

CONSULTANT WATER DESIGN INFORMATION SHEET

As of 1 July 2009 SA Water extended the current Accreditation System for Consultants to include the undertaking of the final Water Reticulation design for new Land Divisions.

The new process included the following aspects:

1. SA Water will determine the **preliminary requirements** for providing water and sewer services for the new LD, based on the initial investigation for the region/zone/area as well as sources of water supply and future water supply demands
2. SA Water will advise the Developer on the best option for servicing the proposed new development
3. When the plan of division is submitted to SA Water a more detail hydraulic modelling for the area will be developed and a **preliminary scheme/design** for the LD will be undertaken. This will involve:
 - preliminary reticulation layout and location of link-ups
 - location and sizing of critical mains within the LD
 - placement of critical valves, hydrants and other fittings
 - assessment of easement requirements
 - determining other requirements, e.g. augmentation, main duplication, etc.
4. This information will be passed on to Developers and Consultants through Customer Services.
5. If the Developers decide to proceed with the development then his nominated Consultant will undertake the final water reticulation design for the land division
6. Consultant submits the design to SA Water for audit
7. SA Water reviews final design for completeness (quality and compliance with relevant standards and with preliminary requirements)

Accreditation of Consultants

Consultancy accreditation levels will be based on the same principals as the sewer accreditation system, i.e. a 2 level system with level 1 being the highest. All consultancies will enter the system at level 2 and will progress up or remain on level 2 depending on their level of competency.

SA Water Objectives of Planning and Design of Water Reticulation Mains

The overall objective of systems planning and design is to provide a water supply service that meets SA Water's obligation for:

- Appropriate quality of supplied water
- Continuity of supply
- Adequate volume and pressure of supplied water at all draw off points

Layout of water reticulation mains needs to be designed properly to maintain disinfectant residual at an acceptable level. Consequently termination points and long mains with dead ends should be avoided:

- to prevent poor water quality
- to provide pressure equalisation
- to ensure continuity of supply in the event of water main bursts

Alternative configurations to long mains with dead ends should be considered:

- a continuous network (grid pattern)
- looped mains
- use of DN63 mains in a cul-de-sac

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Useful Design Hints

Water Main Size, Type and Class

Minimum recommended water main sizes:

- Residential development: DN 100
- Industrial development: DN 150
- Other Size: 63mm PE, used in order to maintain water quality in cul-de-sacs where further extension is unlikely (in residential areas only). However no degree of fire protection is provided!

Common water reticulation main sizes:

Preferred pipe is PVC, it's relatively cheap and easy to lay.

- PVC and DICL pipes:
DN100, DN150, DN200, DN250, DN300, DN375
- PE pipe:
DN63, DN125 (equivalent to DN100 DICL), DN180 (equivalent to DN150 DICL),
DN225 (equivalent to DN200 DICL)

- Maximum number of services:
 - DN 100 main: sufficient for up to 35 allotments
 - DN 150 main: sufficient for up to 150 allotments
- Potable & non-potable water network requires minimum **Class 16** main

Water Main Alignment

- Refer Water Supply Construction Manual (aka "Blue Book") drawing D1 – Space Allocation for Services
- Water main is normally laid 5m off property boundary in carriageway
- Where there is a dual water supply, the preferred alignment is in the opposite sides of the road
- Water main is generally to abut properties that are serviced
- Clearance from other pipes:
 - Horizontal: 1.5 metres
 - Vertical: Refer WSA 03-2002 Table 4.1

Water main in easement

- Only in exceptional circumstances should easements be considered
- Minimum Easement width:
 - for DN 100 - DN 150 main → 7m
 - for DN 200 – DN 375 main → 10m
 - for DN 450 – DN 600 main → 15m
 - for DN 750 – DN 1200 main → 20 m
 - for mains ≥ DN1200 → easement width individually assessed by SA Water
- Main is located approximately 1/3 across the easement, away from building

NOTE:

SA Water's policy is no encroachment into a water easement. Developers need to assess allotment layout to accommodate the easement

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Stop Valves

Stop valves in water reticulation network:

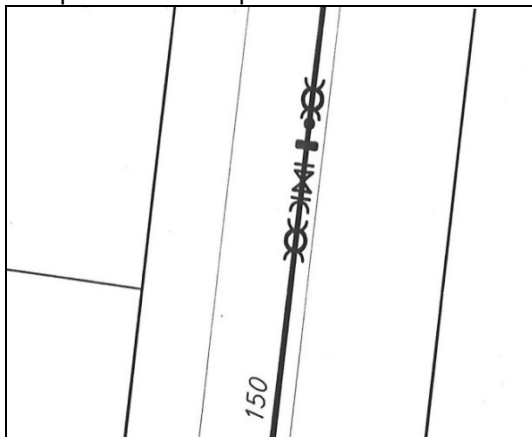
- To limit the size of shut-off area when a main is taken out of service.
 - Maximum 50 affected properties
 - Otherwise, inline stop valves to be located every 500 metres.
- Change of pipe size
 - Stop valve to be located on smaller diameter pipe
- To make shut-off of water main easy (for operational purposes)
- Where water main branches off to a smaller main
- Isolate two different pressure zones
- Fire service and 100mm domestic service
- Flanged valves are used as it's easier to restrain
- Inline valves require extension pipe with puddle flange to provide thrust restrain
- Stop valves are generally located in a cast iron box in roadway.

Samples of stop valves:

Sample 1: Stop valve in branch water main



Sample 2: Inline stop valve



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Fireplugs

Fireplugs in water reticulation network are required for fire fighting

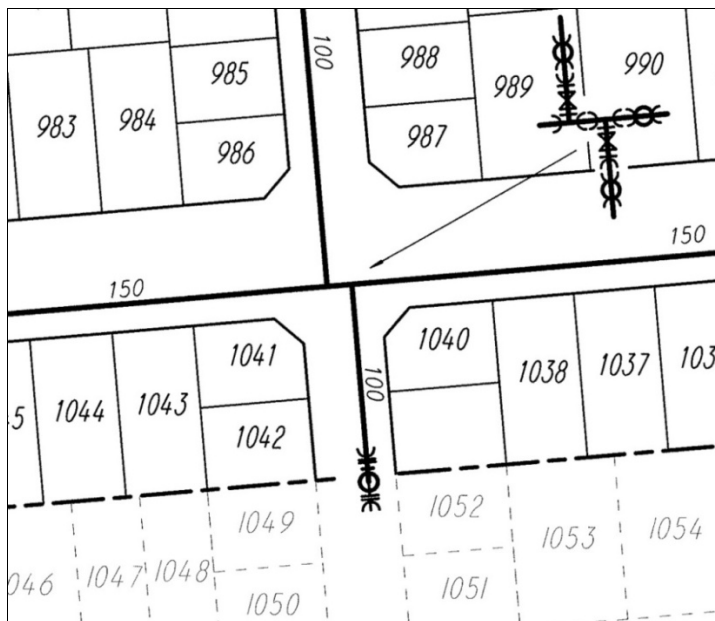
- Fireplugs are spaced not more than 150 metres (residential areas), 400 metres (rural areas) and 80 metres (industrial areas)
- Scouring and bleeding
 - Located at high and low points
 - Placed on either side of stop valves
 - Placed at the end of 100mm main or larger.
 - Bleed valve is fitted at the end 63mm main

Types of fireplug end:

- Temporary end fireplug: used in staged development, very short shut-off time when main is extended
- End fireplug with cap: used in staged development if there is no connection affected when main is extended.
- Permanent end fireplug: used in dead end main where further extension is not possible

Samples of fireplug ends:

Sample 3: Temporary end fireplug

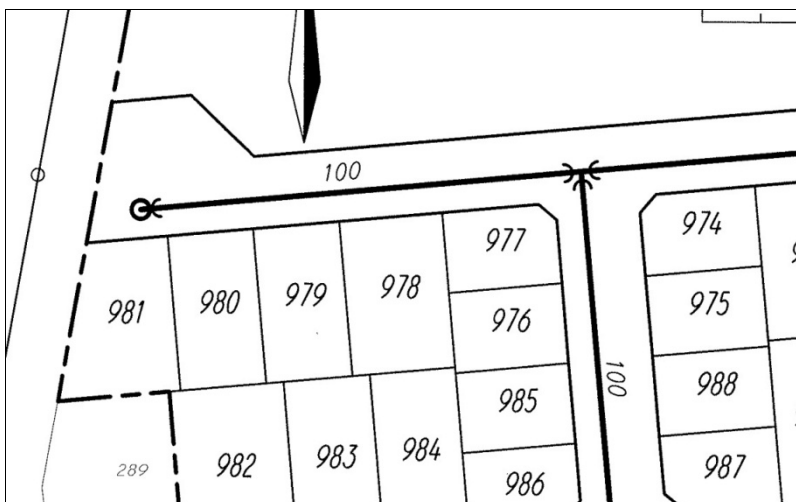


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Sample 4: End fireplug with cap



Sample 5: Permanent end fireplug



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Connections

Connection sizes:

- Standard residential: 20 mm
- Community title:
 - Single connection and meter:
 - 2 – 4 dwellings: 25 mm
 - 5 – 14 dwellings: 40 mm
 - 15 – 30 dwellings: 50 mm
 - 31 or more dwellings: 100 mm or looped 2 x 50 mm

Note: 50 mm & 100 mm meters only available on application

- Manifold with meters:
 - 2 – 4 meters: 25 mm
 - 5 – 12 meters: 40 mm
- Length of connection should be kept to 30 metres or less.

Connections to reserves:

- Under 1200 square metres - 20mm connection
- >1200 to 4000 square metres - 25mm connection
- >4000 to 16000 square metres - 40mm connection

40mm connection or larger will require a request in writing outlining the landscape requirements to Major Land Developments

Drafting Guide

What has changed?

- New template
- On A1 at 1:500 scale similar to sewer drawings
- More details pertaining to the setout – ties, chainages, offsets, etc
- More details pertaining to existing infrastructure – references to field books or previous stage drawings
- Better details of water main doglegs, creek/railway crossings, etc.

Auditing

- Submit the drawings on A1
- The drawings will be marked up, and then returned.
- Resubmit 1xA1 & 1xA3
- Checked and signed if they are ok
- Pick up from Ground Floor
- Available for consultation to discuss design/markups.

What SA Water will provide

- Audit Checklist
- Autocad drawing template (*.dwg) and ctb file
- Text file of limit of contract, notes and connections
- Annotated example showing typical line thicknesses and text heights
- Sent to consultants as a package and also available on the web
- Access to water as-constructed directly or indirectly

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Further Information

- SA Water Networks Infrastructure Standards website:
<http://www.sawater.com.au/SAWater/DevelopersBuilders/NetworkInfrastructureStandards/>
- SA Water Customer Connections Centre website:
<http://www.sawater.com.au/SAWater/AboutUs/CustomerSupport/Customer+Connections+Centre.htm>
- Water Supply Construction Manual
- Water Supply Code of Australia