



# FNQROC DEVELOPMENT MANUAL

## SPECIFICATION

S5

## WATER RETICULATION

Version No. 11/19

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## GENERAL

### S5.01 SCOPE

1. This specification details all matters pertaining to the minimum requirements for Water Supply Reticulation Construction.
2. Where there is any conflict determined between the requirements specified herein and the requirements of any referenced Australian Standard, Statutory Authority Standards or otherwise, the requirements specified herein shall apply.
3. The planning, design, construction and certification of water reticulation infrastructure is to be carried out in accordance with this Manual and the CTM Alliance Water Service Design and Construction Code Version 0.2 May 2015.
4. Aspects of modification or clarification of the CTM Water Alliance Design and Construction Code are detailed in Appendix A of Section D6 – Minimum Design Standard of this Manual.
5. Aspects of modification or clarification of the CTM Water Alliance Design and Construction Code are detailed in Appendix A of this document.

### S5.02 REFERENCE DOCUMENTS

**Note: Where Acts or reference documents are updated, reference should be made to the current version.**

#### Australian Standards

- AS 1289 Methods of Testing Soils for Engineering Purposes
- AS 1432 Copper Tubes for Plumbing, Gasfitting and Drainage Applications
- AS 1646 Elastomeric Seals for Waterworks Purposes
- AS/NZS 1477 PVC Pipes and Fittings for pressure applications
- AS/NZS 1906 Retroreflective Material and Devices for Road Traffic Control Purposes
- AS 2032 Code of Practice for Installation of PVC Pipe Systems
- AS 2033 Installation of Polyethylene Pipe Systems
- AS 2129 Flanges for pipes valves and fittings
- AS/NZS 2280 Ductile Iron Pressure Pipes and Fittings
- AS/NZS 2566 Buried flexible pipelines
- AS 2638 Sluice Valves for Waterworks Purposes
- AS 3952 Water Supply - DN80 Spring Hydrant Valve for Waterworks Purposes
- AS 3992 Pressure equipment – Welding and brazing qualification
- AS 4041 Pressure Piping
- AS/NZS 4129 Fittings for polyethylene (PE) pipes for pressure applications
- AS/NZS 4130 Polyethylene (PE) pipes for pressure applications
- AS 4458 Pressure Equipment - Manufacture
- AS/NZS 4765 Modified PVC (PVC-M) pipe for pressure applications
- AS 4441 Oriented PVC (PVC-O) pipes for pressure applications

## **WATER RETICULATION**

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- AS 5488            Classification of Subsurface Utility Information

CTM Water Alliance Design and Construction Code Version 1.0 August 2019

Queensland Department of Main Roads Standard Specifications

- MRTS45            Road Surface Delineation

Water Services Association of Australia

- WSA 03 – 2011 – Water Supply Code of Australia
- WSA 01 – 2004 – Polyethylene Pipeline Code

## **MATERIALS**

### **S5.03 PIPES GENERAL**

1. All materials used shall be listed on Council's approved products register.
2. All pipes used for water main reticulation shall be constructed from the following materials:
  - (i) Polyvinylchloride (PVC)
  - (ii) Polyethylene (PE)
  - (iii) Ductile Iron
  - (iv) Copper
  - (v) Stainless steel

### **S5.04 POLYVINYLCHLORIDE (PVC)**

1. Unplasticised PVC (PVC-U) pipes shall be manufactured in accordance with AS/NZS 1477 by an Australian Standards quality endorsed company.
2. Modified PVC (PVC-M) pipes manufactured in accordance with AS/NZS 4765 by an Australian Standards quality endorsed company may be used as an alternative to uPVC.
3. Oriented PVC (PVC-O) pipes manufactured in accordance with AS 4441 by an Australian Standards quality endorsed company may be used as an alternative to PVC-U
4. PVC pipes 100mm diameter and greater to be Class 16 rubber ring jointed (Ductile iron compatible).
5. Rubber Rings shall be manufactured and tested in accordance with AS 1646. Jointing lubricant in accordance with the manufacturers specification should be used to facilitate jointing.

### **S5.05 POLYETHYLENE PIPE (PE)**

1. Polyethylene pipe shall be manufactured in accordance with AS/NZS 4130 by an Australian Standards quality endorsed company.
2. PE pipes to be minimum PE100 PN16. As noted in D6 – Appendix A(3.8). Designing engineer is to consider the oxidative reductive potential of the water and an appropriate determination pipe class is to be specified. Fittings shall comply with AS/NZS 4129.
3. All pipes and fittings shall have a co-extruded solid colour of blue for potable water supply and lilac for non-potable water.

### **S5.06 DUCTILE IRON**

1. Ductile Iron pipes shall be manufactured and cement lined in accordance with AS/NZS 2280 by an Australian Standards quality endorsed company. The actual lining material shall be approved by Council and be suitable for potable water.
2. Socketed pipes to be Class PN35 or where cover is less than minimum, then use the patented "Tyton" type rubber ring joint or approved equivalent. Flanged pipes to be Class PN45.
3. Flanges shall comply with AS 2129 Table C. Bolts and nuts for flanged joints shall be in accordance with AS 2129.

## **WATER RETICULATION**

4. All pipes and fittings shall be wrapped in a loose polyethylene sleeving 0.25mm thick and coloured blue for potable water supply and lilac for non-potable. Wrapping and taping shall be carried out in accordance with the pipe manufactures recommendations.

### **S5.07 COPPER**

1. Copper tube shall be a minimum standard of Type B seamless tube manufactured in accordance with AS 1432 by an Australian Standards quality endorsed company.

### **S5.08 STAINLESS STEEL**

1. Stainless steel pipe is to be 316 stainless steel spiral wound pipe to a minimum of PN16.
2. Jointing of SS pipes at bends are to be undertaken by the contractor by welding onsite.
3. Welding is to be carried out in accordance with AS 4458 – Pressure equipment - Manufacture. Qualification of welding procedures and welders is to comply with AS 3992 Pressure Equipment – Welding and Brazing Qualification.
4. Weld arrangements for jointing of stainless steel pipe is to be full penetration butt welds in accordance with AS 4041 – Pressure Piping – Class 2A.
5. On site welds are to be ground smooth removing any slag and sharp projections that may damage the plastic sleeving, but in such a way as to maintain the welds integrity.

### **S5.09 BEDDING MATERIAL**

1. Bedding Material shall consist of a clean coarse sand or recycled glass material free from organic matter, clay, shells and deleterious material with 100% passing the 6.7mm AS sieve and not more than 5% passing a 0.150mm AS sieve.

### **S5.10 VALVES**

1. All Valves shall be manufactured in accordance with AS 2638 by an Australian Standards quality endorsed company.
2. Valves of 100mm diameter and larger, are to be coated with a thermosetting epoxy powder to AS 2638 and AS 3952.
3. All 50mm diameter valves shall be DR brass construction with appropriate pressure rating or approved equivalent and certified by QAS to Standards Mark or Water Mark. All valves shall be fitted with bronze tee handles.

### **S5.11 HYDRANTS**

1. Hydrants shall be the spring hydrant "Maxi Flow" 2000 type (DN80) manufactured in accordance with AS 3952 by an Australian Standards quality endorsed company. Hydrants are to be coated with a thermosetting epoxy powder to AS 2638 and AS 3952.

### **S5.12 BENDS AND TEES**

1. All bends for mains of 100mm diameter or larger and all other associated fittings shall be constructed in accordance with AS/NZS 2280, and have flanged or spigot and socket type joints as specified on the approved Project Drawings. Where flanges are used, bolts shall be matched sets and conform to the following criteria:
  - i. In above ground uses, bolts shall be Hot Dipped Galvanised

- ii. In below ground uses, bolts shall be Grade 316 Stainless Steel with nuts and washers Grade 304 stainless steel.
- 2. All bends, tees and miscellaneous fittings shall be factory nylon powder coated unless otherwise specified.

**S5.13 PAVEMENT MARKING**

- 1. The manufacture, supply and material requirements appropriate to the specification of pavement marking shall be in accordance with Main Roads Standard Specification "MRTS11.45 Road Surface Delineation".

**S5.14 RAISED RETRO REFLECTIVE MARKING**

- 1. Raised retroreflective pavement markers used to locate hydrants shall be blue bi directional markers.
- 2. The material requirements of the raised retroreflective pavement markers shall be in accordance with Main Roads Standard Specification "MRTS45 Road Surface Delineation".



**S5.15 SETOUT**

1. The location and sizes of the mains and position of valves and hydrants shall be as stated on the approved Project Drawings.
2. Bends shall be positioned such that the correct alignment is maintained and remains within the allotted service corridor.
3. Where levels are nominated on the approved Project Drawings the Contractor shall ensure the main is laid within the given tolerances and the equipment used to level the main is approved and tested.
4. The main shall be setout from an approved datum line set by a Registered Surveyor (Consulting). The datum line may be either the road centreline, property boundary, a pegged chainage offset line, or any alternative datum suitable for the purposes of accurately setting out the works.
5. The position of hydrants, fittings, valves and water service connections / conduits shall be located within 1.0m of the side property boundary.

**S5.16 CLEARING AND GRUBBING**

1. All clearing and grubbing works shall be in accordance with Specification S1 EARTHWORKS.
2. Any trees or obstructions not on the line of the pipes shall be preserved.

**S5.17 TRENCHING**

1. All trenching and foundation works necessary for the installation of the pipeline or thrust blocks, shall be in accordance with Specification S1 EARTHWORKS.
2. The width of trenching excavation shall be in accordance with the Standard Drawing S2016 at the trench base and comply with all regulations of Workplace Health and Safety Act.
3. In undertaking trench excavation, the Contractor shall provide any shoring, sheet piling or other stabilisation of the sides necessary to comply with statutory requirements.
4. Where public utilities exist in the vicinity of water reticulation works the Contractor shall obtain the approval of the relevant authority / corporation to the method of excavation before commencing excavation.
5. The safety of the public shall be considered at all times. Where necessary, fenced walkways and vehicular crossways shall be provided across trenches to maintain access from carriageway to individual properties or within individual properties. All such installations shall be of adequate size and strength and satisfactorily illuminated.
6. In the event of any trenching being left open for longer than one week, the Contractor shall provide erosion control measures to ensure minimal soil disturbance and material loss off the site. Some or all of these measures shall be provided immediately upon the onset of rain with an open trench.
7. The Contractor shall leave a clear space of 600mm minimum between the edge of any excavation and the inner toe of spoil banks. No excavated materials shall be stacked against the walls of any building or fence without the written permission of the owner of such building or fence. Topsoil from excavations shall be kept separate and utilised to make good the surface after backfilling.

**S5.18 CROSSINGS**

1. Where a water main crosses a State Controlled Road Railway line or creek, the affected work shall be carried out in accordance with the requirements of the relevant Authority / Corporation. It shall be the Contractor's responsibility to complete written notification to the Authority / Corporation of the intention to carry out the work.
2. Where a water main crosses an existing road, the affected work shall be carried out in accordance with the requirements of Council. It shall be the Contractor's responsibility to notify Council of the intention to carry out the work.

**S5.19 BEDDING**

1. All pipes shall be uniformly bedded in order to ensure solid and uniform support for the full length of the barrel with bell holes formed to accommodate the sockets to ensure a minimum clearance of 20mm.
2. The depth of bedding shall be as detailed on Standard Drawing S2016 with the bedding material complying with the "Bedding Material" section of this Specification.
3. Detector tape / marker wire shall be installed above all non-metallic pipe line at a minimum of 150mm below finished surface level.

**S5.20 LAYING AND JOINTING OF PIPES**

1. All contractors shall have undertaken a manufacturers pipe laying accreditation course.
2. All pipe lines shall be laid to such lines, curves, gradients and levels as shown on approved Project Drawings.
3. Care shall be taken to preserve uniform gradients and correct alignments. Bends shall be used to effect horizontal and vertical changes of direction.
4. The manufacturers recommendations for maximum deflection at each joint shall be strictly adhered to.
5. Jointing of pipes, valves and fittings is to be carried out to the manufactures recommendations and in accordance with Australian Standards.
6. When the joint is made, the witness mark shall at no point be more than 1mm from the end of the socket.
7. Before being laid, all pipes, fittings, valves, etc shall be cleaned and examined by the Contractor.
8. Approved plugs shall be used to prevent foreign matter entering sections of pipeline, which are left uncompleted overnight.
9. The Contractor shall take all necessary precautions to prevent flotation of pipes during laying, backfilling and initial testing. Any temporary supports shall be removed prior to completion of backfilling.
10. Pipes shall be cut as needed to suit closing lengths, to remove damaged pipe or fittings or to remove sockets if necessary when jointing a socketed fitting.
11. For field cuts, only an approved mechanical pipe cutter shall be used, except that uPVC pipes may be cut using a power saw or a fine toothed hand saw and mitre box.
12. Any pipes cut in the field shall have their ends prepared in accordance with the manufacturer's written instructions.
13. Where pipes are cut in the field, a witness mark shall be made on the pipe at the length specified by the manufacturer from the end of the pipe. Scoring of uPVC pipes shall not be permitted.

## **WATER RETICULATION**

### **S5.21 CONNECTION TO EXISTING**

1. Connections to existing pipes carrying water shall be made at such times as will cause the least interference with the supply. The Contractor shall arrange with the Council or other Authority / Corporation concerned for the timing of the work. All works shall be carried out by the relevant Local Authority at the applicants cost.
2. The proposed date of any water connection work is to be submitted to and agreed with Council (Minimum 1 month notice). The scheduled date of the connection work is to then be confirmed by the Contractor exactly 1 month prior to the date. Any change to the date within two weeks of the scheduled date will result in the contractor being responsible for any additional costs incurred by Council to change to the new date.

### **S5.22 FITTINGS**

1. The laying and jointing of mains shall include the fixing in position of all valves of any description, fire hydrants and all other fittings, which are necessary for the completion of the mains.
2. Joints to secure fittings to pipes shall be approved under Australian Standard AS1646.
3. All sluice valves, gate valves, air valves and hydrants shall be carefully placed in the final position so as to be the correct distance from the surface and installed in accordance with Standard Drawings S2000, S2001 and S2005. With air valves and hydrants, risers shall be installed where necessary and if required, trenches shall be deepened and graded in the vicinity of all valves and hydrants in order to secure the correct depth below the surface.
4. Valves, hydrants and specials shall be thoroughly cleaned out prior to installation in main.
5. The spring hydrants shall be bolted to the flange of the hydrant junction so that the bolts of the hydrants are in line with the main, and the hydrant cover box fitted with its long axis along the centre line of the main. Hydrants must be protected during backfilling in such a manner as will prevent earth or grit from damaging the seating.
6. Hydrants and valves shall be fully protected during laying and backfilling, on completion all glands shall be well screwed down, and all valves shall operate freely.

### **S5.23 VALVE / HYDRANT MARKERS**

1. The position of all stop valve, scour valve, air valve and hydrants shall be indicated by a kerb marker plate, painted kerb marker or marker post. The type of marker to be installed shall be as stated on the approved Project Drawings.
2. Where a painted "H" symbol is required to indicate hydrants they shall be in accordance with Standard Drawing S2010.
3. Where a kerb marker plate are required to indicate valve and hydrant locations they shall be fixed to the kerb face it shall be in accordance with Standard Drawing S2010.
4. Where a timber marker posts are required to indicate valve and hydrant locations they shall be in accordance with Standard Drawing S2012.
5. Where a steel marker posts are required to indicate main, valve and hydrant locations they shall be in accordance with Standard Drawing S2011.
6. In addition to painted kerb markers / marker posts, all hydrants shall have a road pavement marker to indicate the location of the hydrant. The road pavement marker shall be either a painted teardrop or blue bi directional raised retro reflective pavement marker as stated on the approved Project Drawings.
7. Where a painted teardrop is specified the teardrop shall be painted with a solid yellow enamel paint and be 630mm overall length with 200mm radius base and a 25mm radius tip. The teardrop shall be painted across

the centreline of a two-lane road or in the middle of the near side lane of a multi laned road. The tapered end of the teardrop shall point towards the relevant hydrant

8. Where a blue bi-directional raised retro reflective pavement marker is specified it shall be fixed securely to the road pavement 100mm offset from the centreline of the road on the side of hydrant. On two lane roads, the marker is to be positioned on the road centreline. For multi-lane roads, it is to be positioned on the lane line between the first and second lane.
9. The installation requirements of and pavement makings and raised retroreflective pavement markers shall be in accordance with Main Roads Standard Specification "MRTS11.45 Road Surface Delineation".

#### **S5.24 ANCHOR BLOCKS**

1. Where a main is installed at a grade of 1 in 6 or steeper, concrete anchor blocks shall be provided in accordance with Standard Drawing S2016.
2. Concrete works shall comply with Specification S7 CONCRETE WORKS.

#### **S5.25 THRUST BLOCKS**

1. Thrust blocks shall be constructed where shown on the approved Project Drawings. The blocks shall be provided at valves, bends, tees, enlargers and reducers or any other point where unbalanced forces resulting from internal pressures will occur.
2. Thrust blocks, sized in accordance with the requirements detailed on Standard Drawing S2015.
3. Concrete works shall comply with Specification S7 CONCRETE WORKS.
4. Chains will not be accepted as an alternative to straps.
5. Where thrust blocks are cast to flanged fittings the concrete is to be kept sufficiently clear of the bolts so that they can be bolted and unbolted.

#### **S5.26 WATER SERVICE CONNECTIONS**

1. Water service connections shall be constructed where shown on the approved Project Drawings in accordance with and to the satisfaction of the relevant Local Authority.
2. All services shall be left turned off at the ferrule following testing.
3. Install brass kerb markers in the kerb, stamped with a "W" at locations where water services cross roads.
4. For Cairns Regional Council, Connections to live mains or mains that will be donated to Council for either subdivision connections, water connections or connections for irrigation are to be undertaken by Cairns Regional Council Water and Waste.

#### **S5.27 BACKFILLING AND COMPACTION**

1. Material for the side support and overlay of the pipe shall comply with the pipe bedding material specification. The material shall be compacted in layers of not more than 150mm to 95 per cent of the standard maximum dry density of the material used when determined in accordance with AS1289. Flooding of non-cohesive material shall be considered as an acceptable method of compacting bedding material.
2. The remainder of the excavation shall be backfilled with excavated material. The backfill shall be compacted in layers of not more than 150mm thick to 95 per cent of the standard maximum dry density of the material used when determined in accordance with AS1289. Flooding of cohesive material shall not be permitted as a means of compacting backfill.

## **WATER RETICULATION**

3. Backfilling and compaction shall be carried out without damaging the pipe or its external coating or wrapping or producing any movement of the pipe.
4. Where trenches are under constructed pavements or in other situations where required, the material used for backfilling shall be approved excavated material with linear shrinkage of the fines passing a 2.36mm sieve of not greater than 6 per cent. The Contractor may elect to use imported, select fill or sand for this purpose. The backfill shall be spread in layers not exceeding 300mm in loose depth at or near optimum moisture content and compacted using mechanical vibration equipment.
5. Backfill material down to a depth of 300mm below the underside of the pavement material shall be compacted to 98 per cent of the standard maximum dry density of the material used when determined in accordance with AS1289, and backfill material below such depth shall be compacted to not less than 95 per cent of the standard maximum dry density of the material used when determined in accordance with AS1289.
6. In cases other than those covered by the above clause backfilling above the level of 300mm above the top of the pipes in open trenches may be carried out by dumping from mechanical plant into the trench providing that no rock is placed in the trench until the pipes are covered by at least 300mm of soil backfill.
7. Compaction testing shall be carried out at a rate of 1 test for each 150 metres of trench backfilled or in the case where trenches are constructed under road pavements and road shoulders, 1 test for each 25 metres of trench backfilled.

### **S5.28 RESTORATION OF SURFACES**

1. Pavements, lawns and other improved areas shall be cleaned and left in the same order as they were at the commencement of the works. Lawns shall be restored with turf cut and set aside from the original surface and / or with imported turf.
2. All restored surfaces shall be maintained in the condition to which they are restored until the expiry of the Defects Liability Period applicable to those surfaces. Pavements shall be maintained with crushed metal, gravel or other suitable material allowing for consolidation and shall then be restored to a condition equivalent to that of the original pavement.
3. Immediately the backfilling of a trench excavated through a pavement has been completed, the pavement shall be temporarily restored. Where the trench crosses bitumen or concrete pavement, a pre-mixed asphaltic material shall be used for such temporary restoration. Temporary restoration works shall be maintained by the Contractor until final restoration is carried out.
4. Final restoration of the pavement shall be carried out to restore the pavement and its sub-base to no less than the original condition. Unless noted otherwise on the approved Project Drawings all trenches excavated through bitumen or concrete pavement shall be sawcut each side to facilitate a neat finish to the final restoration. Final restoration may include, if required, the removal of temporary restoration.
5. Backfill shall be placed sufficiently high to compensate for expected settlement and further backfilling shall be carried out or the original backfill trimmed at the end of the Defects Liability Period in order that the surface of the completed trench may then conform to the adjacent surface. Surplus material shall be removed and disposed of to areas arranged by the Contractor.
6. In locations where surplus material left in the vicinity of the trench would not be objectionable, the surplus material may be disposed by spreading neatly in the vicinity of the trench in such a way as to minimise future erosion of the backfill and adjacent ground surfaces. The Contractor shall maintain the backfill and adjacent ground until the end of the Defects Liability Period.
7. Where, within public or private property, the reasonable convenience of persons will require such, trenches to be levelled off at the time of backfilling. Any subsequent settlement shall be made good by the Contractor, as required by placing additional fill.

8. Where shown on the approved Project Drawings or where the Contractor elects to tunnel under paving, kerb and gutter or other improved surfaces in lieu of trenching, backfilling shall be so carried out as to restore full support to those surfaces. The Contractor shall remain responsible for the repair of the improved surfaces, if subsequently damaged due to subsidence of the backfill, until the end of the Defects Liability Period.

#### **S5.29 TESTING OF LINES**

1. Hydrostatic pressure testing of all water mains shall be carried out prior to the acceptance of the works.
2. The contractor shall have carried out a successful test prior to arranging a Council witness test.
3. Pressure testing shall not be carried out during wet weather unless otherwise approved by Council.
4. Before testing a pipeline section, it shall be cleaned and filled slowly with water, taking care that all air is expelled.
5. The minimum test pressure acceptable shall be 1200 kPa unless advised otherwise by the relevant Local Authority and shall be considered to be satisfactory if:
  - (a) There is no failure of any thrust block, anchor block, pipe, fitting, valve, joint or any other pipeline component;
  - (b) There is no visible leakage; and
  - (c) There is no loss of pressure in the 15 minute test period
6. The specified test pressure shall be maintained as long as required, while the whole section is examined, and in any case not less than 15 minutes.
7. Any failure, defect, and / or visible leakage, which is detected during the pressure testing of the pipeline or during the Defects Liability Period shall be made good by the contractor and re-tested.

#### **S5.30 FLUSHING & DISINFECTION**

1. Preliminary Flushing

The entire new main is to be flushed until it is clean and clear

2. Disinfection (if directed)

If directed by Council, disinfection of the entire new main is to be carried out using a sodium hypochlorite solution or other chlorine bearing agent. The dosing rate is to be 20mg/L with a contact time of 24 hours. During such time all fittings, valve and hydrants should be operated to ensure all parts are being disinfected.

3. Flushing of Disinfection Water

After disinfection, the treated water is to be flushed from either end until the chlorine content does not exceed 1.0mg/L. Disinfection water is not permitted to enter the reticulation system or be discharged to the stormwater drains or waterways.

4. Testing

Upon completion of the flushing and disinfection process, water samples are to be taken for testing by a Council approved testing authority. The samples are to be tested for E-coli, Total coliform and Heterotrophic Plate Count.

1. Tolerances for the construction of water reticulation works shall comply with Table S5.1.

**Table S5.1 Construction Tolerances**

Alignment	On the allocated alignment +/- 100 mm
Hydrants, Fittings	Within 0.3m of design relative to side property boundary
Water service connections / conduits	Within 0.3m of design relative to side property boundary
Valves	Within 0.3m of design relative to first point of truncation of the property boundary

# **APPENDIX A**

## **Amendments to Standard Drawings – CTM Water Alliance Design and Construction Code, Version 1.0 August 2019 – Standard Drawings**



## APPENDIX A – Amendments to Standard Drawings - CTM Water Alliance Design and Construction Code, Version 1.0 August 2019 - Standard Drawings

CTM Drawing Reference	Amendment
CTM-WAT-001 Typical Water Reticulation Locality Plan and Details	Do not use
CTM WAT-002 Small Lots Details Plan	Do not use
CTM WAT-003 Typical Above Ground Property Service and 20mm Water Meter	Do not use
CTM-WAT-004 Typical Appurtenance Installation Scour Arrangement to Stormwater	Do not use

SEQ Drawing Reference	Amendment
WAT-1100-1 Typical Water Reticulation Locality Plan and Details - Sheet 1	Do not use
WAT-1100-2 Typical Water Reticulation Locality Plan and Details - Sheet 1	Do not use
WAT-1101-2 Typical Water Reticulation Locality Plan and Details - Sheet 2	Do not use
WAT-1101-3 Typical Water Reticulation Design Plan Notes - Sheet 3	Do not use
WAT-1102-1 Typical Mains Construction Reticulation Main Arrangement	Do not use
WAT-1103-1 Typical Mains Construction Distribution and Transfer Main Arrangements	Do not use
WAT-1104-1 Typical DN63 PE Cul-De-Sac Arrangement	Do not use
WAT-1104-2 Typical Scour Details for DN63 Mains	Do not use
WAT-1105-1 Typical PE Water Main Details	Do not use
WAT-1105-2 Typical Connection to Existing Mains	Do not use
WAT-1106-1 Typical Property Service Connections Main to Meter	Do not use
WAT-1106-2 Typical Property Service Connections Main to Meter	Do not use
WAT-1107-1 Typical PE Property Services PE Main to Meter and Conduit Detail	Do not use
WAT-1107-2 Typical Copper Property Services PE Main to Meter and Conduit Detail	Do not use
WAT-1107-3 Typical Property Services General Arrangement 20mm or 25mm Meters	Do not use
WAT-1108-1 Property Services Potable Service Connection Conduit Details	Do not use

WAT-1108-2 Property Services Potable Service Connection Typical Main To Meter	Do not use
WAT-1108-3 Property Services Potable Service Connection 20MM Domestic Service Meter Box Details	Do not use
WAT-1109-1 Water Connections Single, Double And Ghost Above Ground Meter	Do Not Use
WAT-1109-2 Water Connections Subdivisional	Do not Use
WAT-1110-1 Property Service General Arrangement and Conduit Details	Replace with S2016
WAT-1110-2 Property Service Water Meter and Installation Assembly Details	Replace with S2016
WAT-1200-1 Typical Soil Classification Guidelines And Allowable Bearing Pressures For Anchors & Thrust Blocks	Replace with S2016
WAT-1200-2 Embedment & Trench fill Typical Arrangement	Replace with S2016
WAT-1201-1 Standard Embedment Typical Flexible & Rigid Pipes	Replace with S2016
WAT-1202-1 Typical Special Embedment Inadequate Foundations Requiring Over Excavation & Replacement	Replace with S2016
WAT-1203-1 Typical Special Embedment Concrete & Stabilised Embedment and Flexible Joint Details	Replace with S2016
WAT-1204-1 Typical Trench And Bedding Details With In Existing Roads Type K To N	Replace with S2016
WAT-1205-1 Typical Thrust Block Details Mass Concrete	See S2015
WAT-1206-1 Typical Thrust and Anchor Blocks for Valves	See S2015
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	Do not use
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
WAT-1212-1 Typical Buried Crossings Major Road Ways	Approved
WAT-1213-1 Typical Buried Crossings Railways	Approved
WAT-1214-1 Typical Buried Crossings Bored and Jacked Encasing Pipe Details	Approved
WAT-1300-1 Typical Valve and Hydrant Identification Markers	Replace with S2010
WAT-1300-2 Typical Valve and Hydrant Identification Marker Posts	Replace with S2010
WAT-1301-1 Typical Valve and Hydrant Installation Valve Arrangement	Do not use
WAT-1302-1 Typical Hydrant Installation	Do not use

**WATER RETICULATION**

WAT-1303-1 Typical Valve and Hydrant Installation Future Extension Installation	Do not use
WAT-1303-2 Typical Valve and Hydrant Installation Future Extension Installation	Do not use
WAT-1304-1 Typical Air Valve Installation For Trunk Main	Do not use
WAT-1305-1 Typical Surface Fitting Installation Valve And Hydrant Surface Boxes Trafficable And Non-Trafficable	Do not use
WAT-1306-1 Typical Surface Fitting Installation Valve And Hydrant Surface Boxes Support And Surround Details	Do not use
WAT-1307-2 PE Water Mains Typical Details Scours	Do not use
WAT-1307-3 Typical Appurtenance Installation Scour Arrangements	Do not use
WAT-1308-1 Typical Appurtenance Installation Large Valve Chambers	Do not use
WAT-1309-1 Typical Appurtenance Installation Passive Pressure Reducing Valves (Prv)	Do not use
WAT-1309-2 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) DN100 To DN300	Do not use
WAT-1309-3 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) DN100 And DN150	Do not use
WAT-1309-4 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) DN200 To DN300	Do not use
WAT-1310-1 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) Above Ground	Do not use
WAT-1310-2 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) Above Ground	Do not use
WAT-1310-3 Typical Appurtenance Installation Active Pressure Reducing Valves (Prv) Above Ground Cabinet Details	Do not use
WAT-1310-4 Typical Appurtenance Installation Flowmeter Details Below Ground Installation	Do not use
WAT-1311-1 Aerial Crossing Typical Aquaduct	Do not use
WAT-1311-2 Typical Aerial Crossing Aqueduct Protection Grille	Approved
WAT-1312-1 Aerial Crossings Typical Bridge Crossing Concepts	Do not use
WAT-1313-1 Flanged Joints Typical Bolting Details	Do not use
WAT-1314-1 Typical Small Water supply Pump Station Or Reservoir Drawing 1 Of 4	Do not use
WAT-1315-1 Typical Small Water supply Pump Station Or Reservoir Drawing 2 Of 4	Do not use

WAT-1316-1 Typical Small Water supply Pump Station Or Reservoir Drawing 3 Of 4	Do not use
WAT-1317-1 Typical Small Water supply Pump Station Or Reservoir Drawing 4 Of 4	Do not use
WAT-1318-1 Typical Arrangement Main Swabbing Chamber	Do not use
WAT-1400-1 Typical Steel Pipe Jointing Butt Welding Of Joints	Do not use
WAT-1401-1 Typical Steel Pipe Jointing Rubber Ring Joint Spigot Band Specials	Do not use
WAT-1402-1 Typical Steel Pipe Jointing Welded Pipe Collars	Do not use
WAT-1403-1 Typical Steel Pipe Jointing Bends	Do not use
WAT-1404-1 Typical Steel Fabrication Access Opening For Pipes > DN 750	Do not use
WAT-1405-1 Typical Steel Fabrication Dismantling And Flexible Joints	Do not use
WAT-1406-1 Typical Steel Fabrication Valve Connection And Bypass	Do not use
WAT-1407-1 DI Installation Valve Bypass Arrangement Typical Di Pipe Fittings	Do not use
WAT-1408-1 Typical Joint Corrosion Protection Cement Mortar Lined Steel Pipe DN 750 To DN 1200	Do not use
WAT-1409-1 Hydrant Installation Fittings Typical Pe Assemblies Nomenclature	Do not use
WAT-1410-1 Typical Chlorination Test Point Details	Approved

# **APPENDIX B**

## **Dual Water Supply Systems**

**Version 1.2 WSA 03-2002**

### **Amendments to Standard Drawings**

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**APPENDIX B - Dual Water Supply Systems Version 1.2 – WSA 03-2011**  
**Amendments to Standard Drawings****STANDARD DRAWINGS**

<b>Drawing</b>	<b>Amendments</b>
WAT-1800	<b>Adopt</b>
WAT-1801	<b>Adopt</b>
WAT-1802	<b>Adopt</b>
WAT-1803	<b>Adopt</b>
WAT-1804	<b>Adopt</b>
WAT-1805	<b>Adopt</b>
WAT-1806	<b>Adopt</b>
WAT-1807	Do not Use
WAT-1808	<b>Adopt</b>
WAT-1810	<b>Adopt</b>
WAT-1811	<b>Adopt</b>
WAT-1820	Do not Use
WAT-1821	Do not use
WAT-1822	<b>Adopt</b>
WAT-1823	<b>Adopt</b>
WAT-1824	Do not use
WAT-1825	<b>Adopt</b>