SEQ Water and Sewerage Planning Guidelines

(Version 1.0)

This document is only valid on the day it was printed.

Document History

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Document Approval

Name	Title	Signature	Date
Paul Heaton	Chief Operating Officer, Allconnex Water		
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References

Reference	Title
The Act	South-East Queensland Water (Distribution and Retail Restructuring) Act 2009
DERM Guidelines	The Department of Environment and Resource Management " Planning Guidelines for Water Supply and Sewerage", April 2010
SEQ D&C – Water Supply Code	Water Supply Code of Australia WSA 03-2011 (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ D&C – Sewer Code	Sewerage Code of Australia (WSAA 02 - 2002) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ D&C – Sewer Pumping Station Code	Sewage Pumping Station Code of Australia (WSAA 04 - 2005) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ D&C – Vacuum Sewer Code	Vacuum Sewage Code of Australia (WSAA 06 - 2008) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ D&C – Pressure Sewer Code	Pressure Sewage Station Code of Australia (WSAA 07 - 2007) (incl SEQ Amendments), Water Service Association of Australia (WSAA)
SEQ D&C – "As Constructed" specification	SEQ D&C "Drawing Specification and ADAC schema"

Contents

Part A – General Planning Principles:

1 Introduction

1.1 General

Provision of effective water and sewerage services underpins environmental, economic and public health outcomes for 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 undertaking long term planning of sustainable water and sewerage networks.

The objective of this guideline is to provide a framework for undertaking water services planning in a manner which is consistent across the region, accommodates current and future demands and delivers sustainable outcomes.

1.2 Purpose and Application of the Planning Guidelines

This guideline sets out to establish the key parameters to be applied in undertaking planning for water and sewerage infrastructure to meet the needs of the SEQ region. Adoption of these guidelines across the region should ensure application of consistent strategic thinking in the planning process.

These guidelines have been developed by the SEQ Water Service Providers. As such, these guidelines are designed for application to distribution networks and have not been developed for the bulk components of the water grid.

1.3 Planning Parameters and Service Standards

In applying these guidelines, it is important to clearly understand the intent and application of the parameters provided. In all instances, the parameters provided in this document relate to planning for the future water/sewer networks within SEQ and are not to be confused with existing standards of service.

Existing 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 are typically existing outcomes which reflect existing constraints within the network. The Desired Standards of Service, referenced in the water businesses Netserv Plans, may reflect an aspirational standard of service.

The planning parameters applied in this guideline relate to the provision of new assets. As such, the planning parameters reflect the businesses desire for service improvement and may be set at a standard above the existing service outcomes. Over time, the planning parameters and service standards may align.

As far as practical, these guidelines have sought to consolidate key parameters used by water distribution businesses across SEQ. In some instances, standardisation of planning parameters is neither practical nor possible. In these cases, different parameters may be specified for different service areas. These differences are clearly marked in the separate Water Supply and Sewerage Planning Parameters Tables.

1.4 Assessment of Existing Systems with Future Development.

SEQ-SPs will need to assess capacity of existing assets on existing planning guidelines and use the latest guidelines for future assets. Appendix D lists these existing planning guidelines for reference to assist in planning new developments.

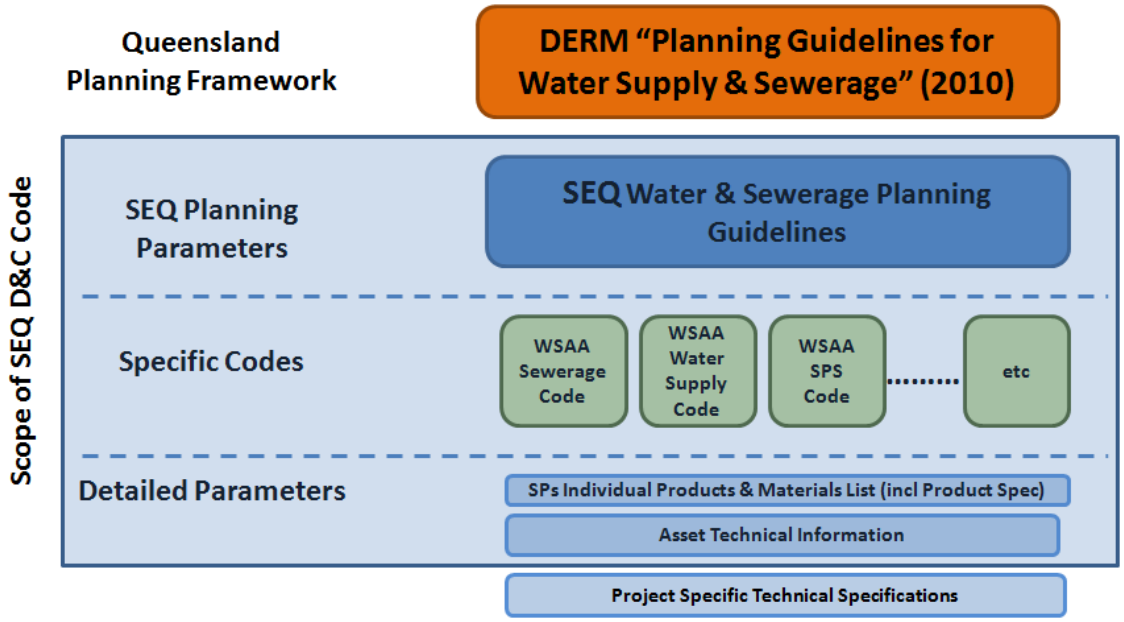
1.5 Document Hierarchy

These guidelines have been developed with the intention of being complementary to other key planning frameworks. In particular, the "Planning Guidelines for Water Supply and Sewerage" developed by the Queensland Department of Environment and Resource Management (DERM) provides an overarching framework to which this, more detailed, water services planning guideline will refer. In effect, the DERM guidelines provide the generic framework for all of Queensland, while these guidelines provide more detailed advice on the specific parameters to be used in undertaking planning within the SEQ water services networks. To avoid the risk of confusion, these guidelines do not elaborate on many of the principles contained within the DERM document. It is assumed that competent planners are aware of the DERM framework and how the (more detailed) planning parameters contained within this guideline build on DERM's more generic framework.

These guidelines have also been developed to be consistent with the various WSAA codes1. The WSAA codes (SEQ D&C Code) typically provide further, more detailed guidance at the network and asset level. The expectation underpinning these guidelines is that individual projects will be constructed to meet water service providers' specifications as contained in the WSAA codes and project level contract documentation.

The relationship between the DERM Planning Guidelines, the SEQ Water and Sewerage Planning Guidelines, the WSAA codes and project specifications is summarised in Figure 1.

Figure 1 – Hierarchy of Planning Documentation



In the event of contradiction between these four (4) levels of documentation, the provisions of THIS guideline will take precedence, except in the case where there are project specific technical specifications.

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

1.6 Structure of the Document

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

Part A – General Planning Principles: Has been developed to provide a very broad overview of key planning 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 Planning: Provides an overview of those planning parameters that drive the development and operation of the drinking water supply and non-drinking water networks;

Part C – Sewerage Network Planning: Provides an overview of those planning parameters that drive the development and operation of the sewer collection and transportation network; and

Appendix A – Demand (by Landuse) Tables

Appendix B - Dual Reticulation Areas

Appendix C – Planning Parameters Prior to 2012 GCCC

Appendix D – Broadband Technical Specification

2 Planning Objectives

2.1 Overview

This section of the guidelines provides an overview of the purpose and outcomes from all planning activities. In particular, it summarises those generic principles that cover both water and sewerage network planning. Parameters that are specifically relevant to either water or sewerage planning are contained in sections B and C of the Guidelines respectively.

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

- Ensure provision of sufficient and sustainable networks which services 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; and
- Communicate the outcomes of the planning process to decision makers through development of consistent and coherent planning reports.

2.2 Key Planning Principles

As a general guide, all water services network planning undertaken within the SEQ Water Distribution system needs to take into account the following core principles:

Regulatory framework[2] – 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 process – planning should follow an iterative process which seeks to balance infrastructure, operation and maintenance, financial, and environmental aspects to achieve the defined outcomes;

Option Analysis –planning 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 in the planning processes.

2.3 Key Elements of Planning

Sound network planning needs to reflect the following key elements;

- Identification of outcomes required by all stakeholders;
- Identification of the service need and service objectives;

[2] 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

- Determine the scope of the planning to be undertaken (i.e. Strategic/Master Planning; Concept Feasibility; Detailed Planning etc);
- Identification of the temporal framework for the planning (long term, medium term, short term);
- Identification of options , undertaking option analysis and objective demonstration of the rationale for selection of a preferred option; and
- Development of an implementation strategy.

Further detail on these key elements of planning is provided in Chapter 3 of the DERM Planning Guidelines for Water Supply and Sewerage.

2.4 Principles for Network Modelling:

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

- The derived 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);
- Wherever possible, modelling outputs should be verified against actual system performance (eg. verification from operational staff or calibration of the model using “real world” outcomes). Ideally, such calibration should be undertaken with reference to historical data. Results for actual system performance will inform updates of this guideline. However, on smaller network 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:

A key outcome of network planning is to maximise the efficiency and capability of the existing network as well as integrate augmentation planning with the business’s asset renewal/rehabilitation program. The success of good planning may be measured by the gradual improvement in the business’s overall cost of operation over the lifecycle of its asset portfolio.

To achieve this outcome, it is recommended that network planning be undertaken with the involvement of operations staff and that the outcomes of the planning are integrated with the business’s broader capital program (both augmentation and renewal).

In addition, all planning reports shall include a detailed assessment of the lifecycle cost of alternative options. The expectations of the water service providers is that the planners will provide appropriate “fit for purpose”, maintenance regimes for alternative options.

Lifecycle cost estimate parameters must be verified with the relevant water service provider before final adoption. In the absence of guidance from the water service provider, the following parameters 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 4121; 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 Trunk Sewers shall be deemed to be 0.5% of capital cost;
- Annual Maintenance Cost of Water Mains and Rising Mains 0.65% of capital cost;
- 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

  (eg , 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 planning function encompasses a broader (holistic) assessment of all of the business's activities and targeted outcomes. As such, all planning reports shall include estimation of the carbon footprint of each of the proposed options. Calculation of the carbon footprint shall be undertaken using the National Greenhouse and Energy Reporting System (NGERS) Calculator.

2.7 Exclusions

Small isolated communities such as North Stradbroke Island and Southern Moreton Bay Islands may operate more effectively at different planning parameters, these parameters will be supplied by the relevant SEQ-SP on application.

Part B – Water Supply Network Planning

3 Overview:

This section of the guidelines provides a summary of those planning parameters which are specific to Water Supply Network Planning. To ensure ease of use, key Water Network Planning Parameters for each water service provider are summarised in Section 2. These parameters define the specific inputs to be used while sections 3 and 4 provide further explanation on HOW these parameters are to be applied when undertaking detailed network modelling and planning.

In most cases, the parameters 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 Planning Parameters – Water Supply

4.1 Key Planning Parameters

The key planning parameters relevant to each water distribution/retail network are summarised in Table 4.1 – Conventional (Potable Water) network, and Table 4.2 – Dual Reticulation. Properties that are served or to be served by Dual Reticulation are identified in a set of maps showing the future Dual Reticulation areas are detailed in Appendix C.

Planners should be aware of the key differences in the operational strategies of the water service providers within SEQ (refer section 6.0).

NB: Figures are given in terms of EP – Equivalent Persons in Table 4.1. Supporting documentation can use either EP or ET. Conversion between EP and ET depends on population and planning scheme densities.

Table 4.0 - EP/ET Conversion Factors for single residential family households

Year	Source	EP/ET Conversion RAte
Allconnex Water -Gold Coast area		
2006-2011	PIFU (Planning Information Fact Unit) 2008 data tables provided to Councils	2.73
2012-	PIFU	2.66
Unitywater – SCRC Central Region		
NA	All areas	2.7

Table 4.1 - Water Network Planning Parameters – Single Supply (Drinking Water Only) Network

No	Parameter	Allconnex Water							QUU		Unity Water
A. Drinking Water – Conventional (Single) Supply Zone		**Gold Coast**					**Logan**	**Redland**			
A1	**Average Day (AD) Demand Residential (Note EP/ET conversion rate provided in separate tables from Water Service Provider)**	200 L/EP/d (Residential Detached)					230 L/EP/d (residential Detached)				
A2	**Estimated Non-Revenue Water (NRW)**	20 L/EP/d					30 L/EP/d (target)		50 L/EP/d		
A3	**Peaking Factors**	Residential (single detached)	Multi-Residential	Commercial /Public	Industrial	Tourist	Open Space	Residential	Commercial/Industrial	Low and Med Density Res	High Density Res	Commercial/Industrial
	MDMM/AD	1.27		1.06	1.06	1.76	1.15	1.5		1.5	1.5	1.5
	PD/AD	1.75	1.45	1.12	1.12	2.51	1.37	1.9	1.2	2	2	2
	PH/PD	2.12							1.3	2	1.75	1.4
	PH/AD	6.03	2.97	2.32	1.54	6.03	2.40	3.8	2.75	4	3.5	2.8
A4	**Pressure Desired minimum SERVICE pressure Urban and Rural Normal operating conditions**	22m at property boundary (under normal operating conditions (PH))						21m at property boundary (under normal operating conditions (PH))				
	In areas defined by the SP, properties with domestic private booster pumps	12m at the suction side of private booster										
	Desired Maximum SERVICE Pressure	80m = maximum service pressure; 55 = TARGET service pressure							60m			
	Emergency fire operating conditions (Minimum Residual Mains Pressures)	9m minimum for infrastructure in small isolated or high elevated areas within the existing water supply zone					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		At the flowing hydrant: 12m At customer connections: 6m At all other locations in the network: 0m		12m min at the main at the hydrant; Min of 6m	
A5	**Fire Fighting Rural**	Rural Residential only): 7.5L/s for 2 hours Rural Commercial: 15L/s for 2 hours							Rural (>5,000m2 lots): 7.5L/s for 2 hours			
	Urban	Residential - 15L/ for 2 hours Commercial/Industrial – 30L/s for 4 hours or 15L/s for 2 hours in small community/rural;							Semi-Rural (1,000 to 5,000 m2 lots):15 L/s for 2 hours Low Density Urban (1-3 storeys) Tin/Timber:25 L/s for 2 hours Low Density Urban (1-3 storeys) Brick/Tile: Greenfield 25 L/s for 2 hrs Brownfield 15 L/s for 2 hrs Medium Density Urban (4-6 storeys): Greenfield 45 L/s for 4 hrs Brownfield 30 L/s for 4 hrs High Density Urban (>6 storeys): 60 L/s for 4 hrs City CBD/Inner City High Rise Case by case but in the order of 300 L/s for 4 hours Commercial/Industrial Greenfield 45 L/s for 4 hrs Brownfield 30 L/s for 4 hrs		Detached Res (<= 3 stories)– 15Ls for 2hrs w background Demand highest of 2/3 PH or AD Multi story Res => 4 levels – 30L/s for 4 hours w background Demand highest of 2/3 PH or AD Commercial/Industrial buildings – 30L/s for 4 hours w background Demand of PH demand (between 10am and 4pm) Risk Hazard Buildings – assessed on needs basis
	Boosters and PRVs	Single feed zone: 80 L/s + background demand Dual feed zone: 50 L/s										
	Background Demand	Res: 2/3 PH (not less than AD) and +ve residual pressure at PH Non Res: PH for localised Commercial/industrial; 2/3 PH for water supply zone. Worst case scenario should be used based on reservoir at MOL.							2/3 x residential peak hour demands plus 1 x non-residential peak hour demands.		As stated for each case above	
A6	**Reservoir storage—operational capacity**	GROUND LEVEL RESERVOIR: 3 x (MD – MDMM) + Emergency Storage (MD – Max Day)							GROUND LEVEL RESERVOIR: Storage – Usable Volume of 1 x Peak Day (ML) + 0.5ML fire-fighting storage Min Operating Storage – four consecutive hours of demand			
		ELEVATED RESERVOIR: 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										
A7	**Reservoir Pump Servicing Requirements**											
	Ground level reservoir – Duty Pump											

No	Parameter	Allconnex Water			QUU	Unity Water
A. Drinking Water – Conventional (Single) Supply Zone		Gold Coast	Logan	Redland		
		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	**Trunk Distribution 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 Hr and fire flow performance	
	- Pipe: Trunk Reticulation					
	Peak pipe velocity	2.5m/s				
A9	**Pipe Friction Losses Based on the preferred material types outlined in the SEQ Water Supply Code (as amended). Any variation form these material types needs to be subject to further investigation**	Hazen Williams Friction Factors for internal diameter <= 300mm, C=110 <300mm-600mm, C=120 >600: 125 Additional Design Criteria: Head Loss rate limits (PH) to be: 5m/km for DN<=150 3m/km for DN>=200				

Table 4.2 - Water Network Planning Parameters – Dual Supply Network

No	Parameter	Allconnex Water Value					QUU Value		Unitywater Value							
C. Drinking Water System in a Dual Supply Zone																
C1	**Average Day Demand** **Case 3 : Potable water plus recycled water (Class A+ Greenfield scenario One)** **Case 4 : Potable water plus rainwater tanks plus recycled water (Class A+ Aggressive case – Greenfield scenario Two)**	Residential Single Family	Case 3 Case 4	182 L/EP/d 132			All Cases ADD (potable water) – 130 L/EP/d		All Cases ADD (Potable water) = 150 L/EP/d							
		Residential Multi Family	Case 3 Case 4	232 L/EP/d 165												
		Commercial/Public	Case 3 Case 4	165 L/EP/d 165												
		Industrial	Case 3 Case 4	298 L/EP/d 298												
		Tourist	Case 3 Case 4	232 L/EP/d 165												
		Open Space	Case 3 Case 4	83 L/EP/d 83												
C2	**Peaking Factors** **MDMM/AD (MDMM – Mean Day Max Month)** **PD/AD (PD – Peak Day; AD – Average Day)** **PH/PD Peak hour (PH) AD Average Day)**			**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	2.4	4.0								
		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										
C4	**Reservoir Storage**	As Per Drinking Water – Single Supply Zone					Peak Day		1.8 MD							
C5	**Pressure**															
	Minimum pressure *** Normal operating conditions** *** Properties with private boosters**	System requirements as per potable network														
	- Maximum pressure															
	- Emergency fire operating conditions															
C6	**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.		System requirements as per potable network							
C7	**Water Pump Servicing Requirements**	As Per Drinking Water – Single Supply Zone														
C8	**Trunk Distribution Capacity Requirements**	As Per Drinking Water – Single Supply Zone														
C9	**Pipe Friction Losses (Hazen Williams 'C' Values)**	As Per Drinking Water – Single Supply Zone														
D. Non-Drinking Water – Dual Supply Zone		**Allconnex Water Value**					**QUU Value**		**Unitywater Value**							
D1	**Average Day & Peak Day Demand (ADD & PDD)**	Residential Single Family	Case 3 Case 4	149 L/EP/d 149			ADD (RW) – 100 L/EP/d		ADD (RW) – 80L/EP/d (based on field information in SC region and paper published in AWA Journal (July 2011) by XJ Wang)							
		Residential Multi Family	Case 3 Case 4	100 L/EP/d 100												
		Commercial/Public	Case 3 Case 4	165 L/EP/d 165												
		Industrial	Case 3 Case 4	33 L/EP/d 33												
		Tourist	Case 3 Case 4	100 L/EP/d 100												
		Open Space	Case 3 Case 4	248L/EP/d 248												
D2	**Peak Day (PD) Peaking Factor (PD/AD)**			**MDMM/AD**	**PD/AD**	**PH/AD**	5.0		**SFR & RUR**		**MFR**		**COM**		**IND**	
		Residential Single Family	Case 3 Case 4	1.33 1.53	1.70 1.93	6.12 6.60										
		Residential Multi Family	Case 3 Case 4	1.21 1.33	1.45 1.59	2.67 2.67			2.5		2.6		2.2		2.2	
		Commercial/Public	Case 3 Case 4	1.08 1.13	1.18 1.24	2.32 2.32										

No	Parameter	Allconnex Water Value					QUU Value	Unitywater Value			
		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					
D3	**Peak hour (PH) Peaking Factor (PH/AD)**	See D2					9.5	7.1	5.9	3.3	3.1
D4	**Reservoir Storage**	Operating Volume 3*(MD-MDMM) Emergency storage As defined by Council in commercial, industrial and high density zones. Greater of 4 hrs MDMM demand or 0.5ML Zone <350 ET - 150 kL Elevated Storage Capacity – Capacity = Operating Volume + 150 kL Fire Storage Operating volume Water supply zones where 8 hours x MH is less than or equal to MDMM demand, operating volume = 2 hours x MH Water supply zones where 8 hours x MH is greater than MDMM demand, operating volume = 6 x (MH - (MDMM/12))						0.5 x PD	Ground Level RW Res: 1.5 x MD + 30% emergency storage Elevated RW Res: 6 x (PH – 1/12 MDMM)+150kl fire storage			
D5	**Pressure**						As per Drinking Water – Single Supply Zone >10m (normal operation)				
	Minimum pressure *** Normal operating conditions** ***Pressure managed areas**	17m 20m						17m			
	- Maximum pressure	75m					As per Drinking Water – Single Supply Zone	70m			
	- Emergency fire operating conditions	9m					As per Drinking Water – Single Supply Zone	Min pressure difference – 5m (targeted pressure difference – 10m)			
D6	**Fire fighting**	As per Drinking Water – Single Supply Zone						NA			
D7	**Water Pump Servicing Requirements**	As per Drinking Water – Single Supply Zone						WPS serving Ground Level Res – MDMM over 20 hours per day WPS serving elevated Res – (6xPH-operating vol)/2 x 3600) Stand by Pump Spec – equivalent to largest pump duty in all cases			
D8	**Trunk Distribution Capacity Requirements**	As per Drinking Water – Single Supply Zone						Bulk supply pipes (under gravity) - MDMM over 24 hours Bulk supply pipes (pumped supply) – MDMM over 20 hours/day Mainta8ining pressure at max hour and for fire flow performance Max pipe velocity – 2.5m/s			
D9	**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 uses is available from each of the water service providers.

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

All planning 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. These guidelines will be updated regularly to reflect unit loads and demand patterns based on actual data and system performance.

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 Table 4 or is available from the demand tables provided by the Distribution Retail businesses.
- 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 planning horizon of greater than 100 ML/yr), demand is to be individually calculated and listed separately in the planning assumptions.

5.3 Non Revenue Water

Non Revenue Water has been determined by the water service providers businesses as the difference between the total customer meter readings and the total bulk water meter readings. For the purposes of planning, the extent of Non Revenue Water is stated in Table 4.

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.

Peaking Factors are to be confirmed with Service Providers

5.5 Calculated Demand Rates

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

Average Day Demand

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

Peak Day Demand

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

Peak Hour Demand

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

5.6 Hydraulic Modelling Scenarios

The following scenarios should be considered in undertaking network planning:

Steady State Analysis

5.6.1 Peak Hour

Purpose:

To assess minimum, peak hour condition customer pressures with respect to the DSS.

Assumptions:

- Peak Hour Demands;
- All water reservoirs at half between Top Water Level (TBL) and Bottom Water Level (BWL) and;
- Pumps and control valves set such that minimum boundary HGL conditions exist for the pressure zone being analyzed[3].

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

5.6.2 Fire-Flow

Purpose:

To assess the total available fire flow capacity of the network water mains with respect to the DSS.

[3] 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 4.14;
- All water reservoirs at half between Top Water Level (TWL) and Bottom Water Level (BWL).

5.6.3 Extended Period Simulation Analysis

Peak Day (3 consecutive days)

Purpose:

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

- Reservoirs never empty;
- Reservoir minimum contingency storage levels are maintained 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 (check appropriateness of individual service area operations);
- Network model to commence at 12:00 am; and;
- Ultimate demand diurnal.

The planner 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 planner 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 planner shall confirm with the water service provider whether water hammer modelling needs to be undertaken.

Where water hammer analysis is undertaken, consideration is to be given to the following:

[4] E.g.. background demand assumptions.

Contributing factors:

- Operating flow; and
- System head

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;
- 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 pipework when pumping into a system and not a reservoir. The planner must also be able to demonstrate that the mitigation device proposed can operate effectively under power failure conditions

6 Water Supply Network Planning Considerations

6.1 Reservoir Sizing and Water Quality

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.

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, equivalent to the Minimum Operating level (MOL), 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 capacity 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:

Planners must ensure that the section of network they are designing retains sufficient fire fighting provision. As such, all planning and design must meet the requirements of the water service providers “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.

6.1.4 Private Building Fire Systems

At the time of design of many private building fire systems, minimum available water main flows and/or pressures were deemed to be sufficient to not require on-site fire pumps or fire tanks. The water services businesses do not to evaluate the performance of private fire systems, nor aim to ensure their compliance with the relevant building codes and standards . However, where planning projects have a significant change in the network’s available fire flows, planning should consider the potential impacts on private building fire systems, and recommend planning outcomes be complemented by customer consultation and communication.

6.1.5 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;
- cost benefit of constructing in stages;
- % of total storage taken up by the minimum operating storage requirement;
- 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 MOL rises, the available buffer storage decreases. A maximum MOL of around 45% of the total available storage should be set as a trigger for the construction of a new reservoir or augmentation of the supply system.

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.

6.1.6 Constant Flow / Trickle Top Up System

Constant flow 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.

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 Water Service Provider.

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

6.3.1 Pipe selection

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

6.3.2 Temporary Cross Links:

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

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 planning and design needs to be undertaken in a manner which will deliver the objectives of the water service providers 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, planning and design should include (at a minimum) consideration of the following parameters:

- Minimising storage time at reservoirs (i.e. elimination of long detention), incorporating provision to ensure stored water is well mixed. Preference is given to reservoirs which have a separate inlet/outlet (common inlet/outlets should be avoided)
- Minimising of detention5 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 and planning (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 Water Service Providers and reflect that businesses statutory 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 level of detail in the plan must be of sufficient detail and complexity to support the water service providers Drinking Water Quality Plan.

[5] Tables 2.1 and 2.2 provide preferred maximums or water storage in reservoirs and in the network.

8 Non-drinking Water

8.1 General:

All water service providers allow for the provision of non-drinking water networks which may supplement the potable water network.

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

- Queensland Urban Utilities does not allow non-drinking water to be used within the building envelope;
- Unitywater and Allconnex Water 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 planned to meet the requirements of the water service providers Recycled Water Management Plan

Part C - Sewerage Network Planning

9 Overview:

This section of the guidelines provides a summary of those planning parameters which are specific to Sewerage Network Planning. To ensure ease of use, key Sewer Network Planning Parameters for each water service provider is contained in Section 10. These parameters 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 planning.

In most cases, the parameters 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 Planning Parameters – Sewerage

10.1 Key Planning Parameters

The key parameters relevant to planning for the sewerage network are summarised in Table 10 below

Table 10 - Sewerage Network Planning Parameters

No	Parameter	Allconnex Water			QUU Value	Unitywater
		Gold Coast	Logan	Redland		
E1	**Average Dry Weather Flow (ADWF)**	Smart Sewers (RIGS ONLY) - 200 L/EP/d	Smart Sewers (RIGS ONLY) - 180 L/EP/d	Smart Sewers (RIGS ONLY) - 200 L/EP/d	Smart Sewers (NuSewer ONLY) - 180 L/EP/d	Smart Seers (RIGS or NuSewer) - 180 L/EP/d
		For "baseline" calculations for existing (Conventional) Sewer – 210L/EP/d				
E2	**Peak Dry Weather Flow (PDWF)**	PDWF = C2 X ADWF where C2 = 4.7 X (EP) -0.105			NuSewer - d x SF + GWI Where: SF = Sanitary Flow of 150L/EP/d GWI = Groundwater Infiltration of 30L/EP/d	PDWF = C2 X ADWF where C2 = 4.7 X (EP) -0.105 EP is the total equivalent population in the catchment gravitating to a pump station
E3	**Peak Wet Weather Flow (PWWF)**	RIGS PWWF = 5 x ADWF			PWWF = PDWF + Rainfall Dependent Inflow(RDF) RDF = 360L/EP/d	Smart Sewers: Mains PWWF = (5 x ADWF)
		Vacuum Sewerage Mains PWWF = (4 x ADWF) A peaking factor of 4 is reasonable to take into account reduced I/I into a vacuum system.				
E4	**Pump Station Servicing Requirements**	Ops Storage = 0.9 x Q / N			(0.9 x Single pump capacity L/s)/ N	
	Operating storage (m3)	Q = pump rate (L/s) of duty pump or Total Pump Capacity (L/s) if multiple duty pumps. However, Number of starts in Allconnex are: N=12 for motors<100kw N=8 for 100-200kw N=5 of motors >200kw			. N = 12 starts for motors less than 50kW. N = 5 starts for motors greater than 50kW.	
	Minimum Wet Well diameter	As shown in the Sewer Pump Station Code (As amended)				
	Emergency storage (new)	4hrs at ADWF of "in catchment"storage (i.e. upstream pump stations turned off) or suitable alternative agreed by SP is a sufficient minimum pending risk analysis			3 hrs Ultimate PDWF (New PStn)	6hrs at ADWF of "in catchment storage (i.e. upstream pump stations turned off) is a sufficient minimum pending risk analysis
	Emergency storage (existing)	Storage volume measured from above duty pump start level in wet Well and can include system storage below wet well overflow level			3 hrs Ultimate ADWF (existing)	Minimum 4 hours (up to 6hours) subject to risk assessment
	Pump Operation Mode6	Duty/assist			Duty/Standby	
	Single pump capacity	Min pump capacity for PStns(duty & assist) = C1 x ADWF Where C1 = 15 x (EP) – 0.1587 Minimum value of C1 to be 3.5 - 5			For SPS with 2 pumps, EACH pump delivers minimum 5 x ADWF For SPS with 3 pumps, 2 pumps delivers minimum 5 x ADWF (third pump has same capacity as the larger of the other 2)	
	Total pump station capacity	PWWF (although, note that Allconnex PWWF is a flat flow rate and is not calculated as a function of ADWF as is proposed by QUU and UW)			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).	
	Size of Pump Station Lot (and buffer)	Refer Clause 5.2.4 of Sewer Pump Station Code (As amended)				
E5	**Grinder Pump Installation (Low Pressure Sewer)** **- Peak Wet Weather Flow (PWWF)**	900 L/EP/d (equivalent of 24 hour storage "on lot")				
E6	**Rising Main Requirements**					
	Preferred Velocity	1.5m/s			1.0 – 1.5 m/s (depending on size of main)	
	Minimum velocity	Min velocity > 0.75m/s				
	Maximum velocity	2.5-3m/s (depending on size: Refer WSAA Sewer Code WSA04 Appendix D – Pressure Main Calculator, section D3.3)				
	Roughness coefficient	Colebrook White formula to be applied in accordance with Australian Standard (AS) 2200				
	Odour Management Requirements	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)				
E7	**Gravity Sewer Requirements (Conventional)** **- Roughness Equation** **- Pipe friction coefficient**	Mannings All Smart Sewers (Nu Sewer and RIGS) - n = 0.0128				

EP	30	300	600	1.2k	3k	12k	20k	50k	100k	500 k
d"	7.8	4.2	3.7	3.2	2.7	2.2	2.0	1.9	1.8	1.7

[6] 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="3">Allconnex Water</th><th colspan="2">QUU Value</th><th>Unitywater</th></tr>
<tr><th></th><th></th><th>Gold Coast</th><th>Logan</th><th>Redland</th><th colspan="3"></th></tr>
<tr><td></td><td>- Minimum pipe grades
(subject to minimum velocity stated below)</td><td colspan="6">Minimum Sewer Grades
<table>
<tr><th>RIGS (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>375</td><td>400</td><td>375</td><td>1:550</td></tr>
<tr><td></td><td>500</td><td>450</td><td>1:700</td></tr>
<tr><td></td><td></td><td>525</td><td>1:750</td></tr>
<tr><td></td><td>630</td><td>600</td><td>1:900</td></tr>
<tr><td></td><td></td><td>675</td><td>1:1050</td></tr>
<tr><td></td><td>800</td><td>750</td><td>1:1200</td></tr>
<tr><td></td><td></td><td>825</td><td>1:1380</td></tr>
<tr><td></td><td>1000</td><td>900</td><td>1:1600</td></tr>
<tr><td></td><td>1200</td><td>1050</td><td>1:2000</td></tr>
<tr><td></td><td></td><td>1200</td><td>1:2400</td></tr>
<tr><td></td><td></td><td>1350</td><td>1:2800</td></tr>
<tr><td></td><td></td><td>1500</td><td>1:3250</td></tr>
<tr><td></td><td></td><td>1650</td><td>1:3700</td></tr>
<tr><td></td><td></td><td>1800</td><td>1:4200</td></tr>
<tr><td></td><td></td><td colspan="2">Note 1 – where approved by the Water Agency, DN 150 main line sewers may be laid at 1:200 in Canal Developments together with a Water Agency agreed reduction in the minimum PDWF Velocity Criteria for the DN 150 main line sewer</td></tr>
</table></td></tr>
<tr><td></td><td>Maximum depth of flow</td><td colspan="6">Suggested Option: 75% d (at PWWF)</td></tr>
<tr><td></td><td>Minimum Velocity</td><td colspan="6">0.7m/s at PDWF
Maximum: 3.0m/s (refer Cl 4.5.9.1 of the 2002 Sewer Code)</td></tr>
<tr><td>E9</td><td>Average Dry Weather Flow (ADWF) for Treatment Plants</td><td colspan="3">263L/EP/d</td><td colspan="2"></td><td></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 is available from each Service Provider . 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

11.2 Unit Loads

All planning 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. These guidelines will be updated regularly to reflect unit loads and demand patterns based on actual data and system performance.

Current and projected loading (per EP) for each area will be stated in terms of Average Dry

Weather Flow (ADWF). 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).

Estimates of EP loading for various types of development are available from each of the water service businesses. Unless notes 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 water service provider 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 planning horizon of greater than 5,000kl/annum), demand is to be individually calculated and listed separately in the planning assumptions.

Peak loads (PWWF and PDWF) should be determined with reference to ADWF using the parameters outlined in Table 10 above. 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 the following 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:

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

Table 4 – Modelling Scenarios

Scenario	Required Performance Criteria
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 service provider 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).

13 Sewer Network Planning Considerations

13.1 Gravity Sewers

Pipe selection shall be undertaken in accordance with the parameters in Table 10 and the SEQ D&C Sewerage Code. For planning 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 headless 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 smaller diameter 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.

There are no downstream connections to the trunk 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 225 mm in diameter unless approved by SEQ-SP.

13.3 Pumping Stations

13.3.1 General:

Pump Stations within QUU and Unitywater will operate on a “duty standby” basis. Allconnex Water 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 “Preferred Materials and Products” has been developed as part of the SEQ D&C Code and is available from each water service provider 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 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 Service Providers, Only very limited extensions to existing systems will be considered

13.4 Septicity and Odour

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 gaseous hydrogen sulphide concentration in the sewer headspace shall not exceed 15ppm. If modelling predicts concentrations greater than 15ppm, then either pump station chemical dosing or headspace gas extraction/treatment will be required.

Appendix A – Demand (by Landuse) Tables

Appendix A1 – Allconnex Water

Table 1 - GCCC Planning Scheme Planned Demand - Domains (AW – Gold Coast Area)
For planned demand for GCCC planning scheme local area plans & structure plans refer to Council's Planning Scheme Part 8, Division 2, Tables 2-58 and 2-59

Projection Category (Domain)	Planning Scheme Use Type	Development Density (ET/Ha of net dev area)		
		Water Supply	Wastewater	Data source
Detached Dwelling - where overlay Map OM5 applies	OM5 Constraint = Min Lot Size 1000m2	10	10	Table 2.55 - GCCC PIP
	OM5 Constraint = Min Lot Size 2000m2	5	5	Table 2.55 - GCCC PIP
	OM5 Constraint = Min Lot Size 4000m2	2.5	2.5	Table 2.55 - GCCC PIP
Detached Dwelling - All other	Size (NDA) if existing site to be developed: up to 500m2	20	20	Table 2.55 - GCCC PIP
	Size (NDA) if existing site to be developed: 501m2 - 799m2	16	16	Table 2.55 - GCCC PIP
	Size (NDA) if existing site to be developed: 800m2 - 1199m2	16	16	Table 2.55 - GCCC PIP
	Size (NDA) if existing site to be developed: 1200-2399m2	18	18	Table 2.55 - GCCC PIP
	Size (NDA) if existing site to be developed: > 2400m2	20	20	Table 2.55 - GCCC PIP
Park Living		3	0	Table 2.55 - GCCC PIP
Residential Choice	RD 2	20.79	20.79	Table 2.55 - GCCC PIP
	RD 3	25.2	25.2	Table 2.55 - GCCC PIP
	RD 4	31.5	31.5	Table 2.55 - GCCC PIP
	RD 5	55	55	Table 2.55 - GCCC PIP
	RD 6	82.5	82.5	Table 2.55 - GCCC PIP
	RD 7	110	110	Table 2.55 - GCCC PIP
Tourist and Residential	RD 4	31.5	31.5	Table 2.55 - GCCC PIP
	RD 5	60	60	Table 2.55 - GCCC PIP
	RD 6	90	90	Table 2.55 - GCCC PIP
	RD 7	120	120	Table 2.55 - GCCC PIP
	RD 8/RDX	231	231	Table 2.55 - GCCC PIP
Village (Mixed Use)	Size (NDA) if existing site to be developed: up to 500m2	16	16	Table 2.55 - GCCC PIP
	Size (NDA) if existing site to be developed: 501m2 - 799m2	16	16	Table 2.55 - GCCC PIP
	Size (NDA) if existing site to be developed: 800m2 - 1199m2	16	16	Table 2.55 - GCCC PIP
	Size (NDA) if existing site to be	16	16	Table 2.55 - GCCC

Projection Category (Domain)	Planning Scheme Use Type	Development Density (ET/Ha of net dev area)		
		Water Supply	Wastewater	Data source
	developed: 1200-2399m2			PIP
	Size (NDA) if existing site to be developed: > 2400m2	16	16	Table 2.55 - GCCC PIP
Integrated Business	RD5	55	55	Table 2.55 - GCCC PIP
	Uncoded	32	32	Table 2.55 - GCCC PIP
Local Business	RD 2	20.79	20.79	Table 2.55 - GCCC PIP
	RD 3	25.2	25.2	Table 2.55 - GCCC PIP
	RD 5	55	55	Table 2.55 - GCCC PIP
	Uncoded	20	20	Table 2.55 - GCCC PIP
Fringe Business	RD 2	20.79	20.79	Table 2.55 - GCCC PIP
	RD 3	25.2	25.2	Table 2.55 - GCCC PIP
	RD 5	55	55	Table 2.55 - GCCC PIP
	Uncoded	20	20	Table 2.55 - GCCC PIP
Industrial 1		16	16	Table 2.55 - GCCC PIP
Industrial 2		16	16	Table 2.55 - GCCC PIP
Extractive Industry		10	0	Table 2.55 - GCCC PIP
Marine Industry		10	10	Table 2.55 - GCCC PIP
Community Purpose		15	15	Table 2.55 - GCCC PIP
Public Open Space		0.3	0.01	Table 2.55 - GCCC PIP
Private Open Space		20	20	Table 2.55 - GCCC PIP
Rural		0	0	Table 2.55 - GCCC PIP

Table 2 Typical Water and Wastewater Supply Demand Generation Rates for Development Types (Gold Coast Area)

Development Type	Development Unit	Demand Equivalent Conversion Rate
Car Wash	Lane	1.0 ET / Lane
Caravan Park	Site	0.3 ET / Site
Child Care Centre	Pupil / staff member	0.05 ET per Pupil / staff member
Commercial (other)	100 m2 GFA	0.6 ET / 100 m2 GFA
Conference / meeting venue	100 m2 GFA	1.6 ET /100 m2 GFA
Detached Dwelling	Dwelling	1 ET/dwelling
Entertainment / Cinemas	100 m2 GFA	2.0 ET / 100 m2 GFA
Family Accommodation	Additional Dwelling	0.275 ET / Additional Dwelling
Hospital	Bed	0.5 ET / Bed
Hostel Accommodation	Bed	0.24 ET / Bed
Hotels / Clubs	Flushing Unit, Water Closet and Urinal	1.1 ET / Flushing Unit, Water Closet and Urinal
Industry	100 m2 GFA	0.36 ET / 100 m2 GFA
Laundromat	Washing Machine	0.4 ET / Washing Machine
Marina (Live aboard)	Berth	0.8 ET / Berth
Marina (Commercial)	Berth	0.2 ET / Berth
Marina (Transient Moorage)	Berth	0.4 ET / Berth
Medical / Dental Centre	Consultation Room	0.3 ET / Consultation Room
Motel / Hotel	Bedroom	0.6 ET / Bedroom
Multi Unit Dwelling 1 bedroom/studio	Dwelling	0.47 ET/ Dwelling
Multi Unit Dwelling 2 bedroom	Dwelling	0.63 ET/Dwelling
Multi Unit Dwelling 3 bedroom +	Dwelling	0.9 ET/Dwelling
Nursing Home	Bed	0.26 ET / Bed
Office	100 m2 GFA	0.6 ET / 100 m2 GFA
Restaurant / Café / Fast Food	Seat	0.05 ET / Seat
Retail	100 m2 GFA	0.6 ET / 100 m2 GFA
School - Primary	Pupil / staff member	0.03 ET per Pupil / staff member
School - Secondary	Pupil / staff member	0.03 ET per Pupil / staff member
School – Tertiary/Further with accom	Pupil / staff member	member 0.1 ET per Pupil / staff
School – Tertiary/Further without accommodation	Pupil / staff	member 0.01 ET per Pupil / staff member
Other development type or where development type is deemed to be a water intensive development.		Demand generation rate to be determined having regard to proposed development.

Interim Demands for Reconfiguring Park Living, Non Residential & Management identifies the interim demands for the reconfiguration of park living, non-residential and management lots.

Purpose of Reconfiguration	Development Unit	Demand Equivalent Conversion Rate
Park Living Lot	Proposed lot	1 ET/Lot
Non-residential (eg office, retail,industrial & other non-residential type development	Proposed lot	1 ET/Lot
Management	Proposed lot	1 ET/Lot

Note: Multi unit dwellings include units, flats, townhouses, duplexes and triplexes

Table 3 – Logan Planning Scheme Development Density by Locality

Locality	Development	Unit or Basis	Development Density (ET/Unit)		
			Water	Sewerage	Data source
Residential Locality	Development, other than a dual occupancy or a multi-unit development, in the residential 250 zone, the Residential 600 zone, the Residential 1000 zone or the Residential 2000 zone, in respect of premises where the site area exceeds 600m2.	Lot	3.2	3.2	Logan City Planning Scheme 2006 Policy 7, Schedule 2
	Development, other than a dual occupancy or a multi-unit development, in the Residential 250 zone, the Residential 600 zone, the Residential 1000 zone and the Residential 2000 zone, in respect of premises where the site area is 450m2 or greater but not greater than 600m2.	Lot	3.0	3.0	Logan City Planning Scheme 2006 Policy 7, Schedule 2
	Development, other than a dual occupancy or a multi-unit development, in the Residential 250 zone, the Residential 600 zone, the Residential 1000 zone and the Residential 2000 zone in respect of premises where the site area is less than 450m2.	Lot	2.8	2.8	Logan City Planning Scheme 2006 Policy 7, Schedule 2
	Development, other than a dual occupancy or a multi-unit development in the Residential 5000 one.	Lot	3.2	3.2	Logan City Planning Scheme 2006 Policy 7, Schedule 2
	Development other than a dual occupancy or a multi-unit development in the Residential 10000 zone.	Lot	3.2	3.2	Logan City Planning Scheme 2006 Policy 7, Schedule 2
	Development for a dual occupancy.	Dwelling Unit	2.8	2.8	Logan City Planning Scheme 2006 Policy 7, Schedule 2
	Development for a multiunit development.	Dwelling Unit	2.0	2.0	Logan City Planning Scheme 2006 Policy 7, Schedule 2
Open space and conservation locality	Development for a residential use.	Lot	2.8	2.8	Logan City Planning Scheme 2006 Policy 7, Schedule 2
	Development for a use other than a residential use.	Subject to assessment by the local government.			Logan City Planning Scheme 2006 Policy 7, Schedule 2
Centres locality	Development for a use other than a general industry or a noxious or hazardous industry.		30 (Water supply)	50 (Sewerage)	Logan City Planning Scheme 2006 Policy 7, Schedule 2
	Development for a general industry or a noxious or hazardous industry.		50 (Water supply)	80 (Sewerage)	Logan City Planning Scheme 2006 Policy 7, Schedule 2

Table 4 – Redlands Planning Scheme Development Density by Type

Category	Types of Use	Unit or Basis	Development Density (ET/Unit)		
			Water	Sewerage	Data source
	Aged Persons and Special Needs Housing	(1 bedroom)	0.33	0.33	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
		(2 bedroom)	0.57	0.50	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
		(3 bedroom)	0.76	0.63	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Hostel	(per person)	0.28	0.33	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Nursing Home	(per bed)	0.31	0.35	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Apartment Building	(per unit)	0.53	0.68	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Bulky Goods Showroom	(per 100m2 floor area)	0.14	0.20	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Child Care Centre	(per child)	0.04	0.03	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Commercial Office	(per 100m2 floor area)	0.13	0.17	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Community Facility-Welfare Premises	(per lot)	0.64	0.40	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Display and Sale Activity	(per 100m2 floor area)	0.48	0.20	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Dual Occupancy	(per unit)	0.53	0.68	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Dwelling House	(per lot)	1.00	1.00	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Education Facility				
	(1) Primary School	(per pupil)	0.035	0.3	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	(2) Secondary School	(per pupil)	0.5	0.5	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Garden Centre	(per 100m2 site area)	0.48	0.2	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	General Industry - Concrete Batching Plant	(per 100m2 site area)	0.28	0.06	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	General Industry	(per 100m2 floor area)	0.10	0.07	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Health Care Centre	(per 100m2 floor area)	0.21	0.3	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Heavy Industry	(per 100m2 floor area)	4.5	6.18	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Hospital	Per bed	0.93	0.93	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Hotel	(per 100m2 floor area)	0.8	1.15	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Indoor Recreation Facility				
	(1) With shower facilities	(per 100m2 floor area)	0.45	0.6	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	(2) No shower facilities	(per 100m2 floor area)	0.06	0.07	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Marine Services	(per 100m2 floor area)	0.1	0.07	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Mobile Home Park	Per site	0.34	0.5	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Multiple Dwelling	Per unit	0.53	0.68	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Outdoor Recreation Facility	(per 100m2 floor area)	1.06	1.3	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Refreshment Establishment	(per 100m2 floor area)	2.05	2.87	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1

Category	Types of Use	Unit or Basis	Development Density (ET/Unit)		
			Water	Sewerage	Data source
	Retail Warehouse	(per 100m2 floor area)	0.14	0.20	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Service Station	(per 100m2 floor area)	1.36	0.40	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Shop				
	(1) Over 6000m2 floor area	(per 100m2 floor area)	0.42	0.57	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	(2) 200m2 - 6000m2 floor area	(per 100m2 floor area)	0.34	0.4	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	(3) Under 200m2	(per 100m2 floor area)	0.28	0.4	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Small Lot House	Per lot	1.0	1.0	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Tourist Accommodation-Caravan Park	Per site	0.34	0.5	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Tourist Accommodation-Motel	Per bedroom	0.23	0.32	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Vehicle Depot				
	(1) cars	(per 100m2 floor area)	0.06	0.03	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	(2) trucks	(per 100m2 floor area)	0.80	0.6	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Vehicle Repair Premises	(per 100m2 floor area)	0.11	0.12	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Veterinary Surgery	Per lot	0.48	0.4	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Warehouse - Freight Depot	(per 100m2 floor area)	0.39	0.4	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1
	Warehouse	(per 100m2 floor area)	0.04	0.01	Redlands Planning Scheme Policy 3, Chapter 7 – Table 1

Table 5 – Redlands Planning Scheme Development Density by Zone

Category	Zone	Unit or Basis	Development Density (ET/Unit)		
			Water	Sewerage	Data source
	Centre (Major, District, Neighbourhood, Local, SMBI, Pt Lookout)	As determined by the Local Government			Redlands Planning Scheme Policy 3, Chapter 7 – Table 2
	Commercial Industry	(per gross hectare)	12.5	12.5	Redlands Planning Scheme Policy 3, Chapter 7 – Table 2
	General Industry	(per gross hectare)	12.5	12.5	Redlands Planning Scheme Policy 3, Chapter 7 – Table 2
	Medium Density Residential	(per gross hectare)	30	30	Redlands Planning Scheme Policy 3, Chapter 7 – Table 2
	Park Residential	(per lot - 6000m2 average)	1.5	0	Redlands Planning Scheme Policy 3, Chapter 7 – Table 2
	Low Density Residential	(per lot - 2000m2 average)	1.25	1.25	Redlands Planning Scheme Policy 3, Chapter 7 – Table 2
	Rural Non-Urban	(per lot)	1.5	0	Redlands Planning Scheme Policy 3, Chapter 7 – Table 2
	Urban Residential	(per gross hectare)	10.0	10.0	Redlands Planning Scheme Policy 3, Chapter 7 – Table 2

Appendix A2 – Queensland Urban Utilities

Table 6 – Brisbane City Planning Scheme Development Density (QUU)

Category	Planning Scheme Use Type	Development Density (EP/Ha of net dev area)		
		Water	Sewerage	Data source
Residential	Low Density Residential (LR)	40	40	PIP Planning Assumptions
	Low -medium Density Residential (LMR)	60	60	PIP Planning Assumptions
	Character Residential (CR)	58	58	PIP Planning Assumptions
	Medium Density Residential (MR)	120	120	PIP Planning Assumptions
	High Density Residential (HR)	180	180	PIP Planning Assumptions
	Emerging Community (EC)	40	40	PIP Planning Assumptions
Multi Purpose Centres	City Centre (MP1)	300	300	PIP Planning Assumptions
	Major Centre (MP2)	150	150	PIP Planning Assumptions
	Suburban Centre (MP3)	45	45	PIP Planning Assumptions
	Convenience Centre (MP4)	21	21	PIP Planning Assumptions
Industrial Areas	Future Industry Area (FI)	30	30	PIP Planning Assumptions
	Light Industry Area (LI)	24	24	PIP Planning Assumptions
	General Industry Area (GI)	30	30	PIP Planning Assumptions
	Heavy Industry Area (HI)	30	30	PIP Planning Assumptions
	Extractive Industry Area (EI)	Individually assessed	Individually assessed	PIP Planning Assumptions
Community Use Areas	Cemetery (CU1)	0	0	PIP Planning Assumptions
	Community facilities (CU2)	18	18	PIP Planning Assumptions
	Crematorium (CU3)	0	0	PIP Planning Assumptions
	Education purposes (CU4)	18	18	PIP Planning Assumptions
	Emergency services (CU5)	18	18	PIP Planning Assumptions
	Health care purposes (CU6)	60	60	PIP Planning Assumptions
	Railway activities (CU7)	Individually assessed	Individually assessed	PIP Planning Assumptions
	Utility installation (CU8)	6	6	PIP Planning Assumptions
Special Purpose Centres	Major hospitals and medical facility (SP1)	60	60	PIP Planning Assumptions
	Major educational and research facility (SP2)	18	18	PIP Planning Assumptions
	Major defence and communications facility (SP3)	Individually assessed	Individually assessed	PIP Planning Assumptions
	Major sporting stadium (SP4)	30	30	PIP Planning Assumptions
	Entertainment centre (SP5)	30	30	PIP Planning Assumptions
	Airport (SP6)	Individually assessed	Individually assessed	PIP Planning Assumptions
	Port (SP7)	24	24	PIP Planning Assumptions
	Major residential institution (SP8)	36	36	PIP Planning Assumptions
	Correctional centre (SP9)	Individually assessed	Individually assessed	PIP Planning Assumptions
	The Brisbane Market (SP10)	Individually assessed	Individually assessed	PIP Planning Assumptions

Category	Planning Scheme Use Type	Development Density (EP/Ha of net dev area)		
		Water	Sewerage	Data source
	Vehicle sales and service (SP11)	18	18	PIP Planning Assumptions
	Mixed industry and business (SP12)	60	60	PIP Planning Assumptions
	Office park (SP13)	60	60	PIP Planning Assumptions
	Cottage industry and retail (SP14)	36	36	PIP Planning Assumptions
	Marina (SP15)	Individually assessed	Individually assessed	PIP Planning Assumptions
	South Bank (SP16)	Individually assessed	Individually assessed	PIP Planning Assumptions
Green Space Areas	Conservation Area (CN)	0	0	PIP Planning Assumptions
	Parkland Area (PK)	0	0	PIP Planning Assumptions
	Sport and Recreation Area (SR)	0	0	PIP Planning Assumptions
	Environmental Protection Area (EP)	0	0	PIP Planning Assumptions
	Rural Area (RU)	0*	0	PIP Planning Assumptions

* Water is supplied in some existing areas of Rural classified land. Use the EP per dwelling figures below for these areas.

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

2.65 EP per detached dwelling (house)

1.79 EP per attached dwelling (townhouse, unit, flat, apartment etc.)

Table 7 – Ipswich City Planning Scheme Development Density (QUU)

Use Class	Planning Scheme Defined Use	Unit	Development Density (EP/Unit)		
			Water	Sewerage	Data source
Residential	Caretaker's Residence	1 bed	1	1	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
		2 bed	1.5	1.5	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
		3 Bed	1.75	1.75	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Display Housing	Per residential	-	-	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Dual Occupancy	1 bed	1.25	1.25	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
		2 bed	1.75	1.75	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
		3 Bed	2	2	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Multiple Residential – 1 bed	1 bed	1	1	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Multiple Residential – 2 bed	2 bed	1.5	1.5	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Multiple Residential – 3 bed	3 Bed	1.75	1.75	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Multiple Residential – Caravan Park	Site	1.5	1.5	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Multiple Residential – Boarding House	Bed	0.75	0.75	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Multiple Residential – Retirement Community	1 Bed	1	1	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Multiple Residential – Retirement Community	2 Bed	1.5	1.5	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Multiple Residential – Student Accommodation	Bed	0.65	0.65	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Single Residential	Site >450m^2	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Single Residential	Site <450m^2	2.7	2.7	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Temporary Accommodation – Boarding House	Bed	0.75	0.75	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Temporary Accommodation – Camping Ground	Site	1	1	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Temporary Accommodation – Caravan Park	Site	1.5	1.5	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Temporary Accommodation – Motel	Unit	1	1	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
Urban Areas	Large Lot Residential	ha	6	6	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Residential Low Density (RL1)	ha	12	12	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Residential Low Density (RL2)	ha	30	30	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Residential Medium Density (RM1)	ha	75	75	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Residential Medium Density (RM2)	ha	38	38	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
Urban Areas	Residential Mixed Density (RM3)	ha	38	38	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Character Areas – Housing Low Density Zone (CHL)	ha	30	30	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Character Areas – Housing Mixed Density Zone (CHM)	ha	38	38	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Future Urban (Low Density)	ha	30	30	Ipswich Planning Scheme 2007 Policy 5 Appendix 1

Use Class	Planning Scheme Defined Use	Unit	Development Density (EP/Unit)		
			Water	Sewerage	Data source
	Future Urban (Medium Density)	ha	75	75	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Local Business and Industry Buffer	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Bundamba Racecourse Stables	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Recreation	Lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Conservation	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Limited Development (Constrained)	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Special Uses	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Special Opportunity	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
Amberley Area	Amberley Air Base and Aviation	lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
Rosewood Area	Character Areas – Housing Low Density Zone (CHL)	ha	30	30	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Character Areas – Housing Medium Density Zone (CHM)	ha	38	38	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Residential Low Density	ha	30	30	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Residential Medium Density	ha	38	38	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Urban Investigation	ha	30	30	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Recreation	lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Special Uses	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
Township Areas	Township Residential	lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Township Character Housing	lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Township Character Mixed Use	lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Stables Residential	lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Township Business	lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Service Trades, Showgrounds and Trotting Track	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1
	Special Uses	residential lot	3.3	3.3	Ipswich Planning Scheme 2007 Policy 5 Appendix 1

Table 8 – Lockyer Valley Planning Scheme Development Density (QUU)

Category	Planning Scheme Zone	Development Density (EP/Ha of Net dev area)		
		Water	Sewerage	Data source
Rural	Rural General, Rural Upland, Rural Landscape, Rural Agricultural Land	0	0	PIP Planning Assumptions
Residential	Rural Residential, Homestead Residential	3	0	PIP Planning Assumptions
	Urban Residential, Residential Expansion, Emerging Communities	30 - 50	30 - 50	PIP Planning Assumptions
	Village	10 - 22	10 - 22	PIP Planning Assumptions
	Park Residential	5 - 15	5 - 15	PIP Planning Assumptions
Other	Commercial, Business	36	36	PIP Planning Assumptions
	Industry	30	30	PIP Planning Assumptions
	Community Facilities, Community Purpose	30	30	PIP Planning Assumptions
	Open Space	0	0	PIP Planning Assumptions

For existing residential development and proposed residential development where development details are known, apply:
2.7 EP per detached dwelling
1.6 EP per attached dwelling

Table 9 - Scenic Rim Planning Scheme Development Density (QUU)

Area	Land Use Type	Development Density (EP/Ha of net dev area)		
		Water	Sewerage	Data source
Beaudesert	Existing Residential	24	24	PIP Planning Assumptions
	Future Residential	36	36	PIP Planning Assumptions
	Commercial	45	45	PIP Planning Assumptions
	Education	Individually Assessed	Individually Assessed	PIP Planning Assumptions
	Community	18	18	PIP Planning Assumptions
	Health	Individually Assessed	Individually Assessed	PIP Planning Assumptions
	General Industry	30	30	PIP Planning Assumptions
	Light Industry	24	24	PIP Planning Assumptions
Aratula Boonah Canungra Kalbar Kooralbyn Mt Alford	Residential	34	34	PIP Planning Assumptions
	Commercial	20	20	PIP Planning Assumptions
	Education	Individually Assessed	Individually Assessed	PIP Planning Assumptions
	Community	18	18	PIP Planning Assumptions
	Health	Individually Assessed	Individually Assessed	PIP Planning Assumptions
	General Industry	30	30	PIP Planning Assumptions
	Light Industry	24	24	PIP Planning Assumptions

For existing residential development and proposed residential development where development details are known, apply:
2.45 EP per detached dwelling (house)
1.3 EP per attached dwelling (townhouse, unit, flat, apartment etc.)

Table 10 – Somerset Planning Scheme Development Density (QUU)

Area	Planning Scheme Zone	Development Density (EP/Ha of Net dev area)		
		Water	Sewerage	Data source
Rural	Rural	0	0	PIP Planning Assumptions
	Areas of large lot residential	4.8	0	PIP Planning Assumptions
Town and Village	Residential (other than in Kilcoy and Jimna)	32	32	PIP Planning Assumptions
	Residential (in Kilcoy and Jimna)	20	20	PIP Planning Assumptions
	Town Centre/Commercial	36	36	PIP Planning Assumptions
	Service Trades/Industry	30	30	PIP Planning Assumptions
	Park and Recreation	Individually Assessed	Individually Assessed	PIP Planning Assumptions
	Community Facilities	30	30	PIP Planning Assumptions
	Park Residential	4.8	0	PIP Planning Assumptions
	Village	27	27	PIP Planning Assumptions

For existing residential development and proposed residential development where development details are known, apply:
2.6 EP per detached dwelling in urban areas
3.1 EP per detached dwelling in rural areas other than in Kilcoy and Jimna
2.6 EP per detached dwelling in rural areas in Kilcoy and Jimna
1.7 EP per attached dwelling

Appendix A3 – Unitywater

Table 11 – Moreton Bay Planning Scheme Water Development Density by Zone – Caboolture

Catchment	Shire Plan Zoning	Unit or Basis	Development Density (EP/Unit)	
			Water	Data source
Upland Residential	Residential A - lot area >1000m2	Lot	3.4	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area 501m2 – 1000m2	Lot	2.8	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area <501m2	Lot	2.25	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential B	ha	67	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Rural Residential	Lot	3.4	
Upland Non-Residential	Metropolitan Centre	ha	30	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	District Centre	ha	30	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Local Centre	ha	10	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Regional Industry	ha	30	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	District Industry	ha	15	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Local Industry	ha	15	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Special Use	ha	6	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Open Space	ha	0	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Management Lot	Lot	3.4	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A

Catchment	Shire Plan Zoning	Unit or Basis	Development Density (EP/Unit)	
			Water	Data source
Lowland - Residential	Residential A - lot area >1000m2	Lot	3.5	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area 501m2 – 1000m2	Lot	2.9	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area <501m2	Lot	2.3	
	Residential B	ha	67	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Rural Residential	Lot	3.5	
All Catchments Non-Residential	Metropolitan Centre	ha	30	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	District Centre	ha	30	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Local Centre	ha	10	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Regional Industry	ha	30	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	District Industry	ha	60	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Local Industry	ha	15	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Special Use	ha	10	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Open Space	ha	0	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Management Lot	Lot	3.4	Planning Scheme Policy PSP 21F - Trunk Infrastructure Contributions – Sewerage Table 3.3A

Table 12 – Moreton Bay Planning Scheme Sewerage Development Density by Zone - Caboolture

Catchment	Shire Plan Zoning	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
Bribie Island Residential	Residential A - lot area >1000m2	Lot	2.7	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area 501m2 – 1000m2	Lot	2.5	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area <501m2	Lot	2.0	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential B	ha	67	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
Burpengary East- Residential	Residential A - lot area >1000m2	Lot	3.3	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area 501m2 – 1000m2	Lot	3.0	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area <501m2	Lot	2.4	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential B	ha	67	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
South Caboolture - Residential	Residential A - lot area >1000m2	Lot	3.3	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area 501m2 – 1000m2	Lot	3.0	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A - lot area <501m2	Lot	2.4	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential B	ha	67	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
Woodford - Residential	Residential A – lot area >1000m2	Lot	3.1	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A – lot area 501m2 – 1000m2	Lot	2.8	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential A – lot area <501m2	Lot	2.25	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Residential B	ha	67	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
All Catchments Non- Residential	Metropolitan Centre	ha	30	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	District Centre	ha	30	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Local Centre	ha	10	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A

Catchment	Shire Plan Zoning	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
	Regional Industry	ha	30	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	District Industry	ha	60	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Local Industry	ha	15	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Special Use	ha	10	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Open Space	ha	-	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A
	Management Lot	Lot	3.4	Planning Scheme Policy PSP 21D - Trunk Infrastructure Contributions – Sewerage Table 3.3A

Table 13 – Moreton Bay Planning Scheme Water Development Density by Zone – Pine Rivers

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
Upland Residential	RESIDENTIAL A	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	RESIDENTIAL B	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SPECIAL RESIDENTIAL	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	PARK RESIDENTIAL	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	RURAL RESIDENTIAL	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	CENTRAL BUSINESS	ha	30	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	COMMERCIAL	ha	30	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	LOCAL BUSINESS	ha	30	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	NEIGHBOURHOOD FACILITIES	ha	30	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	URBAN VILLAGE	ha	30	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	VILLAGE CENTRE	ha	30	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	HOME INDUSTRY	ha	10	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SERVICE INDUSTRY	ha	15	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	GENERAL INDUSTRY	ha	30	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	EXTRACTIVE INDUSTRY	ha	15	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	FUTURE URBAN	ha	30	Planning Scheme Policy PSP 22 - Trunk

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
	RURAL ZONE (COAST AND RIVER LANDS LOCALITY)	ha	7.5	Infrastructure Contributions – Water– Table 3.3A Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	RURAL ZONE (URBAN, MAJOR EMPLOYMENT CENTRE, CATCHMENT, RURAL LIVING, VILLAGE, MT SUMMIT AND FORESTS LOCALITIES)	ha	7.5	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	CONSERVATION	ha	0	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	PARK AND OPEN SPACE	ha	5	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SPORTS AND RECREATION	ha	15	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SPECIAL FACILITIES	ha	15	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SPECIAL PURPOSES	ha	15	Planning Scheme Policy PSP 22 - Trunk Infrastructure Contributions – Water– Table 3.3A

Table 14 – Moreton Bay Planning Scheme Sewerage Development Density by Zone– Pine Rivers

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
Upland Residential	RESIDENTIAL A	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	RESIDENTIAL B	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SPECIAL RESIDENTIAL	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	PARK RESIDENTIAL	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	RURAL RESIDENTIAL	Population Forecast as per Planning Assumptions		Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	CENTRAL BUSINESS	Ha	30	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	COMMERCIAL	Ha	30	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	LOCAL BUSINESS	Ha	30	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	NEIGHBOURHOOD FACILITIES	Ha	30	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	URBAN VILLAGE	Ha	30	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	VILLAGE CENTRE	Ha	30	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	HOME INDUSTRY	Ha	10	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SERVICE INDUSTRY	Ha	15	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	GENERAL INDUSTRY	Ha	30	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	EXTRACTIVE INDUSTRY	Ha	15	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	FUTURE URBAN	ha	30	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	RURAL ZONE (COAST AND RIVER LANDS LOCALITY)	ha	7.5	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	RURAL ZONE (URBAN, MAJOR EMPLOYMENT CENTRE, CATCHMENT, RURAL LIVING, VILLAGE, MT SUMMIT AND FORESTS LOCALITIES)	ha	7.5	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	CONSERVATION	ha	0	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions –

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
				Water– Table 3.3A
	PARK AND OPEN SPACE	ha	5	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SPORTS AND RECREATION	ha	15	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SPECIAL FACILITIES	ha	15	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A
	SPECIAL PURPOSES	ha	15	Planning Scheme Policy PSP 23 - Trunk Infrastructure Contributions – Water– Table 3.3A

Table 15 – Moreton Bay Planning Scheme Water Development Density by Zone – Redcliffe

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Water	Data source
Low Density Residential Zone	Lot Size _ 500m2	Lot	2.0	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Lot Size 501-1500 m2	Lot	2.6	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Lot Size >1500 m2	ha	30	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
Mixed Density Residential Zone	Lot Size _ 500m2	Lot	2.0	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Lot Size 501-700 m2	Lot	2.6	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Lot Size >700 m2	ha	60	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
Medium Density Residential Zone < 3 Storeys	Lot Size _ 500m2	Lot	2.0	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Lot Size 501-750 m2	Lot	2.6	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Lot Size >750 m2	ha	60	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
Medium Density Residential Zone	3 Storeys	ha	120	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	6 Storeys	ha	175	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	8 Storeys	ha	220	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
Retail Core Zone	1-2 storeys	ha	30	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	3 storeys	ha	130	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	6 storeys	ha	190	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Water	Data source
	8 storeys	ha	240	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	12 storeys	ha	290	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
Frame Business Zone	1-2 storeys	ha	30	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	3 storeys	ha	120	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	6 storeys	ha	175	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	8 storeys	ha	220	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	12 storeys	ha	260	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Industry Zone	ha	30	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Health services Zone	ha	30	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Community Purpose Zone	ha	30	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Natural value Zone	0	0	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A
	Open Space and Recreation Zone	ha	5	Planning Scheme Policy PSP4 Part 8.4.5 Development Contributions for Trunk Infrastructure – Water – Table 3.3A

Table 16 – Moreton Bay Planning Scheme Sewerage Development Density by Zone – Redcliffe

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
Low Density Residential Zone	Lot Size _ 500m2	Lot	2.02	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Lot Size 501-1500 m2	Lot	2.62	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Lot Size >1500 m2	ha	30.26	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
Mixed Density Residential Zone	Lot Size _ 500m2	Lot	2.02	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Lot Size 501-700 m2	Lot	2.62	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Lot Size >700 m2	ha	60.52	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
Medium Density Residential Zone < 3 Storeys	Lot Size _ 500m2	Lot	2.02	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Lot Size 501-750 m2	Lot	2.62	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Lot Size >750 m2	ha	60.52	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
Medium Density Residential Zone	3 Storeys	ha	121.05	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	6 Storeys	ha	176.53	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	8 Storeys	ha	221.92	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
Retail Core Zone	1-2 storeys	ha	30.26	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	3 storeys	ha	131.14	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	6 storeys	ha	191.66	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	8 storeys	ha	242.1	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	12 storeys	ha	292.53	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
Frame Business Zone	1-2 storeys	ha	30.26	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	3 storeys	ha	121.05	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	6 storeys	ha	176.53	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	8 storeys	ha	221.92	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	12 storeys	ha	262.27	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Industry Zone	ha	30.26	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Health services Zone	ha	30.26	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Community Purpose Zone	ha	30.26	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk

Area	Planning Scheme Zone	Unit or Basis	Development Density (EP/Unit)	
			Sewerage	Data source
	Natural value Zone	0	0	Infrastructure – Sewer – Table 3.3A Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A
	Open Space and Recreation Zone	ha	5.04	Planning Scheme Policy PSP4 Part 8.4.6 Development Contributions for Trunk Infrastructure – Sewer – Table 3.3A

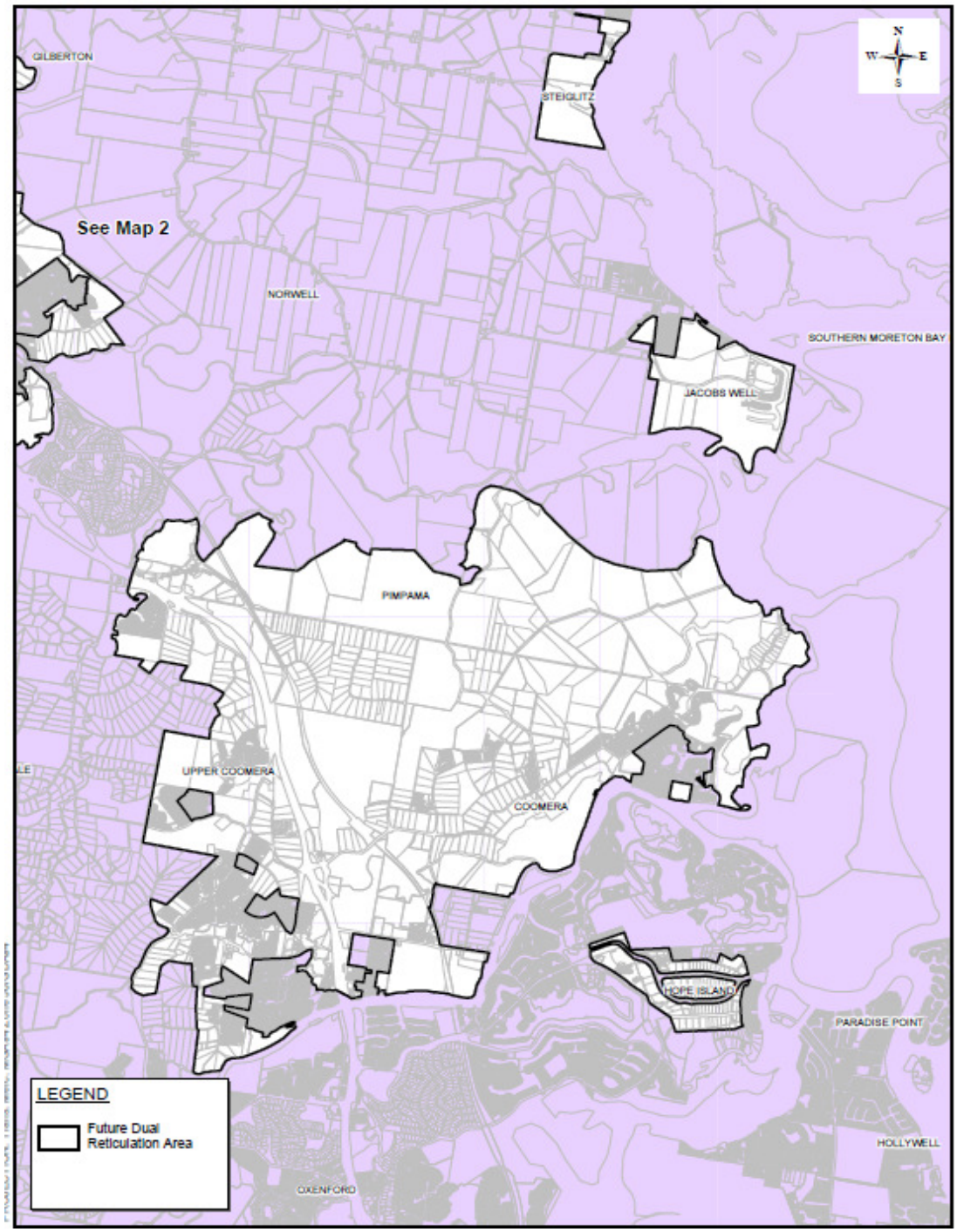
Table 17 – SCRC CENTRAL REGION Planning Scheme Development Density (UW)

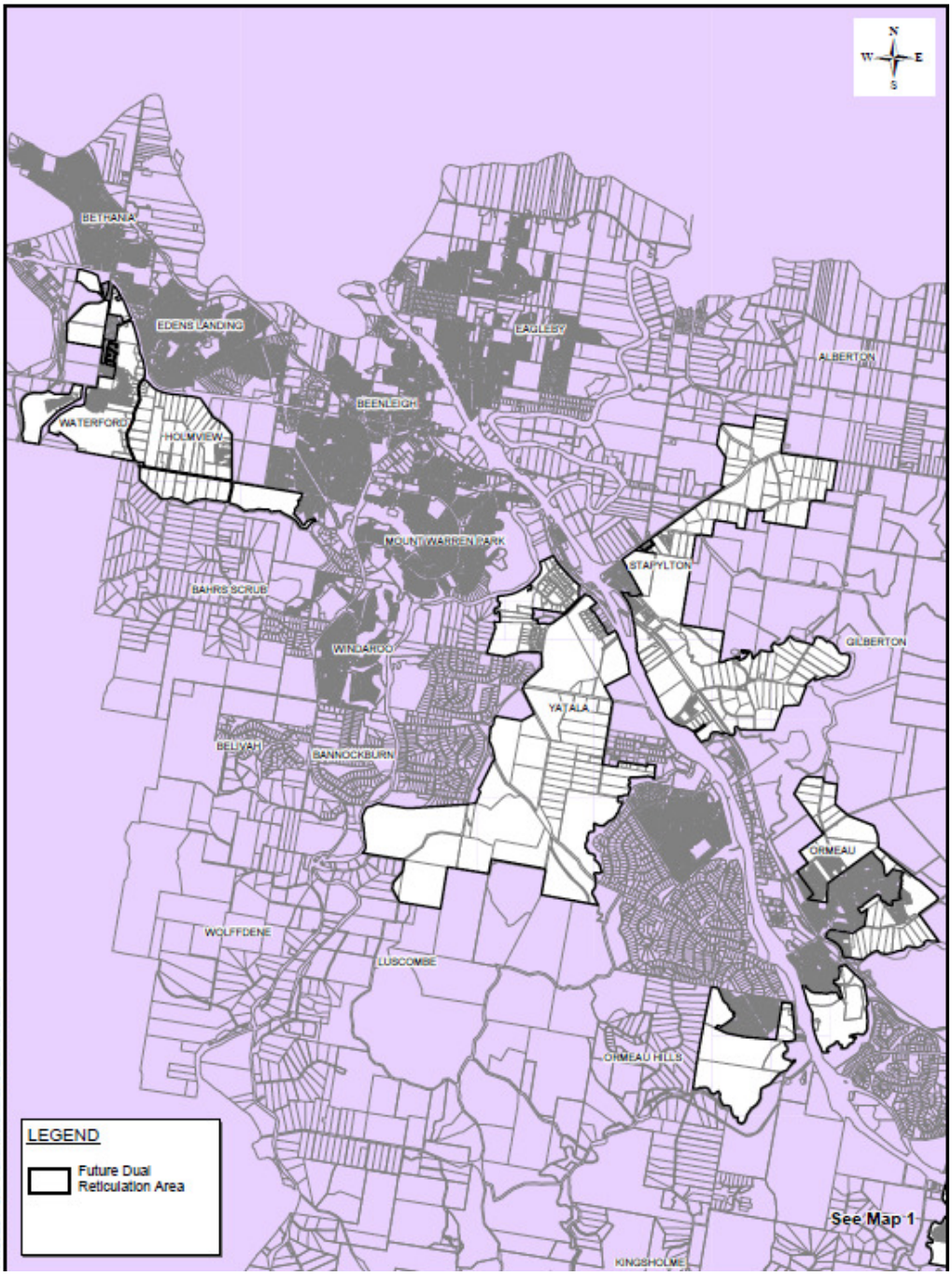
Precinct	No	Planning Area	Development Density (ET/Ha)		
			Water	Sewerage	Data source
Business and Industry	All precincts		25	35	Maroochy Plan Policy DC1: Table 2a
Core Industry	All precincts		25	35	Maroochy Plan Policy DC1: Table 2a
General Rural Lands	All precincts		NA	NA	Maroochy Plan Policy DC1: Table 2a
Hill Slope Residential	All precincts		15	15	Maroochy Plan Policy DC1: Table 2a
Local Centre	22	Maroochydore	45	90	Maroochy Plan Policy DC1: Table 2a
	All precincts		35	70	Maroochy Plan Policy DC1: Table 2a
Master Planned Community	9	Maroochydore	110	121	Maroochy Plan Policy DC1: Table 2a
	10	Maroochydore	110	121	Maroochy Plan Policy DC1: Table 2a
	11	Maroochydore	11-	121	Maroochy Plan Policy DC1: Table 2a
	15	Maroochydore	90	99	Maroochy Plan Policy DC1: Table 2a
	28	Nambour	35	38.5	Maroochy Plan Policy DC1: Table 2a
	4	Sippy Downs	40	44	Maroochy Plan Policy DC1: Table 2a
	5	Sippy Downs	40	44	Maroochy Plan Policy DC1: Table 2a
	8	Sippy Downs	40	44	Maroochy Plan Policy DC1: Table 2a
	11	Sippy Downs	40	44	Maroochy Plan Policy DC1: Table 2a
	15	North Shore	30	33	Maroochy Plan Policy DC1: Table 2a
	16	North Shore	190	209	Maroochy Plan Policy DC1: Table 2a
	8	Mt Coolum	100	133	Maroochy Plan Policy DC1: Table 2a
	9	Mt Coolum	35	38.5	Maroochy Plan Policy DC1: Table 2a
	16	Eudlo Creek Valley	50	55	Maroochy Plan Policy DC1: Table 2a
	All other precincts		30	30	
Mixed Housing	13	Maroochydore	135	180	Maroochy Plan Policy DC1: Table 2a
	17	Maroochydore	120	160	Maroochy Plan Policy DC1: Table 2a
	20	Maroochydore	120	160	Maroochy Plan Policy DC1: Table 2a
	23	Maroochydore	110	146	Maroochy Plan Policy DC1: Table 2a
	25	Maroochydore	135	180	Maroochy Plan Policy DC1: Table 2a
	27	Maroochydore	120	160	Maroochy Plan Policy DC1: Table 2a
	3	Nambour	80	106	Maroochy Plan Policy DC1: Table 2a
	4	Nambour	80	106	Maroochy Plan Policy DC1: Table 2a
	7	Mooloolaba	135	180	Maroochy Plan Policy DC1: Table 2a

Precinct	No	Planning Area	Development Density (ET/Ha)		
			Water	Sewerage	Data source
	8	Mooloolaba	135	180	Maroochy Plan Policy DC1: Table 2a
	13	Mooloolaba	140	186	Maroochy Plan Policy DC1: Table 2a
	2	Buderim	85	113	Maroochy Plan Policy DC1: Table 2a
	5	Alexandra Headland/Cotton Tree	120	160	Maroochy Plan Policy DC1: Table 2a
	8	Alexandra Headland/Cotton Tree	140	186	Maroochy Plan Policy DC1: Table 2a
	10	Alexandra Headland/Cotton Tree	120	160	Maroochy Plan Policy DC1: Table 2a
	11	Alexandra Headland/Cotton Tree	135	180	Maroochy Plan Policy DC1: Table 2a
	4	Kuluin/Kunda Park	70	93	Maroochy Plan Policy DC1: Table 2a
	13	North Shore	70	93	Maroochy Plan Policy DC1: Table 2a
	2	Mt. Coolum	140	186	Maroochy Plan Policy DC1: Table 2a
	3	Coolum Beach	200	266	Maroochy Plan Policy DC1: Table 2a
	2	Woombye	60	80	Maroochy Plan Policy DC1: Table 2a
	6	Eumundi	60	80	Maroochy Plan Policy DC1: Table 2a
	All other precinct		100	133	Maroochy Plan Policy DC1: Table 2a
Multi storey Residential	5	Mooloolaba	240	384	Maroochy Plan Policy DC1: Table 2a
	6	Mooloolaba	240	384	Maroochy Plan Policy DC1: Table 2a
	2	Alexandra Headland/Cotton Tree	320	512	Maroochy Plan Policy DC1: Table 2a
	2	North Shore	200	320	Maroochy Plan Policy DC1: Table 2a
	All other precinct		300	480	Maroochy Plan Policy DC1: Table 2a
Neighbourhood Residential	All precincts		30	30	Maroochy Plan Policy DC1: Table 2a
Special Purpose	3	Sippy Downs	150	150	Maroochy Plan Policy DC1: Table 2a
	All other precincts		To determine demand factor rates, use the precinct or precincts from this table that most closely align with the proposed development		Maroochy Plan Policy DC1: Table 2a
Sustainable Cane Lands	All precincts		NA	NA	Maroochy Plan Policy DC1: Table 2a
Sustainable Horticultural Lands	All precincts		NA	NA	Maroochy Plan Policy DC1: Table 2a
Sustainable Pastoral Lands	All precincts		NA	NA	Maroochy Plan Policy DC1: Table 2a
Sustainable	All precincts		5	NA	Maroochy Plan Policy DC1: Table

Precinct	No	Planning Area	Development Density (ET/Ha)		
			Water	Sewerage	Data source
Rural Residential					2a
Town Centre Core	1	Maroochydore	300	600	Maroochy Plan Policy DC1: Table 2a
	2	Maroochydore	200	400	Maroochy Plan Policy DC1: Table 2a
	3	Maroochydore	110	220	Maroochy Plan Policy DC1: Table 2a
	4	Maroochydore	300	600	Maroochy Plan Policy DC1: Table 2a
	1	Nambour	50	100	Maroochy Plan Policy DC1: Table 2a
	1	Sippy Downs	60	120	Maroochy Plan Policy DC1: Table 2a
	1	Mooloolaba	300	600	Maroochy Plan Policy DC1: Table 2a
	All other precincts		50	100	
Town Centre Frame	5	Maroochydore	40	80	Maroochy Plan Policy DC1: Table 2a
	6	Maroochydore	35	70	Maroochy Plan Policy DC1: Table 2a
	7	Maroochydore	150	300	Maroochy Plan Policy DC1: Table 2a
	8	Maroochydore	200	400	Maroochy Plan Policy DC1: Table 2a
	2	Nambour	45	90	Maroochy Plan Policy DC1: Table 2a
	2	Sippy Downs	80	160	Maroochy Plan Policy DC1: Table 2a
	2	Mooloolaba	200	400	Maroochy Plan Policy DC1: Table 2a
	3	Mooloolaba	200	400	Maroochy Plan Policy DC1: Table 2a
	4	Mooloolaba	100	200	Maroochy Plan Policy DC1: Table 2a
	1	Kuluin/Kunda Park	35	70	Maroochy Plan Policy DC1: Table 2a
	All other precincts		50	100	
Village Centre	1A	Buderim	45	90	Maroochy Plan Policy DC1: Table 2a
	1B	Buderim	45	90	Maroochy Plan Policy DC1: Table 2a
	1	Coolum Beach	200	400	Maroochy Plan Policy DC1: Table 2a
	All other precincts		35	70	
Water Resource Catchment Area	All precincts		NA	NA	

Appendix B – Allconnex Water Dual Reticulation Areas





Appendix C – Planning Parameters Prior to 2012 GCCC

Allconnex Water – Gold Coast area

Attachment 1 – Recommended Desired Standards of Service – Potable Water and Recycled Water

The following data is presented in a tabular format consistent with GCCC Land Development Guidelines Section 4 Water Reticulation.

Potable Water Supply Average Day Demand and Peaking Factors

Item Ref	Design Criteria	Property Type	Case	AD L/ET/day	Peaking Factors (PW5)		
					MDMM	MD	MH
PW1	**Distribution System**	RSF Residential Single Family	Case 1	880	1.23	1.49	4.22
			Case 2	616	1.75	2.12	6.03
			Case 3	484	1.14	1.31	2.67
			Case 4	352	1.34	1.54	3.14
		RMF Residential Multi-Family	Case 1	880	1.14	1.31	2.67
			Case 2	792	1.27	1.45	2.97
			Case 3	616	1.14	1.31	2.67
			Case 4	440	1.43	1.63	3.34
		COM / PUB Commercial/ Public	Case 1	880	1.06	1.12	2.32
			Case 2	880	1.06	1.12	2.32
			Case 3	440	1.06	1.12	2.32
			Case 4	440	1.06	1.12	2.32
		IND Industrial	Case 1	880	1.06	1.12	1.54
			Case 2	880	1.06	1.12	1.54
			Case 3	792	1.06	1.12	1.54
			Case 4	792	1.06	1.12	1.54
		TOU Tourist	Case 1	880	1.59	2.26	5.43
			Case 2	792	1.76	2.51	6.03
			Case 3	616	1.59	2.26	5.43
			Case 4	440	1.99	2.83	6.79
		IRR Irrigation	Case 1	880	1.15	1.37	2.40
			Case 2	880	1.15	1.37	2.40
			Case 3	220	1.15	1.37	2.40
			Case 4	220	1.15	1.37	2.40
PW2	**Treatment**		Case 1	800			
			Case 2	560			
			Case 3	440			
			Case 4	320			
PW3	**Source of Supply**		Case 1	800			
			Case 2	560			
			Case 3	440			
			Case 4	320			

Recycled Water Supply Average Day Demand and Peaking Factors

Item Ref	Design Criteria	Property Type	Case	AD L/ET/day	Peaking Factors (RW5)		
					MDMM	MD	MH
RW1	**Distribution System**	RSF Residential Single Family	Case 3	396	1.33	1.70	6.12
			Case 4	396	1.53	1.93	6.60
		RMF Residential Multi-Family	Case 3	264	1.21	1.45	2.67
			Case 4	264	1.33	1.59	2.67
		COM / PUB Commercial/ Public	Case 3	440	1.08	1.18	2.32
			Case 4	440	1.13	1.24	2.32
		IND Industrial	Case 3	88	1.08	1.18	1.54
			Case 4	88	1.13	1.24	1.54
		TOU Tourist	Case 3	264	1.86	2.83	5.43
			Case 4	264	2.38	3.43	5.43

Item Ref	Design Criteria	Property Type	Case	AD L/ET/day	Peaking Factors (RW5)		
					MDMM	MD	MH
		IRR Irrigation	Case 3 Case 4	660 660	1.22 1.35	1.53 1.71	2.40 2.40
RW2	**Treatment**		Case 3 Case 4	360 360			
RW3	**Source of Supply**		Case 3 Case 4	360 360			

Water and Recycled Water Planning

Demand Distribution	PW4	Water demand in ET determined by GCW IDM process.
	RW4	Water demand in ET determined by GCW IDM process.
Peaking factors	PW5	Refer to table above Potable Water Supply Average Day Demand and Peaking Factors
	RW5	Refer to table above Recycled Water Supply Average Day Demand and Peaking Factors
Diurnal Curves	PW6	Refer to figures in DSS 2009 report
	RW6	Refer to figures in DSS 2009 report
Non Revenue Water **Potable system**	PW7 PW8	10% Applied uniformly across the day
Recycled water system	RW7 RW8	10% Applied uniformly across the day
Periods for System Planning **Potable system**	PW9	3 days at mean day maximum month (3 MDMM), [commence reservoir level 90% full at midnight] – reservoirs shall have a net positive inflow each day. 3 maximum days (3 MD), [commence reservoir level 90% full at midnight] – reservoirs cannot empty below MOL. 5 average days – reservoir should fill from empty to full.
Recycled water system	RW9	3 days at mean day maximum month (3 MDMM), [commence reservoir level 90% full at midnight] – reservoirs shall have a net positive inflow each day. 3 maximum days (3 MD) – reservoirs cannot empty below MOL. 5 average days – reservoir should fill from empty to full.

Minimum Service Pressure

Minimum Pressure	PW10	22 m
	RW10	17m – direct from reservoir 20 m – within DMA
Minimum Pressure Location	PW11 RW11	In the main adjoining the Property boundary
Minimum Pressure Network Condition	PW12 RW12	Minimum operating level (MOL) at MH under MD condition

Maximum Service Pressure

Maximum Pressure	PW13	80 m
	RW13	75 m
Maximum Pressure Location	PW14 RW14	In the main adjoining the Property boundary
Maximum Pressure Network Condition	PW15 RW15	Reservoir level 95% of top water level
Target Maximum Pressure	PW16 PW17 PW18	55 m In the main adjoining the Property boundary Reservoir level 95% of top water level
	RW16 RW17 RW18	50 m Property Boundary Reservoir level 95% of top water level
Pressure Differential	RW19	5 m

Fire Fighting Parameters

Network Pressure	PW19 RW20	12m minimum in the main at FH for existing and future infrastructure. 9m minimum for existing infrastructure in small isolated or high elevated areas within the existing water supply zone
Fire Flow Residential area	PW20 RW21	15 L/s for 2 hrs 7.5 L/s for 2 hrs – Small community (Refer Note 1)
Fire Flow Industrial or Commercial area	PW21 RW22	30 L/s for 4 hrs 15 L/s for 2 hrs – Small community (Refer Note 1)
Background Demand	PW22 RW23	Residential 2/3 maximum hour (not less than AD) Positive residual pressure at MH Non-residential MH for localised Commercial / Industrial 2/3 MH for water supply zone Worst case scenario should be used
Reservoir Level	PW23 RW24	Minimum Operating Level (MOL)
Number of Fires	PW24 RW25	Single residential fire or single commercial / industrial fire
Location of Fires	-	n/a
Note1 : GCCC define small communities as rural / park residential developments built prior to 2000, and any developments provided after 2009 where specific planning approval has been given		

Storage Parameters

Ground Level Storage Capacity	PW25 RW26	Capacity = Operating Volume + Emergency Storage Operating Volume 3*(MD-MDMM) Emergency storage As defined by Council in commercial, industrial and high density zones. Greater of 4 hrs MDMM demand or 0.5ML Zone <350 ET - 150 kL
Elevated Storage Capacity	PW26 RW27	Capacity = Operating Volume + Fire Storage Operating volume Water supply zones where 8 hours x MH is greater than MDMM demand, operating volume = 2 hours x MH Water supply zones where 8 hours x MH is less than or equal to MDMM demand, operating volume = 6 x (MH - (MDMM/12)) Fire Storage 150 kL

Pumping Parameters

Duty Pump serving Ground Level Reservoir	PW27 RW28	MDMM over 20 hours
Duty Pumps serving Elevated Reservoir	PW28 RW29	(6 MH – Operating Volume) /(6 x 3600) (L/s)
Standby Pump Capacity	PW29 RW30	To match the largest single unit pump capacity

Pipeline Design

Pipe Capacity – Bulk Distribution Mains	PW30 RW31	MDMM - 24 hrs/day gravity - 20 hrs/day pumped mains
Pipe Capacity – Zone Trunk and Reticulation Mains	PW31 RW32	Minimum serviced pressure criteria or fire fighting requirements (whichever is critical condition)
Friction Equation	PW32 RW33	Hazen-Williams
Maximum Velocity	PW33 RW34	2.5 m/s

Peaking Factors

Potable Water system peaking factors	PW34 to PW39	Refer to PW5
Recycled Water system peaking factors	RW35 to RW40	Refer to RW5

Potable Water Quality (from Water Treatment Plant)

PW40	**Turbidity**	≤ 0.1 NTU
PW41	**True colour**	≤ 15 HU
PW42	**Manganese**	≤ 0.01 mg/L
PW43	**Acid soluble aluminium**	≤ 0.15 mg/L
PW44	**pH**	6.9 – 7.5
PW45	**Alkalinity**	> 35 mg/L
PW46	**Free chlorine residual**	>0.5 and <1.5 mg/L
All parameters not listed above be maintained in accordance with the Australian Drinking Water Guidelines		

Recycled Water Quality

RW41	**Dual reticulation**	Class A+ in accordance with the Queensland Water Recycling Guidelines
RW42	**Irrigation**	Class B in accordance with the Queensland Water Recycling Guidelines

Appendix D – Broadband Technical Specification

QUEENSLAND Urban Utilities

Technical Specification for:

NATIONAL BROADBAND NETWORK - INCORPORATING OPTIC FIBRES INTO WATER AND SEWERAGE SYSTEMS

Prepared by: **Infrastructure Planning**
Queensland Urban Utilities

Date: **May 2009**
Status: **Draft**

Technical Specification for the National Broadband Network - Incorporating Optic Fibres into Water and Sewerage Systems

Table of Contents

1. Introduction

1.1. Background

The Commonwealth Government has announced plans to build a new super fast National Broadband Network (NBN). This new super fast NBN is to be optic fibre to the premises (FTTP) and the work on the NBN could commence shortly.

The optic fibre may be installed into an existing or together with new water & sewerage infrastructure so that the FTTP project can be implemented in time wise and in a cost effective manner.

This document is written by Queensland Urban Utilities (QUU) for the above mentioned FTTP project. It contains guidelines and technical information for the typical situations of installing optic fibres and/or the communication conduits with QUU's Water & Sewerage infrastructure.

1.2. Scope

This document contains information about the following:

- optic fibres with new water & sewerage systems;
- optic fibres with existing sewerage systems;
- optic fibres with trenchless installation;
- optic fibre with disused pipes.

Green field areas are not included in this document because the optic fibres can be built together with all other services during land development. Only in-fill areas including 'brown field areas' are considered in this document.

2. Benefits

It can be advantageous to utilise the existing water & sewerage pipes as a conduit for the optic fibre particularly in the CBD areas considering the cost, environmental and social impacts. It is also advantageous to make use of the water & sewerage trenches for the installation of the communication conduits where water and sewerage pipes are being installed/replaced. It is obvious that the cost of optic fibre installation would be reduced by shared trench. Other typical situations would be major roads crossing, with space constraint and unstable lands etc.

3. New Water & Sewerage System

The communication conduits can be placed into the same trench while new sewers or water mains are being installed. The following programs / projects may be considered for installing communication conduits in water & sewerage trenches:

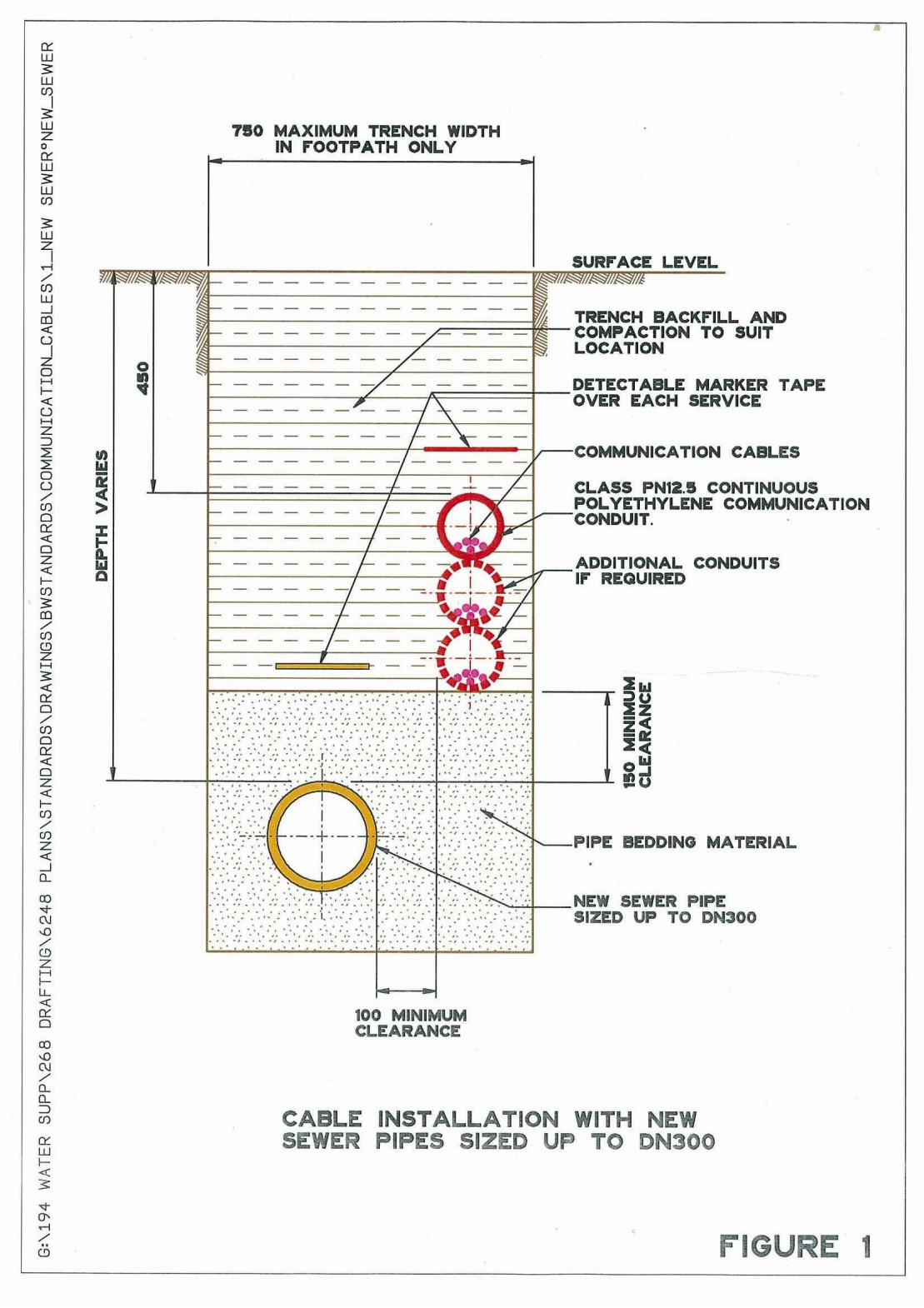
- QUU capital programs i.e. system augmentation, pipe renewals or system expansions etc;
- Land development at some 'brown field areas' i.e. subdivisions.

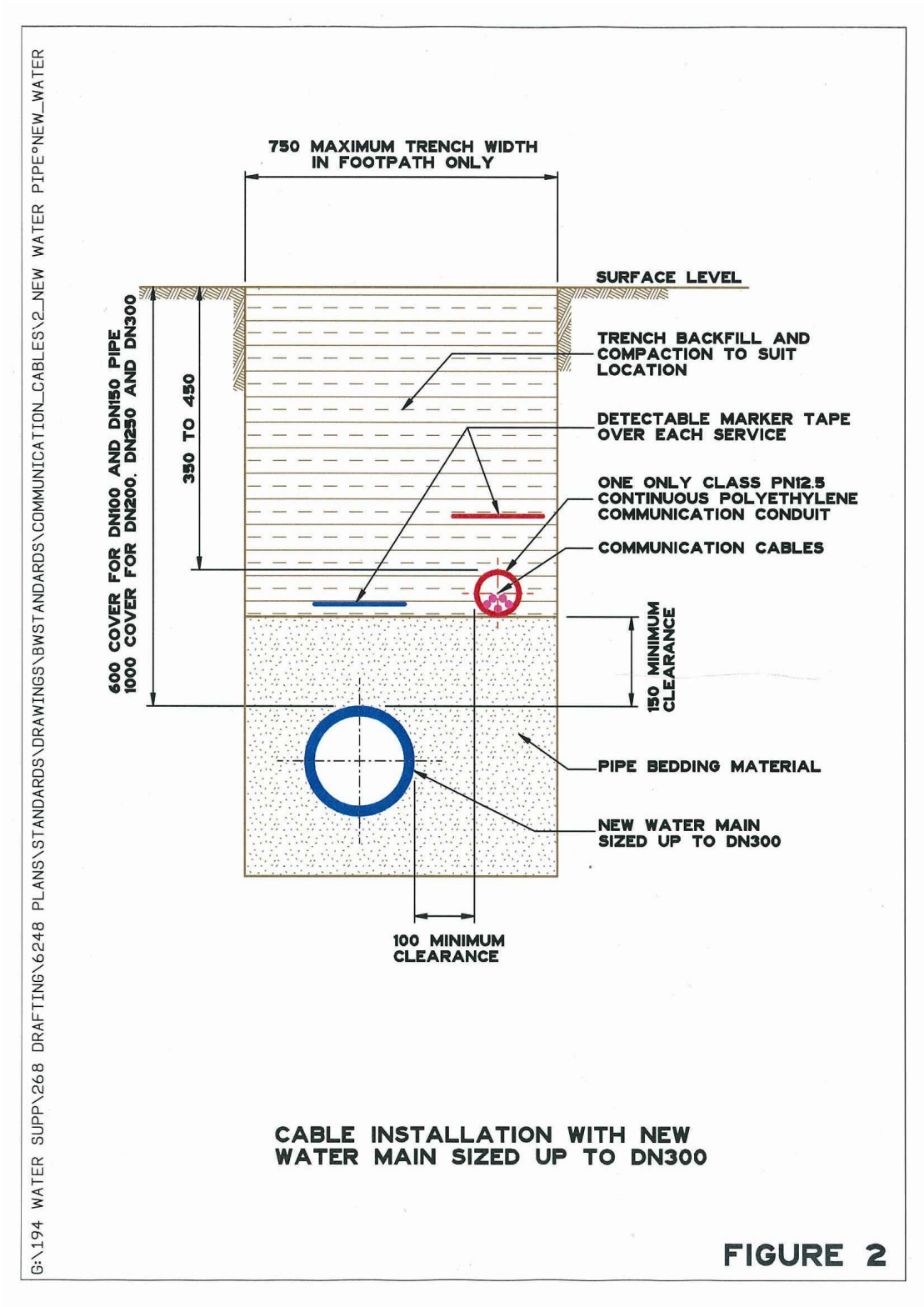
With new sewers (also known as NuSewers) installation. The sewer pipe material is normally PE100. The depth of sewers varies with a minimum cover of 1,150mm in road reserves. The communication conduits can be placed on top of the pipe embedment with a minimum vertical clearance of 150mm from sewers for non-trafficable areas and 300mm for trafficable areas. The minimum horizontal clearance between sewers and communication conduits can be 100. The communication conduits are to be placed on one side only in the trench and a number of the conduits can be installed vertically to suit. Refer to Figure 1 for the Typical Layout.

With new water mains installation. The water pipe material is mostly PE100 but it can be PVC or DICL for some applications. The depth of water mains varies from 600mm to 1,000mm dependant on the size of the water main. A communication conduit can be placed on top of the pipe embedment with a minimum vertical clearance of 150mm and a minimum horizontal clearance of 100mm between

water mains and communication conduits. The conduit is to be installed on one side only in the trench as shown in Figure 2 as a Typical Layout.

The optic fibres are to be installed inside the communication conduits by pulling the fibre between the access points of the conduits. The access points can be formed at the appropriate places i.e. both sides of a road where a conduit crossing road. The access points need to be marked to surface level (FSL) with a marker tape and, where necessary, a marker post.





4. Existing Sewerage System

The optic fibres can be placed into existing sewers without installing a communication conduit. In this case a sewer pipe may function as a communication conduit. As a requirement for this type of optic fibre installation, a sewer pipe is to be relined with a structural liner. Refer to Figure 3 as a Typical Layout.

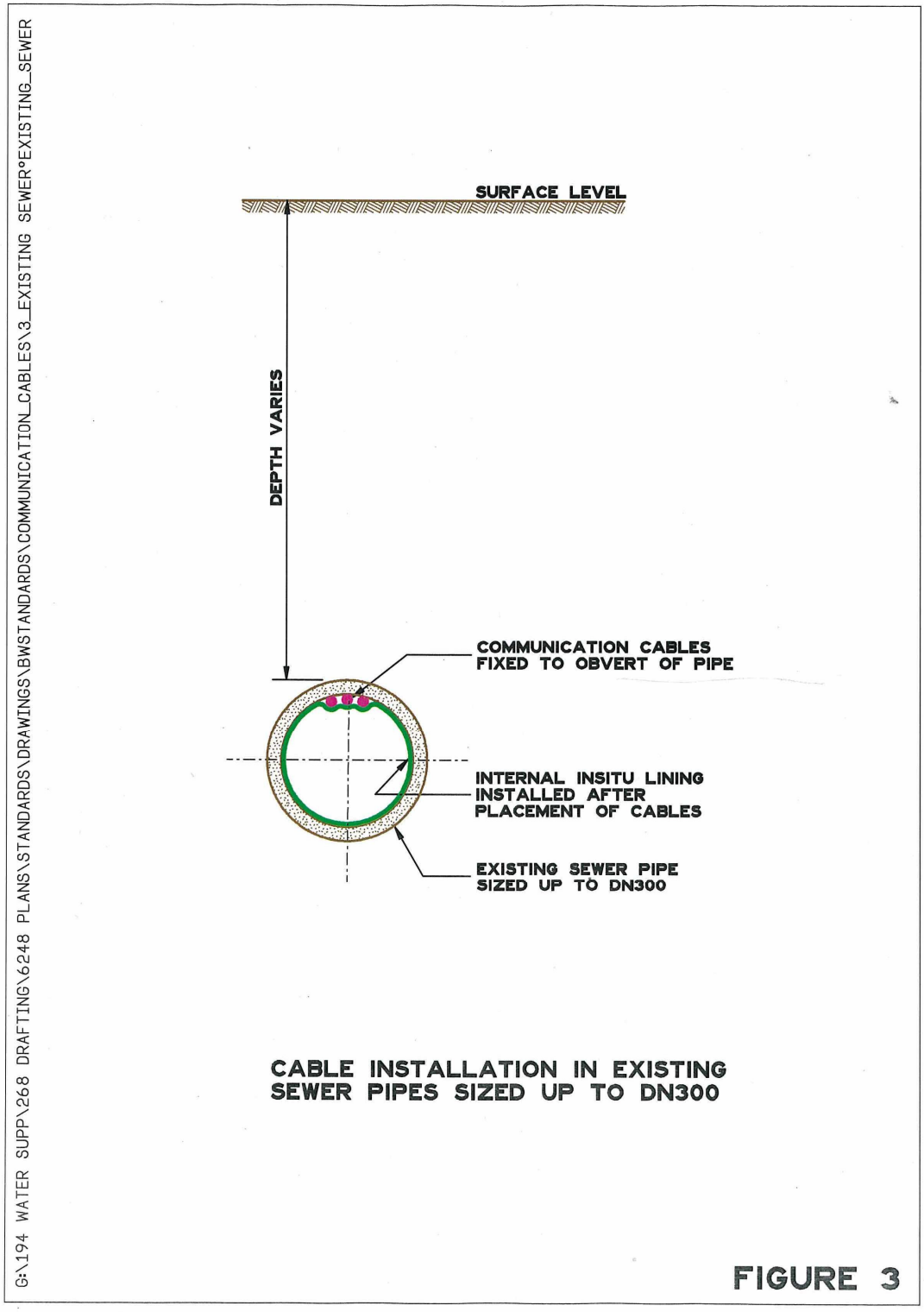
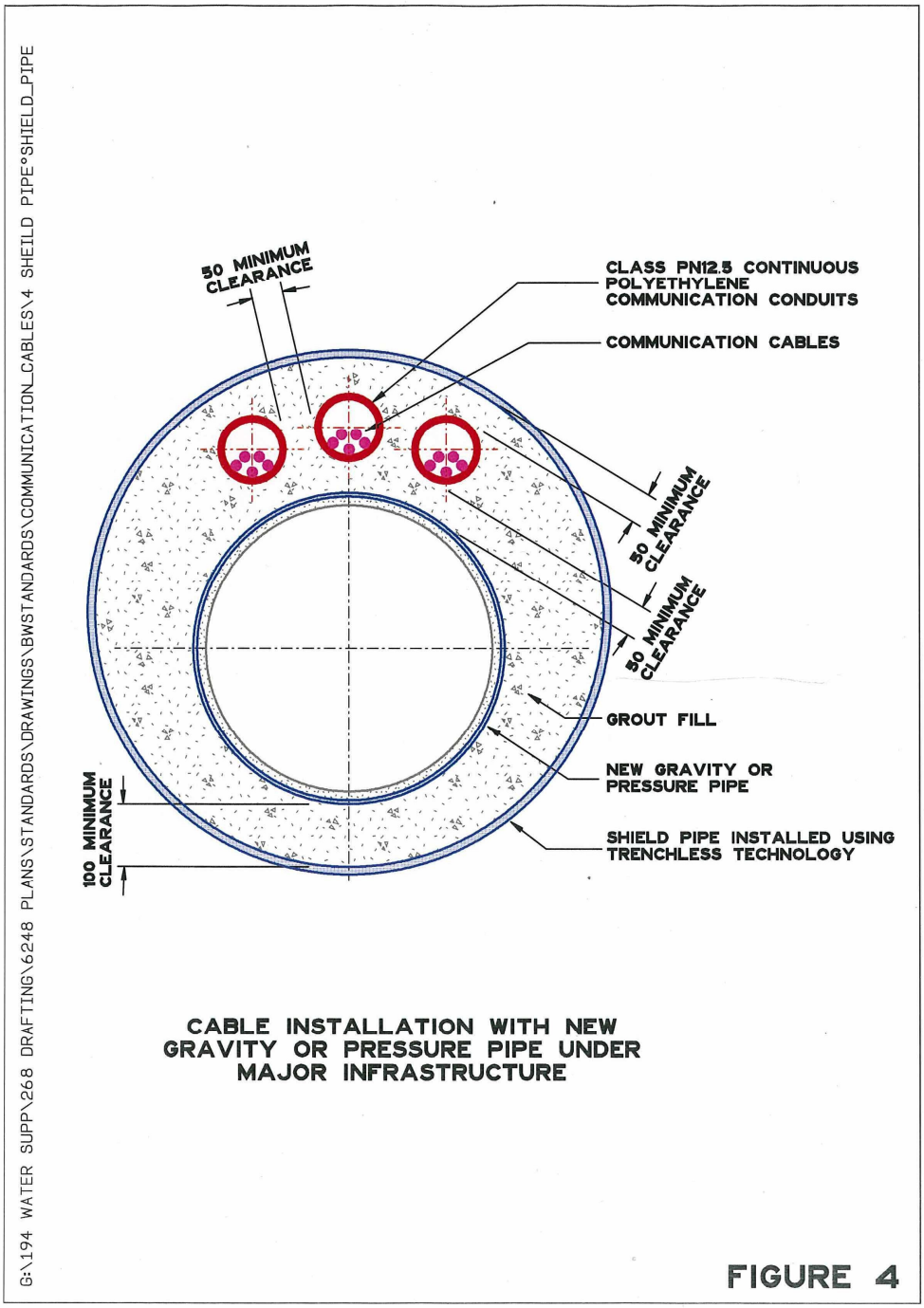


Figure 3 shows that optic fibre cables can be fixed to the crown of a sewer, the sewer is then to be lined with a structural liner.

5. Trenchless Installation New Water and Sewerage

The communication conduits can be placed while new water mains and sewers are being installed by trenchless technology as shown on Figure 4 for a Typical Arrangement. This is specially advantageous where the optic fibres are required in CBD areas or crossing major roads. The optic fibres can be

installed by pulling through communication conduits. Pipe-jacking & micro-tunnelling are the most common types for this installation.



6. Rising Mains

Sewer rising mains can be treated similar to water mains where they are considered for installation of communication conduits.

7. Disused Pipes

All the disused pipes in the ground may be used as a communication conduit. A disused pipe may be identified from the relevant Council's GIS system and As-Constructed drawings.