WBBROC Water Services Design and Construction Code

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

August 2018

Document History

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General

The water businesses of the **Wide Bay Burnett Regional Organisation of Councils (WBBROC)** including Bundaberg, Fraser Coast, Gympie, North Burnett and South Burnett, are responsible for supply of potable water and sewerage transportation/treatment across the region.

Some of the objectives of the WBBROC water services businesses are to:

- Demonstrate leadership in development of the water industry within the WBBROC region;
- Develop an agreed position on a range of issues in consultation with the businesses stakeholders (e.g. the state, regulators, the business owners, key customers etc.); and
- Build the businesses collective capabilities through development of stronger networks and greater "cross border" cooperation between the agencies.

The five (5) Water Services providers to the WBBROC region recognise how the development of a **Design and Construct Code (WBBROC Code)** could benefit the region through greater consistency of standards, alignment with the national urban water industry (WSAA National Codes) and the state water industry.

WBBROC recognises the benefit from building on the established **SEQ D&C Code** as the basis for development of a common standard for the Design and Construction of water services reticulation within their service areas.

The purpose of this document is to align the water services requirements of WBBROC with that of the SEQ industry as far as practical. Where differences arise between the requirements of WBBROC and that of the SEQ Code, these are highlighted in this document. This approach provides a "single point of reference" for any variation from the SEQ Code requirements.

Document Status:

This document provides the technical specification for water services distribution infrastructure. Its application in the design and construction of such infrastructure within WBBROC is mandatory.

Nominated Options:

Unless stated otherwise, the preferences adopted by the WBBROC water service providers are those nominated by "Unitywater" in the SEQ Code.

Terminology

References to "*Water Service Providers", "SEQ Water Service Providers"*, "*SEQ Service Provider*" or "*Service Providers*" should be read as references to the registered "**Water Service Provider**" as defined under the Water Supply (Safety and Reliability) Act 2008.

The acronym **WBB** is a reference to the Water Service Providers of the **Wide Bay Burnett Regional Organisation of Councils (WBBROC)** which comprises the Councils of Bundaberg, Fraser Coast, Gympie, North and South Burnett"

Part A – General Principles

1 Introduction

1.1 General

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

1.2 Statement of Context

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

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

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

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

1.3 Objective and Application:

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

These standards have been developed for **application to non-trunk distribution networks and have not been developed for the trunk or bulk components of water supply network**.

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

1.4 Design Criteria and Service Standards

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

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

In addition, the Desired Standards of Service, referenced in the Councils Planning Schemes, may reflect an aspirational standard of service relevant to the provision of **trunk** infrastructure.

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

Table 1 - Design Criteria, Planning Scheme and Customer Service Standards,

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

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

1.5 Document Hierarchy

This document has been developed to compliment other relevant frameworks. In particular, the "Planning Guidelines for Water Supply and Sewerage" developed by the Queensland State Government[2] provides an overarching framework to which this, more detailed document will refer. In effect, the States guideline provides the generic framework for all of Queensland, while these standards provide more detailed advice on the specific parameters to be applied in the design of water services distribution infrastructure. To avoid the risk of confusion, these standards do not elaborate on many of the principles contained within the States

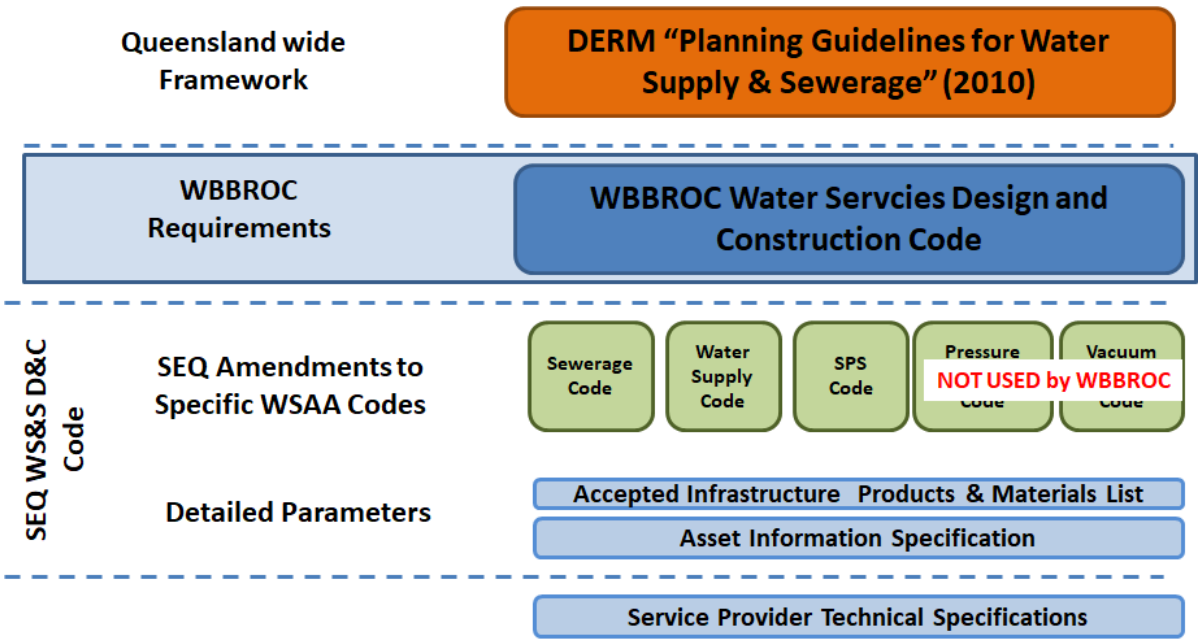
[2] The Department of Environment and Resource Management " Design Criteria for Water Supply and Sewerage", April 2010

document. It is assumed that competent designers are aware of the States framework and how the (more detailed) design criteria contained within this standard build on the States generic framework.

This standard is also developed to be consistent with the SEQ Design and Construct Code which in turn reflects the various, nationally accepted WSAA codes[3]. The WSAA codes (as amended under the WBBROC and SEQ WS&S D&C Codes) provide specific guidance at the network and asset level. The expectation underpinning these standards 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 states guidelines, WBBROC requirements, the SEQ Water Supply and Sewerage Design Criteria, the WSAA codes and project specifications is summarised in Figure 1.

Figure 1 – Document Hierarchy



In the event of contradiction between these four (4) levels of documentation, the following hierarchy will apply:

- The criteria contained within this document (WBBROC Code) will supersede all aspects of the States Planning guidelines;
- Unless otherwise specified, the criteria contained within the WBBROC Code will supersede any conflicting comment contained in the technical specification; and
- The detail provided on WBBROC drawings will take precedence over the text contained within any of the Code documents

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

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1.6 Structure of the Document

This standard has been designed to assist users “step through” the process. In particular:

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

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

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

Appendix A – Contains a copy of the Addenda which define the changes required by the WBBROC Water Services Providers to the SEQ D&C Code.

2 Objectives

2.1 Overview

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

The objectives of all water services network design undertaken for WBBROC will be to:

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

2.2 Key Principles

As a general guide, design of all water services distribution network infrastructure undertaken for the WBBROC agencies needs to take into account the following core principles:

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

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

- **Stakeholder involvement** - key stakeholders should be identified and involved at all stages of the process.

2.3 Key Elements of the Process

The design process needs to reflect the following key elements;

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

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

2.4 Principles for Network Modelling

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

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

2.5 Lowest Lifecycle Costing

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

- Summary of alternative design options which provide “fit for purpose” outcomes;

- Scope of assets and acceptable maintenance regimes for alternative options;
- Summary of the costs of each option (both initial capital investment and ongoing operational costs);
- Assessment of the impact of each alternative option on service outcomes and the environment; and
- Rationale supporting the proposed solution which best meets all requirements of this standard.

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

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

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

2.6 Carbon Footprint

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

2.7 Exclusions

Small isolated communities may operate more effectively using design criteria other than those contained below. Where this applies, the appropriate criteria will be supplied by the relevant Service Provider on application.

Part B – Water Supply Network Infrastructure

3 Overview

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

In most cases, the design criteria provided below have been based on analysis of historical data as well as consideration of trends forecast in each of the service areas.

4 Design Criteria – Water Supply

4.1 Key Criteria

The key criteria relevant to each water distribution/retail network are summarised in Table 4.1 – Single Supply (Drinking Water only) network. Designers should be aware of the key differences in the operational strategies of the WBBROC Water Service Providers covered under this Code (refer Sections 6.0 and 8.0).

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

No	Parameter	Bundaberg Regional Council	Fraser Coast Regional Council	Gympie Regional Council	North Burnett Regional Council	South Burnett Regional Council
A. Drinking Water – Conventional (Single Supply Zone)						
A1	**Average Day Demand (AD) per EP, excluding NRW** (Note: EP/ET conversion rate provided separately from Water Service Providers)	330 L/EP/d	280L/EP/d			621 L/ET/day (c 259 L/EP/Day at 2.4 EP)
A2	**Estimated Non-Revenue Water (NRW)**	10%				
A3	**Peaking Factors** **MDMM/AD** **PD/AD** **PH/AD**	 1.55 2.0 3.50	 MDMM/AD – 1.3 PD/AD – 1.6 PH/AD – 3.6 (residential) PH/AD – 2.4 (non-residential)	Note: PFs vary for different water supply systems – contact Council for confirmation). 1.40 1.90	 MDMM/AD – 1.3 PD/AD – 1.6 PH/AD – 3.6 (residential) PH/AD – 2.4 (non-residential)	Different per scheme details available
A4	**Pressure** **Minimum SERVICE pressure (at PH on PD with Reservoirs at MOL) with no flow through service, Urban and Rural normal operating conditions**	Minimum Requirement – 22m Desirable Min -25m	Minimum Residential = 20m Minimum Commercial = 25m			22m at boundary 16m rural res or elevated
	In areas defined by the SP, properties requiring domestic private boosters	12m at the property boundary				
	Maximum SERVICE Pressure	55m max				
	Emergency fire operating conditions (Minimum Residual Mains Pressures)	12m min in the main at the flowing hydrant. 6m Minimum				
A5	**Fire Fighting** **Rural and Small Communities** **(Definitions as per 6.6.2 of States Planning Guidelines)**	Rural Residential only: 7.5L/s for 2 hours Rural Commercial/Industrial: 15L/s for 2 hours				15 L/s for 2 hours (K and N) 10L/s for 2 hrs. (B,M, P W) Commercial 30L/s for 4hrs Same as above
	Urban	Res: 15L/s for 2 hours (except Blackbutt, Murgon, Proston, Wondai - 10L/s for 2 hrs) Commercial/Ind: 30L/s for 4 hours for commercial & industrial				
	Background Demand	2/3 Residential PH (not less than AD); plus PH for non-res				
A6	**Reservoir storage[5]—operational capacity** (Min Operating Storage – four consecutive hours of demand)	Ground level reservoir PD + 0.5ML	Ground level reservoir 3 (PD-MDMM) + (greater of Emergency Storage/Firefighting Storage			
		Elevated Reservoir Not an acceptable solution ``				
A7	**Reservoir Pump Servicing Requirements**					
	Ground level reservoir – Duty Pump	MDMM over 20 hours.				
	Elevated reservoir – Duty Pump	NA				
	Pumped Systems	Booster Pump Capacity: PH + fireflow				
	Standby pump capacity	Match largest single pump unit capacity				
A8	**Pipeline Capacity Requirements**	Transport: MDMM in 20 hours Reticulation Mains; Maintain pressure for Peak Hour and fire flow performance				
A9	**Pipe Friction Losses** **Hazen Williams Friction Factors** Based on the preferred material types outlined in the SEQ Water Supply Code (as amended). Any variation from these material types needs to be subject to further investigation.	<=150mm, C=100 >150-300mm, C=110 >300, C=120				
	Maximum Allowable Head loss (PH) (m/km)	5m/km for DN <=150mm 3m/km for DN>= 200mm				
	Maximum allowable velocity	2.5m/s for peak hour.				

Table 4.2 – Water Network Design Criteria – Dual Supply Network (NOT USED)

5 Demand and Flow Projections

5.1 Population projections

All water customer population loads should be specified in Equivalent Persons (EP). For residential land uses, the measure of EP will generally be equivalent to the estimated residential population. Estimation of EP loading for non-residential land should reflect land use types contained in the Planning Scheme of the relevant Council. (Prior to commencement, the designer shall consult the relevant Council to confirm the most recent land use coding and conversion rates.

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

5.2 Unit Loads

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

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

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

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

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

Modelling and design of all Water Services infrastructure shall be sized to accommodate the highest lot yield or densities indicated in the Planning Scheme.

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

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 design, the extent of Non-Revenue Water is as stated in the Tables above.

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 Table 4.1. Diurnal water demand patterns to be obtained from Water Authorities.

5.5 Calculated Demand Rates

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

Average Day Demand (AD)

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

Peak Day Demand (PD)

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

Peak Hour Demand (PH)

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

5.6 Hydraulic Modelling Scenarios

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

5.6.1 Steady State Analysis

5.6.1.1 Peak Hour

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

Assumptions:

- Peak Hour Demands;
- All water reservoirs at Minimum Operating Level (MOL)[9] and;

- Pumps and control valves set such that minimum boundary HGL conditions exist for the pressure zone being analysed[7].

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

5.6.1.2 Fire-Flow

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

Assumptions:

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

5.6.2 Extended Period Simulation Analysis

5.6.2.1 Peak Day (3 consecutive days)

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

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

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

Assumptions:

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

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

5.7 Surge and Water Hammer

Further hydraulic analysis may be required on trunk pipes, pumped system or near actuated valves where water hammer is likely to occur (e.g. due to the effects of pump station start/stop; power failure or valve closure or upstream of major inlet valves on reservoirs). In such instances, the designer may

[7] For example, inlet valves open and/or lift pump station on for supply to export reservoirs
[8] E.g. background demand assumptions.
[9] MOL defined as the greater of head or storage requirements as defined in Table 4.1

need to demonstrate that the material and pressure class of selected pipe thrust restraints and proposed mitigation structures are adequate to sustain the surge pressures developed.

The designer shall confirm with the 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:

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

6 Water Supply Network Infrastructure Considerations

6.1 Reservoir Sizing

The information below is intended as a guide on the scope of hydraulic analysis that may be undertaken for a range of reservoir types. Detailed hydraulic and cost benefit analysis undertaken in accordance with the provisions of this standard may show that other combinations of storage and flow are more beneficial. This information only applies to Reservoirs owned (or to be built ad owned by) the water Service Provider.

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 (as amended).

6.1.1 Ground Level Reservoirs:

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

6.1.2 Elevated Reservoirs:

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

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

6.1.3 Fire Fighting:

Designers must ensure that the section of network they are designing retains sufficient firefighting provision. As such, all designs must meet the requirements of the relevant Service Providers “Fire Provision Policy” as well as the various provisions of the WSAA Water Supply Code (as amended).

The WBBROC Water Service providers do not allow direct connection of pump systems to water mains for firefighting purposes

6.1.4 Private Building Fire Systems

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

6.1.5 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;
- storage elsewhere in the network;
- sensitivity of storage volumes to demand projections;
- impacts on water quality;
- cost benefit of constructing in stages;
- reliability of supply system;
- restrictions or bottlenecks in either the supply or reticulation system;
- available land at a proposed reservoir site; and,
- Other supply options (usually only for elevated zones).

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

Operational restrictions may also lead to increased storage requirements. As the 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 drawdown 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 standards 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 will have power supply reliability via fixed generator unless otherwise advised by the relevant Water Service Provider.

6.3 Pipeline Sizing Criteria

Pipe selection shall be undertaken in accordance with the requirements of Table 4.1 and the WSAA Water Supply Code (as amended). For design and hydraulic modelling purposes, the material, nominal diameter and associated internal diameter must be stipulated.

6.4 Land Requirements

It is important to ensure sufficient land is set aside for water supply infrastructure at the earliest opportunity and embedded into the local Planning Scheme. Land requirements shall consider site areas required for reservoirs, pump stations and associated pipelines, including consideration of staging and construction area requirements. Failure to incorporate sufficient land requirements in the

planning scheme can result in significantly more expensive and difficult to operate infrastructure to achieve the same performance outcomes.

6.5 Supply Reliability

Development involving more than 100 dwellings are required to have multiple points of connection to the network to ensure continuity of supply of potable water services.

7 Drinking Water Quality

7.1 General

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

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

7.2 Drinking Water Quality Modelling

All extended hydraulic modelling (i.e. any modelling that extends beyond the limits of a single development), shall include consideration of the drinking water quality parameters within the network. The scope of the drinking water quality assessment will be defined by the 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 assessment must contain sufficient detail and complexity to support the water service providers Drinking Water Quality Management Plan.

[10] Table 4.1 provides preferred maximums or water storage in reservoirs and in the network.

8 Non-drinking Water

8.1 General

All WBBROC Water Service Providers do not intend to accept non-drinking water (NDW) or “Dual Supply” systems to replace or supplement the potable water network.

Part C - Sewerage Network Infrastructure

9 Overview

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

In most cases, the criteria provided below have been based on analysis of historical data as well as consideration of trends forecast in each of the service areas.

10 Design Criteria – Sewerage

10.1 Key Criteria

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

Table 10 – WBBROC Sewerage Network Design Criteria

No	Parameter	Bundaberg Regional Council	Fraser Coast Regional Council	Gympie Regional Council	North Burnett Regional Council	South Burnett Regional Council
D1	Smart Sewer Option	• RIGS (PVC) **preferred** • NuSewer (PE)				
D2	Average Dry Weather Flow (ADWF)	220 l/ep/day				
D3	Peak Dry Weather Flow (PDWF)	PDWF = C_2 X ADWF where C_2 = 4.7 X (EP) $^{-0.105}$ EP is the total equivalent population in the catchment gravitating to a pump station				
D4	Peak Wet Weather Flow (PWWF)	PWWF = (5 x ADWF) or (C1 x ADWF), whichever is the larger C1 = 15 x (EP) $^{-0.1587}$ (note: the minimum value for C1 = 3.5) EP is the total equivalent population in the catchment gravitating to a pump station				
D5	Pump Station Servicing Requirements Operating storage (m3)	Ops Storage = 0.9 x Q / N Q = pump rate (L/s) of duty pump or Total Pump Capacity (L/s) if multiple duty pumps. However, Number of starts per hr. are: N=12 for motors<50kw N=5 for motors>50kw				
	Minimum Wet Well diameter	1.8m min (unless specified otherwise in the Sewerage Pump Station Code)				
	Maximum Wet Well Detention time	2 hours				
	Emergency storage[11]:	4 hours at ADWF				
	Emergency storage (existing)	4 hours at ADWF				
	Pump Operation Mode[12]	Duty / Assist	Smaller Stations– Duty/Standby Larger Stations – Duty/Assist	Duty/Standby (Pumps<35kW) Duty/Standby/Assist (Pumps >=35kw)	Duty/Standby	Duty/assist
	Single pump capacity	Single Pump Capacity (duty & standby) C1 x ADWF Where C1 = 15 x (EP) – 0.1587 Minimum value of C1 to be 3.5 Maximum value of C1 to be 5	Single Pump Capacity (duty & standby) C1 x ADWF Where C1 = 15 x (EP) – 0.1587 Minimum value of C1 to be 3.5 Maximum value of C1 to be 5	5 x ADWF		C1 x ADWF
	Total pump station capacity	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)	Clause 5.2.3 and 5.2.4 4 of WSA Sewage Pumping Code (as amended)				
D6	Low Pressure Sewer Flow	Not used				
D7	Rising Main Requirements	In accordance with the Sewerage Pumping Station Code of Australia, WSA 04-2005, Version 2.1				Rising main to be minimum PN16/SDR11
	Preferred Velocity	Preferred 0.9 - 1.2m/s				
	Minimum velocity	0.9 m/s				
	Maximum velocity	2.5 m/s (at PWWF)				
	Roughness	WSA 04 Sewage Pumping Station Code - Clause 10.3.3 , C =110; > DN300, C=120)				
	Odour Management Requirements	Odour management requirements (including detention times) to be determined as part of the odour impact study for the site (Refer SPS Code Cl 2.5).				
D8	Gravity Sewer Requirements (Conventional) - Roughness Equation - Pipe friction coefficient	Manning's ranging from 0.0128 (DN150-300) to 0.0134 (DN 2000)				

[11] Measurement of overflow storage shall be as being defined by items A and B of Clause 5.6.2.2 of the SPS Code. Storage is to be "in catchment" flows only and determined with reference to the "High Level alarm" as the lower control point and 100mm below the overflow as the upper control point. This may include partial network storage. Constructed "in line" storage which supplements network storage can be considerd in determining abvailable storage.

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

	- Minimum pipe grades (subject to minimum velocity stated below)	Minimum Sewer Grades Diameter (mm) % 150 0.55 225 0.33 300 0.25 375 0.17 450 0.14 525 0.12 600 0.10 750 0.08 For EPs < 20 the min grade for 150 main should be 1% For EPs 20-50 the min grade for 150 main should be 0.67% Prop Conns: DN 100 - 1.65%
	Maximum depth of flow	75% of internal diameter at PWWF
	Minimum Velocity	0.70 m/s at PDWF
D9	**Average Dry Weather Flow (ADWF) for Treatment Plants**	Not Used (refer Water Service Provider)

11 Flow Projections

11.1 General

All sewerage customer loads should be specified in Equivalent Persons (EP). Estimation of EP loading for both residential and non-residential land uses should reflect land use types contained in the Planning Schemes of the relevant Council. Prior to commencement, the designer shall consult the relevant Council to confirm the most recent land use coding and conversion rates.

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

11.2 Unit Loads

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

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

Average Dry Weather Flow (ADWF)

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

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

Where existing or future developments will produce EP's greater than those determined from the above densities, site specific flows shall be used in the analysis. This particularly relates to industrial and commercial type developments. Site specific flow estimates shall utilise sewage flow and / or water consumption data where available. Where this information is not available or in the case of future development where the flow has not been quantified, the relevant 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 design horizon of greater than 5,000kl/annum), demand is to be individually calculated and listed separately in the assumptions.

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

Modelling and design of all Water Services infrastructure shall be sized to accommodate the highest lot yield or densities indicated in the Planning Scheme.

12 Sewer Network Modelling

12.1 Scope of Hydraulic Modelling

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

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

12.2 Modelling Scenarios

12.2.1 General

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

- **Dry Weather Flow:** System meets explicit operational criteria, e.g. minimising detention periods (odour management), or overflow events (equipment or power supply failure)
- **Wet Weather Flow:** Number and location of overflows do not exceed 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).

Modelling of network should ensure that flows in the existing network do not exceed surcharge of manholes to a maximum of 1 m below manhole lid with no overflows from designated overflow locations

For new developments discharging to existing surcharged gravity mains, approval from Water Service Provider is required. Such approval may be conditioned upon field validation.

12.2.2 Static vs Dynamic Modelling:

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

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

13 Sewer Network Considerations

13.1 Gravity Sewers

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

"In line" bends in gravity sewers will not be an acceptable outcome across the region. Bends in the gravity system may only be achieved at manholes.

13.2 Rising Mains

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

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

Discharge into reticulation sewers may only be considered if:

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

No rising main discharges shall be permitted into a reticulation sewer unless approved by relevant Service Provider.

13.3 Pumping Stations

13.3.1 General:

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

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

Accepted pumps are to be used wherever possible. The list of "Accepted Products and Materials" has been developed as part of this 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 Pump Stations on Common Rising Mains:

Discharge into a common rising main is not a preferred option . In the instance where a designer can demonstrate long term benefit for discharge into a common rising main, the pumps should be designed to operate as follows:

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

13.4 Vacuum Sewer Systems and Vacuum Pump Stations

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

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

13.5 Low Pressure Sewer Systems

The design flows of low pressure sewer 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 Low Pressure Sewer systems are not recommended by the Service Providers. Only very limited extensions to existing systems will be considered

13.6 Septicity and Odour Control

Where high retention times are likely to occur, some form of odour / sulphide control will be required. As a guide, average retention times in excess of two hours may lead to hydrogen sulphide generation. The gaseous hydrogen sulphide concentration in the sewer headspace shall not exceed 1ppm. If modelling predicts concentrations greater than 1ppm, then either pump station chemical dosing or headspace gas extraction/treatment will be required. Refer to the WSAA Sewerage Code (as amended) for further guidance on odour management studies.

13.7 Ladders, Step Irons and Wet Well Washers:

Ladders and step irons are not accepted by WBBROC as a means of ingress/egress from pump stations or manholes within the network.

The WBBROC water service providers do not require wet well wash-down facilities to be provided in Sewerage Pumping Stations

13.8 On Site Systems:

On site sewerage systems are not included as part of this Code. Such solutions need to be addressed on a case by case basis in accordance with the policies developed by each agency.

Appendix A – WBBROC Alliance Code Addenda

A1 – Water Supply Code Addenda

SEQ Amendment to Water Supply Code of Australia WSA03—2011 V3.1

(including WBBROC amendments (in BLUE))

Reference	Amendments to WSA03-2011 V3.1
ACKNOWLEDGMENT, FORWARD, PREFACE AND INTRODUCTION	
Scope of Code	**After the first paragraph insert the following.** Hereafter, reference to -Water Agencyll or the like shall be taken to be a reference to the individual South-East Queensland Service Provider (SEQ-SP) within whose service area the assets will be designed and constructed. **After the third paragraph insert the following.** SEQ Amendments sets out the SEQ-SPs requirements for water reticulation mains up to and including 300mm ID. References to mains larger than 300mm are provided for information only.
Code Purpose	**After the third paragraph insert the following.** The SEQ Water Supply & Sewerage Design & Construction Code sets out SEQ Amendments to The Water Supply Code of Australia. The SEQ Amendments include: • The SEQ-SPs requirements for specific detail which the Code anticipates individual water agencies will address, and • Additions, deletions and variations to the Code where the Code 's requirements are not compatible with the SEQ-SPs current requirements (due to local practice, climate, geographic and topographic conditions and statutory requirements, etc.) or where the Code is otherwise silent. Any reference to the Water Supply Code of Australia (—the Codell) shall be deemed to refer to the SEQ Water Supply & Sewerage Design & Construction Code which contains the SEQ Amendments. The Code specifies mandatory requirements for the design and construction of water mains that are to become the responsibility of the SEQ-SPs. The SEQ-SPs reserve the right to specify or approve other design and/or construction requirements for particular projects and/or developments. Before commencement of any construction, the SEQ-SPs approval shall be obtained to any design and/or installation that does not comply with the Code.
New Item Drawings and Figures	**Insert the following new item.** **Drawings and Figures** Drawing references are added throughout the Code. In the event of a clash between the standard drawings and the figures in the specification – details shown on the standard drawings take precedence.
Proposed Amendments	**Before the first paragraph insert the following.** Users of the SEQ Water Supply & Sewerage Design & Construction Code are invited to suggest amendments or improvements to the technical content and format or style of the document by contacting the individual SEQ-SPs.
New Item Conditions of Supply of SEQ Water Supply & Sewerage Design and Construction Code	**Insert the following new item.** **Conditions of Supply of SEQ Water Supply & Sewerage Design and Construction Code** SEQ Water Supply & Sewerage Design & Construction Code is supplied subject to the following understandings and conditions: • SEQ Water Supply & Sewerage Design & Construction Code is copyright and apart from any use as permitted under the Copyright Act 1968, no parts of the documents, no parts of the documents may be sold, reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior permission in writing of SEQ-SPs.

Reference	Amendments to WSA03-2011 V3.1
	• SEQ Water Supply & Sewerage Design & Construction Code is intended for use in connection with SEQ-SPs related projects only.
	• SEQ-SPs do not warrant the applicability of SEQ Water Supply & Sewerage Design & Construction Code to climates, topography, soil types, water and sewage characteristics and other local conditions and factors that may be encountered outside SEQ-SPs area of operations. • The holder of SEQ Water Supply & Sewerage Design & Construction Code acknowledges that they may contain errors and/or omissions. • SEQ-SPs accept no responsibility for any works or parts thereof which may contain design and/or construction defects due to errors or omissions in any part of a SEQ Water Supply & Sewerage Design & Construction Code which has not been prepared or formatted by SEQ-SPs. • SEQ-SPs accept no responsibility for the incorrect application of SEQ Water Supply & Sewerage Design & Construction Code by the holder or any other party. Any details not currently denoted in the SEQ Water Supply & Sewerage Design & Construction Code is to be referred to the relevant SEQ-SP.
PART 0 - GLOSSARY OF TERMS AND ABBREVIATIONS	
Common trenching	**Replace the definition with the following.** The simultaneous installation of two or more services that are owned by different/multiple Utility Entities where these installed services are located within one trench. SEQ-SPs do not permit their mains to be installed in Common Trenching as any main break has the potential to significantly impact or destroy the other Utility Service causing significant cost and safety issues.
Concept Plan	**Insert the following into this term.** Concept Plan can also be a reference to a "Water Supply Schematic Plan".
New Term **SEQ Water Supply & Sewerage Design & Construction Code**	**Insert the following new term.** **SEQ Water Supply & Sewerage Design & Construction Code** The SEQ Water Supply & Sewerage Design and Construction Code (SEQ WS&S D&C Code) is required by legislation and is an instrument— • made jointly by the SEQ-SPs; and • that provides for technical standards relating to the design and construction of water infrastructure in the SEQ region. **SEQ Service Provider (SEQ–SP)** Providers of water services to individual customers/groups of customers. Services to the South-East Corner are specified in the South-East Queensland Water (Distribution and Retail Restructuring) Act and Natural Resources Provisions Act 2009 and service providers include Gold Coast City Council (GCCC), Logan City Council (LCC), Redland City Council (RCC), Queensland Urban Utilities (QUU) and Unitywater (UW).
Shared trenching	**Replace the definition with the following.** The simultaneous installation of two or more services that are owned by a single Utility Entity where these installed services are located within one trench. SEQ-SPs permit Shared Trenching for Dual Reticulation installations. Specific SEQ-SPs approval is required for Shared Trench installations of any Water Product and any other Recycled or Wastewater Product.
New Abbreviations **ADAC**	**Add the following new abbreviation.** **ADAC** Asset Design as Constructed
New Abbreviations **SEQ-SP**	**Add the following new abbreviation.** **SEQ-SP** South East Queensland water services provider.
PART 1 – PLANNING AND DESIGN	
1.1 **Scope**	**After the second paragraph insert the following.** Reader should be aware that: a) Specific design parameters relevant to this document are contained within the SEQ WS&S Design Criteria b) Where there are variations across the regions for specific requirements relevant to the document c) Where there is conflict between this Code and the SEQ WS&S Design Criteria, the later shall

Reference	Amendments to WSA03-2011 V3.1
	take precedence. **In the third paragraph replace the second sentence.** *This Section is not deemed to represent any Water Agency contractual requirements unless so specified by the Agency.* **with the following.** This code has been adjusted to define the DSS for drinking water and non-drinking water standards.
1.2.2 Scope and requirements	**After the first paragraph insert the following.** *The nominated requirements of the SEQ-SPs planners and designers will be in accordance with the SEQ Water Supply and Sewerage Design Criteria and the Queensland Department of Environment and resource Managements Planning Guidelines for Water Supply and Sewerage Schemes. The SEQ Water Supply and Sewerage Design Criteria takes precedence over all other planning advice.*
1.2.3 Concept Plan Format	**After item (ii) insert the following.** (iii) Layout of mains together with the development layout, and (iv) Key to network analysis e.g. node points, elevation, demand, and (v) Size and type of mains indicated graphically and distinguished by color and/or line type, and (vi) Design parameters – number of lots, number of ET, design flows, and (vii) Legend of Domain types (residential, Industrial etc.), and (viii) Supply points and pressure or Hydraulic Grade Line (HGL) as supplied by SEQ-SPs, and (ix) Location of pumps, pressure reducing valves and reservoir Top Water Level (TWL) and volume and a listing of proposed easements and land to be dedicated to the SEQ-SPs, and (x) Limit of water district serviced by the mains, and (xi) Proposed contours for the entire development at a minimum of 5m intervals, and (xii) Connections to adjoining and/or future developments as directed by SEQ-SPs, and (xiii) Valve layout including SEQ-SPs, standard cross connections for non-drinking water systems where a non-drinking water supply is not immediately available. (xiv) The concept plan shall include a servicing strategy for the whole development (including future stages and possible adjoining developments) **Insert "land use" in (B).** (B) Land ownership and land use planning requirement.
1.2.4.1 Asset Categorisation	**At the end of the first paragraph insert the following reference.** (Refer to Queensland government website e.g. search <safeguarding.qld.gov.au/resources/critinfra>).
1.2.5.1 Designers needs and responsibilities	**After the third paragraph insert the following.** The design of the works shall be carried out under the direction of and certified by a Registered Professional Engineer of Queensland (RPEQ) as defined by the Professionals Engineers Act (Qld). The Designer shall obtain the written approval from SEQ-SPs or SEQ-SPs delegate for any variations to the requirements of latest edition of WSA 03-2011 Water Supply Code as amended by SEQ-SPs prior to the submission of the final design.
1.2.5.2 Requirements to be addressed	**At the end of item h) Insert the following.** …including Section 30B of the Queensland WH&S Act 1995.
1.2.5.3 Design outputs	**Insert the following as item e).** Any variations to this Code, and the reason for the variation, shall be highlighted in a boxed note on the design drawings. **Insert the following drawing reference.** Refer to Standard Drawings WBB-WAT-1100-1, WBB-WAT-1100-2, WBB-WAT-1101-1, WBB-WAT- 1101-2 and WBB-WAT-1101-3.

Reference	Amendments to WSA03-2011 V3.1
1.2.6 **Design life, Table 1.2**	**Change the expected design life, years for Reservoirs from 50 to 100 years.**
1.3 **Consultation with other parties**	**Replace item (d) with following.** (d) Local, state and/or federal government.
2.2.4 **Non-drinking water as drinking water substitution**	**At the end of this clause insert the following.** SEQ-SPs have requirements regarding areas for dual reticulation. Planners and designers are to refer to the SEQ-SPs for the details of these requirements. Note that Logan City Council and Redland City Council areas do not use non-drinking water supply as drinking water supply substitution (do not have dual water supply systems).
2.3.2.1 **Dual water supply systems, General**	**Insert the following:** **"WBBROC does not currently support dual reticulation systems"** **This section identifies the following different options in use by SEQ-SPs.** **After the third paragraph insert the following.** **QUU**: Non-drinking water services are not permitted within the building envelope, the design demand for non-drinking water will not include any internal residential components. Firefighting demands shall be provided from the non-drinking water mains by utility hydrants in the street. However, non-drinking water shall not be used for firefighting plumbing within the building envelope i.e. sprinklers/ hose reels in industrial/ commercial premises. **GCCC:** Potable water mains have no Fire Fighting demands provided and have maintenance Flushing Points. Class A+ recycled water mains are to have Fire Fighting demands provided and have standard Spring Top Hydrants. All Building Classes shall be provided with a Potable water and a Class A+ Recycled water service and water meter and Potable water and Class A+ Recycled water plumbing and fire systems shall be provided to each dwelling or building fixture as defined within the GCCC - Water Supply to Allotments Code. Class A+ Recycled water shall be used within the allotment for Fire System Hose Reels and for Fire Hydrants (Pillar Type) but at this point in time there is no Regulator approval for Class A+ Recycled water to be used in Fire Sprinkler systems although the QF&RS has accepted it 's use in Fire Sprinkler systems and as such, we are currently working with the Regulator to resolve this matter. **UW:** Firefighting demands will be drawn from the drinking water mains. Hydrants will not be supplied on non-drinking water mains. Non-drinking water will only be used for toilet flushing within the building envelope and external water usage. **LCC and RCC**: See Clause 2.2.4 **Delete Table 2.1**
2.3.2.2 **Rainwater tanks**	**Replace item (d) with the following.** (d) top-up of rainwater tanks, which may be supplied from the drinking water supply systems; and; **Insert new item (f) and (g) as following.** (f) the Queensland Development Codes require alternative water supplies, that may include rainwater tanks; (g) SEQ-SPs have included the impacts of Rainwater tanks in the design parameters listed within the SEQ Water Supply and Sewerage Design Criteria. **At the end of this clause insert the following.**

Reference	Amendments to WSA03-2011 V3.1
	GCCC: Water Supply to Allotments Code defines the installation and connection requirements for all on-lot alternative water supplies.
2.3.4.1 Peak demands, General	**At the end of this clause insert the following:** The SEQ Water Supply and Sewerage Design Criteria define the demands to be used and their various Peaking Factors.
2.4 System Configuration:	**Amend item j) as follows:** j) Provision of dual or alternate feeds to minimize customer disruptions. Water mains are required on both sides of the roads in industrial and commercial precincts
2.5.2 Network analysis	**At the beginning of this clause insert the following.** SEQ-SPs require a network analysis. Specific advice will be given at the Concept Plan stage where a network analysis is not required.
2.5.3.2 Maximum Allowable Service Pressure	**At the end of this clause insert the following.** SEQ-SPs will provide specific advice on the need for a PRV at the Concept Plan stage.
2.5.3.3 Minimum Service Pressure	**Insert at the beginning of this clause.** SEQ-SPs require a network analysis. Specific advice will be given at the Concept Plan stage where a network analysis is not required. **Replace the Table 2.3 with the following note (keep the table No and table title).** Refer the SEQ WS & S Design Criteria.
2.5.4 Pressure Variation analysis	**Insert new item (d) as follows.** (d) for PRV zones a dual installation with a high flow and a low flow PRV installation. **FCRC** – Flow modulated PRV is preferred (over dual installation) in commercial areas. **BRC -** Flow modulated PRV may be considered (over dual installation) in commercial areas.
New Clause 2.5.6 Constant flow / trickle top up system	**Insert the new clause as following.** 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 SEQ-SPs no longer accept constant flow/trickle top up systems as an acceptable solution.
2.6.2 Prevention of back siphonage	**At the end of this clause insert the following.** The mandatory provision of Alternative Water Supplies in Queensland has been addressed for AS/NZS3500.1 Section 4 —Containmentll protection through the use of dual check valve water meters
2.6.3 Water Age	**Insert the following:** WBBROC requires looped water mains in cul-de-sacs
2.6.4 Disinfection	**After the first paragraph insert the following.** Developments more than 2.0 kilometres from the existing system shall carry out a modelling analysis of residual disinfection levels in the format recommended by the Cooperative Research Centre for Water Quality and Treatment within their manual on Disinfection Management – Implementing Tools for Optimising Disinfection.
2.7.1 Permanent Cross links and cross connections	**Replace the first sentence with the following.** There shall be no permanent linking mains (cross links) or installations that could result in inadvertent cross connection between the drinking water and non-drinking water systems within the network downstream of SEQ-SPs headwork storages. **At the end of this clause insert the following.** **GCCC** provides Potable water back-up to its Class A+ Reservoir.

Reference	Amendments to WSA03-2011 V3.1
2.7.2 Temporary cross links	**At the end of this clause insert the following.** No temporary cross-connections shall be installed downstream of SEQ-SPs headwork storages.[13] **GCCC: Replace Line 2 (Temporary cross links shall be specifically authorized by the Water Agency) as follows**. Temporary cross links shall be specifically authorized for developments that require the continuation of the Gold Coast City Council (Interim) Dual Reticulation system.
2.8.2.3 Service Related factors	**Change item (d) to read as follows.** *(d) Access to the site, pumping unit/s, and into the pump, pipework, etc. for maintenance.* **Add mew item (i) as follows.** *(i) Availability of land for the pump station.*
2.8.3 Concept design	**Adjust sub-clause (a) (iv) as follows.** (iv) peak hour demand rate (or greater) for pressure boosting pumping stations. Boosters supplying a small area may need to be designed for a greater peak demand rate. For small developments (EP ≤ 600) the greater peak demand rate shall be based on the Multiple Simultaneous Demands listed in Section 3 of AS/NZS 3500.1; **Adjust sub-clause (c) as follows for GCCC.** **For GCCC**, (c) A standby Domestic pump unit to be provided in addition to the one or more duty units, with automatic controls to alternate all pumps between duty and stand-by functions. A single dedicated Fire Flow pump unit to be provided in addition to the Domestic Flow pumps.
2.9.1 Storage Capacity	**At the beginning of this clause insert the following.** Design and Construction Specifications with associated Standard Drawings shall be used for any reservoir procurement and SEQ-SPs shall be consulted for details. **Amend the second paragraph as follows.** Service reservoir storage capacity shall consist of operating storage and emergency/fire storage. Operating storage shall cater for demands exceeding the maximum available inflow rate. Reserve storage shall cater for system component failure. Emergency/fire storage shall cater for system component failure. Emergency/fire storage capacity shall be determined by SEQ-SPs. **Third last Paragraph to start.** Where directed by the Service Provider, a risk assessment (Refer to AS/NZS ISO 31000) shall be undertaken…….
2.11 Future System Expansion	**Last sentence of the first paragraph to be amended to read as follows.** The Planner shall make allowance for existing and future land use zonings and possible rates of development based on the Service Providers defined planning.
2.12 System Review	**Second paragraph to be amended as follows.** Once the system has been planned and layout established, a network analysis shall be conducted to demonstrate compliance with at least the following issues and those defined in Clause 1.2.3 herein:
3.1.1 General, Sizing	**First Paragraph to be amended as follows.** Water mains shall be sized in accordance with the SEQ Water and Sewer Design Criteria so that the Water Agency can comply with regulatory and/or customer contract/agreement requirements.

[13] Reference in Design Criteria that cross connections is not allowed

Reference	Amendments to WSA03-2011 V3.1
	Add the following to the end of this clause. SEQ-SPs standard reticulation main sizes are 100, 150, 200, 250 and 300 mm ID. Water main sizes shall have material specified with DN used e.g. DN125 PE or DN100 DICL. Where material needs to be neutral, the water main shall not use DN and shall be related to nominal bore (NB) or internal diameter (ID) e.g. 150 mm NB (or ID) water main means that either DN150 DICL or DN180 PE shall be used. Refer to Appendix B – Equivalent Pipe Diameters which is published on WSAA website for pipe equivalent details.
3.1.2 **Minimum pipe sizes**	**Remove reference to 225 and 280mm and associated Note 2 in Table 3.1** **Additional wording to be provided beneath this table as follows.** **GCCC** traditional Potable water supply minimum pipe sizes are 100mm ID mains for Residential Domains and 150mm ID mains for Industrial and Commercial Domains **Delete Table 3.2 and replace with the following.** Pipe sizing shall be based on hydraulic calculations as per Clause 3.1.6.
3.1.4 **Dual water supply systems**	**Insert the following at the end of the Clause.** **GCCC** Dual Reticulation water supply minimum pipe sizes for the Class A+ recycled water mains are 100mm mains for Residential Domains and 150mm mains for Industrial and Commercial Domains with the associated Potable mains being DN63 @ PE100 for residential Domains and DN110 @ PE100 for Industrial and Commercial Domains based on a single feed source and the following ET limits; (i) Dual Reticulation Potable DN63 @ PE100 serves 14ET (ii) Dual Reticulation Potable DN110 @ PE100 serves 50ET (iii) Dual Reticulation **QUU**: The standard size range for drinking and non-drinking water mains shall be the same as per Clause 3.1.1 and 3.1.2 except DN90 PE pipes may be used on drinking water lines only in dual water supply systems. Potable DN150 and larger @ DICL/PVC serves 250ET
3.1.5 **Fire Flows**	**At the end of the first paragraph insert the following.** SEQ- SPs desire a minimum level of firefighting capacity. Refer SEQ WS&S Design Criteria for nominated Fire Flows in both Potable Systems and Dual Reticulation Systems.
3.1.6.2 **Head Loss**	**Change the third paragraph as follows.** Head loss shall be calculated using computer models or hydraulic formulas e.g. SEQ Water and Sewer Planning Guideline or where approved AS 2200 or the Water Agency may have a preferred or mandated procedure.
3.1.6.3 **Hydraulic Roughness Values**	**Insert a new line at the top of this clause as follows.** Refer SEQ WS&S Design Criteria for the defined Pipe Friction calculation and hydraulic roughness values.
3.1.6.4 **Flow Velocities**	**Insert a new sentence after sentence 1.** Refer SEQ WS&S Design Criteria for the defined Flow velocity values.
3.3.1 **Gravity Systems**	**Amend first sentence as follows.** For gravity systems, the PN of pipes and fittings shall be not less than the design pressure and a minimum of PN16 for general Operational needs.
3.5 **System test pressure**	**Add drawing reference to the end of (b) (ii).** (ii) Water Agency-specified test pressure, such as 100 or 120 m head, refer to WBB-WAT-1205-1.
3.8 **Pipeline components minimum pressure class**	**At the end of this clause insert the following.** The minimum pressure class for water supply pipes and fittings shall be PN16.
4.1	**After the sixth paragraph insert the following.**

Reference	Amendments to WSA03-2011 V3.1
General	Products for which inadequate performance or premature failure may jeopardize the meeting of SEQ-SPs —Standards of Servicell or the economic life of the system must be authorized for use by SEQ-SPs before incorporation into the works. **After the seventh paragraph insert the following.** For specific pipe and fitting types for each SEQ-SP refer to the Accepted Products and Materials List published by each SEQ-SP.
4.2.3 **Water Supply Mains – non-drinking water**	**Insert the following after the second paragraph.** **GCCC** permits blue fusion bonded colored fittings, bends, valves and pre-tapped connectors to be used on non-drinking water mains where the item is PE sleeved in the approved non-drinking water color. Where Purple colored fittings, bends, valves and pre-tapped connectors are available in the market place, they shall be used. **GCCC** temporary cross connection fittings and valves shall be painted Homebush Red R22 and shall not be provided with PE sleeving.
4.2.4 **Property Services – Drinking Water**	**Insert the following after the first paragraph.** **GCCC** requires DN25 and DN32 PE service pipe to be Black with Blue stripes and DN50 and larger PE service pipe to be Blue.
4.2.5 **Property Services – Non-Drinking Water**	**Insert after the first paragraph.** **GCCC** requires DN25 and DN32 PE service pipe to be Purple and DN50 and larger PE service pipe to be either Purple or Black with Purple stripes. **Insert after item b):** **GCCC** permits blue fusion bonded colored pre-tapped connectors to be used on non-drinking water mains where the item is PE sleeved in the approved non-drinking water color. Where Purple colored Ductile Iron pre-tapped connectors are available in the market place, they shall be used. **GCCC:** Table 4.1 Not used. **In Table 4.1 Reticulation mains color coding is required for fittings, valves and hydrants.** **In Table 4.1 Property Services, PE Pipes (Non-potable) – Remove reference to Black + Purple Stripes** **Table 4.1 Note 3: SEQ-SPs require color differentiation to be provided.**
4.3.1 **Product specifications - Ductile iron pipeline systems**	**Insert the following at the start of the clause.** DICL pipe class shall be PN35. PN20 pipe may be approved by the SEQ –SPs. Fittings may be PN16.
4.3.2 **Sizes and Configurations**	**Change item (a) as follows.** (a) Pre-tapped connectors are required for property services on all new reticulation mains (Refer also to Clause 5.11). Where the use of pre-tapped connectors is determined by the SEQ-SP to be impracticable, mechanical tapping bands may be used. **Delete item (b).**
4.3.4 **Sleeving**	**Insert the following line at the bottom of this clause.** Sleeving on ISO pipe shall be marked to identify that the pipe is to EN 545.
4.3.6 **Flanged Joints**	**Insert after paragraph 1.** Flanges to be drilled to Figure – B5 of AS 4087.
4.4 **PVC pipeline systems**	**Change item (a) as follows.** (a) Pre-tapped connectors are required for property services on all new reticulation mains (Refer also to Clause 5.11). Where the use of pre-tapped connectors is determined by the SEQ-SP to be impracticable, mechanical tapping bands may be used.

<table>
<tr><th>Reference</th><th>Amendments to WSA03-2011 V3.1</th></tr>
<tr><td></td><td>Delete item (b).

After item (c) insert the following paragraph.

PVC pipe shall be Series 2 PN16 with spigot and socket rubber ring joints.</td></tr>
<tr><td>4.5
PE pipeline systems</td><td>Insert the following at the start of this clause.

All WBBROC accept PVC and DICL. PE and other materials shall not be used without the approval of the Service Provider.

PE pipes and fittings shall comply with AS/NZS 4129 and AS/NZS 4130 with PN16 pressure rating. PE pipe equivalent sizes shall be as per Appendix B.
Add “/bands” to (a) as following.

(a) Electrofusion welded tapping saddles shall be used at all times with new and existing installations of PE pipe. (Refer also to WSA 01 and Clause 5.11) except where the use of electrofusion tapping saddles is determined to be impracticable, in which case mechanical tapping saddles/bands may be used for:
used for:

Replace (c) with the following.

(c) With the exception of valves, acceptable jointing types for PE to PE connections are electro-fusion and/or butt welding at all times with new and existing installations. Except where the use of the electro-fusion and butt welding joints are determined to be impracticable, in which case restraint gripper couplings may be used for rehabilitation installations or connections to existing PE mains.

Mechanical compression fittings or transition couplings may be used for PE size <DN63.

Debeading is not required for E-F joints unless otherwise specified by SEQ-SPs.

Valves may be connected to PE pipeline system with an electro-fusion, butt welding or restraint gripper couplings. Flanged valves may connect to the PE main as per (e) of this Clause.

Replace (e) with the following.

(e) For reticulation water mains, only approved full bore flange/gripper adaptors or full face full bore PE flanges with stainless steel (SS 316) backing rings shall be permitted for flange connections including valve installations. The full face full bore flanges and the stainless steel backing rings shall comply with the bolting details of AS4087 Figure B5 or B7 with PN16 pressure rating. PE pipe sizes and the corresponding flange sizes are given in the following table:

<table>
<tr><th>PE pipe size</th><th>Corresponding full bore flange size</th></tr>
<tr><td>63</td><td>50</td></tr>
<tr><td>90</td><td>80</td></tr>
<tr><td>125</td><td>100</td></tr>
<tr><td>180</td><td>150</td></tr>
<tr><td>250</td><td>200</td></tr>
<tr><td>315</td><td>250</td></tr>
<tr><td>355</td><td>300</td></tr>
</table>

PE pipe sizes and the corresponding flange sizes should be designed to achieve full bore connections. For PE pipes larger than reticulation sizes, additional reducers may need to be used where the full-bore connection is required.

The PE stub flanges which are not full face should not be used as they may rotate due to relaxation of the PE stub flange material.</td></tr>
<tr><td>4.8.3
Protection against</td><td>The start of this clause replace “At least one thickness…” with “Double thickness…” to read as:</td></tr>
</table>

Reference	Amendments to WSA03-2011 V3.1
damage to coating	Double thickness of PE sleeving shall be specified for….
4.8.5 Cathodic protection	**Add after the first paragraph.** Any SCL or DICL pipe systems will be assessed for induced current and shall be referred to SEQ-SPs for a decision on the requirement for cathodic protection.
4.8.7 Protection against contaminated ground	**After (D) insert the following as (E).** (E), Proposals for materials for water mains in contaminated land shall be submitted to SEQ-SPs development assessment team for approval.
4.8.8 Bolted connections	**Insert before the first paragraph.** Refer to drawing WBB-WAT-1313-1 for detail requirements.
5.1.1 Design tolerances	**Insert the following into the last paragraph.** Horizontal alignment shall be referenced to the Australian Geodetic Datum GDA94/BCSG02.
5.1.2 Levels	**At the end of this clause add the following.** A localised longitudinal elevation detail is also required for smaller sized mains where existing and/or proposed service conflicts to existing structures such as stormwater culverts and major electrical conduits or conduit banks.
5.1.4.1 Environmental consideration-General	**Insert the following after first paragraph.** Full details of the environmental management plan and mitigation works shall be shown on the Design Drawings and submitted to relevant Authority for approval. Prior to any works being accepted the consulting engineer shall provide SEQ-SPs delegate with certification that the works have been carried out in accordance with any environmental requirements.
5.2.4 Reduced size mains	**Replace the Table 5.1 and the Figure 5.2 with following paragraphs.** DN63 PE shall be used as reduced mains in cul-de-sacs, subject to a maximum length of reduced main of 40m and not more than 10 water service connections. DN90 PE may be used as drinking water mains only in dual water supply systems. Refer to Standard Drawings WBB-WAT-1104-1.
5.3 Water main access	**Insert the drawing reference at the end.** Refer drawing WBB-WAT-1404-1 for a typical arrangement.
5.4.2.1 Water mains in road reserves – General	**At the beginning of this clause insert the following.** Water mains are generally laid in road reserves. All mains in the road reserve shall be located in the water main allocation as required by relevant road authority. **At the end of (f) insert the following.** This is especially important where thrust blocks exist for bends, tees and valves as the thrust block size often needs the physical space of the adjoining Allocation to be properly founded for it's design function. **Insert the following to the end of this clause.** Where it is not practicable to use the dedicated water main allocation, the order of preference for alternative locations shall be: (i) elsewhere in a SEQ-SPs service allocation; (ii) other service allocation (with written approval of the service owner); (iii) road carriageway (kerb side lane preferred), road shoulder (with written approval from the relevant road authority); (iv) Council land reserves (with written approval from relevant Council); (v) other SEQ-SPs approved locations. Where a water main was originally laid in a verge but with road widening is now laid a carriageway, the water main shall be relocated to an appropriate alignment and constructed in an appropriate

Reference	Amendments to WSA03-2011 V3.1
	material for the location. Where a proposed road crosses an existing AC main, the main shall be replaced with an approved material. Where a water main in a road reserve is to be relocated, the order of preference for the alignment of the relocated main shall be: (A) within the appropriate allocation for water services; (B) in the same verge but within another service corridor, subject to the service owners approval; (C) within the water service corridor, but on the opposite side verge; (D) in the opposite footpath but within another service corridor, subject to the service owners approval; (E) substitute with a new main on the same alignment as the existing main; (F) if all the above are not feasible then discuss with the relevant SEQ-SP.
5.4.2.2 Location in footway	**After the second paragraph insert the following.** Wherever practicable, water mains shall be laid on the opposite side of the road to the sewer. As the sewer is usually laid on the high side, the water main, in such cases, will be laid on the low side.
5.4.2.3 Location in carriageway	**After the first paragraph insert the following.** Where the water main is proposed to be located in a road carriageway, written approval of the alignment and level of the main shall be obtained from the road authority and the relevant SEQ-SP.
5.4.2.4 Location in roundabout and bus bays	**Before the first paragraph insert the following.** Preference is for surface ancillaries (e.g. footpaths, bikeways, bus shelters, benches etc.) not to be placed over water infrastructure. The Water Agency shall be consulted concerning the alignment of the main. ~~Where applicable, a main shall be laid in a straight line through roundabout intersections and bus bays, as a prolongation of the line of the main leading to the intersection.~~ If there is limited access for maintenance, a maintenance-free installation shall be used (Refer Clause 7.6). ~~Where a straight line location of the main is not feasible, the Water Agency shall be consulted concerning alternative arrangements for the main, e.g. deviation around the intersection~~.
5.4.3 Location in other than dedicated public road reserves	**After the first paragraph insert the following.** Where the water main is located on private property, written approval of the landowner is required and an easement or land tenure shall be provided.
5.4.4 Water mains in easements	**In Table 5.2 amend the easement width to 6 m for reticulation mains (up to and including 300mm NB) and 10 m for trunk mains.** **Insert the following at the end of this Clause.** The Developer shall arrange for the provision of any easements over private property and registration of such easements.
5.4.8 Contaminated sites	**Insert the following at the end of this Clause.** A register of contaminated land sites is held by the DEHP Contaminated Land Unit. Details of works to be carried out on a contaminated site shall be referred to the Environmental Officer of relevant authority for approval.
5.4.9.2 Requirements for encased pipe installations	**Delete the last sentence of the third last paragraph to read.** Where fully welded pipes such as steel or PE are installed in encasing pipes, sufficient annulus dimension shall be specified so that the main can be secured in place using hardwood skids or a proprietary centralising and spacer system. ~~The annulus shall be grouted as necessary~~. The annulus shall not be grouted **Add drawing reference to the end of this clause.** Refer WBB-WAT-1212-1, WBB-WAT-1213-1 and WBB-WAT-1214-1 for typical arrangement.
5.4.10 Railway reserves	**Insert the following after the first paragraph.**

Reference	Amendments to WSA03-2011 V3.1
	Where a water main crosses a railway reserve a Deed of Agreement is required between the railway authority and SEQ-SPs. Refer Drawing WBB-WAT-1213-1.
5.4.11 Crossings of creeks or drainage reserves	**Insert the following after first sentence.** Acceptable options for crossing creeks include: (a) mains laid under the creek bed, refer details in drawing standard WBB-WAT-1211-1, or (b) mains attached to bridges, refer details in standard drawing WBB-WAT-1312-1, or (c) mains laid within an enveloper/encasing pipe, refer details in standard drawing WBB-WAT-1212-1. SEQ approved option is to be an engineered outcome from an approved material. **GCCC** permits Aqueduct creek and river crossings where an easement or land parcel is provided.
5.4.12 Overhead power lines and transmission towers	**Insert the following at the end of the second last paragraph.** Where the distance from a metal water main to a power line or transmission tower is within the distances stated in this clause, a report detailing the procedures to be adopted for the construction and maintenance of the main shall be provided by an RPEQ.
5.4.13 Water mains in conjunction with landscaping and/or other development	**Insert (h) at the end.** (h) Refer SEQ building over or adjacent asset (BOAA) guidelines.
5.4.14 Water mains on curved alignments	**Inert the following after item (c).** Option (a) PE system shall be used for curved alignments. **GCCC** requires that where the Dual Reticulation PE mains are used then Option (a) is required and where the RRJ pipe such as DICL or PVC pipes are used then Option (c) is required.
5.4.16.3 Property services	**Replace the second paragraph with the following.** **For GCCC and UW**, only PE will be accepted for domestic services. **For RCC and QUU**, either PE or copper will be accepted for property services. **For LCC** only copper property services shall be used. PE water services shall have a detectable marking tape placed above the pipe embedment. Where the PE service is placed inside a conduit the detectable marking tape shall also be placed inside the conduit.
5.6 Shared trenching	**Replace the second paragraph with.** Common trenching for different/multiple Utility Entities shall not be permitted. Shared trenches shall only be permitted for drinking and non-drinking water mains.
5.7 Duplicate mains	**After the first paragraph insert the following.** For dual water systems in industrial areas, where possible, both DW and NDW mains shall be laid on both sides of the road. **GCCC** does not require Duplicate Mains in Industrial areas, refer standards drawing WBB-RW-2200-1.
5.9 Connection of new mains to existing mains Insert the following at the front	**Before the first paragraph insert the following.** All works on the existing reticulation system shall be considered as –live works‖ and will be controlled by the SEQ-SPs or their designated agent at the Contractors cost. These works shall be clearly delineated on the Design Drawings and shown in sufficient detail such that the works can be readily constructed. If the proposed main crosses a roadway adjacent to the connection point, the full length of main at the road crossing shall be included in the –live works‖. The connection point to the existing system shall be located to minimize disruption of supply to customers and be subject to SEQ-SPs approval.

Reference	Amendments to WSA03-2011 V3.1
	Add the drawing reference to the end of this clause: Refer Standards Drawings WBB-WAT-1105-1 and WBB-WAT-1105-2.
5.10.2 Temporary ends of water mains	**Add drawing reference to the end of the second paragraph.** Drawing WBB-WAT-1302-1 represents the preferred option for "end of line" within the WBBROC region. Refer WBB-WAT-1303-1 and 2 for standard future extension installations.
5.10.3 Chlorination assemblies	**Insert the following at the end of this Clause.** Hydrants and/or test points may be used as chlorination assemblies. ~~The test points as per drawing SEQ-WAT-1410-1 shall be constructed at the end of all new mains before the scour and whereas required for commissioning purposes.~~ ~~In the case of dual water supply systems, the test points shall be installed on both drinking and non-drinking water mains.~~
5.10.4 Flushing points	**After the second paragraph insert the following.** Flushing points are required on all mains where hydrants or scours are not provided. Refer WBB-WAT-1104-1, WBB-WAT-1104-2, SEQ -NDW-2200-1, SEQ-NDW-2205-1, SEQ-NDW-2300-1 and SEQ-NDW-2302-1 for details.
5.11.1 Property services – General	**Insert the following to the end of this clause**. Property services and water meters form part of SEQ-SPs infrastructure. All supply and installation costs for water services and meters shall be borne by the Developer. Details of 20mm and 25mm water meter connections and associated water services shall comply with the details shown on drawings series WBB-WAT-1106, WBB-WAT-1107, WBB-WAT-1108 and WBB- WAT-1109 sets. Water services shall only be installed on water reticulation mains ≤ 300mm NB. The maximum length of a water service is 40 m or 20 m as per above standard drawings. PE water services shall have a detectable marking tape placed above the pipe embedment as per Clause 5.4.16.3. For PE systems, water services shall be connected to the new mains with electrofusion fittings only. For renewals, either electrofusion or mechanical tapping fittings can be used.
5.11.2 Connections to water mains	**Adjust the 5th paragraph to read.** Connections shall be located so as to provide at least 500 mm spacing between connection (tapping bands/saddles, pre-tapped connections and/or pipe joints for PE, and 600 mm for DN100 PVC and all DICL pipes, and 900mm for all DN150 and larger PVC pipes. Service connections shall only be provided on mains up to and including 200 mm ND **Delete all reference to Table 5.4. Table 5.4 is not used.**
5.11.3 Services, outlets and meters	**Adjust paragraph 5 to include drawing reference and delete Figures 5.9, 5.10 and 5.11.** Typical property service layouts and duct and service marker details are shown in WBB-WAT-1106, WBB-WAT-1107, WBB-WAT-1108 and WBB-WAT-1109 sets.
New Clause 5.11.4 Sizing of property services	All the sizes stated for water services shall have material specified with DN used e.g. DN25 PE or DN20 copper. Where material needs to be neutral, the water services shall not use DN and shall be related to nominal bore (NB) or internal diameter (ID) e.g. 20mm NB (or ID) water service means that either DN20 copper or DN25 PE. DN25 & DN32 PE is equivalent to DN20 & DN25 copper respectively, refer to Appendix B – Equivalent Pipe Diameters which is published on WSAA website for a summary (note that only type A copper shall be used).

Reference	Amendments to WSA03-2011 V3.1
	Single residential lots shall have a 20mm ID property service unless a 25mm ID service has been requested by the property owner and agreed to by SEQ-SPs. **QUU** requires that property services laid across a road shall be one size larger than the size of an individual property connection. If the long-term static head of the property service is less than 350 kPa (35m) or if private booster is required, the minimum size of property service shall be 32mm ID. For other than single residential lots, the size of property services shall be designed for the hydraulic demand and be subject to SEQ-SPs approval. **QUU:** if the development requires the construction of internal water mains, water services will be sized by SEQ-SPs concurrently with sizing the internal mains. If the development does not require the construction of internal water mains, water services may be sized by SEQ-SPs on application. The location of the service connections shall be shown on the water reticulation Design Drawings.
New Clause 5.11.5 Location of property services	Where practicable, property service connection points shall be located 300 mm from the residential property side boundary on the opposite side of the lot to the electrical service pillar-box. If, as may occur at corner properties, electrical pillar-boxes are located on both side boundaries, the property service connection shall be placed at the residential property boundary truncation point. For lots greater than 1,000m^2, the property service entry point shall be determined after the lot is released for sale. Services shall be located at least 1.1m from all electrical sources and clear of existing or future driveways. Property services laid parallel to the footpath and/or property boundary are not permitted. Large diameter services shall terminate in the footway approximately 250 mm from the property boundary.
New Clause 5.11.6 Property Service Conduits	Conduits shall be provided as shown in the standard drawings WBB-WAT-1106-1, WBB-WAT-1107-1 & 2 and WBB-WAT-1108-1. Water services up to and including DN63 PE which are located under existing or future roadways, concrete or paved driveways, footpaths, bikeways or other hard standing areas, shall be installed in a solvent welded DN100 PVC conduit. The conduit shall have a maximum length of 25 m and extend 300 mm beyond the back of the kerb or concrete/paved area. Conduits shall not be installed in the same trench as electrical cables. Brass and stainless steel markers indicating the service or conduit location shall be placed on the kerb or concrete/paving edge.
New Clause 5.11.7 Depth of property services	(a) Water services < DN63 PE Unless overridden by the relevant road authority, water services in the footway shall be laid with a minimum cover 300 mm. Conduits in the roadway shall be laid with a minimum cover of 600 mm, measured from the lip of kerb. (b) Water services ≥ DN63 PE The cover to services shall comply with that specified for the same sized water mains.
New Clause 5.11.8 Property service meters	All DN25 PE and DN32 PE services shall be designed for installation of 20mm meters unless advised otherwise. 20, 25 and 32mm meters shall be housed in PE meter boxes located in the footway against the RP boundary. The meters shall be located a minimum of 1.1m from electrical pillar-boxes. Generally, 50mm and larger meters shall be installed above-ground, within private property at the front of the building. If insufficient space is available at the front of the building, the meter may be placed within the building. For certain building classes, large meters may be installed outside the private property. This needs to be approved at design stage by local authority. All meters shall be accessible for reading and maintenance purposes.
New Clause 5.11.9 Water services ≥	All connections > 32mm ID to be provided in accordance with the requirements of relevant SEQ-SP. Water services ≥ 100mm NB shall be constructed using DICL, 316SS or SCL pipework.

Reference	Amendments to WSA03-2011 V3.1
100mm NB	**UW** does not allow SCL pipework. Vertical bends shall have flanged connections. Where space constraints prevent the use of concrete anchor blocks, SCL pipework is acceptable. SCL pipework shall terminate with flanged connections. Water services shall not be constructed using PVC. Services from mains in the adjoining footpath shall be constructed using flanged connections.
New Clause 5.11.10 Irrigation services	The approval procedures for irrigation services shall be the same as that applying to residential property services. The brass markers for conduits containing irrigation services shall have the letter —Ill stamped on the disk. Drawings that include irrigation services shall have the following boxed note: - Irrigation services shall have a backflow prevention device specified in accordance with AS/NZS 3500.1.
New Clause 5.11.11 Private boosters	Private boosters to property services are required in some elevated areas where it is not possible to achieve the water authorities desired minimum service pressure. The need for a break tank to be assessed on a case by case basis. SEQ-SPs shall nominate properties that require private boosters and provide the pump duty conditions, which shall form part of the Development Conditions. The design of private boosters shall comply with the appropriate guideline provided by the SEQ-SPs.
New Clause 5.11.12 Services to community title scheme	Community title schemes shall be provided with a single service to the property boundary. Details of the submetering shall comply with the relevant SEQ-SPs technical specification.
5.12.4 Clearance from structures and property boundaries	**Add to the end of this clause the following.** Refer to the specific SEQ Council for their defined Service Allocations.
5.12.5.2 Clearance requirements	**After the first paragraph Insert the following.** Water mains shall be located with sufficient clearance to structures to allow for maintenance and operation activities and provide protection against damage from pipeline bursts.

Reference	Amendments to WSA03-2011 V3.1
	Amend the Table 5.5 as. **TABLE 5.5** **CLEARANCES BETWEEN WATER MAINS AND OTHER UNDERGROUND SERVICES**

Utility (Existing or proposed)	Minimum horizontal clearance mm		Minimum vertical clearance[1] mm
	New main size NB		
	≤ 200 mm	> 200 mm	
Water mains ≤ 375 mm	300[3]	600	150
Water mains[2] > 375 mm	600	600	500
Gravity sewers ≤ 300 mm	1000[5]/600	1000[5]/600	500[4]
Gravity sewers > 300 mm	1000[5]/600	1000[5]/600	500[4]
Sewers – pressure	1000[5]	1000[5]	500
Sewers – vacuum	300	600	500
Gas mains	500	600	500[4]
Telecommunication conduits and cables	500	600	500
Electricity conduits and cables	500	1000	500[4 & 7]
Stormwater drains ≤ 300 mm	500	600	150[4]
Stormwater drains > 300 mm	500	600	300[4]
Kerbs	150	600[6]	150 (where possible)

Amend Note 4 of Table 5.5 as following.

4 Water mains (including water services and fire hydrant offtakes) should always cross over sewers, stormwater drains, gas mains and electrical conduits unless written approval is obtained from SEQ-SPs. For cases where there is no alternative and the water main must cross under other services, the design shall nominate an appropriate trenchless construction technique in accordance with Clause 5.5 or other water main construction and protection treatment (i.e. SCL water main with concrete encasement), effectively joint-free (i.e. fully welded PE) in the vicinity of other services.

5.12.6.1 Deviation of water mains - General	**Insert the following at the end of the clause.** **For QUU** It shall not be permitted to make use of the allowable deflections at joints to achieve pipe deviations. Use PE, DICL bends or welded SCL pipes to provide pipe deviations.
5.12.6.2 Horizontal deviation of water mains	**Insert the following paragraph at the start of this clause.** **For QUU**, Figure 5.12 and 5.13 are not permitted as per the QUU requirements in Clause 5.12.6.1.

Reference	Amendments to WSA03-2011 V3.1
5.12.6.3 Vertical deviations of water mains	**Insert the following paragraph at the start of this clause.** **For QUU**, Figure 5.15 is not permitted as per the QUU requirements in Clause 5.12.6.1.
5.12.6.4 Curving of pipes to avoid obstructions	**Replace this clause with following.** Curving of PVC pipes is not permitted. Curving of PE pipes including limiting the radius of curvature shall be in accordance with PIPA Guideline POP202.
6.2.1 Planning criteria – In-line pressure booster pumping stations	**After the last paragraph insert the following.** In–line booster pumping stations, without associated high-level storage, may be used in situations where all of the following conditions apply: (A) it is impractical to build a storage; (B) the pump and motor can be replaced in 8 hours; (C) no more than 150 property connections will be without water when the pump is off-line; and (D) the pump motor is variable speed; (E) Duty/Standby pumps shall be provided unless otherwise approved by the SEQ-SPs.
6.2.2.4 – (in Line Pressure Booster Pumping Stations) Due Diligence	**Amend item b) of this clause as follows:** **b) ~~standard connection on the electrical cubicle for a mobile generator~~; Provision of a fixed generator**
7.4.1 External forces – General	**Amend Figure 7.1 reference as following.** Bedding may be omitted if trench base is a suitable material as approved by the SEQ-SP.

<table>
<tr><th>Reference</th><th>Amendments to WSA03-2011 V3.1</th></tr>
<tr><td>7.4.2
Pipe Cover</td><td>
Replace the Table 7.2 Minimum Depths of Pipe Cover with the following.
<table>
<tr><th>Location</th><th>≤150mm NB</th><th>≥200mm NB</th></tr>
<tr><td>Non-roadways</td><td>600</td><td>1,000</td></tr>
<tr><td>Sealed roads</td><td>600</td><td>1,000</td></tr>
<tr><td>Major roadways/embankment</td><td>750</td><td>1,000</td></tr>
<tr><td>Freeways</td><td>1,200</td><td>1,200</td></tr>
</table>
Replace the first paragraph under Table 7.2 with the following.

In a footway the depth of cover is measured from the lip of kerb, or if there is no kerb, from the road shoulder. If the footway cross fall is non-standard, i.e. greater than 1 in 50, the finished surface level shall be the reference point. A cross-section at a scale of 1:50 shall be provided with the Design Drawings.

In a road carriageway, the depth of cover shall be measure from the road shoulder or lip of kerb.

Where site works will reduce the depth of cover below the required pipe cover, the main shall be redesigned to provide the required cover.

Replace the second last paragraph with the following.

The maximum depth to invert shall not exceed 1.5 m for reticulation mains and for mains > 300mm ID the maximum pipe cover shall not exceed 1.5 m, unless a special design for the pipeline and its installation is submitted to and approved by SEQ-SPs.

The depth of non-drinking water mains shall comply with the requirements for drinking water mains. Refer drawings SEQ-RW-2110-1, SEQ-RW-2207-1 and SEQ-RW-2307-1.
</td></tr>
<tr><td>7.4.4
Pipe embedment</td><td>
Change the title of Figures 7.2 and 7.3 by deleting the embedment type numbers.

At the end of this clause insert the following drawing reference.

Refer standard drawings WBB-WAT-1201-1, WBB-WAT-1202-1, WBB-WAT-1203-1 and WBB-WAT-1204-1 & 2 for all embedment types from A to N.

Insert the following at the end of the Note of Figure 7.2.

To be used only in sand where approved by the relevant SEQ-SP.
</td></tr>
<tr><td>7.5.1
Geotechnical consideration - General</td><td>
Adjust the first paragraph so read.

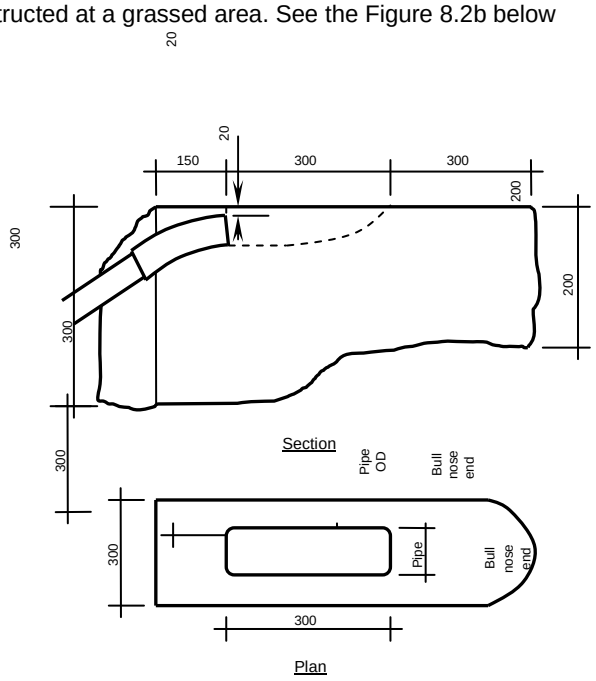
Unless otherwise specified, a geotechnical assessment shall be made of all the proposed route.
</td></tr>
</table>

Reference	Amendments to WSA03-2011 V3.1
	Add the following before the third paragraph. Where difficult ground conditions are anticipated a geotechnical and construction method report shall be submitted with the design. **Change the title of Figures 7.4 and 7.5 by deleting the embedment type numbers.** **Remove description of embedment types C to H by deleting the last paragraph.** **At the end of this clause insert the following drawing reference.** Refer standard drawings WBB-WAT-1201-1, WBB-WAT-1202-1, WBB-WAT-1203-1 and WBB-WAT-1204-1 & 2 for all embedment types from A to N. **Delete Figures 7.6, 7.7 and 7.8 the Types F, G and H support.**
7.6.1 **Concrete encasement - General**	**After the fourth paragraph insert the following.** Concrete surrounding works shall be carried out in **one** continuous pour, without horizontal joints. Where it is necessary to concrete encase a section of plastic pipe material, a heavy duty 3mm thick polyethylene material shall be placed between the concrete and the PE pipe to minimise imposed loadings particularly where the pipe emerges from the concrete block. Rocker pipes (min length to be the greater of 600mm or 2 x DN) may be required at each end of the transition from the concrete encased pipe to the natural trenched section of the main.
7.8 **Above-ground water mains**	**Insert a paragraph at the end.** Design to incorporate allowance for expansion at bridge expansion joints and at ends of a bridge.
7.9.2.2 **Concrete thrust blocks**	**Insert the following into the second paragraph.** SEQ-SPs require 1200 kPa test pressure, see Note 4 for the required concrete thrust block sizes of 1200 kPa pressure.
7.9.2.4 **Timber and recycled plastics thrust blocks**	**At the beginning insert the following.** Timber thrust blocks shall not be used. **Delete Table 7.4 and Figure 7.17.**
7.9.5 **Restrained elastomeric seal joint water mains**	**Add the following as the first paragraph.** Where space available for thrust blocks is limited, a SEQ-SPs approved commercial restrained joint system may be used subject to SEQ-SPs delegate approval. Installation of joints must follow the manufacturer's specifications. **Insert drawing reference to the end.** Refer to Drawing WBB-WAT-1208-1.

Reference	Amendments to WSA03-2011 V3.1
7.9.6.5 Restraint requirements for special situations – PE mains	**Insert the following paragraph at the beginning.** Generally, a fully restrained PE pipe system does not require the use of anchorage. The restrained system may be provided through welded joints, restrained couplings or flanges. Designer shall assess the needs for anchorage i.e. ends of mains or transition between different pipe materials. **Insert the following to the end of the clause.** The transition areas shall be restrained with concrete thrust restraints. Push-on PVC or DICL directly connecting to PE without appropriate restraints on the transition area is not permitted.
7.10 Bulkheads and trenchstops	**Amend Table 7.5, spacing for 5<Grade<15 as following.** *S*=100/Grade% or 10m whichever is less **At the end of the clause insert drawing reference as following.** Refer to Drawings WBB-WAT-1209-1 and WBB-WAT-1210-1
8.1.2 Valves siting principles	**Insert the following to the end of this Clause.** Valves, hydrants and scours shall not be installed in roadways where an alternative location is available.
8.2.3 Stop valves for transfer/distribution mains	**Insert the following to the end of this Clause.** Where an application requires valve size up to DN600 and pressure class up to PN16, unless specified otherwise the stop valves shall be resilient seated gate valves (RSVs). For mains >=750mm, the requirement for metal seated gate valves (MSVs) will be dependent on the network configuration. Where man entry to a water main may be required, for maintenance purposes, one or more MSV may be specified. *A MSV can perform as a physical plug in a water main and protects a man inside the water main.*

Reference	Amendments to WSA03-2011 V3.1
8.2.4 **Stop valves for reticulation mains**	**Insert the following to the end of the first paragraph.** *Stop valves are also used to improve water quality by controlling the direction of flow.* **After the fourth paragraph insert the following.** No more than two reticulation branches shall be located between stop valves. Stop Valves may not be required on a 100mm ID main leading from a 100mm or 150mm ID main where no more than 20 residential lots are located within a cul-de-sac or between adjacent stop valves. For DICL and PVC pipes, the stop valves shall be the double socket type online, except where the valve is connected to a flanged branch in which case the valve shall be of the flange/socket type. Stop valves on PE systems shall be flange, electro-fusion or gripper types. Stop valves on reticulation mains shall be resilient seated gate valves (RSVs). Butterfly valves shall not be used in the reticulation system, refer Clause 8.2.2.3. **Amend Table 8.2 the valve spacing as the following.** (a) 200 m for 100mm and 150mm NB mains; (b) 300 m for 200mm, 250mm and 300mm NB mains.
8.2.5 **Stop valves for local in-line booster pumping stations**	**Delete d) ii) and the last paragraph which allows butterfly valves.**
8.2.6 **Bypass of Stop Valve**	**Replace third paragraph with the following.** For all mains >= 450mm, the designer shall consult the SEQ-SP on the need for stop valve bypass. Refer to Standard Drawing WBB-WAT-1308-1). **Change DN to NB for main sizes in subclause (a), (b) and (c).**
8.2.7.1 **Stop Valves – location and arrangement**	**After the second paragraph insert the following paragraph.** Valves shall be located adjacent to common allotment boundaries, and/or the tangent points of allotment boundary truncations and shall not be located in road carriageways. Where truncation is not provided, stop valves shall be installed 6m back from the corner of the allotment. Refer to Standard Drawings WBB-WAT-1102-1 and WBB-WAT-1103-1.
8.2.7.3 **Arrangement 2**	**Amend the Clause as following.** Where a road crossing is necessary immediately after the tee branch and there is no space available adjacent to the tee, a stop valve shall be installed on the opposite side of the road. In this instance, the pipework between the tee and the valve shall be thrust restrained (Refer to Figure 8.9).
8.2.7.4 **Arrangement 3**	**At the end insert the following.** **UW** requires use of option B, with the valve normally closed marked as a closed zone valve.

Reference	Amendments to WSA03-2011 V3.1
8.2.8 **Stop valve special arrangements**	**At Note 2 Example B of Figure 8.14 insert the following.** This is the preferred arrangement.
8.3.2 **Automatic inlet control valves (AICV)**	**After the second paragraph insert the following.** AICV's shall be capable of remote control by telemetry. Float valves are not permitted.
8.3.3 **Pressure reducing valve (PRV)**	**Insert the drawing reference to the end of this clause.** Refer standard drawings WBB-WAT-1309 set and WBB-WAT-1310 set.
8.4.2 **Air valves – Installation design criteria**	**At the end of this paragraph insert the following.** Air valves are not required on reticulation mains, either drinking water or non-drinking water, as water services and/or hydrants serve to release air. Refer to Drawing WBB-WAT-1304-1.
8.6.1 **Air valves – Installation design criteria**	**Insert the drawing reference to the end of this clause.** Refer standard drawings WBB-WAT-1307-2 and WBB-WAT-1307-3.
8.6.2 **Scours design**	**After the first paragraph insert the following.** Scours are also provided for the removal of sediment. **For QUU**: Scours at the end of line and intermediate low points shall, where practical, have a hydrant installed adjacent to the scour on drinking water lines. However, hydrants are not required adjacent to the scour on non-drinking water lines in dual water systems. At creek and river crossings, the scour tee and the scour outlet shall be installed at a level equal to or just higher than the mean water level in the watercourse. **Change DN to nominal bore (NB) in Table 8.3.**
8.6.3 **Scours application**	**Change DN to nominal bore (NB) in this clause.**
8.6.4 **Scours size**	**Change DN to nominal bore (NB) in Table 8.4.**

Reference	Amendments to WSA03-2011 V3.1
8.6.5 **Scours locations**	**After Items i to iv insert the following.** **GCCC and UW** will not allow discharge to (ii) or (iii) **At the end of this clause insert the following.** When a scour is located at the end of the main, the scour valve shall be connected to an outlet pipe from a tee at the end of the main. The maximum length of the outlet pipe shall be 6m. Where there is no kerb and channel, the scour shall discharge in a 750 (L) x 300 (W) x 300 (D) concrete apron constructed at a grassed area. See the Figure 8.2b below  Notes: 1, Have a 45^{O} bend come up to 20mm from the surface as with Kerb and Channel. 2, Concrete encased at 45^{O} bend and taper extra concrete down pipe as per detail. **8.28b Typical scour outlet arrangement— No kerb and channel**
8.7 **Swabbing points**	**After the first paragraph insert the following.** Swabbing points are not required under normal conditions. **Insert the drawing reference WBB-WAT-1318-1 to the end of the second paragraph.** **Change DN to NB in this clause.**

Reference	Amendments to WSA03-2011 V3.1
8.8.4 **Hydrant types**	**At the end of this paragraph insert the following.** All hydrants shall be (a) spring hydrant type unless approved otherwise by SEQ-SPs. Isolation valve assemblies require the approval of SEQ-SPs. Where the water main will not be extended as in a cul-de-sac street end, a hydrant with a removable top and internal assembly that provides a clean bore for high velocity pigging, flushing or swabbing shall be installed.
8.8.5 **Hydrant installation**	**Change DN to NB in this clause.**
8.8.7 **Hydrant sizes**	**At the end of this paragraph insert the following.** ~~Spring hydrants shall have 100mm NB risers and DN100 flanges. For PE systems, either DN125 or DN90 PE risers (DN90 PE risers must be used with Plasson moulded adaptor and its SS316 backing ring or similar approved) shall be used.~~ ~~The PE flange to the hydrant shall be full face with SS316 backing rings and the bolting configuration shall match the DN100 flange on the hydrant. Hydrant saddles or hydrant tees to the main shall be fully welded connections.~~ WBBROC accept 80mm hydrants, flanges and risers unless area pressures require larger fittings.
8.8.8 **Hydrant spacing**	**After the first paragraph insert the following.** The spacing of hydrants on water mains in urban areas shall comply with the following requirements: (a) within 40 m of property boundaries; (b) at a maximum interval of 80 m, or, in rural residential areas, the maximum spacing of hydrants shall be 240m subject to compliance with the other conditions of this clause; (c) as required for operational purposes, and (d) at the crest of the main to enable release entrapped air; and (e) at the low points in the mains. *Fire protection within community title scheme developments shall comply with the relevant building or fire service codes.*
8.8.9 **Hydrant location**	**After the third paragraph insert the following.** Hydrants shall be located in line (+/- 200mm) with the side real property boundary. Refer drawings WBB-WAT-1302-1 for typical installations.

Reference	Amendments to WSA03-2011 V3.1
8.8.10 Hydrants for reticulation system operation requirements	**Insert the following at the end of this Clause.** In the case of dual water supply system: (i) Hydrants for fire fighting and/or operational purposes shall only be installed on the non-drinking water mains. (ii) Hydrants spacing on non-drinking water mains shall be the same as the spacing for single drinking water system to Clause 8.8.8. **UW:** Hydrants for fire fighting purposes shall only be installed on drinking water lines as per Clause 2.3.2.1. **QUU:** Hydrants for strategic and/or operational purposes (not for fire fighting purposes) shall be installed on the drinking water mains. The hydrants shall be the same spring type as for single drinking water systems. Hydrants on drinking water mains (not for fire fighting purposes) in a dual water system shall be located: A adjacent to scours for water saving purposes as per the Clause 8.6.2, and B at the crest of the main and where required for operational purposes. Hydrants (the spring type) may be required on DN90 PE drinking water lines for operational purposes. Hydrants are not required on DN63 PE drinking water mains.
New Clause 8.8.12 Metering Fire Hose Reels and Hydrant Services	All new fire services to hydrants and/or fire hose reels for commercial, industrial and residential developments shall be metered unless otherwise approved by SEQ-SP. Existing hydrants and/or fire hose reels services, where significant alterations or renovations are proposed, which will involve a Development Application or plumbing service, shall also be metered. The flow meter assembly configuration shall include a detector check valve in the by-pass line. The detector check valve shall be of stainless steel construction. The type of metering arrangement to be used is dependent on the type of fire service and the property title classification. Consult individual SEQ-SPs for the details of the typical metering arrangements set out in their —Fire Hose Reels and Hydrant Services Metering Arrangements‖ policy. Generally, water delivered to a fire sprinkler system shall not pass through a meter. Pipework to the sprinklers may branch off the incoming main on the supply side of a meter avoiding the need for a separate incoming main for the sprinkler service. In such an arrangement, the sprinkler branch shall not supply any other services. Water delivered to a fire sprinkler system in accordance with Australia Standards Automatic Fire Sprinkler Systems AS2118.1 or AS2118.6 may pass through a meter, only if a performance based solution document from a registered professional engineer of Queensland (RPEQ) is submitted to Council's Plumbing Service Group for Council approval.
8.10.2 General	**At the end of this clause insert the following drawing reference.** Refer Drawings WBB-WAT-1305-1, WBB-WAT-1305-2 and WBB-WAT-1306-1.
8.10.3 Marking of surface fittings	**Insert the following at the end of this Clause.** Valve and hydrant box covers shall have the markings of —V‖ and —H‖ as per drawings WBB-WAT- 1300-1. Dual water system shall have the markings as per drawings SEQ-RW-2122-1 & SEQ-RW- 2125-2, SEQ-RW-2209-1 & SEQ-RW-2211-1 or SEQ-RW-2309-1 & SEQ-RW-2311-1.
8.10.4 Installation requirements	**At the end of this clause insert the following drawing reference.** Typical installation requirements for SEQ-SPs are shown in Drawings WBB-WAT-1301-1 and WBB- WAT-1302-1.

Reference	Amendments to WSA03-2011 V3.1
8.11.2 **Marker posts and plates**	**Insert the following at the beginning.** In areas where there is no suitable road pavement to install the pavement markers such as unsealed roads, parks and easements, fire hydrant marker posts with reflective indicator plates shall be erected on the nearest street alignment opposite the hydrant as shown on drawing WBB-WAT-1300-1. The indicator plates shall be kept covered until the main is accepted "On Maintenance". Marker posts shall be installed adjacent to the appurtenances, but clear of the road carriageway. All marker posts for the non-drinking water components shall have the non-drinking water sign or letters NDW added to the lettering on the indicator plates and top of the marker posts painted purple.
8.11.3 **Pavement markers**	**Insert the following at the end.** Fire hydrant pavement markers shall be installed adjacent to all fire hydrants. The pavement markers shall meet the requirements of the relevant road authority. The typical hydrant pavement marker systems are as shown on the drawings WBB-WAT-1300-2, WBB-WAT-1300-3 and WBB-WAT-1300-4, or WBB-WAT-1300-5.
9.2.1 **Design Drawings - General**	**Replace the 2nd sentence with the following.** All design drawings shall be provided to the SEQ-SPs in accordance with the requirement of Asset Design As Constructed (ADAC) package.
New Clause 9.2.4.1 **Locality plan** **(To be replaced by ADAC requirements.)**	(a) the location of the development relative to surrounding areas; (b) the property or development boundary shown with a heavy line; (c) existing and proposed road boundaries; (d) sufficient street names and major topographical features to easily locate the development; (e) sufficient details of the local mains to enable SEQ-SPs to readily carry out the "live connections"; and (f) the UBD map reference number (where available).
New Clause 9.2.4.2 **Site plan** **(To be replaced by ADAC requirements.)**	(a) cadastral information including streets, street names, lot boundaries and numbers and easement locations; (b) proposed and existing water mains diameter (DN), material type, pressure class (PN), diameter, series (PVC); (c) water main location (offset) from property boundary; (d) "Live" water connections to be built by SEQ-SPs, including mains and fittings; (e) mains to be substituted and associated fittings; (f) mains to be disused; (g) sufficient details of the existing system for the "live connections"; (h) SEQ-SPs "As Constructed" reference or file number for all existing mains affected by the live connections; (i) list of all proposed fittings, including live connections. The lists shall be located near the point of placement on the plan; (j) diagrammatic sketch of pipe fitting arrangements; (k) hydraulic force in kN and direction indicated by an arrow at each bend, junction and dead-end (refer WBB-WAT-1205-1); (l) details of all existing and proposed structures and utilities that may affect the works, including the cover, size and alignment; (m) overhead high voltage power lines and support towers; (n) water service sizes, material and entry points for each lot; (o) location of service conduits; (p) allotments with zero lot alignments; and (q) a bold line drawn around the development property or site. (r) all SCL specials shall be detailed.

Reference	Amendments to WSA03-2011 V3.1
New Clause 9.2.4.3 Tabulations **(To be replaced by ADAC requirements.)**	The following tabulations and its details shall be shown on the drawings: **Asset register:** (a) name of Subdivision or Development; (b) Development site address; (c) application numbers from relevant SEQ-SPs delegate; (d) SEQ-SPs delegate approval date; (e) material and total length of each diameter of main; (f) material and total length of each diameter of service; (g) number of meters in each diameter; and (h) date works completed. (i) Drawing or Detail Plan numbers. **Service details:** For minor services, the following details are required: (j) size of each service; (k) total number of each size of service; and (l) special requirements of lots not requiring services. For major services the following details are required: (m) street name; (n) type of service (Domestic/fire/Sprinkler); (o) length, diameter and material of each service; (p) commencement and completion date; (q) Construction Representative signature; (r) Service approval and charge number; (s) levels to be adopted; and (t) remarks for WSI record. **SEQ-SPs connections and substitution** (u) street name and location; (v) length, diameter and material of each main; (w) commencement and completion date.
	Disused mains. (x) street name; (y) length, diameter and material of each main; (z) ―As constructed‖ folio and year; (aa) number of fire hydrants on the length of main.
9.4 Recording of work as constructed information	**Insert the following at the beginning.** The design drawings shall be prepared so that the as-constructed information can be readily incorporated and comply with ADAC requirements.
PART 2 - CONSTRUCTION	
New Clause 11.1.1 Personnel qualifications	During any construction activity at least one person on site must have completed a pipelaying training course approved by the supplier and appropriate to the pipeline under construction (refer the ―Accepted Products and Materials‖ listing). The contractor will provide documented evidence of such qualification prior to commencement of the works.
11.5.1 Protection of other services	**Insert the following at the start of this clause.** The contractor shall be responsible for any damage they cause to existing underground services. If the contractor damages any existing services, it shall arrange for the relevant service authority to make good such damage and the cost thereof shall be borne by the contractor. If in the opinion of the SEQ-SP, the failure or damage causes an emergency situation, then remedial action will be taken by the SEQ-SP and the full cost of such action shall be borne by the contractor.

Reference	Amendments to WSA03-2011 V3.1
New Clause 12.1.2 Pressure pipes and fittings	All pipe materials and fittings to be used in the SEQ-SPs water reticulation network shall be authorised by SEQ-SPs. A list of the accepted items is included in —Accepted Products and Materials‖ listing. All material and fittings shall be installed to the manufacturer's specifications. Where products are required, but not included in the accepted product list, they shall be referred to the SEQ-SPs for consideration. Installation of pipes and fittings shall comply with the following: **PVC pipe:** PVC shall be laid in accordance with the requirements for laying PVC. PVC pipes shall not be cut within 1.5m of the socket and in general the minimum length of PVC pipe shall be 1.5m. (*This requirement relates to the potential for longitudinal splits to occur down the main particularly if a hole is drilled in a short length of pipe. In addition, short lengths of pipe have the potential to compound joint rotation increasing the possibility of spigot and socket disengagement.)* Ductile iron or cast-iron spigots shall not be joined to PVC sockets. **Ductile iron pipe and fittings:** DICL pipes shall not be cut within 1.5m of the socket and in general the minimum length of DICL pipe shall be 1.5m. *(This requirement relates to outer diameter of DICL varying within this length which can cause incorrect seal at the rubber joint. In addition, short lengths of pipe have the potential to compound joint rotation increasing the possibility of spigot and socket disengagement.)* **FBE coated flanges:** FBE coated flanges shall be joined by Grade 316 stainless steel bolts, nuts and washers. In this configuration, flanges do not need to have a corrosion protection wrapping (e.g. Denzo wrapping or equivalent). **Restrained joint rubber sealing rings** Where restrained joints are used on DICL mains, the joint shall be installed in accordance with manufacturer's written instructions. The joint shall be tested by inserting a feeler gauge to ensure that the rubber ring is installed with the correct depth. Where restrained joint DICL mains are used, a pink marking strip shall be placed over the top of the embedment material directly over the pipe to alert maintenance crews of the restrained joints as Clause 5.4.16.2. **Steel pipes and fittings – flanged joints** Hot-dip galvanised bolts, nuts and washers are accepted for use for flanged fittings within concrete valve chambers or above ground locations. Where galvanised bolts and welded steel flanges are approved for buried installations they are to protected using the denso wrap system or approved equivalent. Refer WBB-WAT-1313-1 for details. **Polyethylene Service Pipes and Fittings** Only DR brass male threads shall be screwed directly into pre-tapped connectors or tapping bands. Male thread polyethylene connection fittings shall not be used in such connections. (Ground movement can cause the fittings to shear at the thread interface.) Metallic male threads shall not be screwed into unrestrained plastic female threads. (Excessive tightening can cause the plastic socket to split, or over time, the joint can leak due to plastic creep.) Electro-fusion and field butt welding of PE pipes shall be carried out by a suitably qualified welder. The minimum allowable bend radius for PE100 PN16 pipe is 15 x Pipe OD as per PIPA guidelines POP202. PE pipe has a high coefficient of expansion (0.18mm/m/^{o}C) and must be installed in the trench such that no thermal induced stresses develop in the pipe or fittings. The backfilling of side support and overlay zones shall not be placed when the ambient temperature

Reference	Amendments to WSA03-2011 V3.1
15.1.4 Laying	**Insert following before the last paragraph.** In the case of PE systems, PE has a relatively high co-efficient of thermal expansion. When long lengths of welded pipe are being installed in warm weather, the excavation backfill shall be placed as soon as practicable. This will allow the pipe to cool to ambient temperature and contract fully before making lateral connections or tying-in to an existing network.
15.2.3 Curving of pipe	**At the end of this clause insert the following.** Curving of PVC pipe is not permitted. Curving of PE pipe shall be in line with the PIPA guidelines POP202.
15.5.3 Disinfection of fittings and equipment	**Delete all words of the first sentence after "applications" and read as.** Do not use equipment that has been used in sewer applications.
15.8 Curving of pipe	**Replace (b) with the following.** (b) tapping on curved mains is not permitted, tapping can be made on a straight section before the section is curved (e.g. PE).
New Clause 15.13.3 Distance between fittings	Distances between adjacent socketed fittings shall be separated by a straight length of minimum length of 600 mm.
15.19 Flanged joints	**Add the drawing reference WBB-WAT-1313-1 to the end of the first paragraph.** **Replace the 3rd & 4th paragraph with the following.** For reticulation PE pipelines sizes ≤ DN355, use flange/griper adaptors and full face full bore PE flanges with SS316 backing ring as per Clause 4.5 (e) and (f).
15.20.3 Reinstatement of cement mortar lining	**Replace ≤ DN750 with < DN750.**
New Clause 15.21.1 Welding of PE pipelines - Repairs	Permanent repair of PE pipelines generally involves cutting out the damaged section and replacing it with a new pipe using fusion jointed or mechanical thrust restraint couplings. Flanged telescopic fittings with joint permitting bending (refer Accepted Products and Materials List) can be used for flange sizes up to DN200 where flexible joints are required. For pipe sizes to DN 180 the central register of the E-F coupling may be removed enabling the coupling to slide over the pipe ends to be joined.
16.2 Embedment materials	**Insert the following at the end of this clause.** Embedment material for water mains shall be 5 or 7 mm nominal single sized aggregate as per WSA PS-351, 10 mm nominal single sized recycled concrete aggregate as per WSA PS-366 or bedding sand as per Table G3 of AS/NZS 2566.2. Embedment material for water services shall be either bedding sand as per Table G3 of AS/NZS 2566.2 or 5 or 7 mm nominal single sized aggregate as per WSA PS-351.
16.3.1 Compaction of embedment - methods	**Insert the following at the end of this paragraph.** Flooding compaction is only permitted in granular sand embedment.

Reference	Amendments to WSA03-2011 V3.1
18.1 **General**	**At the end of this paragraph insert the following.** Swabbing is not required by SEQ-SPs under normal conditions.
19.3.1 **Compaction testing – General**	**Insert the following at the end of this Clause.** (a) The Contractor (or the consulting engineer for development works) shall be responsible for all compaction testing and shall arrange for the testing to be carried out by a NATA certified Test Laboratory. Modified compaction tests to be used. (b) Prior to commencing work the Contractor/ consulting engineer shall prepare test plan showing the number of tests and depths in each zone where tests are to be carried out. (c) The Laboratory shall randomly select test locations in each zone. The road authority supervisor may direct the Laboratory to undertake additional tests in any zone. The test locations shall be uniformly distributed over the works. (d) Testing shall not be clustered within a zone or at boundaries of a zone. In deep trenches where more than 1 layer is to be tested, the test locations shall, where practicable, be staggered from those layers above or below by at least 5 m for water mains and 2 m for water services.
19.3.2.1 **Compaction testing requirements - General**	**Before the last paragraph insert the following.** Prior to the works are accepted ‗on maintenance ', the Contractor/ Consulting Engineer shall submit the individual compaction test records and a Certificate of Compliance from the NATA Test Laboratory confirming that the tests have been completed in accordance with the test plan and that the specified compaction has been achieved.
19.3.2.5 **Retesting**	**At the end of this paragraph insert the following.** The compaction tests shall be repeated at the Contractors/Consulting Engineers 'cost until satisfactory compaction levels are achieved.
19.4.1 **Hydrostatic pressure testing - General**	**At the end of this paragraph insert the following.** The test pressure shall be 1200 KPa applied as close as practicable to the lowest point of the main, including drinking and non-drinking water systems as per Australian standards.
19.4.3 **Property Services**	**After the first paragraph insert the following.** Hydrostatic pressure testing of property services shall be undertaken at the same time and to the same parameters as the water mains
19.7.1 **Water quality testing - General**	**Insert the following to the end of the first paragraph.** Contractors/Consulting Engineers are responsible to arrange the tests. **Insert the following to the end** **of this clause.** Contractors/Consulting Engineers are responsible for the costs associated with water quality testing.
20.1 **Application**	**Insert the following into the end of 5th paragraph.** Swabbing is not required by SEQ-SPs under normal conditions as per Clause 18.1.
20.2 **Flushing of disinfection water**	**Insert the following at the end of this Clause.** No disinfection water shall be permitted to enter the reticulation system or be discharged to the storm water drains or waterways unless approved by the regulator i.e. DERM.
22.1 **General**	**After the first paragraph insert the following requirement.** All works on the existing reticulation system shall be considered as ―live works‖ and will be controlled by the SEQ-SPs or their delegates and shall be at the Contractor 's cost. The installation details shall comply with the details given in Clause 5.9.

Reference	Amendments to WSA03-2011 V3.1
24 **Work as constructed details**	**Replace the first paragraph with following.** Prepare and submit asset as-constructed data and asset manuals to the SEQ-SP in accordance with SEQ D&C Asset Information Specification.
Appendix B **Equivalent pipe diameters**	**Replace Copper type B with type A as per AS1432.** **Remove pipe classes of PN12 & PN12.5 because PN16 is the minimum water mains class.** **Remove DN225/DN280 pipe sizes from the table.** **Add a new Note 5 as following.** PVC pipes shall be Series 2 minimum PN16 with spigot and socket rubber ring joints. PE pipes shall be PE100 Series 1 minimum PN16.
Appendix I **Disinfection-** **I4.3**	**In the first paragraph of Clause I4.3 remove the swabbing requirement.**
Appendix I **Disinfection-** **Annexure 1**	**Delete the table of NON-DRINKING WATER QUALITY PARAMETER SAMPLE TOLERANCE LIMITS.** **Adopt the table of DRINKING WATER QUALITY PARAMETER SAMPLE TOLERANCE LIMITS for both drinking and non-drinking water pipe acceptance tests.** **Amend the parameters in the column "ADWG Recommended limits" in the adopted table as following:** 1. pH—GCCC only: add —new cement lined mains or in‖ to Note 2 so that to read: —Note 2, 9.2 allowed for pH only for new cement lined mains or in extreme cases 2. Turbidity—Change the limit of Turbidity from 5 to 2 NTU. 3. EC (Conductivity)—Change from -~ 1250‖ to following: a. QUU < 650. b. UW < 300 except South Caboolture dual reticulation scheme which is < 250. c. GCCC </= 250 (units). d. LCC South of the Logan River have waters at </= 250 (units) and for areas North of the Logan River have waters at ~1250 (units). e. RCC (excludes the Island Supplies) have waters at ~1250 (units). 4. Total chlorine residual—For chlorinated systems < 5 mg/L, for chloraminated systems < 4.1 mg/L. 5. Total coliforms—Remove the requirement of this category altogether for QUU, GCCC, LCC and RCC as HPC is a better indicator. Retain the requirement of total coliforms < 1 for UW only.

Water Supply Code Drawings – WBBROC Acceptance List

SEQ Drawing Reference	WBBROC
WAT-1100-1 Typical Water Reticulation Locality Plan and Details - Sheet 1	**Approved**
WAT-1100-2 Typical Water Reticulation Locality Plan and Details - Sheet 1	**Not Approved**
WAT-1101-2 Typical Water Reticulation Locality Plan and Details - Sheet 2	**Approved** (with changes)
WAT-1101-3 Typical Water Reticulation Design Plan Notes - Sheet 3	**Approved** (with changes)
WAT-1102-1 Typical Mains Construction Reticulation Main Arrangement	**Approved** (with changes)
WAT-1103-1 Typical Mains Construction Distribution and Transfer Main Arrangements	**Approved** (with changes)
WAT-1104-1 Typical DN63 PE Cul-De-Sac Arrangement	**Not Approved**
WAT-1104-2 Typical Scour Details for DN63 Mains	**Not Approved**
WAT-1105-1 Typical PE Water Main Details	**Approved** (with changes)
WAT-1105-2 Typical Connection to Existing Mains	**Approved** (with changes)
WAT-1106-1 Typical Property Service Connections Main to Meter	**Not Approved**
WAT-1106-2 Typical Property Service Connections Main to Meter	**Not Approved**
WAT-1107-1 Typical PE Property Services PE Main to Meter and Conduit Detail	**Not Approved**
WAT-1107-2 Typical Copper Property Services PE Main to Meter and Conduit Detail	**Not Approved**
WAT-1107-3 Typical Property Services General Arrangement 20mm or 25mm Meters	**Not Approved**
WAT-1108-1 Property Services Potable Service Connection Conduit Details	**Approved** (with changes)
WAT-1108-2 Property Services Potable Service Connection Typical Main To Meter	**Approved**
WAT-1108-3 Property Services Potable Service Connection 20MM Domestic Service Meter Box Details	**Approved**
WAT-1109-1 Water Connections Single, Double And Ghost Above Ground Meter	**Not Approved**
WAT-1109-2 Water Connections Subdivisional	**Not Approved**
WAT-1200-1 Typical Soil Classification Guidelines And Allowable Bearing Pressures For Anchors & Thrust Blocks	**Approved**
WAT-1200-2 Embedment & Trench fill Typical Arrangement	**Approved**
WAT-1201-1 Standard Embedment Typical Flexible & Rigid Pipes	**Approved** (with changes)
WAT-1202-1 Typical Special Embedment Inadequate Foundations Requiring Over Excavation & Replacement	**Approved**
WAT-1203-1 Typical Special Embedment Concrete & Stabilised Embedment and Flexible Joint Details	**Approved** (with changes)
WAT-1204-1 Typical Trench And Bedding Details With In Existing Roads Type K To N	**Approved**
WAT-1205-1 Typical Thrust Block Details Mass Concrete	**Approved**
WAT-1206-1 Typical Thrust and Anchor Blocks for Valves	**Approved**
WAT-1207-1 Typical Thrust and Anchor Blocks for Vertical Bends	**Approved**
WAT-1208-1 Typical Restrained Joint System DN100 to DN 375 DI Mains	**Approved**
WAT-1209-1 Typical Trench Drainage Bulkheads and Trench stops	**Approved**
WAT-1210-1 Typical Trench Drainage Trench Systems	**Approved**
WAT-1211-1 Typical Buried Crossings Under Obstructions	**Approved** (with changes)

SEQ Drawing Reference	WBBROC
WAT-1212-1 Typical Buried Crossings Major Road Ways	**Approved** (with changes)
WAT-1213-1 Typical Buried Crossings Railways	**Approved** (with changes)
WAT-1214-1 Typical Buried Crossings Bored and Jacked Encasing Pipe Details	**Approved** (with changes)
WAT-1300-1 Typical Valve and Hydrant Identification Markers	**Approved** (with changes)
WAT-1300-2 Typical Valve and Hydrant Identification Marker Posts	**Approved** (with changes)
WAT-1301-1 Typical Valve and Hydrant Installation Valve Arrangement	**Approved** (with changes)
WAT-1302-1 Typical Hydrant Installation	**Approved** (with changes)
WAT-1303-1 Typical Valve and Hydrant Installation Future Extension Installation	**Approved** (with changes)
WAT-1303-2 Typical Valve and Hydrant Installation Future Extension Installation	**Not Approved**
WAT-1304-1 Typical Air Valve Installation For Trunk Main	**Tentatively Approved** BRC to provide an option
WAT-1305-1 Typical Surface Fitting Installation Valve And Hydrant Surface Boxes Trafficable And Non-Trafficable	**Approved**
WAT-1306-1 Typical Surface Fitting Installation Valve And Hydrant Surface Boxes Support And Surround Details	**Approved** (with changes)
WAT-1307-2 PE Water Mains Typical Details Scours	**Not Approved**
WAT-1307-3 Typical Appurtenance Installation Scour Arrangements	**Approved**
WAT-1308-1 Typical Appurtenance Installation Large Valve Chambers	**Approved**
WAT-1309-1 Typical Appurtenance Installation Passive Pressure Reducing Valves (Prv)	**Not Approved**
WAT-1309-2 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) DN100 To DN300	
WAT-1309-3 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) DN100 And DN150	
WAT-1309-4 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) DN200 To DN300	
WAT-1310-1 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) Above Ground	**Not Approved**
WAT-1310-2 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) Above Ground	
WAT-1310-3 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) Above Ground Cabinet Details	
WAT-1312-1 Aerial Crossings Typical Bridge Crossing Concepts	**Approved**
WAT-1313-1 Flanged Joints Typical Bolting Details	**Approved** (with changes)
WAT-1314-1 Typical Small Water Supply Pump Station Or Reservoir Drawing 1 Of 4	**Not Approved**
WAT-1315-1 Typical Small Water Supply Pump Station Or Reservoir Drawing 2 Of 4	**Not Approved**
WAT-1316-1 Typical Small Water Supply Pump Station Or Reservoir Drawing 3 Of 4	**Not Approved**
WAT-1317-1 Typical Small Water Supply Pump Station Or Reservoir Drawing 4 Of 4	**Not Approved**
WAT-1318-1 Typical Arrangement Main Swabbing Chamber	**Not Approved**
WAT-1400-1 Typical Steel Pipe Jointing Butt Welding Of Joints	**Approved**
WAT-1401-1 Typical Steel Pipe Jointing Rubber Ring Joint Spigot Band Specials	**Approved**
WAT-1402-1 Typical Steel Pipe Jointing Welded Pipe Collars	**Approved**
WAT-1403-1 Typical Steel Pipe Jointing Bends	**Approved**
WAT-1404-1 Typical Steel Fabrication Access Opening For Pipes > DN 750	**Approved**

SEQ Drawing Reference	WBBROC
WAT-1405-1 Typical Steel Fabrication Dismantling And Flexible Joints	**Approved**
WAT-1406-1 Typical Steel Fabrication Valve Connection And Bypass	**Approved**
WAT-1407-1 DI Installation Valve Bypass Arrangement Typical Di Pipe Fittings	**Approved**
WAT-1408-1 Typical Joint Corrosion Protection Cement Mortar Lined Steel Pipe DN 750 To DN 1200	**Approved**
WAT-1409-1 Hydrant Installation Fittings Typical Pe Assemblies Nomenclature	**Approved** (with changes)
WAT-1410-1 Typical Chlorination Test Point Details	**NOT Approved**
NDW-INDEX NON-DRINKINGWATER DRAWINGINDEX	

A2 – Sewerage Code Addenda

Part A – Changes to the Sewerage Code wording

SEQ Amendment to Sewerage Code of Australia WSA02 – 2002 V2.3

(including WBBROC amendments (in BLUE))

Reference	Amendments to WSA02 - 2002 V2.3
ACKNOWLEDGMENT, FORWARD, PREFACE AND INTRODUCTION	
Scope of Code	**Insert the following at the end of the first paragraph.** Hereafter, reference to -Water Agency or the like shall be taken to be a reference to the individual South-East Queensland Service Provider (SEQ-SP) within whose service area the assets will be designed and constructed. **After the second paragraph insert the following.** SEQ Amendments sets out the SEQ-SPs requirements for sewerage reticulation mains up to and including ~~300mm~~ **225mm** nominal bore. References to mains larger than ~~300mm~~ **225mm** are provided for information only.
Code Purpose	**After the third paragraph insert the following.** The SEQ Design & Construction Code sets out SEQ Amendments to The Sewerage Code of Australia. The SEQ Amendments include: • The SEQ-SPs requirements for specific detail which the Code anticipates individual water agencies will address, and • Additions, deletions and variations to the Code where the Code's requirements are not compatible with the SEQ-SPs current requirements (due to local practice, climate, geographic and topographic conditions and statutory requirements, etc.) or where the Code is otherwise silent. Any reference to the Sewerage Code of Australia (–the Code‖) shall be deemed to refer to the SEQ Design & Construction Code which contains the SEQ Amendments. The Code specifies mandatory requirements for the design and construction of sewerage mains that are to become the responsibility of the SEQ-SPs. The SEQ-SPs reserve the right to specify or approve other design and/or construction requirements for particular projects and/or developments. Before commencement of any construction, the SEQ-SPs approval shall be obtained to any design and/or installation that does not comply with the Code.
After the section titled "Code Purpose"	**Insert the following NEW titles and text** **Drawings and Figures** Drawing references are added throughout the Code. In the event of a clash between the standard drawings and the figures in the specification – details shown on the standard drawings take precedence **Condition of Supply of SEW Design and Construction Code** SEQ Design & Construction Code is supplied subject to the following understandings and conditions: • SEQ Design & Construction Code is copyright and apart from any use as permitted under the Copyright Act 1968, no parts of the documents, no parts of the documents may be sold, reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior permission in writing of SEQ-SPs. • SEQ Design & Construction Code is intended for use in connection with SEQ-SPs related projects only. • SEQ-SPs do not warrant the applicability of SEQ Design & Construction Code to climates, topography, soil types, water and sewage characteristics and other local conditions and factors that may be encountered outside SEQ-SPs area of operations. • The holder of SEQ Design & Construction Code acknowledges that they may contain errors and/or omissions. • SEQ-SPs accept no responsibility for any works or parts thereof which may contain design and/or construction defects due to errors or omissions in any part of a SEQ Design & Construction Code which has not been prepared or formatted by SEQ-SPs.

Reference	Amendments to WSA02 - 2002 V2.3
	• SEQ-SPs accept no responsibility for the incorrect application of SEQ Design & Construction Code by the holder or any other party.
PART 0 – GLOSSARY OF TERMS, ABBREVIATIONS AND REFERENCES	
I Glossary of Terms	**Amend the following terms.** ~~**Access Chamber**~~ ~~Add to the end of the definition —…and maintenance shaft and terminal entry point.~~ **Average dry weather flow (ADWF)** **Replace the last sentence with —ADWF is based on empirical evidence and is defined in the SEQ Design Criteria.** **Reticulation sewer** **Amend the first sentence as follows:** A sewer operated by the Water Agency, generally DN 150 to DN 225……, **Insert the following terms into the Glossary** **SEQ Design & Construction Code** The SEQ Design and Construction Code is required by legislation and is an instrument— • made jointly by the SEQ-SPs; and • that provides for technical standards relating to the design and construction of water infrastructure in the SEQ region. **Service Provider (SP)** Providers of water services to individual customers/groups of customers in the Bundaberg, Fraser Coast, Gympie, North and South Burnett regions **Smart Sewers** Systems designed to modified design criteria which take advantage of modern materials and design and construction approaches to produce a lower cost collection system without any loss in the quality of service to customers. For WBBROC, Smart Sewers include the PE based NuSewer and the PVC based RIGSS systems excluding bends and maintenance shafts. NuSewers which comprise fully welded PE pipes and fittings ~~and maintenance shafts.~~ The elimination of rubber ring joints is designed to minimize ground water infiltration and tree root intrusion reducing maintenance and sewage treatment costs. RIGSS (Reduced Infiltration Gravity Sewerage Systems) which comprise RRJ PVC sewers with Maintenance ~~Shafts and~~ Chambers and improved concrete Manholes ~~combined with in-line bends~~ and reinforced house connections that are proven to eliminate infiltration and root intrusion. ~~Unless otherwise stated, for gravity sewers, —NuSewers are the only acceptable solution for QUU; —RIGSS are the only acceptable solution for GCCC, LCC and RCC, and UW may allow either option~~. **Terminal entry point** *See terminal maintenance shaft*
II Abbreviations	**Add the following new items** **ADAC:** Asset Design As Constructed **AWA:** Australian Water Association **SEQ-SP:** South East Queensland water services provider
III Reference documents	**Change drawing reference to WBB-SEW-1307-3 for AS 1170.2.** **Change drawing reference to WBB-SEW-1204-1 for AS 2159.** **Change drawing reference to WBB-SEW-1401-1 for AS 4799.** **Change drawing reference to WBB-SEW-1313-1 for AS/NZS** **1260.** **Change drawing reference to WBB-SEW-1405-1 and WBB-SEW-1406-1 for AS/NZS** **3679.1. Change drawing reference to WBB-SEW-1500-1 for AS/NZS 4327.**
PART 1 – PLANNING AND DESIGN	

Reference	Amendments to WSA02 - 2002 V2.3
1.1 **Scope**	**Add after first paragraph** *The nominated requirements of the SEQ-SPs planners and designers will be in accordance with the SEQ Water Supply and Sewerage Design Criteria and the Queensland Department of Environment and Resource Managements Planning Guidelines for Water Supply and Sewerage Schemes. The SEQ Water Supply and Sewerage Design Criteria takes precedence over all other planning advice.* **Add the follows at the end of the third paragraph.** *For Queensland, this option is defined in the Standard Plumbing and Drainage Regulation 2003 at Part 5, Division 1, Section 34 and Section 35.* **Insert the following at the end of the section** Smart Sewers are mandatory for all new developments as directed by the SEQ-SP for the Council area. In-fill areas shall also use Smart Sewers except that other materials may be used where specific approval has been obtained from the SEQ-SP. Gravity sewers are the preferred means for providing sewer service. Any other options require specific approval from the relevant SEQ-SP. Smart Sewers are designed on the basis that inspection will be undertaken with CCTV equipment and blockages cleared using jet rodders. This approach allows the sewer alignment to include both horizontal and vertical curves minimising the number of maintenance access structures compared to a traditional sewer system. With Smart Sewers, the majority of access structures will be maintenance shafts and chambers. However, MH's are still required for complex sewer junctions and at strategic locations for the removal of miscellaneous items that occasionally enter the sewer system. "In line" bends in gravity sewers will not be an acceptable outcome across the region. Bends in the gravity system may only be achieved at manholes. Approved access structures are listed in Table 6.1
1.3.2 **Planning responsibilities**	**Delete this clause and replace with the following** *The relevant SEQ-SP is generally responsible for overall planning for the provision of sewerage to its customers. Refer to SEQ Design Criteria for details.*
1.3.3 **Design responsibilities**	**Insert the following at the start of the second paragraph** The design of the works shall be carried out under the direction of, and certified by a Registered Professional Engineer of Queensland (RPEQ). The Designer shall obtain the written approval from the relevant SEQ-SP for any variations to the requirements of this Code (as amended) prior to the submission of the final design. **Add a new sub-clause (I) into the item (iii):** (I) The flow contributing to each section of sewer main including the design PWWF and the pipes capacity.
2.1.3 – Level 2 Transportation Systems	**Amend clause as follows:** (a) Reticulation sewers are a network of pipes including property connection sewers nominally ~~up to and including~~ DN 150 to DN 225 that receives sewage from customer properties (residential, commercial and industrial). ~~(b) Branch sewers are a network of pipes nominally DN 375 to DN 600 that connect the reticulation pipes within a reticulation area or a group of reticulation areas. Property connection sewers are not generally connected directly to branch sewers.~~ (c) Trunk sewers are a network of pipes nominally DN **300** and greater ~~that connect the branch sewers and transport sewage to a treatment facility.~~
2.2.1 **Planning horizon**	**Remove existing reference to —10 – 30 years‖ in the advisory wording in the code** **Insert after the first paragraph the following** The SEQ planning horizon shall be the ultimate projected population under the Planning Scheme for the relevant Council Area that the works are being provided within. In the absence of a Planning Scheme horizon, the SEQ-SPs will provide guidance on the planning horizon to be used.
2.3.1	**Change Sub-clause (c) as follows.**

Reference	Amendments to WSA02 - 2002 V2.3
Loading per serviced property	*(c) Average Equivalent Population (EP) per unit or per area rating, based on the loading rate nominated in the SEQ Design Criteria.*
2.3.2 Assessment of future loads	**At the end of the first sentence, change the —…of 180 L/EP/d.‖ to —…based on SEQ Design Criteria.‖.** **Change item (a) as follows** (a) Use the EP loadings per unit type listed in the SEQ Design Criteria.
2.4.2 Sewage quality / Trade waste management	**Add as the last sentence to 2.4.2** The EP loadings per unit type shall be as listed in the SEQ Design Criteria.
Insert a New Clause 2.4.3	**Insert the following after Clause 2.4.2** **2.4.3 - Swimming Pools** For operational reasons, swimming pool discharges including backwash from either commercial or domestic pools shall not be discharged to the sewerage reticulation system without the written consent of the relevant SEQ-SP.
3.2.1 Design flow estimation method-General	**Add the following mandatory sentence** Estimates of demand per land use type shall be in accordance with advice contained in the SEQ Design Criteria.
3.2.5 Flow schedule	**Add —…, refer Clause 1.3.3 herein to the end of the sentence.**
4.1 Detail design process	**Add the following after item (f)** Multi-unit developments shall be serviced by a min 150 nominal bore (DN160 PE) diameter property connection. Internal works shall be constructed as private sanitary drainage. Multi-unit developments that are redeveloped under a future reconfiguration which is to have individual units located on a freehold title lot will require each of the lots to be serviced with a min 100 nominal bore (DN110 PE) diameter property connection. This may involve the construction of a sewerage reticulation system to provide a property connection to each lot. Where this could occur in the future, consideration should be given to constructing the private sanitary drainage to the sewer standards defined herein. Stubs shall be provided to accommodate future flow from upstream properties as necessary. To facilitate future Trade Waste management, for all commercial and industrial developments, property connections shall be connected to sewers through maintenance structures.
4.2.2 Design accuracy	**Replace the last paragraph with the following.** Refer Asset Information Specification for the details of level and location references.
4.2.3 Sewer layout	**Insert the following after paragraph 2.** The SEQ-SPs preferred location for sewers shall be within the service allocation in the road reserve. Where this is not practicable, the following alternatives may be considered: a) another service allocation, subject to the service owner's approval; b) along drainage reserves subject to provision of vehicular access to sewer maintenance points; and c) in the road carriageway. **Insert before the final paragraph.** No junctions shall be provided on reticulation sewers that exceed 3m depth to top of pipe without the approval of the relevant SEQ SP. Where a sewer is greater than 3m deep, options may be either provision of a high-level reticulation sewer that services the allotments within the 3m constraint, or the use of maintenance structures.
4.2.4.1 Environmental considerations-General	**Insert the following at the start of Clause 4.2.4.1.** Full details of environmental mitigation works shall be shown on the Design Drawings and submitted to the relevant authority for approval. Prior to any works being accepted, the consulting engineer shall provide the relevant SEQ-SP with certification that the works have been carried out in accordance with any environmental requirements. The design submission for the pumping infrastructure and the receiving system shall be accompanied by

Reference	Amendments to WSA02 - 2002 V2.3
	the appropriate approvals and certificates (e.g. ERA 63) from the Queensland Department of Environment and Heritage Protection (DEHP). An ~~and an associated~~ Odour Impact Assessment Report will be required at the discretion of the Water Service Provider. Any odour impacts associated within the pumping system and within the receiving sewerage system shall be assessed to the requirements of the Environment Regulators *Guideline for Odour Impact Assessment from Developments*.
4.2.4.4 Contaminated sites	**Insert the following at the start of this clause** A register of contaminated sites is held by the DEHP Contaminated Land Unit. Details of works to be carried out on a contaminated site shall be referred to the relevant Council Environmental Officer.
4.2.5 Easements	**Change the drawing reference in the first paragraph to WBB-SEW-1100-1 and WBB-SEW-1100-** **2. Replace the second paragraph with the following.** Easements shall be provided along the full alignment of any gravity sewers located on private property. Easements shall be centred over the pipe. The easement for gravity sewers up to 3m deep and up to and including 300mm diameter shall be 3m wide. Gravity mains greater than 300mm up to and including 600mm diameter and/or mains to a depth of 5m, require a 6m wide easement. For mains that are deeper than 5m or larger than 600mm diameter, the easement to be 10m wide. Where a maintenance structure is located on lot, a 1m wide easement along the side boundary from the front boundary to the rear boundary, for sewerage purposes, is to be provided to facilitate access to the structure.
4.2.6 Disused sewers	**The first paragraph is replaced by follows** Where a design results in the disuse of an existing sewer, the Design Drawings and Specification shall detail proposed treatment such as demolition of top 300 mm of an MH top and/or capping both ends of the sewer at each MH or complete removal of the sewer and structures. Works to be undertaken on sewers and maintenance structures that are no longer required shall primarily be as advised by the relevant SEQ-SP. GRC requires all AC sewers to be removed from site in accordance with ~~SEQ-SPs~~ Councils requirements and all relevant safety requirements. For all other Councils, removal of AC sewers will be at the service providers discretion. For all other pipe materials, disused sewers are to be either removed, grout filled or plugged as advised by the relevant SEQ-SP. Disused sewer maintenance holes are to be removed or demolished in situ as advised by the relevant SEQ-SP. The works undertaken on disused sewers and MHs shall be recorded as part of the —As –Constructedǁ details.
4.3.2 Road, reserves and public open space	**Insert the following after paragraph 1** Wherever practicable, sewers shall be located in the sewer allocation on the high side of the road reserve. The designer is to check the details of the sewer allocation with the relevant road authority. Where there is a significant advantage in placing the sewer in another utility allocation, written approval shall be obtained by the designer from the relevant utility before this allocation is used. Sewers laid in the road carriageway shall be located in accordance with the relevant authorities 'alignments/corridor allocations. The designer shall provide the SEQ-SP with written approval for thehorizontal and vertical alignment from the relevant road authority. Wherever practicable, sewers in drainage reserves shall be laid parallel and adjacent to the drainage system and clear of grassed waterways to minimize the effect of pipe bedding material on ground water movement. The use of pipeline aqueducts across waterways shall be avoided where possible as they can impede stream flow and incur additional maintenance costs. Wherever practicable, maintenance structures shall not be located within any drainage infrastructure (e.g. swales, drains, detention and retention facilities). **Change the drawing references in the second paragraph to WBB-SEW-1400-1, WBB-SEW-1401-1, WBB-SEW-1402-1, WBB-SEW-1403-1 and WBB-SEW-1404-1.** **Add —where required by the SEQ-SPǁ into the third paragraph to read as follows.** Where sewers cross freeways, arterial roads and other designated major road reserves, where required by the SEQ-SP, the following design criteria shall apply:

Reference	Amendments to WSA02 - 2002 V2.3
	Change the reference in the last sentence from Clause 6.2 to Clause 6.3
4.3.3 Railway reserves	**Change the drawing reference in paragraph 1 to WBB-SEW-1401- 1.** **Amend Paragraph 1 as follows:** "…..and approval of the Water Agency **and Rail Authority** shall be sought prior to finalization of any design requiring sewers in railway reserves (Refer to Standard Drawing SEW SEW–1401-1)". **Add the following after paragraph 1** Where a sewer is to be located within a railway reserve, a Deed of Agreement between the Railway Authority and the relevant SEQ Service Provider will be required.
4.3.4 Public and private property	**Add the following text to the start of this clause** Sewers will not generally be allowed within industrial or commercial property. Sewers in industrial areas shall be located in the road reserve unless the topography does not permit such a location. Where the sewer is located along the side or rear boundary of an industrial property and it is possible that the sewer will be built over, the sewer should be positioned 2m to 4 m from the boundary Where a new reticulation sewer in residential areas is to be located on private or public property, the designer will provide to the ~~SEQ~~ SP written approval from the property owner. For the purposes of this clause, public property includes parks, reserves and land administered by a government authority. Such written approval is to be submitted with the design when an application is lodged for design approval. Sewers on residential properties shall be offset 1.0m to 1.5m from the property boundary, with preference for the larger offset. Sewers on-lot shall always be closer to the dwelling than the stormwater drainage system and shall be provided with an easement To avoid conflict with site improvements (e.g. landscaping etc.), sewers shall generally not be located within the area between the front property boundary and the standard setback for building works. Where sewers are to be located within private or public property the designer shall ensure maintenance structures and property connections are located clear of structures, in locations vertically open to the sky, allow for future maintenance and operation, and have unrestricted access from the street frontage of the site at all times. No mains shall be located within the rear of a Canal estate allotment.
4.3.5 Changes in direction using an MH	**Change the MH to Maintenance Structure in the title of this clause. Change the first paragraph to read.** *Achievable changes in direction at an maintenance structure are dependent on the diameter of the sewer, the physical ability of the maintenance structure to accommodate the deviation in direction and the type of inlet / drop across the maintenance structure.* The maximum allowable deflection of a sewer through an MH, excluding horizontal bends external to the MH, shall be in accordance with Table 4.1. For MS arrangement, refer WBB-SEW-1314-1 and WBB-SEW-1315-1 for details. *Clause 4.3.7 specifies requirements for external horizontal bends.* **Insert the following as Note 4 of Table 4.1.** 4. **For ~~QUU~~ WBBROC,** the 150° deflection and the associated external drop chamber are not permitted. **Update drawing number in Table 4.1 to SEQ drawing number format.**
4.3.6 Dead-ends	**Add –…terminating in a maintenance structure…‖ to read as follows.** Where a sewer is to be extended in the future, the end of the sewer shall terminate at least 1.0 m past the boundary of the development and terminating in a maintenance structure to ensure that a future extension of the sewer does not require the unnecessary excavation within lots or streetscapes already developed.

Reference	Amendments to WSA02 - 2002 V2.3
4.3.7 Horizontal curves in sewers	**Delete the drawing reference in the third paragraph.** **Modify paragraphs 4, 5 and 6 of the SEQ Code with the following:** Horizontal curves are not permitted under the WBBROC Code ~~Smart Sewers may include horizontal curves to avoid obstructions and reduce the number of maintenance structures.~~ ~~For all NuSewers, a maximum of two long radius bends (LRB) may be used between adjacent maintenance structures. The maximum deflection angle for long radius bends shall be 90 degrees. For DN150 RIGSS installation a third LRB may be utilised between adjacent maintenance structures where this additional bend is located directly at a maintenance structure or shaft, refer to SEQ-SEW-1100 and SEQ-SEW-1101 drawing sets for details.~~ ~~Curves in NuSewers may include both long and short radius bends. For NuSewers, a short radius bend (SRB), with a maximum deflection angle up to 45 degrees, may be provided immediately upstream of a maintenance structure. The standard radius for a SRB is 750 mm. Where a NuSewer approved SRB is provided, only one additional long radius bends up to 90 degrees may be included between maintenance structure's. The minimum LRB radius for NuSewers shall comply with the POP202 requirements i.e. 35 times outside diameter for a SDR21 PE pipe. In curved streets, the bend radius shall match the road curvature provided the bend radius limitations in POP202 are not exceeded.~~ ~~An acceptable alignment for a NuSewers is shown below.~~ ~~Horizontal curves are not permitted in RRJ sewers without the use of a LRB. For RIGSS, only DN150 sewer LRBs are directly available from suppliers, refer to the drawing SEQ-SEW-1103-1 and SEQ-SEW-1314-3. DN225 and larger bends in RIGSS shall be fabricated bends from AS/NZS1260 Certified Fabricators or formed PE sweep bends as shown in SEQ-SEW-1314-3. Larger diameter sewer bends for RIGSS are detailed in SEQ-SEW-1310-1.~~ ~~Sections of a curve in a sewer shall not be located under the road carriageway.~~ ~~Sewer connections shall be placed on straight sections of the sewer~~.
4.4.3 Clearances from transmission towers and power lines	**Add the following as the last paragraph in this clause** Where the distance between a metal sewer and a power line or transmission tower falls within the distances stated above, a report on the procedures to be adopted for the construction and maintenance of the sewer shall be provided and signed by a RPEQ as conforming with all relevant regulations etc.
4.4.4 Clearance from structures	**Clause to read as follows** The design of new sewer infrastructure shall address the impact of the works on existing structures. The designer shall ensure that the proposed works will not adversely affect the structural integrity or performance of the structure. For sewers located close to structures such as foundations for brick walls and buildings, the sewer shall be located clear of the —zone of influence of the structure foundations to ensure that the stability of the structure is maintained and that excessive loads are not imposed on the sewer. Refer to Clause 4.4.4.1 for the detail of SEQ-SPs building over or adjacent asset (BOAA) details. The location of existing structures within the vicinity of the sewer shall be detailed on the design. Footings and retaining structures may need to be detailed in section views. Where the designer proposes underpinning, bridging or other works to protect the sewer, these shall be detailed on the sewer design. While the location and type of these works may be subject to agreement with the relevant SEQ-SP, the structural design remains the responsibility of the designer. Sewers shall cross retaining walls as close as practicable to right angles. Where the sewer crosses under a retaining wall, an RPEQ certificate shall be provided to the relevant SEQ-SP verifying the structural integrity of the sewer. Where the sewer crosses under a boulder

Reference	Amendments to WSA02 - 2002 V2.3
	retaining wall, a concrete bridging slab shall be placed over the sewer and a RPEQ certificate provided to the relevant SEQ-SP for the slab design and the integrity of the sewer.
Insert New Clause 4.4.4.1	**Insert new Clause as follows** **4.4.4.1 Building over or adjacent assets (BOAA)** Section 192 of the Water Sustainability and Reliability Act requires persons undertaking any of the following, to obtain written consent from the responsible SEQ-SP before undertaking such activities: a) Building over sewerage infrastructure; b) Interfering with access to sewerage infrastructure; c) Increasing or reducing the cover over sewerage infrastructure; d) Changing the surface of land in a way causing ponding of water over an access chamber for sewerage infrastructure. Part 1.4 of the Queensland Development Code provides a mechanism for initial assessment of potential impact a building or structure may have on infrastructure assets and provides some acceptable solutions. Where a design is proposed which does not meet the provisions of the ~~Building Code~~ QDC MP1.4, the designer shall contact the relevant SEQ-SP for the requirements, acceptable solutions and process for Building Over or Adjacent to Assets (BOAA).
4.4.5.1 General	**Insert as the first sentence:** Services will be exposed and the actual location and depth of those services shall be determined as part of the design. Design drawings stating indicative locations and depths will not be accepted.
4.4.5.2 Clearance requirements	**Add the following before the first paragraph.** Where a sewer crosses over or under a water main > 300mm, the design details shall be submitted to the relevant SEQ-SP for approval. Where a stormwater drain >= 600 mm crosses over a sewer, the stormwater drain shall be supported by a bridge structure that spans the sewer trench.
	Amend the Table 4.2 as follows. **TABLE 4.2** **CLEARANCES BETWEEN GRAVITY SEWERS AND OTHER UNDERGROUND SERVICES**

Reference	Amendments to WSA02 - 2002 V2.3

Utility (Existing or proposed)	Minimum horizontal clearance mm		Minimum vertical clearance[1] mm
	New sewer size NB		
	≤ 200mm	> 200mm	
Water mains ≤ 375 mm	1000[5]/600	1000[5]/600	500[4]
Water mains > 375 mm	1000[5]/600	1000[5]/600	500[4]
Gravity sewers ≤ 300 mm	500	600	300
Gravity sewers > 300 mm	600	600	300
Sewers – pressure	500	600	500
Sewers – vacuum		600	500
Gas mains		600	500[4]
Telecommunication conduits and cables		600	500
Electricity conduits and cables	500	1000	500[4]
Stormwater drains ≤ 300 mm	500	600	300
Stormwater drains > 300 mm		600	300[4]
Kerbs	150	600[6]	150 (where possible)

Change Notes 3 and 4 as follow.

3 *Clearances can be further reduced to 150 mm for distances up to 2 m where mains are to be laid past installations such as concrete bases for poles, pits and small structures, providing the structure will not be destabilised in the process.*

4 *Sewers should always cross under water mains and stormwater drains.* For cases where there is no alternative and the sewer must cross over a water main, construction shall be in accordance with the Note 4 of Table 5.5 and Standard Drawing WBB-WAT–1211-1 of the Water Supply Code.

4.5.3 Minimum air space for ventilation

This clause to be re-written as follows

To ensure the efficiency of natural ventilation of a sewer, an airspace shall be retained at design flow. At design flow, the depth of flow shall be not more than 75% of pipe diameter i.e. a minimum air space equivalent to 25% of pipe diameter at design flow. This criterion will also ensure that under peak dry flow conditions sewage will not contact the sewer obvert which can lead to a build-up of fat and subsequent blockages. This air space also reduces the chances of the sewer siphoning out the water seals or water traps within a connected dwelling or building ~~Water Agency shall nominate which of the following options shall be adopted:~~

~~Option A - Air space at peak dry weather flow (PDWF)~~
~~At PDW F, the depth of flow shall be not more than 60% of the pipe diameter i.e. a minimum air space equivalent to 40% of pipe diameter at PDWF.~~
~~Option B - Air space at design flow~~
~~*Catering for future growth or phased development may be achieved by providing an air space in the sewer at the design.*~~
~~At design flow, the depth of flow shall be not more than 70% of pipe diameter i.e. a minimum air space equivalent to 30% of pipe diameter at design flow.~~

4.5.4 Minimum pipe sizes for maintenance purposes

Table 4.3 - Minimum Pipe Sizes for Reticulation and Property Connection Sewers to be replaced as follows

Sewer	Minimum size DN NuSewers/RIGSS
-Property connection sewer servicing 1 residential premise on a single lot.	110/100
~~-Property connection sewer servicing 1 residential lot 2 residential premises on a single lot or 2 adjoining lots.~~	~~110/150~~
-Property connection sewer servicing more than 1	

Reference	Amendments to WSA02 - 2002 V2.3		
		residential premises on a single lot; -Property connection sewer servicing commercial and industrial lots ≤300 m^{2} development; -Reticulation sewers ~~servicing residential lots~~.	160/150
		For re-development within in-fill areas, where the developer can demonstrate, to the satisfaction of the SEQ-SP, that an existing property connection sewer: (i). is suitably located, and (ii). meets hydraulic capacity, and (iii). is in sound conditions assessed by CCTV, material and age etc.	Existing property connection sewers may be used
		Reticulation sewer servicing commercial and industrial lots >300 m^{2} and other complexes where large flows may be expected	150
4.5.5 Maximum EP for sewers – Table 4.4	**All text (And Table 4.4) to be deleted and replaced with the following** Sewers shall be sized to carry the design flow without exceeding the 75% flow depth (refer Cl4.5.3). The maximum EP figures in Table 4.4 do not apply.		
4.5.7.1 Minimum grades for self-cleansing- General	**All text (including Tables 4.5, 4.6 and 4.7) to be deleted and replaced with the following** Minimum grades for self-cleansing are specified in the (separate) SEQ WS&S Design Criteria.		
4.5.7.2 Reticulation sewers	**All text to be deleted and replaced with the following** Reticulation sewers shall be graded to achieve self-cleansing at least once per day in accordance with the SEQ-SPs requirements.		
4.5.7.3 Property connection sewers and ends of lines:	**Clause deleted**		
4.5.9.1 Branch and trunk sewers	**Adjust the second paragraph as follows.** The maximum grade shall be that for which the velocity of flow is 3.0 m/s for the sewer flowing full. The maximum grade shall be determined using the Colebrook-White equations for a roughness coefficient (ks) of 1.5 mm, or equivalent Manning —nM value from the SEQ Design Criteria or as agreed by the SEQ-SP.		
4.6.1 Vertical alignment of sewers - General	**Add as the first sentence to this clause.** Sewers and property connections shall be constructed at the shallowest practicable depth, while ensuring that the critical factors described in the clause are achieved.		
4.6.2 – Long Section Design Plan	**Amend the Clause as follows**: In addition, levels shall also be provided for the following locations: (a) At each side of any road crossing. (b) At crossings of existing and proposed creeks, drains, cables and other pipes and services. (c) At changes in grade including at maintenance structures ~~and vertical bends~~. (d) At regular intervals ~~on vertical curves~~ so that the sewer depth is within minimum and maximum limits below FSL. **Vertical bends are not an acceptable solution for WBBROC**		
4.6.3 Minimum cover over sewers	**Amend Table 4.8 as follows to add QUU figures**		

Location	Minimum cover to top of sewer (mm)
Private residential property and public land not subject to vehicular loading	600 – new developments 450 – existing developments
Private residential property subject to vehicular loading	750
Footways, nature strips, industrial property, sealed road pavements other than arterial roads subject to vehicular loading	900 (1150 for QUU)
Sewer in a footway containing a 200mm to 300mm ID water mains	900 (1650 for QUU)

Reference	Amendments to WSA02 - 2002 V2.3
	Unsealed road carriageways 1200 Arterial road carriageways 1200 Future road, rail and tram pavements 1200
4.6.4.1 Lot servicing requirements - General	**Add after the first paragraph** The Control Point for the allotment is the House Drain Connection Tee either at the SEQ-SP s reticulation sewer or at the end of the House Connection Branch off the SEQ-SPs reticulation sewer and this connection tee shall be low enough to control the whole of the allotment to be serviced using the criteria contained in AS 3500.2 The lowest point to be serviced must be higher than the overflow point (i.e. next upstream manhole) in case of blockage downstream of the connection point For calculation purposes, the house drain alignment shall generally be 1 metre from side and rear boundaries and 6 metres from the front boundary (may vary in waterfront properties and reduced building alignments). **Add as the final paragraph** Where filling of a site is proposed as a way of controlling or increasing control of a lot, the filling will be subject to separate approval from the relevant authority.
4.6.4.2 Serviced area requirements for residential lots	**Delete this clause and replace with the following** For single residential lots, the property connection shall service the total area of the lot. For lots with multiple residential units, the relevant SEQ-SP may consider partial lot servicing. For —battle axell blocks the serviced area may be considered to start at the end of the access way.
4.6.4.3 Serviced area requirements for industrial and commercial lots.	**Amend the first paragraph to read as follows** In general, the area to be serviced shall be the full area of the lot less any minimum setback distance. In suburban commercial areas where the sewers are located at the rear, the area to be serviced shall be the total area of the lot from the footway level of the frontage. **Add after the second paragraph** For industrial and commercial lots, the relevant SEQ-SPs may consider partial lot servicing.
4.6.4.5 Servicing of basements	**Delete this clause**
4.6.5.1 Minimum depth of sewer connection point-General	**Replace this clause with the following** The property connection point shall be at the upstream end of the property connection sewer, rather than at the main sewer. The depth of the property connection point shall be determined such that it provides for the physical losses from the controlling point on the lot to the property connection point and achieves the minimum cover requirements. The physical losses shall be calculated by assuming: a) the invert of the house drain at the controlling point is 0.5 m below the finished surface level (FSL); b) the longest run possible for the house drain around the perimeter of the serviced area; and, c) the grade of the house drain is 1:60 for 100mm services and 1:100 for 150mm services in compliance with AS/NZS 3500.2. The minimum depth of cover to property connection sewers shall comply with the requirements given in Table 4.8.
4.6.5.2 Soffit requirements:	**Delete the following text from this clause** With the approval of the Water Agency, the soffit requirements of 750 mm and 900 mm may be reduced by 150 mm where: (i) the number of properties connected upstream of the subject property does not exceed 10 or the equivalent loading; or (ii) the grade of the sewer downstream of the property connection is steeper than 3.0%.
4.6.5.4	**Amend the SEQ change as follows.**

Reference	Amendments to WSA02 - 2002 V2.3
Depth of connection point	For residential connections, only options (a) and (c) are acceptable. For Multi-residential commercial and industrial sites options (b) and (d) can be applied (refer clause 5.4) ~~SEQ SPs will only accept the provision of connections that comply with case (a) and case (c).~~ **Replace the drawing references in the last paragraph to WBB-SEW-1104-1, WBB-SEW-1105-1 and WBB- SEW-1106 set.**
4.6.6.1 Grading through MHs- General	**Replace the second paragraph with the following.** The maximum and minimum fall through a MH shall comply with the tables in WBB-SEW-1301-2, WBB-SEW-1301-4 and WBB-SEW-1303-1. **Change the drawing reference in the third paragraph to WBB-SEW-1301 set, WBB-SEW-1302-1, WBB- 1304-1 and WBB-SEW-1305-1.**
4.6.6.2 Internal fall through MHs joining sewers of same diameter	**Delete the Table 4.9.** **Replace the —…Table 4.9‖ at the end of the first paragraph with —…tables of WBB-SEW-1301-2, WBB- SEW-1301-4 and WBB-SEW-1303-1‖.**
4.6.6.3 Internal fall through MHs joining sewers of different diameters	**Add the following at the end of this Clause.** **For QUU**, refer WBB-SEW-1301-10.
4.6.6.4. Large falls at MHs.	**Replace drawing references in both paragraphs with WBB-SEW-1301-2, WBB-SEW-1301-4 and WBB-SEW-1303-1.** For WBBROC, the original WSAA Table 4.10 applies. However, FCRC does not accept internal drops. ~~**For QUU only, replace Table 4.10 with the following.**~~ ~~**For QUU**, No internal drops are permitted in a 900mm MH. A maximum of one internal drop is permitted in a 1200mm MH. Refer SEQ-SEW-1301 set.~~
4.6.7 Vertical curves	**Insert the following after first paragraph.** Vertical curves are not permitted by WBBROC ~~Smart Sewers may include vertical curves where a significant cost benefit can be achieved and the depth to invert is greater than 1.5m.~~ ~~Vertical curves are not permitted in RRJ sewers except through the use of a long radius bend as shown in the standard drawings.~~ ~~**Adjust the third paragraph as follows.**~~ ~~Where vertical curves are specified, no more than two (2) LRBs may be included between adjacent Maintenance Structures. The bend radii shall comply with the requirements given in CL 4.3.7. Manufactured bends shall be placed on the upstream and/or downstream side of the MS/MH immediately adjacent to the structure i.e. one at the outlet of an MH/MS and one at the inlet of a downstream MH/MS. The maximum deflection at each bend is 30°.~~ ~~**Replace the last two (2) paragraphs of this clause with drawing reference —Refer SEQ-SEW-1100 and SEQ-SEW-1101 sets‖.**~~
4.6.8 Compound curves	**Replace the last paragraph with the following.** Compound bends are not permitted by WBBROC ~~Excluding bends used immediately adjacent to Maintenance structure, a maximum of one compound long radius bend is permitted between adjacent maintenance structures in accordance with the limitations set out in Clauses 4.3.7 and 4.6.7. Refer SEQ-SEW-1100 and SEQ-SEW-1101 sets.~~
4.7.2 Internal corrosion	**Insert the following to the end of this clause.** *Reticulation sewers with no pump system discharges entering the system generally do not require management for internal corrosion.*

Reference	Amendments to WSA02 - 2002 V2.3
	Where a pump station discharges into a receiving maintenance structure, internal corrosion protection shall be provided in accordance with the standard drawings and the network checked downstream for potential corrosion hazards (e.g. drop pipes) Manholes will require protection coatings in the following circumstances: • All 1500mm dia and larger manholes; • Manholes greater than 4m in depth; • Manholes on sewers > 300mm nominal bore; • Manholes servicing industrial estates; and • SPS collection manholes. Refer to Clause 18.8 for the types of coating required by SEQ-SPs.
4.7.3 **External corrosion**	**Insert at the end of this clause** Where concrete structures and pipes are installed in acid sulphate soils or within soils affected by the tidal zone, the provision of an acid resistant coating to the exterior of the structure or pipe shall occur prior to installation. Plastic pipes including NuSewers (PE) and RIGSS (PVC) shall not be used in ground likely to be contaminated with hydrocarbons. In cases where hydrocarbons are likely to be encountered, possible alternatives may be discussed with the relevant SEQ-SP.
4.8 **Steel sewers**	**Change the whole clause to informative.** **Change the drawing reference in Clause 4.8.2 to –WBB-WAT-1408-1 of Water Supply** **Code‖. Add a new Clause –‖**
Insert a new clause (informative) 4.8.5	**New Clause** **4.8.5 Coating and lining** *Steel pipe shall be coated and lined with a fusion bonded polyethylene material approved by the SEQ-SP.*
5.1 **Property connection-General**	**Replace the drawing reference with WBB-SEW-1104-1, WBB-SEW-1105-1 and WBB-SEW1106 set.**
5.2 **Limitations of connection to sewers**	**Adjust the last paragraph as following.** *Special precautions such as water seals may be required on these connections (refer to Clause 7.2).*
5.3.1 **Methods of the property connection, General**	**Delete the drawing references in (a) and (b).** **Insert at the end of this clause the following.** Sewer connection details shall comply with the standard drawings WBB-SEW-1104-1, WBB-SEW-1105-1 and WBB-SEW1106 set.
5.3.2 **IO interface method**	**Add —Not used by SEQ-SPs‖ at the start of this clause.**
5.3.3 **Buried interface method**	**Add —Refer formats in WBB-SEW-1104-1, WBB-SEW-1105-1 and WBB-SEW1106 set‖ at the start of this clause.**
5.4 **Maximum Depth of Property Connection**	**Insert the following at the end of this clause** The maximum depth to invert of a property connection for a single residential lot shall be 1.5m. Where the sewer is 1.5 to 3m deep, a vertical riser (jump up) or slope up connection is required. For multi- residential, commercial and industrial developments, the maximum depth to invert of the property connection shall be 3 m. No connections shall be specified to sewers at depths greater than 3 m. In such cases, connections shall be made to a maintenance structure or to a higher level secondary sewer. Clearances around property connections shall comply with the requirements stated for maintenance structures in CL. 6.4.

Reference	Amendments to WSA02 - 2002 V2.3
	Where a concrete slab is to be constructed over a property connection, a 0.9 m square removable section with suitable lifting lugs shall be provided centrally over the connection as required under the "Building Over Assets" policy.
5.5.1 Single occupancy lots	**Insert the following at the end of this clause.** A maximum of two single residential connections may be installed with a vertical riser or sloped connection. For RIGSS, a maximum of possible four single lot connections (two Dual House Connections) may be installed on a vertical riser. Refer WBB-SEW-1104-1, WBB-SEW-1105-1 and WBB-SEW-1106 set.
5.5.2 Multiple Occupancy Lots	**Change the second paragraph to non—italicised.** **Amend the last paragraph as follows** Only option a) will be permitted by the SEQ-SPs (refer Cl 4.1 for details). This Option shall only apply in self-contained catchments. Where a sewer will be required for future extensions of the sewer system to other properties external to or upstream of the development, the design shall be to this Code and constructed as a Water Agency sewer.
5.6 Location of Connection Points	**Insert the following to the end of this clause.** Property connections shall not be located within 1.5m of existing or proposed structures.
5.6.1 Undeveloped lots	**Adjust the first sentence as following.** The location of property connection points on undeveloped lots shall be as shown in the Standard Drawings. Where this can not be achieved, the connection point may be: **Change the drawing reference in the last paragraph as "WBB-SEW-1104-1, WBB-SEW-1105-1 & WBB- SEW-1106 set".**
5.7 Y – Property connections	**Amend the clause as follows.** Each lot will have a separate property connection. *Where permitted by the Water Agency, consideration may be given to "Y" property connections i.e. those providing for connection of two lots where cost savings would result and the property owners would not be disadvantaged.* No more than two (2) properties shall be connected to a single point on the reticulation/property connection sewer (Refer WBB-WAT-1106 set). For RIGSS, a possible four single lot connections may be made to a vertical riser as discussed in Clause 5.5.1 herein. With -in-fill‖ lot developments where one lot is divided into two, an existing property connection may, subject to approval by the relevant SEQ-SP, have a branch to service the additional lot.
5.8 Length of property connection sewers	**Change item b)** to state that the maximum length of a 150mm property connection sewer shall **be 20 m**. **Replace the drawing reference with WBB-SEW-1106-1.**
Inset New Clause 5.9	**This Clause does not apply to the WBBROC** ~~**QUU: Insert the following new clause**~~ ~~**5.9 PE SEDIMENT TRAPS (QUU ONLY)**~~ ~~For NuSewers, a PE sediment trap shall be installed on each DN110 property connection. The sediment trap details are shown on drawings SEQ-SEW-1106 set.~~ ~~The interface between the sewer and the lot owner's sanitary drain is located at the connection between the PE trap and the house drain.~~ ~~Where the reticulation sewer is located outside the front boundary, the access cap on the sediment trap shall be located 300 to 750 mm inside the property boundary.~~ ~~The sediment trap shall have a PE/PVC connector with an end plug. The unit shall be vacuum tested together with the property connection sewer and the sewer main.~~ ~~Sediment traps are not required for RRJ sewers.~~

<table>
<tr><th>Reference</th><th>Amendments to WSA02 - 2002 V2.3</th></tr>
<tr><td></td><td>~~This configuration enables a test to be carried out on the joint at the interface of the sewer and the lot owners' sanitary drain.~~

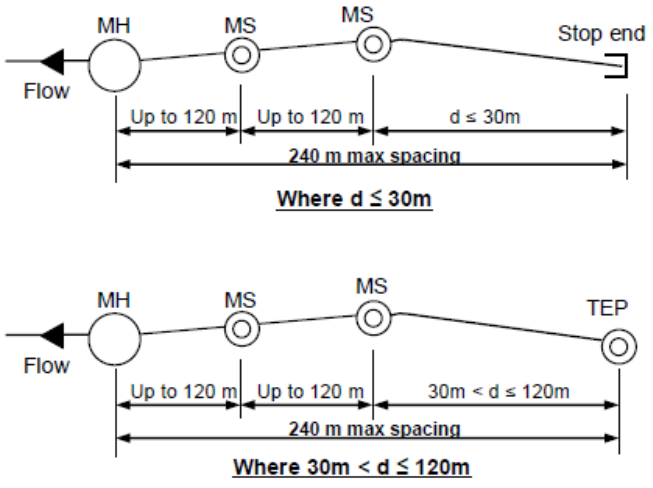
~~The function of the sediment trap is to allow detection of cementitious material flushed down the sewer during building construction and fats poured down the sewer following occupancy. Fats are a major cause of sewer chokes. With the public becoming aware that such inappropriate actions can be detected, the number of such occurrences may decrease.~~</td></tr>
<tr><td>6.1
Types of Maintenance Structures</td><td>This clause to read as follows

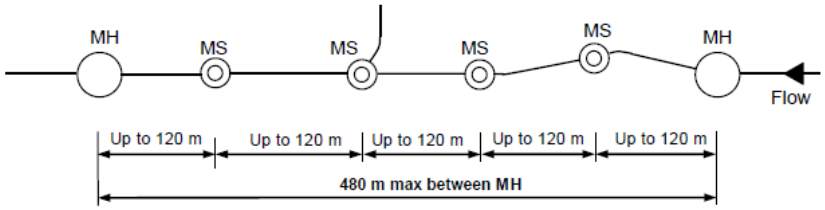
This Code addresses three (3) types of maintenance structures:

(a) Maintenance Holes (MHs) - which are applicable to either RIGS sewers and NuSewers and shall comply with the details on Standard Drawings WBB-SEW-1300-1; 1301 set, 1302-1; 1303-1; 1303-3; 1304-1; 1305-1; 1306-1; 1307 set; 1309-1; 1310-1; 1311-1; and 1312-1 inclusive. For discharge manholes, refer to WBB-SPS–1406-1 to 1406-5 inclusive. All MHs allow personnel and equipment access to the sewer system;

~~(b) Maintenance Shafts (MSs) - which are for both RIGS sewers and NuSewers are available up to and including 225mm ID sewers. The details shall comply with the Standard Drawing SEQ-SEW-1314-2 and SEQ-SEW-1315-1 and are currently only applicable to 150mm ID and 225mm ID sewers and only allow equipment access to the sewer system; and~~

~~(c) Terminal Entry Points (TEPs) - to comply with the details shown on Standard Drawings SEQ-SEW-1314-1 and SEQ-SEW-1315-1 which and are currently only applicable to 150mm and 225mm sewers and only allow equipment access to the sewer system. For RIGSS, in some situations, a TEP may be used in lieu of the external drop of an MH subject to the agreement of the SEQ SP.~~</td></tr>
<tr><td>Table 6.1</td><td>Table 6.1 – Acceptable MH,MS and TEP options for reticulation sewers, to be amended as follows
<table>
<tr><th rowspan="2">APPLICATION</th><th colspan="3">ACCEPTABLE OPTIONS [1]</th></tr>
<tr><th>MH</th><th>MS</th><th>TEP</th></tr>
<tr><td>Intersection of reticulation sewers—≤2 inlets at same level</td><td>YES</td><td rowspan="2">NO</td><td>NO</td></tr>
<tr><td>Intersection of reticulation sewers—≤3 inlets at any level</td><td>YES</td><td>NO</td></tr>
<tr><td>Reticulation sewers / change of grade at same level</td><td>YES</td><td>NO</td><td>NO</td></tr>
<tr><td>Change of grade at different level</td><td>YES
MH with internal/external drops</td><td>NO</td><td>NO</td></tr>
<tr><td>Change in sewer size</td><td>YES</td><td>NO</td><td>NO</td></tr>
<tr><td>Change in sewer horizontal direction</td><td>YES
Within permissible deflection at MH</td><td>NO</td><td>NO</td></tr>
<tr><td>Change of pipe material</td><td>YES</td><td>NO</td><td>NO</td></tr>
<tr><td>Permanent end of a reticulation sewer</td><td>YES</td><td>NO</td><td>NO</td></tr>
<tr><td>Permanent end of a property connection sewer</td><td>NO</td><td colspan="2">NO</td></tr>
<tr><td>Sewer pressure main discharge point</td><td>YES
MH is the only option and must include a vent</td><td>NO</td><td>NO</td></tr>
<tr><td>Junction of reticulation sewer and property connection sewer—same size sewers</td><td>YES</td><td>NO</td><td>NO</td></tr>
</table></td></tr>
</table>

Reference	Amendments to WSA02 - 2002 V2.3
	NOTES: 1 Where personnel entry is required down to the level of the sewer, an MH is the only option. 1 Not at same level. In lieu of a drop MH subject to approval by the Water Agency.
6.2 Locations of maintenance structures	**Add a sub-clause (k).** (k) at Pump Stations all flows into the station shall be through a single Manhole.
6.3.1 Spacing of Maintenance Structures	**Add the following to the end of second paragraph** The design preference is that access to every part of the sewer can be achieved with jet rodder equipment assuming the service vehicle is fitted with pressure hoses with a maximum length of 120m for sewers up to 300mm dia and 150 m for sewers above 300mm.
6.3.2 Maintenance structures spacing – Reticulation sewers	**This clause to be amended as follows** For reticulation sewers, the maximum distance between any two consecutive maintenance structures shall be 120 m and subject to the provisions of Clause 6.3.1 (Refer Figures 6.1 and 6.2). Where the upstream end of the sewer line is equal or less than 30m to the nearest downstream maintenance structure, the sewer is permitted to terminate in a maintenance structure (rodding end) ~~stop end~~. For NuSewers the stop end shall be an electrofusion or butt-welded end cap. For RIGSS the stop end shall be as shown ~~for~~ in WBB- SEW-1314-1 ~~Dual House Connection outside Private Property , see WBB-SEW-1104-1.~~ Where the end of the line is further than 30m to the nearest downstream maintenance structure, a maintenance hole (MH) ~~structure (terminal entry point/rodding end)~~ shall be installed ~~at the end of the line as shown on WBB-SEW-1314-1 and WBB-SEW-1315-1.~~ At the permanent end of line sewers, where the end of line is not a MH, the distance from the end of line maintenance structure/end cap to the nearest downstream MH shall not exceed 30m ~~240 m~~, ~~(Refer to Figure 6.1).~~ Where the end of line maintenance structure is a MH, the distance from the end of line MH to the nearest downstream MH shall not exceed 120m ~~480 m~~ as shown on Figure 6.2.  **FIGURE 6.1 MULTIPLE MS BETWEEN MH AND "LAST" MH/MS/TEP (diagrammatic o n l y)** Where a combination of MHs and MSs is used along the same sewer, the maximum spacing between any two consecutive MHs shall not exceed 480 m irrespective of how many MSs are used between the two MHs (Refer to Figure 6 . 2).

Reference	Amendments to WSA02 - 2002 V2.3
	 **FIGURE 6.2 MULTIPLE MSs BETWEEN CONSECUTIVE MHs (diagrammatic only)**
6.3.3 Maintenance structures spacing – Branch and trunk sewers	**Change the first paragraph as following.** Only MHs shall be used for branch and trunk sewers of sizes 300mm and greater. The maximum distance between any two MHs shall be 150 m. For 300mm sewers, only MHs shall be used and the distance between any two MHs shall be 120m as specified in Clause 6.3.2. **Insert the following informative paragraphs at the end of this clause.** *MH spacing for large diameter trunk sewers (>300mm), which are generally installed by tunnel boring techniques, may be increased to achieve significant cost savings and reflect current trenchless technology capabilities. Specialist equipment is available for inspecting and cleaning sewer lengths of 500m or more without requiring personnel entry to the sewer.* *Therefore, for sewers of 1000mm or larger, the MH spacing may be up to 500 m subject to a suitable project specific risk assessment being undertaken at the feasibility stage and confirmed at the detailed design stage. This risk assessment must ensure that serviceability needs are met by the proposed sewer configuration and adequate secure access to MHs is provided. If necessary, easements should be provided to ensure secure long-term access to MHs. Access must allow for large cleaning vehicles to park in close proximity to MHs and manoeuvre as required.*
6.4 Special Considerations in Locating Maintenance Structures	**Replace the first paragraph with the following.** Clearances to maintenance structures, ends of line and property connections shall be in accordance with the relevant SEQ-SPs Building Over or Adjacent Assets Policy. They shall not be located within a building, or underneath a building overhang. **Delete the last paragraph of this clause.**
6.5 Special considerations for connection of new sewers to existing sewers	**Replace the drawing reference in (a) with —WBB-SEW-1301-4, WBB-SEW-1303-1, WBB-SEW-1306-1, WBB- SEW-1307-2, WBB-SEW-1307-3 and WBB-SEW-1307-4‖.** **Delete item b) as follows:** ~~(b) An external drop using a new TEP adjacent to an existing MH. (not for NuSewers)~~ **Replace the drawing reference in (c) with WBB-SEW-1502-1.**
6.6.1 General	**Add the following to the end of the clause** Concrete Maintenance Holes (MHs) shall be provided at the following locations: • Intersection of more than 3 incoming sewers, • At complex sewer junctions, such as where the entry angle exceeds 90^0, • ~~At a maximum spacing of 480m.~~ Convenient vehicular access must be available to all concrete maintenance holes.
6.6.2 Types of MH construction	**WBBROC requirements for manholes are as follows:** • BRC, GRC, FCRC and North Burnett allow external drops (as per type "F") • FCRC, South Burnett and North Burnett prefer cast insitu manholes (for depths up to 3m) • BRC prefer precast manholes (up to 3m) • GRC accept either precast or cast insitu (up to 3m); • All manholes deeper than 3m shall be cast insitu.or as directed by the WSP. ~~**Add "Not for QUU" to sub-clause (b).**~~ ~~**For NuSewers, Pre-cast MH's are not acceptable (except as formwork) within QUU service**~~

<table>
<tr><th>Reference</th><th>Amendments to WSA02 - 2002 V2.3</th></tr>
<tr><td></td><td>~~areas.~~
~~For RIGSS, external drops are not permitted for use with pre-cast MHs.~~

Concrete for MH construction shall be special class to WSA PS-358 with requirement of calcareous aggregates.

Replace the drawing reference in the second paragraph with WBB-SEW-1300 to WBB-SEW-1307 sets.

Replace the drawing reference in the last paragraph with WBB-SEW-1309-1, WBB-SEW-1310-1, WBB-SEW-1311-1 and WBB-SEW-1312-1.</td></tr>
<tr><td>6.6.5
Diameters of MH’s</td><td>Delete the first paragraph and replace with the following

Suitable Maintenance Hole sizing is addressed in standard drawing sets WBB-SEW-1301 and 1303.</td></tr>
<tr><td></td><td>Insert a table at the end of this clause to show the relationship between MH sizes, MH depth and sewer sizes.

<table>
<tr><th rowspan="2">Sewer size (mm, NB)</th><th colspan="3">MH diameter (mm, ID)</th></tr>
<tr><th>NuSewers (cast-in-situ only)</th><th colspan="2">RIGSS</th></tr>
<tr><th></th><th></th><th>pre-cast</th><th>cast-in-situ</th></tr>
<tr><td>Up to 225</td><td>900, MH depth ≤ 3 m (G type)</td><td rowspan="2">1000</td><td rowspan="2">1050</td></tr>
<tr><td>1200, MH depth > 3 m (F type)</td></tr>
<tr><td>300 to 600</td><td>Min 1200 (F or X type)</td><td>Nominated by SEQ-SP</td><td>1500</td></tr>
<tr><td>675 to 900</td><td>Min 1200 (X type)</td><td>Nominated by SEQ-SP</td><td>1800</td></tr>
<tr><td>Larger than 900</td><td>Min 1200 (X type)</td><td colspan="2">N minated by SEQ-SP</td></tr>
</table>

* For RIGSS, The use of the above reticulation access structure shall generally be based on the following percentages per development population: manholes at 1050mm diameter minimum shall be 35% of structures; refer clause 6.7.2 for residual population percentages for other access structure and alternative types.</td></tr>
<tr><td>6.6.8
Ladders, Step Irons and Landings</td><td>Replace the clause by the following paragraph.

Either adders or step irons shall be specified for MHs depth from top of coping to bench exceeds 0.85m (Refer to Standard Drawings SEQ SEW–1301-2 and WBB-SEW-1301-4). For deeper MHs where the depth from ground level to sewer invert exceeds 4.25m, ladders shall be specified (Refer to Standard Drawings WBB-SEW–1301-6 and WBB-SEW–1301-12).

Insert the following at the end of this clause
UW And GCCC will not accept ladders, step irons and landings within manholes.</td></tr>
<tr><td>6.6.9
MH covers</td><td>Delete the first line and replace with:

MH covers and frames shall comply with the details shown on the WBB-SEW-1308 drawing set.

MH covers shall generally be located over the downstream sewer outlet as shown in WBB-SEW-1301-3, WBB-SEW-1301-5, WBB-SEW-1301-8 and WBB-SEW-1307-1 with covers for Maintenance Shafts and trunk sewer MHs to be as shown in the drawings.

Delete option a) as follows:
~~(a) in areas where the risk of sewer overflow is high;~~

Adjust the last paragraph to the following.

In sewers subject to surcharging, the design shall specify —tying together of MH components to the cast in-situ riser e.g. restrained precast concrete cover slab and ductile iron frames with bolt down or hinged covers, to avoid the possibility of various components separating in the event of a sewer surcharge (Refer to drawing WBB-SEW-1301-1).</td></tr>
<tr><td>6.6.10
Cross-fall on MH covers</td><td>Change the drawing reference in the bracket to —WBB-SEW-1308-1 for RIGSS‖.</td></tr>
<tr><td>Insert New Clause 6.6.11</td><td>Insert a new clause as follows.

6.6.11 Modifications to Existing Maintenance Holes

When undertaking work within existing service areas, modifications to existing maintenance holes are to meet the specific requirements of that SEQ-SP.</td></tr>
</table>

Reference	Amendments to WSA02 - 2002 V2.3
	For QUU when undertaking modification work to existing maintenance holes the follows are to meet. Where existing MHs do not have the current top slab, cover and frame and changes to surface levels or loading conditions are proposed, the modifications in following two tables shall be applied. **Changed Surface Level – No increase in loading conditions** **Existing cover type** / **Modification** Triangular or rectangular: Replace top slab, install 600mm cover Circular: Reuse top slab and cover "A" and "B": Reuse top slab, install 600mm cover **Changed Surface Level – Increased loading conditions** **Existing conditions** / **Modifications** MH type –GI or –FI: Replace top slab, install 600mm cover MH type –EI: Replace with appropriate MH. Where existing MH's have damaged components the modifications in following table shall be applied. **MH with damaged top slab, cover and frame** **Existing conditions** / **Modifications** Damaged cover and frame to MH type —G or —F: Reuse top slab, install 600mm cover Damaged top slab to MH type —G or —F: Replace top slab, install 600mm cover MH type —E: Replace with appropriate MH. Should any works be undertaken on a lamphole, the lamphole shall be replaced with an appropriate maintenance structure.
6.7.1 Maintenance shafts (MS)- General:	**Replace the clause by the following.** MSs and TEPs may be used on reticulation sewers of 150mm and 225mm sewers as an alternative to some MHs (Refer to Table 6.1 and Standard Drawings WBB-SEW–1314 and WBB-SEW–1315 sets). MSs are manufactured with a range of inbuilt horizontal deflections (0° to 90° generally and in some instances 120°) and may be used with or without variable bends. (Refer to WBB-SEW-1314-1 and WBB-SEW-1315-1).
6.7.2 Design parameters for MSs and TMSs	**Clause to be deleted and replaced with the following.** MSs and TEPs shall only be used at the design locations detailed in Table 6.1. The design of **NuSewers** MS shall comply with the following criteria **(**Refer WBB-SEW-1315 set**)**: (i) The combined flow entering a MS shall not exceed 22 L/s. (ii) The flow redirected at an deflection angle greater than 60° shall not exceed 12 L/s. (iii) Where the deflection angle is more than 60° and the flow exceeds 12 L/s, the incoming sewer configuration shall be a 45° stub inlet with a SRB or a LRB. (iv) The MS shall be designed to allow the entry of jet rodder cleaning nozzles and CCTV equipments, the PE riser shall be PE100 SDR21 and fabricated to DN250. (v) Maintenance shafts shall only be installed on DN160 and DN250 sewers. Where the diameters of the inlet and outlet sewers are the same, the inlets shall be installed 20 mm above the MS invert. Where the outlet diameter is larger than the inlet, the obvert levels shall be common. (vi) The maximum grade of an inlet connection to the MS shall be 1 in 10. Where the incoming grade is steeper than 1 in 10, the sewer shall be regraded or vertical curves to be included. (vii) The top section of the riser shall comprise a rubber ring seal PE/PVC connector. The cap for the riser shall comprise a rubber ring seal push on cap to allow for surcharge relief of sewers. (viii) The maximum depth to invert for maintenance shafts with standard construction conditions shall be 5 m. (ix) The vertical distance between a sewer connection entering the riser and the invert of a MS shall be a minimum of 750 mm. Where this distance is less than 750 mm the incoming sewer shall enter at the base of the MS with 20mm invert offset or obvert to obvert. The entry grading

Reference	Amendments to WSA02 - 2002 V2.3
	may be achieved by either adjusting the sewer grade or using long radius vertical curves. (x) All MSs and TEPs shall have DI covers and frames that comply with the requirements in Cl 6.6.9.
	For **RIGSS** installations, the following criteria shall apply (see WBB-SEW-1314 set): (a) The flow leaving a MS shall not exceed 22 L/s. (b) Directly opposing sewer inlets into a MS are permitted. (c) DN225 shafts are permitted but due to increasing maintenance concerns, DN300 shafts are preferred. (d) Where the MS base supports/permits upstream sewers entering the base from between 60 degrees to 300 degrees from the downstream outlet, these formats are permitted. (e) 100-150 property connections use all MS Types with the House Connection Inspection Tee to be located a minimum of 2.0 meters from the MS centre. (f) 150-225mm sewers use Type G, ‗H, J and ‗K with a minimum of a 225mm shaft with 300mm shaft preferred. (g) 150-225mm sewers use pre-cast concrete maintenance shaft (Quicktee or approved equal), shaft shall be minimum 600 mm diameter. (h) Rodding ends shall be minimum size of 150 mm diameter and only on 150 mm sewers to a maximum depth to sewer invert of 2.5 metres. (i) The use of the reticulation access structure shall generally be based on the following percentages per development population. And the following population are rounded out by in-line bends being approximately 15% of structures: (A) maintenance shafts shall generally be 40% of structures, (B) rodding ends or as appropriate HCB terminal ends shall be 10% of structures, (C) those listed in Clause 6.6.5. (j) Drops through Type G, H, J and K maintenance shafts shall be as per the manufactured form of the structure. (k) For Type ‗J‘maintenance shafts and their equals, the up stream sewer lines shall be graded only to the bottom centre invert and shall transition to this invert via the ball radius to a maximum of 1 in 1 grade. (l) ‗Z‘ drops are permitted to enter the shaft of a Type ‗G‘, ‗H‘, ‗J‘ and ‗K‘ maintenance shaft. (m) Maintenance shafts shall be limited to one ‗Z‘ drop for sewers up to 2.5 metres deep and a maximum of two ‗Z‘ drops for sewers between 2.5 and 4.0 metres deep. (n) Where the outlet diameter is larger than the inlet, the obvert levels shall be equal. (o) The maximum grade of an inlet connection to PVC and Polypropylene MS‘s and the maximum grade of an outlet connection to a Concrete, PVC, PE and Polypropylene MS‘s shall be 1 in 10. Where the incoming or outgoing grade is steeper than 1 in 10, the sewer shall be provided with long radius curves to align to the set outlet and the set inlet/s. (p) For MS‘s that accommodate grade at the inlet and/or outlet, where the sewer grade exceeds the factory capability of the inlet and/or outlet, the sewer shall be provided with long radius curves to align to the factory made outlet and inlet/s. (q) For MS‘s with DN 225 or DN 300 riser shafts, 1 sewer main or 2 property connection sewers may enter the MS riser as shown in WBB-SEW-1314-1. The property connection sewers shall be connected to the riser at different levels. (r) For MS with DN 600 risers, due to the pipe connection format only either 1 sewer main or 1 property connection sewer may enter the MS riser as shown in WBB-SEW-1314-1. In these instances, there is no requirement for a drop fitting and drop pipe to be installed. (s) The surface finish of the MS shall be as shown in WBB-SEW-1308-1. Due to safety issues, surcharge relief shall be provided for the maintenance shaft from the sewer via a 20mm hole drilled into the top of the cap (following pressure testing) and a 20mm-25mm rubber bung placed within the drilled hole. (t) All MSs and TEPs shall have covers and frames that comply with the requirements in WBB- SEW-1308-1. (u) The maximum depth to invert for maintenance shafts with standard construction conditions shall be 4.0 m to top of pipe. (v) The vertical distance between a sewer connection entering the riser and the invert of a MS shall be as Tabled in WBB-SEW-1314-1. Where this distance is less than the nominal for the type of structure, the incoming sewer design shall re-graded so that the upstream sewer enters the base of the MS. Plastic maintenance shafts for PE shall comply with WSA PS–322, and for PVC shall comply with WSA PS-321.
6.7.3 Property	**Change the drawing reference to —WBB-SEW-1314-1 and WBB-SEW-1315-1‖.**

Reference	Amendments to WSA02 - 2002 V2.3
connection sewer into MSs and TMSs	**Insert the following RIGSS exception to the end of this clause.** **For RIGSS**, a rodding end as shown shall be used, refer to Clause 6.3.2 herein. **Insert WBBROC requirements as follows:** • North Burnett and South Burnett do not allow connections into MHs • BRC, FCRC and GRC will allow connections into MHs
7.2 Water seals, boundary traps and water sealed MHs	**This clause is deleted and replaced with the following** *Water seals are a means of preventing noxious gases or persistent odours back-venting into a customer sanitary drain. Water seals are generally not required by SEQ-SPs.* **For GCCC and WBBROC**, where advised by SEQ-SP to provide water seals as shown on WBB-SEW-1408 set. **For QUU**, where advised by SEQ-SP to provide water seals as shown on WBB-SEW-1307-2 to 4.
7.3 Gas check MHs	**Delete Clauses 7.3.1 and 7.3.2. Add the following at the start of this clause.** *A gas check MH is a combination of two MHs separated by a water seal. Gas check MHs are generally not required by SEQ-SPs.*
7.4 Vertical and near vertical sewers	**Original WSAA Clause 7.4 to be retained as part of the WBBROC Code (SEQ Code amendments to this clause do not apply)**
7.5.2 Design parameters for vents	**Replace the last paragraph with follows.** Educt vents are shown as Standard Drawing WBB-SEW-1307-3. Induct vents are shown as Standard Drawing WBB-SEW-1407-1. The final locations and types of vent shafts to be used shall be decided in consultation with the SEQ-SPs.
7.6 Near Horizontal Boreholes	**Change the Title to —Near-Horizontal Boreholes and Horizontal Directional Drilling (HDD)‖.**
7.6.2 Design requirements	**Change the reference in sub-clause (A) from Table 6.1 to Table 7.1.**
Insert New Clause 7.6.4	**Insert New Clause.** **7.6.4 Horizontal Directional Drilling – Acceptance criteria** HDD may be approved by the SEQ-SPs delegate subject, but not limited, to the following criteria: (a) Preferred pipe material is PE100. Mechanical or E-F couplings shall not be used within boreholes. (b) Diameter to be 1 size larger than that determined by the following the requirements of Section 3 and 4. (c) Pipe class to be minimum 2 classes up than that determined by the following the requirements of Section 3 and 4. Consulting engineers/contractors are responsible to ascertain & confirm pipe classes to suit required construction forces according to the pipe length, pipe diameter, pipe construction wear & tear and equipments etc. (d) Minimum grade to be the value given in Table 4.6 plus 0.5%. (e) The full pipe length shall be pressure tested as per Clause 22.4.2. (f) Check for ponding with water followed by CCTV inspections, ponding or backfill is not acceptable. (g) If there is a sag area found by CCTV, consulting engineers/contactors shall carry out a calculation to ensure that the ultimate PDWF level as designed will not exceed 75% of the pipe diameter at the sag section in depth. (h) If above requirements are not met, consulting engineers/contractors shall excavate & make good or abandon the pipes and start the installation again. Before any approvals can be granted, the consulting engineer/contractor shall agree in writing to accept the requirements as per points (f), (g) & (h) above.
7.8.2 Design parameters for inverted syphons	**Replace the sub paragraph (ix) with the following.** (ix) The inlet structure shall be designed so that only the primary barrel comes into operation f o r

Reference	Amendments to WSA02 - 2002 V2.3
	flows up to PDWF (with a provision of freeboard), and the secondary barrels are brought into service for increased flows i.e. PWWF.
7.9.2 Design parameters for ERSs	**Replace the drawing reference in the bracket of the second paragraph with —(Refer to Standard Drawings WBB-SEW-1409 set, WBB-SEW-1410 set, WBB-SEW-1411 set, WBB-SEW-1412 set and WBB-SEW-1413-1 as appropriate for the SEQ-SP).**
8.1 Structure design-General	**Adjust the last second paragraph as follows.** Sewers shall not be laid within railway reserves unless it is necessary to cross that land, in which case, the crossing shall be in accordance with AS 4799 and to the details of WBB-SEW-1401-1.
8.2 Products and Materials	**Insert the following as the second last paragraph.** Specific requirements for **NuSewers** are as follows: All PE - PE connections in the PE sewer system shall be welded. Welding shall be in accordance with the following: **Factory welds:** (i) butt welding preferred; (ii) electro-fusion welding is acceptable; (iii) where butt or electro-fusion welding is not possible extrusion hot air welding is permitted. **Site welding**: (iv) butt welding preferred; (v) electro-fusion welding is acceptable. Only approved fittings shall be used, refer to SEQ accepted civil products & materials list. All pipes and fitting for NuSewers shall comply with AS/NZS 4130 and AS/NZS 4129. All site and factory welding shall be carried out by a person who has completed the Nationally Accredited Training Courses for Butt welding or Electro-fusion and must hold a valid welding certificate as per AS/NZS 2033. Refer to PIPA website for the training course details. The manufacturer 's printed instructions on the electro-fusion welding procedure (in particular, the surface preparation requirements) are to be strictly adhered to. PE sewers (NuSewers) shall be used in residential, commercial and industrial areas except where there is a possibility that the sewer flow or surrounding ground may contain certain forms of hydrocarbons or other chemicals which may have impact on the PE material, refer to manufacture for the information of PE chemical resistances. For contaminated lands or old landfills, this requires special considerations in pipe material selection and approval from the relevant SEQ-SP. For **RIGSS**, all products and materials shall be selected from the SEQ Accepted Civil Products and Materials List.
8.6.1 Geotechnical considerations-General	**Replace the drawing reference in the last paragraph with —WBB-SEW-1200 set‖.**
8.6.7 Water-charged ground	**Replace the drawing reference with —WBB-SEW-1202-1 and WBB-SEW-1203-1‖.**
8.7 Above ground crossings	**Replace the drawing reference with —WBB-SEW-1404-1, WBB-SEW-1405-1 and WBB-SEW-1406-1‖.**
Insert New Clause 8.7.1	**Insert New Clause.** **8.7.1 Creek Crossing** Where approved by relevant SEQ-SP, sewers shall be designed such that any sewer crossing a creek shall be located below the creek bed. This requirement will provide a critical control point in the network layout design. However, where this requirement cannot be met the sewer shall be located above the Q100 flood level (i.e. aerial crossings or bridge crossings). If this cannot be achieved and the aerial crossing sewer is located below the Q100 flood level, the sewer shall be designed for Q100 flood force

<table>
<tr><th>Reference</th><th>Amendments to WSA02 - 2002 V2.3</th></tr>
<tr><td></td><td>loadings.

Where the sewer crosses a tidal creek, the sewer shall be located below the creek bed on —at grade‖ crossing or where this is not possible alternatives shall be agreed with the relevant SEQ-SP.

For creek crossings, the designer shall obtain the approval of the relevant authority responsible for management of the waterway e.g. DEHP, and/or relevant road authorities/bridge owners.</td></tr>
<tr><td>8.8
Pipe cover</td><td>Replace the drawing reference with –WBB-SEW-1200-2‖.</td></tr>
<tr><td>8.9
Trench design</td><td>Replace the drawing reference with –WBB-SEW-1200-2‖.</td></tr>
<tr><td>8.10
Bulkheads and trenchstops</td><td>Replace the drawing reference in the first paragraph with —WBB-SEW-1206-1 and WBB-SEW-1207-1‖ respectively.

Insert the following after paragraph 4.

Where it is possible, bulkheads on PE pipe shall be located on electro-fusion couplings. Where there are no electro-fusion couplings, factory made puddle flanges shall be used for the required bulkheads. Intermediate trench stops shall comply with the requirements of Table 8.1.

Replace Table 8.1 – Requirements for Bulkheads and Trenchstops with the following.
<table>
<tr><th>Grade
%</th><th>Requirement</th><th>Spacing S
m</th></tr>
<tr><td>5<Grade<15</td><td>Bulkheads or Trenchstops</td><td>S=100/Grade% or 10m (whichever is less)</td></tr>
<tr><td>15≤Grade<30</td><td>Concrete bulkhead</td><td>S=L/Grade%, where
L = 80xPipe length*, m (450 m max)
Where L>100 m – use intermediate trenchstops at spacing <100/Grade</td></tr>
<tr><td>30≤Grade<50</td><td>Concrete encasement (continuous) and concrete bulkheads</td><td>S = 100/Grade(%) or 10m (whichever is less)</td></tr>
<tr><td>50 ≤ Grade</td><td>Special design</td><td></td></tr>
<tr><td colspan="3">*Pipe length is the standard pipe length installed.</td></tr>
</table></td></tr>
<tr><td>9.2
Design Drawings</td><td>Replace all of clause 9.2 with the following.

All drawings are to be provided to the water authority in accordance with the SEQ Asset Information Specification and ADAC schema.</td></tr>
<tr><td>9.3
Drafting Standards</td><td>Clause be amended to read.

Drawings shall be prepared in accordance with the SEQ Asset Information Specification and ADAC schema.</td></tr>
<tr><td>9.3.1
Scale</td><td>Clause Deleted.</td></tr>
<tr><td>9.3.2
Recording of As constructed information:</td><td>Insert new line.

-As Constructed information shall be provided in accordance with the SEQ Asset Information Specification and ADAC schema.</td></tr>
<tr><td colspan="2">PART 2 PRODUCTS & MATERIALS</td></tr>
<tr><td>10.1
Purpose</td><td>Insert the following text at the end of this clause.

Critical products for which inadequate performance or premature failure may jeopardize the meeting of the relevant SEQ-SPs —Standards of Service‖ or the economic life of the system must be authorized for use by the relevant SEQ-SP before incorporation into the works.

A list of accepted products and materials or suppliers of critical products is available separately from each SEQ-SP.

Other products referred to on the WSAA web site, given below, may be used in specific projects subject to the approval of the relevant SEQ-SPs.</td></tr>
<tr><td>10.6
Selection Guide</td><td>Adjust the title of the Table 10.1 as following.</td></tr>
</table>

Reference	Amendments to WSA02 - 2002 V2.3
for Pipeline systems	**PRINCIPAL GRAVITY SEWER PIPELINE SYSTEMS** **Informative** **(Refer SEQ Accepted Products & Materials List)** **Insert the following at the end of this clause.** Applicability of PE pipes: Polyethylene (PE) pipes shall be used for all new developments that using NuSewers. PE pipes shall be PE100 with minimum class of SDR21. Higher pipe classes may be used (higher pipe class means lower SDR e.g. SDR17 or lower values.) in accordance with in-situ conditions e.g. low strength soils. The standard pipe sizes are DN110, 160, 250 and 315 (reflect 100mm, 150mm, 225mm and 300mm nominal bore respectively). For sewers larger than reticulation, DN400, 500, 630, 800, 1000 and 1200 may be used. The DN for PE pipes refers to outside diameters as per AS/NZS 4130. Pipe color shall be: • External light grey—solid or striped. • Internal white or light color to facilitate CCTV inspection. Internal white or light color is mandatory as CCTV inspection forms part of the gravity sewer asset acceptance requirements. Pipe welds shall be butt welding or electro-fusion types. Where this is not possible factory applied extrusion hot air welding is acceptable. Applicability of PVC pipes: PVC pipes shall predominantly be used for all new developments that using RIGSS. Only rubber ring jointed PVC pipes may be used. Other materials: Use of other materials for pipes and fittings may be appropriate in some circumstances and requires specific approval by the relevant SEQ-SP.
PART 3: CONSTRUCTION	
11.2 Interpretation	**Replace the Standard Drawings as following.** **"Standard Drawings"** means the SEQ Standard Drawings in the SEQ WS & S Design and Construction Code.
12.2 Personnel Qualifications	**Insert the following text at the end of this clause** During any construction activity at least one person on site must have completed a pipe laying training course approved by the supplier and appropriate to the pipeline under construction (refer the SEQ Accepted Products and Materials List). The contractor will provide documented evidence of such qualification prior to commencement of the works.
13.1 General	**Insert the following line at the end of this clause** NuSewers shall be installed in accordance with the requirements of AS/NZS 2033.
13.2 Order of construction, testing and commissioning	**Replace the sub-clause (e) with following.** (e) Connect to the live sewer after all other Works have been constructed as specified. Make application to the SEQ-SP for the Live Connection and provide all required certifications for Vacuum, Pressure and Ovality tests.
13.5.2 Protection of Other Services	**Insert the following at the start of this clause.** The contractor shall be responsible for any damage they cause to existing underground services. If the contractor damages any existing services, it shall arrange for the relevant service authority to make good such damage and the cost thereof shall be borne by the contractor. If in the opinion of the SEQ-SP, the failure or damage causes an emergency situation, then remedial action will be taken by the SEQ-SP and the full cost of such action shall be borne by the contractor. **Add as the last paragraph in this clause** Where a development is approved for full site coverage and foundation works require excavations on-

Reference	Amendments to WSA02 - 2002 V2.3
	site, the use of temporary Earth Anchors requires extreme caution as the anchors placement within the verge/footway or even into the roadway may impact on the existing sewer or other services. Where a development causes damage to the service, the responsible person for the works shall be liable for the full cost of restoration including all diversion and tankering cost.
13.5.3 Disused/Redundant sewers	**Amend the clause to read.** Take action regarding disused sewers e.g. removal or capping at points of disconnection and /or grout filling the pipe and also removing surface fittings and parts of access structures as specified.
14.1 Authorised Products and Materials	**Amend the second paragraph to read.** Use only products and materials accepted by the SEQ-SPs. **Replace the last paragraph with the following.** A list of the accepted items is included in the —SEQ Accepted Products and Materials List‖. Where items are required but not included in the List, those items shall be referred to the relevant SEQ-SP for appraisal.
15.2 Limits of Excavation	**Add the following to the end of this clause** Where a sewer or property connection sewer is located in rock and has the potential to be extended, the excavation shall be extended 1.0m or as directed by the superintendent.
15.3 Excavation across improved surfaces	**Change the second sentence of the third paragraph to the following.** Saw cut neat straight lines, at the distances shown in the WBB-SEW-1205-1 beyond the outer limits of the excavation through bitumen, asphalt and concrete.
15.8 Foundations and foundation stabilisation	**Replace the drawing reference in the second paragraph with –WBB-SEW-1200-1‖.**
16.3 Placement of bedding	**Replace the drawing reference with —WBB-SEW-1200-2 and WBB-SEW-1201-1‖.**
16.4 Special pipe support for non-supportive soils	**Replace the drawing reference with —WBB-SEW-1202-1, WBB-SEW-1203-1 and WBB-SEW-1204-1‖.**
16.5 Bedding for maintenance shafts and bends	**Replace the drawing reference with —WBB-SEW-1314 set and WBB-SEW-1315-1‖.**
16.6 Bedding for maintenance holes	**Replace the drawing reference with –WBB-SEW-1200-1‖ in the second paragraph** **Replace the drawing reference with —WBB-SEW-1200-2 and WBB-SEW-1203-1‖ in the last paragraph.**
17.1.3 Polyethylene	**Add the follows at the end of this clause.** Debeading is not required unless otherwise specified by SEQ-SP.
17.1.4 Laying	**Replace the drawing reference with —WBB-SEW-1103 set and WBB-SEW-1200-2‖**
17.2.2 Methods of deflection	**Replace the drawing reference in sub-clause (c) with —WBB-SEW-1314 set and WBB-SEW-1315-1‖ Insert the following after (c).** **NuSewers** permits the _methods' discussed in (b) or (c) above. **RIGSS** only permits the _method' discussed in (c) above. **Change the Table 17.1 as following.**

TABLE 17.1
METHODS OF ACHIEVING CURVED SEWERS

Curve type	Material and joint	Deflection at joint	Pipe size	Pipe length m	Minimum horizontal and vertical curve

Reference	Amendments to WSA02 - 2002 V2.3					
				DN		**radius m**
	Cumulative deflection at joints	VC Socket - Spigot	Yes	100 – 1400	Up to 2.5– varies with DN	Note 1
		VC PE coupling	Yes	100 – 300	Up to 2.5– varies with DN	Note 1
		PVC elastomeric seal jointed (RRJ)	Yes	100 – 375	3.0 – 6.0	Note 1
		Profiled wall PE Socket - Spigot	Yes	375 – 2100	2.4 – 6.0	Note 1
	Manual cold bending	PVC solvent cement jointed	No	100 – 300	Not dependent	Note 3
		PE welded joints SDR ≤21	No	160 – 355	Not dependent	Note 3
	Manufactured bends	PVC	Yes RRJ only	100 – 375 Note 2	Not dependent	Note 3
		GRP	Yes	300 – 1200	Not dependent	As manufacture requirement
		Profiled wall PE	No	Up to 1500	Not dependent	Note 3
		PE short radius bend (up to 45°)	No	110 – 250 Note 4	Not dependent	0.75
		PVC variable bend	No	150 – 225	Not dependent	0.9
	NOTES: 1 *The minimum radius for solvent cement welded PVC pipes and welded PE pipes is based upon:* *(a) the deflection that may be achieved without overstressing the pipe or pipe joint; and* *(b) ensuring that the necessary restraint of the pipe and joints around the curve is readily achievable based on manually cold bending the pipe in the field.* 2 Manufactured bends for RIGSS are available at DN150 with other sizes to be individually fabricated to AS/NZS1260. 3 Refer to POP202 for minimum acceptable radii for manufactured bends and manual cold bends. 4 Short Radius bend for PE are available for DN110, DN160 and DN250, up to 45 degree. Larger sizes of PE or greater degrees shall use long radius bends as per Note 3.					
17.2.3 Horizontal curves	**Adjust the third paragraph as following.** Place bends or initiate curves in the sewer as per Clause 4.3.7 and as shown on the Standard Drawing WBB-SEW-1314 set and WBB-SEW-1315-1.					
17.2.4 Vertical curves	**Replace the 5th and 6th paragraph with the following.**					

Reference	Amendments to WSA02 - 2002 V2.3
	Place vertical bends as per Clause 4.6.7.
17.2.5 Compound curves	**Replace the clause with the following.** Place the compound bends as per Clause 4.6.8.
17.4 Flotation control	**Replace the drawing reference in sub-clause (a) with –WBB-SEW-1206-1‖.**
17.5 Trench Stops	**Add the following after the first sentence** Trench Stops are to be used only where specified on the Design Drawings or shown on the Standard Drawings or where an underground water path is encountered during construction. **Replace the drawing reference with —WBB-SEW-1206-1 and WBB-SEW-1207-1‖.**
17.6 Bulkheads	**Change first sentence to read as follows** Construct concrete bulkheads with trench drainage as specified on the Design Drawings or shown on the Standard Drawings or where an underground water path is encountered during construction. **Replace the drawing reference with —WBB-SEW-1206-1 and WBB-SEW-1207-1‖.**
17.7 Property connection sewers	**Replace the drawing reference with —WBB-SEW-1104-1, WBB-SEW-1105-1 and WBB-SEW-1106 set‖.**
17.8 Dead ends	**Replace the drawing reference with —WBB-SEW-1104-1, WBB-SEW-1105-1, WBB-SEW-1106 set, WBB- SEW-1314-1 and WBB-SEW-1315-1‖.**
17.9 Marking of Property Connections and Dead Ends	**Replace the clause as following.** Mark the position of each dead end and location of each property connection point using identification formats as shown in the Standard Drawings. Reference: Standard Drawings WBB-SEW-1104-1, WBB-SEW-1105-1 and WBB-SEW-1106 set as appropriate.
17.11.1 Non-detectable marking tape	**Replace the drawing reference with –WBB-SEW-1200-2‖.**
17.11.2 Detectable Marking Tape	**Change the first paragraph as following.** Detectable marking tape shall be laid above all buried non-metallic pipes along the top of the embedment zone or at 1 m below the surface (whichever is the closer to ground surface) for: **Replace the drawing reference with –WBB-SEW-1200-2‖.**
17.12 Bored Pipes under Roads, Driveways and Elsewhere	**Add the following as the first paragraph:** Proposed methods and materials for bored pipelines shall be approved by the relevant SEQ-SP before commencement of boring. Contractor shall carry out a risk analysis of any piling works adjacent to buildings, bridges and other structures and this analysis shall be included in the proposal. **Add the following after the third paragraph.** Where plastic pipes are grouted within the encasing pipe, the approved work method statement shall detail the controls to prevent either floatation or thermal reversion of the carrier pipe (the sewer). **Replace the drawing reference with —WBB-SEW-1400-1, WBB-SEW-1401-1, WBB-SEW-1402-1 and WBB- SEW-1403-1‖.**
17.13 Aqueducts	**Replace the drawing reference with —WBB-SEW-1404-1 and WBB-SEW-1405-1‖.**
17.14 Bridge crossings	**Replace the drawing reference with –WBB-SEW-1406-1‖.**
17.16.1 Welding of steel pipelines- General	**Replace the drawing reference with —WBB-WAT-1400-1 to WBB-WAT-1408-1 within SEQ Water Supply Code‖.**
Insert New Clause	**Insert New Clause** **17.16.3 Reinstatement of linings and coatings**

Reference	Amendments to WSA02 - 2002 V2.3
17.16.3	The requirements of Clauses 15.20.3 to 15.21.1 within the SEQ Water Supply Code shall apply.
18.1 Maintenance Holes (MHs)-General	**Replace the clause with the following.** Construct MHs and install covers, surrounds, step irons and ladders as specified. **GCCC and UW-**Step irons and ladders shall not be installed in service areas managed by GCCC and UW. Reference: Standard Drawings WBB-SEW-1300-1, WBB-SEW-1301 set, WBB-SEW-1302-1, WBB-SEW-1303 set, WBB-SEW-1304-1, WBB-SEW-1305-1, WBB-SEW-1306-1, WBB-SEW-1307 set, WBB-SEW-1308 set, WBB-SEW-1309-1, WBB-SEW-1310-1, WBB-SEW-1311-1, WBB-SEW-1312-1 and WBB-SEW-1313-1.
18.2 MH base	**Replace the drawing reference with —WBB-SEW-1304-1, WBB-SEW-1305-1 and WBB-SEW-1306-1‖ in the first paragraph.** **Replace the last two paragraphs with following.** For precast MHs, form the channels after the first component has been placed where pre-benched or bowl benched bases are not used. Reference: Standard Drawings WBB-SEW-1301 to WBB-SEW-1312 as appropriate.
18.3 Trench drainage around MHs	**Replace the drawing reference with —WBB-SEW-1207 set‖.**
18.4 Precast concrete MH systems.	**Add as the first sentence of this clause** **QUU:** Precast MHs are not accepted for use within QUU service areas. **Replace the last three paragraphs with the following.** For precast MHs that are using cast in-situ MH bases, secure the hydrophilic seal at the locations shown in the Standard drawings and prime the lower 200mm of the precast component with a wet to dry bonding agent or cement slurry before placing the component onto the wet concrete base. Embed the component 50 mm into the wet concrete base, then build up and compact a 150mm concrete fillet on the outside to seal against infiltration. Form channels in the base in accordance with Clause 18.2. Do not place other shaft sections until the concrete base has set. For pre-benched or bowl benched precast bases, install in accordance with the manufacturer's instructions. Reference: Standard Drawings WBB-SEW-1300 to WBB-SEW-1306.
18.5 Cast in-situ concrete MH	**Replace the second and the third paragraphs with the follows.** At each construction joint, place water stops and dowels, remove laitance and prime with a wet and dry bonding agent or cement slurry before pouring the next lift. Where hydrophilic seals are to be used, place these after the laitance removal. Where a water stop is used at any construction joint, support it in such a manner that it will retain its position during the pour. **Replace the drawing reference with —WBB-SEW-1301 and WBB-SEW-1307 sets‖.**
18.8 – Internal Coating of Concrete Manholes:	**Delete existing text and replace with the following** Where required by the SEQ-SP (refer to Clause 4.7.2), MH's shall have all internal surfaces coated with a protective coating system as detailed below. The DI cover and frame does not require coating. **QUU and UW:** Internal surfaces shall be lined with a PE cast in place lining system. Refer SEQ-SPS-1407 drawing set for details. **GCCC**: Internal surfaces shall be coated with either PE lining systems as above or a two part solvent free 100% solids epoxy protective coating system at 2.0mm thick and suitable for application to damp concrete, a) the protective coating system shall be installed to the manufacturer's requirements and the application shall be carried out by an accredited applicator approved by the manufacturer and the Superintendent;

Reference	Amendments to WSA02 - 2002 V2.3
	b) The two part solvent free epoxy protective coating system suitable for wastewater works, shall be a chemical resistant two part epoxy primer/ sealer (if specified by the manufacturer) with a high build capability, resistant to Sulphuric Acid and abrasion with a minimum dry film thickness of 2000 microns c) The pot life of the mixed coating shall be a minimum of 40 minutes with a color when dry of either light grey, white or off white. d) The protective epoxy coating system may include Quartzite aggregates and where used the minimum dry film thickness shall be 4000 microns. e) Prior to the application of the coating system the new concrete surface shall be pressure blasted or scabbled so as to remove any laitance, loose or porous material leaving a clean, rough, hard concrete surface. The Contractor shall: f) certify to the Superintendent (in a manner approved by the Superintendent) that: (i) the protective coating has been applied in accordance with the manufacturer's recommendation; (ii) the protective coating has been applied by an accredited applicator and that the tests required by the manufacturer have: (A) been carried out; and (B) met the manufacturer's requirements; and (C) passed all necessary tests. g) Provide to the Superintendent a joint manufacturer's and applicators written warranty (in favour of the SEQ-SP) covering the protective coating for a minimum period of 10 years.
18.9 Covers	**Change the first line from:** -…as specified‖ to -…as specified on Standard Drawings‖. **Replace the drawing references with —WBB-SEW-1300-1, WBB-SEW-1301-1 and WBB-SEW-1308 set‖.**
18.10 Connections to Manholes	**Change the first line from :** -…as specified‖ to -…as specified on Standard Drawings‖ **Replace the drawing references with —WBB-SEW-1301 set, WBB-SEW-1302-1, WBB-SEW-1303-1, WBB- SEW-1307-4 and WBB-SEW-1313-1‖.**
18.11 – MH Drops	**Change the first line from :** -…as specified‖ to -…as specified on Standard Drawings‖ **Replace –…Superintendent‖ in the second paragraph with –…relevant SEQ-SP‖.** **Replace the drawing references with —WBB-SEW-1301 set, WBB-SEW-1303-1, WBB-SEW-1306-1 and WBB-SEW-1307-2‖.**
19.1 MAINTENANCE SHAFTS (MS AND TMS) AND INSPECTION OPENINGS (IO)-General	**In the title replace the "TMS" and "Inspection Openings (IO)" with "TEPs" and "Inspection Tees and Sediment Traps".** **Replace the clause with the follows.** Install MSs, TEPs, Inspection Tees and Sediment Traps as specified on Standard Drawings. Where the manufacturer's printed installation instructions vary from the Design Drawings, refer to the Superintendent for written instruction. Embed and surround MSs, TMS, Inspection Tees and Sediment Traps with embedment material as specified for the reticulation sewer. Compact embedment as specified for reticulation sewer trench fill. Provide and install covers and surrounds as specified. Reference: Standard Drawings WBB-SEW–1104 to 1106, WBB-SEW-1308-1 and WBB-SEW-1314 to 1316.
19.2 Sealing caps	**Replace the clause with the follows.** Cut the MS/TEPs shaft to provide the access cover clearance as specified on Standard Drawings. Seal the shaft with a cap in accordance with the manufacturer's printed instructions. Reference: Standard Drawings WBB-SEW–1314 set, WBB-SEW-1315-1 and WBB-SEW-1316-1.
19.3 Covers	**Replace the clause with the follows.** Install covers and frames as specified on Standard Drawings. Clean sealing surfaces of covers and frames. Apply grease to seating surfaces where specified in

Reference	Amendments to WSA02 - 2002 V2.3
	accordance with manufacturer's printed instructions. Reference: Standard Drawings WBB-SEW-1308-1, WBB-SEW-1314-1 to 2 and WBB-SEW-1316-1.
19.4 Connections to MSs and TMSs	**In the title change TMSs to TEPs and replace the clause with the follows.** Make connections of sewers to MSs and TEPs as specified on the Standard Drawings and in accordance the manufacturer's printed instructions. Reference: Standard Drawings WBB-SEW–1314 set, WBB-SEW-1315-1 and WBB-SEW-1316-1.
20.1 Pipe embedment and support- General	**Insert the following after second paragraph** Bedding material shall be screeded and compacted to grade before the pipe is laid making provision for sockets. Embedment material shall be rodded into haunch area to provide continuous support.
20.2 Embedment Details	**Delete this clause and the Table 20.1, and replace the clause with follows.** Use embedment materials that: (a) Are single sized materials with nominal sizes of 5mm or 7mm; and (b) Comply with the Purchase Specification for embedment materials as nominated in the SEQ Accepted Products & Materials List. Reference: Standard Drawings WBB-SEW-1104-1, WBB-SEW-1105-1, WBB-SEW-1106 set, WBB-SEW-1200-2, WBB-SEW-1201-1, WBB-SEW-1202-1, WBB-SEW-1314 set and WBB-SEW-1315-1.
20.4 Special bedding and embedments/ Geotextile surround and pillow	**Change drawings References to Standard Drawings WBB-SEW–1202-1, 1203-1 and 1204-1.**
20.6 Concrete Embedment and Encasement	**Change first sentence to read.** Concrete embed or encase pipes as per engineered design solution in accordance with Clause 14.5. **Change drawing references to Standard Drawings WBB-SEW–1203-1, 1400-1, 1401-1, 1402-1 and 1403-1.**
21.1.1 Trench fill-General	**Add the following at the start.** Place marker tapes as shown in the Standard Drawings. **Change drawings References to Standard Drawings WBB-SEW–1200 set.**
21.1.2 Material requirements	**Add the following at the start of this clause.** Trench fill shall consist of the best material from the trench excavation and free from organic matter, has a particle size not exceed 75mm that can achieve the required compaction. For trenches in the roadways and footpaths, trench fill and restoration to be in accordance with the requirements of the relevant road owner, refer typical details in Standard Drawings WBB-SEW-1205-1 and WBB-SEW-1205-2.
22.3.1 Compaction testing- General	**Add the following to the start of this clause.** The Contractor (or the consulting engineer of the development works) shall be responsible for all compaction testings and shall arrange for the testing to be carried out by a NATA certified Test Laboratory. Prior to commencing works the Contractor / consulting engineer shall prepare a test plan showing the number of tests and depths in each zone where testing is to be carried out. Refer Clause 22.3.3 or 22.3.4 herein for the required minimum number of tests. The Test Laboratory shall randomly select test locations in each zone. The relevant authority may direct the Test Laboratory to undertake additional tests in any zone. The test locations shall be uniformly spread over the works. **Compaction Certificates:** Prior to the works being accepted 'on maintenance', the Contractor / consulting engineer shall submit the individual compaction test records and a Certificate of Compliance from the NATA test laboratory confirming that the tests have been completed in accordance with the test plan and that the specified compaction as per Clause 22.3.3 or Clause 22.3.4 herein has been achieved. **Non-compliance of Compaction testing:** The compaction tests shall be repeated at the Contractor / consulting engineer's cost until satisfactory compaction levels are achieved as per Clause 22.3.3.3 or Clause 22.3.4.5 herein.

Reference	Amendments to WSA02 - 2002 V2.3
22.3.3.1 Applicable pipe sizes	**Replace the drawing reference in sub-clause (a) with –WBB-SEW-1200-1‖.**
22.3.3.2 Frequency and location of embedment tests	**In the second paragraph change –>375mm‖ to –≥ 375mm‖.**
22.3.3.3 Retesting	**Adjust the second sentence as the follows.** If one or more of the repeat tests does not comply, re-do the embedment/fill and re-compact the full zone and continue repeat testing on the full zone. **Replace the drawing reference in the Table 22.1 and Table 22.2 Notes with –WBB-SEW-1201-1‖.**
22.3.4.1 Trafficable test zone	**Change drawing reference to —…WBB-SEW – 1200-2‖.**
22.3.4.4 Frequency and location of tests	**Insert the following at the start of this clause.** Testing shall not be clustered within a zone or at boundaries of a zone. **Insert the following at the end of this clause.** In deep trenches where more than 1 layer is to be tested, the test locations shall, where practicable, be staggered from those layers above or below by at least 5 m for sewers and pressure mains and 2 m for property connection sewers.
22.3.4.5 Retesting	**Adjust the second sentence as the follows.** If one or more of the repeat tests does not comply, re-do the embedment/fill and re-compact the full zone and continue repeat testing on the full zone.
22.4.1 Air pressure and vacuum testing of sewers- General	**Delete the —…or air pressure…‖ at the start of paragraph 2 to read as follows** Vacuum test all sewers ….. **Delete —…air pressure and…‖ in the paragraph 5 to read as follows** Make calibration certificates for all vacuum testing equipment…… **Add the following informative to the end of this clause.** *The SEQ-SP may permit sewers 1050mm ≤ diameter ≤ 1500mm to be tested by the method defined in Clause 22.5 as an alternative to the vacuum testing.*
22.4.2.1 Vacuum testing	**Change the Heading of this clause to read** **22.4.2.1 Vacuum testing – RRJ Sewers** **Add the following as the first line of this clause:** All components of the sewer including MS's and property connection sewers shall be subject to a vacuum test.
22.4.2.2 Low pressure air testing	**This clause including title to be replaced with the follows.** **22.4.2.2 Vacuum testing – NuSewers** All components of the sewer including MS's and property connection sewers shall be subject to a vacuum test. Plug all sewer inlets and outlets and cap and seal all MS risers in the test length of sewer. The vacuum test for NuSewers shall be carried out in accordance with the following procedure: • apply a negative pressure of approximately 50kPa; • close the valve, shut off the pump and allow the pressure to stabilise for 3 minutes; • when the pressure has stabilised at or below the starting test vacuum of 45kPa, commence the test by allowing the pressure to drop to 45kPa at which point the time recording begins; and • record the vacuum drop over a 20 minute period. The sewer is acceptable under test if the vacuum loss is less than 2kPa. If the test fails, re-apply the vacuum to identify leaks and rectify all defects prior to conducting further tests.
22.4.4.1 Testing of concrete	**Replace the first two paragraphs with the following.** Vacuum test all concrete MHs regardless cast in-situ MHs or precast MHs.

Reference	Amendments to WSA02 - 2002 V2.3
MHs- General	**Delete Table 22.5**
22.6.3 Flexible sewers ≤ 300mm	**Replace the drawing reference with –WBB-SEW-1201-1‖.**
Insert New Clause 22.7.1	**Insert New Clause.** **22.7.1 CCTV Inspection Requirements** All sewers and maintenance structures shall be inspected by CCTV after all backfilling operations have been satisfactory completed and all junctions are installed. This inspection is required to ensure that the pipe is without any construction defects, the pipe has no internal flow obstructions and all approved junctions are in right location. Further the inspection will verify the information provided with the ‗As Constructed' drawings. A secondary inspection is also required prior to but not more than two (2) weeks before on site inspection for off maintenance certification. The sewers and maintenance structures shall be cleaned prior to the CCTV inspection. All CCTV inspections in general shall be carried out in accordance with the latest version of the WSAA Conduit Inspection Reporting Code of Australia WSA 05. The operator shall use Appendix F to highlight all unacceptable defects in the CCTV report. In addition to the WSAA WSA 05 requirements the CCTV surveys shall comply with the following additional requirements: a) All CCTV surveys shall be accompanied by an inclination report in the form of a scaled graph that plots the pipe's altitude over the distance travelled. The inclinometer shall be accurate to +/-1%. The inclinometer reading shall be on screen display at all times during the recording of the CCTV survey. b) The CCTV survey shall be carried out from the centre of the start maintenance structure to the centre of the finish maintenance structure. Each maintenance structure shall be fully scanned using the pan/tilt and zoom functions of the CCTV camera and the video footage recorded as part of the overall CCTV survey. c) All pipe joints shall be scanned by a 360 degree pan. d) Additional welding defects to be coded for PE sewers with electrofusion joints: a. A PE pipe end not cut square in a joint shall be coded as circumferential welding defect (Code WC) b. Visible welding wires in a joint shall be coded as circumferential welding defect (Code WC) c. Partially melted fusion couplings in a joint shall be coded as circumferential welding defect (Code WC) e) All changes in horizontal and vertical direction of the pipe along the survey shall be coded using the appropriate WSA 05 codes. a. A number of general photographs shall be taken along the sewer surveyed, as a minimum to satisfy the requirements of this standard: b. one photograph in each maintenance structure showing the condition of the structure above the pipe obvert level c. one photograph each showing the connection point between the maintenance shaft/maintenance hole and the incoming/ outgoing pipes d. a general photograph every 20-25m of the pipe condition not related to any defect over the distance surveyed e. a photograph of each junction installed f. photographs of all welding defects identified Two copies of the following information shall be provided prior to commissioning of the assets: f) A digital video file (MPEG 1 or MPEG 2 format) for each sewer segment (Maintenance shaft/hole to Maintenance shaft/hole), g) Digital photographs (JPEG format) of certain defects as stated in Appendix F of WSA 05 and for all the situations mentioned above h) One digital file with the asset information, coding information and Inclinometer readings (to an acceptable version of the WinCan software or other digital formats stated in future editions of the WSA 05 standard) i) Hardcopy of the WinCan report with the coding information including the photographs taken j) Hardcopy of the inclination report

Reference	Amendments to WSA02 - 2002 V2.3
	All digital files shall be provided as data files on CD or DVD medium (‗vob' files not acceptable).
23.3 Tolerance on Finished Surface Structures and Fittings	**Delete existing clause and replace with the following.** For structures and fittings designed to finish flush with the ground/pavement surface or proud of the surface, the following tolerances to the design shall apply: a) +/- 5mm, for all constructed pathways, b) +10mm high, -5mm low in road reserves including sealed pavements, and driveways, c) +15mm high, -5mm low in sealed vehicular and pedestrian areas within private property, d) +20mm high, -5mm low including garden areas, unsealed areas, non- trafficable or occasional trafficable areas.
24 Connection to Existing Sewers	**Insert before the first paragraph, the following sub-heading for the existing text.** **24.1 – General**
New Clause	**Insert the following new Clause after existing sub-clause (f).** **24.2 CONNECTIONS TO EXISTING SEWERS** **24.2.1 General** All works undertaken within SEQ–SPs service area which involve connection to, or modification of, the existing sewerage system are known as ―Live Sewer Works‖ and shall be undertaken by the SEQ-SP. Typical ―Live Sewer Works‖ include: a) new connections to existing MH's, MS's, ends and sewers; b) sealing connections to existing MH's and MS's; c) construction of a new MH or MS over an existing sewer or end; d) extension or relaying existing sewers; e) replacement of sewers; f) raising or lowering of existing MH's or MS's; and g) other works on existing sewers MS's and MH's. ―Live Sewer Works‖ shall be clearly described in a table on the drawings refer SEQ-SEW-1102-1 as a sample format. **24.2.2 Procedure for "Live Sewers" connections** For **GCCC and UW**, the procedures for live sewer connections shall be defined at the time of the works and may generally follow the QUU procedure below. **QUU procedure:** Where a new MH is to be built over an existing PE sewer (NuSewers): a) The Contractor shall weld two PE puddle flanges on the existing PE sewer for the distance of the MH walls centre; b) QUU shall cut the whole circumferential section of the existing PE pipe for the width of the MH and still hold the cut pipe in place between the two puddle flanges by tape wrapping the two cut ends; c) The Contractor shall construct the MH and benching to the existing pipe; d) QUU shall remove the cut pipe within the MH and make good the benching and the channel to match the internal wall of the existing PE pipe. Where a new MH is to be built over an existing VC or PVC sewer: e) The Contractor shall construct the MH and benching to the existing pipe; f) QUU shall demolish the existing pipe within the MH and make good the benching. Where a new MH is to be built over an existing DICL sewer: g) QUU shall remove a top section of the existing sewer for the width of the MH and install a temporary by-pass in the sewer; h) The Contractor shall construct the MH; i) QUU shall remove the temporary by-pass and make good the benching. Where a new sewer is to connect to an existing MH: j) QUU shall construct a stub to the MH and install a temporary plug in the stub; k) The Contractor shall construct a short pipe with an IO from the stub then lay the sewer line away from the stub; l) The Contractor shall concrete encase the IO after completion of testing procedures;

Reference	Amendments to WSA02 - 2002 V2.3
	m) QUU shall remove the temporary plug after completion of the —On Maintenance‖ Testing. As an alternative to this procedure, QUU may provide a temporary internal bypass, which will permit the Contractor to make the new connection to the MH. This alternative is limited to situations where all of the following requirements apply: n) the sewer is 225mm or smaller; o) the incoming sewer is full depth or has an external drop; and p) there are no connections to the MH. Where a new sewer connects to an existing MH at End of Line: q) QUU shall install a temporary plug to seal the outlet, r) The Contractor to remove the end cap/break into the MH and lay away, s) QUU shall remove the temporary plug after completion of the "On Maintenance" Testing
26 **Work As - Constructed Details**	**Amend this clause to read as follows.** Prepare and submit asset as-constructed data and asset manuals to the SEQ-SP in accordance with SEQ Asset Information Specification.

Sewerage Code Drawings – WBBROC Acceptance List

SEQ Drawing Reference	WBBROC
GEN-1100-1 Water Supply, Sewerage, Vacuum Sewerage & Pressure Sewerage Legend	**Approved**
SEW-1100-1 Design Layout Nusewers Typical Locality & Site Plan	**Not Approved**
SEW-1100-2 Design Layout Rigss Typical Locality &Site plan	**Approved** (with changes)
SEW-1101-1 Design Layout Pe Nusewers Typical Longitudinal Sections	**Not Approved**
SEW-1101-2 Design Layout Rigss Typical Longitudinal Sections	**Approved** (with changes)
SEW-1101-3 Sewerage Reticulation Typical Estate Details and Notes	**Approved**
SEW-1102-1 Design Layouts Connection To Existing Sewer Typical Schedule Of Works	**Approved**
SEW-1103-1 Rigss Pipelaying Typical Arrangements	**Approved** (with changes)
SEW-1103-2 Nusewer Pipelaying Typical Arrangements	**Approved** (with changes)
SEW-1104-1 Sewerage House Connection Typical Construction Details Rigss-Sheet1	**Approved** (with changes)
SEW-1104-2 Typical Twin Property Connection Risers	**Approved** (with changes)
SEW-1105-1 Sewerage House Connection Typical Construction Details Rigss-Sheet2	**Not Approved**
SEW-1106-1 Property Connections Typical Layout	**Approved** (with changes)
SEW-1106-2 PE Nusewers Typical Property Connection Type A1, A2 Standard & Extended	**Not Approved**
SEW-1106-3 PE Nusewers Typical Property Connection Type A3, A4 Standard & Extended	**Not Approved**
SEW-1106-4 PE Nusewers Typical Property Connection Type B1 to B4 Sloped Connections	
SEW-1106-5 PE Nusewers Typical Property Connection Type C1 to C4 Vertical Riser	**Not Approved**
SEW-1106-6 PE Nusewers Typical Twin Property Connection Type C1 to C4 Vertical Riser	**Not Approved**
SEW-1106-7 PE Nusewers Typical Twin & Single Property Connections	**Not Approved.**
SEW-1200-1 Soil Classification Guidelines And Allowable Bearing Pressures For Anchors And Thrust Blocks	**Approved**
SEW-1200-2 Embedment & Trench fill Typical Arrangement	**Approved** (with changes)
SEW-1201-1 Typical Standard Embedment Flexible & Rigid Pipes	**Approved**
SEW-1202-1 Typical Special Embedment Inadequate Foundations Requiring Over Excavation &Replacement	
SEW-1203-1 Typical Special Embedment Concrete And Stabilised Supports	
SEW-1204-1 Typical Special Embedment Support Utilising Piles	**Approved** (with changes)
SEW-1205-1 Typical Trench And Bedding Details Within Existing Roads Type 14 To 17	**Approved**
SEW-1206-1 Typical Bulkheads & Trench Stops	
SEW-1207-1 Trench Drainage Typical Systems	
SEW-1207-2 Typical Drainage Of Sewer Trenches And Diversion Drains	
SEW-1300-1 Maintenance Holes < Dn300 Sewer Types P1, P2 & P3 Typical Pre-Cast	**Approved** (with changes)
SEW-1301-1 Cast in-Situ Maintenance Hole Typical Coping & Anchor Bracket Details	
SEW-1301-2 "G"Type-Pe NuSewers Typical Maintenance Hole Details	
SEW-1301-3 "G"Type- Pe NuSewers Typical Maintenance Hole And Slab Details	
SEW-1301-4 "F"Type- Pe NuSewers Typical Maintenance Hole Details	**Not Approved**
SEW-1301-5 "F"Type Pe NuSewer Typical Maintenance Hole And Slab Details	
SEW-1301-6 "X"Type Deep Maintenance Hole Typical Arrangement Sewer<1200	**Not Approved**
SEW-1301-7 "X"Type Deep Maintenance Hole Typical Arrangement Sewer>1200	
SEW-1301-8 "X"Type Deep Maintenance Hole Typical Arrangement Sewer<600 With Drop Pipe	
SEW-1301-9 "X"Type Deep Maintenance Hole Typical Arrangement Sewer 675 To	

SEQ Drawing Reference	WBBROC
0900 With Drop Pipe And Safety Chain Details	
SEW-1301-10 "X"Type Deep Maintenance Hole Typical Junction Details	
SEW-1301-11 "X"Type Deep Maintenance Hole Typical Top Slab Details	
SEW-1301-12 Typical M.S. And S.S. Ladder And Associated Fittings	
SEW-1302-1 Maintenance Holes Cast In-Situ & Precast Typical Pipe Connection Details	Approved
SEW-1303-1 Maintenance Holes Sewers < Dn300 Typical Changes In Level Details	
SEW-1303-2 Iron Inspection Bends For Typical Internal Drop Pipes In Sewerage Manholes	Not Approved
SEW-1303-4 Typical Stainless Steel Bracket For Dn100 And Dn150 Upvc Drop Pipes	
SEW-1304-1 Maintenance Holes Sewers <DN300 Typical Channel Arrangements	
SEW-1305-1 Maintenance Holes Typical Channel Details	Approved
SEW-1306-1 Maintenance Holes Typical Alternative Drop Connections	**Approved** (with changes)
SEW-1307-1 DN1000 to DN1500 Cast In-Situ Maintenance Holes Typical Details	Approved
SEW-1307-2 Sulphide Control Sewer Maintenance Hole-Relined General Arrangement	
SEW-1307-3 Sulphide Control Sewer Maintenance Hole-Relined Details	Not Approved
SEW-1307-4 Sulphide Control Sewer Maintenance Hole-Relined Cut-Ins	
SEW-1308-1 Typical Maintenance Hole Cover & Surround Detail	Approved
SEW-1308-2 Maintenance Hole Cover Sewer-Class b-Concrete In Fill Typical Frame Details	
SEW-1308-3 Maintenance Hole Cover Sewer-Class b-Concrete In Fill Typical Cover Details	Not Approved
SEW-1308-4 Maintenance Hole Cover Sewer-Class b-Concrete In Fill Typical Lifting Hole Details	
SEW-1308-5 Maintenance Hole Cover Sewer-Class b-Bolt Down Typical Frame Details	
SEW-1308-6 Maintenance Hole Cover Sewer-Class b-Bolt Down Typical Cover Details	
SEW-1308-7 Maintenance Hole Cover Sewer-Class b-Bolt Down Typical Cover Details	
SEW-1308-8 Maintenance Hole Cover Sewer-Class b-Bolt Down Typical Base Frame Details	
SEW-1308-9 Maintenance Hole Cover Sewer-Class b-Bolt Down Typical Riser Ring Details	
SEW-1308-10 Maintenance Hole Cover Sewer-Class b-Bolt Down Typical Cover Details	Approved
SEW-1308-11 Maintenance Hole Cover Sewer-Class b-Bolt Down Typical Cover Details	
SEW-1309-1 "Y" Type Maintenance Hole Sewers DN600 & DN750 Typical Arrangement	
SEW-1310-1 "Z1" Type Non-Trafficable Typical Grip MH Option Dn1200 And Larger Sewers	
SEW-1311-1 "Z2" Type Typical Tunnel Jacking Shaft-Caisson Option	
SEW-1312-1 "Z3" Type Typical Tunnel Receival Shaft Manhole Option	
SEW-1313 -1 Maintenance Hole Sewer Connection Details All Pipe Materials	
SEW-1314-1 Maintenance Structures For Dn225 And Smaller Rigss Typical Arrangement Details	Not Approved
SEW-1314-2 Maintenance Shafts Ms And Variable Bend for Rigss Typical Arrangement Details	
SEW-1314-3 Gravity Sewers Rigss Typical In-Line Bend Details	Not Approved
SEW-1315-1 Pe NuSewers Typical Maintenance Shaft And Terminal Entry Point	
SEW-1316-1 Pe NuSewers Typical Maintenance Structure Cover Frame And Support Details	Not Approved
SEW-1400-1 Buried Crossings Typical Siphon Arrangement	Approved
SEW-1401-1 Typical Buried Crossings Railways	**Approved** (with changes)
SEW-1402-1 Typical Buried Crossings Major Roadways	**Approved** (with changes)"
SEW-1403-1 Typical Buried Crossings Bored And Jacked Encasing Pipe Details	Approved

SEQ Drawing Reference	WBBROC
SEW-1404-1 Typical Aerial Crossings Aqueduct	**Approved** (with changes)
SEW-1405-1 Typical Aerial Crossings Aqueduct Protection Grille	**Approved**
SEW-1406-1 Aerial Crossings Typical Bridge Crossing Concepts	
SEW-1407-1 Typical Ventilation Systems Induct Vent	
SEW-1408-1 Water seal Arrangements Typical Mains Type	
SEW-1408-2 Water seal Arrangements Typical Maintenance Hole System	
SEW-1409-1 Standard Overflow Flap Valve Chamber-Type1 Typical Chamber Details	**Not Approved**
SEW-1409-2 Standard Overflow Flap Valve Chamber-Type1 Typical Top Slab And Flap Details	
SEW-1410-1 Standard Overflow Flap Valve Chamber-Type2 Typical Chamber Details	
SEW-1410-2 Standard Overflow Flap Valve Chamber-Type2 Typical Top Slab And Flap Details	
SEW-1411-1 Standard Overflow Flap Valve Chamber-Type3 Typical Chamber Details	
SEW-1411-2 Standard Overflow Flap Valve Chamber-Type3 Typical Top Slab And Flap Details	
SEW-1412-1 Typical Overflow Details From Pump Well Or Manhole Shielded Outlet	**Not Approved**
SEW-1412-2 Typical Overflow Shield Shielded Outlet	
SEW-1413-1 Sewerage Overflow Arrangement Typical Overflow with Screened Outlet	
SEW-1500-1 Insertions And Repair Systems Typical Pipe cut-In methods	**Approved** (with changes)
SEW-1501-1 Insertions And Repair Systems Typical Insertion Of Junctions	
SEW-1502-1 Insertions And Repair Systems Typical Maintenance Structures	

A3 – Sewerage Pump Station Code Addenda

SEQ Amendment to Sewage Pumping Station Code WSA 04-2005 Version 2.1

(including WBBROC amendments (in **BLUE**))

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
Part 0 – Glossary of Terms, Abbreviations and References	
INTRODUCTION (Pages 9 & 10)	**Change the first paragraph of the section labelled "Scope of Code" as follows:** The Sewage Pumping Station Code of Australia covers the planning, design and construction of pumping stations and pressure rising mains up to and including 200 L/s and DN 375, respectively. **Insert the following paragraphs at the end of the first paragraph in the section labelled "Scope of Code":** The South East Queensland Service Providers (SEQ-SPs) have adopted the term 'rising main" rather than pressure main' to describe the pipeline into which each sewage pumping station discharges. These changes are not normally marked in the left margin by the thick vertical black bar used to identify other changes in this part. Hereafter, reference to -Water Agency‖ or the like shall be taken to read as a reference to the individual south east Queensland service provider within whose sewerage network the sewage pumping station and rising main will be designed and constructed. **Change the second paragraph of the section labelled "Scope of Code" as follows:** ….However, where those pumping stations and pressure rising mains are likely to be maintained by the Water Agency or its Contractor, it is recommended that the Sewage Pumping Station Code be adopted as a —deemed-to-comply‖ solution for sanitary drainage systems specified in the Plumbing Code of Australia. **Insert the following paragraphs at the end of the section labelled "Code Purpose":** The SEQ SPS Design & Construction Code sets out the SEQ Amendments required by the SEQ-SPs to -The Sewage Pump Station Code of Australia‖. The SEQ amendments include: • The SEQ-SPs' requirements for specific detail which the Code anticipates each individual SEQ- SP will address, and • Additions, deletions and variations to the Code where the Code's requirements are not compatible with each SEQ-SP's current requirements (due to local practice, climate, geographic and topographic conditions and statutory requirements, etc.) or where the Code is otherwise silent. Any reference to the Sewage Pump Station Code of Australia (—the Code‖) shall be deemed to refer to the SEQ Design & Construction Code which contains the SEQ Amendments. The Code specifies mandatory requirements for the design and construction of Sewage Pump Stations that are to become the responsibility of the SEQ-SPs. Each SEQ-SP reserves the right to specify or approve other design and/or construction requirements for particular projects and/or developments. Before commencement of any construction, approval from the SEQ-SPs shall be obtained to any design and/or installation that does not comply with the SEQ-SP's Code.
	Insert after "MANDATORY AND INFORMATIVE" clause. **Drawings and Figures** Drawing references are added throughout the Code. In the event of a clash between the individual drawings and the figures in the Code – the details shown on the individual standard drawings take precedence.

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	Insert the following after "Proposed Amendments" clause. Conditions of Supply of the SEQ Design and Construction Code The SEQ Design & Construction Code is supplied subject to the following understandings and conditions: • The SEQ Design & Construction Code is copyright and apart from any use as permitted under the Copyright Act 1968, no parts of the documents, no parts of the documents may be sold, reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior permission in writing of one of the SEQ-SPs. • The SEQ Design & Construction Code is intended for use in connection with SEQ-SPs' related projects only. • The SEQ-SPs do not warrant the applicability of SEQ Design & Construction Code to climatic conditions, topography, soil types, water and sewage characteristics and other local conditions and factors that may be encountered outside of the SEQ-SPs' area of operations. • The holder of the SEQ Design & Construction Code acknowledges that it may contain errors and/or omissions. • The SEQ-SPs accept no responsibility for any works or parts thereof which may contain design and/or construction defects due to errors or omissions in any part of a SEQ Design & Construction Code which has not been prepared or formatted by the SEQ-SPs. • The SEQ-SPs accept no responsibility for the incorrect application of the SEQ Design & Construction Code by the holder or any other party.
I GLOSSARY OF TERMS	**Add the following definition in alphabetical order:** -**SEQ Design & Construction Code** means the SEQ Design and Construction Code which is required by legislation and which is an instrument: • made jointly by the SEQ-SPs; and • that provides for technical standards relating to the design and construction of water infrastructure in the SEQ region —**SEQ-SP Supplementary Specifications** means - Nominated National Codes which may incorporate specific SEQ SP requirements for design and construction of infrastructure and the manufacture and supply of associated products and materials, and other documents including supplements to National Codes prepared and published or adopted by SEQ SP from time to time which further set out such requirements -**Water Agency** means an authority, board, business, corporation, council or local government body with the responsibility for planning or defining planning requirements, for defining and authorising design requirements, for defining and authorising construction requirements and for operating and maintaining or defining operation and maintenance requirements for a water supply and/or sewerage system or systems **Package Pump Stations**: Proprietary Package Pump Stations are not acceptable. Alternative fully integrated pump stations that are consistent in all respects with the technical requirements of the water service provider may be considered at the discretion of the relevant water service provider.
II ABBREVIATIONS	**Add the following definition in alphabetical order:** —ADAC‖ means -Asset Design as Constructed‖ —FAT‖ means –factory acceptance test‖ —N‖ means —Newton‖ (in context) —SAT‖ means -site acceptance test‖ —SEQ-SP‖ means —The south east Queensland (water) service providers‖ **The following changes were made in the abbreviations schedule:** —pressure main‖ replaced with —rising main‖

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	—kohms replaced with—kΩ -Moms replaced with –MΩ
III REFERENCED DOCUMENTS	**The following standards shall be referenced by the Code:.**

AS 4373	Pruning of Amenity Trees
	The following shall apply to preparation of drawings:
AS 1100	Technical Drawings
AS 1102	Graphical Symbols for Electrotechnology
The following shall apply to materials and equipment which is specified or otherwise required for the work:	
AS 1012	Methods of Testing Concrete
AS 1012.1	Methods for Sampling Fresh Concrete
AS 1012.3	Methods for the Determination of Properties Related to the Consistency of Concrete
AS 1012.4	Methods for the Determination of Air Content of Freshly Mixed Concrete
AS 1012.8	Method for Making and Curing Concrete Compression, Indirect Tensile and Flexure Test Specimens in the Laboratory or in the Field
AS 1012.9	Method for the Determination of the Compressive Strength of Concrete Specimens
AS 1012.13	Determination of the drying shrinkage of concrete for samples in the field or in the laboratory
AS 1111.2	Product Grade C - Screws
AS 1141	Methods for Sampling and Testing Aggregates (Set)
AS 1444	Wrought Alloy Steels - Standard and Hardenability [H] Series and Hardened and Tampered to Designated mechanical Properties
AS 1478	Chemical Admixtures for Use in Concrete, Mortar and Grout – Admixtures for Concrete
AS 1554.3	Structural Steel Welding - Welding of reinforcing steel
AS 1627	Metal Finishing - Preparation and Pre-treatment of Surfaces
AS 1627.1	Cleaning Using Liquid Solvents and Alkaline Solutions
AS1627.9	Pictorial Surface Preparation Standards for Painting Steel Surfaces
AS 1646.1	Elastomeric Seals for Waterworks Purposes – General Requirements
AS 1657	Fixed Platforms, Walkways, Stairways and Ladders - Design, Construction and Installation
AS 1796	Certification of Welders and Welding Supervisors
AS1830 31	Grey Cast Iron
AS 2053.1	Conduits and fittings for electrical installations – General Requirements
AS 2074	Steel Castings
AS 2312	Guide to the Protection of Iron & Steel against Exterior Atmospheric Corrosion
AS 2544	Grey Iron Pressure Fittings
AS 2758	Aggregates and Rock for Engineering Purposes
AS 2758.1	Concrete Aggregates
AS 2837	Wrought Alloy Steels - Stainless Steel bars and Semi-Finished Products
AS 3578	Cast Iron Non-return Valves for General Purposes
AS 3582 (Set)	Supplementary cementitious materials for use with Portland and Blended Cement
AS 3583	Methods of test for supplementary cementitious materials for use with Portland and Blended Cement
AS 3972	Portland and Blended Cements
AS/NZS 4158	Polymeric Coatings on Valves and Fittings for Water Industry Purposes - Thermal-bonded Coatings
AS/NZS 4671	Steel Reinforcing Materials
AS 6401	Knifegate Valves for Waterworks Purposes
The following shall apply to testing and reporting:	
AS 1055	Acoustics - Description and Measurement of Environment Noise
AS 1081	Acoustics - Measurement of Airborne Noise Emitted by rotating Electrical Machinery
AS 1217	Acoustics - Determination of Sound Power Levels of Noise Sources
AS/IEC 61672	Electroacoustics - Sound Level Metres
AS 1686	Metric Units for Use in Water Supply, Sewerage and Drainage (Including Plumbing)
AS 2417	Rotodynamic Pumps – Hydraulic Performance acceptance Tests – Grades 1 and 2

Part 1 – Planning and Design	Amendments to Sewage Pump Station WSA04-2005 V2.1
NOTE	**General comment "pressure main" replaced with "rising main" throughout this part, not normally marked in the left margin by the thick vertical black bar used to identify other changes in this part**
PREFACE	**Add the following paragraphs:** Reference to -Water Agency‖ or the like shall be taken to read as a reference to the individual south east Queensland service provider within whose sewerage network the sewage pumping station and rising main will be designed and constructed.

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	Any reference to the Sewage Pump Station Code of Australia (—the Codell) shall be deemed to refer to the SEQ Design & Construction Code which contains the SEQ Amendments. The Code specifies mandatory requirements for the design and construction of Sewage Pump Stations that are to become the responsibility of the SEQ-SPs. Each SEQ-SP reserves the right to specify or approve other design and/or construction requirements for particular projects and/or developments. Before commencement of any construction, approval from the SEQ-SPs shall be obtained to any design and/or installation that does not comply with the SEQ-SP's Code.
1.2.2 Pumping Alternatives	**Insert the following as non italic in second last paragraph:** A Planning Report that has anaylyzed all of the options in detail is required to be submitted to the relevant SEQ-SP. The Planning Report shall include the life cycle cost of all options that have been analyzed. The process for acceptance of the planning report will be in accordance with Clause 2.5.
1.5.2 Planning responsibilities	**Delete all informative text after the word** Unless otherwise agreed…….
1.5.3 Design Responsibilities	**In addition to the provided Mandatory and Informative clauses, the following requirements shall be added as:** **Add the following to paragraph 2:** The designers must engage with the water service providers in the development and design of all Pump Stations. **Add new items under the paragraph relating to Designers responsibilities:** d) Any SEQ-SP may require, at the cost of the Developer, the input of an independent Consultant to represent the Service Provider in the design review, supervision and construction processes associated with sewage pump stations. ~~The following table sets out the typical layouts for each SPS for each Service Provider in SEQ covered by this code:~~ **Add the following to the end of (iii), new Item (H) and (I) as follows:** (H) rising main design to match construction technique (e.g. HDD); and (I) standby generator supply for the SPS versus overflow storage options. **Add new item (vii) as follows:** the designer must establish the structural design of wet wells and MH's that suit the ground conditions and constructability. E.g. caisson construction, contiguous piled excavation or open cut excavation and cast insitu construction. Remove SEQ Table of Drawing prefernces. WBBRIC drawing prefernces are identified on the Drawing Acceptance list and on the drawings themselves.
1.6.3 Objectives of the system design	**Change item (f) as follows:** Sufficient hydraulic capacity to service and depth to control the full catchment… **Extend item (i) as follows:** …. retention of the peak design sewage flow within the system in accordance with the Water Service providers requirements. **Insert the following after item (o):** (p) Telemetry as per SEQ-SP's requirements (q) Back-up level control system that operates when the primary level control system fails; ~~and~~ (r) Odour management measures where required.; and (s) Operations and Maintenance manuals covering the scope and structure prescribed in the SEQ

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	Asset information Specification
1.6.4 Design output	**Amend item (a) by inserting the following after "pumping station detail":** ….. including a functional description specification and P&I diagram/s, in accordance with the Water Service Providers requirements **Insert the following additional sentence at the end of this clause:** Any variations shall be highlighted in a boxed note on the design drawings.
2.1 LIFE CYCLE CONSIDERATIONS	**Delete the reference to package pump stations as follows:** ~~Package pumping stations should also be considered when determining the optimal solution.~~ **Add additional item (f) as follows:** (f) layout design and functionality in accordance with the relevant standard drawings.
2.2 FUNCTIONALITY	**Amend items (a) and (b) as follows:** (a) Efficiently deliver sewage from a defined catchment to an appropriate receiving system via a discharge manhole with appropriate odour management. (b) Achieve pump station design parameters as set out in the SEQ D&C design guidelines.
2.3 MAINTAINABILITY	**Insertion the following as item (f):** (f) Provision for double isolation for all liquid carrying pipeline connections.
2.4 RELIABILITY	**Amend item (b) as follows:** ….. e.g. provision for emergency/standby generator supply, emergency storage or a second electrical supply
2.5 DUE DILIGENCE REQUIREMENTS	**Add the following after the 5th paragraph on EIA requirements:** The requirements set out in —Code of environmental compliance ERA 63—Sewage treatment activities shall be mandatory. Please refer to the —Department of Environment and Heritage Protection (EHP) website www.ehg.qld.gov.au. The odour and noise impacts associated within the pumping system and within the receiving sewerage system shall be assessed to the requirements of ERA63. A design submission for the pumping infrastructure and the receiving system shall be accompanied by the Odour Impact Assessment Report. **Add the following to the end of the line starting "Reliable and proven equipment shall be…..":** …. and in accordance with the relevant SEQ-SP's requirements
2.7 STAGING	**Add the following requirement to the end of the clause:** The system shall operate effectively when only a minimal number of properties are connected. This requirement needs to be particularly focused on by the Developer in new subdivisions, where development may take some time to reach the critical numbers the system was designed for. Septicity should be a key consideration as per Clause 2.8.
2.8 SEPTICITY CONTROL	**Add the following mandatory statement after item i)** All sewage pumping systems produce septic sewage to varying degrees during the diurnal curve of flows. The —septicityll of the system shall be managed by application of Clause 2.9.
2.9 ODOUR MANAGEMENT	**Relabel the section from "Odour Control" to "Odour** **Management" Add the following new mandatory paragraph to** **the end of this clause:** The Odour Impact Assessment Report discussed in Clause 2.5 herein shall address the odour impacts at the air discharge of the vent poles of the SPS and at the rising main discharge point to the downstream gravity network, and gas release valve arrangements.
2.10 NOISE CONTROL	**Add the following to the end of this clause:**

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	As directed by the SEQ-SP, the Designer shall undertake noise studies to: • determine background noise levels, • identify sensitive receivers, including consideration of future development, • estimate expected noise levels from the pumping station, • ensure that the pumping station location and design includes appropriate measures to mitigate any potential noise issues. Mitigation measures may include: • use of silenced plant and equipment, • house all plant and equipment in acoustic enclosures as far as practicable, • physically separate the noise sources and the sensitive receivers (both existing and planned) as far as practicable, • position all openings (e.g. ventilation intake/exhaust) away from sensitive receivers, • use acoustic louvers on ventilation openings, • schedule construction works such that usage occurrences and usage times of noisy equipment are minimised.
2.12 ACCESS	**Add the following sentence to this paragraph:** Unless agreed otherwise with the relevant SEQ-SP, all access roads shall have the same flood immunity criteria as required for the connecting road network.
2.13 SECURITY	**Add the following sentence to this clause:** The Australian Standard for security fencing is AS1725.1 and provides the minimum requirements.
2.15 SUPPORTING SYSTEMS	**Amend item (C) as follows:** (a) Fire detection, monitoring and fighting as per building code requirements.
2.17 COMMISSIONING PLAN	**Add after item (f) sub-item (v), a new sub-item (vi) as follows:** (vi) P and I diagram/s. **Add a new item (g) as follows:** (g) Where staged provision of the pumping system is proposed to be undertaken, a separate Commissioning Plan shall be provided for each stage extension.
2.17.2 Pre-commissioning	**Add the following to the end of item (f):** SEQ -SP Specific Factory Acceptance Tests (FATs) , Pre Site Acceptance Tests and Site Acceptance Tests (SATs)
2.17.3 Commissioning	**Add the following as the last paragraph in this clause:** After commissioning, the Designers shall provide a fully marked up as performed Commissioning Plan with any changes clearly identified with red font or strikethrough.
3.1 GENERAL	**Add the following Mandatory sub-clause:** All rising mains and gravity mains shall be shown in adequate detail and for their complete length on Longitudinal Sections in addition to Plan views and specific Detail Plans and Sections. All corridors shall be cleared, easements provided (if unavoidable), and above ground marking of the corridor (refer Clause 30.6) is required.
3.3 LEVELS	**Add the following Mandatory sub-clause:** Maintaining the levels of the pipelines is critical to successful lifetime operation (refer Part 3 Construction to ensure that levels are maintained for the life of the network).
3.7 EASEMENTS	**Change first sentence of this clause form advisory to mandatory:** **Add the following Mandatory sub-clauses:** Rising mains are not permitted within an allotment for new development unless approved by the

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	relevant SEQ - SP. Rising mains shall not be located in easements to achieve capital cost minimisation where satisfactory routes in road reserves are available and viable, as this adversely affects the relevant SEQ SP's access and ongoing maintenance requirements. Easements shall be a minimum of 6m wide. Easements shall not be shared with power, gas and telecommunications unless the service is related to the pump station or associated infrastructure such as odour management. All pumping stations, lift stations, storage tanks etc. (including all pump station appurtenances including collection/grit manhole, switchboard/RTU and valve chamber, odour management components, etc.) shall be located on land that, at the time of commissioning is owned by the relevant SEQ SP. This land shall be provided at no cost to the relevant SEQ SP as freehold and appropriately **titled** The Developer (or it's Designer) shall confirm easement and property ownership requirements and produce SP plans as required for lodgement with DEWS.
3.8 CROSSINGS, 3.8.1 General	**First sentence to be mandatory (i.e. as per WSAA** **Code)** **Insert new sentence at the end of the first** **paragraph:** *All pipeline crossings shall be designed and constructed in accordance with the (separate) SEQ Water Supply Code and SEQ Sewer Code.*
3.10 AC VOLTAGE MITIGATION OF METALLIC PIPELINES	**Add the following sentence at the end of the first paragraph:** In accordance with recommendations in Appendix H AS/NZS 4853, no HV earths or bare copper should be installed within 3 m of a metallic pipeline. **Add as the final paragraph in this clause:** Work around existing water mains shall be undertaken in accordance with the provisions of Section 5.1.3 of the SEQ Water Supply Code.
3.11.1 Obstructions And Clearances, General	**Amend the first sentence as follows:** Alter the phrase –...determined and shown on the Design Drawings.to –...determined by potholing and shown on the Design Drawings.
3.11.4.2 Clearance requirements	**Add the following sentences after the first paragraph:** All rising mains shall be located with sufficient clearance to structures to allow for maintenance and operation activities and provide protection against damage from pipeline bursts. Where practicable, SEQ- SPs'preferred clearances as shown in Table 3.1 shall be maintained.
TABLE 3.1	**Replace the contents of Table 3.1 with the following:**

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1

Utility (Existing or proposed)	Minimum horizontal clearance mm		Minimum vertical clearance[1] mm
	New sewer size NB		
	≤ 200mm	> 200mm	
Water mains ≤ 375 mm	1000[5]/600	1000[5]/600	500[4]
Water mains > 375 mm	1000[5]/600	1000[5]/600	500[4]
Gravity sewers ≤ 300 mm	500	600	300
Gravity sewers > 300 mm	600	600	300
Sewers – pressure	500	600	500
Sewers – vacuum		600	500
Gas mains		600	500[4]
Telecommunication conduits and cables		600	500
Electricity conduits and cables	500	1000	500[4]
Stormwater drains ≤ 300 mm	500	600	300
Stormwater drains > 300 mm		600	300[4]
Kerbs	150	600[6]	150 (where possible)

Notes

1. Vertical clearances apply when ~~pressure~~ rising mains cross other utility services, except in the case of water mains when a vertical separation shall always be maintained, even when the ~~pressure~~ rising main and water main are parallel. *The pressure rising main should always be located below the water main to minimize the possibility of backflow contamination in the event of a ~~pressure~~ rising main break.*
2. *Clearances can be further reduced to 150 mm for distances up to 2 m when passing installations such as poles, pits and small structures, providing the structure is not destabilised in the process.*
3. *Rising mains should always cross over sewers and stormwater drains.*
4. When the sewer is at the minimum vertical clearance below the rising main (500 mm), maintain a minimum horizontal clearance of 1000 mm. *This minimum horizontal clearance can be progressively reduced to 600 mm as the vertical clearance is increased to 750 mm.*
5. Clearance from kerbs shall be measured from the nearest point of the kerb. *For ~~pressure~~* rising *mains ≤DN 375 clearances from kerbs can be progressively reduced until the minimum of 150 mm is reached for mains ≤DN 200 mm.*

3.11.6 Deviation of rising mains around structures	**Insert new paragraph as follows:** Bending of pipes is not permissible by WBBROC
3.12 Disused or Redundant	GRC requires all AC sewers to be removed from site in accordance with ~~SEQ-SPs~~ Councils requirements and all relevant safety requirements. For all other Councils, removal of AC sewers will be at the service providers discretion. For all other pipe materials, disused sewers are to be either removed, grout filled or plugged as advised by the relevant SEQ-SP. Disused sewer maintenance holes are to be removed or demolished in situ as advised by the relevant SEQ-SP.

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
4.2.2 Concrete surfaces	**Add the following sentences to the end of this clause:** Protective coatings shall be provided for all of the internal concrete surfaces of each pumping station, receiving maintenance holes and discharge maintenance hole in accordance with the relevant SEQ-SP's requirements. External surfaces of all structures (particularly the wet well) which are located in aggressive soils (including Acid Sulphate Soils) shall be assessed for the purposes of corrosion management.
4.2.3 Metallic materials	**After the first paragraph as follows:** Ductile iron valves and rising main bends and fittings shall be provided with a coating that complies with AS/NZS4158. In soils subject to electrical conductivity, ductile iron pipes shall be validated by the pipe supplier or a specialist corrosion consultant for their suitability.
4.2.4 Miscellaneous items	**Add to the end of this clause:** or equivalent **Insert the following as the second sentence in this clause:** Dissimilar metals shall be effectively insulated to prevent corrosion.
4.2.5 Corrosion protection against aggressive environments	**Change the reference to:** Refer to Clause 4.8.2 of WSA 03.
4.2.6 Cathodic protection	**Change the reference to:** Refer to Clause 4.8.5 of WSA 03.
4.2.7 Stray current corrosion	**Change the reference to:** Refer to Clause 4.8.6.4 of WSA 03.
4.2.8 Protection against contaminated ground	**Change the reference to:** Refer to Clause 4.8.2 of WSA 03.
5 .PUMPING STATION DESIGN **5.1 INTRODUCTION**	~~**After Reference Drawings: delete WSA drawing references and add**~~ ~~The following table sets out the typical layouts for each SPS for each Service Provider in SEQ covered by this code:~~
5.2.1 Site selection	**Change paragraph 1 as follows to delete items (3) to (7):** (1) Water Agency owned land. (2) Council land. ~~(3) Vacant Crown land.~~ ~~(4) Road reserve.~~ ~~(5) Vacant private property.~~ ~~(6) Developed Crown land.~~ ~~(7) Developed private property.~~ **Change the start of paragraph 2 as follows:** Change "In difficult ground conditions…" to "–In all ground conditions…" **Change item (c) as follows:**

<table>
<tr><th>Reference</th><th>Amendments to Sewage Pump Station WSA04-2005 V2.1</th></tr>
<tr><td></td><td>(c) Buoyancy Effects: Written and RPEQ checked calculations shall be provided to the relevant SEQ- SP with regard to flotation. The design factor of safety shall be 1.15 for the structure only with no allowance for the converter/top slab.</td></tr>
<tr><td>5.2.3 Location and Layout</td><td>Change the last paragraph and amend as follows:

Where the pumping station is to be built in a flood prone area:
The top slab of the wet-well should be at least 100 mm (see drawings for freeboard dimensions) above the 1 in 100-year flood level and 500 mm above the estimated maximum ground water table.
The power and control cubicle shall be at least 100 mm above the 1 in 100 year flood level.
Flood immunity for access roadways and parking areas shall be the same as the requirements for the road that the access is connected to ~~trafficable in all weathers~~ (Refer to Standard Drawing SEQ-SPS-1205).
~~These requirements do not apply to existing pumping stations that may be being upgraded.~~ Please

refer to the Due Diligence requirements of ERA63 set out in clause 2.5 Due Diligence.</td></tr>
<tr><td>5.2.4 Site area</td><td>Amend item (a) as follows:

(a) Odour management vent or…

Amend item (f) as follows:

(f) An on-site or mobile emergency generator…

Insert the following paragraphs and table at the end of this clause:

The size of the parcel of land provided shall be large enough to accommodate the infrastructure and its appurtenances, provide for maintenance and for the access and egress of vehicles large enough to maintain the infrastructure, and to satisfy the requirements for the Development Approval. The site area shall be a minimum of 20m x 20m

In respect of sewage pumping stations without superstructures or emergency generators, the following minimum clearances shall apply between infrastructure and any lot or road reserve boundary.

<table>
<tr><th>Bordering</th><th>Pumping Station</th><th>Lift Station</th><th>Appurtenances</th></tr>
<tr><td></td><td colspan="3">Minimum Clearance (m)</td></tr>
<tr><td>Arterial and Collector Roads</td><td>5.0</td><td>3.0</td><td>2.0m</td></tr>
<tr><td>Access and Minor Collector Streets</td><td>3.0</td><td>3.0</td><td>2.0m</td></tr>
<tr><td>Property Boundaries</td><td>~~3.0~~ 30</td><td>~~2.0~~ 30</td><td>1.5m</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>
All land (including access roads) to be provided as freehold title.</td></tr>
<tr><td>5.2.6 Landscaping</td><td>Add the following paragraph to the end of this clause:

Landscaping works require an Operational Works approval. A Landscaping Plan prepared by a landscape consultant shall be provided to the relevant SEQ-SP's satisfaction.</td></tr>
<tr><td>5.3.1 Location</td><td>Add the following line:

Where a collector~~/grit collector~~ manhole is used it shall be as per drawing WBB-SPS-1400-1.</td></tr>
<tr><td>5.3.2 Design</td><td>Replace item (d) with the following:

(d) Overflow monitoring/telemetry equipment where required by the relevant SP.

Replace Reference: Standard Drawings: with</td></tr>
</table>

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	WBB-SEW-SPS–1300 Series –from 1300-1, to 1316-1. Please refer to notes on applicability of drawings to each -SP's service area SPS–1301, SPS–1302, SPS–1303 and SPS–1304.
5.4.3 Pumping control volume and pump starts	**Change the second sentence to read:** The volume shall be calculated in accordance with the SEQ Water and Sewerage Design Guidelines (as amended).
5.4.5 – Detention Time	**Amend this clause as follows:** The detention time of sewage in the rising main shall be calculated in accordance with Clause D3.2. Unless provision is made for treating the sewage in the pressure rising main (Refer to Clause 10.10), the time sewage is detained in the wet-well and pressure rising main shall be limited to 2 hours. ~~Where the calculated detention time is more than 2 hours, measures to mitigate septicity arising from excessive detention time shall be employed (Refer to Clause 10.10). Measures to minimize the generation of H2S shall also be incorporated~~
5.5.1 Natural ventilation	**Change paragraph 3 to read as follows:** Ventilation of the wet well shall be provided in accordance with the Odour Impact Assessment Report. Induct vents are not required **Change the remainder of the clause to be informative only.**
5.6.2.2 Emergency Storage - Configurations	**Insert the following as the first paragraph:** Storage configurations to be discussed and agreed with the relevant Water Service Provider
5.8 – Wet Well Access Covers	**Delete reference to Standard Drawings (Access Covers to be addressed in APAM listing)** ~~Reference: Standard Drawings SPS–1304, SPS–1506 and SPS–1507.~~
5.9 SAFETY SYSTEMS	**Add the following to the end of this clause:** Where parts of a sewage pumping station involve confined space entry requirements, provision shall be made for safety equipment attachment points in accordance with AS 2865. The specific requirement shall be as agreed with the relevant SEQ SP.
5.10 – Grit Collectors **5.11 – Screens** **5.12- Mixers**	**Delete the clauses. WBBROC agencies do not use grit removal, screens or mixers (**unless specified separately by a water service provider).
6. PUMPING SYSTEM	**This clause shall apply in conjunction with the following SEQ-SP Supplementary Specifications whose requirements will supersede any identified conflicting requirement with this WSA code. Any conflicting requirement shall be communicated to the SEQ-SP for resolution.** **The Supplementary Specifications are:** This clause shall apply in conjunction with the following SEQ-SP Supplementary Specifications whose requirements will supersede any identified conflicting requirement with this WSA code. Any conflicting requirement shall be communicated to the SEQ-SP for resolution. ~~The Supplementary Specifications are: **GCW:**~~ ~~• GCW SUPPLEMENTARY ELECTRICAL & MECHANICAL SPECIFICATION **QUU:**~~ ~~• SSM001 Metal Clad Switchboards and Enclosures~~ ~~• SSM002 Electrical and Instrument Installation **UNITYWATER:**~~ ~~• Specification for Electrical Installations at Sewage Pumping Stations~~ ~~• MECHANICAL Specification **Logan Water:**~~

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	~~Redland Water:~~ **Supplementary Electrical and Mechanical Specifications will be provided by the relevant WBBROC Water Service Provider on request.**
6.1 STAGING	**Add the following to paragraph 2:** VSDs may be an acceptable alternative subject to the approval of the relevant SEQ-SP.
6.4 PUMP SELECTION	**Add the following to the end of the first sentence of the second paragraph:** …. shall extend to intersect all system curves and shall be in a format consistent with drawings WBB-SPS- 1100 series as required in the design submission.
6.6.1 General	**Delete all of paragraph 2 as follows:** ~~Where the total hydraulic head to be overcome is greater than the capacity of a single submersible pump, two such pumps of the same capacity may be installed in series. The first pump is usually installed in the wet-well in the normal way, with the second pump being located in a separate chamber beside the wet-well and above the normal top water~~ level.
6.6.3 Motor Selection	**Change item (f) to read as follows:** (f) have a power rating 10% above the shaft power at the duty point; and **Add a new item (h) as follows:** (h) be fitted with one PTC semiconductor type temperature sensing device in each phase; **Insert the following sentence after item (g):** The stated voltage shall be consistent with the latest standard.
6.6.4 Standard discharge connection	**Amend the second paragraph to read as follows:** Refer to WBB-SPS-1300 series inclusive for details of a pump set connection system that enables removal and maintenance of pump set and ancillary items without the need to enter the wet-well.
6.6.5 Junction boxes	**Clause shall be amended as follows:** 6.6.5 Motor cable disconnection box All motor cables shall terminate in the motor starter cabinet. Where a motor cable length of greater than the standard 15 m is required approval for an alternative option shall be sought from the water service provider to suit the installation. ~~(unless noted otherwise), disconnection box for external use or a junction box for internal use shall be provided to enable an additional length of cable to connect to the motor starter. A disconnection box can include:~~ ~~• De-contactors~~ ~~• Links~~ ~~• Studs~~ ~~• Full load isolator~~ ~~Each disconnection box shall be provided in accordance with the requirements of the SEQ SP. Attachments shall be fitted to hold the cables so that the box does not support the cable weight. If boxes are located in the dry well, they must be above the overflow level. All boxes shall be IP56 and shall be Grade 316 SS including all door hardware, fixings and fasteners.~~
6.6.6 Pump set lifting equipment	**Add the following to the end of paragraph 1:** Pump lifting equipment shall be included in relevant drawings.
6.8.1 General	**Change pump size reference from 5.5 kW to 4.0kW in the first and third sentence** **Change reference from "autotransformers" to "variable speed** **drives"**

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	Change the line at the bottom of the clause from informative to mandatory: Arrangements shall be confirmed with the relevant SEQ–SP.
6.8.2 Single and double speed starters	**Change clause title to read as follows:** 6.8.2- Motor starters **Delete item (f) from this clause, the reference has been moved to item (h) in Clause 6.6.3:**
6.8.3 Soft starters	**Change item (b) as follows:** (b) be by-passed using suitably rated internal or external bypass contactors after ramp-up; **Insert new items (f) and (g) as follows:** ~~(f) shall be capable of providing communications links in accordance with the requirements of the relevant SEQ-SP; and~~ (g) shall provide appropriate overload and fault protection including for a locked rotor condition.
6.8.4 Variable speed drives	**Reinstate paragraph 1 as follows:** Variable speed drives are not normally used in submersible type stations and their use should be limited to situations where hydraulic control is required for particular pumping situations e.g. pumping directly to sewage treatment plants or where their application significantly improves the cost of pumping. **Amend item (e) as follows:** (e) provide appropriate overload and fault protection including for a locked rotor condition; **Insert new item f) as follows:** (f) have a harmonics profile acceptable to the SEQ SP's electricity supply company i.e. the total harmonic voltage distortion at the PCC during start shall be within the electricity supply company's prescribed limits;
7 POWER SYSTEM	This clause shall apply in conjunction with the following SEQ-SP Supplementary Specifications and drawings whose requirements will supersede any identified conflicting requirement with this WSA code. Any conflicting requirement shall be communicated to the SEQ-SP for resolution. A power system analysis report for the installation shall be provided to the WSPs satisfaction ~~**The Supplementary Specifications are:**~~ ~~**GCW:**~~ ~~• GCW SUPPLEMENTARY ELECTRICAL & MECHANICAL SPECIFICATION~~ ~~**QUU:**~~ ~~• SSM001 Metal Clad Switchboards and Enclosures~~ ~~• SSM002 Electrical and Instrument Installation~~ ~~**UNITYWATER:**~~ ~~• Specification for Electrical Installations at Sewage Pumping Stations~~ ~~• MECHANICAL~~ ~~Specification **Logan Water:**~~ ~~**Redland Water:**~~ **Supplementary Electrical and Mechanical Specifications will be provided by the relevant**

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	WBBROC Water Service Provider on request
7.2.2 Security of Supply	**Change paragraph 1 from informative to** **normative Change paragraph 3 as follows:** After the phrase …duplicate power supply from the electricity supply company…..‖ **insert the words** —….or a permanent on-site generator…. The minimum size of the generator shall be determined from the power system analysis report to comply with AS 3000 Cl 1.5.5.3.
7.2.6 On-site generator	**Insert the following as the first paragraph in this clause:** Unless advised otherwise by the relevant SEQ-SP, onsite emergency or standby generators shall be sized to start all of the duty pump(s). Generators shall be provided with load bank to avoid engine glazing if they run continuously at less than 30% capacity. **Replace the last sentence of the clause with the following:** Where external fuel storage is available on site, bunding complying with Australian Standards and local regulations shall be provided to contain potential spills, e.g. diesel.
7.2.7 Mobile generator	**Insert as the first paragraph in this clause:** Unless advised otherwise by the relevant SEQ-SP, mobile generators are to be sized for the duty pump(s). An appropriate pad shall be provided on site for portable generators as required by the relevant SEQ-SP. Provision for "plug in" connection to be incorporated at each site.
7.3.2.4 Degree of protection	**Change the first sentence of the clause as follows:** Indoor low voltage switchboards shall have a degree of IP ~~protection~~ rating in accordance with the requirements of the relevant SEQ-SP for each type of compartment. **Replace the last sentence of the clause with the following:** The external surfaces on outdoor low voltage switchboards shall be sun shielded and painted in accordance with the requirements of the relevant SEQ-SP.
7.3.4 Lighting	**Change the first sentence to remove the word "fluorescent". This paragraph should read:** Lighting shall be specified…. **Add the following sentence after paragraph 2:** Explosion and corrosion proof lighting shall be provided for wet wells where required by the relevant SEQ- SP.
7.11.1 – Wet Weather Storage General	**Additional advisory text to be added as follows:** ***"No additional wet weather storage is required as a general rule. Where wet weather storage requirements can't be satisfied by in system storage, the issues are to be raised with the relevant Water Services Provider for resolution."***
8. CONTROL AND TELEMETRY SYSTEM	**This clause shall apply in conjunction with the following SEQ-SP Supplementary Specifications and drawings whose requirements will supersede any identified conflicting requirement with this WSA code. Any conflicting requirement shall be communicated to the SEQ-SP for resolution.** ~~**The Supplementary Specifications are:**~~ ~~**GCW:**~~ ~~• GCW SUPPLEMENTARY ELECTRICAL & MECHANICAL SPECIFICATION~~ ~~**QUU:**~~ ~~• SSM001 Metal Clad Switchboards and Enclosures~~ ~~• SSM002 Electrical and Instrument Installation~~ ~~**UNITYWATER:**~~ ~~• Specification for Electrical Installations at Sewage Pumping Stations~~

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	~~• MECHANICAL~~ ~~Specification **Logan Water:**~~ ~~**Redland Water:**~~ **Supplementary Electrical and Mechanical Specifications will be provided by the relevant WBBROC Water Service Provider on request**
8.1 GENERAL	**Change the second last sentence to read as follows:** The telemetry system shall be capable of connection to the relevant SEQ SP's SCADA system.
8.2 OPERATING LEVELS AND SETTINGS	**Change the first two bullet points to paragraphs and renumber the remaining bullet points. Add the word "level" to renumbered items (c) and (d).**
8.3.1 Control design	**Change the last first line of paragraph 4 as follows:** In a pump station equipped with two pumps (i.e. one duty pump and one standby pump) an interlock shall be provided to prevent both pumps from starting simultaneously, on both automatic and manual control. In a pump station equipped with multiple pumps (i.e. duty pump, duty assist pump and one standby pump) an interlock shall be provided to prevent all pumps from starting simultaneously, on both automatic and manual control. However, the level controller should allow two (2) pumps to run where required
8.5.2 Reliability	**Add the following sentence after the first paragraph:** For critical sites, backup telecommunications facilities may be required by the relevant SEQ-SP.
8.8.2 -8.8.16	**Clauses not used by BRC. Refer to separate BRC specification**
8.8.3 Flowmeter cabling	**Insert the following** **All field mounted analogue signal cabling shall be provided with over voltage surge protection devices**
8.8.6 Float-switch	**Change the clause title to read:** 8.8.6 Conductivity level probe **Replace references to "digital float switch" in paragraphs 1 and 2 with** "approved conductivity level probe. Failsafe probes will be specified as required."
8.8.10 Contactors	**Reinstate item (h)**
9.2.1 Isolating valves	**Amend item (a) as follows:** **(a) Valve performance options ~~e.g. clockwise versus anticlockwise closing.~~** shall be as follows: • BRC, GRC and SBRC only accept valves with anti-clockwise close for sewer • FCRC and NBRC only accept valves with clockwise close for sewer **Insert as a separate paragraph (paragraph 5):** In specific circumstances, the relevant SEQ SP may require additional sluice valves for operational requirements.
9.2.4 Sewage air-release valves	**Insert the following at the beginning of clause:** For all installations, gas air management facilities shall be provided as required by the relevant SEQ-SP. Refer to Standard Drawings WBB-SPS-1606-1 **Change the remainder of text to be informative**
9.3.1 Valve Chamber, General	**Remove all text down to "… valve chambers shall be provided with adequate**

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	clearance….” Replace the removed text with the following sentence: Valve chambers shall be provided for all valves, flowmeters and other appurtenances. Adequate space shall be provided for pipework assembly and dismantling.
10 ~~PRESSURE~~ RISING MAIN **10.1 DESIGN** **10.1.1 General**	**Insert the following two paragraphs at the start of this clause:** Rising mains shall be designed to have a minimum continuous rise of 1:500 where feasible. If it is not feasible they shall have minimum rises and falls of 1:500 and 1:250 respectively. Where feasible, the rises and falls of the rising mains shall be such that it would minimize the requirement of using gas release valves. The minimum working/operating pressure of Gas Release Valves (generally 2m – 5m, depending on the make) is to be taken into account when designing the hydraulics of rising mains. Scour valves shall be provided at all low points. Section sluice valves shall be provided every 1000 metres unless otherwise approved by the relevant SEQ-SP. Common rising mains shall not be permitted Where a new rising main injects into an existing rising main, a sluice valve shall be installed on the new rising main at the injection point. In addition, a sluice valve shall be installed on the upstream side of the injection point on the existing pressure main. The format of the injection point fitting shall provide for the best possible hydraulic flow such as a flanged ‚Y‘ Ductile Iron fitting.
10.2.1 Location of Rising Mains (General)	**Amend clause as follows:** (iii) Easements over: (A) Vacant Crown land. (B) Vacant private property. ~~(C) Developed Crown land.~~ ~~(D) Developed private property~~
10.2.6 Easements	**Delete this clause**
10.3.1 Hydraulic Design, Total mean head	**Add the following as the first sentence of this clause:** The hydraulic design shall reflect the parameters outlined in the SEQ Water And Sewerage Design Guidelines.
10.3.3 Friction head loss	**Amend this clause:** k=0.15 mm for mean rising main velocity of 2 m/s and above.
10.3.5 Velocity in ~~pressure~~ rising mains	**Delete Paragraph 2 and replace with the following:** For rising mains less than DN 300, the flow velocity shall be in accordance with the parameters identified in the SEQ Water and Sewerage Design Guidelines. Surge and water hammer analysis shall be undertaken (as outlined in section 7 of the SEQ Water and Sewerage Design Guidelines).
10.3.6 Sizing of pressure mains	**Insert the following at the end of paragraph 1:** Consideration of lifecycle operating versus capital costs of alternative rising main diameters shall be undertaken in accordance with sections 2.5 and 2.6 of the SEQ Water and Sewerage Design Guidelines.
10.6 PLASTICS PIPES	**Change the title of Clause 10.6.1:** 10.6.1 Plastic pipes and fittings requirements **Insert the following:** The minimum pipe and fitting pressure class shall be PN16. **Change the following:** The pressure class of plastic pipes is determined **using WSAA cyclic loading calculations** at 20°C
10.10 Odour and septicity control	**Change item a) of this clause as follows:** **(a)** Hydrogen sulphide (H2S) gas concentration to be **<1 ppm** anywhere in the system.as measured at the property boundary

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
10.11.2 Discharge MHs	**Add the following as the first paragraph in this clause:** Where a rising main discharges to a gravity system, the receiving structure shall be a PE lined maintenance hole or approved alternative. Connection to the relevant SEQ-SP's sewer system shall be into a maintenance hole on the receiving gravity sewer with any odours generated managed as required by the Odour Impact Assessment Report. Refer to Standard Drawings WBB-SPS-1406 series **Change the third last paragraph as follows:** Downhill rising mains shall not discharge into a MH with a downstream sewer <=DN 150
11.1.1 Foundation design and ground water control	**Insert the following at the end of Clause 11.1.1:** Flotation prevention using emergency pop-up valves, ground water relief valves or similar arrangements are not permitted.
11.2.1 Design loads and forces	**Delete item iii) and insert the sentence:** Flotation prevention using emergency pop-up valves, ground water relief valves or similar arrangements are not permitted.
11.2.2.2 Concrete strength	**Change the wording in the clause as follows:** The strength grade of concrete for all liquid retaining structures shall be SB40 in accordance with WSA 114.
11.2.2.3 Minimum cover	**Remove the second sentence of this clause from "For exposure classification D…….. or approved equivalent"**
11.3.4.2 Pipe cover	**Change paragraph 4 to read as follows:** The minimum depth of cover for each section of rising main shall be shown on the Design Drawings. For **all** rising mains ~~less than or equal to DN150~~, the minimum pipe cover shall be **1000mm**. ~~For rising mains DN200 to DN300 inclusive, the minimum cover shall be 1000mm.~~ In a footpath, the depth of cover shall be measured from the top of kerb, or if there is no kerb, from the road crown. If the footway cross fall is non-standard, i.e. greater than 1 in 50, the finished surface level shall be the reference point. A cross-section at a scale of 1: 50 shall be provided within the Design Drawings. In a road carriageway, the depth of cover shall be measured from the road crown. Where site works will reduce the depth of cover below the required pipe cover, the rising main shall be redesigned to provide the required cover. The maximum depth to invert shall not exceed 1.5 m for rising mains less than or equal to DN300 and, for rising mains greater than DN300, the maximum pipe cover shall not exceed 1.5 m, unless a special design for the pipeline and its installation is submitted to and approved by the relevant SEQ-SP.
11.3.5 Specific Geotechnical Considerations	**Add new clause:** Where difficult ground conditions are anticipated or encountered, then a Geotechnical Assessment Report and a Construction Method Report shall be submitted with the Detailed Design to the relevant SEQ-SP.
11.3.6 Above ground crossings	**Add new clause:** Design to incorporate allowance for expansion at bridge expansion joints and at ends of bridge
11.3.7 Bulkheads and trench stops	**Replace the contents of Table 11.1 with the following:**

<table>
<tr><th>Reference</th><th>Amendments to Sewage Pump Station WSA04-2005 V2.1</th></tr>
<tr><td></td><td>
<table>
<tr><th>Grade
%</th><th>Requirement</th><th>Spacing S
m</th></tr>
<tr><td>5<Grade<15</td><td>Bulkheads or Trenchstop</td><td>S=100/Grade% or 10m whichever is less</td></tr>
<tr><td>15≤Grade<30</td><td>Concrete bulkhead</td><td>S=L/Grade%, where
L = 80xPipe length*, m (450 m max)
Where L>100 m – use intermediate trenchstop t spacing <100/Grade</td></tr>
<tr><td>30≤Grade<50</td><td>Concrete encasement (continuous) and concret bulkheads</td><td>S = 100/Grade(%)</td></tr>
<tr><td>50 ≤ Grade</td><td>Special design</td><td></td></tr>
</table>
* Pipe length is the standard pipe length installed.

* Pipe length is the standard pipe length installed.</td></tr>
<tr><td>11.3.10 Restrained elastomeric seal joint pressure mains</td><td>Insert the following before the second last paragraph:

Where space available for thrust blocks is limited, a commercial restrained joint system approved by the relevant SEQ-SP may be used subject to the approval of the relevant SEQ-SP‘s delegate. Installation of joints shall follow the manufacturer‘s specifications.

Add new clause:

For —Tyton-Locǁ restrained elastomeric seal joints, refer to the product limitations advised by the manufacturer.</td></tr>
<tr><td>15.2.1 General</td><td>Change first sentence to:

Design Drawings shall be prepared in accordance with the relevant SEQ SP‘s requirements including the SEQ ǁTotal Asset Information Packageǁ specification which includes the ADAC schema.</td></tr>
<tr><td>15.2.8 Other</td><td>Add the following to the end of this clause:

The following boxed note shall be included on the Design Drawings.

All water and sewer construction work shall comply with the requirements of the latest revision of the Queensland Workplace Health and Safety Act.
Contact the Division of Workplace Health and Safety for information
Telephone: 1300 369 915
.</td></tr>
<tr><td>15.2.9 Electrical and telemetry</td><td>Change the first sentence to read as follows:

Design Drawings shall include but will not be limited to the following:

Amend item (g) to be advisory

Move existing items (j) and (k) below the bullet

points. Insert new items (j) and (k) as follows:

(j) Site specific Functional Description Specification.
(k) Provide RPEQ approved detailed design documentation issued for construction.

Amend the last line to be advisory and to read as follows:

The PLC/RTU ladder diagrams or logic coding shall be provided as a separate document, using propriety software associated with the equipment. PLC and logic diagrams and functional specification shall be as per the requirements of the relevant SEQ-SP.</td></tr>
<tr><td>15.3.3 Recording of as-constructed information</td><td>Add as the first paragraph in this clause:

The Asset Manual and asset handover documentation for each sewage pump stations shall be completed and submitted to the relevant SEQ-SP prior to either practical completion; acceptance by</td></tr>
</table>

<table>
<tr><th>Reference</th><th>Amendments to Sewage Pump Station WSA04-2005 V2.1</th></tr>
<tr><td></td><td>the relevant SEQ SP; or setting the pump station into service.</td></tr>
<tr><td>APPENDIX A

TYPICAL PRECOMMISSIONING

CHECKLIST</td><td>Add to BOTH the Mechanical and Electrical Pre-Commissioning Checklist the following rows and renumber
all other items:

<table>
<tr><td>Item</td><td>Action/Requirement</td><td>Constructor to certify compliance</td></tr>
<tr><td>1</td><td>All Factory Acceptance Tests (FATs) for each item of equipment</td><td></td></tr>
<tr><td>2</td><td>All PreSite and Site Acceptance Tests (SATs) for each item of equipment</td><td></td></tr>
</table>

Alter text for “ohm” to symbol “Ω” in new rows 40, 41 and 42 of “Electrical Items”</td></tr>
<tr><th>PART 2 – PRODUCTS AND MATERIALS</th><th>Amendments to WSA04-2005 V2.1</th></tr>
<tr><td>16.1 PURPOSE</td><td>General comment “pressure main” replaced with “rising main” throughout this part, not normally marked in the left margin by the thick vertical black bar used to identify other changes in this part</td></tr>
<tr><td>16.1 PURPOSE</td><td>Add the following paragraphs after the second paragraph:

Reference to -Water Agency‖ or the like shall be taken to read as a reference to the individual south east Queensland service provider within whose sewerage network the sewage pumping station and rising main will be designed and constructed.

Any reference to the Sewage Pump Station Code of Australia (—the Code‖) shall be deemed to refer to the SEQ Design & Construction Code which contains the SEQ Amendments. The Code specifies mandatory requirements for the design and construction of Sewage Pump Stations that are to become the responsibility of the SEQ-SPs.

Each SEQ-SP reserves the right to specify or approve other design and/or construction requirements for particular projects and/or developments. Before commencement of any construction, approval from the SEQ-SPs shall be obtained to any design and/or installation that does not comply with the SEQ-SP‘s Code..</td></tr>
<tr><th>PART 3 - CONSTRIUCTION</th><th>Amendments to WSA04-2005 V2.1</th></tr>
<tr><td>17.1 SCOPE</td><td>General comment “pressure main” replaced with “rising main” throughout this part, not normally marked in the left margin by the thick vertical black bar used to identify other changes in this part</td></tr>
<tr><td>17.1 SCOPE</td><td>Add the following paragraphs after the second paragraph:

Reference to -Water Agency‖ or the like shall be taken to read as a reference to the individual south east Queensland service provider within whose sewerage network the sewage pumping station and rising main will be designed and constructed.

Any reference to the Sewage Pump Station Code of Australia (—the Code‖) shall be deemed to refer to the SEQ Design & Construction Code which contains the SEQ Amendments. The Code specifies mandatory requirements for the design and construction of Sewage Pump Stations that are to become the responsibility of the SEQ-SPs.

Each SEQ-SP reserves the right to specify or approve other design and/or construction requirements for particular projects and/or developments. Before commencement of any construction, approval from the SEQ-SPs shall be obtained to any design and/or installation that does not comply with the SEQ-SP‘s Code.</td></tr>
<tr><td>17.2 INTERPRETATION</td><td>Add the following definition in alphabetical order:

SEQ Design & Construction Code means the SEQ Design and Construction Code which is required by legislation and which is an instrument:
• made jointly by the SEQ-SPs; and
• that provides for technical standards relating to the design and construction of water infrastructure in the SEQ region.</td></tr>
</table>

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
18.1.1 General	**Add the following as the second sentence to this clause:** Specific requirements of the relevant SEQ-SP (in terms of compliance with AS 9000 series etc.) may be specified in an internal document.
18.2 PERSONNEL QUALIFICATIONS	**Add the following as the final sentence to this clause:** During any construction activity at least one person on site must have completed a pipe laying training course approved by the supplier and appropriate to the pipeline under construction (refer the —SEQ-SPs Accepted Products and Materials‖ list). The contractor will provide documented evidence of such qualification prior to commencement of the works.
19.5.2 Protection of other services	**Insert the following at the start of this clause:** The Developer or it's Constructor/s shall be responsible for any damage they cause to existing underground services. If the Developer or it's Constructor damages any existing services, they shall arrange for the relevant service authority to make good such damage and the cost thereof shall be borne by the Developer or it's Constructor. If in the opinion of the relevant SEQ-SP, the failure or damage causes an emergency situation, then remedial action will be taken by the relevant SEQ-SP and the full cost of such action shall be borne by the Developer or it's Constructor.
20 Products, Materials and Equipment	**This clause shall apply in conjunction with the following SEQ-SP Supplementary Specifications whose requirements will supersede any identified conflicting requirement with this WSA code. Any conflicting requirement shall be communicated to the SEQ-SP for resolution.** **The Supplementary Specifications are:** ~~**GCW:**~~ • ~~GCW SUPPLEMENTARY ELECTRICAL & MECHANICAL SPECIFICATION~~ ~~**QUU:**~~ • ~~SSM001 Metal Clad Switchboards and Enclosures~~ • ~~SSM002 Electrical and Instrument Installation~~ ~~**UNITYWATER:**~~ • ~~Specification for Electrical Installations at Sewage Pumping Stations~~ • ~~MECHANICAL~~ ~~Specification **Logan Water:**~~ ~~**Redland Water:**~~ **Supplementary Electrical and Mechanical Specifications will be provided by the relevant WBBROC Water Service Provider on request**
20.3 ELECTRICAL EQUIPMENT	**Change the second paragraph to read as follows:** Only use clean Grade 316 SS or marine grade aluminum in the construction of the switchboard cubicle and panels. **Add the following sentence to the end of the second paragraph:** Thoroughly pickle and passivate all fabricated components both internally and externally at the end of the fabrication and/or site modification processes. **Change the first line of the last paragraph to read as follows:** Calculate and show prospective ……. **Change the second line of the last paragraph to read....** Liaise with Supply Authority to confirm fault levels at point of connection and calculate fault levels, protection coordination of protective devices, earth fault loop impedance and touch voltage compliance with AS 3000 ~~with the Supply Authority~~

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
20.8 FASTENERS	**Add the following sentence as a paragraph after the first paragraph:** Where stainless steel fixings, nuts and bolts are used, nickel based anti-galling or anti-seize compound shall be applied to the thread and/or nut before assembly.
20.10.7 Compaction	**Amend the following sentence at the end of the first paragraph:** Do not vibrate to the point where segregation of the ingredients occurs but ensure that all the air bubbles are expelled from the concrete mass i.e. well graded concrete mixes that are in the target slump range do not tend to ingredient segregate until well after the entrained air is expelled.
21 Electrical Works	**This clause shall apply in conjunction with the following SEQ-SP Supplementary Specifications and drawings whose requirements will supersede any identified conflicting requirement with this WSA code. Any conflicting requirement shall be communicated to the SEQ-SP for resolution.** **The Supplementary Specifications are:** ~~**GCW:**~~ • ~~GCW SUPPLEMENTARY ELECTRICAL & MECHANICAL SPECIFICATION~~ ~~**QUU:**~~ • ~~SSM001 Metal Clad Switchboards and Enclosures~~ • ~~SSM002 Electrical and Instrument Installation~~ ~~**UNITYWATER:**~~ • ~~Specification for Electrical Installations at Sewage Pumping Stations~~ • ~~MECHANICAL~~ ~~Specification **Logan Water:**~~ ~~**Redland Water:**~~ **Supplementary Electrical and Mechanical Specifications will be provided by the relevant WBBROC Water Service Provider on request**
21.1 COMPLIANCE WITH AUTHORITIES, STATUTES, REGULATIONS AND STANDARDS	**Change item d) to read as follows:** (d) all relevant Statutory Authorities including the Electrical Safety Act and Electricity regulations; and
21.2 SCOPE OF WORK	**Change the title to read:** 21.2 Typical Scope of Work **Change the first sentence to read as follows:** The scope of work will be advised by the relevant SEQ-SP. As a minimum, the Developer or it's Constructor shall carry out the following works: **Change items (a) and (b) to read as follows:** (a) Arrange supply with the Supply Authority (b) Supply and install all electrical equipment **Change item (m) to read as follows:** (m) Arrange and install data communications media including all cabling/connections as required **Add new item (p) as follows:** (p) Provide RPEQ approved as constructed documentation
21.3 SUPPLY AUTHORITY REQUIREMENTS AND	**Delete the first three clauses and replace with the following clause:** The Developer or it's Constructor shall submit all forms required by the relevant SEQ SP's

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
METERING	electrical supplier as the SEQ-SP's agent to ensure that permanent power is connected prior to commissioning of the pump station. **Amend the fourth clause to read:** The Developer or it's Constructor shall forward the Customer Copy of all forms to the relevant SEQ-SP. **Amend the fifth clause to read:** The Developer or it's Constructor shall arrange for the mounting of the metering equipment…
21.4.2 Cable size	**Change this clause to read:** Determine the size of consumer mains cable and the main incoming main switch and circuit breaker based on the ultimate installed load for the site. ~~rating of the incoming supply~~
21.4.3 Maximum demand	**Change the first line in the clause as follows:** Base the maximum demand for pumping stations with up to two pumps installed on all pumps running simultaneously …….
21.4.4 Calculations to be submitted	**Change the clause to read:** Submit all calculations as required by the relevant SEQ-SP as a part of the documentation required prior to acceptance.
21.4.6 Mains requirements	**Amend pargraph 3 as follows:** Use the nominated point of supply as prescribed by the relevant service provider **Delete items (a), (b), (c) and (d)**
21.4.7 Lead-in pole and overhead mains construction	**Delete the entire clause**
21.4.8.1 General	**Replace with the following:** Install consumer mains underground in heavy duty PVC-U or PVC-M conduit ≥DN 50..
21.4.8.2 Location	**Revise the text in the paragraph 1 as follows:** Locate the cable within any public roadway from the base of the pole, perpendicular to the kerb and then along the relevant SEQ SP's electrical supplier's underground cable footway allocation in accordance with local requirements for allocation of space in footways.
21.4.8.5 Cable installation on poles	**Delete the entire clause**
21.5.1 General	**Amend this clause as follows:** **Delete the first line of paragraph 4 starting "Install an equipotential earth bond……" Delete paragraph 6 starting: "Use a main earth electrode complying….."** **Delete paragraph 7 starting: "Bond the main earth and…..".**
21.5.2 Earth circuits	**Delete the entire clause**
21.6.3 Thermal derating of equipment	**Delete this clause and replace with the following clause:** Switchgear installed in indoor and outdoor switchboards shall be derated in accordance with the manufacturer's recommendations.
21.6.4 Labelling	**Delete this clause and replace with the following clause:**

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	Labelling and tag naming convention shall be undertaken as per the requirements of the relevant SEQ-SP. External labelling shall be engraved or etched 316 stainless steel fixed in place, screwed, stainless zip tied or chain.
21.7 CIRCUITS	**Delete subclauses 21.7.1 and 21.7.2 and replace with the following clause:** Circuits shall meet the requirements of the relevant SEQ-SP. **Delete Table 21.1**
21.8.1 General	**Delete this clause and replace with the following clause:** Cabling shall be undertaken in accordance with the requirements of the relevant SEQ-SP.
21.10.1 – Installation of Level Sensors: General	~~**Install**~~ **Level sensor probes accepted by the water service providers shall be installed in accordance with the manufacturer's guidelines, and at the locations shown on the Design Drawings.**
21.10.2 Wet-well level sensor probes	**Delete this clause**
21.11 TERMINATIONS	**Delete this clause and replace with the following clause:** Terminations shall be undertaken in accordance with the requirements of the relevant SEQ-SP.
21.12 PAINTING	**Delete this clause and replace with the following clause:** Painting shall be undertaken in accordance with the requirements of the relevant SEQ-SP.
21.14 NOTIFICATION OF ELECTRICAL WORK	**Delete this clause and replace with the following:** Notification of electrical work shall be undertaken in accordance with the requirements of the relevant SEQ- SP.
22 TELEMETRY SYSTEM	**Delete this clause and subclauses and replace with the following:** **This clause shall apply in conjunction with the following SEQ-SP Supplementary Specifications and drawings whose requirements will supersede any identified conflicting requirement with this WSA code. Any conflicting requirement shall be communicated to the SEQ-SP for resolution.** **The Supplementary Specifications are:** ~~**GCW:**~~ ~~• GCW SUPPLEMENTARY ELECTRICAL & MECHANICAL SPECIFICATION~~ ~~**QUU:**~~ ~~• SSM001 Metal Clad Switchboards and Enclosures~~ ~~• SSM002 Electrical and Instrument Installation~~ ~~**UNITYWATER:**~~ ~~• Specification for Electrical Installations at Sewage Pumping Stations~~ ~~• MECHANICAL~~ ~~Specification **Logan Water:**~~ ~~**Redland Water:**~~ **Supplementary Electrical and Mechanical Specifications will be provided by the relevant WBBROC Water Service Provider on request**
24 MECHANICAL INSTALLATION OF PUMPS, VALVES AND FITTINGS	**This clause shall apply in conjunction with the following SEQ-SP Supplementary Specifications and drawings whose requirements will supersede any identified conflicting requirement with this WSA code. Any conflicting requirement shall be communicated to the SEQ-SP for resolution.** **The Supplementary Specifications are:** ~~**GCW:**~~ ~~• GCW SUPPLEMENTARY ELECTRICAL & MECHANICAL SPECIFICATION~~ ~~**QUU:**~~

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	~~• SSM001 Metal Clad Switchboards and Enclosures~~ ~~• SSM002 Electrical and Instrument Installation~~ ~~**UNITYWATER:**~~ ~~• Specification for Electrical Installations at Sewage Pumping Stations~~ ~~• MECHANICAL~~ ~~Specification **Logan Water:**~~ ~~**Redland Water:**~~ **Supplementary Electrical and Mechanical Specifications will be provided by the relevant WBBROC Water Service Provider on request**
25.4 Fasteners	**Revise the text in last two paragraphs as follows:** Apply Loctite or similar nickel anti-seize thread lubricant to the threads of all stainless steel nuts and bolts and other threaded items prior to assembly. Depending on the application fasteners manufactured from Grades 304, 304L, 316, 316L, 321 or S32304 stainless steel are acceptable alternatives to hot dip galvanised steel fasteners.
28 EXCAVATION	**Delete this clause and subclauses and replace with the following:** See SEQ WS&S D&C CODE Water Supply Code (WSA 03 -2011-3.1) —Clause 13‖ EXCAVATION.
29 BEDDING FOR PIPES, BENDS, WET-WELLS AND MAINTENANCE STRUCTURES	**Delete this clause and subclauses and replace with the following:** For Rising Mains -See SEQ WS&S D&C CODE Water Supply Code (WSA 03 -2011-3.1) -Clause 14‖ BEDDING FOR PIPES‖. For Gravity mains, Wet Wells and Maintenance Structures See SEQ WS&S D&C CODE Sewerage Code (WSA 02 -2002-2.3) —Clause 16‖ BEDDING FOR PIPES AND MAINTENANCE STRUCTURES‖.
30 PIPE LAYING AND JOINTING	**Delete this clause and subclauses and replace with the following:** For Rising Mains -See SEQ WS&S D&C CODE Water Supply Code (WSA 03 -2011-3.1) -Clause 15‖ PIPE LAYING AND JOINTING‖. For Gravity mains- See SEQ WS&S D&C CODE Sewerage Code (WSA 02 -2002-2.3) —Clause 17‖ PIPE LAYING AND JOINTING.
31 WET-WELLS	**Retitle this clause and add the following clause:** For Maintenance Holes - See SEQ WS&S D&C CODE Sewerage Code (WSA 02 -2002-2.3) —Clause 18‖ MAINTENANCE HOLES (MHS). **Revise the references to Standard Drawings to include:** Standard Drawings WBB-SPS–1300-1 to WBB-SPS-1308-1. Standard Drawings SEW–1207, SEW–1302, SEW–1303, SEW–1304, SEW–1305 and SEW– 1306, SPS-1304-Series.
32 PIPE EMBEDMENT AND SUPPORT	**Delete this clause and subclauses and replace with the following:** For Rising Mains -See SEQ WS&S D&C CODE Water Supply Code (WSA 03 -2011-3.1) -Clause 16‖ PIPE EMBEDMENT AND SUPPORT. For Gravity mains- See SEQ WS&S D&C CODE Sewerage Code (WSA 02 -2002-2.3) —Clause 17‖ PIPE EMBEDMENT AND SUPPORT.
33 FILL	**Delete this clause and subclauses and replace with the following:** For Rising Mains -See SEQ WS&S D&C CODE Water Supply Code (WSA 03 -2011-3.1) -Clause 17‖ FILL. For Gravity mains- See SEQ WS&S D&C CODE Sewerage Code (WSA 02 -2002-2.3) –Clause 21‖ FILL.
34 CONNECTION TO EXISTING GRAVITY SEWERS	**Delete this clause and subclauses and replace with the following:** For —Connection To Existing Gravity Sewers‖ - See SEQ WS&S D&C CODE Sewerage Code (WSA 02 - 2002-2.3) —Clause 24‖ CONNECTION TO EXISTING SEWERS.

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
35 RESTORATION	**Delete this clause and subclauses and replace with the following:** For ―Restoration‖ - See SEQ WS&S D&C CODE Sewerage Code (WSA 02 -2002-2.3) ―Clause 25‖ RESTORATION.
36 ACCEPTANCE TESTING	**Insert the following clause immediately before Table 36.1:** Vacuum testing of pumping station wet wells is not permitted. These structures must be tested hydrostatically in accordance with the requirements of AS 3735 and shall be filled to 500 mm above the overflow level. The pump station shall be covered to remove the effect of sun and wind induced evaporation and to prevent the entry of rainwater or stormwater. A test bucket shall be suspended within the pump station to measure evaporation. No leakage (other than the loss measured by the change of the surface level of the test bucket) shall occur over 48 hours. The Designer shall certify compliance with AS 3735.
36.3 COMPACTION TESTING	For -Compaction Testing‖ - See SEQ WS&S D&C CODE Water Code (WSA 03 -2011 -2-3.1) –Clause 19.3 COMPACTION TESTING.
36.4.2.2 Low pressure air testing	**Delete this clause and replace with the following:** Gravity mains shall be tested in accordance with the provisions contained in the SEQ Sewerage Code Clause 22 ―Acceptance Testing‖.
36.6 Infiltration testing	**Delete this clause and replace with the following:** Infiltration for gravity sewers shall be tested in accordance with the provisions contained in the SEQ Sewerage Code Clause 22.5 -INFILTRATION TESTING.‖
36.7 Deflection (ovality) testing of flexible GRAVITY sewers	**Delete this clause and replace with the following:** Deflection (ovality) of flexible GRAVITY sewers mains shall be tested in accordance with the provisions contained in the SEQ Sewerage Code Clause 22.6 DEFLECTION (OVALITY) TESTING OF FLEXIBLE GRAVITY SEWERS.
36.8 CCTV INSPECTION	**Delete this clause and replace with the following:** CCTV INSPECTION shall be performed in accordance with the provisions contained in the SEQ Sewerage Code Clause 22.7 CCTV INSPECTION.
37.2.4 Handover	**Revise the text in paragraph 1 as follows:** Handover is when the system is accepted by the Water Agency as fit-for-purpose and subsequently put into operation by the Water Agency. It is also when all documentation is completed and supplied to the Water Agency by the Developer/ Designer/ Constructor having been endorsed by an RPEQ, and when all system defects are closed out.
39.1 GENERAL	**Delete existing clause 39.1 and replace with the following:** Prepare and submit asset -as-constructed data and asset manuals to the SEQ-SP in accordance with SEQ D&C Asset Information Specification.
PART 4 - DRAWINGS	**Amendments to WSA04-2005 V2.1**
40.1 GENERAL	**Revise the text in paragraph 2 as follows:** The Drawings included in the Code have been prepared by the SEQ-SPs. To meet special needs, Designers and Constructors are encouraged to identify improved construction methods and other variations from the requirements set out in the Standard Drawings. Authorisation by the relevant SEP-SP will be necessary before any major departure from the principles outlined in the drawings are implemented. Successful initiatives will be considered by the SEQ-SPs for inclusion in future editions of this version of the Code.
40.1 GENERAL	**Add the following paragraphs after the second paragraph:** Reference to -Water Agency‖ or the like shall be taken to read as a reference to the individual south east Queensland service provider within whose sewerage network the sewage pumping station and rising main will be designed and constructed. Any reference to the Sewage Pump Station Code of Australia (―the Code‖) shall be deemed to refer

Reference	Amendments to Sewage Pump Station WSA04-2005 V2.1
	to the SEQ Design & Construction Code which contains the SEQ Amendments. The Code specifies mandatory requirements for the design and construction of Sewage Pump Stations that are to become the responsibility of the SEQ-SPs. Each SEQ-SP reserves the right to specify or approve other design and/or construction requirements for particular projects and/or developments. Before commencement of any construction, approval from the SEQ-SPs shall be obtained to any design and/or installation that does not comply with the SEQ-SP's The Sewage Pump Station Code of Australia.
40.2 DRAWING COMMENTARY	**Delete the first paragraph:**
41 LISTING OF STANDARD DRAWINGS	**Add the listed drawings of the SEQ-SPs as per the table below. .**

Part B – Drawing List and Additional WBBROC Drawings.

Sewerage Pumping Station Code Drawings – WBBROC Acceptance List

SEQ Drawing Reference	WBBROC
SPS-1100-1 Typical Locality and Site Plan	**Approved** (with changes)
SPS-1100-2 Typical Longitudinal Section of Rising Main	
SPS-1101-1 Typical P & Id Diagram Duty-Assist Operation	**Approved** (with changes)
SPS-1101-2 Typical P & Id Diagram Duty Standby Operation	Incorporated into 1101-1
SPS-1101-3 Pump and Rising Main Details	**Approved**
SPS-1101-4 Rising Main Concept Design Sections and Mean Head Calculations	
SPS-1102-1 Typical Site Layout	**Refer Additional Drawings**
SPS-1102-2 Typical Site Layout With Storage And Back-Up Power	
SPS-1102-3 Alternative Layout With Storage And Optional Flow-Meter	
SPS-1102-4 Typical Site Layout With Pig Insertion Emergency Pump Point And Grit Collector	
SPS-1102-5 Level And Capacities Interaction Diagram	**NOT Approved**
SPS-1102-6 Alternative Level Interaction Diagram For Small Stations	**Approved** (with changes)
"SPS-1300-1 Typical 2.4m Wet Well General Arrangement	**Approved** (with changes)
SPS-1300-2 2.4m Wet Well Section Details	**Approved** (with changes)
SPS-1300-3 2.4m Wet Well Pipework Arrangement	**Approved** (with changes)
SPS-1300-4 Flow Meter & Section Valve Chamber	**Approved**
SPS-1300-5 2.4M Wet well Structural Details	**Not Approved**
SPS-1300-6 Level Control And Well washer Details	**Approved** (with changes)
SPS-1300-7 2.4M Wet well `Notes Sheet 1 Of 2`	**Approved**
SPS-1300-8 2.4M Wet well Notes Sheet 2 Of 2	**Approved**
SPS-1300-9 Typical 1800 Dia lift Station	**Approved** (with changes)
SPS-1300-10 Typical 1800 Dia lift Station Sections	**Approved**
SPS-1300-11 Typical 1800 Dia lift Station Miscellaneous Details	**Approved** (with changes)
SPS-1300-12 Alternative Lift station Arrangement Including Storage Option	
SPS-1301-1 Pump well General Arrangement Plan At Top Slab Level	
SPS-1301-2 Pump well General Arrangement Plan At Header Pipe Level	
SPS-1301-3 Pump well General Arrangement Sectional Elevation	
SPS-1301-4 Chain Suspended Submersible Pump Typical Installation	**NOT APPROVED**
SPS-1304-0 Aluminium Access Covers Drawing Index & General Notes	**NOT APPROVED** **Proprietary products covered under APAM**
SPS-1304-1 Aluminum Access Covers General Arrangement	
SPS-1304-2 Typical Multi Cover Arrangement & Section Details	
SPS-1304-3 Aluminum Access Covers Section & Hinge Details	**NOT APPROVED** **Proprietary products covered under APAM**
SPS-1304-4 Aluminum Access Covers Cover Section Details	
SPS-1304-5 Aluminum Access Covers Lock Box Mechanism Detail	
SPS-1304-6 Aluminium Access Covers Grille Hinge Details & Sections	
SPS-1304-7 Aluminium Access Covers Centre Grille Hinge Details & Sections	
SPS-1304-8 Aluminium Access Covers Miscellaneous Details	
SPS-1304-9 Aluminium Access Covers Retaining Post Details	
SPS-1304-10 Sewage Pump Station Light Duty Access Covers	**NOT APPROVED**
SPS-1304-11 Lifting Duty Access Covers Frame, Safety Mesh Panels And Cover	
SPS-1304-12 Lifting Duty Access Covers Pump Well Hinge And Seal Details	
SPS-1304-13 Lifting Duty Access Covers Pump Well And Valve Pit Latch Mechanism	
SPS-1304-14 Lifting Duty Access Covers Latch Mechanism Box Details	
SPS-1304-15 Lifting Duty Access Covers Striker Plate On Frames Details	
SPS-1304-16 Lifting Duty Access Covers Valve Pit General Arrangement	
SPS-1304-17 Lifting Duty Access Covers Sections And Details	**NOT APPROVED**
SPS-1305-1 Aluminium Ladders ``	
SPS-1305-2 Aluminium Extendable Hand Grip Stanchion	
SPS-1305-3 Aluminium Handrails	
SPS-1305-4 Fabricated Metal Work	

SEQ Drawing Reference	WBBROC
SPS-1308-1 RPZ Device Typical Layout	Not Approved
SPS-1400-1 Grit Collector Maintenance Hole General Arrangement	NOT APPROVED
SPS-1401-1 Grit Collector-Maintenance Hole Bar Screen Installation General Arrangement	
SPS-1401-2 Grit Collector-Maintenance Hole Inlet Pipe & Valve Installation & Details	
SPS-1402-1 Additional Storage Chamber General Requirements	**Approved** (with changes)
SPS-1405-2 Typical Vent Pole	**Approved** (with changes)
SPS-1406-1 Rising Main Discharge to Gravity Sewer	Not Approved
SPS-1406-2 Preferred Rising Main Discharge Manhole To Gravity Sewer - 900Mm Dia	Not Approved
SPS-1406-3 Alternative Rising Main Discharge Manhole To Gravity Sewer - 900Mm Dia	**Approved** (with changes)
SPS-1406-4 Rising Main Discharge Manhole To Gravity Sewer - 1200Mm Dia	Not Approved
SPS-1407-1 Polyethylene Lining Top Slab & Wall Typical Details	Approved
SPS-1407-2 Polyethylene Lining Wall Pipe Penetration Typical Details	Approved
SPS-1508-1 Survey Plate, Pump Label Plate Valve Spindle Access	Approved
SPS-1508-2 Rising Main Valve Marking	Approved
SPS-1509-1 Grit Collector Maintenance Hole Above Ground Gear Box	Not Approved
SPS-1601-1 Typical Pipe Installation, Support And Trench fill-Rising Mains=Dn300	Not Approved
SPS-1602-1 Rising Main Scour Drain Arrangement	Approved
SPS-1603-1 Scour Maintenance Hole For Rising Mains Dn300 Or Smaller	NOT APPROVED
SPS-1604-1 Scour Maintenance Hole For Rising Mains Larger Than Dn300	NOT APPROVED
SPS-1605-1 Dn32 Air Bleed Assembly For Od250 Rising Mains Or Smaller	**Approved (BRC and FRC only) (**with changes)
SPS-1606-1 Automatic Gas Release Valves	• **Approved** (with changes)
SPS-1607-1 Cast Iron Valve Box And Cover	NOT APPROVED **Refer APAM list for suitable products**
SPS-1608-1 Combination Emergency Pump Connection And Pig Insertion Point Details	NOT APPROVED
Electrical Drawings	Not Used

Appendix B – Asset Information Specification

The Asset Information Specification shall be as per the SEQ D&C Code document