS of 75% is only marginally exceeded at 77.9% and so the risk of surcharge is also unlikely.

Table 30 - Ultimate Stage PWWF - Everleigh Drive

Label (US MH to DS MH)	Invert (Start) (m)	Invert (Stop) (m)	Length (m)	Slope (%)	Diameter (mm)	Population	Flow (L/s)	Velocity (m/s)	Capacity (Full Flow) (L/s)	Depth / Rise (%)
12/T1 to 11/T1	49.56	49.25	44.64	0.694	300	6,345	73.44	1.31	81.84	74.0
11/T1 to 10/T1	49.22	48.93	44.75	0.655	300	6,345	73.44	1.28	79.47	75.9
10/T1 to 9/T1	48.88	48.16	103.09	0.697	300	6,345	73.44	1.31	82.02	73.8
9/T1 to 8/T1	48.12	46.49	84.86	1.916	300	6,345	73.44	1.96	135.94	52.4
8/T1 to 7/T1	46.43	43.43	86.3	3.475	300	6,345	73.44	2.45	183.09	44.1
7/T1 to 6/T1	40.83	40.55	44.85	0.618	300	6,345	73.44	1.24	77.18	77.9

6.2 Minimum Velocity

The WSAA Gravity Sewerage Code of Australia (WSA 02-2014-3.1 section 2.2.3) generically defines reticulation sewers as a network of pipes nominally up to and including DN300 that receive sewage and/or trade waste from customer properties. In the context of sewerage modelling, network performance and compliance of the minimum velocity LOS of 0.7m/s for trunk sewers, trunk sewers will be defined as greater than DN300 diameter. Self-cleansing performance for reticulation and branch sewers of diameter DN300 and smaller will be ensured through compliance with minimum grades as shown in Table 2.

Table 31 shows a summary of minimum velocity during PDWF for all stages of the development. Results are shown for all stages to provide the range of values for minimum velocity as development staging progresses and related demands increase.

Table 31 - All Stages PDWF - Minimum Velocity

Section	Diameter (mm)	Minimum Velocity (m/s)				
		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Ivory Parkway DN375	375	0.82	0.82	0.82	0.89	0.91

The results show that the minimum velocity LOS of 0.7m/s during PDWF was maintained in all sections of trunk sewer.

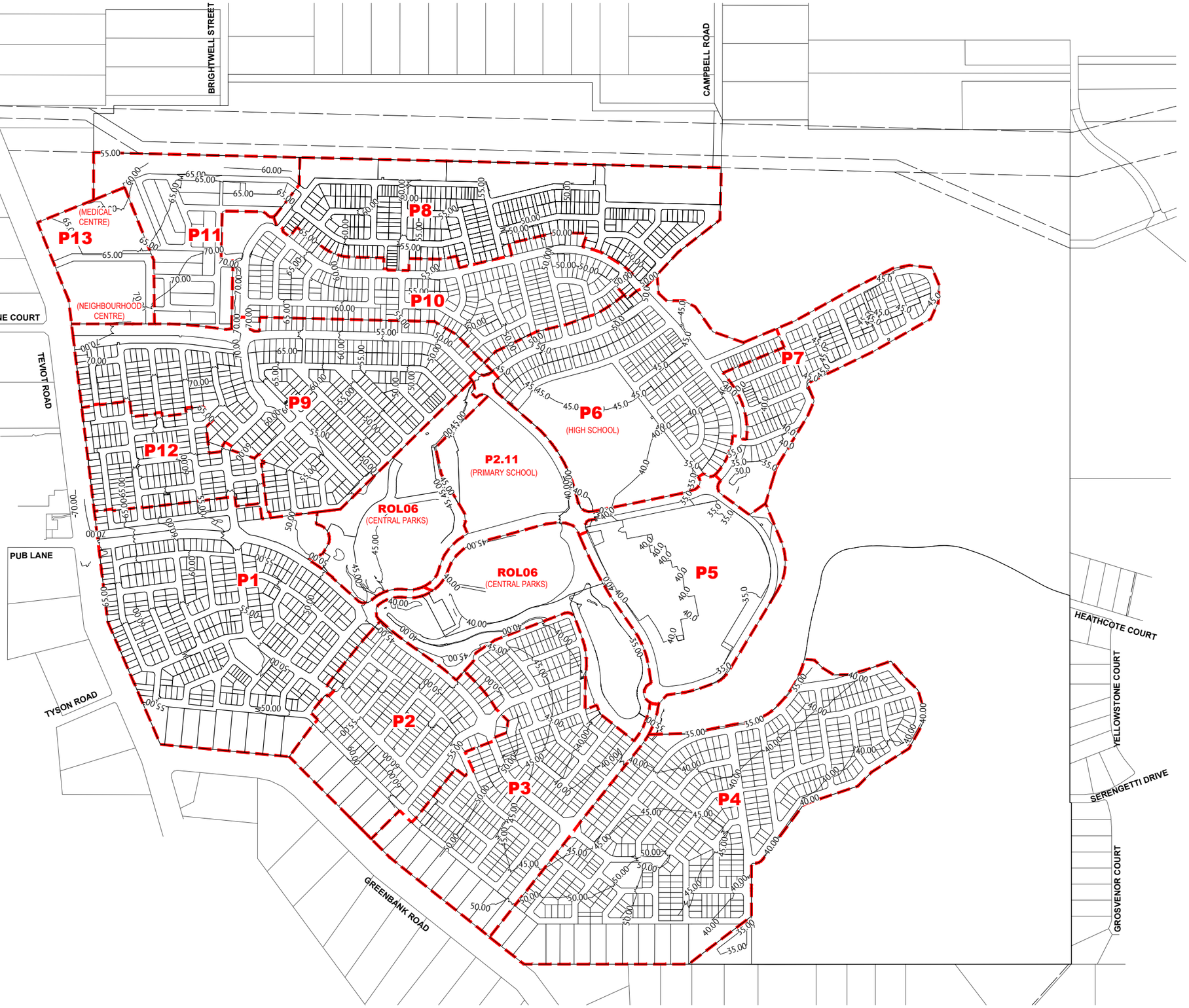
7. CONCLUSIONS AND RECOMMENDATIONS

This report provides a summary of the design basis for the Everleigh development and addresses the key requirements for sewerage infrastructure. A summary of the key points of the integrated master plan is shown below:

- The development was previously supported by a Water and Sewer Infrastructure Master Plan, prepared by MWH (Ver 5 dated 29 May 2017). There are a number of differences between the MWH Master Plan and this report, including adopted levels of service, loading rates, occupancy rates and planning densities. These differences are discussed in detail in this report.
- The total ultimate population of the site is estimated to be 10,346 EP.
- The ultimate population of the site consists of:
  - 3,577 Residential dwellings equivalent to 9,757 EP
  - Commercial Sites equivalent to 236 EP
  - Two school sites equivalent to 353 EP.
- The ultimate sewerage servicing solution for the site consists of collection of flows at a Regional Pump Station located on Ivory Parkway, which transfers flows from the development to the Cedar Grove WWTP. Flows are transferred from the site via a rising main, which connects to a shared rising main on Greenbank road transferring flows from North Maclean SPS to Cedar Grove WWTP.
- Additional flows to the development site are received via a rising main from the Covella Development along Teviot Road and into the gravity network along Everleigh Drive. The additional flow is equivalent to approximately 5,875 EP and 69L/s at PWWF.
- Internal infrastructure for the site also consists of 4 local pump stations which transfer flows into the Regional Pump Station catchment, in addition to Temporary Pump Station that services the school site. The Temporary Pump Station transfers flows to the Regional Pump Station via a rising main along Ivory Parkway.
- Ultimate demand loading for the Regional Pump Station is estimated to be 16,221 EP and 37.55 L/s ADWF and 187.73 L/s PWWF, which consists of the ultimate population of the site and external flows from the Covella Development.
- Pump Station and rising main sizing has been completed in alignment with the levels of service outlined in Table 1 which have been based on the SEQ Code.
- The results of the sewerage model developed in SewerCAD indicate that the performance of the network is compliant with the maximum velocity LOS of 3.0m/s at PWWF and minimum velocity LOS of trunk sewers of 0.7m/s at PDWF.
- The results of the sewerage model indicate that the maximum depth of flow LOS of 75% was exceeded in only marginally in two sections of the DN300 Everleigh Drive sewer during PWWF for ultimate development staging. Due to the depth of sewer in these sections and the marginal exceedance of maximum depth above LOS, the risk of potential surcharge and overflow is considered unlikely.
- The following actions are recommendation based on the results of this report:
- It is noted the ultimate loading calculated for the Regional Pump Station as part of this report differ to the values as shown in the Logan City Council as constructed drawings. Ultimate loading was calculated as 16,221 EP and 187.73 L/s PWWF, whilst the as constructed drawings show design ultimate loading as 15,097 EP and 174.70L/s. Potential reasons for the difference in ultimate loading are provided in Section 4.5.2. It is recommended that the loading of the pump station be monitored as the stages of the

development progress and that the pumps and switchboard be replaced if incoming flow increased beyond the design duty point of the pumps.

APPENDIX A– PROPOSED DEVELOPMENT LAYOUT AND CONTOUR PLAN



LEGEND

PRECINCT BOUNDARY

N

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
24/05/2024	D	UPDATED ROL13 LAYOUT	KK	NS
16/02/2024	C	UPDATED ROL13 LAYOUT	AL	NS
12/10/2023	B	UPDATED LAYOUT AND CONTOURS	KK	NS
	A	ORIGINAL ISSUE		

REVISIONS

Premise

BRISBANE OFFICE
LEVEL 11, 300 ADELAIDE STREET
BRISBANE, QLD 4000
PH: (07) 3253 2222
WEB: www.premise.com.au

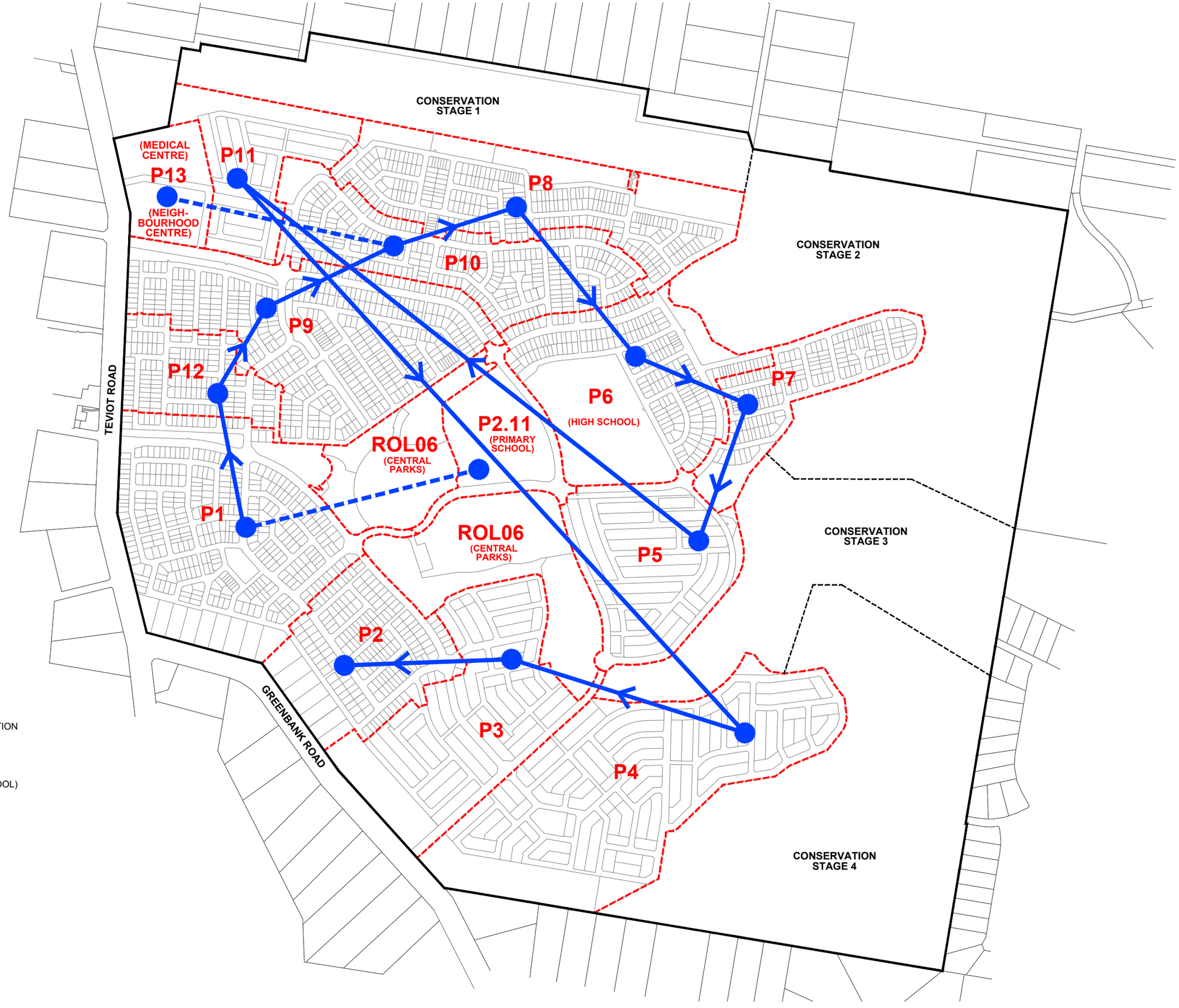
DESIGNED KLYNT KIWANG
CHECKED ANDREW LANGDON
PROJECT MANAGER NICK SOMMERVILLE
ENGINEERING CERTIFICATION
PATRICK BRADY RPEQ 7112

SCALE
0 100 200 300m
SCALE 1:5000 (A1)
ORIGINAL SHEET SIZE A1

CLIENT MIRVAC QLD PTY LTD
PROJECT PROPOSED SUBDIVISION
LOCATION TEVIOT ROAD, GREENBANK
SHEET TITLE EVERLEIGH DEVELOPMENT LAYOUT AND CONTOUR PLAN

JOB CODE MIRSGB
SHEET NUMBER SKC121
REV D

APPENDIX B– EVERLEIGH STAGING PLAN



LEGEND

- SITE BOUNDARY
- PRECINCT BOUNDARIES
- PRECINCT DELIVERY DIRECTION
- CONCURRENT DELIVERY

SEQUENCE

1. PRECINCT 1 (+ PRIMARY SCHOOL)
2. PRECINCT 12
3. PRECINCT 9
4. PRECINCT 10 (+ PRECINCT 13)
4. PRECINCT 8
5. PRECINCT 6
6. PRECINCT 7
7. PRECINCT 5
8. PRECINCT 11
9. PRECINCT 4
10. PRECINCT 3
11. PRECINCT 2

URBIS

EVERLEIGH

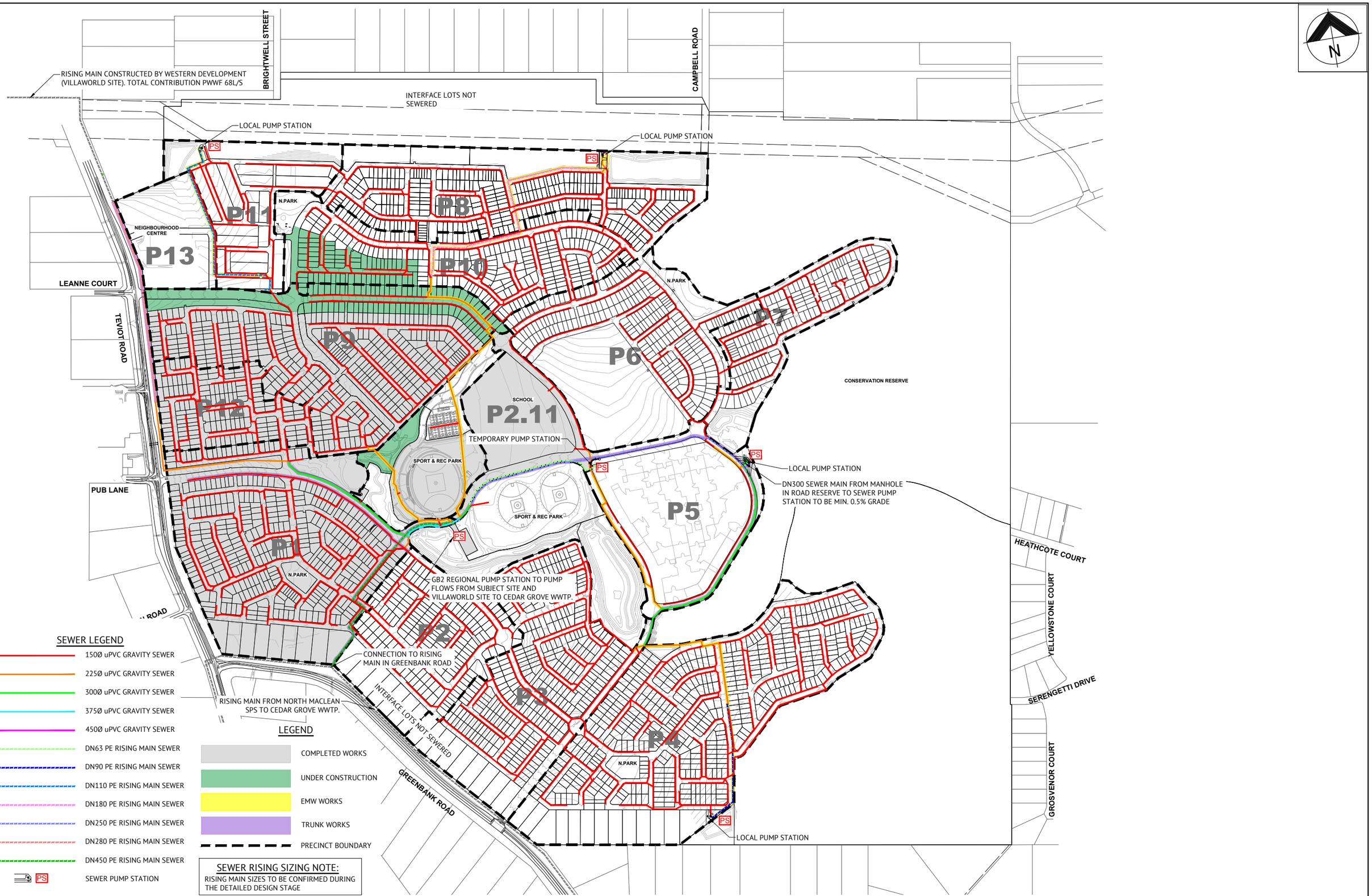
Sequencing Plan

Scale 1:10,000 @ A3

0 100 200 500m

PROJECT NO: ND1309
DATE: 17.05.2024
DRAWING NO: WOS-04
REV: 34

APPENDIX C– SEWER NETWORK LAYOUT



PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
24/05/2024	L	UPDATED ROL13 LAYOUT AND SEWER ALIGNMENT	KK	NS
15/01/2024	K	UPDATED PRECINCT 5 PUMP STATION LOCATION	KK	NS
27/10/2023	J	UPDATED TO MATCH CHANGES TO LOT CALCS	KK	NS
11/07/2023	I	UPDATED TO MATCH UPDATES ON LOT CALCS	KK	NS
13/09/2022	H	2022 UPDATES	KK	NS
30/09/21	G	BASE UPDATED	SS	

REVISIONS

Premise

BRISBANE OFFICE
LEVEL 11, 300 ADELAIDE STREET
BRISBANE, QLD 4000
PH: (07) 3253 2222
WEB: www.premise.com.au

DESIGNED KLYNT KIWANG
CHECKED ANDREW LANGDON
PROJECT MANAGER NICK SOMERVILLE
PATRICK BRADY RPEQ 7112

SCALE
0 100 200 300m
SCALE 1:5000 (A1)
ORIGINAL SHEET SIZE A1

CLIENT MIRVAC QLD PTY LTD
PROJECT PROPOSED SUBDIVISION
LOCATION GREENBANK ROAD, GREENBANK
SHEET TITLE SERVICING LAYOUT - SEWERAGE RETICULATION LAYOUT

JOB CODE MIRSGB
SHEET NUMBER SL200
REV L

APPENDIX D– EDQ CORRESPONDENCE

Lawrence Mills

From: Nick Somerville
Sent: Thursday, 14 September 2023 9:08 AM
To: Lawrence Mills
Cc: Andrew Langdon
Subject: Fwd: [#MIRSGB] Everleigh IMP Updates | Conversions

FYI

Nicholas Somerville

Begin forwarded message:

> **From:** Marco Bonotto <Marco.Bonotto@dsdilgp.qld.gov.au>
> **Date:** 14 September 2023 at 7:31:50 am AEST
> **To:** Nick Somerville <nick.somerville@premise.com.au>
> **Subject: RE: [#MIRSGB] Everleigh IMP Updates | Conversions**
>
> Hi Nick,
>
> I've just provided a similar advice to another developer and I've realised that I've made a type in my email below:
> The non-renewable water as per the LCC DSS is **25L/EP/day** as opposed to 30 and therefore the AD is **190L/EP/day** and not 195.
>
> Cheers

Queensland Government

Marco Bonotto
Director Engineering, Infrastructure Solutions
Economic Development Queensland
Department of State Development, Infrastructure, Local Government and Planning

*Microsoft teams – **meet now***

P 3214 9581 **M** 0499 527 249
Level 14, 1 William Street, Brisbane QLD 4000
PO Box 2202, Brisbane QLD 4001

statedevelopment.qld.gov.au

I acknowledge the traditional custodians of the lands and waters of Queensland. I offer my respect to elders past, present and emerging as we work towards a just, equitable and reconciled Australia.

From: Marco Bonotto
Sent: Friday, September 8, 2023 10:15 AM
To: Nick Somerville <nick.somerville@premise.com.au>
Subject: RE: [#MIRSGB] Everleigh IMP Updates | Conversions

Hi Nick,

I recommend using the conversation rates defined in the SRIA table reported below to avoid confusion:

USES			CONVERSION FACT
Residential Uses	Pre 1 January 2016	detached dwelling	2.91EP/dwelling
		attached dwelling	1.83EP/dwelling
	On or after 1 January 2016 7 Ha	detached dwelling	2.8EP/dwelling
		attached dwelling	1.78EP/dwelling
Retail uses (excluding showrooms)			30EP/ha
Showrooms			30EP/ha
Commercial uses			30EP/ha
Industrial uses			30EP/ha
Service, community and other uses (excluding child care centre and educational establishment)			30EP/ha
Child Care Centre			0.25EP/pupil and st
Educational establishment	Primary school		0.1EP/pupil and st
	Secondary school		0.1EP/pupil and st
	Any other educational establishment		0.1EP/pupil and st
Sport, recreation and entertainment uses			30EP/ha
Tourism uses			30EP/ha
Rural uses			30EP/ha
Mixed use (being a development combining residential uses and any other use)			The conversion factor for the R and, if the mixed use includes centre or Educational establi conversion factor for the Chil and Educations establishment and as set out above) plus
Any other uses			30EP/ha

I note that the conversion rate for the 'land lease community' should be either 2.8EP/dwelling or 1.78EP dwelling depending if these are attached or detached dwellings.
Happy for the school EP are based on expected number of pupil and staff at 0.1EP/pupil and staff conversion rate as per your email below.

In terms of demand units, I recommend use the attached LCC DSS document.
The water AD demand for the system design is **195L/EP/day** that include 165L/EP/day of consumption plus 30L/EP/day for non-renewable water (i.e. system losses and not billed water)

Please let me know if you require any clarifications.

Cheers

Marco Bonotto
Director Engineering, Infrastructure Solutions
Economic Development Queensland
Department of State Development, Infrastructure, Local Government and Planning
*Microsoft teams – **meet now***

P 3214 9581 **M** 0499 527 249
Level 14, 1 William Street, Brisbane QLD 4000
PO Box 2202, Brisbane QLD 4001

statedevelopment.qld.gov.au

<image006.png>

From: Nick Somerville <nick.somerville@premise.com.au>
Sent: Friday, September 1, 2023 5:21 AM
To: Marco Bonotto <Marco.Bonotto@dsdilgp.qld.gov.au>
Subject: RE: [#MIRSGB] Everleigh IMP Updates | Conversions

Morning Marco.
Further to our chat on Wednesday, I cannot find where LCC requested an update the EP conversion to 3. When looking through the various reports it seems to have been in 1 report, however in a later (newer) report it has adopted the below. As such, I am proposing to just use the below again.

An update to a land use is the land lease community. For this we will use the 1.83EP/dwelling.

Use I checked the school and the primary school has 126EP allocated to it. So ~18EP/Ha or 1,260 pupils and staff. On this basis the high school will have around 174 EP or 1,740 pupils and staff.

With the below table, the previous AD for water was 165L/EP/day. I believe the updated SEQ Code has 230L/EP/Day. Do you want this change to the below, or remaining at the 165 being an existing development?

Table 4.1 - Water Network Design Criteria -

No	Parameter	Gold Coast				
A. Drinking Water – Conventional (Single Supply Zone)						
A1	Average Day Demand (AD) per EP, excluding NRW (Note: EP/ET conversion rate provided in separate tables from SEQ-SP)	220 L/EP/d				
A2	Estimated Non-Revenue Water (NRW)	20 L/EP/d				
A3	Peaking Factors (Note: Peaking Factors are not applied to NRW)	Residential (single det.)	Multi-Residential	Commercial /Public	Indus.	Tourist
	MDMM/AD	1.75	1.27	1.06	1.06	1.76
	PD/AD	2.12	1.45	1.12	1.12	2.51
	PH/PD	2.84	2.05	2.07	1.38	2.40

NICK SOMERVILLE
Senior Construction Engineer

T 07 3253 2222 **| M** 0417 545 938
E nick.somerville@premise.com.au
A Level 11, 300 Adelaide St, Brisbane QLD 4000

From: Nick Somerville
Sent: Wednesday, August 30, 2023 2:36 PM
To: 'Marco Bonotto' <Marco.Bonotto@dsdilgp.qld.gov.au>
Subject: RE: [#MIRSGB] Everleigh IMP Updates | Conversions

Afternoon Marco.
Just seeing if you have had a chance to look at this.
I just tried to call to discuss.

Thanks!

Nick

<image016.jpg>

NICK SOMERVILLE
Senior Construction Engineer

T 07 3253 2222 **| M** 0417 545 938
E nick.somerville@premise.com.au
A Level 11, 300 Adelaide St, Brisbane QLD 4000

<image017.jpg>

<image018.jpg>

<image019.jpg>

From: Nick Somerville
Sent: Friday, August 25, 2023 3:08 PM
To: Marco Bonotto <Marco.Bonotto@dsdilgp.qld.gov.au>
Subject: [#MIRSGB] Everleigh IMP Updates | Conversions

Afternoon Marco.

Further to our phone conversation yesterday, please find below a table of demands and EP conversions used in previous reports. Of note, with the education sites we adopted 1.05EP/Ha which was mentioned in the previous reports.

E
<image013.png>

Table 6.1: Design Parameters - Water Demands and Modelling Factors

Parameter	Adopted Value	
	Residential	Non-Residential
AD Demand	165 L/EP/day	165 L/EP/day
Unaccounted for	25 L/EP/day	25 L/EP/day
MDMM / AD Ratio	1.3	1.2
MD / AD Ratio	1.7	1.3
PH / AD Ratio	3.1	2.0

AD = Average Day

On top of the above, fire fighting requirements for residential and commercial are 15 L/s for 2 hours and 30 L/s for 4 hours respectively. Minimum pressure of 12 m was required during fire fighting scenario. We also had an irrigation demand of 2.28 L/s per Ha, although this is not actually stated anywhere in the report.

<image016.jpg>

NICK SOMERVILLE
Senior Construction Engineer

T 07 3253 2222 **| M** 0417 545 938
E nick.somerville@premise.com.au
A Level 11, 300 Adelaide St, Brisbane QLD 4000

<image017.jpg>

<image018.jpg>

<image019.jpg>