TasWater
Supplement to
Water Supply Code of Australia
WSA 03 - 2011-3.1 MRWA Edition V2.0

Issue Number: PUBLIC 05

Table of Contents

Introduction

This supplement describes the requirements of the Tasmanian Water & Sewerage Corporation (TW) for water reticulation works additional to those in the WSAA Water Supply Code of Australia WSA-03-2011-3.1 MRWA Edition V2.0 herein known as “the Code”, and this supplementary document must be read in conjunction with the Code.

The Code and this supporting documentation essentially provides "deemed to comply" solutions for the creation of TW reticulation water assets.

Alternative solutions, practices, equipment and methodologies will continue to evolve and offer opportunities to improve the creation of these assets. TW encourages employment of any innovation that offers enhanced productivity and serviceability.

TW input should be sought if an innovative opportunity is being considered.

Suggestions or comments are welcome using the document improvement request form and can be sent to: enquiries@taswater.com.au

Acknowledgments

TW acknowledges the following documents which have been drawn upon for the creation of this document:

- Southern Water’s Supplement
- North East Water’s Engineering Guidelines
- Goulburn Valley Water’s Supplement
- Barwon Water’s Supplement
- City West Water Approved Products Catalogues

Part 0: Glossary of Terms and Abbreviations

I. GLOSSARY OF TERMS

Add

'Agreement Conditions'	means any conditions and requirements specified in the "TW Response to Council Notice of Planning Application Referral", "TW Certificate of Certifiable Works", the "Permit to Construct TW Infrastructure" and any "Approved Drawings".
Authority	Tasmanian Water and Sewerage Corporation trading as TasWater *(*TW)
average day demand	the average rate of usage for an average day (past, present or future)
connection	identical meaning to "service pipe".
mean day max month	the average rate of usage for the peak month (past, present or future)
peak hour demand	identical meaning to "maximum hour demand"
Water Agency	to also include the Tasmanian Water and Sewerage Corporation trading as TasWater.

II. ABBREVIATIONS

Add

AD	Average Day
ET	Equivalent Tenement – A standard residential lot
MDMM	Mean Day Max Month
PD	Peak Day
PH	Peak Hour
TW	Tasmanian Water and Sewerage Corporation trading as TasWater

Part 1: Planning and Design

1 GENERAL

1.2 PLANNING AND DESIGN

1.2.5 Detailed design

1.2.5.2 Requirements to be addressed

Add in additional requirement:

Any TW special requirements to be satisfied in the design process shall be defined in the 'Agreement Conditions'.

If a staged development is proposed the "Designer" shall provide an indicative overall concept plan of the development at the time of submitting the first stage to TW for approval.

1.3 CONSULTATION WITH OTHER PARTIES

Any TW responsibilities for consultation shall be defined in the 'agreement conditions'.

2 SYSTEM PLANNING

2.2 SYSTEM PLANNING PROCESS

2.2.2 Extending / upgrading an existing water supply system

In lieu of (a) and (b) of this Clause of WSA 03, the "Planner/Designer" shall:

(a) Take into account points (i), (ii) and (iii) which will be provided by TW in designing the extension/upgrade of an existing water supply system to ensure that it adequately services any existing and any future customers on that system.

(b) Provide details of the proposed extension/upgrade in the preliminary/early phases of the design in particular the number and location of both existing and future customers, to TW to allow it to be "trialled / modelled " in TW's network analysis model and determine its impact on the existing water reticulation system.

The outcome of this trialling may lead to TW placing additional requirements on the proposed extension/upgrade and/or the developer to augment the existing system to meet the demands of the proposed extension/upgrade.

2.2.3 Providing a new water supply

The actual demand value(s) used in the design must be authorised by TW.

2.3 DEMANDS

2.3.1 General

For all new developments the Average Day Demand (AD) shall be taken as 250kL/ET/annum which equates to 685L/ET/day.

The value of 250kL/ET/annum allows for the following contributions:

Contribution	kL/ET/annum	L/ET/day
Average annual residential water allowance	200	548
Community use @ 2.5%	5	14
System Losses @ 22.5%	45	123
Total (AD)	**250**	**685**

For Equivalent Tenement rates refer to Table A1 in Appendix A of this Supplement.

Where appropriate and actual consumption figures are accurately known actual consumption should be the basis for design.

2.3.3 Demand assessment

2.3.3.1 General

The actual demand value(s) used in the design must be authorised by TW.

2.3.4 Peak demands

2.3.4.1 General

TW requires that the following factors are adopted for analysis of system capacity

In addition to the other demand definitions, Mean Day Max Month (MDMM) demand is defined as 1.5 x Average Day (AD) demand.

MDMM/AD = 1.50

2.3.4.2 Peak Day Demand

Generally Peak Day (PD) demand shall be defined as 2.25 x Average Day (AD) demand. In areas of high tourism or fluctuation the PD Demand shall be defined as 2.50 x AD demand.

PD/AD [General] = 2.25
PD/AD [Tourism] = 2.50

2.3.4.3 Peak Hour Demand

Peak Hour demand shall be assumed to be 2.0 x Peak Day Average Hour Demand.

PH/PD = 2.0

2.5 SYSTEM HYDRAULICS

2.5.2 Network analysis

Add in additional paragraph

Guidelines for modellers are contained within Appendix B of this Supplement.

2.5.3 Operating pressures

2.5.3.2 Maximum service pressure

TW will allow maximum pressure to new connections within existing supply zones up to the current maximum pressure within that supply zone. Supply zones shall not be extended if the extension means the maximum service pressure within the zone shall exceed 800kPa without approval from TW.

Pressure limiting valves (PLV's) installed on property connections shall be installed on the customer side of the meter and be maintained by the property owner.

2.5.3.3 Minimum service pressure

The minimum service pressures specified in Table 2.3 are not applicable. Desirable minimum service pressure does not apply.

The minimum service pressures shall be as per Table 2.5.3.3 below.

Pressure at the connection point [1,2]	**Residential Flat Grade [3] (≤ 18%)**	**Residential Steep Grade [3] (> 18%)**	**Non-Residential**
Minimum Pressure at PH	220kPa (22m)	250kPa (25m)	250kPa (25m)

Table 2.5.3.3

1 Excluding fire fighting and measured at the connection point with the relevant supplying water storage reservoir not more than one third full at PH – generally deemed to be at the property road frontage but for internal lots commonly known as 'hammerhead style blocks' the minimum pressure at PH is to be achieved at the 'lot proper' boundary. Where pressure is achieved at the lot proper the developer shall include an allowance for losses between the connection point and the Lot Proper in their design.

2 The minimum pressures at PH are based on Section 3 Sizing of Water Services and Appendix C of AS/NZS3500.1.2:2003 for a double storey dwelling fed from a DN20 metered service connection, a 40m Index Length and achieving a 50kPa working head at the most disadvantaged fixture without on-property storage tanks or booster pumps and a demand of 0.1l/s. Where the Index Length is greater than 40m or smaller pipe diameters are used then additional pipe losses shall be allowed for. This is the responsibility of the property owner who should engage a suitably qualified person.

3 Measured on the high side of the street from the connection point to the highest contour on the block

4. The maximum allowable Peak Day pressure variation is a drop of 20% from the static pressure. Where the static pressure is less than 30m, the maximum allowable variation is 10% and in no case can the minimum pressure be less than 22m.

2.5.5 Determining Supply Zones

The creation of new supply zones is not preferred and "Planners/Designers" should discuss this issue with TW in the early stages of the design phase in an attempt to eliminate such zones. Preferably supply zones shall be consistent with TW's existing system.

2.8 PUMPING STATIONS

2.8.1 General

A standby pump of the same capacity as the duty pump is required. Provision shall be made in the design and ultimate operation for the standby and duty pumps to be alternated.

All pump stations must conform to TW Electrical standards.

The power supply mains cabling to the pumping stations shall have 20% spare capacity for future upgrading and be electrically configured such that the pumping stations can operate from an emergency generator supply at times of power failure. The provision of space in the switchboard for a manual or Automatic Source change over panel (ATS) is also required.

Where pumps are to be installed above ground, they are to be housed in a concrete block, brick or precast concrete building appropriately designed to minimise nuisance noise emissions. In residential areas, care shall be taken to ensure pump stations have an aesthetic appearance and do not cause any noise nuisance. The arrangement within the pump station shall include sufficient valves and fittings to allow for future repairs and maintenance.

As a minimum the duty of the pump sets shall be capable of delivering the MDMM over 20 hours.

All pump stations shall be complete with a flow meter.

For continuously operating booster pump sets the minimum duty shall be based on the peak instantaneous demand or fire fighting requirement whichever is the larger.

Continuously operating booster pump sets shall incorporate an emergency generator with auto changeover if they are installed to supply connections that would not receive any flow during periods of power outage.

The design of any water pump station must be undertaken in consultation with TW.
TW does not permit private in-line pumping directly from water mains, private booster pumping must be from a private break pressure tank within the property, with the inflow into the tank regulated.

2.9 SERVICE RESERVOIRS

2.9.1 Storage capacity

Service Reservoir

The minimum capacity for any service reservoir shall be one (1) full day supply at peak day demand plus additional reserve storage equal to the greater of 1/3 full day supply at peak demand or 150kL i.e. minimum reservoir capacity = max(1.33PD, 1PD + 150kL).

The size of the service reservoir should then be rounded up to the nearest 50 kL (eg 353 kL will be rounded up to 400 kL).

The service reservoir should be located at an elevation such that the water level when the service reservoir is 1/3 full provides not less than the minimum allowable service pressures at the customers services under peak demand conditions (Table 2.5.3.3 of this Supplement).

Reservoirs are to be designed as part of an overall system and are to be located at elevations consistent with other reservoirs within the same supply zone.

When designing the service reservoir consideration shall be given to the need for a drainage easement and associated piping for reservoir overflows and scouring/flushing. Unless otherwise approved, all service reservoirs shall be concrete, designed and constructed in accordance with the requirements of AS3735-2001 Concrete structures retaining liquids. All service reservoirs shall be roofed.

The design of any service reservoir; in particular confined space access and egress, must be undertaken in consultation with TW's Compliance / Development Officers who will liaise with the relevant TW Asset Management Department.

Elevated and standpipe reservoirs

Elevated and standpipe reservoirs will be considered by TW on a case by case basis.

2.12 SYSTEM REVIEW

Add item (o) as follows:

(o) For design purposes a minimum flow rate of 15 litres per minute shall be provided at the customer connection point after the meter and boundary backflow protection device through a standard 20mm service connection at PH demand.

3 HYDRAULIC DESIGN

3.1 SIZING

3.1.2 Minimum pipe sizes

TW accepts pipe sizes <DN250 in CBD zones provided that adequate flow rates and residual pressures are satisfied.

The minimum acceptable pipe size is DN100 for “residential” areas and DN150 for “commercial and industrial” areas.

The minimum pipe size for the bowls of courts, cul-de-sacs and roads shall be DN50 (63 mm outside diameter if polyethylene (PE) pipe is being used), however fire hydrants must have a minimum main diameter of DN100 on the supply side.

Reduced size duplicate mains shall only be installed in urban areas:

(a) Where the need for a duplicate main is identified based on Clause 5.2.4 and fire flows are not required from the duplicate main; and

(b) During renewals when the replacement of a reduced size duplicate main with individual service crossings would lead to significant additional cost and disruption in comparison to replacing the existing reduced size duplicate main.

Table 3.1 - Note 1
TasWater Drawing TWS-W-0015 replaces MRWA-W-108 and MRWA-W-109 regarding requirements for installation of reduced size mains servicing cul-de-sacs.

Reduced size mains may be allowed in rural areas where installation of a 100mm main would result in poor water quality outcomes.

3.1.3 Empirical sizing of reticulation mains

Number of lots in table 3.2 is equal to number of ET’s.

3.1.5 Fire flows

Fire flows from TasWater fire hydrants must comply with Table 3.1.5

Zoning[1]	Unassisted Feed Hydrant Demand[2]	Design Fire Flows[3]	System Residual Pressure	Background Demand[4]
General Residential Inner Residential Urban Mixed Use Village (if Serviced) Low Density Residential Rural Living	10 L/s @ 200kPa minimum residual pressure from one hydrant for a period of 4 hours	10 L/s @ 250 kPa (new) or 300 kPa (old) minimum residual pressure from one hydrant for a period of 4 hours	100 kPa in entire service zone	2/3PH (not less than AD)
Local Business General Business Central Business Commercial Light Industrial General Industrial	20 L/s @ 200kPa minimum residual pressure from two adjacent hydrants @ 10l/s each for a period of 4 hours	20 L/s @ 250 kPa (new) or 300 kPa (old) minimum residual pressure from two adjacent hydrants @ 10 l/s for a period of 4 hours	50 kPa in entire service zone	2/3PH (not less than AD)
Community Purpose Recreation Utilities Major Tourism Port and Marine	As per highest adjacent zoning	As per highest adjacent zoning	As per highest adjacent zoning	

Table 3.1.5

1 Zoning as per Tasmanian planning scheme
2 Feed hydrants are as defined in AS2419
3 To achieve the minimum standards, the design flows include an increased pressure allowance to account for losses within the hydrant, based on internal coating. If the hydrant has an epoxy resin coating it is classified in the table above as 'new', otherwise it is 'old'.
4 Service Reservoir level to be modelled at not more than 1/3 full

3.1.6 Sizing by analysis

3.1.6.3 Hydraulic roughness values

The Roughness coefficient, either Colebrook White k or Hazen-Williams Coefficient C_{HW}, shall be not more favourable than those in Table 3.1.6.3 regardless of material type or age:

	Pipe Roughness Default Values			
Pipe Material	**Colebrook White** k (mm)	**Hazen-Williams** C_{HW} (D <= 150)	**Hazen-Williams** C_{HW} (150 < D <= 500)	**Hazen-Williams** C_{HW} (D > 500)
AC	0.6	120	130	140
CICL	0.6	120	130	140
Cu	0.15	130	140	150
DICL	0.6	120	130	140
MSCL	0.6	120	130	140
PE	0.15	130	140	150
PVC	0.15	130	140	150
SS	0.15	130	140	150
Unknown	0.6	120	130	140

Table 3.1.6.3

1 An allowance for minor losses (bends and valving) has been incorporated into the above values. Additional fitting losses shall be generally in accordance with the latest edition of AS2200 Design Charts for Water Supply and Sewerage Chart 14 and manufacturer's literature.

3.2 DESIGN PRESSURES

3.2.3 Pumped Systems

Change item (c) and add item (d) as follows:

(c) Pressure due to 1.5 times the duty point of the pump(s) plus the maximum suction pressure minus the lowest ground level along the route of the pipeline.

(d) The design head for pumped systems shall be the greater of these three values.

3.3 PRESSURE CLASS OF SYSTEM COMPONENTS

TW requires the pressure class of all pipes to be a minimum of PN16.

Table 3.3.2 replaces Table MRWA 3.6 PN Classes and Pressure Limits

PN Class	Max Allowable Operating Pressure (m)	Max Design Pressure (m)	Max Test Pressure (m)
16	108	128	160
20	148	168	200
35	298	318	350

Table 3.3.2

4 PRODUCTS AND MATERIALS

4.1 GENERAL

TW has its approved products listed within the MRWA approved products portal (Refer to www.mrwa.com.au/Pages/Products.aspx) products must be used within the limitations specified by TW noting that TW will not approve the use of non Australian standard pipes and fittings for non-polyethylene piping.

Where products are required that are not listed in the TW Approved Products Catalogues then they can be considered for approval by TW provided that they have Watermark Approval http://www.watermark.standards.org.au/ and are approved for use in contact with drinking water to AS/NZS 4020. TW approval is required prior to use.

The following paragraphs provide commentary on TasWater preference for materials based on diameters.

Property Service Connections & Below DN100 water mains

High Density Polyethylene (HDPE) pipe with trace wire is approved for use in property service connections and reduced size mains. HDPE pipe must be SDR11. If the pipe has to cross a road, (HDPE pipe with trace wire is to be inserted into a sleeve pipe of minimum class SN4, Typically DN100 for max 63OD service. Sleeved pipes shall be installed so that water hammer and pressure fluctuations do not cause pipe movement within the conduit. Ref Table 110-B for conduit sizes.

The default material to be utilised shall be HDPE) pipe unless the pipe is located in contaminated ground which can attack HDPE or the pipe is located in the central business district (CBD) or adjacent to major traffic routes. In these cases copper type A or B shall be utilised.

For above ground applications such as meter installations requiring air gaps for testable backflow devices Copper tube type A shall be utilised for the above ground components less than DN80. DICL pipework shall be utilised for all pipework ≥ DN80.

In bushfire-prone areas all exposed piping shall be Copper tube Type A including all pipework and connections within the meter pit as outlined in Section 5.23 of AS/NZS 3500.1:2003. A bush-fire prone area is land within a boundary of an overlay on a planning scheme map or where no overlay exists is land that is within 100m of an area of bushfire-prone vegetation equal to or greater than 1 hectare.

The following pipeline materials are currently approved for use. Other materials may be considered but will require TW approval on a case-by-case basis.

DN100 to DN300 water mains shall be constructed in:

- PVC-M (AS/NZS 4765), Series 2 rubber ring joint. PVC-M shall not be utilised where cyclic loading occurs due to its fatigue de-rating i.e. pump rising mains.
- PVC-O (AS/NZS 4441), Series 2, rubber ring joint
- HDPE (AS/NZS 4130)
- DICL or DIEL (AS/NZS 2280), rubber ring joint, polyethylene wrapped to AS 3680;. Only CIOD DICL or DIEL pipe is permitted.
- MSCL (AS1579), rubber ring joint or welded, Sintakote wrapped.

Pipelines located in urban road reserves of the following road types as defined by the List Transport Segments Dataset shall be either DICL or MSCL unless agreed with TW.

- Collector
- Arterial Road
- Major Arterial Road
- National/State Highway

For pipelines in rural areas HDPE and/or PVC-O may be utilised with TasWater approval in the above road types where mains are parallel to and located beyond the road formation.

Pipelines in contaminated ground shall be metallic. Landslip or other high risk areas shall be either restrained joint ductile iron, fully welded high density polyethylene or fully welded mild steel pipe.

Over DN300 water mains shall be constructed in:

- DICL or DIEL AS/NZS 2280, rubber ring joint, polyethylene wrapped to AS 3680, Only CIOD DICL or DIEL pipe is permitted.
- MSCL AS1579, rubber ring joint or welded, Sintakote wrapped.

Landslip or other high risk areas shall be either restrained joint ductile iron or fully welded mild steel pipe.

Pipelines which cross major highways or other high value assets such as large bridges or rail lines (shall be fully welded MSCL Sintakote wrapped and cathodically protected with test points. On a case by case basis TW may approve the use of sleeved HDPE for highway crossings where the depth of cover exceeds 1.5 times the minimum cover specified in Section 7.4.2 of the Supplement.

All cement linings must be treated with a potable approved seal-coat to reduce leaching.

The decision to use epoxy linings over cement linings with a seal coat will be made on the corrosivity of the water which is when the Langelier Index (LI) is <-0.5. Information on the LI can be obtained from TW.

Central Business Districts

All new water mains installed within road reserves within the Central Business Districts as indicated in Figures 1-4 following must be a minimum of DN150 and have a minimum pressure class PN35. This includes all road reserves that form the boundary of the CBD districts

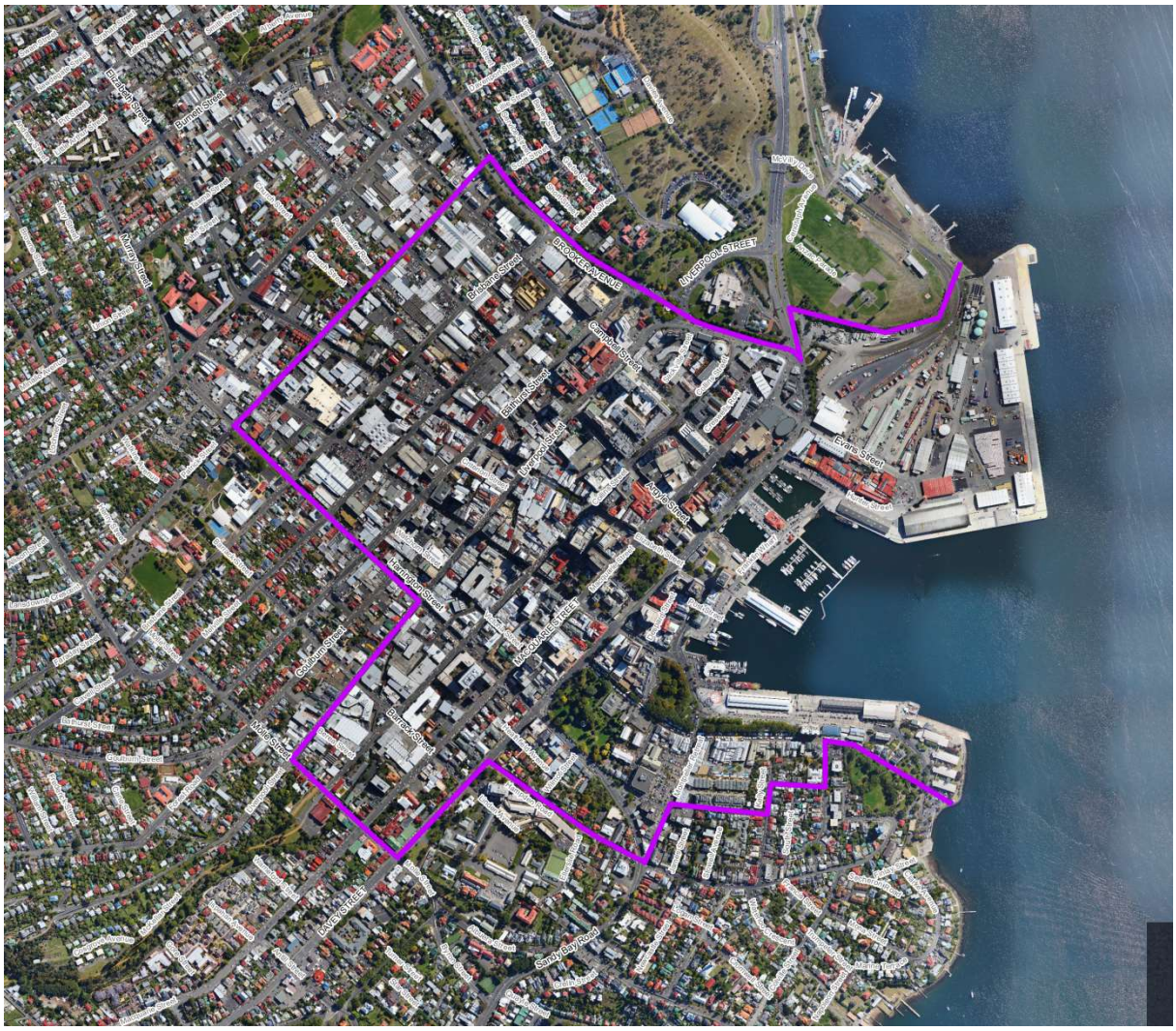

Figure 1- Hobart CBD

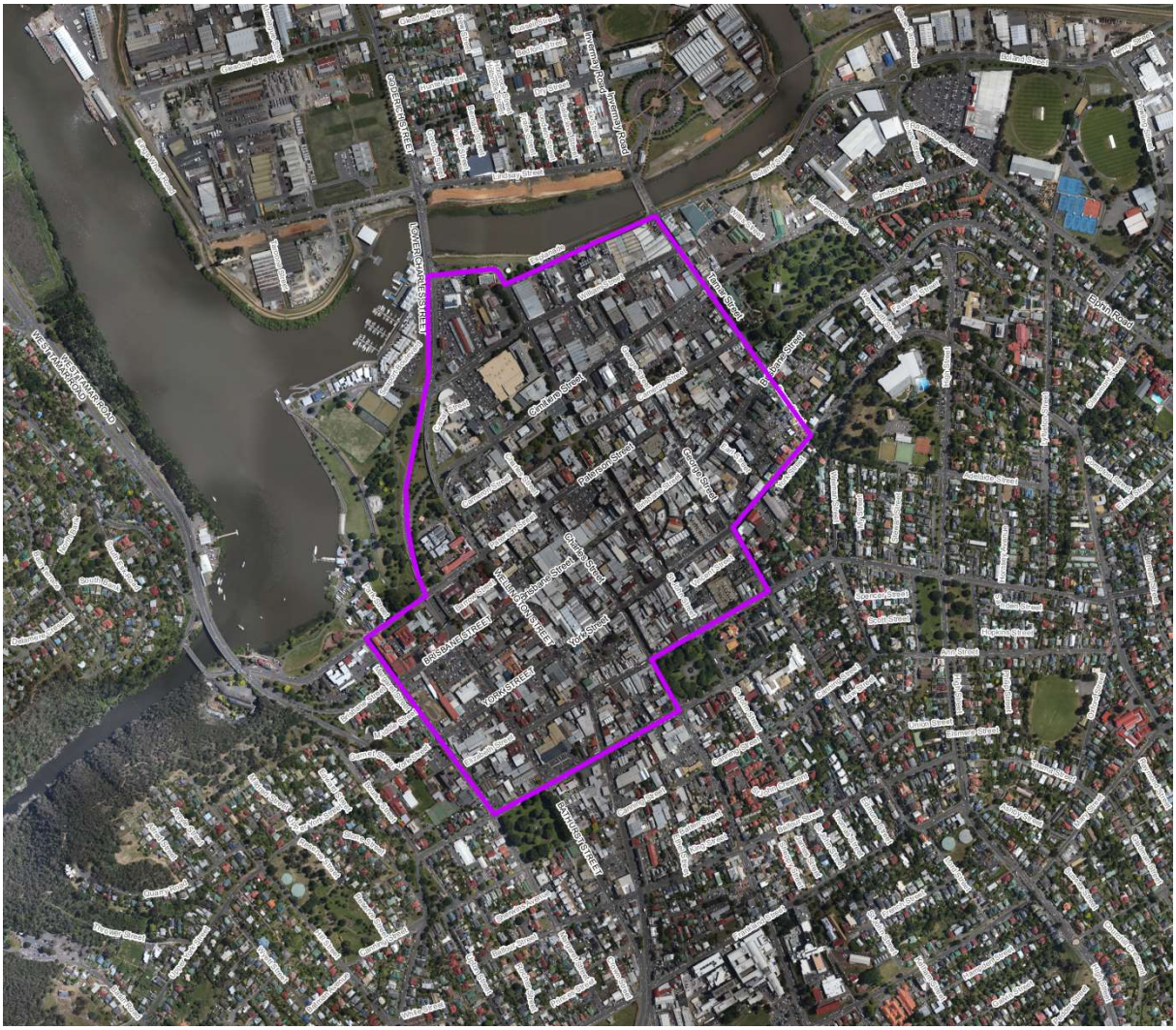

Figure 2 – Launceston CBD

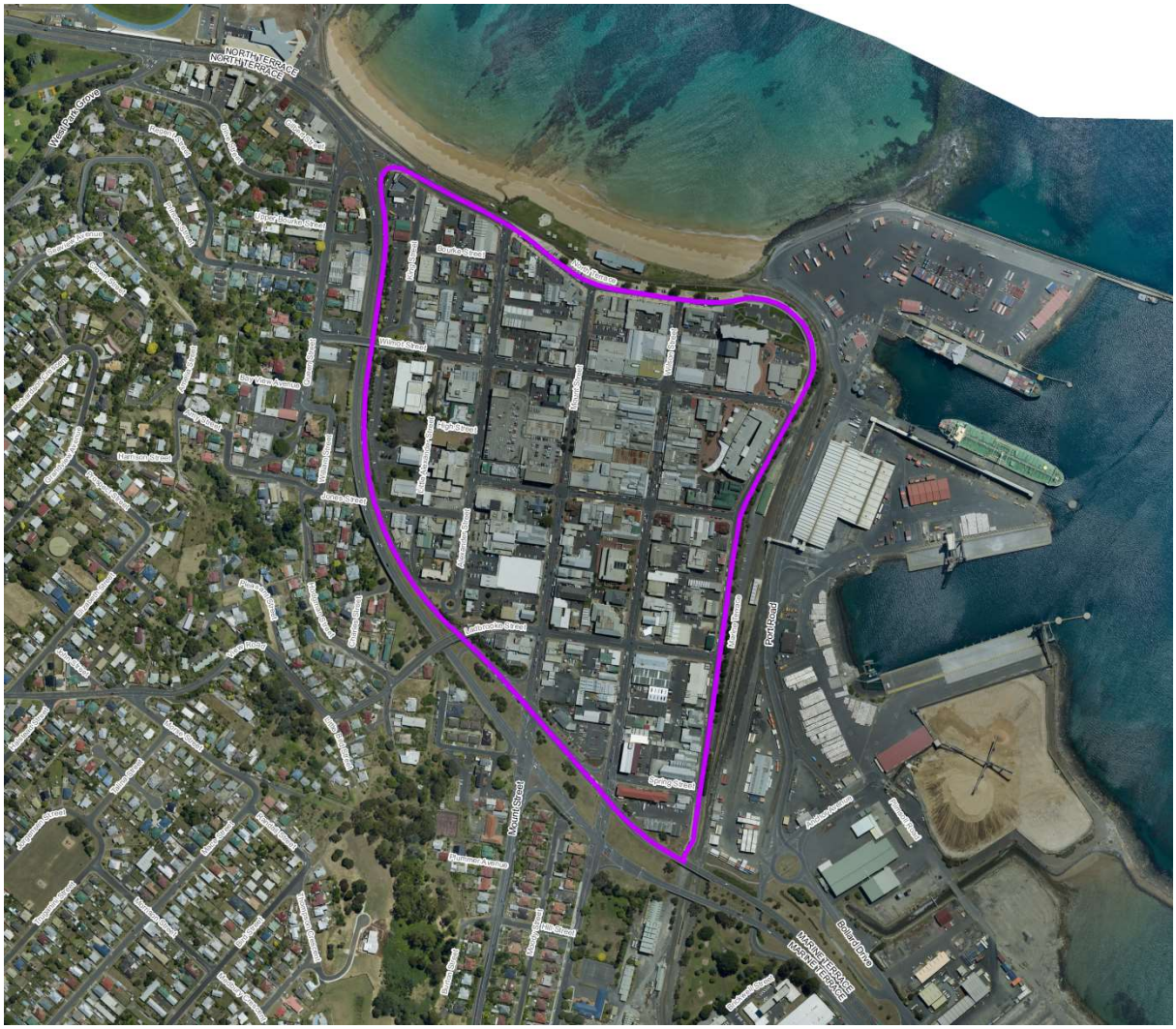

Figure 3 – Burnie CBD

Fittings

Pipeline fittings for joining DICL and/or PVC-M and PVC-O pipes shall be cast or ductile iron, cement lined or epoxy lined and conforming to AS 2544 and AS 2280 respectively.

If gibault joints are used they shall be the elongated (long barrelled) type or vari-gib type.

4.3 DUCTILE IRON PIPELINE SYSTEMS

4.3.3 Seal coating of linings

A seal coating, complying with AS/NZS 2280, shall be specified for all cement mortar lined pipes ≥ DN300 and for all cement mortar lined pipes < DN300 where the total alkalinity of the water being conveyed is less than 30 mg/L.

4.5 PE PIPELINE SYSTEMS

The PE pipe sizes in Table 4.5 are acceptable

DN PE (Nominal and Outside Diameter)	Approximate CIOD Equivalent
25	20
32	25
40	32
50	40
63	50
90	80
125	100
180	150
250	200
315	250
355	300

Table 4.5

5 GENERAL DESIGN

5.1 GENERAL REQUIREMENTS

5.1.1 Design tolerances

Horizontal alignments shall be referenced to GDA.

5.4 LOCATION OF WATER MAINS

5.4.1 General

Water mains in urban areas are to be located in the nature strip unless otherwise approved by TW.

5.4.4 Water mains in easements

Because of the potential for damage if a water main bursts, the easement width and clearance requirements are considerably greater than those required for sewers.

Table 5.2 Default Easement Guidelines is to be deleted and replaced with TW's minimum requirements as per Table 5.4.4

Water Main Diameter DN	Minimum Easement Widths (mm)
≤DN150	4 000
DN150< DN ≤ DN300	6 000
DN300≤ DN ≤ DN600	8 000
>DN600	10 000

Table 5.4.4

Noting that for water mains ≤DN150 the main is to be located centrally in the easement and for water mains >DN150 the main is normally to be located one third (1/3) across the easement and if there is a cross fall, the main is to be on the low side.

Any additional specific TW requirements relating to the location of water mains in an easement shall be specified in the 'Agreement Conditions'.

5.4.11 Crossings of creeks or drainage reserves

Water mains crossing creeks or drainage reserves shall be concrete encased or installed using directional boring.

5.6 SHARED TRENCHING

In TW easements the designer should avoid sharing the easement with all other services, namely electricity, fibre optic or gas.

5.9 CONNECTIONS OF NEW OFF-TAKES TO EXISTING MAINS

Where it is necessary to connect to a TW water supply main, unless approved otherwise, only TW personnel shall undertake this work.

5.11 PROPERTY SERVICES

A common property service, which is then further divided to service multiple additional properties, is generally not permitted. Requests for dual services from the one connection will only be considered in areas where it can be shown that any water hammer effects on one property does not affect the adjacent property.

Property services shall be located either at a point where the meter assembly is:
Located 500mm inside the front property boundary and 500mm from the edge of the driveway towards the centre of the lot; or alternatively
located 500mm inside the front boundary and within 300-500mm from the side boundary

Where a building is located at the property boundary, such as in a CBD area, and the meter is required to be located inside the structure, TW will own up to the downstream face of the last valve prior to the service entering the property. Meters in this instance become stranded TW assets where the property owner must allow access for TW to undertake maintenance and reading of the meter as required. This situation also applies to retaining walls where access to the property service between the boundary and the meter is not possible.

The location of the property service shall be coordinated with the design of other services.

For new residential lots greater than 700m^2, 25mm internal diameter tappings and TPFNR's shall be provided.

The maximum length of a property service shall be 30m.

5.11.2 Connections to water mains

TW allows the use of tapping bands and saddles on new DI, PVC-M and PVC-O DN 100 and DN 150 mains.

Where properties on the far side of the road are serviced, a conduit containing two connections is preferred to service meters adjacent to a common side boundary – tappings to the main in this instance should be via a ready-tap connector.

FIGURE 111-D on MRWA-W-111 shows <500. This should be >500.

5.11.3 Services, outlets and meters

Refer to TW Water Metering Guidelines for further details associated with the required metering arrangements.

Refer to TW Standard Drawing – Property Service Connections for details of metering arrangements.

Refer to TW Boundary Backflow containment Selection Requirements for further details associated with the required backflow prevention arrangements.

5.12 OBSTRUCTIONS AND CLEARANCES

5.12.4 Clearance from structures

In accordance with Clause 56W of the Water and Sewerage Industry Act 2008 no prescribed structure is to be built, or any filling to be placed, within 2 metres laterally of any TW water infrastructure where a prescribed structure is as defined in the Water and Sewerage Industry Act without TW's consent.

TW must be consulted if any prescribed structure is planned within the 2m lateral exclusion zone (measured from edge of structure) and may approve a reduction to the 2m lateral exclusion zone depending upon the nature of the proposed works and the criticality, condition and depth of the TW infrastructure.

5.12.5 Underground obstructions and services

5.12.5.2 Clearance Requirements

Notes 3 and 5 associated with Table 5.5 permitting a reduction in minimum clearances are deleted.

For electrical installations greater than 33,000V Tasnetworks and TW shall be consulted.

Where other utilities incorporate junction boxes, light pole footings and the like the minimum horizontal separation distances shall be not less than:

- 100mm for a TW service pipe < DN50
- 300mm for DN50 ≤ TW service pipe ≤ DN200
- >DN200 to be advised by TW on a case by case basis

Where an earth mat is installed as part of the electrical supply authority (Tasnetworks) infrastructure, TW service pipes < DN200 shall be installed with a minimum 1300mm from the edge of the earth mat t the centre of the TW service pipe.

5.12.6 Deviation of water mains

5.12.6.1 General

TW approves the use of socketed fittings to achieve vertical deflections, provided it can be demonstrated that the fittings can be satisfactorily anchored.

The maximum individual joint deflections in either the horizontal or vertical plane or a multiple joint (i.e. where there is deflection in both planes) shall be not more than 75% of the manufacturer's recommendation.

5.13 DISUSED OR REDUNDANT PIPELINES

(d) TW's advice shall be obtained before the removal of any MSCL pipelines.

(e) AC pipelines shall be left in place and filled with low strength grout, sand or other TW approved material.

7 STRUCTURAL DESIGN

7.4 EXTERNAL FORCES

7.4.2 Pipe Cover

The following notes are to be applied to Table 1 in Drawing MRWA-W-202:

- Local Traffic Streets are Local Roads as defined by the List Transport Segments Dataset
- Major Roads include Collector Roads, Sub-Arterial Roads, Arterial Roads and Major Arterial Roads as defined by the List Transport Segments Dataset
- Highways includes National and State Highways as defined by the List Transport Segments Dataset

Refer to Table 5.3 of AS/NZS 3500.1:2003 for minimum cover requirements for service connections

7.4.4 Pipe embedment

Type A embedment as per Table 203A on Drawing MRWA-W-203 shall be utilised unless approval from TasWater for an alternative system is approved in writing.

7.6 CONCRETE ENCASEMENT

7.6.1 General

TW shall be consulted and its approval obtained for any concrete encasement and/or other alternative pipe protection proposals.

7.9 PIPE ANCHORAGE

7.9.2 Thrust blocks

TW only permits the use of concrete thrust blocks for soils with AHBP > 50kPa . Rapid set concrete anchor blocks are not permitted. Lightweight/Timber restraint can be used in particular areas with low-strength soils in accordance with drawing TWS-W-0017 with TW approval.

8 APPURTENANCES

8.2 STOP VALVES

8.2.2.2 Gate Valves

All valves shall have clockwise rotation of the input spindle for closure (clockwise closing) except for valves installed in Burnie and Devonport municipalities which shall have anti clockwise rotation of the input spindle for closure (anticlockwise closing)

Anchorage shall be designed and installed for all valves DN150 and greater.

8.2.2.3 Butterfly Valves

All butterfly valves shall be geared and double-flanged or lugged. Butterfly valves shall be clockwise closing when operated except in Burnie or Devonport where valves shall be anti-clockwise closing.

Wafer style butterfly valves shall not be used.

8.2.4 Stop valves for reticulation mains (≤DN 300)

In Table MRWA 8.5 the YVW preferences shall be adopted.

Stop valve spacing shall be in accordance with Table 8.2 with the nominal maximum number of property service connections for water main sizes <DN150 being 25.

TW's approval shall be obtained for the valving arrangement of a single water service to a multi-unit development.

8.3 CONTROL VALVES

8.3.3 Pressure reducing valves

TW preference is for PRV's to be installed above ground.

Where a single PRV installation feeds a supply zone PRV's shall have a bypass installed. The bypass shall provide redundancy for the main line PRV to ensure maintenance can be undertaken without interruption to downstream customers. TW approval is required for more than one feed to a supply zone.

For TasWater Standard PRV requirements the following documents shall be consulted:

- TDESTD32 – TasWater Specification for Pressure Reducing Stations.
- TWS-W-0001 – Pressure Reducing Valve Installations

8.6 SCOURS AND PUMP-OUT BRANCHES

8.6.3 Scour application

TW requires only one gate valve on mains ≥750.

8.6.4 Scour size

Table 8.4 shall be replaced as follows:

Main size DN	**Scour size DN**
≤DN 300	100
>DN300 - ≤DN900	150
>DN900	200

8.7 SWABBING POINTS

TW-does not require the installation of swabbing points.

8.8 HYDRANTS

Drawings MRWA-W-300 and MRWA-W-301 do not apply. See Appendix C for Drawings S-1998-01, S-1998-05 and S-1998-06 noting that blue 'Stimsonite' thermoplastic markers are to be replaced with Golden Yellow 'Stimsonite' thermoplastic markers on these drawings. Marker posts and kerb marking are also required to be Golden Yellow

8.8.4 Hydrant types

Unless otherwise approved TW only allows the use of spring hydrants . Hydrants shall be installed in line to minimise stagnant water. Offset hydrants will be considered on a case by case basis in designated parking areas and for operator/maintainer safety.

8.8.8 Hydrant spacing

Table MRWA 8.6 is to be deleted and replaced with Table 8.8.8

Zoning	Maximum Hydrant Spacing
Urban Mixed Use Local Business General Business Central Business Commercial Light Industrial General Industrial	60m and at street intersections
General Residential Inner Residential Village (if Serviced)	The lesser of 120m from the rear boundary of all properties to the hydrant measured along the hose-path length or 90m and at street intersections
Low Density Residential Rural Living	500m and at road intersections
Community Purpose Recreation Utilities Major Tourism Port and Marine	As per lowest spacing required for adjacent zoning

Table 8.8.8

8.10 SURFACE FITTINGS AND MARKINGS

Drawings MRWA-W-300 and MRWA-W-301 do not apply.

Valve disc markers are not used

8.10.3 Marking of Surface fittings

Add

Valve and Hydrant Surface Boxes and surrounds shall be painted with a heavy duty non-slip reflective road marking paint coating as per Table 8.10.3

Valve Type	Colour of Cover & Lid	AS2700 No
Dialysis Patient Shut Off & Meter	Homebush Blue	B22
Stop Valve	Blue Bell	B41
Zone Valve	White	N14
Fire Fighting Hydrants	Golden Yellow	Y14
Operational Flushing Point	Black	N61
Effluent Reuse	Purple	P12
Sewerage	Cream	Y34

Table 8.10.3

NOTE: In the TW-N legacy region white is used for anticlockwise closing and lids are Cross cut for normally closed valves (zone boundaries)

8.11 APPURTENANCE LOCATION MARKING

The requirements of this section do not apply.

8.12 VALVE LOCATION MARKING

8.12.1 Kerb markings

Valves shall be marked with a kerb marking in the same colour as the valve box or surround as defined in table 8.10.3. Zone Valves shall have “ZV” painted in Black on the kerb marking.

8.12.2 Marker posts

When no kerb exists a marker post shall be installed at right angles to the main with markings facing towards the valve. Posts should extend 1.5m above FSL in grass or cropped areas. Marker posts shall be the same colour as the valve box or surround.

9 DESIGN REVIEW AND DRAWINGS

9.2 DESIGN DRAWINGS

9.2.2 Composition of Design Drawings

Replace dot point (d) with the following:

(d) TW requires long sections for all pipelines >DN150 and for all pipelines ≥DN150 in undulating terrain.

9.2.4 Contents of Design Drawings

Include the following dot point:

(ab) The top right hand corner of every drawing sheet is to include provision for a TW signature endorsing approval of the drawing.

9.4 RECORDING OF WORK AS CONSTRUCTED INFORMATION

Work As Constructed drawings shall be provided in the same format as the Design Drawings.

TasWater requires that asset spatial data and attributes be captured and provided in 'digital ready format' in accordance with the latest edition of TasWater's Asset Data Specification. This is to enable efficient input of the asset data into TasWater's GIS and Asset Management Information System.

Part 2: Construction

11 GENERAL CONSTRUCTION

11.2 ORDER OF CONSTRUCTION, TESTING AND COMMISSIONING

TW adopts South East Water's preferred process.

12 PRODUCTS AND MATERIALS

12.1 AUTHORISED PRODUCTS AND MATERIALS

12.1.1 General

TW has its approved products listed within the MRWA approved products portal (Refer to www.mrwa.com.au/Pages/Products.aspx) products must be used within the limitations specified by TW and noting that:

- non Australian standard pipes and fittings i.e. ISO are not approved for use
- All valves must be clockwise closing . (except some parts of TW-NW+ – refer section 8.2.2.2 of this Supplement)
- TW will permit the use of non epoxy lined ductile iron pipe for the following Langelier Index (LI) situations:

LI≤ -2.0	Epoxy lined
-2.0 ≤ LI ≤ -0.5	Cement lining with a seal-coat
-0.5 ≤ LI	Cement lining

TW shall be consulted and its approval obtained in relation to the:

- Specification of alternative product compliance requirements;
- Authorisation of new products;
- Nomination of alternative purchase specifications;
- Specification of the quality assurance option;
- Authorisation of innovative or non-standard products; and
- Determination of the need for second-party verifications.

Where products are required that are not listed in the TW Approved Products Catalogues then they can be considered for approval by TW provided that they have Watermark Approval www.watermark.standards.org.au and are approved for use in contact with drinking water to AS/NZS 4020. TW approval is required prior to use.

13 EXCAVATION

13.4 BLASTING

Prior to blasting commencing TW will require a blasting plan to be prepared and submitted to satisfy the requirements of Appendix A of AS2187.2-2006. The blasting plan shall incorporate the undertaking of documented dilapidation surveys of nearby structures.

16 PIPE EMBEDMENT AND SUPPORT

16.1 GENERAL

The requirement of MRWA-W-203 that Type B embedment (cement stabilised class 3 FCR) to be used "where water main grade >5%" shall be replaced with Type B embedment (cement stabilised class 3 FCR) to be used "where water main grade >10%", except where significant ground water is observed during site investigations.

Note G on MRWA-W-208 is not required, water mains with grade >10% require cement stabilised class 3 FCR as per above.

16.3 COMPACTION OF EMBEDMENT

16.3.1 Methods

TW does not allow the use of flooding compaction.

17 FILL

17.1 TRENCH FILL (BACKFILL)

17.1.1 Material requirements

17.1.1.1 Trafficable Areas

Where Vicroads Class 2 and Class 4 Backfill materials are specified in the Code then the equivalent DIER Specification R40 material shall be substituted as detailed in Table 17.1.1.1.

Vicroads Specifications 812, 820 & 818	DIER Specification R40
Class 2 Backfill	Base Class A – Nominal 19mm
Class 4 Backfill	Sub Base 1

Table 17.1.1.1

For further information refer to DIER Specification R40 available from:
http://www.transport.tas.gov.au/road/specifications/roadworks_specifications

18 SWABBING

18.1 GENERAL

TW does not require swabbing of all mains. However, swabbing may be required to achieve the requirements of Section 19.7.1.

19 ACCEPTANCE TESTING

19.7 WATER QUALITY TESTING

Note that TW does not necessarily require mains to be swabbed as specified in the MRWA Water Quality Compliance Specification. However, this may be required to achieve the requirements of Section 19.7.1.

19.8 HYDRANT FLOW TESTING

19.8.1 General

All hydrants shall be flushed and tested in accordance with the requirements of Section 10 of AS2419.1:2005 in the presence of a TW officer starting with the most hydraulically disadvantaged hydrant.

A copy of the commissioning test results as per Section 10.7 of AS2419.1:2005 incorporating the date, time and static pressure prior to the test shall be provided to TW.

TasWater hydrant test sheet is to be completed for all hydrant tests and is available from the TasWater web site http://www.taswater.com.au/Development/Development-Standards.

20 DISINFECTION

20.1 APPLICATION

In addition to mains >225mm, TasWater requires all mains 100-225mm that are longer than 200m to be disinfected.

22 CONNECTIONS TO EXISTING WATER MAINS

Unless approved otherwise by TW in writing, only TW personnel are to undertake all live works on existing TW infrastructure.

22.3 INSERTED TEE CONNECTION

Unless approved otherwise by TW in writing, only TW personnel are to undertake all live works on existing TW infrastructure.

25 ABANDONED ASSETS

TW requires that abandoned assets that are not able to be reused for alternative functions are either removed or left in place and filled with Liquifill® or approved equivalent.

Asbestos cement pipes are to be left in place and filled.

All Pipes left in place should be clearly identified on the Work As Constructed drawings.

Part 3: Standard Drawings

25 INTRODUCTION

TW has adopted the latest edition of the MRWA standard drawings (100 Series, 200 Series, 300 Series and 400 Series) which are available for download from http://www.mrwa.com.au/Pages/Standards.aspx where there are differences between CWW, YVW and SEW on the standard drawings the TW adopted option is listed within Section 26 with associated comments/conditions.

The MRWA Standard drawings 500 Series have not been adopted by TW. See TW Property Service Connection Drawings.

Drawings which have been replaced with TW standard drawings are listed in Section 26 together with any additional TW standard drawings.

26 LISTING OF MRWA STANDARD DRAWINGS

The following WSAA MRWA Drawings have been adopted by TW:

MRWA WATER SUPPLY STANDARD DRAWINGS – 100 SERIES			
MRWA STD DWG No	**TITLE**	**TW Adopted Version/Option**	**Comment/Condition**
MRWA-W-000	Water Standards Index	-	-
MRWA-W-100	Water Supply Symbol Library	-	-
MRWA-W-101	Design Template With Example Design Locality Plan And Notes	-	-
MRWA-W-102A	Example Design Detail Plan	-	
MRWA-W-102B	Example Details	-	-
MRWA-W-103	Pipe & Joint Requirements	-	Refer to Section 4 of this Supplement for acceptable pipe materials
MRWA-W-104A	Pipeline Restraint Options, Branch & Bend Arrangements and Fitting Layout	-	-

MRWA-W-104B	Concrete Thrust Anchor Branchs & Bends And PE Intersection PipeWork	-	-
MRWA-W-105	Distribution Main Divide Valve & Bypass Arrangements	Table 105-A – YVW Table 105-B - YVW	-
MRWA-W-106	Installation of ≥DN100 Offtakes To Existing Mains	-	Use concrete pedestals and wedges
MRWA-W-107	Installation of DN40PE, DN50PE & DN63PE Offtakes	-	-
MRWA-W-108	Dead End Polyethylene Reticulation In Residential Areas		Drawing not used – Replaced by TWS-W-0015
MRWA-W-109	Polyethylene Reticulation Details		Drawing not used – Replaced by TWS-W-0015
MRWA-W-110	Property Service Arrangements	-	-
MRWA-W-111	Installation of DN25PE and DN32PE Offtakes	-	Figure 111-D separation should be greater than 500mm

MRWA WATER SUPPLY STANDARD DRAWINGS – 200 SERIES			
MRWA STD DWG No	**TITLE**	**TW Adopted Version/Option**	**Comment/Condition**
MRWA-W-200	Soil Classification Guidelines And Allowable Horizontal Bearing Pressure	-	-
MRWA-W-201	Trenchfill	-	Refer Supplement Section 17.1.1.1 for VicRoads Material Class equivalents
MRWA-W-202	Pipe Trench Details		-
MRWA-W-203	Embedment	-	Type B embedment is required where water main grade is >10%
MRWA-W-204	Socket Spigot Main Horizontal Thrust Restraint Area Calculations	TWS-N W-0017 for low strength soils	Timber/Recycled plastic not to be used for thrust restraint – use concrete

MRWA-W-205A	Single Main Concrete Restraints And PE Pipe Thrust Restraint	-	-
MRWA-W-205B	Dual Main Concrete Restraints	-	-
MRWA-W-205C	Vertically Cantilevered Thrust Restraints	-	-
MRWA-W-206	Timber/Recycled Plastic Thrust Restraint & Valve Support Details	-	Not used
MRWA-W-207	Restrained Joints	-	Used only on written approval
MRWA-W-208	Sloping Mains and Trench Drainage	-	-
MRWA-W-209	Trench Bulkheads and TrenchStops	-	-
MRWA-W-210	Underground Crossings	-	-
MRWA-W-211	Bridge Crossings	-	-
MRWA-W-212	Curves and Deflections (Vertical & Horizontal)	-	-

MRWA WATER SUPPLY STANDARD DRAWINGS – 300 SERIES			
MRWA STD DWG No	**TITLE**	**TW Adopted Version/Option**	**Comment/Condition**
MRWA-W-300	Valve and Hydrant Marking Arrangements	-	See TWS-W-0018 Sheet 1 and 2
MRWA-W-300A	Shut Off Block Design Appertunance Placement	-	-
MRWA-W-300B	Shut Off Block Design Examples Appertunance Placement	-	-
MRWA-W-301	Valve and Hydrant Marking Details	-	Drawing not used Use drawing TWS-W-0018 Sheet 1 and 2
MRWA-W-302	Valve Surface Arrangements Trafficable & Non-Trafficable Areas	Trafficable –Type B	Support to be either precast or insitu concrete
MRWA-W-303	Hydrant & Washout Surface Arrangements	-	

MRWA-W-304	Hydrant and Air Valve Arrangements	Table 1 - CWW	See also TW-W-305
MRWA-W-304B	Hydrant and Air Valve Arrangement Examples	Table 1 - CWW	See also TW-W-305
MRWA-W-305	Hydrant and Air Valve Fitting Details	-	Figure 305-B not used See also TW-W-306
MRWA-W-306A	Flange Arrangements	-	-
MRWA-W-306B	Flange Details and Flange Fastening Requirements	-	-
MRWA-W-307	Scour Arrangements for ≥DN300 Mains	-	-
MRWA-W-308	Chlorination and Termination & Extension of Mains	-	-
MRWA-W-309	Swabbing and Placing Mains into Service	-	Use only where specified in design drawings

MRWA WATER SUPPLY STANDARD DRAWINGS – 400 SERIES			
MRWA-W-400	Steel Pipeline Jointing	-	-
MRWA-W-401	Steel Pipeline Cathodic Protection (Pending)	-	-
MRWA-W-402	Steel Pipeline Cathodic Protection (Pending)	-	-
MRWA-W-403	Steel Pipeline Cathodic Protection (Pending)	-	-
MRWA-W-404	Steel Pipeline Cathodic Protection (Pending)	-	-

26 LISTING OF REPLACED/ ADDITIONAL STANDARD DRAWINGS

The following WSAA MRWA Drawings have been replaced:

WSAA DRAWING		**TW REPLACEMENT DRAWING**	
MRWA STD DWG No	**TITLE**	**TW STD DWG No**	**TITLE**
MRWA-W-500 Series	-	TWS-W-0002	Property Service Connection Standard Drawing Series

The following additional standard drawings have been included:

TW ADDITIONAL STANDARD DRAWINGS	
TW STD DWG No	**TITLE**
TWS–W-0017	Pipe Installation – Thrust Blocks
TWS–W-0018 Sheet 1	Stop Valves/Fire Plugs – Typical Layout
TWS–W-0018 Sheet 2	Stop Valves/Fire Plugs – Typical Installation
TWS–W-0019 Sheet 1	Fire Plugs Marking – With Kerb(s)
TWS–W-0019 Sheet 2	Fire Plugs Marking – Without Kerb(s)
TWS–W-0019 Sheet 3	Fire Plugs Marking – At Intersections
TWS–W-0015	Cul-de-sac – End of Water Main – Poly Loop

Appendix A: Equivalent Tenement Rates

A1 EQUIVALENT TENEMENT RATES

The equivalent tenement rates contained within Table A1 shall be utilised.

ET Code	Development Type	Water	Sewer	Units
RC	**Subdivision**			
RC01	Creation of new lot 300m2	1	1	Lot
RC02	Creation of new lot <450m2	1	1	Lot
RC03	Creation of new lot 450 <2000m2	1	1	Lot
RC04	Creation of new lot 500m2	1	1	Lot
RC05	Creation of new lot 1000m2	1	1	Lot
RC06	Creation of new lot >2000m2	1	1	Lot
RC07	Creation new lot	1	1	Lot
	Residential dwellings:			
RE	**Standard Occupancy**			
RE01	Single dwelling any size lot	1	1	Dwelling
RM	**Multiple Occupancy Medium Density - 1-2 Storeys**			
RM01	Unit - 1 bedroom	0.4	0.5	Dwelling
RM02	Unit - 2 bedroom	0.6	0.75	Dwelling
RM03	Unit - 3+ bedroom	0.8	1	Dwelling
RA	**Multiple Occupancy High Density - >2 Storeys**			
RA01	Apartment - 1 bedroom	0.33	0.5	Dwelling
RA02	Apartment - 2 bedroom	0.5	0.75	Dwelling
RA03	Apartment - 3+ bedroom	0.67	1	Dwelling
AP	**Accomodation (Permanent)**			
AP01	Nursing home / Special care home	0.657	0.971	Bed
AP02	Self Care Retirement Units / Villas	Use Unit Rate	Use Unit Rate	Dwelling
AP03	Self Care Retirement - Serviced Unit (On-site)	0.5	0.75	Dwelling
AP04	Self Care Retirement - Serviced Unit (Off-site)	0.3	0.45	Dwelling
AP05	Boarding house	0.33	0.5	Bed
AP06	Caravan / Mobile Home Park - 1 bedroom	0.4	0.5	Van
AP07	Caravan / Mobile Home Park - 2 bedrooms	0.6	0.75	Van
AP08	Caravan / Mobile Home Park - 3+ bedrooms	0.8	1	Van

AS	**Accomodation (Short Term)**			
AS01	Caravan Park - Caravan/Cabin/Camping site (temporary)	0.5	0.6	Site
AS02	Bed & Breakfast / Guest House	0.4	0.5	Room
AS03	Services - Motel / Hotel / Resort Room - medium density	0.3	0.45	Room
AS04	Services - Motel / Hotel / Resort Room - high density (low end)	0.3	0.45	Room
AS05	Backpackers / Hostel	0.15	0.23	Bed
AS06	Serviced/unserviced apartments	Use Apartment Rate	Use Apartment Rate	Dwelling
AM	**Accommodation (Medical Care)**			
AM01	Hospital	0.622	0.971	Bed
AM02	Hostel (Medical)	0.622	0.971	Bed
BE	**Business (Excluding food preparation)**			
BE01	Single retail shop	0.002	0.003	GBFA(sqM)
BE02	Supermarket	0.002	0.003	GBFA(sqM)
BE03	Shopping centre	0.0013	0.002	GBFA(sqM) [WSAA 0.002 GBFA sqM applied unless determined otherwise on a case-by-case analysis]
BE04	Office	0.004	0.006	GBFA(sqM)
BE05	Hairdresser / Beauty Salon	0.5	0.8	Basin
BE06	Laundromat	0.45	0.7	Machine
BE07	Medical Centre	0.4	0.6	Room
BE08	Service Station	0.6	0.9	Lane
BE09	Car Wash (Wand Wash)	1.442	2.247	Wand
BE10	Car Wash (Drive Through)	5.7	9	Lane
BE11	Animal Boarding	Case-by-case	Case-by-case	Case-by-case
BE12	Self Storage	0.004	0.006	GBFA(sqM) - Office area only
BE13	Nursery	Case-by-case	Case-by-case	Case-by-case
BE14	Airport	Case-by-case	Case-by-case	Case-by-case
MP	**Meal Preparation**			
MP01	Restaurant/Café	0.005	0.008	GBFA(sqM)
MP02	Take Away/Fast Food no public amenities	0.015	0.024	GBFA(sqM)
MP03	Take Away/Fast Food including public amenities	0.03	0.048	GBFA(sqM)
MP04	Catering	0.005	0.008	GBFA(sqM)
FM	**Food Manufacture**			

FM01	Meat - Abattoir/Smallgoods	0.064	0.064	GBFA(sqM)
FM02	Dairy - Milk	0.160	0.160	GBFA(sqM)
FM03	Dairy - Cheese, Butter, Yoghurt	0.096	0.096	GBFA(sqM)
FM04	Dairy - Ice Cream	0.032	0.032	GBFA(sqM)
FM05	Grain - Flour Milling/Bakery	0.0016	0.0016	GBFA(sqM)
FM06	Grain - Biscuits & Cakes	0.016	0.016	GBFA(sqM)
FM07	Beverages - Beer	0.064	0.064	GBFA(sqM)
FM08	Beverages - Soft drinks & Cordials	0.032	0.032	GBFA(sqM)
FM09	Others - Confectionery	0.008	0.008	GBFA(sqM)
TL	**Textile & Leather**			
TL01	Wool - Wool scour	0.128	0.128	n/a
TL02	Wool - Felt & Carpet, Dyeing & Spinning	0.032	0.032	n/a
MM	**Metal Processing & Manufacturing**			
MM01	Factory/Workshop	0.004	0.004	GBFA(sqM)
MM02	Metal Finishing - Electroplating, Anodising, Galvanising	0.032	0.032	GBFA(sqM)
MM03	Engineering - Machine Shops, Sheet Metal, Foundry, Extrusion	0.016	0.016	GBFA(sqM)
MM04	Engineering - Rolling	0.016	0.016	GBFA(sqM)
MM05	Manufacturing - Concrete Products	0.064	0.064	GBFA(sqM)
SL01	**Services**			
SL01	Services - Laboratories	0.064	0.064	GBFA(sqM)
SL02	Services - Laundries - Industrial	0.24	0.24	GBFA(sqM)
EF	**Entertainment**			
EF01	Licensed Club	0.045	0.071	Occupant
EF02	Pub / Bar	0.03	0.048	GBFA(sqM)
EF03	Cinema / Theatre / Public Entertainment	0.009	0.014	Visitor
EF04	Conference Centre	0.009	0.014	Visitor
EF05	Marina	0.6	0.9	Berth
SF	**Sporting / Spectator Facilities**			
SF01	Sports stadium	Case-by-case	Case-by-case	Case-by-case
SF02	Amenities & Indoor Facilities	Case-by-case	Case-by-case	Case-by-case
SF03	Hockey Field - artificial surface	Case-by-case	Case-by-case	Case-by-case
SF04	Sports ground irrigated area	Case-by-case	Case-by-case	Case-by-case
SF05	Bowling Alley	0.35	0.55	Lane
SF06	Bowling Green	Case-by-case	Case-by-case	Case-by-case
SF07	TWimming Pool - Indoor/Outdoor	Case-by-case	Case-by-case	Case-by-case

CF	Community Facilities			
CF01	Child Care Centre/Pre-school	0.06	0.1	Person
CF02	Education - School (primary & secondary)	0.037	0.057	Student
CF03	Education - College, University (tertiary)	0.037	0.057	Student
CF04	Correctional Centre	0.5	0.75	Person
CF05	Church / Place of Worship	Case-by-case	Case-by-case	Case-by-case
CF06	Community Centre/Hall	Case-by-case	Case-by-case	Case-by-case
CF07	Parks / Gardens / Reserves	n/a	n/a	GrossArea(sqM)
CF08	Public amenities Block (per shower)	0.4	0.6	Shower
CF09	Public amenities Block (per wc)	0.4	0.6	WC
	Trade Waste (Non-Domestic Sewage)			
TW	Biological loading exceeding domestic sewage	Case-by-case	Case-by-case	Case-by-case

Appendix B: DEVELOPING A WATER MODEL FOR A PROPOSED SUBDIVISION

B1 GENERAL

When undertaking the development of a model for submission to TW the following items should be noted:

1. TW will provide the minimum total head at the offtake to the proposed development for the 2 basic scenarios (Clause Ref 2.1):
   - Peak Day
   - Peak Day + Fireflow

   Additional values may be provided where required in large developments for staging options or where the development is divided into separate zones supplied from different offtakes. In these cases the number of ETs in each stage/zone will need to be specified in the initial application.

   If a proposed development is to be built in stages, the consultant does not need to submit a separate model for each stage, only a model to show that the worst case stage still complies. This will then show that each of the other stages will comply.

2. A model is to be developed by the consultant for each of the above scenarios. While this may be done using any hydraulic modelling software, it must be exported into H2OMAP, EPANET or Infoworks-WS.

3. The layout of the model is to be spatially accurate in plan view.

4. The system boundary in the model is to be a constant head reservoir with the total head field set to the minimum total head at the offtake provided by TW for that scenario. The internal design of the subdivision, including the selection of pipe sizes and configuration, is to be done from this offtake boundary condition.

5. Residential Peak Day demand/ET is calculated as follows:

Total consumption = 250 kL/ET/year	(Clause Ref 2.3.1)
Average Day Demand = 685 L/ET/D	(Clause Ref 2.3.1)
Peak Day Demand (general) = 1,541 L/ET/D	(Clause Ref 2.3.4.2)
Peak Day Demand (general) = 0.017836 L/ET/s	

6. Coincident Peak Hour Demand (PH) and fireflow are calculated automatically in an extended period analysis when the residential, commercial or fire diurnal demand patterns are allocated to the appropriate junctions. These demand patterns, in 0.5 hour time steps, are attached.

7. Demand is to be allocated across all of the junctions in the subdivision. It is generally easier to express junction demands as ETs, rather than having to convert ETs to base flows. To do this:

    - Count the number of ETs supplied by each pipe
    - Split these ETs between the pipe end junctions and sum them for each junction
    - Enter this ET figure as the base demand for each junction together with the demand pattern

8. To convert Base Demand in ETs to base flow in L/s, the Peak Day base demand/ET value of 0.017836 L/s is entered as a global demand multiplier in the model settings.

9. With this demand multiplier, a residential fire flow of 10 L/s (Clause Ref 3.1.5) can be modelled (in a separate model) as the equivalent of a point demand of 10/0.017836 = 561 ET at the most disadvantaged junction with the Fire demand pattern allocated to that junction.

10. The TW adopted pipe roughness coefficients are to be used, not values supplied by the manufacturer for new pipes. The TW coefficients already incorporate an allowance for minor losses for bends and valving (Clause Ref 3.2.5.2)

11. Pipes are modelled with their actual internal diameter (ID), not the nominal size (DN) e.g. DN63 PE pipe is typically ID50

12. All junction surface levels are to be included.

13. Where, having regard to the requirements of Clause 2.4.5, a development requires the construction of a service reservoir and pump station, they shall be sized to comply with the design standards in Clause 2.6 and Clause 2.7. A pump can be sized initially by modelling it with a single-point pump curve. The service reservoir initial level should be set at 80% full.

14. After creating the model it is useful to perform a database check to ensure that all element modelling data has been included and entered correctly i.e. :
    - No pipes for which diameter = the model default value or greater than (say) 300
    - No junctions for which elevation = 0 or greater than the level of the highest lot

15. The Peak Day model for each of the required scenarios is to be run for an extended period analysis, not single period, over 3 peak days. The Peak Day + Fireflow model may be run as an extended period analysis over 1 peak day with the service reservoir level to be modelled at not more than 1/3 full (Clause Ref 3.1.5).

16. Scenario results can be displayed in the model to view Peak Day minimum pressures and fireflow residual pressures across the proposed development.

17. It should be noted that the model of a proposed development may initially comply with the minimum peak day pressures using only DN100 pipe in each road segment. However, it is generally the fireflow scenario that will stress the system and determine whether some pipe sizes need to be increased and/or the configuration improved to incorporate better looping.

18. The EPANET models submitted must demonstrate that pipe sizes and connectivity within the proposed development have been designed to ensure compliance with all TW standards for both peak day and fireflow (Clauses 2.4.3.3, 3.2.5.4 & 3.2.4)

19. A modelling report and model checklist to be submitted to certify that the models are complete and have been developed using the methodology outlined and that the modelling results demonstrate compliance.

Enquiries regarding Appendix B shall be directed to the hydraulic modelling section of TW.

Residential		Commercial		Fire	
Time	Factor	Time	Factor	Time	Factor
0:00	0.22	0:00	0.46	0:00	0
0:30	0.18	0:30	0.43	0:30	0
1:00	0.17	1:00	0.41	1:00	0
1:30	0.17	1:30	0.40	1:30	0
2:00	0.18	2:00	0.41	2:00	0
2:30	0.20	2:30	0.42	2:30	0
3:00	0.24	3:00	0.42	3:00	0
3:30	0.31	3:30	0.43	3:30	0
4:00	0.39	4:00	0.46	4:00	0
4:30	0.48	4:30	0.50	4:30	0
5:00	0.57	5:00	0.54	5:00	0
5:30	0.67	5:30	0.58	5:30	0
6:00	0.80	6:00	0.80	6:00	0
6:30	0.96	6:30	1.14	6:30	0
7:00	1.16	7:00	1.40	7:00	0
7:30	1.42	7:30	1.53	7:30	0
8:00	1.72	8:00	1.57	8:00	0
8:30	1.94	8:30	1.59	8:30	0
9:00	2.00	9:00	1.59	9:00	0
9:30	1.99	9:30	1.60	9:30	0
10:00	1.94	10:00	1.61	10:00	0
10:30	1.84	10:30	1.61	10:30	0
11:00	1.71	11:00	1.62	11:00	0
11:30	1.58	11:30	1.62	11:30	0
12:00	1.46	12:00	1.62	12:00	0
12:30	1.36	12:30	1.61	12:30	0
13:00	1.28	13:00	1.61	13:00	0
13:30	1.21	13:30	1.60	13:30	0
14:00	1.16	14:00	1.60	14:00	0
14:30	1.11	14:30	1.59	14:30	0
15:00	1.07	15:00	1.58	15:00	0
15:30	1.04	15:30	1.57	15:30	0
16:00	1.03	16:00	1.52	16:00	0
16:30	1.04	16:30	1.45	16:30	0
17:00	1.07	17:00	1.35	17:00	1
17:30	1.12	17:30	1.11	17:30	1
18:00	1.20	18:00	0.82	18:00	1
18:30	1.28	18:30	0.69	18:30	1
19:00	1.33	19:00	0.63	19:00	1
19:30	1.31	19:30	0.56	19:30	1
20:00	1.24	20:00	0.53	20:00	1
20:30	1.13	20:30	0.51	20:30	1
21:00	0.96	21:00	0.50	21:00	0
21:30	0.80	21:30	0.50	21:30	0
22:00	0.66	22:00	0.49	22:00	0
22:30	0.54	22:30	0.48	22:30	0
23:00	0.43	23:00	0.48	23:00	0
23:30	0.33	23:30	0.46	23:30	0

CHANGE LOG

Date	Rev No	Section	Details
28/09/10	Draft -02	Various	Updated after public consultation
16/03/12	Public -01A	Clause 2.4.3.3	Paragraph deleted
02/05/12	Public -02	Various	Demand Values Equivalent Tenement Rates Hydrant Spacing & Commissioning
1/2/13	Draft -03	Various	Updated to WSA03-2011 MRWA V2.0 TW-N,TW-NW and TW-S differences added TW abbreviation added Hydraulic Model Appendix added
1/12/14	Public - 04	Various	Removal of regional requirements Demand values revised Material selection revised
1/7/23	Public – 05	Various	See Release Notes CM Ref 23/41465

DOCUMENT IMPROVEMENT REQUEST

DOCUMENT IMPROVEMENT REQUEST

TW's Supplementary Manual to WSA 03-2002 Version 2.3 MRWA V2.0

FROM: Name:		
Position/Title:		
Section/Company:		
Address:		
Email:	Phone:	Fax:
Signature		Date:
TO: **Standards Manager**, TasWater		
Email: enquiries@taswater.com.au		

SUGGESTED IMPROVEMENT

Part	Clause	Page No	Proposed Improvement & Justification