SEQ Water Supply and Sewerage Design & Construction Code (SEQ WS&S D&C Code)

DESIGN CRITERIA

1 February 2020

Document History

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1.0	Initial Publication	1 July 2013
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References

Reference	Title
The Act	South-East Queensland Water (Distribution and Retail Restructuring) Act 2009
DEWS Guidelines	The Department of Environment and Resource Management "Design Criteria for Water Supply and Sewerage", April 2010
SEQ WS&S D&C – Water Supply Code	Water Supply Code of Australia (WSA 03-2011) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ WS&S D&C – Sewerage Code	Sewerage Code of Australia (WSAA 02-2014) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ WS&S D&C – Sewage Pumping Station Code	Sewage Pumping Station Code of Australia (WSAA 04-2005) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ WS&S D&C – Vacuum Sewerage Code	Vacuum Sewerage Code of Australia (WSAA 06-2008) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ WS&S D&C – Pressure Sewerage Code	Pressure Sewerage Code of Australia (WSAA 07-2007) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ WS&S D&C – Asset Information Specification	SEQ WS&S D&C Asset Information Specification

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Part A – General Principles

1 Introduction

1.1 General

Provision of effective water supply and sewerage services underpins environmental, economic and public health outcomes for all of South East Queensland (SEQ). The ongoing expansion of the region means that it is essential that the industry participants have a clear understanding of the processes and key parameters to be applied in development of sustainable water supply and sewerage networks.

1.2 Statement of Context

In undertaking the design and construction of water services infrastructure, it is imperative that participants understand the context within which such infrastructure needs to function. As water service systems typically involve complex interconnections and controls it is often necessary to undertake a review of the needs of the broader system to which the infrastructure will be connected (this is particularly true for larger scale developments). This broader review is referred to nationally by the term "Systems Planning". In simple terms:

- **Systems Planning** provides the context for connection of proposed infrastructure. This may include defining boundary conditions or other network constraints which need to be reflected in the subsequent design;
- Development of a **Concept Plan** provides further scoping (including determination of the scale, location and general arrangement of key items of infrastructure);
- **Hydraulic modelling** which reflects the known (calibrated) performance the network (both that proposed and the existing assets); and
- The outcomes of such Systems Planning and Concept Planning then provide critical inputs necessary to fully inform the **Detailed Design Process**

The overall objective of this process (from System Planning to Detailed Design) is to provide a system that meets the Water Agency's obligations under its operating licence and customer contract[1].

This guideline is an essential element of the SEQ WS&S D&C Code in that it contains material that informs all developers (big and small) on how to accommodate all aspects of water services infrastructure in their development.

1.3 Objective and Application:

The objective of this guideline is to establish the key criteria to be applied in the design of water supply and sewerage reticulation infrastructure to meet current and future needs of the SEQ region. Adoption of these criteria across the region should ensure application of consistent strategic thinking in the process.

These guidelines have been developed by the SEQ Water Service Providers (SEQ-SPs) for **application to non-trunk distribution networks and have not been developed for the bulk components of the water grid**.

[1] WSAA, WSA03-2011-3.1, "Water Supply Code of Australia, Third Edition", Clause 1.2.1

1.4 Design Criteria and Service Standards

It is important to clearly understand the intent and application of the design criteria contained within this guideline. In all instances, the criteria provided relate to future additions to the water/sewer distribution networks within SEQ and are not to be confused with existing customer standards of service.

Customer standards of service reflect the standards being achieved within the existing networks. Such service standards need to accommodate a very wide range of asset, customer, and geographic differences. These outcomes reflect existing constraints within the network.

In addition, the Desired Standards of Service, referenced in the water businesses Netserv Plans, may reflect an aspirational standard of service relevant to the provision of trunk infrastructure.

The criteria applied in this guideline relate to the provision of new, non-trunk distribution assets only. As such, the criteria reflect the businesses desire for service improvement and may be set at a standard different to existing service outcomes. Over time, these criteria may align with the service standards. The relationship between these Design Criteria, the Customer Standard of Service and the Desired Standard of Service contained within the Netserv Plan is summarised in Table 1 below.

Table 1 - Design Criteria, Netserv and Customer Service Standards,

Document	Business Driver	Scope
SEQ WS&S Design Criteria	Defines the technical parameters relevant to the provision of NEW, smaller scale water supply and sewerage distribution assets.	Primarily applies to **NEW distribution assets** only
Netserv Plans	Outlines the businesses process for accommodating regional growth. Includes a statement of Desired Standards of Service (DSS) for new TRUNK infrastructure	Primarily applies to the determination of **TRUNK assets required to service growth**
Customer Service Standards/Customer Charter	Defines the service provided to existing customers at the point of delivery	Relates to the actual **performance of the existing network**

As far as practical, these guidelines have sought to consolidate key criteria used by the SEQ-SPs. In some instances, standardisation of criteria is neither practical nor possible. Such differences may arise through differences in licence requirements and/or from the statutory obligations of the SEQ-SPs to apply actual measured figures as the basis of their design of future networks. In these cases, different parameters may be specified for different service areas. These differences are clearly marked in the separate Water Supply and Sewerage Design Criteria tables.

1.5 Document Hierarchy

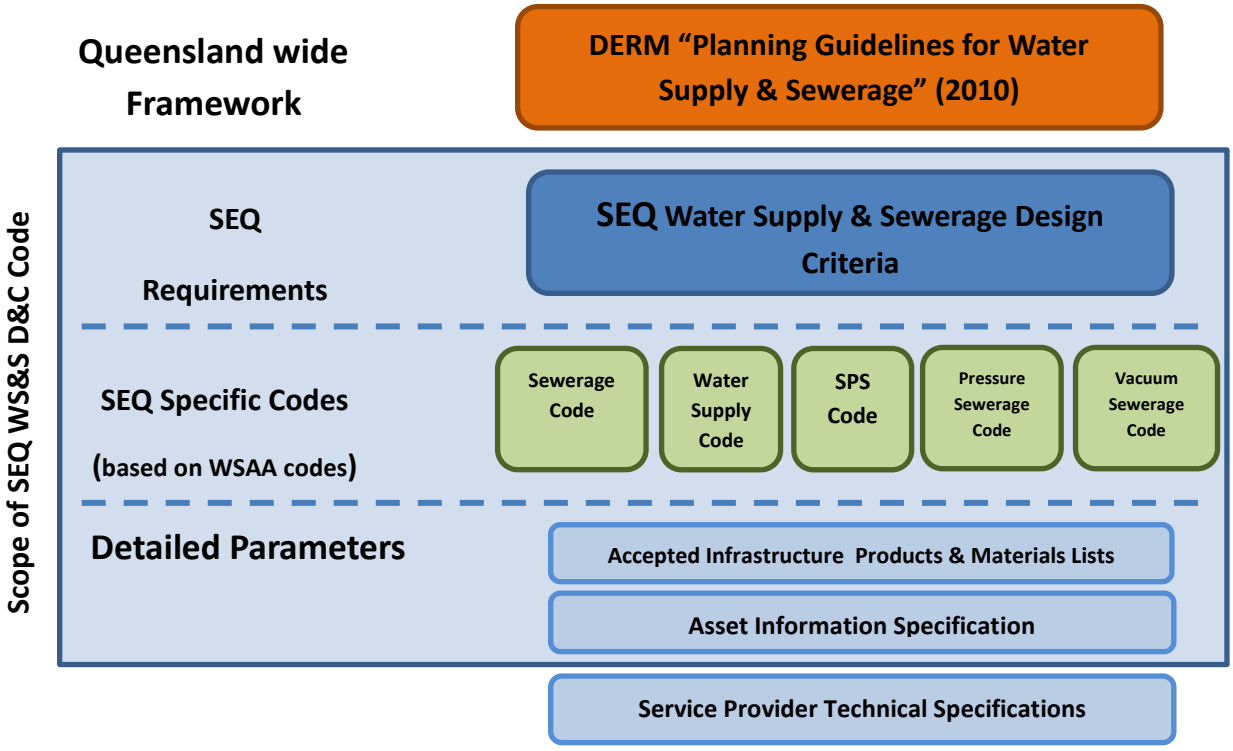
This document has been developed to complement other relevant frameworks. In particular, the "Planning Guidelines for Water Supply and Sewerage" developed by the Queensland State Government[2] provides an overarching framework to which this, more detailed document will refer. In effect, the State's guideline provides the generic framework for all of Queensland, while these guidelines provide more detailed advice on the specific parameters to be applied in the design of SEQ water services distribution infrastructure. To avoid the risk of confusion, these guidelines do not elaborate on many of the principles contained within the State's document. It is assumed that competent designers are aware of the State's framework and how the (more detailed) design criteria contained within this guideline build on the State's generic framework.

[2] The Department of Energy and Water Supply " Planning Guidelines for Water Supply and Sewerage", April 2010, Chapter 6 amended March 2014

This guideline is also developed to be consistent with the various, nationally accepted WSAA codes[3]. The WSAA codes (SEQ WS&S D&C Code) provide specific guidance at the network and asset level. The expectation underpinning these guidelines is that individual projects will be constructed to meet SEQ-SPs' specifications as contained in the WSAA codes and project level contract documentation.

The relationship between the State's guidelines, the SEQ Water Supply and Sewerage Design Criteria, the WSAA codes and project specifications is summarised in Figure 1.

Figure 1 – Document Hierarchy



In the event of contradiction between these four (4) levels of documentation, the project specific technical specification will take precedence on construction matters. Otherwise, the provisions of THIS guideline will take precedence over all other documents.

1.6 Structure of the Document

This guideline has been designed to assist users "step through" the process. In particular:

Part A – General Principles: Has been developed to provide a very broad overview of key objectives and highlight how these guidelines "fit in" with other key documents. This section of the guideline is relatively "generic" and is equally applicable to either water supply or sewerage services;

Part B – Water Supply Network Infrastructure: Provides an overview of the design criteria which will drive the development and operation of drinking water supply and non-drinking water networks;

Part C – Sewerage Network Infrastructure: Provides an overview of the design criteria which will drive the development and operation of the sewer collection and transportation network;

[3] In the context of these guidelines, references to the WSAA codes should be read to mean the SEQ WS&S D&C amended version of the national code

Appendix A – Contains a copy of the landuse demand tables sourced from the Planning Schemes of each Council at the time of publication.

2 Objectives

2.1 Overview

This section of the guideline provides an overview of the purpose and outcomes from all design activities. In particular, it summarises those generic principles that cover the efficient design of both water supply and sewerage network infrastructure. Criteria specific to either water or sewerage network infrastructure are contained in sections B and C of the guideline respectively.

The objectives of all water services network design undertaken within South East Queensland will be to:

- Ensure provision of sufficient and sustainable distribution networks which serves growth anticipated within the region and delivers the defined outcomes identified for each area;
- Ensure sound asset management including a holistic evaluation of options for delivering the defined outcomes (including consideration of operations, asset condition/performance, concurrent programs and non-asset solutions);
- Determine the optimal strategy that delivers the defined outcomes at the lowest financial, social and environmental (triple bottom line) cost;
- Take into account the requirements of Water Sensitive Urban Design (WSUD) as well as align with and support the Total Water Cycle Management Planning processes undertaken by the relevant Councils; and
- Communicate the outcomes of the process to decision makers through development of consistent and coherent reports.

2.2 Key Principles

As a general guide, design of all water services distribution network infrastructure within SEQ needs to take into account the following core principles:

- **Regulatory framework**[4] – planners must be aware of the regulatory framework and its potential impact on options and implementation programs relating to the provision of water supply and sewerage services. The regulatory framework includes legislative drivers relevant to the water services businesses as well as quasi regulatory requirements applied by local governments within the SEQ water service area;
- **Planning and design process** – planning and design should follow an iterative process which seeks to balance infrastructure, operation and maintenance, financial, and environmental aspects to achieve the defined outcomes;
- **Option Analysis** –design should include a comprehensive and rigorous identification of all options to meet the defined outcomes. These options are to include non-asset solutions; and
- **Stakeholder involvement** - key stakeholders should be identified and involved at all stages of the process.

[4] Refer to the Department of Environment and Resource Management "Planning Guidelines for Water Supply and Sewerage" for a comprehensive summary of key elements of the regulatory framework

2.3 Key Elements of the Process

The design process needs to reflect the following key elements;

- Identification of outcomes required by all stakeholders;
- Identification of the service need and service objectives;
- Determine the scope of the planning and design to be undertaken (i.e. Strategic/Master Planning for larger development leading to; Concept Design/Feasibility; Detailed Design etc);
- Identification of the temporal framework for the design solution (long term, medium term, short term);
- Identification of options , undertaking option analysis and providing an objective demonstration of the rationale for selection of a preferred option; and
- Development of an implementation strategy.

Further detail on these key elements is provided in Chapter 3 of the States Guideline.

2.4 Principles for Network Modelling

The elements cited above outline the scope of the process to be undertaken. However, it is imperative that all network modelling retains a clear understanding of the principles which will drive that process. It is essential that all network modelling consider the following:

- The desired outcomes of modelling work should be established before commencing the modelling process (including a clear statement of the anticipated outcomes and the extent/detail of modelling required to provide sufficient clarity on how those outcomes may be achieved);
- Modelling outputs should be verified against actual system performance (e.g. verification from operational staff or calibration of the model using “real world” outcomes including but not limited to flow data from existing DMA/PMA meters, reservoir meters trunk meters and large customer meters as well as pressure data from data loggers on PRVs and reservoir level monitors). Calibration should be applied where data from the existing network is available and will be mandatory on all larger projects. However, on smaller modelling projects, anecdotal checking of modelling outcomes with operational staff may be sufficient; and
- Operational staff should be involved in the process.

2.5 Lowest Lifecycle Costing

Key outcomes of the process is to maximise the efficiency and capability of the existing network, maximise utility and service outcomes for customers, integrate with the asset augmentation / renewal/rehabilitation program of the relevant SEQ-SP and minimise the impact on the environment. To achieve these outcomes, the designer shall provide to the relevant SEQ-SP a report which includes a detailed assessment of the lifecycle cost of a range of alternative options together with a recommendation on the preferred solution. The matters to be addressed in this report will include but are not limited to:

- Summary of alternative design options which provide “fit for purpose” outcomes;
- Scope of assets and acceptable maintenance regimes for alternative options;
- Summary of the costs of each option (both initial capital investment and ongoing operational costs);

- Assessment of the impact of each alternative option on service outcomes and the environment; and
- Rationale supporting the proposed solution which best meets all requirements of this guideline.

It is recommended that the lifecycle costing process be undertaken with the involvement of the operations staff of the relevant SEQ-SP and be consistent with nationally recognised standards contained within AS 4539 and the requirements of the Queensland Competition Authority (specifically section 26 of the QCA Act and as may be prescribed in any future price oversight framework developed by the authority).

Lifecycle cost estimate parameters used in the assessment must be verified with the relevant SEQ-SP before final adoption. In the absence of guidance from the relevant SEQ-SP, the following design criteria shall apply:

- **The term** of the lifecycle analysis will not be less than fifty (50) years;
- The **discount rate** to be used in the lifecycle analysis shall be determined as follows:
    - The nominal weighted average cost of capital (WACC) as set by the Queensland Competition Authority (QCA).
    - This nominal rate may be adjusted to a REAL rate by selecting the mid point of the Reserve Bank of Australia's target for long term inflation.
- **Cost escalation** to be the ten (10) year average of the Roads and Bridge Construction Index, Queensland (ABS Catalogue 6427; index No 3101; Series ID; A2333727L)
- **Energy Cost** (at pump stations) shall be estimated using the most recent gazetted price per kilowatt hour for Tariff 22 – General Supply: "All Consumption". Load factor between peak and off peak hours shall default to 0.5 if no energy consumption figures are available.
- **Annual Maintenance** Cost of 0.5% of the capital cost of all gravity trunk sewers;
- **Annual Maintenance** Cost of 0.65% of the capital cost of all water mains and rising mains;
- Reservoir **Annual Maintenance** Cost of 0.25% of the capital cost of each Reservoir
- Pump Station **Operation and Maintenance Costs** (excluding energy costs) is to be based on the total installed power at the pump station where:
    - Annual O&M Cost = 3% of the capital value + 35 x Total Installed kW (e.g. for a $1m pump station containing two 30 kW Pumps, the annual O&M Cost = $30,000 + 35x60 = $32,100 pa (excluding energy costs))

2.6 Carbon Footprint

In addition to the lifecycle costing estimate determined above, it is important that the process encompass a broader (holistic) assessment of all of the business's activities and targeted outcomes. All designs shall include estimation of the carbon footprint of each of the proposed options in a format agreed with by the relevant SEQ-SP.

2.7 Exclusions

Small isolated communities such as North Stradbroke Island and Southern Moreton Bay Islands may operate more effectively using design criteria other than those contained below. Where this applies, the appropriate criteria will be supplied by the relevant SEQ-SP on application.

Part B – Water Supply Network Infrastructure

3 Overview

This section of the guidelines provides a summary of those design criteria which are specific to Water Supply Network Infrastructure. To ensure ease of use, key Water Network Design Criteria for each SEQ-SP are summarised in Section 4. These criteria define the specific inputs to be used while subsequent discussions provide further explanation on HOW these design criteria are to be applied when undertaking detailed network modelling and design.

In most cases, the design criteria provided below have been based on analysis of historical data as well as consideration of trends forecast in the South East Queensland Water Strategy.

4 Design Criteria – Water Supply

4.1 Key Criteria

The key criteria relevant to each water distribution/retail network are summarised in Table 4.1 – Single Supply (Drinking Water only) network, and Table 4.2 – Dual Supply Network. Designers should be aware of the key differences in the operational strategies of the relevant SEQ-SPs (refer Sections 6.0 and 8.0).

Table 4.1 - Water Network Design Criteria – Single Supply (Drinking Water Only) Network

No	Parameter	Gold Coast	Logan	Redland	Urban Utilities	Unitywater
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	230 L/EP/d			
A2	**Estimated Non-Revenue Water (NRW)**	20 L/EP/d	30 L/EP/d			
A3	**Peaking Factors** (Note: Peaking Factors are not applied to NRW)	**Residential (single det.)** / **Multi-Residential** / **Commercial /Public** / **Indus.** / **Tourist** / **Open Space**	**Low and Med Density Res**		**High Density Res**	**Commercial/Industrial**
	MDMM/AD	1.75 / 1.27 / 1.06 / 1.06 / 1.76 / 1.15	1.5		1.5	1.5
	PD/AD	2.12 / 1.45 / 1.12 / 1.12 / 2.51 / 1.37	2		2	2
	PH/PD	2.84 / 2.05 / 2.07 / 1.38 / 2.40 / 1.75	2		1.75	1.4
	PH/AD	6.03 / 2.97 / 2.32 / 1.54 / 6.03 / 2.40	4		3.5	2.8
A4	**Pressure**					
	minimum SERVICE pressure (at PH on PD with Reservoirs at MOL) with no flow through service, Urban and Rural **Normal operating conditions**	22 m in the main adjoining the Property boundary.	22 m at the property boundary			
	In areas defined by the SP, properties requiring domestic private boosters	12 m at the property boundary				
	Maximum SERVICE Pressure	Target maximum pressure 55 m Maximum pressure 80 m	55 m			
	Emergency fire operating conditions (Minimum Residual Mains Pressures)	12m min at the main at the hydrant 9m minimum for infrastructure in small isolated or high elevated areas within the existing water supply zone	12 m min in the main at the flowing hydrant 6 m elsewhere in mains that have customer connections Positive pressure throughout			
A5	**Fire Fighting (Refer Notes 1 to 3)**				**Refer Notes 4 and 5**	
	Rural, Small Communities and Tourist Affected Small Communities (Land not zoned for urban uses, and all land within an urban centre having a permanent residential population of less than 500 people and not classified as a **Constant Flow/Trickle Top Up** area)	**Rural Residential only**: 7.5L/s for 2 hours **Rural Commercial:** 15L/s for 2 hours			**Up to 2 Storeys -** **Residential**: 7.5 L/s for 2 hrs by 1 hydrant **Non-Residential**: 15 L/s for 2 hrs by up to 2 hydrants **>2 Storeys -** Requirements as per Urban Category	**Rural Residential only:** 7.5L/s for 2 hours **Rural Commercial/Industrial:** 15L/s for 2 hours
	Urban (Land zoned for urban uses, within an urban centre having a permanent residential population of more than 500 people, having regard for future land use planning and population growth, and not classified as a **Constant Flow/Trickle Top Up** area) *[Greenfield is undeveloped land where no water network infrastructure exists to enable installation of property connection/s to service the proposed development.* *Brownfield is undeveloped or redeveloping land where an existing water network infrastructure can enable the installation of property connection/s to service the proposed development.]*	**Residential:** 15 L/s for 2 hours **Commercial/Industrial:** 30 L/s for 4 hours	**Detached Res (<= 3 storeys):** 15 L/s for 2hrs w background Demand **Multi storey Res (> 3 storeys):** 30 L/s for 4 hours w background Demand **Commercial/Industrial buildings:** 30 L/s for 4 hours w background Demand **Risk Hazard Buildings** – assessed on needs basis		**Large Lot Res (>1,000 m² lots)**: 15 L/s for 2 hrs by up to 2 hydrants **Low Density Res (1-3 storeys) Tin/Timber**: 25 L/s for 2 hrs by up to 2 hydrants **Low Density Res (1-3 storeys) Brick/Tile:** Greenfield 25 L/s for 2 hrs by up to 2 hydrants Brownfield 15 L/s for 2 hrs by up to 2 hydrants **Medium Density Res (4-6 storeys):** Greenfield 45 L/s for 4 hrs by up to 4 hydrants Brownfield 30 L/s for 4 hrs by up to 3 hydrants **High Density Res (>6 storeys):** 60 L/s for 4 hrs by up to 5 hydrants **Commercial/Industrial:** Greenfield 45 L/s for 4 hrs by up to 4 hydrants Brownfield 30 L/s for 4 hrs by up to 3 hydrants	**Detached/Attached Res (<= 3 storeys):** 15 L/s for 2hrs w background Demand **Multi story Res (> 3 storeys):** 30 L/s for 4 hours w background Demand **Commercial/Industrial buildings:** 30 L/s for 4 hours w background Demand **Risk Hazard Buildings** – assessed on needs basis

No	Parameter	Gold Coast	Logan	Redland	Urban Utilities	Unitywater
A. Drinking Water – Conventional (Single Supply Zone)						
	Background Demand	Res: 2/3 PH (not less than AD) and +ve residual pressure at PH Non Res: PH for localised Commercial/industrial or 2/3 PH for water supply zone. Worst case scenario should be used based on reservoir at MOL,**based on single residential or single commercial/industrial fire within water supply zone**		Res(Detached/ Multi storey): Highest of 2/3 PH or AD Commercial/Industrial: PH demand (between 10am and 4pm) (single fire event only)	2/3 x residential peak hour demands plus 1 x non-residential peak hour demands.	Res (Detached/ Multi storey): Highest of 2/3 PH or AD Commercial/ Industrial: PH demand (between 10am and 4pm) (single fire event only)
A6	**Reservoir storage—operational capacity** (Min Operating Storage – four consecutive hours of demand)	<u>GROUND LEVEL RESERVOIR:</u> 3 x (PD – MDMM) + Emergency Storage (Emergency Storage - Greater of 4 hrs at MDMM or 0.5 ML. For less than 1000 EP, 150 kL)			<u>GROUND LEVEL RESERVOIR:</u> 3 x (PD – MDMM) + greater of 4 hrs MDMM and Firefighting Storage, subject to a minimum reservoir size of 150 kL (Firefighting Storage based on flow and duration requirements stated under item A5 for development types serviced by the reservoir)	<u>GROUND LEVEL RESERVOIR:</u> 3 x (PD – MDMM) + Emergency Storage (Emergency Storage - Greater of 4 hrs at MDMM or 0.5 ML. For less than 1000 EP, 150 kL)
		<u>ELEVATED RESERVOIR:</u> 6 x (PH – 1/12 MDMM)+150kL fire storage In supply zones where 8xPH is less than or equal to MDMM the following equation is used (2xPH)+150kL fire storage Note: PH is in kL/h, MDMM is in kL/d and reservoir storage is in kL in the above formulae.				
A7	**Reservoir Pump Servicing Requirements** **Ground level reservoir – Duty Pump**	MDMM over 20 hrs				
	Elevated reservoir – Duty Pump	Capacity (L/s) = Peak Hour (L/s)				
	Standby pump capacity	Match largest single pump unit capacity				
A8	**Pipeline Capacity Requirements**	Trunk gravity system: MDMM in 24hours; Reticulation Mains: Maintain pressure for PH and fire flow performance Pump system: MDMM in 20 hours	Transport MDMM in 20 hrs Reticulation mains; Maintain pressure for Peak Hour and fire flow performance			
A9	**Pipe Friction Losses** **Hazen Williams Friction Factors** Based on the preferred material types outlined in the SEQ Water Supply Code (as amended). Any variation from these material types needs to be subject to further investigation.	<=150, C=100 >150 -300mm, C=110				
	Maximum Allowable Headloss (PH) (m/km)	5m/km for DN<=150 3m/km for DN>=200				
	Maximum allowable velocity	2.5m/s				

Notes:

1. Determination of whether or not an area is categorised as “Rural, Small Communities and Tourist Affected Small Communities” or “Urban” for the purposes of fire fighting provision must take into account the future population and zoning, as inferred by the council planning scheme. Land zoned for urban uses are tabulated in Appendix B. For RCC: refer to Appendix F of the current published Redland Water Water Supply Master Plan and contact RCC for zoning details if required.
2. An urban centre shall be taken as the discrete cluster of land zoned for urban uses, e.g. an urban village or township. The population of an urban centre includes the permanent residential population living on land zoned for urban uses. Confirmation of the area’s fire fighting category shall be obtained from the relevant SEQ-SP prior to adopting the Rural, Small Communities and Tourist Affected Small Communities category for an area. For RCC: refer to Appendix F of the current published Redland Water Water Supply Master Plan and contact RCC for zoning details if required.
3. SEQ-SPs no longer accept Constant Flow/Trickle Top Up systems, however, minor extensions to or infill development in areas served by existing systems may be permitted at the SEQ-SP’s discretion. Whilst these systems may incorporate hydrants on some mains, they are primarily for operational purposes and have not been designed for fire flows. Any extensions permitted would likewise not be designed for fire flows.
4. Urban Utilities fire fighting requirements specify the maximum number of hydrants from which the design fire flow can be drawn. These must be the closest hydrants to the property being assessed for fire protection. In addition to these requirements, any single hydrant operating on its own must be capable of delivering a minimum of 13 L/s, with the exception of areas where the required flow is less than 13 L/s (i.e. Residential development up to 2 storeys in a Rural and Small Communities category area).
5. The development categories refer to the characteristics of an area rather than individual premises or properties. For example, commercial/industrial fire flows are generally not required to be provided for a local shop or school situated in the middle of a low density residential area. Reasonable judgement needs to be used to determine the appropriate development category to apply. If in doubt, refer to the SEQ-SP for confirmation.

Table 4.2 - Water Network Design Criteria – Dual Supply Network

No	Parameter	Gold Coast[5]					Urban Utilities		Unitywater							
B. Drinking Water System in a Dual Supply Zone																
B1	**Average Day Demand (AD)**	Residential Single Family	Case 3 Case 4	177 L/EP/d 129			AD (drinking water): 150 L/EP/d									
		Residential Multi Family	Case 3 Case 4	226 L/EP/d 161												
		Commercial/ Public	Case 3 Case 4	161 L/EP/d 161												
		Industrial	Case 3 Case 4	290 L/EP/d 290												
		Tourist	Case 3 Case 4	226 L/EP/d 161												
		Open Space	Case 3 Case 4	81 L/EP/d 81												
B2	**Non-Revenue Water (NRW)**	10% NRW included in AD					15 L/EP/d									
B3	**Peaking Factors** (Note: Peaking Factors are not applied to NRW) **MDMM (Mean Day Max Month)** **PD (Peak Day)** **AD (Average Day)** **PH (Peak Hour)**			**MDMM/AD**	**PD/AD**	**PH/AD**	**PD/AD**	**PH/PD**	**SFR & RUR**		**MFR**		**COM**		**IND**	
									PD/AD	**PH/PD**	**PD/AD**	**PH/PD**	**PD/AD**	**PH/PD**	**PD/AD**	**PH/PD**
		Residential Single Family	Case 3 Case 4	1.14 1.34	1.31 1.54	2.67 3.14	1.2 (Res) 1.6 (Non Residential)	2.6 (Res) 1.5 (Non Residential)								
		Residential Multi Family	Case 3 Case 4	1.14 1.43	1.31 1.63	2.67 3.34			2.5	4.2	2.4	4.1	1.8	2.7	1.8	2.5
		Commercial/ Public	Case 3 Case 4	1.06 1.06	1.12 1.12	2.32 2.32										
		Industrial	Case 3 Case 4	1.06 1.06	1.12 1.12	1.54 1.54										
		Tourist	Case 3 Case 4	1.59 1.99	2.26 2.83	5.43 6.79										
		Open Space	Case 3 Case 4	1.15 1.15	1.37 1.37	2.4 2.4										
B4	**Reservoir Storage**	As Per Drinking Water – Single Supply Zone														
B5	**Pressure**															
	Minimum pressure * Normal operating conditions * Properties requiring domestic private boosters	As Per Drinking Water – Single Supply Zone														
	- Maximum pressure															
	- Emergency fire operating conditions															
B6	**Fire fighting**	No fire flow to be drawn from drinking water mains in areas where non-drinking water infrastructure has been provided					No requirement for provision of fire fighting capacity in the drinking water network where non-drinking water infrastructure has been provided.		As Per Drinking Water – Single Supply Zone							
B7	**Water Pump Servicing Requirements**	As Per Drinking Water – Single Supply Zone														
B8	**Pipeline Capacity Requirements**	As Per Drinking Water – Single Supply Zone														
B9	**Pipe Friction Losses (Hazen Williams 'C' Values)**	As Per Drinking Water – Single Supply Zone														

[5] **Case 3 : Potable water plus recycled water (Class A+ Greenfield); Case 4 : Potable water plus rainwater tanks plus recycled water (Class A+ Aggressive case- Greenfield)**

No	Parameter	Gold Coast[5]					Urban Utilities		Unitywater							
B. Drinking Water System in a Dual Supply Zone																
C. Non-Drinking Water System in a Dual Supply Zone																
C1	**Average Day Demand (AD)**	Residential Single Family	Case 3 Case 4	145 L/EP/d 145			AD (non-drinking water): 80 L/EP/d									
		Residential Multi Family	Case 3 Case 4	97 L/EP/d 97												
		Commercial/ Public	Case 3 Case 4	161 L/EP/d 161												
		Industrial	Case 3 Case 4	32 L/EP/d 32												
		Tourist	Case 3 Case 4	97 L/EP/d 97												
		Open Space	Case 3 Case 4	242 L/EP/d 242												
C2	**Non-Revenue Water (NRW)**	10% NRW included in AD					15 L/EP/d									
C3	**Peaking Factor** (Note: Peaking Factors are not applied to NRW) **MDMM (Mean Day Max Month)** **PD (Peak Day)** **AD (Average Day)** **PH (Peak Hour)**			**MDMM/AD**	**PD/AD**	**PH/AD**	**PD/AD**	**PH/AD**	**SFR & RUR**		**MFR**		**COM**		**IND**	
		Residential Single Family	Case 3 Case 4	1.33 1.53	1.70 1.93	6.12 6.60	3.5 (Residential) 2.0 (Non Residential)	8.1 (Residential) 3.8 (Non Residential)	**PD/AD**	**PH/AD**	**PD/AD**	**PH/AD**	**PD/AD**	**PH/AD**	**PD/AD**	**PH/AD**
		Residential Multi Family	Case 3 Case 4	1.21 1.33	1.45 1.59	2.67 2.67			2.5	7.1	2.6	5.9	2.2	3.3	2.2	3.1
		Commercial/ Public	Case 3 Case 4	1.08 1.13	1.18 1.24	2.32 2.32										
		Industrial	Case 3 Case 4	1.08 1.13	1.18 1.24	1.54 1.54										
		Tourist	Case 3 Case 4	1.86 2.38	2.83 3.43	5.43 5.43										
		Open Space	Case 3 Case 4	1.22 1.35	1.53 1.71	2.4 2.4										
C4	**Reservoir Storage**	**Operating Volume:** 3*(PD-MDMM) **Emergency storage**: As defined by Council in commercial, industrial and high density zones.Typically • Greater of 4 hrs MDMM demand or 0.5ML • Zone <350 ET; 150 kL **Elevated Storage Capacity ;** Operating Volume + 150 kL Fire Storage Where Operating volume • Water supply zones where 8 hours x PH is less than or equal to MDMM demand, operating volume = 2 hours x PH • Water supply zones where 8 hours x MH is greater than MDMM demand, operating volume = 6 x (PH - (MDMM/12))						0.5 x PD									
C5	**Pressure**															
	Minimum pressure * Normal operating conditions *Pressure managed areas	17m 20m					As per Drinking Water – Single Supply Zone									
	- Maximum pressure	75m					As per Drinking Water – Single Supply Zone									
	- Emergency fire operating conditions	As per Drinking Water – Single Supply Zone														
	Pressure Differential between dinking and non drinking	5m directly off a reservoir and 2m in a pressure managed area					NA									
C6	**Fire fighting**	As per Drinking Water – Single Supply Zone							NA							
C7	**Water Pump Servicing Requirements**	As per Drinking Water – Single Supply Zone														
C8	**Pipeline Capacity Requirements**	As per Drinking Water – Single Supply Zone														
C9	**Pipe Friction Losses (Hazen Williams 'C' Values)**	As per Drinking Water – Single Supply Zone														

5 Demand and Flow Projections

5.1 Population projections

All water customer population loads should be specified in Equivalent Persons (EP). For residential land uses, the measure of EP will generally be equivalent to the estimated residential population. Estimation of EP loading for non residential land should reflect landuse types contained in the Planning Scheme of the relevant Council. Draft landuse demands (correct at the time of publication) are attached as Appendix A. Prior to commencement, the designer shall consult the relevant Councils to confirm the most recent landuse coding and conversion rates.

Population projections should be established for the existing case (base year) and at a maximum of five (5) year intervals over a planning horizon of at least 30 years or up to the proposed "ultimate" development.

5.2 Unit Loads

The process should include a clear and concise summary of the basis on which the current and future demand has been developed. Ideally, all unit loads should be based on actual system performance, historical records and a consideration of future demand patterns. Ideally, unit demand should be separated into "internal" and "external" components to allow the impact of demand management changes to be accurately assessed.

Current and projected water demands (per EP) for each area will be stated in terms of either:

- **Average Day Demand (AD)** – defined in litres per EP per day (L/EP/d). This information is detailed in the demand tables provided by the relevant Councils Planning Schemes and reproduced in Appendix A[6].
- **Non Revenue Water (NRW)** – unless noted otherwise, Non Revenue Water is to be added to the "Average Day" demand as part of the derivation of daily unit load; and
- **Peak Hour Demand (PH)** – defined in litres per EP per second (L/EP/s).

These are to be separately derived for different demand categories which depend on the type of land use being considered (e.g. residential, non residential etc).

For major users (defined as those customers who have a projected demand over the design horizon of greater than 100 ML/yr), demand is to be individually calculated and listed separately in the assumptions.

5.3 Non Revenue Water

Non Revenue Water has been determined by the SEQ-SPs businesses as the difference between the total customer meter readings and the total bulk water meter readings. For the purposes of design, the extent of Non Revenue Water is as stated in the Tables above.

[6] It is imperative that the design criteria align with the current Planning Schemes used by each Council. As such, prior to commencement, the designer shall consult the relevant Councils to confirm the most recent landuse coding and conversion rates.

Non Revenue Water shall have no peaking factors applied to it.

5.4 Peaking Factors and Diurnal Demand Patterns

Daily usage patterns generate fluctuations in the demand for water services throughout the day (peak hour). Further variation in demand can result from climatic conditions (peak day demand). This variation in peak flows can vary depending on the land use/demand category as well as varying across water supply zones. Such daily and peak demands should be accommodated within the modelling using the peaking factors contained within Tables 4.1 and 4.2.

5.5 Calculated Demand Rates

The following demand rates should be determined or estimated based on actual population, consumption, peaking factors and non revenue water

Average Day Demand (AD)

$$AD = (\Sigma^{\text{demand category}} AD_{\text{L/EP/day}} \times EPs) + (NRW_{\text{L/EP/day}} \times EPs)$$

Peak Day Demand (PD)

$$PD = (\Sigma^{\text{demand category}} PD/AD \times AD_{\text{L/EP/day}} \times EPs) + (NRW_{\text{L/EP/day}} \times EPs)$$

Peak Hour Demand (PH)

$$PH = (\Sigma^{\text{demand category}} PH/AD \times AD_{\text{L/EP/day}} \times EPs) + (NRW_{\text{L/EP/day}} \times EPs)$$

5.6 Hydraulic Modelling Scenarios

To ensure good design outcomes, the following scenarios should be considered:

5.6.1 Steady State Analysis

5.6.1.1 Peak Hour

Purpose: To assess minimum, peak hour condition customer pressures with respect to the nominated standard of service.

Assumptions:

- Peak Hour Demands;
- All water reservoirs at Minimum Operating Level (MOL)[9] and;
- Pumps and control valves set such that minimum boundary HGL conditions exist for the pressure zone being analysed[7].

The planner must ascertain whether such assumptions are realistic and customize if necessary.

5.6.1.2 Fire-Flow

Purpose: To assess the total available fire flow capacity of the network water mains with respect to the nominated standard of service.

[7] For example, inlet valves open and/or lift pump station on for supply to export reservoirs

Assumptions:

- As for Peak Hour scenario, except where overridden by Table 4.1[8];
- All water reservoirs at Minimum Operating Level (MOL)[9].

5.6.2 Extended Period Simulation Analysis

5.6.2.1 Peak Day (3 consecutive days)

Purpose: To assess the bulk water transportation capacity of the network to ensure that

- Reservoirs never empty;
- Reservoir Minimum Operating Level is maintained (refer Table 4.1, indicator A6) and;
- The reservoir supply system has a net delivery capacity equal to or greater than Peak Day.

This scenario is required only for specific bulk water models or for those Water Supply Zones that have either internal or export reservoirs.

Assumptions:

- Reservoir initial levels to correspond to top water level (TWL) (check appropriateness of individual service area operations);
- Network model to commence at 12:00 am; and;
- Ultimate demand diurnal shall be sourced from the specific SEQ-SP.

The modelling must consider the range of operational modes possible, as some Water Supply Zones have multiple configurations, often depending as to which water source(s) are in operation, and the mode of their operation.

5.7 Surge and Water Hammer

Further hydraulic analysis may be required on trunk pipes, pumped system or near actuated valves where water hammer is likely to occur (e.g. due to the effects of pump station start/stop; power failure or valve closure or upstream of major inlet valves on reservoirs). In such instances, the designer may need to demonstrate that the material and pressure class of selected pipe thrust restraints and proposed mitigation structures are adequate to sustain the surge pressures developed.

The designer shall confirm with the relevant SEQ-SP whether water hammer modelling needs to be undertaken. Where water hammer analysis is undertaken, consideration is to be given to the following:

Contributing factors:

- Operating flow; and
- System head

[8] E.g. background demand assumptions.
[9] MOL defined as the greater of head or storage requirements as defined in Table 4.1

Modes of failure:

- Sudden Pump failure or power failure and/or;
- Timing of valve closure; and/or
- Network pressure

Possible means of mitigation:

- Air release valves; and/or
- Slow closing valves; and/or
- Enclosed surge tank; and/or
- Pressure reduction valves; and/or
- Sacrificial pressure release flanges; and/or
- Appropriate material selection

In undertaking the water hammer analysis, the designer is to assess the impact of water hammer on the adjoining system pipe work when pumping into a system and not a reservoir. The designer must also be able to demonstrate that the mitigation device proposed can operate effectively under power failure conditions

6 Water Supply Network Infrastructure Considerations

6.1 Reservoir Sizing

The information below is intended as a guide on the scope of hydraulic analysis that may be undertaken for a range of reservoir types. Detailed hydraulic and cost benefit analysis undertaken in accordance with the provisions of this guideline may show that other combinations of storage and flow are more beneficial. This information only applies to Reservoirs owned (or to be built and owned) by the SEQ-SPs. It does not relate to reservoirs owner by the State's Bulk Water Supply business.

The minimum level of storage provided by a reservoir should be as specified in Table 4.1. If no specification is provided, the reservoir sizing should be consistent with the requirements of the WSAA Water Supply Code developed for the SEQ distribution network

6.1.1 Ground Level Reservoirs:

The minimum operating storage of a reservoir shall be equivalent to the four subsequent hours of demand in the system without inflow to the reservoir. The minimum operating storage varies throughout the day as demand in the system changes. This variation is also true for seasonal demand i.e., during winter and summer.

6.1.2 Elevated Reservoirs:

Sizing should be undertaken to provide the minimum volumes stated in Table 4.1. However, as the capacities of the delivery system and storage requirements for elevated reservoirs are interrelated, hydraulic modelling and economic analysis should be used to determine the most suitable and least cost combination. This will include consideration of:

- the capacity and reliability of the delivery network;
- the Peak Hour (PH) demand of the system; and
- The frequency and duration of power failures.

6.1.3 Fire Fighting:

Designers must ensure that the section of network they are designing retains sufficient fire fighting provision. As such, all designs must meet the requirements of the relevant SEQ-SP's "Fire Provision Policy" as well as the various provisions of the SEQ Water Supply Code (as amended).

Where non-drinking water is designated for providing fire protection, the fire provision shall be the equivalent of a potable system.

6.1.3.1 Private Building Fire Systems

The water services businesses do not evaluate the performance of private fire systems, nor aim to ensure their compliance with the relevant building codes and standards. However, where projects have or may have a significant change in the network's available fire flows, the designer should consider the potential impacts on private building fire systems, and recommended outcomes be complemented by customer consultation and communication.

6.1.4 Staging

As an area develops there will be corresponding increases in the demand for water and, in most areas, the construction of more storage will eventually be required. A cost benefit analysis may show that savings can be made by constructing the required storage in stages rather than as a single storage. The timing of each stage will depend upon a number of factors. When determining the

staging of augmentation to the available storage in a particular zone the following are to be taken into account:

- total storage required;
- storage elsewhere in the network;
- sensitivity of storage volumes to demand projections;
- impacts on water quality;
- cost benefit of constructing in stages;
- reliability of supply system;
- restrictions or bottlenecks in either the supply or reticulation system;
- available land at a proposed reservoir site; and,
- other supply options (usually only for elevated zones).

The construction of the next stage of a reservoir complex may be delayed by increasing the flow being delivered by the supply system. A detailed investigation and cost benefit analysis should be carried out into augmenting the supply system rather than constructing further storage. The initial capital costs and ongoing operations costs should be calculated for all options. Future augmentation and operations costs should be capitalised over the life of the asset. A comparison of the initial capital costs, ongoing operation costs and the total capitalised cost will show the least cost option.

Operational restrictions may also lead to increased storage requirements. As the required minimum operating storage rises, the available buffer storage decreases. The construction of a new reservoir or augmentation of the supply system should be triggered once the required minimum operating storage of the reservoir is around 45% of the total available storage.

Another operational restriction that should be addressed, when considering augmentations of the storage system, are isolated high points in a zone limiting the draw down of the reservoir. Here, augmenting the reticulation system to increase the useable storage may have a greater cost benefit than constructing a further reservoir.

6.1.5 Constant Flow / Trickle Top Up System

Constant flow/trickle top up systems consist of a service connection to an on-site storage tank, which is then supplied to the building via a pump and pressure system. **The water service businesses no longer accept constant flow/trickle top up systems as an acceptable solution.**

Existing trickle top up areas are not designed to provide fire flow, even in situations where the property connections branch off from water mains that have hydrants installed.

6.2 Pump Stations Sizing

6.2.1 General

Outlined below are the proposed guidelines for sizing pumping stations and boosters. The information below is intended to be a guide only. Detailed hydraulic modelling and cost benefit analysis may show that other combinations of flow and storage are more beneficial.

Typically, a pumping station is responsible for delivering flow into a zone which has a storage reservoir. The pumping station is required to recharge the water level in a reservoir and satisfy system demands during peak hour periods.

Booster stations are responsible for maintaining the desired pressures within a service area during periods of high demand in the system. The use of boosters is generally not a preferred option as they have ongoing operational and maintenance costs. However, over the life of the asset, a booster station can be a lower total cost option when compared to the cost of constructing an elevated storage reservoir or augmentation works involved with rezoning an area.

Refer to Clause 2.8 and Clause 6.2 of WSA03 Water Supply V3.1 for further details.

6.2.2 Pumping Stations

Pumping stations supplying flow to a ground level reservoir shall be capable of delivering water as outlined in Table 4.1. The volume of water to be pumped into an area may be reduced if there is sufficient excess storage capacity available in the service area to meet demands.

Pumping stations supplying flow to an elevated storage reservoir shall also be capable of delivering water supply as outlined in Table 4.1. A greater flow rate than that specified in Table 4.1 may be required for some smaller elevated reservoirs where there is insufficient storage compared to peak demands in the system being serviced. The flow rate required is dependent upon the volume of storage and the peak hour demand in the system. Hydraulic analyses should be carried out to determine the required flow given the available or proposed storage.

6.2.3 Boosters

In elevated areas during high demand periods in the system, booster stations may be required to maintain pressures above the minimum defined outcomes.

For booster zones less than 500 properties, network plans should consider that with a low number of serviced properties, the daily diurnal pattern changes significantly, typically with much higher peak hour peaking factors. In assessing the capacity of existing booster pumps, and recommendations for booster pump augmentations, network plans should make allowance for this. Typically, decisions on this should be supported by flow data from a reliable flow meter.

Surge control devices shall be included in the system design where required by the relevant SEQ-SP.

6.2.4 Standby Pumps

All pump stations including boosters shall have standby pump(s) of equivalent capacity to duty pump(s). Private boosters shall be considered where serviced properties are 50 or less.

6.2.5 Power System and Supply

All pumps stations/boosters shall be assessed for power supply reliability and the consequence of power failures, and consideration given to the provision for fixed or portable generators, or diesel pumps.

6.3 Pipeline Sizing Criteria

Pipe selection shall be undertaken in accordance with the requirements of Table 4.1 and the SEQ WS&S D&C Water Supply Code. For design and hydraulic modelling purposes, the material, nominal diameter and associated internal diameter must be stipulated.

6.4 Land Requirements

It is important to ensure sufficient land is set aside for water supply infrastructure at the earliest opportunity and embedded into the local planning scheme. Land requirements shall consider site

areas required for reservoirs, pump stations and associated pipelines, including consideration of staging and construction area requirements. Failure to incorporate sufficient land requirements in the planning scheme can result in significantly more expensive and difficult to operate infrastructure to achieve the same performance outcomes.

7 Drinking Water Quality

7.1 General

All modelling and design needs are to be undertaken in a manner which will deliver the objectives of the relevant SEQ-SP's statutory "Drinking Water Quality Management Plan" as well as Water Quality (clause 2.6 of the SEQ Water Supply Code (as amended)). While not limiting the scope of issues to be considered in assessing water quality, modelling and design should include (at a minimum) consideration of the following:

- Minimising storage time at reservoirs (i.e. elimination of long detention), incorporating provision to ensure stored water is well mixed. Preference is given to in-line reservoirs which have a separate inlet/outlet (off-line reservoirs as well as common inlet/outlet reservoir arrangements should be avoided)
- Minimising detention[10] within water mains and adequate provision of scour appurtenances; and
- Minimising dead ends in the network;

7.2 Drinking Water Quality Modelling

All extended hydraulic modelling (i.e. any modelling that extends beyond the limits of a single development), shall include consideration of the drinking water quality parameters within the network. The scope of the drinking water quality assessment will be defined by the relevant SEQ-SP and reflect their Drinking Water Quality Management Plan. This may include but is not limited to, consideration of:

- General discussion on how the proposed infrastructure (as modelled) may affect the businesses Drinking Water Quality objectives:
- Discussion on disinfection within the nominated infrastructure network;
- Any hazards and hazardous events that may affect drinking water quality;
- A broad risk assessment of the process for managing these risks
- A brief summary of the day-to-day operational requirements for managing the system (including proposed monitoring regime)

Overall the assessment must contain sufficient detail and complexity to support the relevant SEQ-SP's Drinking Water Quality Management Plan.

[10] Tables 4.1 and 4.2 provide preferred maximums or water storage in reservoirs and in the network.

8 Non-drinking Water

8.1 General

All SEQ-SPs except Redland and Logan City Councils allow for the provision of non-drinking water networks which may supplement the potable water network. Recycled water networks will be approved by the relevant SEQ-SP on a case by case basis.

Application of non-drinking water for designated areas within the service area varies across the region as follows:

- Urban Utilities does not allow non-drinking water to be used within the building envelope; and
- Unitywater and Gold Coast City Council will allow (Class A+) non-drinking water for specific internal use in all landuse types (refer to the respective customer service standards or NetServ plans).

Development of dual supply networks needs to be designed to meet the requirements of the relevant SEQ-SP's Recycled Water Management Plan

8.2 Temporary Cross Links:

No temporary cross-connections shall be installed downstream of the Water Service Providers headwork storages

Part C - Sewerage Network Infrastructure

9 Overview

This section of the guidelines provides a summary of those design criteria which are specific to Sewerage Network Infrastructure. To ensure ease of use, key design criteria for each SEQ-SP are contained in Section 10. These criteria define the specific inputs to be used while sections 11 to 13 provides further explanation on HOW the above parameters are to be applied when undertaking detailed network modelling and design.

In most cases, the criteria provided below have been based on analysis of historical data as well as consideration of trends forecast in the South East Queensland Water Strategy.

10 Design Criteria – Sewerage

10.1 Key Criteria

The key criteria relevant to modelling and design of the sewerage network are summarised in Table 10 below

Table 10 - Sewerage Network Design Criteria

<table>
<tr><th>No</th><th>Parameter</th><th colspan="4"></th></tr>
<tr><th></th><th></th><th>Gold Coast</th><th>Logan</th><th>Redland</th><th>Unitywater</th><th>Urban Utilities</th></tr>
<tr><td>D1</td><td>Smart Sewer Option</td><td colspan="3">RIGSS</td><td>NuSewer or RIGSS</td><td>NuSewer</td></tr>
<tr><td>D2</td><td>Average Dry Weather Flow (ADWF)</td><td colspan="5">For RIGSS: 200 L/EP/d (including for Vacuum and Pressure Sewer systems in RIGSS areas)
For NuSewer: 180 L/EP/d (including for Vacuum and Pressure Sewer systems in NuSewer areas)
For “baseline” calculations for existing Conventional Sewer 210L/EP/d</td></tr>
<tr><td>D3</td><td>Peak Dry Weather Flow (PDWF)</td><td colspan="4">PDWF = C2 X ADWF where C2 = 4.7 X (EP) $^{-0.105}$</td><td>PDWF = d x SF + GWI
Where:
SF = Sanitary Flow of 150L/EP/d
GWI = Groundwater Infiltration of 30L/EP/d for NuSewer, and 60L/EP/d for conventional sewer
<table><tr><th>EP</th><th>30</th><th>300</th><th>600</th><th>1.2k</th><th>3k</th><th>12k</th><th>20k</th><th>50k</th><th>100k</th><th>500k</th></tr><tr><td>d</td><td>7.8</td><td>4.2</td><td>3.7</td><td>3.2</td><td>2.7</td><td>2.2</td><td>2.0</td><td>1.9</td><td>1.8</td><td>1.7</td></tr></table></td></tr>
<tr><td>D4</td><td>Peak Wet Weather Flow (PWWF)</td><td colspan="4">For RIGSS PWWF = 5 x ADWF

NuSewer and Coomera Pimpama in Gold Coast Area[11]: PWWF=4 x ADWF</td><td>PWWF = PDWF + Rainfall Dependent Inflow (RDF)
RDF = 360L/EP/d</td></tr>
<tr><td rowspan="11">D5</td><td>Pump Station Servicing Requirements
Operating storage (m3)</td><td colspan="4">Ops 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</td><td>(0.9 x Single pump capacity L/s)/ N
N = 12 starts per hr for motors less than 50kW.
N = 5 starts per hr for motors greater than 50kW.</td></tr>
<tr><td>Minimum Wet Well diameter</td><td colspan="5">As shown in the Sewer Pump Station Code (As amended)</td></tr>
<tr><td>Emergency storage (new)
Required storage based on “in catchment” flows (i.e. upstream pump stations turned off)</td><td colspan="2" rowspan="2">4hrs at ADWF</td><td>6hrs at ADWF</td><td>3 hrs Ultimate PDWF (New PStn)</td></tr>
<tr><td>Emergency storage (existing)</td><td>Minimum 4 hours (up to 6hours)</td><td>3 hrs Ultimate ADWF (existing)</td></tr>
<tr><td>Pump Operation Mode[12]</td><td colspan="3">Duty/assist</td><td>Duty/Standby</td></tr>
<tr><td>Single pump capacity</td><td colspan="3">Min pump capacity for PStns(duty & assist) = C1 x ADWF
Where C1 = 15 x (EP) $^{-0.1587}$</td><td rowspan="2">For SPS with 3 pumps, 2 pumps delivers PWWF (third pump has same capacity as the larger of the other 2)
For SPS with 2 pumps, EACH pump delivers PWWF</td></tr>
<tr><td></td><td>Value of C1 to be within the range 3.5 - 5</td><td>Value of C1 to be minimum of 3.5</td></tr>
<tr><td>Total pump station capacity</td><td>PWWF</td><td>PWWF (i.e. 5 x ADWF min or C1 x ADWF; Whichever is the greater) Overflows should not occur at flow < 5 x ADWF or C1 x ADWF (whichever is the larger).</td><td>PWWF</td></tr>
<tr><td>Size of Pump Station Lot (and buffer)</td><td colspan="5">Refer Clause 5.2.4 of Sewer Pump Station Code (As amended)</td></tr>
<tr><td>D6</td><td>Vacuum Sewer / Pressure Sewer Flow</td><td colspan="5">Discharge for system = 4 x ADWF</td></tr>
<tr><td>D7</td><td>Rising Main Requirements</td><td colspan="5" rowspan="2"></td></tr>
<tr><td>Preferred Velocity</td></tr>
<tr><td></td><td>Minimum velocity</td><td colspan="5">1.0 – 1.5 m/s
0.75m/s</td></tr>
<tr><td></td><td>Maximum velocity</td><td colspan="5">3m/s</td></tr>
<tr><td></td><td>Roughness</td><td colspan="5">As per Clause 10.3.3 of WSA 04 Sewage Pumping Station Code</td></tr>
<tr><td></td><td>Odour Management Requirements</td><td colspan="5">Odour management requirements (including detention times) to be determined as part of the odour impact study for the site (refer Sewerage Pump Station Code (as amended) Clause 2.5)</td></tr>
</table>

[11] Based on licence requirements

[12] For “Duty/standby” arrangement, in a 2 pump sewerage pump station, EACH pump delivers PWWF and only 1 pump runs at a time. Under a “Duty/Assist” operating philosophy each pump delivers C1 x ADWF and 2 pumps together deliver PWWF

<table>
<tr><th>No</th><th>Parameter</th><th colspan="5"></th></tr>
<tr><th></th><th></th><th>Gold Coast</th><th>Logan</th><th>Redland</th><th>Unitywater</th><th>Urban Utilities</th></tr>
<tr><td>D8</td><td>Gravity Sewer Requirements (Conventional)
- Roughness Equation
- Pipe friction coefficient</td><td colspan="5">Manning’s
All Smart Sewers (Nu Sewer and RIGSS) - n = 0.0128</td></tr>
<tr><td></td><td>- Minimum pipe grades
(Trunk sewers are subject to minimum velocity requirements contained further within this table)</td><td colspan="5">Minimum Sewer Grades
<table>
<tr><th>RIGSS (PVC) (mm)</th><th>NuSewer (PE) (mm)</th><th>Nominal Bore (mm)</th><th>Slope</th></tr>
<tr><td>100</td><td>110</td><td>100</td><td>House Connection Branch, one allotment only at 1:60</td></tr>
<tr><td>150</td><td>160</td><td>150</td><td>House connection Branch and/or sewers for first 10 allotments: 1:100
Sewer after first 10 allotments 1:180 (see note 1)</td></tr>
<tr><td>225</td><td>250</td><td>225</td><td>1:300</td></tr>
<tr><td>300</td><td>315</td><td>300</td><td>1:400</td></tr>
<tr><td colspan="4">Note 1 – where approved by the SEQ-SP, DN 150 main line sewers may be laid at 1:200 in Canal Developments</td></tr>
</table>
Note: Pipe size selection shall use the minimum size pipe to convey the design PWWF. Pipe size shall not be increased to achieve minimum grade requirements.</td></tr>
<tr><td></td><td>Maximum depth of flow</td><td colspan="5">75% d (at PWWF)</td></tr>
<tr><td></td><td>Maximum velocity</td><td colspan="5">3.0m/s (refer Cl 5.5.9.1 of the South East Queensland edition of the WSAA 2014 Sewerage Code)</td></tr>
<tr><td></td><td>Minimum velocity for trunk sewers</td><td colspan="5">0.7 m/s at PDWF</td></tr>
<tr><td>D9</td><td>Average Dry Weather Flow (ADWF) for Treatment Plants</td><td colspan="5">As per network flows</td></tr>
</table>

11 Flow Projections

11.1 General

All sewerage customer loads should be specified in Equivalent Persons (EP). Estimation of EP loading for both residential and non-residential land uses should reflect landuse types contained in the Planning Schemes of the relevant Council. Draft lists of landuse Demand (correct at the time of publication) are attached as Appendix A. Prior to commencement, the designer shall consult the relevant Councils to confirm the most recent landuse coding and conversion rates.

Population projections should be established for the existing case (base year) and at a maximum of five (5) year intervals over a design horizon of at least 30 years or up to the proposed "ultimate" development

11.2 Unit Loads

All modelling and design should include a clear and concise summary of the basis on which the current and future demand has been developed. Ideally, all unit loads should be based on actual system performance, historical records and a consideration of future loading projections. Ideally, unit demand should take into account the potential for changes in internal water demand resulting from demand management initiatives and the impact of inflow/infiltration management programs.

The following loading rates should be determined or estimated based on actual population/EP and, peaking factors

Average Dry Weather Flow (ADWF)

$$ADWF = (\text{demand category } ADWF_{L/EP/day} \times EPs)$$

ADWF is to be separately derived for different demand categories which depend on the type of land use being considered (e.g. residential, non residential etc). Unless noted otherwise, the development areas to be applied in estimating EP loading are based on actual areas excluding roads, etc

Where existing or future developments will produce EP's greater than those determined from the above densities, site specific flows shall be used in the analysis. This particularly relates to industrial and commercial type developments. Site specific flow estimates shall utilise sewage flow and / or water consumption data where available. Where this information is not available or in the case of future development where the flow has not been quantified, the relevant SEQ-SP shall specify the rates to be applied.

Trade waste loading should be included in the modelling of the sewerage network. For major trade waste users (defined as those customers who have a projected loading over the design horizon of greater than 5,000kl/annum), demand is to be individually calculated and listed separately in the assumptions.

Peak loads (PWWF and PDWF) should be determined with reference to ADWF using the parameters outlined in Table 10. In the event that there is a discrepancy, PWWF should be defined as at least 5 x ADWF

12 Sewer Network Modelling

12.1 Scope of Hydraulic Modelling

As a minimum, the scope of the hydraulic modelling should include all (current and future) infrastructure of the following types;

- All 225 mm dia. sewers and greater including associated maintenance holes that are required to service all areas to be sewered within the nominated wastewater service area;
- All pump stations and rising mains that are required to service all areas to be serviced within the nominated wastewater service area. This may include receiving reticulation; and
- Flows from private pump stations, rising mains and sewers shall be included from where they discharge into the Sewerage system.

12.2 Modelling Scenarios

12.2.1 General

The scope of modelling scenarios and their associated performance criteria is summarised in the States Guidelines as follows:

- **Dry Weather Flow:** System meets explicit operational criteria, e.g. minimising detention periods (odour management), or overflow events (equipment or power supply failure)
- **Wet Weather Flow:** Number and location of overflows do not exceed relevant SEQ-SP's customer service standards and EPA requirements

The scenarios should include assessment of the impacts of various strategies (e.g. new works, renewals, operational modifications, etc) to meet service standards and operational objectives (e.g. energy management or I/I reduction).

12.2.2 Static vs Dynamic Modelling:

It is anticipated that, in general (specifically on smaller developments) static modelling will be sufficient. In this instance, the criteria identified in Table 10 will apply. In some instances, dynamic modelling may be required. In this case, issues relevant to dynamic modelling (e.g. modelling scenarios, number and location of overflows etc) will comply with the requirements of sections 11, 12 and 13.

The requirements for dynamic modelling will be at the discretion of the relevant SEQ-SP. It is anticipated that dynamic modelling will be required for larger developments as well as for environmentally sensitive areas. The designer is to confirm with the relevant SEQ-SP on the extent of modelling to be undertaken.

13 Sewer Network Considerations

13.1 Gravity Sewers

Pipe selection shall be undertaken in accordance with the design criteria contained in Table 10 and the SEQ WS&S D&C Sewerage Code (as amended). For design and hydraulic modelling purposes, the material, nominal diameter and associated internal diameter must be stipulated.

13.2 Rising Mains

Rising mains are to be designed in accordance with the criteria specified in Table 10.

The criterion for pump velocities should be assessed in parallel with the headloss gradient (i.e., higher velocity in smaller mains results in greater head loss per 1000m). Rising mains should be as short as possible, with the smallest economical diameter adopted with a view to minimizing sewage retention time. Consideration should be given to staging of rising mains to meet existing and ultimate flows where sewage retention times may be excessive in the initial period.

Discharge into reticulation sewers may only be considered if:

- It can be shown that the maximum expected flow (pumped slug flow + gravity flow) through the line under peak wet weather conditions will not exceed two-thirds depth of the sewer; or
- There are no downstream connections to the receiving sewer within 300 m of the rising main discharge point.

No rising main discharges shall be permitted into a reticulation sewer that is less than DN225 mm in diameter unless approved by relevant SEQ-SP.

13.3 Pumping Stations

13.3.1 General:

Pump Stations within Urban Utilities will operate on a “duty standby” basis. Gold Coast City Council, Logan City Council, Redland City Council and Unitywater use a “duty/assist” mode of operation.

Under “duty/standby” mode of operation, each pump within a 2 pump station delivers PWWF and only 1 pump operates at a time. Under a “duty/assist” mode of operation, each pump delivers C1 x ADWF and 2 pumps (running in parallel) deliver PWWF,

Under either operating mode, in the case of a three pump sewer pump station, two pumps operate as above and the third pump is on standby

Accepted pumps are to be used wherever possible. The list of “Accepted Products and Materials” has been developed as part of the SEQ WS&S D&C Code and is available from each SEQ-SP on request. Special pumps may be required for pumps that fall outside this range. If non-standard pumps are required then an additional complete replacement pump may need to be provided. Specific written directions will be given in these circumstances.

Pump station wet wells are to be designed to meet the criteria stated in Table 10 for operational storage, pump starts and emergency dry weather overflow storage. Pump stations (civil works – wet / dry well) shall be designed to deliver the ultimate design PWWF (as defined in Table 10 above) and address septicity of wastewater. Pumps shall be sized to meet the maximum projected flow that the pumps will require to deliver during their lifetime (i.e. 15 to 20 years).

13.3.2 Pump Stations on Common Rising Mains:

Discharge into a common rising main is not encouraged by the SEQ-SPs. In the instance where a designer can demonstrate that discharge into a common rising main is the most cost effective solution, the pumps should be designed to operate as follows:

- When all other pumps on the rising main are continuously operating in duty/assist mode; and
- When a single pump from the pump station is operating.

13.4 Vacuum Sewer Systems and Vacuum Pump Stations

The design flows of vacuum systems shall be calculated using the same design criteria as a standard submersible pump station. The populations to be allowed for in the design of the system shall comply with the requirements for the design of gravity sewers.

The development of new vacuum sewer systems are not recommended by the SEQ-SPs. Only very limited extensions to existing systems will be considered

13.5 Pressure Sewerage Systems

The design flows of Pressure Sewerage Systems shall be calculated using the same design criteria as a standard submersible pump station. The populations to be allowed for in the design of the system shall comply with the requirements for the design of gravity sewers.

The development of Pressure Sewerage Systems (PSS) are not recommended by the SEQ-SPs. Only very limited extensions to existing systems will be considered in accordance with the SEQ-SP's policy for PSS and is subject to approval by the SEQ-SP.

13.6 Septicity and Odour Control

Where high retention times are likely to occur, some form of odour / sulphide control will be required. As a guide, average retention times in excess of two hours may lead to hydrogen sulphide generation. The 90th percentile gaseous hydrogen sulphide concentration in the sewer headspace shall not exceed 10ppm anywhere in the system. If modelling predicts concentrations greater than 10ppm, then either pump station chemical dosing or headspace gas extraction/treatment will be required. Refer to the WSAA Sewerage Code and the WSAA Sewage Pumping Station Code (as amended) for further guidance on odour management studies.

Appendix A – Demand (by Landuse) Tables

The following tables of demand (by landuse) have been developed to align with the specific landuse types used within the Planning Schemes of each Council within the SEQ Water Service area. It is imperative that the design criteria align with the Planning Schemes used by each Council. Over time (as Council Planning Schemes consolidate on a more succinct range of landuse types) the tables below may be subject to change. Hence, the designer shall consult the relevant Councils prior to confirm the most recent landuse coding and conversion rates.

Noting that supporting documentation can use either EP or ET, the following table provides a general conversion between EP and ET for each area. However, this conversion depends on population and planning scheme densities; hence the factors provided below are regarded as "information only" and are not definitive.

EP/ET Conversion Factors for single residential family households

Source	EP/ET Conversion Rate
City of Gold Coast	
All areas	As per Appendix A1
Unitywater	
All areas	2.7
Logan City Council	
All areas	2.7
Redland City Council	
All areas	2.7

Appendix A1 – City of Gold Coast

Refer to the City of Gold Coast's Water and Sewage Land Use Category Demand Table as published on the website: https://www.goldcoast.qld.gov.au/water-and-sewage-land-use-category-demand-table-8502.html.

Appendix A2 – Logan City Council

Refer to the Logan Planning Scheme 2015 V6.0, Section 4.2.2 (Development) available online at https://logan.isoplan.com.au/eplan/.

Appendix A3 – Redland City Council

Refer to Redland City Council's current published Redland City Plan (https://www.redland.qld.gov.au/info/20292/redland_city_plan) and contact Redland City Council for development density details if required.

Appendix A4 – Urban Utilities

Table A4.1 – Brisbane City Planning Scheme Development Density (Urban Utilities)

Planning Scheme Zone	Planning Scheme Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
Low density residential zone	All	42.7	0.0	42.7	42.7	0.0	42.7
Low-medium density residential zone	2 storey mix zone precinct	101.3	0.0	101.3	101.3	0.0	101.3
	2 or 3 storey mix zone precinct	105.5	0.0	105.5	105.5	0.0	105.5
	Up to 3 storeys zone precinct	157.2	0.0	157.2	157.2	0.0	157.2
Medium density residential zone	All	315.0	0.0	315.0	315.0	0.0	315.0
High density residential zone	Up to 8 storeys zone precinct	535.5	0.0	535.5	535.5	0.0	535.5
	Up to 15 storeys zone precinct	714.0	0.0	714.0	714.0	0.0	714.0
Character residential zone	Character zone precinct	54.0	0.0	54.0	54.0	0.0	54.0
	Infill housing zone precinct	55.8	0.0	55.8	55.8	0.0	55.8
Emerging community zone	All	46.8	0.0	46.8	46.8	0.0	46.8
Township zone	All	43.5	0.0	43.5	43.5	0.0	43.5
Rural zone	All	0.0	0.0	0.0	0.0	0.0	0.0
Rural residential zone	All	8.2	0.0	8.2	0.0	0.0	0.0
Tourist accommodation zone	All	0.0	4.1	4.1	0.0	6.0	6.0
Neighbourhood centre zone	In the Neighbourhood centre zone where not otherwise specified in this table	11.0	22.1	33.1	11.0	32.2	43.2
	Acacia Ridge—Archerfield neighbourhood plan/NPP-005: Hellawell Road residential	0.0	14.4	14.4	0.0	21.0	21.0
	Acacia Ridge—Archerfield neighbourhood plan/NPP-009: Coopers Plains centre/office and industry	0.0	14.4	14.4	0.0	21.0	21.0
	Ashgrove—Grange district neighbourhood plan/NPP-003: The Grange terminus	0.0	14.4	14.4	0.0	21.0	21.0
	Ashgrove—Grange district neighbourhood plan/NPP-004: Wilston village	0.0	14.4	14.4	0.0	21.0	21.0
	Bowen Hills neighbourhood plan/NPP-001: Residential village	0.0	51.5	51.5	0.0	75.0	75.0
	Bracken Ridge and district neighbourhood plan/NPP-009: Gawain Road centre	0.0	14.4	14.4	0.0	21.0	21.0
	Bulimba district neighbourhood plan/NPP-003: Hawthorne centre	52.5	18.5	71.0	52.5	27.0	79.5
	Capalaba west neighbourhood plan	0.0	0.8	0.8	0.0	1.2	1.2
	Holland Park—Tarragindi district neighbourhood plan/NPP-002: Greenslopes busway station	0.0	14.4	14.4	0.0	21.0	21.0
	Holland Park—Tarragindi district neighbourhood plan/NPP-004: Greenslopes central neighbourhood centre	0.0	14.4	14.4	0.0	21.0	21.0
	Holland Park—Tarragindi district neighbourhood plan/NPP-006: Kuring-gai Avenue neighbourhood centre	0.0	14.4	14.4	0.0	21.0	21.0
	Ithaca district neighbourhood plan/NPP-007: Rosalie village	0.0	14.4	14.4	0.0	21.0	21.0
	Latrobe and Given Terraces neighbourhood plan/NPP-001: Centres	70.0	24.7	94.7	70.0	36.0	106.0
	Moggill—Bellbowrie district neighbourhood plan/NPP-004: Multi-purpose centres	0.0	14.4	14.4	0.0	21.0	21.0
	New Farm and Teneriffe Hill neighbourhood plan/NPP-004c: Merthyr Road and Moray Street	0.0	33.0	33.0	0.0	48.0	48.0
	New Farm and Teneriffe Hill neighbourhood plan/NPP-004d: James and Arthur streets	0.0	33.0	33.0	0.0	48.0	48.0
	New Farm and Teneriffe Hill neighbourhood plan/NPP-004e: Merthyr Road and James Street	0.0	33.0	33.0	0.0	48.0	48.0
	Western gateway neighbourhood plan/NPP-002: Wacol institutional	0.0	14.4	14.4	0.0	21.0	21.0
	Western gateway neighbourhood plan/NPP-003: Wacol industrial	0.0	14.4	14.4	0.0	21.0	21.0
	Western gateway neighbourhood plan/NPP-004: Inala	0.0	14.4	14.4	0.0	21.0	21.0
	Western gateway neighbourhood plan/NPP-005: Carole Park/Ellen Grove	0.0	14.4	14.4	0.0	21.0	21.0
District centre zone—District zone precinct	In the District zone precinct of the District centre zone where not otherwise specified in this table	21.9	46.3	68.2	21.9	67.5	89.4
	Acacia Ridge—Archerfield neighbourhood plan/NPP-007a: Beaudesert Road centre south - Elizabeth Street	87.5	24.7	112.2	87.5	36.0	123.5
	Acacia Ridge—Archerfield neighbourhood plan/NPP-007b: Beaudesert Road centre north - O'Connel Street	0.0	30.9	30.9	0.0	45.0	45.0
	Acacia Ridge—Archerfield neighbourhood plan/NPP-008b: District centre	0.0	41.2	41.2	0.0	60.0	60.0
	Albion Neighbourhood plan/NPP-005: Raceway	0.0	137.3	137.3	0.0	200.0	200.0
	Ashgrove—Grange district neighbourhood plan/NPP-001: Newmarket shopping area	0.0	20.6	20.6	0.0	30.0	30.0

Planning Scheme Zone	Planning Scheme Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
	Ashgrove—Grange district neighbourhood plan/NPP-002: Ashgrove Village	0.0	20.6	20.6	0.0	30.0	30.0
	Aspley district neighbourhood plan/NPP-001: Aspley centre	0.0	30.9	30.9	0.0	45.0	45.0
	Aspley district neighbourhood plan/NPP-006: Robinson Road centre	0.0	30.9	30.9	0.0	45.0	45.0
	Banyo—Nudgee neighbourhood plan/NPP-004: Banyo centre	0.0	30.9	30.9	0.0	45.0	45.0
	Bowen Hills neighbourhood plan/NPP-005: Breakfast Creek wharf	0.0	30.9	30.9	0.0	45.0	45.0
	Bracken Ridge and district neighbourhood plan/NPP-003: Taigum residential	0.0	30.9	30.9	0.0	45.0	45.0
	Bracken Ridge and district neighbourhood plan/NPP-007: Bald Hills village centre	0.0	30.9	30.9	0.0	45.0	45.0
	Bulimba district neighbourhood plan/NPP-002a: Oxford Street	72.2	34.5	106.7	72.2	50.3	122.4
	Bulimba district neighbourhood plan/NPP-002b: Oxford Street	0.0	30.9	30.9	0.0	45.0	45.0
	Darra—Oxley district neighbourhood plan/NPP-001a: Darra suburban centre	168.0	39.5	207.5	168.0	57.6	225.6
	Darra—Oxley district neighbourhood plan/NPP-002a: Oxley suburban centre	168.0	39.5	207.5	168.0	57.6	225.6
	Eastern corridor neighbourhood plan/NPP-007a: Annerley corridor	288.8	36.2	325.0	288.8	52.8	341.6
	Everton Park neighbourhood plan/NPP-001a: Everton Park centre	122.5	9.9	132.4	122.5	14.4	136.9
	Everton Park neighbourhood plan/NPP-001: Everton Park centre	0.0	30.9	30.9	0.0	45.0	45.0
	Forest Lake neighbourhood plan/NPP-002: District business centre	0.0	20.6	20.6	0.0	30.0	30.0
	Holland Park—Tarragindi district neighbourhood plan/NPP-003: Greenslopes mall district centre	0.0	30.9	30.9	0.0	45.0	45.0
	Holland Park—Tarragindi district neighbourhood plan/NPP-005: Holland Park central district centre	0.0	20.6	20.6	0.0	30.0	30.0
	Indooroopilly centre neighbourhood plan/NPP-001b: Moggill Road north (identified as C in Figure c in section 7.2.9.1)	0.0	117.4	117.4	0.0	171.0	171.0
	Latrobe and Given Terraces neighbourhood plan/NPP-001: Centres	70.0	24.7	94.7	70.0	36.0	106.0
	Moggill—Bellbowrie district neighbourhood plan/NPP-004: Multi-purpose centres	0.0	30.9	30.9	0.0	45.0	45.0
	Moorooka—Stephens district neighbourhood plan/NPP-003: Moorvale shopping centre	0.0	30.9	30.9	0.0	45.0	45.0
	New Farm and Teneriffe Hill neighbourhood plan/NPP-004a: Brunswick Street	122.5	9.9	132.4	122.5	14.4	136.9
	New Farm and Teneriffe Hill neighbourhood plan/NPP-004b: Brunswick Street and Merthyr Road	122.5	9.9	132.4	122.5	14.4	136.9
	Petrie Terrace neighbourhood plan/NPP-003a: Low-rise commercial 1	131.3	30.9	162.1	131.3	45.0	176.3
	Petrie Terrace neighbourhood plan/NPP-003b: Low-rise commercial 2	122.5	9.9	132.4	122.5	14.4	136.9
	Petrie Terrace neighbourhood plan/NPP-003c: Low-rise commercial 3	131.3	30.9	162.1	131.3	45.0	176.3
	Petrie Terrace neighbourhood plan/NPP-003d: Low-rise commercial 4	122.5	9.9	132.4	122.5	14.4	136.9
	Petrie Terrace neighbourhood plan/NPP-004a: Police barracks a	0.0	20.6	20.6	0.0	30.0	30.0
	Petrie Terrace neighbourhood plan/NPP-004b: Police barracks b	0.0	20.6	20.6	0.0	30.0	30.0
	Petrie Terrace neighbourhood plan/NPP-004c: Police barracks c	0.0	177.1	177.1	0.0	258.0	258.0
	Petrie Terrace neighbourhood plan/NPP-004d: Police barracks d	0.0	20.6	20.6	0.0	30.0	30.0
	Racecourse precinct neighbourhood plan/NPP-001: Racecourse Road	99.8	38.1	137.8	99.8	55.5	155.2
	River gateway neighbourhood plan/NPP-001b: District centre	262.5	33.0	295.5	262.5	48.0	310.5
	River gateway neighbourhood plan/NPP-003b: Wynnum Road corridor	262.5	33.0	295.5	262.5	48.0	310.5
	River gateway neighbourhood plan/NPP-003c: Cannon Hill shopping centre	0.0	51.5	51.5	0.0	75.0	75.0
	River gateway neighbourhood plan/NPP-003e: Former CSIRO site	253.8	0.0	253.8	253.8	0.0	253.8
	Sandgate district neighbourhood plan/NPP-001: Sandgate town centre	87.5	24.7	112.2	87.5	36.0	123.5
	Sherwood—Graceville district neighbourhood plan/NPP-004: Honour Avenue centre	0.0	30.9	30.9	0.0	45.0	45.0
	South Brisbane riverside neighbourhood plan/NPP-003: Boundary and Vulture	131.3	98.9	230.1	131.3	144.0	275.3
	Spring Hill neighbourhood plan/NPP-002: Boundary Street heart precinct	110.3	185.4	295.6	110.3	270.0	380.3
	West End—Woolloongabba district neighbourhood plan/NPP-002a: Mater Hill a	262.5	33.0	295.5	262.5	48.0	310.5
	Western gateway neighbourhood plan/NPP-004: Inala	0.0	30.9	30.9	0.0	45.0	45.0

Planning Scheme Zone	Planning Scheme Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
	Woolloongabba centre neighbourhood plan/NPP-003: Ipswich Road and Stanley Street corridor	70.9	20.4	91.3	70.9	29.7	100.6
	Wynnum—Manly neighbourhood plan/NPP-004: Manly harbour village	28.0	46.3	74.3	28.0	67.5	95.5
District centre zone—Corridor zone precinct	In the Corridor zone precinct of the District centre zone where not otherwise specified in this table	13.1	58.7	71.8	13.1	85.5	98.6
	Albion Neighbourhood plan/NPP-001: Station	0.0	247.1	247.1	0.0	360.0	360.0
	Eastern corridor neighbourhood plan/NPP-001a: Buranda core	157.5	86.5	244.0	157.5	126.0	283.5
	Eastern corridor neighbourhood plan/NPP-002a: Buranda Station core	306.3	24.7	331.0	306.3	36.0	342.3
	Eastern corridor neighbourhood plan/NPP-003a: Stones Corner core	87.5	65.9	153.4	87.5	96.0	183.5
	Eastern corridor neighbourhood plan/NPP-005a: Coorparoo core	700.0	33.0	733.0	700.0	48.0	748.0
	Kelvin Grove urban village neighbourhood plan/NPP-001a: Village centre 1	444.1	23.9	468.0	444.1	34.8	478.9
	Kelvin Grove urban village neighbourhood plan/NPP-001b: Village centre 2	644.0	51.9	695.9	644.0	75.6	719.6
	Kelvin Grove urban village neighbourhood plan/NPP-003a: Health and recreation 1	507.5	23.9	531.4	507.5	34.8	542.3
	Lutwyche road corridor neighbourhood plan/NPP-001a: Lutwyche centre mixed use corridor	87.5	65.9	153.4	87.5	96.0	183.5
	Lutwyche Road corridor neighbourhood plan/NPP-002a: Windsor east mixed use corridor	560.0	33.0	593.0	560.0	48.0	608.0
	Milton station neighbourhood plan/NPP-001: Mixed use centre	157.5	86.5	244.0	157.5	126.0	283.5
	Mitchelton centre neighbourhood plan/NPP-001a: Brookside A	546.9	0.0	546.9	546.9	0.0	546.9
	Mt Gravatt corridor neighbourhood plan/NPP-002a: Mt Gravatt central core	131.3	57.7	188.9	131.3	84.0	215.3
	Mt Gravatt corridor neighbourhood plan/NPP-002b: Mt Gravatt central mixed use frame	262.5	12.4	274.9	262.5	18.0	280.5
	Mt Gravatt corridor neighbourhood plan/NPP-003a: Logan Road mixed use frame	262.5	12.4	274.9	262.5	18.0	280.5
	Richlands—Wacol corridor neighbourhood plan/NPP-002b: Richlands core	131.3	30.9	162.1	131.3	45.0	176.3
	River gateway neighbourhood plan/NPP-001b: District centre	262.5	33.0	295.5	262.5	48.0	310.5
	River gateway neighbourhood plan/NPP-003b: Wynnum Road corridor	210.0	33.0	243.0	210.0	48.0	258.0
	Sherwood—Graceville district neighbourhood plan/NPP-002: Corinda centre	232.8	18.5	251.3	232.8	27.0	259.8
	Sherwood—Graceville district neighbourhood plan/NPP-003: Sherwood centre	232.8	18.5	251.3	232.8	27.0	259.8
	Taringa neighbourhood plan/NPP-001: Taringa core precinct	465.5	47.0	512.5	465.5	68.4	533.9
	Taringa neighbourhood plan/NPP-002: Taringa gateway precinct	698.3	70.4	768.7	698.3	102.6	800.9
	Taringa neighbourhood plan/NPP-003: Harrys Road east precinct	803.3	21.0	824.3	803.3	30.6	833.9
Major centre zone	In the Major centre zone where not otherwise specified in this table	13.6	58.7	72.3	13.6	85.5	99.1
	Carindale centre neighbourhood plan/NPP-001: Centre core	0.0	82.4	82.4	0.0	120.0	120.0
	Indooroopilly centre neighbourhood plan/NPP-001c: Indooroopilly shopping centre mixed use (identified as A in Figure c in section 7.2.9.1)	0.0	185.4	185.4	0.0	270.0	270.0
	Mitchelton centre neighbourhood plan/NPP-001b: Brookside B	273.4	51.5	324.9	273.4	75.0	348.4
	Mitchelton centre neighbourhood plan/NPP-001c: Brookside C	546.9	0.0	546.9	546.9	0.0	546.9
	Mitchelton centre neighbourhood plan/NPP-001d: Brookside D	0.0	103.0	103.0	0.0	150.0	150.0
	Mitchelton centre neighbourhood plan/NPP-001e: Brookside E	0.0	103.0	103.0	0.0	150.0	150.0
	Mitchelton centre neighbourhood plan/NPP-003: McConaghy Street south	393.8	8.2	402.0	393.8	12.0	405.8
	Mitchelton centre neighbourhood plan/NPP-005a: Blackwood Street west	136.7	77.2	213.9	136.7	112.5	249.2
	Mitchelton centre neighbourhood plan/NPP-005b: Blackwood Street east	136.7	77.2	213.9	136.7	112.5	249.2
	Mitchelton centre neighbourhood plan/NPP-006a: Osborne Road south A	136.7	77.2	213.9	136.7	112.5	249.2
	Mitchelton centre neighbourhood plan/NPP-006b: Osborne Road south B	437.5	20.6	458.1	437.5	30.0	467.5
	Mitchelton centre neighbourhood plan/NPP-006c: Osborne Road south C	437.5	20.6	458.1	437.5	30.0	467.5
	Toombul—Nundah neighbourhood plan/NPP-001a: Nundah Village	183.8	51.9	235.6	183.8	75.6	259.4
	Toombul—Nundah neighbourhood plan/NPP-001b: Nundah Village	126.0	23.7	149.7	126.0	34.5	160.5
	Toombul—Nundah neighbourhood plan/NPP-002: Toombul central	154.0	115.3	269.3	154.0	168.0	322.0

Planning Scheme Zone	Planning Scheme Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
	Toombul—Nundah neighbourhood plan/NPP-002a: Toombul east	383.3	30.9	414.1	383.3	45.0	428.3
	Toowong—Auchenflower neighbourhood plan/NPP-001a: Toowong centre a	315.0	173.0	488.0	315.0	252.0	567.0
	Toowong—Auchenflower neighbourhood plan/NPP-001b: Toowong centre b	315.0	173.0	488.0	315.0	252.0	567.0
	Toowong—Auchenflower neighbourhood plan/NPP-001c: Toowong centre c	350.0	82.4	432.4	350.0	120.0	470.0
	Wynnum—Manly neighbourhood plan/NPP-003a: Wynnum CBD northern frame	0.0	30.9	30.9	0.0	45.0	45.0
	Wynnum—Manly neighbourhood plan/NPP-003f: Wynnum CBD southern frame	218.8	0.0	218.8	218.8	0.0	218.8
Principal centre zone—City Centre zone precinct	In the City Centre zone precinct of the Principal centre zone where not otherwise specified in this table	568.8	428.4	997.1	568.8	624.0	1,192.8
	City Centre neighbourhood plan/NPP-002a: Quay Street north sub-precinct	117.3	87.9	205.1	117.3	128.0	245.2
	City Centre neighbourhood plan/NPP-002b: Quay Street south sub-precinct	292.3	219.7	511.9	292.3	320.0	612.2
	Fortitude Valley neighbourhood plan/NPP-001: Gotha Street	1,225.0	98.9	1,323.9	1,225.0	144.0	1,369.0
	Fortitude Valley neighbourhood plan/NPP-002: Valley heart	398.1	69.2	467.3	398.1	100.8	498.9
	Fortitude Valley neighbourhood plan/NPP-002a: Special Context Area	1,093.8	205.9	1,299.7	1,093.8	300.0	1,393.8
	South Brisbane riverside neighbourhood plan/NPP-003: Boundary and Vulture	262.5	74.1	336.6	262.5	108.0	370.5
	South Brisbane riverside neighbourhood plan/NPP-004: Kurilpa	656.3	123.6	779.8	656.3	180.0	836.3
	South Brisbane riverside neighbourhood plan/NPP-004a: Kurilpa south	0.0	164.8	164.8	0.0	240.0	240.0
	South Brisbane riverside neighbourhood plan/NPP-004b: Kurilpa north	0.0	535.5	535.5	0.0	780.0	780.0
	Spring Hill neighbourhood plan/NPP-001: City Centre expansion precinct	810.3	259.5	1,069.7	810.3	378.0	1,188.3
Principal centre zone — Regional centre zone precinct	Chermside centre neighbourhood plan/NPP-001: Chermside centre activity	229.7	100.9	330.6	229.7	147.0	376.7
	Mt Gravatt corridor neighbourhood plan/NPP-001a: Upper Mt Gravatt core	229.7	100.9	330.6	229.7	147.0	376.7
	Mt Gravatt corridor neighbourhood plan/NPP-001b: Upper Mt Gravatt mixed use frame	437.5	20.6	458.1	437.5	30.0	467.5
Mixed use zone — Inner city zone precinct	In the Inner city zone precinct of the Mixed use zone where not otherwise specified in this table	66.5	49.4	115.9	66.5	72.0	138.5
	Bulimba district neighbourhood plan/NPP-005: Godwin Street	218.8	10.3	229.0	218.8	15.0	233.8
	Fortitude Valley neighbourhood plan/NPP-001: Gotha Street	328.1	41.2	369.3	328.1	60.0	388.1
	Fortitude Valley neighbourhood plan/NPP-002: Valley heart	262.5	74.1	336.6	262.5	108.0	370.5
	Fortitude Valley neighbourhood plan/NPP-003: Valley gateway	262.5	74.1	336.6	262.5	108.0	370.5
	Fortitude Valley neighbourhood plan/NPP-004: Light Street hill	190.8	15.4	206.2	190.8	22.5	213.3
	Fortitude Valley neighbourhood plan/NPP-005: James Street	262.5	33.0	295.5	262.5	48.0	310.5
	Fortitude Valley neighbourhood plan/NPP-006: Water Street	262.5	33.0	295.5	262.5	48.0	310.5
	Kangaroo Point south neighbourhood plan/NPP-001: Main Street	164.1	72.1	236.1	164.1	105.0	269.1
	Kangaroo Point south neighbourhood plan/NPP-001a: Neighbourhood heart	131.3	72.1	203.3	131.3	105.0	236.3
	Kangaroo Point south neighbourhood plan/NPP-004: River Terrace	0.0	185.4	185.4	0.0	270.0	270.0
	Kangaroo Point south neighbourhood plan/NPP-006: Vulture Street	350.0	123.6	473.6	350.0	180.0	530.0
	Kangaroo Point south neighbourhood plan/NPP-007: Wellington and Lytton Roads	328.1	41.2	369.3	328.1	60.0	388.1
	Kangaroo Point south neighbourhood plan/NPP-007a: Manilla Street	65.6	87.5	153.2	65.6	127.5	193.1
	Milton neighbourhood plan/NPP-003: (identified as special area 1 in Figure A in section 7.2.13.2)	49.2	52.5	101.7	49.2	76.5	125.7
	Milton neighbourhood plan/NPP-003a: Office a	0.0	61.8	61.8	0.0	90.0	90.0
	Milton neighbourhood plan/NPP-003b: Office b	0.0	61.8	61.8	0.0	90.0	90.0
	Milton neighbourhood plan/NPP-003c: Office c	0.0	267.7	267.7	0.0	390.0	390.0
	Milton station neighbourhood plan/NPP-001: Mixed use centre	105.0	57.7	162.7	105.0	84.0	189.0
	Milton station neighbourhood plan/NPP-002: Mixed use residential	191.4	15.4	206.9	191.4	22.5	213.9
	Milton station neighbourhood plan/NPP-002: Mixed use residential	700.0	41.2	741.2	700.0	60.0	760.0
	Milton station neighbourhood plan/NPP-004: Commercial	210.0	115.3	325.3	210.0	168.0	378.0
	Milton station neighbourhood plan/NPP-004a: Cribb Street	656.3	123.6	779.8	656.3	180.0	836.3
	Newstead and Teneriffe waterfront neighbourhood plan/NPP-002: Commercial Road	367.5	37.1	404.6	367.5	54.0	421.5
	Newstead and Teneriffe waterfront neighbourhood plan/NPP-002a: Heritage	367.5	37.1	404.6	367.5	54.0	421.5
	Newstead and Teneriffe waterfront neighbourhood plan/NPP-002b: Riverside	262.5	74.1	336.6	262.5	108.0	370.5

Planning Scheme Zone	Planning Scheme Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
	Newstead and Teneriffe waterfront neighbourhood plan/NPP-003: Riverpark	367.5	37.1	404.6	367.5	54.0	421.5
	South Brisbane riverside neighbourhood plan/NPP-002: Musgrave	328.1	41.2	369.3	328.1	60.0	388.1
	South Brisbane riverside neighbourhood plan/NPP-003: Boundary and Vulture	262.5	74.1	336.6	262.5	108.0	370.5
	South Brisbane riverside neighbourhood plan/NPP-005: Riverside north	262.5	74.1	336.6	262.5	108.0	370.5
	South Brisbane riverside neighbourhood plan/NPP-006: Buchanan and Davies parks	109.4	82.4	191.8	109.4	120.0	229.4
	South Brisbane riverside neighbourhood plan/NPP-006a: Hockings Street	382.8	30.9	413.7	382.8	45.0	427.8
	Spring Hill neighbourhood plan/NPP-001: City Centre expansion precinct	540.3	173.0	713.3	540.3	252.0	792.3
	Spring Hill neighbourhood plan/NPP-002: Boundary Street heart precinct	109.4	185.4	294.7	109.4	270.0	379.4
	Spring Hill neighbourhood plan/NPP-003: Spring Hill east precinct	109.4	185.4	294.7	109.4	270.0	379.4
	Woolloongabba centre neighbourhood plan/NPP-001: Woolloongabba core	656.3	123.6	779.8	656.3	180.0	836.3
	Woolloongabba centre neighbourhood plan/NPP-003: Ipswich Road and Stanley Street corridor	216.6	49.8	266.4	216.6	72.6	289.2
Mixed use zone—Centre frame zone precinct	In the Centre frame zone precinct of the Mixed use zone where not otherwise specified in this table	131.3	24.7	156.0	131.3	36.0	167.3
	Albion Neighbourhood plan/NPP-002: Albion Village	0.0	68.7	68.7	0.0	100.0	100.0
	Albion Neighbourhood plan/NPP-003: Corunna Street	292.3	68.6	360.9	292.3	100.0	392.2
	Carindale centre neighbourhood plan/NPP-002: Centre fringe	0.0	82.4	82.4	0.0	120.0	120.0
	Chermside centre neighbourhood plan/NPP-001b: Gympie Road	328.1	61.8	389.9	328.1	90.0	418.1
	Chermside centre neighbourhood plan/NPP-001c: Mixed use	437.5	20.6	458.1	437.5	30.0	467.5
	Chermside centre neighbourhood plan/NPP-001d: Playfield Street	437.5	20.6	458.1	437.5	30.0	467.5
	Indooroopilly centre neighbourhood plan/NPP-001: Multi-purpose centre (identified as B in Figure c in section 7.2.9.1)	551.3	55.6	606.9	551.3	81.0	632.3
	Indooroopilly centre neighbourhood plan/NPP-001a: High Street (identified as B in Figure c in section 7.2.9.1)	551.3	55.6	606.9	551.3	81.0	632.3
	Indooroopilly centre neighbourhood plan/NPP-001a: High Street (identified as C in Figure c in section 7.2.9.1)	383.3	30.9	414.1	383.3	45.0	428.3
	Mitchelton centre neighbourhood plan/NPP-004a: University Road east	196.9	5.1	202.0	196.9	7.5	204.4
	Mt Gravatt corridor neighbourhood plan/NPP-001b: Upper Mt Gravatt mixed use frame	437.5	20.6	458.1	437.5	30.0	467.5
	Toombul—Nundah neighbourhood plan/NPP-001: Nundah Village	329.0	41.2	370.2	329.0	60.0	389.0
	Toombul—Nundah neighbourhood plan/NPP-002: Toombul central	175.0	131.8	306.8	175.0	192.0	367.0
	Toombul—Nundah neighbourhood plan/NPP-005: Nundah north	164.1	30.9	195.0	164.1	45.0	209.1
	Toombul—Nundah neighbourhood plan/NPP-006: Toombul west	201.3	0.0	201.3	201.3	0.0	201.3
	Toowong—Auchenflower neighbourhood plan/NPP-004a: Regatta riverside a	218.8	51.5	270.2	218.8	75.0	293.8
	Wynnum—Manly neighbourhood plan/NPP-003e: Bay Terrace	122.5	12.4	134.9	122.5	18.0	140.5
	Wynnum—Manly neighbourhood plan/NPP-003g: Waterloo Bay Hotel	122.5	12.4	134.9	122.5	18.0	140.5
	Wynnum—Manly neighbourhood plan/NPP-003h: Esplanade	122.5	12.4	134.9	122.5	18.0	140.5
Mixed use zone—Corridor zone precinct	In the Corridor zone precinct of the Mixed use zone where not otherwise specified in this table	26.3	44.5	70.8	26.3	64.8	91.1
	Eastern corridor neighbourhood plan/NPP-001b: Buranda corridor	0.0	123.6	123.6	0.0	180.0	180.0
	Eastern corridor neighbourhood plan/NPP-002b: Buranda Station corridor	382.8	30.9	413.7	382.8	45.0	427.8
	Eastern corridor neighbourhood plan/NPP-003b: Stones Corner corridor	109.4	61.8	171.2	109.4	90.0	199.4
	Eastern corridor neighbourhood plan/NPP-004a: Langlands Park corridor	87.5	20.6	108.1	87.5	30.0	117.5
	Eastern corridor neighbourhood plan/NPP-005b: Coorparoo corridor	306.3	24.7	331.0	306.3	36.0	342.3
	Eastern corridor neighbourhood plan/NPP-006a: Bennetts Road corridor	246.8	5.1	251.9	246.8	7.5	254.3
	Indooroopilly centre neighbourhood plan/NPP-001: Multi-purpose centre (identified as C in Figure c in section 7.2.9.1)	315.0	49.4	364.4	315.0	72.0	387.0
	Indooroopilly centre neighbourhood plan/NPP-001: Multi-purpose centre (identified as E in Figure c in section 7.2.9.1)	0.0	61.8	61.8	0.0	90.0	90.0
	Indooroopilly centre neighbourhood plan/NPP-001b: Moggill Road north (identified as C in Figure c in section 7.2.9.1)	0.0	123.6	123.6	0.0	180.0	180.0
	Ithaca district neighbourhood plan/NPP-001a: Butterfield Street b	382.8	30.9	413.7	382.8	45.0	427.8
	Indooroopilly centre neighbourhood plan/NPP-003b: Moggill Road west special context area	19.6	4.9	24.5	19.6	7.2	26.8

Planning Scheme Zone	Planning Scheme Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
	Kelvin Grove urban village neighbourhood plan/NPP-002a: Mixed use 1	656.3	49.4	705.7	656.3	72.0	728.3
	Kelvin Grove urban village neighbourhood plan/NPP-002b: Mixed use 2	656.3	49.4	705.7	656.3	72.0	728.3
	Kelvin Grove urban village neighbourhood plan/NPP-002c: Mixed use 3	315.0	49.4	364.4	315.0	72.0	387.0
	Kelvin Grove urban village neighbourhood plan/NPP-002d: Mixed use 4	444.1	35.8	479.9	444.1	52.2	496.3
	Kelvin Grove urban village neighbourhood plan/NPP-002e: Mixed use 5	444.1	35.8	479.9	444.1	52.2	496.3
	Kelvin Grove urban village neighbourhood plan/NPP-002f: Mixed use 6	444.1	35.8	479.9	444.1	52.2	496.3
	Kelvin Grove urban village neighbourhood plan/NPP-002g: Mixed use 7	444.1	35.8	479.9	444.1	52.2	496.3
	Kelvin Grove urban village neighbourhood plan/NPP-002h: Mixed use 8	382.8	30.9	413.7	382.8	45.0	427.8
	Kelvin Grove urban village neighbourhood plan/NPP-002i: Mixed use 9	444.1	35.8	479.9	444.1	52.2	496.3
	Racecourse precinct neighbourhood plan/NPP-003a: Kingsford Smith Drive west	164.1	30.9	195.0	164.1	45.0	209.1
	South Brisbane riverside neighbourhood plan/NPP-007: Riverside south	183.8	18.5	202.3	183.8	27.0	210.8
	Toombul—Nundah neighbourhood plan/NPP-004: Oxenham park	166.2	4.7	171.0	166.2	6.9	173.1
	Toombul—Nundah neighbourhood plan/NPP-005: Nundah north	126.0	23.7	149.7	126.0	34.5	160.5
	Toowong—Auchenflower neighbourhood plan/NPP-005a: Auchenflower heart a	183.8	18.5	202.3	183.8	27.0	210.8
	Toowong—Auchenflower neighbourhood plan/NPP-005b: Auchenflower heart b	189.0	4.9	193.9	189.0	7.2	196.2
Low impact industry zone	All	0.0	16.9	16.9	0.0	24.6	24.6
Industry zone	General industry A zone precinct	0.0	20.6	20.6	0.0	30.0	30.0
	General industry B zone precinct	0.0	20.6	20.6	0.0	30.0	30.0
	General industry C zone precinct	0.0	20.6	20.6	0.0	30.0	30.0
Special industry zone	All	0.0	5.5	5.5	0.0	8.0	8.0
Industry investigation zone	All	0.0	20.6	20.6	0.0	30.0	30.0
Sport and recreation zone	Local zone precinct	Individually Assessed					
	District zone precinct	Individually Assessed					
	Metropolitan zone precinct	Individually Assessed					
Open space zone	Local zone precinct	Individually Assessed					
	District zone precinct	Individually Assessed					
	Metropolitan zone precinct	Individually Assessed					
	City Centre neighbourhood plan/NPP-005 - Area 1.1: Howard Smith Wharves precinct	0.0	90.6	90.6	0.0	132.0	132.0
	City Centre neighbourhood plan/NPP-005 - Area 1.2: Howard Smith Wharves precinct	0.0	53.5	53.5	0.0	78.0	78.0
	City Centre neighbourhood plan/NPP-005 - Area 1.3: Howard Smith Wharves precinct	0.0	53.5	53.5	0.0	78.0	78.0
	City Centre neighbourhood plan/NPP-005 - Area 2: Howard Smith Wharves precinct	0.0	53.5	53.5	0.0	78.0	78.0
Environmental management zone	All	0	0	0.0	0.0	0	0.0
Conservation zone	Local zone precinct	0	0	0.0	0.0	0	0.0
	District zone precinct	0	0	0.0	0.0	0	0.0
	Metropolitan zone precinct	0	0	0.0	0.0	0	0.0
Community facilities zones	Major health care zone precinct	0.0	61.8	61.8	0.0	90.0	90.0
	Major sports venue zone precinct	0.0	12.4	12.4	0.0	18.0	18.0
	Cemetery zone precinct	0.0	0.4	0.4	0.0	0.6	0.6
	Community purposes zone precinct	0.0	16.5	16.5	0.0	24.0	24.0
	Education purposes zone precinct	0.0	14.4	14.4	0.0	21.0	21.0
	Emergency services zone precinct	0.0	20.6	20.6	0.0	30.0	30.0
	Health care purposes zone precinct	0.0	20.6	20.6	0.0	30.0	30.0
Special purpose zone	Defence zone precinct	Individually Assessed					
	Detention facility zone precinct	Individually Assessed					
	Transport Infrastructure zone precinct	Individually Assessed					
	Utility services zone precinct	Individually Assessed					
	Airport zone precinct	Individually Assessed					
	Port zone precinct	Individually Assessed					
Specialised centre zone	Major educational and research facility zone precinct	0.0	4.1	4.1	0.0	6.0	6.0
	Entertainment and conference centre zone precinct	0.0	24.7	24.7	0.0	36.0	36.0

Planning Scheme Zone	Planning Scheme Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
	Brisbane Markets zone precinct	0.0	24.7	24.7	0.0	36.0	36.0
	Large format retail zone precinct	0.0	24.7	24.7	0.0	36.0	36.0
	Mixed industry and business zone precinct	0.0	24.7	24.7	0.0	36.0	36.0
	Marina zone precinct	0.0	0.4	0.4	0.0	0.6	0.6
Extractive industry zone	All	0.0	0.2	0.2	0.0	0.3	0.3

Water and sewerage demand values determined based on information contained within the Brisbane City Plan 2014.

For existing residential development and proposed residential development where development details are known, apply:

- 2.72 EP per detached dwelling (house)
- 1.75 EP per attached dwelling (townhouse, unit, flat, apartment etc.)

For non-residential development and proposed non-residential development where development details are known, apply:

- 0.006 EP per m^2 GFA for Retail / Commercial / Community Purpose / Medium Impact Industry / Future Industry / Industry Investigation
- 0.0048 EP per m^2 GFA for Low Impact Industry
- 0.008 EP per m^2 GFA for High Impact Industry & Extractive Industry

Table A4.2 – Ipswich City Planning Scheme Development Density (Urban Utilities)

Category	Planning Scheme Use Type	Description	Development Density (EP/Ha of net dev area)					
			Water			Sewerage		
			Res	Non-Res	Total	Res	Non-Res	Total
Urban Areas Locality	Large Lot Residential	Detached dwelling	6.9	0.0	6.9	6.9	0.0	6.9
	Residential Low Density	Detached dwelling (RL1)	13.7	0.0	13.7	13.7	0.0	13.7
		Detached dwelling (RL2)	32.9	0.0	32.9	32.9	0.0	32.9
	Residential Medium Density	Attached dwelling (RM2, RM3)	85.5	0.0	85.5	85.5	0.0	85.5
		Attached dwelling (RM1)	128.3	0.0	128.3	128.3	0.0	128.3
	Character Areas - Housing	Detached dwelling (CHL)	27.4	0.0	27.4	27.4	0.0	27.4
		Attached dwelling (CHM)	85.5	0.0	85.5	85.5	0.0	85.5
	Future Urban	Detached dwelling (FU3)	6.9	0.0	6.9	6.9	0.0	6.9
		Detached dwelling (FU-RL5)	21.9	0.0	21.9	21.9	0.0	21.9
		Detached dwelling (FU2, FU2-RL4, FU4-RL2, FU5)	27.4	0.0	27.4	27.4	0.0	27.4
		Detached dwelling (FU2-RL3)	32.9	0.0	32.9	32.9	0.0	32.9
		Detached dwelling (FU2-RL1, FU2-RL2)	35.6	0.0	35.6	35.6	0.0	35.6
		Attached dwelling (FU2-RM2, FU4-RM2)	85.5	0.0	85.5	85.5	0.0	85.5
		Attached dwelling (FU2-RM1, FU2-SA3, FU4-RM1)	128.3	0.0	128.3	128.3	0.0	128.3
		Retail (FU2-LN, FU2-MN)	0.0	10.3	10.3	0.0	15.0	15.0
		Retail (FU4-PBA, FU4-SCA)	0.0	16.5	16.5	0.0	24.0	24.0
		Commercial (FU4-PBA, FU4-SCA)	0.0	4.1	4.1	0.0	6.0	6.0
		Commercial (FU2-LN, FU2-MN)	0.0	10.3	10.3	0.0	15.0	15.0
		Industrial (FU4-RBIL, FU4-SOA3)	0.0	20.6	20.6	0.0	30.0	30.0
	Major Centres	Retail	0.0	16.5	16.5	0.0	24.0	24.0
		Commercial	0.0	4.1	4.1	0.0	6.0	6.0
	Local Retail and Commercial	Retail	0.0	10.3	10.3	0.0	15.0	15.0
		Commercial	0.0	10.3	10.3	0.0	15.0	15.0
	Local Business and Industry	Industrial	0.0	20.6	20.6	0.0	30.0	30.0
	Local Business and Industry Investigation	Industrial	0.0	8.2	8.2	0.0	12.0	12.0
	Local Industry and Industry Buffer	Industrial	0.0	2.7	2.7	0.0	4.0	4.0
	Character Areas - Mixed Use	Detached dwelling	27.4	0.0	27.4	27.4	0.0	27.4
		Commercial	0.0	12.4	12.4	0.0	18.0	18.0
	Business Incubator	Industrial	0.0	20.6	20.6	0.0	30.0	30.0
	Bundamba Racehorse Stables Area	Detached dwelling	27.4	0.0	27.4	27.4	0.0	27.4
	Recreation		Individually Assessed					
	Conservation		0.0	0.0	0.0	0.0	0.0	0.0
	Limited Development (Constrained)	Detached dwelling	2.7	0.0	2.7	2.7	0.0	2.7
	Special Uses	Detached dwelling (SU55)	2.7	0.0	2.7	2.7	0.0	2.7
		Detached dwelling (SU14, SU26)	27.4	0.0	27.4	27.4	0.0	27.4
		Detached dwelling (FU2-SA2)	21.9	0.0	21.9	21.9	0.0	21.9
		Detached dwelling (FU2-SA1, FU2-SA4)	35.6	0.0	35.6	35.6	0.0	35.6
		Attached dwelling (SU41, SU42, SU43, SU44, SU45)	68.4	0.0	68.4	68.4	0.0	68.4
		Attached dwelling (SU12, SU13)	85.5	0.0	85.5	85.5	0.0	85.5
		Retail (SU68, SU76)	0.0	10.3	10.3	0.0	15.0	15.0
		Retail (SU35, SU36, SU37, SU38, SU40, SU47)	0.0	20.6	20.6	0.0	30.0	30.0
		Commercial (SU53)	0.0	9.9	9.9	0.0	14.4	14.4
		Commercial (SU68, SU76)	0.0	10.3	10.3	0.0	15.0	15.0
		Commercial (SU30, SU31, SU46, SU49, SU50, SU58, SU80)	0.0	20.6	20.6	0.0	30.0	30.0
		Industrial (SU74, SU75)	0.0	0.5	0.5	0.0	0.8	0.8
		Industrial (SU54)	0.0	12.4	12.4	0.0	18.0	18.0
		Industrial (SU67)	0.0	16.5	16.5	0.0	24.0	24.0
		Industrial (SU25, SU72, SU73)	0.0	20.6	20.6	0.0	30.0	30.0
	Special Opportunity Areas	Detached dwelling (SA45)	2.7	0.0	2.7	2.7	0.0	2.7
		Detached dwelling (SA40)	2.7	0.0	2.7	2.7	0.0	2.7
		Detached dwelling (SA7, SA26, SA39, SA41, SA42, FU4-SOA1, FU4-SOA5)	6.9	0.0	6.9	6.9	0.0	6.9
		Detached dwelling (SA30)	8.2	0.0	8.2	8.2	0.0	8.2
		Detached dwelling (SA2, SA15, SA16, SA21, SA33, SA34, SA35, SA36, SA37, FU4-SOA2, FU4-SOA4)	27.4	0.0	27.4	27.4	0.0	27.4

Category	Planning Scheme Use Type	Description	Development Density (EP/Ha of net dev area)					
			Water			Sewerage		
			Res	Non-Res	Total	Res	Non-Res	Total
		Detached dwelling (SA31)	35.6	0.0	35.6	35.6	0.0	35.6
		Attached dwelling (SA8, SA10)	51.3	0.0	51.3	51.3	0.0	51.3
		Attached dwelling (SA4, SA22, SA23, SA24)	85.5	0.0	85.5	85.5	0.0	85.5
		Attached dwelling (SA6)	128.3	0.0	128.3	128.3	0.0	128.3
		Retail (SA19)	0.0	4.9	4.9	0.0	7.2	7.2
		Retail (SA13, SA14, SA43, SA45)	0.0	10.3	10.3	0.0	15.0	15.0
		Commercial (SA28)	0.0	1.6	1.6	0.0	2.4	2.4
		Commercial (SA45)	0.0	4.1	4.1	0.0	6.0	6.0
		Commercial (SA19)	0.0	4.9	4.9	0.0	7.2	7.2
		Commercial (SA2)	0.0	6.6	6.6	0.0	9.6	9.6
		Commercial (SA13, SA14, SA43)	0.0	10.3	10.3	0.0	15.0	15.0
		Industrial (SA28)	0.0	2.7	2.7	0.0	4.0	4.0
		Industrial (SA32)	0.0	5.5	5.5	0.0	8.0	8.0
		Industrial (SA5, SA9, SA25, SA29)	0.0	20.6	20.6	0.0	30.0	30.0
City Centre Locality	CBD Primary Retail	Attached dwelling	128.3	0.0	128.3	128.3	0.0	128.3
		Retail	0.0	131.8	131.8	0.0	192.0	192.0
	CBD North - Secondary Business	Commercial	0.0	33.0	33.0	0.0	48.0	48.0
	CBD Primary Commercial	Retail	0.0	41.2	41.2	0.0	60.0	60.0
		Attached dwelling	128.3	0.0	128.3	128.3	0.0	128.3
		Retail	0.0	33.0	33.0	0.0	48.0	48.0
		Commercial	0.0	131.8	131.8	0.0	192.0	192.0
	CBD Top of Town	Attached dwelling	34.2	0.0	34.2	34.2	0.0	34.2
		Retail	0.0	24.7	24.7	0.0	36.0	36.0
		Commercial	0.0	16.5	16.5	0.0	24.0	24.0
	CBD Medical Services	Attached dwelling	25.7	0.0	25.7	25.7	0.0	25.7
		Commercial	0.0	41.2	41.2	0.0	60.0	60.0
	CBD Residential High Density	Attached dwelling (RHD1)	171.0	0.0	171.0	171.0	0.0	171.0
		Attached dwelling (RHD)	256.5	0.0	256.5	256.5	0.0	256.5
Regionally Significant Business Enterprise and Industry Areas	Regional Business and Industry	Industrial (RB2L, RB2M)	0.0	16.5	16.5	0.0	24.0	24.0
		Industrial (RB1L, RBIM, RB3L, RB3M, RB4L, RB4M)	0.0	20.6	20.6	0.0	30.0	30.0
	Regional Business and Industry Investigation	Industrial (RBIA1.3)	0.0	7.2	7.2	0.0	10.5	10.5
		Industrial (RBIA2, RBIA2.1, RBIA3, RBIA3.1)	0.0	10.7	10.7	0.0	15.6	15.6
		Industrial (RBIA1, RBIA1.4, RBIA4, CSE)	0.0	20.6	20.6	0.0	30.0	30.0
	Regional Business and Industry Buffer		0.0	0.0	0.0	0.0	0.0	0.0
	Business Park		Individually Assessed					
Amberley Area	Amberley Air Base and Aviation Zone	Attached dwelling	427.5	0.0	427.5	427.5	0.0	427.5
Rosewood Area	Town Centre	Retail (TCS)	0.0	10.3	10.3	0.0	15.0	15.0
		Retail (TCP)	0.0	16.5	16.5	0.0	24.0	24.0
		Commercial (TCP)	0.0	2.1	2.1	0.0	3.0	3.0
		Commercial (TCS)	0.0	10.3	10.3	0.0	15.0	15.0
	Services Trades and Showgrounds	Industrial	0.0	16.5	16.5	0.0	24.0	24.0
	Character Areas	Housing Low Density Zone (CHL)	27.4	0.0	27.4	27.4	0.0	27.4
		Housing Medium Density Zone (CHM)	85.5	0.0	85.5	85.5	0.0	85.5
	Residential Low Density		32.9	0.0	32.9	32.9	0.0	32.9
	Residential Medium Density		85.5	0.0	85.5	85.5	0.0	85.5
	Urban Investigation Areas	Detached dwelling	27.4	0.0	27.4	27.4	0.0	27.4
	Recreation		Individually Assessed					
	Special Uses		Individually Assessed					
Township Areas	Township Residential	Detached dwelling (TR1)	5.5	0.0	5.5	5.5	0.0	5.5
		Detached dwelling (TR)	6.9	0.0	6.9	6.9	0.0	6.9
	Township Character Housing	Detached dwelling (TCH1)	5.5	0.0	5.5	5.5	0.0	5.5
		Detached dwelling (TCH)	6.9	0.0	6.9	6.9	0.0	6.9
	Township Character Mixed	Detached dwelling	27.4	0.0	27.4	27.4	0.0	27.4
		Commercial	0.0	3.3	3.3	0.0	4.8	4.8
	Township Business	Retail	0.0	10.3	10.3	0.0	15.0	15.0
		Commercial	0.0	10.3	10.3	0.0	15.0	15.0
	Showgrounds, Sport, Recreation, Service Trades and Trotting		Individually Assessed					
	Special Uses		Individually Assessed					
Springfield Locality	Springfield Community Residential	Detached dwelling	32.9	0.0	32.9	32.9	0.0	32.9
	Brookwater Activity Centre	Attached dwelling	256.5	0.0	256.5	256.5	0.0	256.5
		Retail	0.0	1.2	1.2	0.0	1.8	1.8
		Commercial	0.0	2.9	2.9	0.0	4.2	4.2

Category	Planning Scheme Use Type	Description	Development Density (EP/Ha of net dev area)					
			Water			Sewerage		
			Res	Non-Res	Total	Res	Non-Res	Total
	Neighbourhood Centres	Retail	0.0	10.3	10.3	0.0	15.0	15.0
		Commercial	0.0	10.3	10.3	0.0	15.0	15.0
	Springfield Town Centre 1	Attached dwelling	4129.7	0.0	4129.7	4129.7	0.0	4129.7
		Retail	0.0	15.1	15.1	0.0	21.9	21.9
		Commercial	0.0	2.2	2.2	0.0	3.2	3.2
	Springfield Town Centre 3/9	Attached dwelling	3249.0	0.0	3249.0	3249.0	0.0	3249.0
		Commercial	0.0	10.4	10.4	0.0	15.1	15.1
	Springfield Town Centre 4	Attached dwelling	4617.0	0.0	4617.0	4617.0	0.0	4617.0
		Retail	0.0	0.4	0.4	0.0	0.5	0.5
		Commercial	0.0	0.4	0.4	0.0	0.5	0.5
	Springfield Town Centre 5	Attached dwelling	11115.0	0.0	11115.0	11115.0	0.0	11115.0
		Commercial	0.0	6.2	6.2	0.0	9.0	9.0
	Springfield Town Centre 6	Commercial	0.0	5.8	5.8	0.0	8.4	8.4
		Industrial	0.0	21.2	21.2	0.0	30.9	30.9
	Springfield Town Centre 7	Attached dwelling	513.0	0.0	513.0	513.0	0.0	513.0
		Commercial	0.0	19.4	19.4	0.0	28.3	28.3
	Springfield Town Centre 10	Attached dwelling	1026.0	0.0	1026.0	1026.0	0.0	1026.0
	Springfield Town Centre 12	Attached dwelling	4275.0	0.0	4275.0	4275.0	0.0	4275.0
		Commercial	0.0	12.1	12.1	0.0	17.6	17.6
	Springfield Town Centre 13	Attached dwelling	1368.0	0.0	1368.0	1368.0	0.0	1368.0
		Commercial	0.0	5.5	5.5	0.0	8.0	8.0
	Springfield Town Centre 14	Attached dwelling	513.0	0.0	513.0	513.0	0.0	513.0
		Commercial	0.0	1.5	1.5	0.0	2.1	2.1
	Springfield Town Centre 15	Attached dwelling	1710.0	0.0	1710.0	1710.0	0.0	1710.0
	Springfield Town Centre 18	Attached dwelling	1094.4	0.0	1094.4	1094.4	0.0	1094.4
		Retail	0.0	8.2	8.2	0.0	12.0	12.0
		Commercial	0.0	8.2	8.2	0.0	12.0	12.0
	Springfield Town Centre 19	Attached dwelling	2565.0	0.0	2565.0	2565.0	0.0	2565.0
		Commercial	0.0	2.4	2.4	0.0	3.5	3.5
	Springfield Town Centre 20	Attached dwelling	2394.0	0.0	2394.0	2394.0	0.0	2394.0
	Springfield Town Centre 21	Attached dwelling	513.0	0.0	513.0	513.0	0.0	513.0

Water and sewerage demand values determined based on information contained within the Ipswich Planning Scheme – LGIP (April 2018).

For existing residential development and proposed residential development where development details are known, apply:

- 2.74 EP per detached dwelling (house)
- 1.71 EP per attached dwelling (townhouse, unit, flat, apartment etc.)

For non-residential development and proposed non-residential development where development details are known, apply:

- 0.006 EP per m^2 GFA for Retail / Commercial / Community Purpose / Medium Impact Industry / Future Industry / Industry Investigation
- 0.0048 EP per m^2 GFA for Low Impact Industry
- 0.008 EP per m^2 GFA for High Impact Industry & Extractive Industry

Table A4.3 – Lockyer Valley Planning Scheme Development Density (Urban Utilities)

Category	Planning Scheme	Planning Scheme Use Type	Development Density (EP/Ha of net dev area)					
			Water			Sewerage		
			Res	Non-Res	Total	Res	Non-Res	Total
Residential Development	Gatton	Urban Residential - Gatton and Helidon	32.3	0.0	32.3	32.3	0.0	32.3
		Urban Residential - 3,000m^2 Lots (Withcott)	6.9	0.0	6.9	6.9	0.0	6.9
		Urban Residential - 1,000m^2 Lots (Grantham)	20.6	0.0	20.6	20.6	0.0	20.6
		Urban Residential - 2,000m^2 Lots (Grantham)	10.3	0.0	10.3	10.3	0.0	10.3
		Village	6.9	0.0	6.9	6.9	0.0	6.9
		Park Residential	6.9	0.0	6.9	6.9	0.0	6.9
		Homestead Residential - Within Water Supply Service Area	5.8	0.0	5.8	5.8	0.0	5.8
		Homestead Residential - Outside Water Supply Service Area	2.9	0.0	2.9	2.9	0.0	2.9
		Rural Residential - 1. Adare	1.5	0.0	1.5	0.0	0.0	0.0
		Rural Residential - 2. Woodlands	1.2	0.0	1.2	0.0	0.0	0.0
		Rural Residential - 3. Placid Hills	1.2	0.0	1.2	0.0	0.0	0.0
		Rural Residential - 4. Winwill	1.2	0.0	1.2	0.0	0.0	0.0
		Rural Residential - 5. Veradilla	0.8	0.0	0.8	0.0	0.0	0.0
		Rural Residential - 6. Helidon	1.2	0.0	1.2	0.0	0.0	0.0
		Rural Residential - 7. Helensdale Drive	2.3	0.0	2.3	0.0	0.0	0.0
		Rural Residential - 8. Postmans Ridge	0.7	0.0	0.7	0.0	0.0	0.0
		Rural Residential - 9. Blanchview	0.6	0.0	0.6	0.0	0.0	0.0
		Rural Residential - 10. Diana Crescent	2.3	0.0	2.3	0.0	0.0	0.0
		Rural Residential - 11. Park Ridge Drive	3.9	0.0	3.9	0.0	0.0	0.0
		Rural Residential - 12. Table Top	4.6	0.0	4.6	0.0	0.0	0.0
		Rural Residential - 13. Withcott West	0.9	0.0	0.9	0.0	0.0	0.0
		Rural Residential - 14. Murphys Creek	1.2	0.0	1.2	0.0	0.0	0.0
		Rural Residential - 10,000m^2 Lots (Grantham)	2.3	0.0	2.3	0.0	0.0	0.0
		Rural Residential - 20,000m^2 Lots (Grantham)	1.2	0.0	1.2	0.0	0.0	0.0
		Rural	0.0	0.0	0.0	0.0	0.0	0.0
	Laidley	Urban Residential	32.3	0.0	32.3	32.3	0.0	32.3
		Village	6.9	0.0	6.9	6.9	0.0	6.9
		Rural Residential	5.8	0.0	5.8	0.0	0.0	0.0
		Rural	0.0	0.0	0.0	0.0	0.0	0.0
Non-Residential and Mixed Development	Gatton	Commercial	0.0	33.0	33.0	0.0	48.0	48.0
		Industrial	0.0	24.7	24.7	0.0	36.0	36.0
		Community Facilities	0.0	33.0	33.0	0.0	48.0	48.0
		Low Impact Industry	0.0	19.8	19.8	0.0	28.8	28.8
		Local Centre	0.0	24.7	24.7	0.0	36.0	36.0
		Limited Development	0.0	33.0	33.0	0.0	48.0	48.0
		Open Space	0.0	33.0	33.0	0.0	48.0	48.0
	Laidley	Commercial	0.0	33.0	33.0	0.0	48.0	48.0
		Industrial	0.0	24.7	24.7	0.0	36.0	36.0
		Community Facilities	0.0	33.0	33.0	0.0	48.0	48.0
		Open Space	0.0	33.0	33.0	0.0	48.0	48.0

Water and sewerage demand values determined based on information contained within the Gatton Planning Scheme – LGIP (June 2018).

For existing residential development and proposed residential development where development details are known, apply:

- 2.57 EP per detached dwelling (house)
- 1.9 EP per attached dwelling (townhouse, unit, flat, apartment etc.)

For non-residential development and proposed non-residential development where development details are known, apply:

- 0.006 EP per m^2 GFA for Retail / Commercial / Community Purpose / Medium Impact Industry / Future Industry / Industry Investigation
- 0.0048 EP per m^2 GFA for Low Impact Industry
- 0.008 EP per m^2 GFA for High Impact Industry & Extractive Industry

Table A4.4 - Scenic Rim Planning Scheme Development Density (Urban Utilities)

Category	Planning Scheme Zone & Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
Residential Development	Low Density Residential	24.4	0.0	24.4	24.4	0.0	24.4
	Low Density Residential - Mountain Residential	18.0	0.0	18.0	18.0	0.0	18.0
	Low -Medium Density Residential	18.0	0.0	18.0	18.0	0.0	18.0
	Rural	0.0	0.0	0.0	0.0	0.0	0.0
	Rural - Tamborine Mountain Rural	0.0	0.0	0.0	0.0	0.0	0.0
	Rural - Rural Escarpment	0.0	0.0	0.0	0.0	0.0	0.0
	Rural Residential	8.1	0.0	8.1	0.0	0.0	0.0
	Rural Residential - Rural Residential A	2.4	0.0	2.4	0.0	0.0	0.0
	Township	9.8	0.0	9.8	9.8	0.0	9.8
	Township - Township Residential	8.1	0.0	8.1	8.1	0.0	8.1
Non-Residential or Mixed Use Development	Community Facilities	0.0	33.0	33.0	0.0	48.0	48.0
	Conservation	0.0	0.0	0.0	0.0	0.0	0.0
	District Centre	Individually Assessed					
	Industry	0	24.7	24.7	0.0	36.0	36.0
	Limited Development - Flood Land	2.4	0	2.4	2.4	0	2.4
	Limited Development - Historical Subdivision	2.4	0	2.4	2.4	0	2.4
	Local Centre	Individually Assessed					
	Major Centre	Individually Assessed					
	Major Tourism	Individually Assessed					
	Minor Tourism	Individually Assessed					
	Mixed Use	Individually Assessed					
	Mixed Use - Commercial Industrial	Individually Assessed					
	Neighbourhood Centre	Individually Assessed					
	Recreation and Open Space	Individually Assessed					
	Special Purpose	Individually Assessed					
	Special Purpose - Bulk Water Storage	Individually Assessed					
	Special Purpose - Bromelton State Development Area	Individually Assessed					

Water and sewerage demand values determined based on information contained within the Beaudesert Shire Planning Scheme – LGIP (June 2018).

For existing residential development and proposed residential development where development details are known, apply:

- 2.44 EP per detached dwelling (house)
- 1.33 EP per attached dwelling (townhouse, unit, flat, apartment etc.)

For non-residential development and proposed non-residential development where development details are known, apply:

- 0.006 EP per m^2 GFA for Retail / Commercial / Community Purpose / Medium Impact Industry / Future Industry / Industry Investigation
- 0.0048 EP per m^2 GFA for Low Impact Industry
- 0.008 EP per m^2 GFA for High Impact Industry & Extractive Industry

Table A4.5 – Somerset Planning Scheme Development Density (Urban Utilities)

Category	Planning Scheme Zone & Precinct	Development Density (EP/Ha of net dev area)					
		Water			Sewerage		
		Res	Non-Res	Total	Res	Non-Res	Total
Residential Development	Emerging Community	Individually Assessed					
	General Residential	22.1	0.0	22.1	22.1	0.0	22.1
	General Residential - Park Residential	4.7	0.0	4.7	4.7	0.0	4.7
	Rural Zone	0.0	0.0	0.0	0.0	0.0	0.0
	Rural Residential	4.7	0.0	4.7	0.0	0.0	0.0
	Township Zone	11.9	0.0	11.9	11.9	0.0	11.9
Non-residential Development	Centre - Retail	0.0	24.7	24.7	0.0	36.0	36.0
	Centre - Commercial	0.0	33.0	33.0	0.0	48.0	48.0
	Industry	0.0	24.7	24.7	0.0	36.0	36.0
	High Impact Industry	0.0	33.0	33.0	0.0	48.0	48.0
	Community Facilities	0.0	33.0	33.0	0.0	48.0	48.0

Water and sewerage demand values determined based on information contained within the Somerset Regional Planning Scheme (Version 3 – April 2018) and the Equivalent Land Uses, Zones & Precincts Supporting Information.

For existing residential development and proposed residential development where development details are known, apply:

- 2.37 EP per detached dwelling (house)
- 1.57 EP per attached dwelling (townhouse, unit, flat, apartment etc.)

For non-residential development and proposed non-residential development where development details are known, apply:

- 0.006 EP per m^2 GFA for Retail / Commercial / Community Purpose / Medium Impact Industry / Future Industry / Industry Investigation
- 0.0048 EP per m^2 GFA for Low Impact Industry
- 0.008 EP per m^2 GFA for High Impact Industry & Extractive Industry

Appendix A5 – Unitywater

Refer to the Water Netserv Plan Part A Schedule of Works Attachment 1 (Sunshine Coast Council area), Attachment 2 (Noosa Shire Council area) and Attachment 3 (Moreton Bay Regional Council area) available online at:
https://www.unitywater.com/building-and-developing/reference-library/water-netserv-plan

Appendix B – Urban Zoning Tables

The following urban zoning tables have been developed to provide guidance as to land zoning that is considered “Urban” for the purposes of fire fighting requirements in Table 4.1 Item No. A5.

Appendix B1 – City of Gold Coast

Refer to Section 3.2.2 City Shape and Urban Transformation of the City Plan and/or the Strategic Framework Map 1 – Designated Urban Areas of the Interactive Mapping of the City of Gold Coast: https://www.goldcoast.qld.gov.au/planning-and-building/city-plan-2015-19859.html

Appendix B2 – Logan City Council

Table B2.1 – LCC – Urban Zoning Table

Zoning	Precincts
Centre zone	District centre
	Local centre
	Neighbourhood centre
Community facilities zone	Community purposes
	Education
	Infrastructure
Emerging community zone	No precincts
Low density residential zone	Acreage
	Large suburban
	Small acreage
	Small lot
	Suburban
	Village
Low impact industry zone	No precincts
Low-medium density residential zone	Apartment
	Townhouse
Medium density residential zone	High rise
	Medium rise
Medium impact industry zone	No precincts
Mixed use zone	No precincts
Recreation and open space zone	Constrained open space
	Major parks
	Private sport and recreation
	Recreation parks
Rural residential zone	Carbrook
	Cottage rural
	Park living
	Park residential
Special purpose zone	Defence
	Rail

Zoning	Precincts
Specialised centre zone	Albert River tourism
	Highway business
	Loganholme tourism
	Low impact office
	Old Chatswood Road
	Underwood business

Appendix B3 – Redland City Council

Refer to Appendix F of the current published Redland Water *Water Supply Master Plan* (https://www.redland.qld.gov.au/info/20292/redland_city_plan/895/local_government_infrastructure_plan) and contact Redland City Council for urban zoning details if required.

Appendix B4 – Urban Utilities

Table B4.1 – Brisbane Region Urban Zoning Table

Brisbane City Council

Zoning
Low Density Residential
Low-Medium Density Residential
Medium Density Residential
High Density Residential
Character Residential
Tourist Accommodation
Principal Centre
Major Centre
District Centre
Neighbourhood Centre
Sport and Recreation
Open Space
Low Impact Industry
Industry
Special Industry
Industry Investigation
Community Facilities
Emerging Community
Extractive Industry
Mixed Use
Rural Residential
Special Purpose
Specialised Centre
Township

Table B4.2 – Ipswich Region Urban Zoning Tables

Ipswich Planning Scheme

Zoning	Precincts
Urban	Large Lot Residential (Urban)
	Residential Low Density
	Residential Medium Density
	Character Areas / Housing
	Major Centres
	Local Retail and Commercial
	Local Business and Industry
	Local Business and Industry Investigation
	Local Business and Industry Buffer Zone
	Character Areas Mixed Use Zone
	Business Incubator Zone
	Bundamba Race Stables Area
	Recreation
	Special Uses
	Special Opportunity
City Centre	CBD Primary Retail
	CBD North – Secondary Business
	CBD Primary Commercial
	CBD Top of Town
	CBD Medical Services
	CBD Residential High Density
Regionally Significant Business	Regional Business and Industry
	Regional Business and Industry Investigation
	Regional Business and Industry Buffer
	Special Uses
	Business Park
	Recreation
Amberley	Amberley Air Base and Aviation Zone
Rosewood	Town Centre
	Service Trades and Showgrounds
	Character Areas – Housing
	Residential Low Density
	Residential Medium Density
	Urban Investigation
	Recreation

Zoning	Precincts
Rosewood (Cont.)	Special Uses
Township	Township Residential
	Township Character Housing
	Township Character Mixed Use
	Township Business
	Showgrounds, Sport, Recreation, Service Trades and Trotting Zone
	Special Uses
Springfield	Community Residential (Structure Plan Designation)
	Town Centre (Structure Plan Designation)
	Open Space (Structure Plan Designation)
	Conservation (Structure Plan Designation)
	Regional Transport Corridor (Structure Plan Designation)
Ripley Valley	Sub-urban
	General Urban
	Urban Centre
	Urban Core
	Special District
	Recreation
	Special Uses

Table B4.3 – Lockyer Valley Region Urban Zoning Tables

Gatton Shire Planning Scheme

Zoning
Urban Residential
Commercial
Industry
Village
Park Residential
Emerging Communities
Open Space and Recreation
Community Facilities
Existing Rural Residential (Helendale Drive, Diana Crescent, Park Ridge Drive and Table Top)
Rural Residential

Laidley Planning Scheme

Zoning
Urban Residential
Village Area
Business Area
Residential Expansion
Community Purpose Area
Open Space and Reserve
Industrial
Rural Residential
Grantham Reconstruction Area
Community Purpose
Limited Development (Constrained Land)
Local Centre
Low Impact Industry
Recreation and Open Space
Residential Living
Rural Residential

Table B4.4 – Scenic Rim Region Urban Zoning Tables

Beaudesert Shire Planning Scheme

Zoning	Precincts
Mt Lindesay Corridor	Town Centre Core
	Frame
	Mixed Use
	Minor Convenience Centre
	Industry
	Residential
	Park Living
Tamborine Mountain	Business
	Gallery Walk
	Curtis Falls
	Cottage Tourist Facility
	Special Development
	Village Residential
	Restricted Residential
Rural	Village
Kooralbyn	Business
	Industry
	Residential
	Community Facilities
Bromelton	Major Industry
	Rail Dependent Industry
Canungra	Village Centre
	Mixed Use
	Residential
	Active Recreation
	Community Facilities
	Park Living
Beaudesert	Town Centre Core
	Frame
	Industry
	Residential
	Medium Density Residential
	Emerging Community
	Community Facilities

Boonah Planning Scheme

Zoning	Precincts
Shire Wide Zoning	Rural Residential
	Town
	Village
Boonah	Rural Residential
	Community Use (Town Zone)
Kalbar	Rural Residential
	Community Use (Town Zone)
	Parkland (Town Zone)
Villages	Rural Residential
	Village
	Preferred Industry Area

Ipswich Planning Scheme

Zoning	Precincts
Urban	Large Lot Residential (Urban)
	Residential Low Density
	Residential Medium Density
	Character Areas / Housing
	Major Centres
	Local Retail and Commercial
	Local Business and Industry
	Local Business and Industry Investigation
	Local Business and Industry Buffer Zone
	Character Areas Mixed Use Zone
	Business Incubator Zone
	Bundamba Race Stables Area
	Recreation
	Special Uses
	Special Opportunities
City Centre	CBD Primary Retail
	CBD North – Secondary Business
	CBD Primary Commercial
	CBD Top of Town
	CBD Medical Services
	CBD Residential High Density

Zoning	Precincts
Regionally Significant Business	Regional Business and Industry
	Regional Business and Industry Investigations
	Regional Business and Industry Buffer
	Special Uses
	Business Park
	Recreation
Amberley	Amberley Air Base and Aviation Zone
Rosewood	Town Centre
	Service Trades and Showgrounds
	Character Areas - Housing
	Residential Low Density
	Residential Medium Density
	Urban Investigation
	Recreation
	Special Uses
Township	Township Residential
	Township Character Housing
	Township Character Mixed Use
	Township Business
	Showgrounds, Sport, Recreation, Service Trades and Trotting Zone
	Special Uses

Table B4.5 – Somerset Region Urban Zoning Table

Somerset Regional Council

Zoning
Central Zone
General Residential
General Residential – Park Residential
Township
Recreation and Open Space
Emerging Community
Industry Zone
High Impact Industry Zone
Community Facilities
Rural Residential

Appendix B5 – Unitywater

Table B5.1 – Sunshine Coast Region Urban Zoning Table

Sunshine Coast Planning Scheme

Zoning
Low Density Residential
Medium Density Residential
High Density Residential
Tourist Accommodation
Principal Centre
Major Centre
District Centre
Local Centre
Sport and Recreation
Open Space
Low Impact Industry
Medium Impact Industry
High Impact Industry
Waterfront and Marine Industry
Community Facilities
Emerging Community
Specialised Centre
Tourism

Table B5.2 – Moreton Bay Region Urban Zoning Table

Moreton Bay Planning Scheme

Zoning
Centre
Community Facilities
Emerging Community
General Residential
Industry
Recreation and Open Space
Township

Table B5.3 – Noosa Shire Region Urban Zoning Table

Noosa Shire Planning Scheme

Zoning
Detached Housing
Attached Housing
Semi-Attached Housing
Village Mix
Neighbourhood Centre
Business Centre
Shire Business Centre
Community Services
Industry
Open Space Recreation