



**THE QUEENSLAND BULK WATER AUTHORITY  
(trading as 'Seqwater')**

**Supplementary Manual to  
WSAA Water Supply Code of Australia**

**WSA 03-2011**


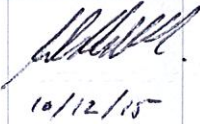
**Third Edition  
Version 3.1**

**This document contains information supplementary to WSAA Water Supply  
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# Supplementary Manual to WSAA Water Supply Code of Australia

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***Note: The clause and section numbers match those that are used in the WSAA Water Supply Code (WSA 03-2011 V3.1)***

# Supplementary Manual to WSAA Water Supply Code of Australia

## INTRODUCTION

### General

This Supplementary Manual describes Seqwater's specific requirements for water works that vary from, or are additional to, those detailed in the WSAA Water Supply Code of Australia WSA 03-2011, Version 3.1.

Supplementary sections are provided for each part of the Water Supply Code (Parts 1 and 2). Each supplement contains –

- Table of Contents to the Supplementary Manual
- Description of Seqwater requirements where different to the WSAA Code

A copy of WSA 03-2011, Version 3.1 is available from the Water Services Association of Australia via [www.wsaa.asn.au](http://www.wsaa.asn.au)

### Operation

The user can refer to the Table of Contents of the Supplementary Manual to establish where Seqwater has further requirements. The clause numbering of this Supplementary Manual matches the WSAA Code.

Seqwater may accept alternative products to those referred to in this Supplementary Manual if it can be demonstrated that such products comply with the applicable standards or specifications and are equivalent to the products referred to.

Seqwater encourages employment of any innovation that offers enhanced productivity and serviceability, but Seqwater's input should be sought before any innovative system is installed.

### Responsibilities

Designers and constructors are responsible for their respective aspects of the design and construction process. It is the designer/constructors responsibility to justify any variation from the requirements set out in the Water Supply Code of Australia, this Supplementary Manual and any specific directions given by Seqwater for the particular project. The designer/constructor is to obtain Seqwater endorsement for any variation.

**Disclaimer**

Seqwater exclude all liability to all persons and to all conditions and warranties, which are expressed or implied at law (including under statute). Where liability and conditions and warranties cannot be excluded at law, the liability of Seqwater is limited at their choice, to resupplying the Supplementary Manual or paying the cost of resupplying the Supplementary Manual.

Please note that the Supplementary Manual must only be used in conjunction with the WSAA Code. Further, the WSAA Code may be periodically updated. For current information, users should refer to the latest version located on the WSAA website.

Seqwater will not be liable for any loss or damage that may occur as result of the use of the information contained herein.

**NOTES**

**THE QUEENSLAND BULK WATER AUTHORITY  
(trading as 'SEQWATER')**

**PART 1: PLANNING AND DESIGN**

**Supplementary Manual to**

**WSAA Water Supply Code of Australia**

**WSA 03-2011**

**Third Edition  
Version 3.1**

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## **1 GENERAL**

### **1.2.5 Detailed Design**

#### **1.2.5.1 *Designer's needs and responsibilities***

Seqwater has a number of Standard drawings which can be provided as a guidance only to show minimum Seqwater requirements. They are not suitable for construction without further engineering design detail.

#### **1.2.5.2 *Requirements to be addressed***

The Designer shall provide the Operational Philosophy and a Functional Design Specification.

Designers shall ensure the following additional aspects have been considered and where appropriate included in the design:

- o) The infrastructure of other Utilities, or Agencies, which may be affected by the proposed work, are clearly marked on the design drawings;
- p) The scope of work is to include all disconnection and/or connection and/or diversion of services necessary for the proper construction of the new facilities and their subsequent operation;
- q) All work associated with the potholing and survey of services shall be carried out to the satisfaction of the appropriate authority; and
- r) Fibre optic cabling installed parallel with pipeline (if required by Seqwater).

The design of the works shall be carried out under the direction of and certified by a Registered Professional Engineer of Queensland (RPEQ).

#### **1.2.5.3 *Design Outputs***

Design output shall also include:

- e) Details construction drawings including the location of all existing services;
- f) Design drawings showing, as appropriate, location of pump stations, reservoirs and buildings, materials used and size;
- g) Detailed drawings and specifications including structural, electrical, mechanical, civil and hydraulic design;
- h) Inspection and test plan;
- i) Acquisition plans detailing any additional land and/or easement requirements that may be associated with the proposed works; and
- j) Operation and Maintenance Manuals.

### 1.2.6 Design life

Unless agreed otherwise Asset design lives shall be in accordance with Table 1.2 as modified herein.

**TABLE 1.2 TYPICAL DESIGN LIVES**

Infrastructure Asset Type	Minimum design life (years)
Water Mains (including all appurtenances)	100
Facilities (e.g. Reservoirs, Pump stations, amenities buildings, offtakes, section valve pits, pigging pits)	50
Mechanical equipment (e.g. Pumps, motors, valve actuators, pressure vessels, compressors)	20
Electrical equipment	20
Instrumentation (e.g. SCADA, Control Systems)	15

### 1.2.7 Instrumentation and control systems

All designs incorporating monitoring and control equipment shall comply with Seqwater's SCADA system standards.

## **2.3 DEMANDS**

### **2.3.1 General**

Seqwater is a Bulk Water Transfer Authority, so peak hour and peak day demands are not as relevant as for water reticulation businesses. Pipelines shall be designed to deliver flows that comply with Seqwater's requirements.

### **2.5.3 Operating Pressures**

#### **2.5.3.2 *Maximum allowable service pressure***

Where Seqwater mains supply directly to consumers, the maximum allowable operating pressures are set by the Local Water Authority.

## **2.6 WATER QUALITY**

### **2.6.1 General**

Water Quality will be measured at the distribution main offtakes and at other required locations as specified by Seqwater.

### **2.7.2 Temporary cross links to Non-drinking water pipes**

Temporary cross links between a drinking water system and a non-drinking water system are not permitted.

## **2.8 PUMPING STATIONS**

### **2.8.2.2 *Site related factors***

Site factors to be considered when locating pump/s shall also include:

- f) Ensure all structures are constructed with a level of flood immunity equivalent to a Q200 flood event;
- g) Drainage at the site;
- h) Ensure access to critical electrical gear during flood events is provided at all times;
- i) Obtain approval from the Local Authority for any buildings to be located on the flood plain;
- j) Filling of the flood plain shall not be considered or permitted without the specific and written approval of the Local Authority; and
- k) Line of sight from electrical pump connection.

### **2.8.2.3 *Service related factors***

Service factors to be considered in the design of a pumping station shall also include:

- i) Access to electrical cabling and communication cabling;
- j) Site access to the pump station site for light and heavy vehicles; and
- k) Security fencing.

## **2.10 TRENCHLESS TECHNIQUES FOR PIPELAYING**

In addition to those listed in WSA-03, trenchless techniques shall be evaluated for alignments:

- a) passing through:
  - (iv) areas of cultural heritage significance; and
  - (v) temporary works outside easement, or allocated, areas which may require special arrangements to secure access.

## **2.13 WATER QUALITY FACILITIES**

Water quality facilities are used within the transfer main system to ensure that water quality is maintained to Seqwater standards.

A concept or detailed water quality facility design shall document the design basis and technical inputs to the design.

The Planner/Designer shall address the following factors/requirements in water quality facility design:

- a) Designed for the range of flows expected;
- b) Standby items of equipment to be provided in addition to the duty units, with automatic controls to alternate between duty and standby functions;
- c) Undertake an investigation of flooding and drainage at the site;
- d) Ensure all structures are constructed with a level of flood immunity equivalent to a Q200 flood event;
- e) Ensure access to critical electrical gear during flood events is provided at all times;
- f) Obtain approval from the Local Authority for any buildings to be located on the flood plain; and
- g) Filling of the flood plain shall not be considered or permitted without the specific and written approval of the Local Authority.

### **3 HYDRAULIC DESIGN**

#### **3.1.3 Empirical sizing of reticulation mains**

Water main size of 225mm diameter is not accepted for Seqwater infrastructure.

### **3.8 PIPELINE COMPONENTS MINIMUM PRESSURE CLASS**

The minimum pressure class for water pipe and fittings shall be Class 16. For DICL pipes, the required class shall be 35 to provide a larger allowance for corrosion protection (the fittings do not have to be Class 35). In addition to the above, the pipe and fittings pressure class shall always be greater than the design pressure (including transient pressures).

### **4.6 STEEL PIPELINE SYSTEMS**

#### **4.6.3 Joints**

Internal joint reinstatement is to be undertaken for all joints in pipes larger than DN600.

Deflections at weld collars shall not exceed  $\frac{1}{2}^{\circ}$  per joint.

Deflections at rubber ring joints shall be as per pipe manufacturer's recommendations.

### **4.7 GRP PIPELINE SYSTEMS**

GRP pipes and fittings shall not be used for water mains.

### **4.8 PROTECTION AGAINST DEGRADATION**

#### **4.8.5 Cathodic Protection**

Cathodic protection is required for all steel pipelines. When the steel pipeline total length does not exceed 20 metres, CP may not be required subject to Seqwater approval.

Where required to prevent electrical current from continuing along a pipeline (e.g. at flowmeters, valves in pits, etc) or draining to ground via equipment in direct ground contact (e.g. buried valves), Electrical Isolation of the fittings shall be provided at the flanges.

Details of Electrical Isolated Joints and Cathodic Bonding Cables are shown in Seqwater Standard Drawing D-DWG-STD-009 and E-DWG-STD-001 respectively.

When steel mains are laid in proximity to power lines, e.g. high voltage transmission lines and railway overhead power lines, the design of cathodic protection systems shall consider LFI and EPR.

Where fittings are located, earth mats may be required.

#### **4.8.8 Bolted Connections**

Bolted connections shall comply with Standard drawing D-DWG-STD-009.

## **5 GENERAL DESIGN**

### **5.1 GENERAL REQUIREMENTS**

#### **5.1.1 Design Tolerances**

Horizontal alignment shall be referenced to the Australian Map Grid coordinate system, Geocentric Datum of Australia 1994 (GDA 1994), Map Grid of Australia Zone 56 (MGA 56).

For buildings and structures, the accuracy of all surveys should comply with standard cadastral and/or engineering survey conventions.

The survey shall be connected into the cadastre at sufficient intervals to enable plotting of all subject, and abutting, cadastral parcels.

#### **5.1.4 Environmental Considerations**

Full details of the environmental mitigation works shall be shown on Design Drawings and/or Project Specification and presented to Seqwater for approval.

Land subject to Vegetation Protection Orders (VPO) shall be avoided.

### **5.3 WATER MAIN ACCESS**

Water main access facilities shall be coincident with Air valves tees where practical.

Buried access facilities are not acceptable.

### **5.4 LOCATION OF WATER MAINS**

#### **5.4.2.1 Water mains in road reserves - General**

It is preferred that water mains are laid in the road shoulder or footpath. The second preference is the kerb side lane of the carriageway. When the water main is located in the road reserve, written approval of the alignment and level of the main shall be obtained from the road owner.

Water mains shall not be laid under a footpath, bikeway or roadway constructed of concrete, unless the water main is concrete encased. Where applicable, water mains shall be laid straight through roundabouts.

Where a water main was originally laid in a footpath or road shoulder, but with road widening is now laid in a carriageway, the water main shall be relocated or concrete encased.

Where an existing AC main is proposed to be located in a carriageway, the main shall be replaced with an approved pipe material.

All water main's appurtenances must be accessible from the finished surface level for maintenance and operational activities at all times, and must not be restricted by any proposed road upgrades or other improvements.

#### **5.4.2.2 Water mains in road reserves – Location in Footway**

Where possible, a water main shall be located on the alternate side of the street to the sewer location.

#### **5.4.3 Location in other than dedicated public road reserves**

An easement is required if the pipeline cannot be laid in a road reserve



#### **5.4.4 Water mains in easements**

Water mains are not to be located in an easement to reduce capital costs where a suitable route in a road reserve is available.

Easements shall be a minimum of 12 metres wide.

If a water main cannot be placed in a road reserve, an easement will be required. When an easement is required, consideration shall be given to long term access arrangements for operational and maintenance reasons.

If scour valves are located in an easement, then consideration needs to be given to obtaining easements for the drainage path of any water which may leave the pipe easement.

The Developer, or persons requiring the placement of an asset in an easement, shall arrange for the provision of that easement and registration of such easement.

##### **5.4.9.1 Crossings - General**

The design of water main crossings of controlled access roads (e.g. freeways and major arterials), railways and waterways shall include mechanical protection of the main. The installation of pre-cast reinforced concrete slabs over the water main as a means of providing mechanical protection is not permitted. Mechanical protection shall be provided by concrete of the water main (Refer to Clause 7.6.1)

All surface fittings shall be positioned outside the controlled road reserve, rail corridor or waterway embankments.

The design shall include drawings showing the reinstatement of road layers for open cut crossings. These details must be approved by the relevant road authority.

Water crossings shall be designed as buried pipelines using trenchless techniques unless approved otherwise by Seqwater.

##### **5.4.9.2 Requirements for encased pipe installations**

For further information, refer to Clause 7.6.1

##### **5.4.10 Railway reserves**

A Wayleave Agreement or suitable tenure is required between the Railway Authority and Seqwater.

##### **5.4.11 Crossings of creeks or drainage reserves**

Water mains which cross waterways, dams and drainage reserves shall be positioned below ground level. The construction of the crossing shall be welded mild steel cement lined pipe which is encased in concrete or grouted inside an envelope pipe. The launch and retrieval pits shall be located outside any environmentally sensitive areas.

##### **5.4.12 Overhead power lines and transmission towers**

When this clause is relevant, a report detailing the procedures to be adopted for design, construction and maintenance of the water main shall be provided by a Registered Professional Engineer of Queensland.

Where water main is located within a power easement, pipeline alignment lateral offset between edge of power easement and centreline of pipeline is to be 5 m unless otherwise agreed with the power company.

#### **5.4.13 Water mains in conjunction with landscaping and/or other development**

c) Structural design – provision of a structural slab over the main as a means of providing mechanical protection is not acceptable.

#### **5.4.15 Location Markers**

Marker posts to be located as per the requirements of Seqwater Standard drawing D-DWG-STD-003 and D-DWG-STD-004.

#### **5.4.16.2 Marking Tape – Mains**

Marking tape shall be installed above all buried water mains and fibre optic conduits as per the details shown in Standard Seqwater drawings D-DWG-STD-001.

### **5.6 SHARED TRENCHING**

Shared Trenching shall not be permitted.

### **5.9 CONNECTION OF NEW MAINS TO EXISTING MAINS**

The first valve on the branch to a reticulation main shall be at minimum cover. For steel mains, the branch shall be welded steel pipe up to the flange which connects to this first valve.

Standard offtake design to include 2 isolation valves directly off the Seqwater mainline tee with DN300 riser pipe and ball valves for de-pressurisation of pipe section between valves; followed by a flowmeter installed in a pit; followed by an above-ground section of pipework housed in a building including isolation valves, rate of flow control valve and non-return valve. Safety relief valve(s) may be required depending on pressure class of receiving main. Pressure transducers to be located at all offtakes.

### **5.11 PROPERTY SERVICES**

Property connections shall not be attached to Seqwater water mains unless approved by the South East Queensland Water Grid Manager. Maintenance and metering of this connection is carried out by the Local Water Authority. The design of the property connection must be approved by Seqwater. Seqwater cannot guarantee regular supply to the property service.

### **5.12 OBSTRUCTIONS AND CLEARANCES**

#### **5.12.5.1 Underground obstruction and services – General**

The Designer must confirm the position and depth of Seqwater's infrastructure (including any fibre optic conduit) has been accurately located by approved non-destructive methods such as hydro-vacuum potholing systems.

#### **5.12.5.2 Clearance requirements**

For trenched and trenchless installations, clearances from other service utility assets shall not be less than (and preferably exceed) the minimum vertical and horizontal clearances shown in Table 5.5. Where new services interfere with an existing thrust block's integrity, then an engineering assessment is required to determine the minimum clearances (the minimum clearance shall be the larger of Table 5.5 or the determined value).

**TABLE 5.5 CLEARANCES BETWEEN SEQWATER MAINS AND UNDERGROUND SERVICES**

SERVICE TYPE	Minimum Horizontal Clearance to Seqwater Main (mm)			Minimum Vertical Clearance to Seqwater Main <sup>1</sup> (mm)	
	≤ DN200	> DN200 and < DN600	≥ DN600	< DN375	≥ DN375
Water Mains ≤DN375 <sup>2</sup>	300 <sup>3</sup>	600	1000	150	300
Water Mains >DN375 <sup>2</sup>	600	1000	2000	300	500
Gas mains - Low pressure	300 <sup>3</sup>	600	1000	300	500
Gas mains - High pressure	5000	5000	5000	300	500
Telecommunication conduits and cables	300 <sup>3</sup>	600	600	150	150
Electrical conduits and cables	500	1000	1000	300	500 <sup>7</sup>
Electrical and communication poles	600	600	2000	N/A	N/A
Drains <DN300	300 <sup>3</sup>	600	1000	150 <sup>4,8</sup>	150
Drains ≥DN300	300 <sup>3</sup>	600	2000	150 <sup>4,8</sup>	500 <sup>4,8</sup>
Sewers <DN200	1000 <sup>5,9</sup> /600	1000 <sup>5,9</sup> /600	1000 <sup>9</sup>	500 <sup>4,8</sup>	500
Sewers ≥DN200	1000 <sup>5,9</sup> /600	1000 <sup>5,9</sup> /600	1000 <sup>9</sup>	500 <sup>4,8</sup>	500 <sup>4,8</sup>
Kerbs	150	600 <sup>6</sup>	600	900	900

**Notes:**

3. Clearances can be further reduced to 150 mm for distances up to 2 m when passing installations such as concrete bases for small structures, providing the structure is not destabilised in the process. The clearance from timber poles should be at least 300mm.
4. Sewers and Drains should cross under water mains. For cases where there is no alternative then the sewer or drain should be joint free and continuous between manholes. It may be necessary to concrete encase the Seqwater main as per Drawing No. D-DWG-STD-001 (encasement to extend 2 m on both sides of the utility service crossing)
7. An additional clearance from high voltage electrical installations should be maintained above the conduits or cables to allow for a protective barrier and marking to be provided as per the requirements of an LFI and EPR investigation (to be approved by Seqwater).
8. When the water main is concrete encased a minimum vertical clearance of 150 mm is required between the sewer/drain and the concrete encasement.
9. If the sewer cannot be maintained at the minimum vertical clearance below the water main, then the horizontal clearance must be amended in accordance with an assessment of the associated risks to water quality.

#### **5.12.6.1      *Deviation of water mains – General***

Using pipe joint deflections to achieve a deviation around an object is not permitted. Bend fittings or welded SCL pipes shall provide the pipe deviation.

#### **5.12.6.2      *Horizontal deviation of water mains***

Refer to Clause 5.12.6.1. Figures 5.12 and 5.13 are not permitted.

#### **5.12.6.3      *Vertical deviation of water mains***

Refer to Clause 5.12.6.1. Figure 5.15 is not permitted. Flange fittings shall be fully wrapped, refer to D-DWG-STD-009.

#### **5.12.6.4      *Curving of pipes to avoid obstructions***

Curving of PVC pipe is not permitted. Curving of PE pipes including limiting the radius of curvature shall be in accordance with PIPA Guideline POP202.

### **7.4            EXTERNAL FORCES**

#### **7.4.2        Pipe Cover**

The required (and minimum) cover for pipelines not laid in a road carriageway shall be:

- DN 63 – 150    600 mm
- DN 200 – 300   900 mm

When DN 63 -300, is laid in a carriageway the depth of trench shall not exceed 1500mm without prior approval. All levels are relative to the finished surface level.

The minimum cover requirements for pipes >DN300, from the finished surface level to the top of the pipe, shall be:

- 900mm in parkland/car parks and private property
- 1200mm in industrial areas/farming land and roads

The maximum cover shall not exceed 2.5 metres without prior approval from Seqwater.

If the pipeline has to exceed maximum cover, then extra pipe protection may be required by Seqwater (e.g. concrete encasement).

Where a smaller pipe connects to a larger pipe, then the smaller pipe must achieve the required depth within 20 metres. This is achieved by pipe deflection; however, if adjacent services or pipe deflections do not allow this, then either:

- welded SCL bends shall be used when the larger pipe is SCL, or
- flanged DICL bends shall be used when the larger pipe is DICL.

## 7.5 GEOTECHNICAL CONSIDERATIONS

Embedment support shall be suitable for the location and constraints encountered on site and shall generally comply with the requirements of Seqwater Standard drawings.

A geotechnical investigation including field testing is required to determine ground conditions before detailed design of Seqwater infrastructure is undertaken.

Typical trench details as per the Seqwater Standard drawings D-DWG-STD-001 and 002 are as follows:

- Type 1 for normal conditions
- Type 2 for poor ground conditions
- Type 3 for low strength surround
- Type 4 for concrete encasement
- Type 5 for reinforced concrete encasement  
(where side support or foundation are inadequate)
- Type 6 for sealed road construction
- Type 7 for unsealed road construction
- Type 8 for trenchless installation

Treated Hardwood piles are not permitted.

### 7.6.1 Concrete Encasement

Concrete encasement shall be as per the requirements of D-DWG-STD-001 Type 4 trench detail or D-DWG-STD-002 Type 8 Construction.

Mechanical protection shall be welded mild steel cement lined pipe which is encased in concrete or grouted inside an enveloper pipe.

For major roadways and railways, mechanical protection shall extend 2000mm beyond the property boundaries.

For water ways, mechanical protection shall extend 2000mm beyond the riparian zone.

Non-flexible pavements (i.e. rigid concrete pavements) over the top of the water main will not be acceptable as mechanical protection.

It is preferable for concrete surrounding works to be carried out in one continuous pour without horizontal joints. Concrete shall be poured on only one side of the pipe until the concrete has risen at least 25% of the pipe diameter on the opposite side.

Rocker pipes (maximum 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.

### 7.6.3.2 Encased steel pipelines - Existing steel pipelines

For major roadways and railways, mechanical protection shall extend 2000mm beyond the property boundaries.

For water ways, mechanical protection shall extend 2000mm beyond the riparian zone.

## 7.1 WATER MAINS IN UNSTABLE GROUND

### 7.7.1 General

All water mains proposed to be located within unstable ground, slip areas and mine subsidence areas shall be the subject of a risk assessment. Mitigation measures shall include monitoring of any further land movements and the effect on Seqwater assets.

## **7.9.2 Pipe Anchorage - Thrust Blocks**

Preferred restraint is to be provided using concrete thrust blocks. When the thrust block size exceeds 30 m<sup>3</sup>, an alternative thrust restraint shall be investigated. All alternative thrust restraints shall take into account future maintenance requirements.

Thrust blocks and the zone of influence shall not protrude outside the easement or outside the space allocated in roadways.

Concrete thrust/anchor blocks shall not obstruct the removal of bolts and nuts at flanged joints.

### **7.9.2.4 Timber and recycled plastics thrust blocks**

Timber thrust blocks are not permitted.

## **7.9.5 Pipe Anchorage – Restrained elastomeric seal joint water mains**

Commercial restrained joint systems may only be used where there is limited space for the thrust block and Seqwater approval is obtained.

## **7.10 BULKHEADS AND TRENCHSTOPS**

Bulkheads and trenchstops shall be designed in accordance with AS/NZS 2566.2 (Clauses 1.4.2 and 5.8, and Table 5.7).

When the grade is  $\geq 30\%$ , the pipeline shall be fully welded.

Trench drainage shall not cause bolted fittings to become submerged for long periods of time. Trench drainage shall not affect land use of property owners.

## **8.1 VALVES - GENERAL**

All valves greater than DN600 are to be installed in pits. Valve pits shall comply with Seqwater Standard drawing S-DWG-STD-005. In all cases a valve coupling is to be provided to allow removal of the valve.

Pits that cannot be gravity drained within a reasonable distance, and considering constructability of the drain line, shall be provided with a sump pit for pumping equipment. A permanent removable grating to cover sump pit shall not be provided instead the placement of a guard rail will be provided to control the safety hazard.

Pit lids shall have an opening through pit lid to allow sump pump removal without entering the pit.

Permanent sump pumps shall only be provided in pits with equipment needing protection against flooding. For some pits, level sensors may be required to avoid valves being submerged for excessive time.

## **8.2 STOP VALVES**

### **8.2.1 Product Specification**

All valves shall be double flanged (in particular, wafer and lugged type valves shall not be used). Knife Gate valves shall not be used.

Valves with integral bypasses shall not be used.

### **8.2.2.2 Gate Valves**

Gate valves, which are greater than DN600 or which require gearboxes, shall be installed in full size valve chambers. Under special circumstances (e.g. resilient seated valves) and when Seqwater approves, the valve chamber may only provide access to the gearbox.

Metal seated gate valves perform as physical plugs when man entry into a water main is required.

### **8.2.2.3 Butterfly Valves**

Lever operated butterfly valves shall not be used for below ground installation.

Butterfly valves shall be double flanged type designed in accordance with AS 4795. PN25 and above pressure rating butterfly valves shall be seal on disc type. PN21 and lower pressure class shall be seal on body type.

Butterfly valves for air valve isolation are not approved. Gates valves shall be used instead.

### **8.2.3 Stop valves for transfer/distribution mains**

Double isolation by closure of two isolation valves at adjacent sites must be provided before confined space entry is considered.

Isolation valves may be sized at 75% of pipeline diameter subject to pigging requirements and Seqwater approval.

Locations need to consider topography, accessibility, operational requirements, flooding, high risk areas and minimising water loss.

High risk areas include, but are not limited to the following: Creek crossings, rail crossings, main road crossings, steep terrain, mine subsidence areas, sensitive environmental areas and locations where there is a higher risk of pipe failure e.g. acid sulphate soil areas.

Tapered connectors may be concentric or eccentric as appropriate and subject to Seqwater's approval.

For transfer mains greater than DN900, the maximum spacing may be increased to 10km if:

- There is no more than one offtake between valves
- No high risk areas exist between valve locations

### **8.2.6 Bypass of stop valve**

The bypass valve connections shall not be cast integral with the main stop valve.

DN225 bypass valves and pipework shall not be used.

By-passes complete with gate valve are to be provided around all main line valves greater than DN300.

#### **8.2.7.1 Stop valves - location and arrangements - general**

All valves shall be double flanged.

#### **8.2.7.3 Stop valves - Arrangement 2**

Where a stop valve is located on the opposite side of the road to the trunk main, the pipework between the trunk main and the valve shall be:

- Fully welded if the trunk main is fully welded
- Flanged if the trunk main is not fully welded

#### **8.4.2 Air valve – Installation design criteria**

Air valve installations shall comply with Seqwater Standard drawing D-DWG-STD-001.

Valve pits shall comply with the following requirements:

- Be located below ground in pits with access lids;
- Located at all high points in the pipeline, at maximum distance of first air valve from drain down valve of 800 m, at a maximum spacing of 800 m, as close as possible to property boundaries or existing fence lines to avoid impacts on the landowner and the property;
- At 1.5 m maximum depth of valves to avoid complications for operational access;
- An isolation valve shall be provided adjacent to air valves to facilitate air valve maintenance. The isolating valve used with air valves shall be a double flanged gate valve and the same size as the air valve. The isolation valve must be operable from above ground;
- Concentric reducers at offset air valves are not permitted;
- Be provided with a vent pipe;
- Anti-slam air valves are required at the highest point on pipeline between section valves and at last AV to close in each section;
- Bi-bidirectional-flow pipelines require anti-slam valves on both sides of section valves (to be reviewed as part of transient analysis);
- Pressure test points are to be incorporated in all air valve assemblies to enable pressure test gauges to be connected manually for testing;
- Air valves on pipes DN750 and greater shall include a DN600 access branch also serving as an air collection chamber as detailed in Seqwater Standard Drawing No. D-DWG-STD-001; and
- Air valves on pipes less than DN750 shall include a branch equal to the air valve size.

#### **8.4.4 Air valve size**

On pipelines, the minimum air valve size shall be 100mm. Within pump stations, DN50 and smaller air valves may be used. These smaller air valve installations shall include a stainless steel ball valve as the isolator.

#### **8.4.6 Use of hydrants as an alternative to air valves**

For pipelines less than DN450, fire hydrants may be used in lieu of air valves with the approval of Seqwater. These fire hydrants are for air control and are not to be marked as fire hydrants for fire fighting purposes. The fire hydrants will have a DN100 flange.

### **8.5 NON-RETURN VALVES**

Generally swing check valves with external lever arms and adjustable counterweights suitable for dampener installation with micro switch position indicators are preferred. All external moving parts are to be covered with a suitable removable guard.

### **8.6 SCOURS AND PUMP-OUT BRANCHES**

#### **8.6.1 Location and Arrangements**

Scour valve installations shall comply with Seqwater Standard drawing D-DWG-STD-005.



### **8.6.2 Design**

Scour/Drain down arrangements may include an orifice plate to limit velocities through valves.

Scours shall also:

- c) not be subject to inundation from a flood due to a storm event of a frequency of 1 in 2 year recurrence;
- e) be located such that it is not submerged for an extended period of time;
- f) not be located at the lowest point when inundation, access or submersion is a problem. Under these circumstances, it is acceptable for the retained water to be removed by pumping, subject to Seqwater approval; and
- g) take into consideration the surroundings in which it discharges and the need of any drainage easements.

### **8.6.4 Scours size**

Unless approved by Seqwater, all scour valves are to be the same size for a given pipeline. DN225 shall not be used.

### **8.6.5 Scour Location**

Locations need to consider topography, accessibility, operational requirements, flooding and suitability of environment for discharge. Unless approved otherwise, scours shall not discharge to closed storm water systems such as at maintenance holes.

Emptying of the drain down collection manhole by pumping is acceptable in areas where it is impractical to locate the manhole in an area where it is self draining.

## **8.7 SWABBING POINTS**

Swabbing/pigging installations shall comply with Seqwater Standard drawing S-DWG-STD-004.

Swabbing/pigging points shall be provided on all mains DN 900 and larger unless otherwise directed by Seqwater.

Swabbing/pigging installations shall also:

- a) be located at 10 km maximum spacing between pigging stations, unless otherwise approved by Seqwater.
- b) permanent launching and retrieval pigging stations with valving may be considered rather than 'drop out' pipe section facilities.

## **8.8 HYDRANTS**

Hydrants shall not be used unless approved by Seqwater.

## **8.9 DISINFECTION FACILITIES**

Facilities in this clause refer to the pipe attachments for disinfection of new mains.

### **8.10.2 Surface Fittings - General**

The design of surface fittings shall take into account safe access for the operation of the fittings.

### **8.11 APPURTENANCE LOCATION MARKING**

Marker posts and identification plates shall be provided as shown on drawings D-DWG-STD-003 and D-DWG-STD-004.

### **8.12 FLOWMETERS**

Flowmeters shall not be buried. Flowmeters shall be installed in pits.

Flowmeters shall comply with the draft South East Queensland Water Market Rules, Schedule 1 – Metering Standards (21st May, 2008).

## **9.2 DESIGN DRAWINGS**

### **9.2.1 General**

Additional information is provided in the following document

- X-PRO-STD-007 Drawing & Spatial Data Standards

### **9.2.3 Scale**

Additional information is provided in the following document

- X-PRO-STD-007 Drawing & Spatial Data Standards

### **9.2.4 Content of drawings**

Additional information is provided in the following document

- X-PRO-STD-007 Drawing & Spatial Data Standards

## **9.4 RECORDING OF ‘WORK AS CONSTRUCTED’ INFORMATION**

The design drawings shall be prepared so that the ‘As Constructed’ information can be submitted in the format described in Clause 24 of Part 2: Construction.

**NOTES**

**THE QUEENSLAND BULK WATER AUTHORITY  
(trading as 'SEQWATER')**

**PART 2: CONSTRUCTION**

**Supplementary Manual to**

**WSAA Water Supply Code of Australia – 03-2011**

**WSA 03-2011**

**Third Edition  
Version 3.1**

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## **10 GENERAL**

### **10.1 SCOPE**

The Constructor shall refer to specific project contract documents for construction requirements on each asset creation or modification project.

The project contract documents shall be provided to Seqwater for review and approval before their implementation.

Construction of Seqwater assets shall comply with all relevant Australian Standards, local, state and federal by-laws, building approvals and current legislation requirements. Construction requirements shall include but necessarily be limited to the following requirements:

- Safety in Design including protection of people, services, property and the surrounding environment and heritage areas
- Community and stakeholder consultation
- Seqwater Planning and Design requirements
- Delivery of all materials including pipes, mechanical couplings, fittings and valves
- Visual inspection of all line pipes, mechanical couplings, fittings and valves from the suppliers and report defects before installation
- Laying and jointing of pipes including rubber ring, flanged and welded mild steel joints
- Repair of pipe coatings
- Supply and application of field coatings to mild steel pipes and flanged joints
- Supply and installation of all concrete thrust blocks, bulk heads, pipe supports, pipe welding, etc required for the anchoring of line pipes and fittings as nominated on the drawings
- Location, exposure and protection of all existing services and public utilities along the pipeline
- route impacted or potentially impacted by construction
- Coordination of all necessary interfaces with external service authorities or effected asset owners
- All dewatering and groundwater disposal in accordance with the Environmental Management
- Plan and Environmental Work Method Statements developed
- All activities relating to spoil handling and disposal in accordance with the Environmental
- Management Plan and Environmental Work Method Statements
- All activities related to the filling, disinfection, flushing, testing and commissioning of the pipeline.
- All activities related to the reinstatement of works areas such as roads, landscaping, temporary and permanent protection structures, etc.

#### **11.5.2 Disused / Redundant water mains**

All fittings, walls, etc related to the pipeline need to be removed entirely or removed to a depth of at least 600mm.

### 12.1.1 Authorised products and materials - General

All pipe materials and fittings shall be approved by Seqwater. All materials and fittings shall be installed to the manufacturer's specifications.

Table 12.1 provides general information on pipeline options approved by Seqwater.

**TABLE 12.1 PRINCIPAL PIPELINE SYSTEMS**

Description		Requirement
DI	Cement mortar lined with approved seal coating	Pipe Class PN35 Fittings can be Class 16
	Polymer lined	
Steel	Cement mortar lined with approved seal coating	Wall thicknesses and outside diameter need to be confirmed with Seqwater
	PE coated and lined	
GRP		GRP pipes and fittings shall not be used
PE and PVC		Seqwater does not keep spare parts for PE or PVC as it is not a reticulation Water Agency. Therefore, the use of PE and PVC is limited for pressure pipe.
Hot dipped galvanised bolts, nuts and washers		Accepted for use within concrete valve chambers or above ground locations

### 15.2.3 Curving of Pipe

Curving of PVC pipe is not permitted. Curving of PE pipes including limiting the radius of curvature shall be in accordance with PIPA Guideline POP202.

## 24 WORKS AS CONSTRUCTED DETAILS

Additional information is provided in the following document

- X-PRO-STD-007 Drawing & Spatial Data Standards

## 25 STANDARD DRAWINGS

Standards drawings are available for some pipeline activities.

**NOTES**