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The WSAA Board would like to express its appreciation to WSAA Members, Associates and staff for their contributions to this first edition of the Supplement. Contributions from other industry organisations and individuals are also gratefully acknowledged. In particular the following contributors deserve special mention for their productive work and commitment to the development of this Supplement:

Bruce Douglas  Gold Coast Water
Graham Couchman  Sydney Water Corporation

Standard Drawings by Jan Tribe, Whizzcad Pty Ltd,
293 Galston Road, Galston, NSW.

Disclaimer

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Dual water supply systems are a component of “water sensitive urban development” (WSUD) directed at optimising the substitution of non-drinking water for drinking water.

Dual water supply systems are not new and have been used by Australia’s non-urban communities for many years. However, in more recent times the concepts have been applied to urban developments in Australia, such as at Rouse Hill in north western Sydney and Sydney Olympic Park at Homebush in inner western Sydney and in other developments which have commenced construction at Aurora Estate, Bluestone Green Estate, Manor Lakes Estate, Melbourne, Pimpama Coomera, Gold Coast, Mawson Lakes, Adelaide and other locations.

While some reduction in residential drinking water demands can be achieved without hydraulic redesign of the water supply system, a common element of many planned WSUD’s is supply of both drinking water and non-drinking water with or without rainwater collection, storage and delivery.

It is thus opportune for the Water Services Association to produce a Dual Water Supply Systems Supplement to its Water Supply Code, drawing upon the experience and documentation of its members who have adopted the Water Supply Code, in particular South Australia Water, City West Water, South East Water, Sydney Water and Yarra Valley Water and other members such as Gold Coast Water who use their own Codes (Land Development Guidelines).
This Supplement should be read and applied in conjunction with the Melbourne Retail Water Agencies Edition of the Water Supply Code of Australia WSA 03. Additional and/or different requirements for non-drinking water have been included in this Supplement and take precedence over the Melbourne Retail Water Agencies Edition of the Water Supply Code.

Any reference to the Water Supply Code of Australia ("the Code") shall be deemed to refer to the Melbourne Retail Water Agencies Edition of the Code. The Code specifies mandatory requirements for the design and construction of dual water supply systems that are to become the responsibility of the Water Agencies.

The Water Agencies reserve the right to specify or approve other design and/or construction requirements for particular projects and/or developments. Before commencement of any construction, the Water Agency’s approval shall be obtained to any design and/or installation that does not comply with the Melbourne Retail Water Agencies Edition of the Water Supply Code or this Supplement.

The term “non-drinking water” is preferred to “recycled water” to acknowledge that not all water used for drinking water substitution has been recycled, and to align with the Plumbing Code of Australia, 2004, AS/NZS 3500.0 Plumbing and drainage Part 0: Glossary of Terms, and AS/NZS 3500.1 Plumbing and Drainage Part 1: Water Services.

Non-drinking water is not intended for human consumption, food preparation, bathing & showering or filling swimming pools & spas and any other uses designated by the Health Regulator.

Refer to the Department of Human Services Victoria and/or the EPA Guidelines “Use of Reclaimed Water” or “Dual Pipe Water Recycling Scheme: Health and Environmental Risk Management” for further details regarding approved uses for recycled water.

There are no International Standards that apply to the colour identification of buried pipes, conduits and ducts. Blue has become the default internationally adopted colour for drinking water mains, although in above ground pipework International Standard ISO/R 508 (AS 1345) assigns blue for “air, vacuum, ventilation and pneumatic conveyor” pipework, conduits and ducts. In this Supplement it has been accepted that blue pipe does not require marking to designate “drinking water” since “blue” is the industry standard default colour for drinking water supply and, as such, it is only necessary to mark non-drinking water supply pipes.
International Standard ISO/R 508 assigns “violet” for acids and alkalis for above ground pipes, conduits and ducts and AS 1345 more specifically requires “Lilac P23” to AS 2700.

The adoption of the colour “purple” for non-drinking water pipes follows the requirement of the NSW Guidelines for Urban and Residential Use of Reclaimed Water, 1st Edition, May 1993 published by the NSW Recycled Water Coordination Committee, which, in turn, had adopted the purple colour protocol of the State of California, USA as prescribed by Title 22, Chapter 4, of the California Code of Regulations.

Clause numbers in this Supplement have been prefixed ‘NDW’ to avoid confusion with the Clause numbers of the Water Supply Code. It is intended to incorporate this Supplement into the next edition of the Water Supply Code of Australia.

Requirements for the drinking water part of a dual water supply system should be in accordance with the Melbourne Retail Water Agencies Edition of the Water Supply Code of Australia WSA 03 and Water Agency supplementary requirements.

Text in ‘italics’ is informative, while text in ‘normal case’ is normative or mandatory.
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Glossary of Terms, Abbreviations and References
# Glossary of Terms

The purpose of this glossary is to assist in interpreting terminology used in the various parts of the Dual Water Supply Systems Supplement.

The terms and definitions are adopted from Water Agency documentation and are generally additional to those in the MRWA edition of the Water Supply Code of Australia.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>A colour defined in accordance with RAL¹ DESIGN colour numbers as being no darker than 200 80 25 or 210 80 25 and no lighter than 200 90 10 or 210 90 10, respectively.</td>
</tr>
</tbody>
</table>
| Notes                    | 1. RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification)  
Siegburger Straße 39  
D-53757 Sankt Augustin  
Telephone: +49(0)2241/1605-30  
Telefax: +49(0)2241/1605-16  
2. No equivalent colours can be defined in accordance with AS 2700 (NZS 7702). |
<p>| Cross-connection         | A cross-connection is any connection or arrangement physical or otherwise, between any potable water supply systems either directly or indirectly connected to a water main, and any fixture, storage tank, receptacle, equipment or device through which it may be possible for any non-potable, used, unclean, polluted or contaminated water, or any other substance to enter any part of such potable water system under any condition. |
| direct tapping           | A procedure consisting of drilling and tapping the pipe wall followed by insertion of a tapping valve/maintap. |
| drinking water           | Water that is suitable for human consumption, food preparation, utensil washing and oral hygiene. For the purposes of this Supplement, drinking water is cold water at a temperature ≤40°C. |
| Note                    | Adopted from AS/NZS 4020. |
| dual water supply system | A system of water supply consisting of dual separate mains (pipelines from separate sources) and designed to concurrently provide two separate water supplies to the consumer. One main conveys drinking (potable) water, the other conveys appropriately treated non-drinking water. |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lilac</td>
<td>See purple.</td>
</tr>
<tr>
<td>MRWA</td>
<td>Melbourne Retail Water Agencies (City West Water, South East Water, Yarra Valley Water).</td>
</tr>
<tr>
<td>non-drinking water</td>
<td>Any water other than drinking water including wastewater, stormwater, bore water, ground water, lake or river water, which has been treated to meet a Standard (as defined by the Regulator), and which is satisfactory for its intended use(s). For the purposes of this Supplement, non-drinking water is cold water at a temperature ≤40°C.</td>
</tr>
<tr>
<td>potable water</td>
<td>See drinking water.</td>
</tr>
<tr>
<td>Purple</td>
<td>A colour defined in accordance with RAL(^1) DESIGN colour numbers as being no darker than 330 40 40 or 310 50 30 and no lighter than 310 70 15, respectively. Notes: 1. RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL German Institute for Quality Assurance and Certification) Siegburger Straße 39 D-53757 Sankt Augustin Telephone: +49(0)2241/1605-30 Telefax: +49(0)2241/1605-16 <a href="http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml">http://www.ral.de/farben/en/farbvorlagen/index.html?content1.shtml</a> 2. Equivalent to a colour defined in accordance with AS 2700 (NZS 7702) as being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac.</td>
</tr>
<tr>
<td>recycled water</td>
<td>Water that has been reclaimed from wastewater and treated to a standard (as defined by the Regulator) for reuse. See non-drinking water.</td>
</tr>
<tr>
<td>Reduced Pressure Zone Device (RPZD)</td>
<td>A high hazard, testable, fail safe backflow prevention device with built in independently acting non-return valves (reduced pressure zone device (RPZD)).</td>
</tr>
<tr>
<td>sub-mains</td>
<td>Any reticulation Non-drinking or Drinking main less than DN100.</td>
</tr>
<tr>
<td>single services</td>
<td>A property service connected to a non drinking water or drinking water main that has been sized appropriately to service one allotment.</td>
</tr>
<tr>
<td>split services</td>
<td>A property service connected to a non drinking water or drinking water main that has been sized appropriately to service two allotments.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| water sensitive urban design | The integration of urban planning with the management, protection and conservation of the urban water cycle, that ensures urban water management is sensitive to natural hydrological and ecological processes.  
**Note:** Adopted from Intergovernmental Agreement on a National Water Initiative, 25 June 2004. |
| water sensitive urban development | An holistic approach to planning, design and construction of water supply, sewerage, rainwater and stormwater systems for urban communities. Underpins sustainable development by improved efficiency in water use through optimised storage, distribution, use, diversion, loss reduction, treatment and recycling. |
Part 1

Planning and Design
INTRODUCTION

NDW 1.1 Scope

This Supplement covers the design and construction of dual water supply systems for servicing new developments. The Supplement addresses the provision of a non-drinking water supply and its impacts on (drinking) water supply design and construction.

NDW 1.2 Application

This Supplement should be applied in conjunction with the MRWA Edition of the Water Supply Code of Australia.

DIFFERENTIATION OF PIPE SYSTEMS

NDW 2.1 Principles

Regulators’ guidelines for use of non-drinking water generally stipulate a range of measures that permit clear and easy differentiation between the drinking and non-drinking water supply systems, particularly in urban/commercial/industrial developments.

The principal means of differentiation between mains conveying drinking water and non-drinking water shall be as follows:

a. Pipes of different colours - Refer to Clauses NDW 2.2 and NDW 2.3.

b. Warnings printed on non-drinking water mains and/or sleeving - Refer to Clause NDW 2.3.

c. Use of marker tapes - Refer to Clause NDW 2.6.

d. Marking of surface fittings - Refer to Clause NDW 3.17.

e. Identification markers and marker posts - Refer to Clause NDW 3.18.

Other additional differentiation measures may include:

i. Operating the systems with a service pressure differential - Refer to Clause NDW 3.6.

ii. Different pipe locations - Refer to Clause NDW 3.7.

iii. Maintaining a minimum pipe separation - Refer to Clauses NDW 3.7, NDW 3.8, NDW 3.9 and NDW 3.11 and relevant Clauses of MRWA Edition of WSA 03.

iv. Use of different pipe materials for the drinking and non-drinking water mains. (However, this is not an MRWA requirement.)

The application of each measure should be based on risk
Risk assessment. Risk assessment should be undertaken in accordance with AS/NZS 4360. Identified risks can be treated by reducing the likelihood or reducing the consequence or both.

**NDW 2.2 Water Supply Mains – Drinking Water**

Water supply mains conveying drinking water as part of a dual water supply system shall be constructed from pipes that are:

a. blue in colour; or

b. blue striped in accordance with pipe product Standards; or

c. sleeved with polyethylene sleeving coloured blue. In the case of bored or directionally drilled pipelines this is not possible.

Blue pipe includes pipe that has a co-extruded blue sheathing.

Blue sleeved purple pipes shall not be used for reticulation mains conveying drinking water.

Buried appurtenances such as fittings, valves, hydrants etc. that form part of the reticulation system are required to be colour coded for maintenance purposes, in which case, one of the following two options shall be adopted:

i. Buried components shall be coated blue in accordance with product Standards; or

ii. Buried components shall be sleeved with blue sleeving.

In the case of option (ii) purple components shall not be used.

*Where colour differentiation of buried appurtenances such as hydrants, flushing points etc. is also required for operational purposes, this may be achieved by application of a blue (or purple in the case of non-drinking water) coating in accordance with AS/NZS 4158 to that part of the appurtenance visible from the surface when operating (e.g. a spindle cap of a valve, a hydrant claw, a flushing point outlet etc.)*

**NDW 2.3 Water Supply Mains – Non-Drinking Water**

Water supply mains conveying non-drinking water as part of a dual water supply system shall be constructed from pipes that are:

a. purple; or

b. purple striped in accordance with pipe product Standards; or

c. sleeved with polyethylene sleeving coloured purple. In the case of bored or directionally drilled pipelines this is not possible.
Purple pipe, including purple striped or sheathed pipe, and purple sleeving shall be legibly and durably marked with one of the following wording options using distinctively coloured vertical block type lettering of a minimum size of at least 0.05 X DN mm and repeated at intervals such that the length of any unmarked pipe or sleeving does not exceed 1 m:

i. “NON-DRINKING WATER”; or

ii. “RECYCLED WATER – DO NOT DRINK”.

Blue pipe, including blue striped or sheathed pipe, shall not be used for non-drinking water reticulation mains.

*It may be acceptable to the Water Agency to use purple sleeving for any pipe material apart from that coloured blue.*

Buried appurtenances such as fittings, valves and hydrants that form part of the reticulation system are required to be coloured purple.

Where purple-coloured fittings, valves and hydrants are not available, blue-coloured fittings, valves and hydrants shall be wrapped in purple polyethylene sleeving.

Where a blue fitting is used for supply of non-drinking water to a property, e.g. tapping band or pre-tapped connector, the outlet connection of the fitting shall be coated purple.

Where approved purple-coloured fittings, valves and hydrants are manufactured, they shall be used.

*Where colour differentiation of buried appurtenances such as hydrants, flushing points etc. is also required for operational purposes, this may be achieved by application of a purple coating (or blue in the case of drinking water) in accordance with AS/NZS 4158, to that part of the appurtenance visible from the surface when operating (e.g. a spindle cap of a valve, a hydrant claw, a flushing point outlet etc.)*

**NDW 2.4 Property Services – Drinking Water**

Property services conveying drinking water as part of a dual water supply system shall be installed using pipes that are:

a. blue in colour; or

b. blue striped in accordance with pipe product Standards; or

c. sleeved with polyethylene sleeving or expanded mesh coloured blue.
Refer to Standard Drawing WAT–1803–V and Commentary Clause NDW 11.4 for property service pipe details.

Buried components (i.e. valves, bends, fittings and other appurtenances, but not the pipe) that form part of the property service are required to be colour coded for maintenance purposes, in which case, one of the following two options shall be adopted:

i. Buried components shall be coated blue in accordance with product Standards; or

ii. Buried components shall be sleeved with blue sleeving.

In the case of option (ii), purple components shall not be used.

Drinking water meters, meter boxes and standpipe hydrants shall not be coloured purple.

NDW 2.5 Property Services – Non-Drinking Water

Property services conveying non-drinking water as part of a dual water supply system shall be installed using pipes that are coloured purple.

Refer to Standard Drawing WAT–1803-V and Commentary Clause NDW 11.4 for property service pipe details.

Purple pipe, including purple striped or sheathed pipe, shall be legibly and durably marked with one of the following wording options using distinctively coloured vertical block type lettering of a minimum size of at least 3.0 mm for pipes sizes up to and including nominal outside diameter of 32 mm, and 5 mm for larger sizes. Marking shall be repeated at intervals such that the length of any unmarked pipe or sleeving does not exceed 1 m:

a. “NON-DRINKING WATER”; or

b. “RECYCLED WATER – DO NOT DRINK”.

Buried components that form part of the property service are required to be colour coded for maintenance purposes, in which case, one of the following two options shall be adopted:

i. Buried components shall be coated purple in accordance with product Standards; or

ii. Buried components shall be sleeved with purple sleeving.

In the case of option (ii), blue components shall not be used.

Non-drinking pretap connectors, tapping bands, water meters, meter boxes and standpipe hydrants shall be coloured purple.
Where purple-coloured non-drinking pretap connectors or tapping bands, are not available, the outlet connection of the fitting shall be coated purple.

Where approved purple-coloured, non-drinking pretap connectors or tapping bands are manufactured, they shall be used.

**NDW 2.6 Marker Tapes**

Detectable marker tapes for drinking water mains and property services shall be coloured blue and shall include the words: “DRINKING WATER” in the written marking along the marker tape in distinctively coloured vertical block type lettering of a minimum size of at least 25 mm, and repeated at intervals such that the length of any unmarked section of tape does not exceed 1 m.

Detectable marker tapes for non-drinking water mains and property services shall be coloured purple and shall include the words: “RECYCLED WATER – DO NOT DRINK” in the written marking in distinctively coloured vertical block type lettering of a minimum size of at least 25 mm, and repeated at intervals such that the length of any unmarked section of tape does not exceed 1 m.

Where PE property services are not laid at 90±5 degrees to the water main, detectable marker tapes shall be laid immediately above the property service. Copper property services can be readily detected and do not require detectable marker tape.

**NDW 3 DESIGN**

**NDW 3.1 Demands**

Demands for design purposes shall be determined for each system, based on the ultimate predicted usage of drinking water and non-drinking water for the end uses nominated in the Concept Plan. Where rainwater tanks are to be integrated with the dual water supply system, the following factors shall be taken into account in substitution of collected rainwater for drinking water and/or non-drinking water:

a. reliability of rainwater collection, storage and supply;

b. usable volume of the rainwater tank;

c. top-up of rainwater tanks, which may be supplied from either the drinking water or non-drinking water supply systems; and

d. rainwater end uses.

The water demands for each system and their associated peaking factors shall be applied in accordance with Clause 2.2 of MRWA
WSA 03 taking into account the different usage pattern for dual versus single water supply systems. An allowance shall be made for the additional potential demand when a dual water supply system is used.

Experience on what this allowance should be is limited; however, a default allowance of 10 - 15% of the total demand for both systems is recommended until more usage data becomes available. Peaking factors for non-drinking water in warmer or dryer parts of Australia may exceed existing peaking factors.

**NDW 3.1.1 Distribution Demand**

For a residential zone, the traditional demand pattern for a single supply system has a diurnal shape with a morning peak and an evening peak. The daily demand pattern between seasons varies quite significantly as does the timing of the peak. In winter peak demand is driven by indoor demand with a morning peak whereas in summer, peak demand is higher and is driven by outdoor demand with an evening peak.

As a result the network for a single supply system is designed to cater for a historically hot summer peak (0.078 l/s/lot). However for a dual supply system it is necessary to split the traditional design pattern into an “internal” and “external” demand curve. The “internal” and “external” patterns are then adjusted to derive “drinking water” and “non drinking water” demand curves by accounting for:

- toilet demand being part of the non-drinking water system;
- demand management influences; and
- allotment densities.

<table>
<thead>
<tr>
<th>Allotment Size (m²)</th>
<th>Drinking Water System Demand (L/s/lot)</th>
<th>Non Drinking Water System Demand (L/s/lot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 to 450</td>
<td>0.045</td>
<td>0.046</td>
</tr>
<tr>
<td>650 to 800</td>
<td>0.045</td>
<td>0.066</td>
</tr>
</tbody>
</table>

**Note**: allotments between 450m² and 650m² values can be interpolated.

**NDW 3.1.2 Reticulation Demand**

The modelling of smaller reticulation mains can be rather complex. At this scale the demand applied to a given node in the system is no longer constant. A sliding scale philosophy, based on the probability of simultaneous demand, is adopted when dealing at the
neighbourhood level.

The relationship between demand and number of allotments is shown below. This relationship currently applies to both the drinking water reticulation and non-drinking water reticulation.

**System Demand: 1 to 50 allotments**

\[ Q = 0.3801n^{-0.3078} \quad \text{or} \quad D = 0.3801n^{0.6922} \]

**System Demand: 50 to 500 allotments**

\[ Q = 0.2798n^{-0.2152} \quad \text{or} \quad D = 0.2798n^{0.7848} \]

Where:
- \( Q \) = Demand (L/s/Lot)
- \( D \) = Demand (L/s)
- \( n \) = number of allotments

**NDW 3.2 Service Reservoirs**

Service reservoirs for the non-drinking water network shall be in accordance with Clause 2.7 of MRWA WSA 03.

**NDW 3.3 System Configurations**

The water agency is responsible for system planning, including demand forecasting, definition of supply zones and system configuration.

The network layout of both drinking water and non-drinking water reticulation systems shall be subject to approval by the Water Agency.

A guide to system configurations of dual water reticulation networks to complement the information and requirements of the MRWA Water Supply Code should generally be provided by the Water Agency.

**NDW 3.4 Cross Connection Between the Drinking and Non-Drinking Water Supply Systems**

**NDW 3.4.1 Permanent Cross Connections**

There shall be no permanent cross connections between the drinking water and non-drinking water systems within the network downstream of storages without the express permission of the Water Agency. Where the non-drinking water supply needs to be supplemented by water from the drinking water supply, this shall
be provided through a registered air-gap at the inlet to the non-drinking water storage or by means of a high hazard, annually tested, fail safe backflow prevention device with built in independently acting non-return valves (reduced pressure zone device (RPZD)).

In some instances the Water Agency may require the installation of two RPZD’s in parallel to provide alternative supply.

Installation of backflow prevention devices (RPZD’s) shall comply with AS/NZS 3500. Only backflow prevention device(s) manufactured and quality assured to AS/NZS 2845.1 are to be installed on any cross-connection connections between the drinking water and non-drinking water systems within Water Agency’s area of responsibility.

The RPZD must be located in a well drained site and not situated in any location that may inhibit discharge from the unit to atmosphere. In any event, the device needs to be located above ground level and in a secure surrounding compound, but not in a cabinet without drainage or ventilation.

**NDW 3.4.2 Temporary Cross Connections**

Temporary cross connection between the drinking water system and the non-drinking water system may be permitted when the non-drinking water system is supplied from the drinking water system. Temporary cross connections shall be subject to Water Agency approval.

Temporary cross connections shall be provided at locations and in accordance with WAT–1824–V and the requirements of the Water Agency.

*It is responsibility of the Water Agency to ensure the management of temporary cross-connections and their removal when non-drinking water becomes available.*

**NDW 3.5 Sizing Of Mains**

**NDW 3.5.1 General**

Sizing of water mains for drinking water and non-drinking water shall be determined in three steps.

First, size the water mains for drinking water and non-drinking water based upon estimated ultimate water demands for each system as determined in NDW 3.1 without imposing the requirements for fire fighting (Refer to Clause 3.2.4 of MRWA
WSA 03 and Clause NDW 3.5.2).

Second, determine the most appropriate system from which to satisfy fire fighting needs in accordance with NDW 3.5.2.

Third, size the mains identified in step 2 in accordance with NDW 3.5.2.

Irrespective of the sizes determined in steps 1 to 3, the following limitations shall apply:

a. The minimum pipe size shall be DN 40 or equivalent (Refer to Appendix NDW A); and

b. For non-drinking water with turbidity $\geq 2$ NTU, the minimum velocity shall be at least 0.8 m/s at least once per day when modelled on the peak day demand for the ultimate development ( Refer to Clause 2.2.3 of MRWA WSA 03).

**Note:** Appendix NDW A designates equivalent pipe sizes for commonly used pipe materials and pressure classes.

Based on the demands in NDW 3.2, the following table provides a guideline for the maximum number of customers for different reticulation pipe sizes:

**Table 3.1 Pipe Sizing**

<table>
<thead>
<tr>
<th>Diameter of Main</th>
<th>Residential (lots) – Capacity of main (single feed direction only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 DN</td>
<td>50 +</td>
</tr>
<tr>
<td>90PE PN16</td>
<td>35 to 50</td>
</tr>
<tr>
<td>75PE PN16</td>
<td>20 to 35</td>
</tr>
<tr>
<td>63PE PN16</td>
<td>Up to 20 or up to 100m in length</td>
</tr>
<tr>
<td>Diameter of Main</td>
<td>Residential (lots) – Capacity of main (dual feed direction)</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>100 DN</td>
<td>100 +</td>
</tr>
<tr>
<td>90PE PN16</td>
<td>70 to 100</td>
</tr>
<tr>
<td>75PE PN16</td>
<td>40 to 70</td>
</tr>
<tr>
<td>63PE PN16</td>
<td>Up to 40 or up to 200m in length</td>
</tr>
</tbody>
</table>

**NDW 3.5.2 Fire Flows**

Where the design of systems is to incorporate fire fighting capability, either by specific flow allowance or water main sizing to suit basic fire fighting, determination of the most appropriate system from which to satisfy fire fighting needs shall be based upon the following factors:

a. security of supplies;

b. available storage volumes;

c. life-cycle costs;

d. pressure of supplies;

e. the Water Agency shall nominate which supply system shall have fire plugs for fire fighting capability, usually this will be the non-drinking water supply system;

f. other factors nominated by the Water Agency.

Pipe sizes to satisfy fire fighting demands shall be determined by hydraulic design or adoption of a standard minimum size by the Water Agency (Refer to Section 3 of MRWA WSA 03) and in each case shall not be less than:

i. DN 100 for residential zones.

ii. DN 150 for industrial and commercial zones.
NDW 3.5.3 Design Pressure (Head) and Pipe Class

The maximum service pressures defined in the MRWA WSA 03 shall apply. For PVC and PE infrastructure pipework and fittings, the minimum pipe class is PN16.

The minimum design pressure at the allotment boundary shall be 20 metres.

NDW 3.5.4 Head Losses / Roughness Coefficients

The head loss coefficients (Darcy Weisbach) to be utilised during design depends on the type of design undertaken.

Distribution sizing - Roughness coefficient = 0.6
Reticulation sizing - Roughness coefficient = 0.06

NDW 3.6 Allowable Service Pressures

Where specified by the Water Agency, the non-drinking water supply system shall be designed with a lower available static head or steady state pumping pressure than the drinking water supply system, provided the minimum service pressures of each system comply with Clause 2.4 of MRWA WSA 03.

A typical differential static design head or steady state pumping pressure is 10 m.

NDW 3.7 Location Of Mains

The location of drinking water and non-drinking water mains shall be nominated by the Designer from one or more of the following options:

a. in shared trenching in the footway allocation;

b. in shared trenching in the road carriageway, subject to Water Agency approval;

c. in separate trenches in the same footway allocation;

d. in separate trenches in the footway allocation on opposite sides of the road reserve; and/or

e. in separate trenches in the road carriageway, subject to Water Agency approval.

Where both mains are located in the footway allocation on the same side of the road carriageway, the non-drinking water main shall be located closest to the property boundary (Refer to Standard

Where insufficient space is available in the footway allocation to accommodate both mains, each main shall be located separately on either side of the road carriageway in the respective footway allocation (Refer to Standard Drawing WAT–1102–V).

Where no footway allocation agreement exists such as for footways less than 3 m wide, any water main shall generally be laid as close as possible to the kerb to allow room for other services, but also allow sufficient clearance for maintenance excavation. The minimum clearance from the back of the kerb shall be 300 mm.

Where both mains are located under the road carriageway, the drinking water main shall be located nearer to the centreline.

Shared trenching with other utilities services shall also comply with Clause 4.4 of the MRWA WSA 03.

NDW 3.8 Main Depths

Mains shall be laid to a common obvert depth to facilitate property service connections (offtakes), except where mains are to be offset for crossings, installation of thrust blocks etc. (Refer to Standard Drawings WAT–1810–V and WAT–1811–V and Commentary Clauses NDW 11.10 and NDW 11.11).

NDW 3.9 Crossings

Where practicable, the non-drinking water main shall be laid under the drinking water main wherever they cross.

NDW 3.10 Property Services

Property services for drinking water and non-drinking water shall be positioned to suit the type of planned development [single, duplex side-by-side or duplex one behind the other (battle-axe)].

Non-drinking water property services shall always be located on the left of the drinking water property service as you look from the road to the front of the property.

Separate property service outlets (connection points for on-property water services) for drinking water and non-drinking water shall be provided for each identified lot in the development to service the planned number of customers occupying the lot.
Service connections at the main shall suit single services as detailed in Drawings WAT–1803–V, WAT–1804–V and WAT–1806–V. Split property services are not desirable and may only be used with the approval of the Water Agency.

Meters for drinking water and non-drinking water shall be placed together near a common boundary or in the middle of the front property boundary or at the side of an access way as detailed in Standard Drawings WAT–1803–V and WAT–1804–V.

When located above ground, meters may be installed as detailed in Standard Drawing WAT–1806–V. When located below ground, meters may be installed as detailed in Standard Drawing WAT–1807–V.

Refer also to Commentary Clauses NDW 11.4, NDW 11.5, NDW 11.7 and NDW 11.8.

Service connections shall be made to reticulation or sub-mains only.

The locations of all service connections and property services shall be recorded on the Work as Constructed plans.

NDW 3.11 Clearances

Clearances between services on non-drinking water mains and other services shall be not less than the minimum clearances specified in Clause 4.10 of in MRWA WSA 03 for drinking water mains.

NDW 3.12 Hydrants

Hydrants for fire fighting and/or operational purposes shall be installed on the water main designated for fire fighting in accordance with Clause 6.8 of MRWA WSA 03.

Hydrants for operational purposes shall be installed on the water main not designated for fire fighting in accordance with Clause 6.8 of MRWA WSA 03.

Hydrants connected to water mains not designated for fire fighting purposes may be made available for fire fighting purposes. Where the Water Agency wishes to limit or prevent access to the system not designated for fire fighting purposes, an alternative non-standard hydrant (preferably one used elsewhere within Australia) may be specified.
Hydrants on each system shall be of the same standard type specified by the Water Agency for installation on a single (drinking) water reticulation system.

The maximum spacing of hydrants in residential areas shall be:

a. On mains designated for fire fighting - in accordance with clause 6.8.7 of MRWA WS403.

b. On mains not designated for fire fighting (e.g. for operational purposes) - as defined in Clause 6.8.2 of MRWA WSA 03 for flushing/swabbing and Clause 6.8.9 of MRWA WSA 03 for high and low points.

NDW 3.13 Cul-De-Sacs and Dead End Non-Drinking Water Mains

Dead end non-drinking water mains shall be avoided in the non-drinking water main layout design by the use of looped mains, link mains or reduced diameter mains. Refer to Standard Drawing WAT–1801–V.

NDW 3.14 Flushing Points

Flushing points shall be installed on Non-drinking water reticulation mains using the same criteria as specified in Clause 6.8.2 of MRWA WSA 03 for flushing/swabbing and Clause 6.8.9 of MRWA WSA 03 for high and low points.

Refer to Standard Drawings WAT–1822–V and WAT–1823–V.

**Note**: Non-drinking water may be high in nutrients. The environmental regulator should be consulted to determine whether discharge of non-drinking water to the receiving water/environment is permissible. If it is not permissible, flushing to a tanker for disposal or to a collection structure for transfer to a tanker and disposal or to the sewer should be investigated to provide the most appropriate solution.

NDW 3.15 Scours

Scours shall be installed on non-drinking water mains using the same criteria as specified in Clause 6.6 of MRWA WSA 03 for drinking water mains.
NDW 3.16 Trust and Anchor Blocks

Where non-restrained joint pipeline systems are used, pipeline anchorage shall be provided in accordance with MRWA WSA 03, WAT–1811–V and the Design Drawings. Separate thrust/anchor blocks shall be provided except where common thrust/anchor blocks are required due to site constraints, in which case the thrust/anchor block shall be designed for all design force combinations. Elastomeric seal joints shall not be encased by concrete.

NDW 3.17 Surface Fittings

Surface fittings for appurtenances on the drinking water network shall be as specified in MRWA WSA 03.

Surface fittings for appurtenances on the non-drinking water network shall be as specified in Standard Drawings WAT–1820–V and WAT–1821–V and shall be identified in accordance with Standard Drawing WAT–1825–V using:

a. the words “NON-DRINKING WATER” or “RECYCLED WATER” cast into the cover of the surface fitting; or

b. the letters “NDW” or “RW” cast, stamped, embossed or engraved onto the cover of the surface fitting; or

c. a purple surface fitting cover and/or surround; or

d. any combination of the above as nominated by the Water Agency.

NDW 3.18 Identification Markers and Marker Posts

Retro-reflective pavement markers, marker posts and the coloured tops of Type B marker posts as well as the lettering on marker plates (Refer to WAT–1300) for the non-drinking water supply system shall be coloured purple in accordance with Standard Drawings WAT–1820–V, WAT–1821–V and WAT–1825–V and Water Agency requirements.

NDW 3.19 Stop Valves for Non-Drinking Water Mains

Stop valves used to limit the size of the ‘shut-off’ area when the main is taken out of service shall be in accordance Clause 6.2.3 MRWA WSA-03.
Part 2

Products and Materials
<table>
<thead>
<tr>
<th>NDW 4</th>
<th>PIPE MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDW 4.1</td>
<td>General</td>
</tr>
</tbody>
</table>

Refer to MRWA WSA 03 Part 2 – Products and Materials and Water Agency requirements.

<table>
<thead>
<tr>
<th>NDW 4.2</th>
<th>Products and Materials in Contact With Non-Drinking Water</th>
</tr>
</thead>
</table>

All products and materials used in contact with non-drinking water shall comply with AS/NZS 4020.
Part 3

Construction
NDW 5  \hspace{1cm} \textbf{GENERAL REQUIREMENTS FOR EXCAVATION AND INSTALLATION}

All excavations and installation of pipes and fittings shall be in accordance with the Design Drawings and Standard Drawings referenced in Part 4.

NDW 6  \hspace{1cm} \textbf{PRODUCT INSTALLATION ARRANGEMENTS}

NDW 6.1  \hspace{1cm} \textbf{Pipes}

Pipes shall be installed with identification markings facing upwards.

NDW 6.2  \hspace{1cm} \textbf{Valves, Hydrants and Other Appurtenances}

Valves, hydrants and other appurtenances shall be installed so that access to each item for maintenance and repair purposes is not restricted. This requirement particularly applies to installation of dual water reticulation in common trenching.

NDW 7  \hspace{1cm} \textbf{PROPERTY CONNECTIONS}

NDW 7.1  \hspace{1cm} \textbf{Tapping of Mains}

Tapping of the drinking water and non-drinking water reticulation mains shall be made at the time of construction with the main dry and completed before completing embedment and placement of trench fill. Tapping shall be as detailed in Standard Drawing WAT–1805–V.

Only Water Agency approved pre-tapped connector/tapping band/saddle/tee shall be used.

Appropriately sized ball valves shall be installed on property services at predetermined locations on the drinking and non-drinking water mains as they are being laid.

NDW 7.2  \hspace{1cm} \textbf{Installation of Property Services}

Property services shall be installed in accordance with Standard Drawings WAT-1803–V, WAT-1804–V and WAT-1806–V, as appropriate. Where possible property services shall be installed at the same time as tapping and before completing embedment, embedment compaction and placement of trench fill. The timing of provision of property services shall be in accordance with the
requirements of the Water Agency.

As far as is practicable, property services shall be laid across footways at $90\pm 5^\circ$ to the water main/kerb up to the point of bifurcation for split property services.

Split property services are not desirable and may only be used with the approval of the Water Agency.

The location of all service connections shall be advised to the Designer for recording on the Work As Constructed plan.

All property services crossing a road shall be one continuous length and laid within a duct, with the drinking water and non-drinking water service pipes being housed in either the same duct or separate individual ducts. The duct shall be laid in accordance with Standard Drawing WAT–1806–V. Permission to lay pipes across a street or public place shall firstly be obtained from the local planning authority, generally the local council, before commencing construction.

The common pipe of a split property service (Refer to standard Drawing WAT–1803–V) shall be positioned to service two properties on adjoining lots or two properties on the same lot in the case of duplex lots, and shall be in line with the abutting lot boundaries. A split property service shall be bifurcated in accordance with Standard Drawing WAT–1803–V and located at standard offsets from the side boundary in accordance with Standard Drawing WAT–1804–V.

In cases where there is conflict with existing driveways and/or other services and no other solution exists, each of the properties in question shall be serviced by a single service, located as near as practicable to the mid-point of the front property boundary.

Refer also to Commentary Clauses NDW 11.4 to NDW 11.7 inclusive.

During the progress of works, the Superintendent shall arrange for the recording of all as-constructed details. On completion of the works the as constructed records will be submitted to the Water Agency, all in accordance with the Water Agency’s Survey Manual.
NDW 8  ACCEPTANCE TESTING OF PROPERTY SERVICES

NDW 8.1  General

Testing of property services may be carried out in conjunction with testing of the reticulation pipeline or independently after installation of the services.

NDW 8.2  Testing in Conjunction With Reticulation Main

During pressure testing of the reticulation main, the ball valve or electrofusion tapping saddle (with integral cutter and service isolation valve) at the reticulation main, for each service connection, shall be open. For each property service, the ball valve at the property shall be closed. In order to ensure escape of entrapped air and to check that service connections are to the correct supply water main (drinking or non-drinking), the appropriate ball valves at each property shall be temporarily opened to allow water to flow through the service.

The constructor shall be required to submit for Water Agency approval an Inspection and Test Plan (ITP) prior to the commencement of works to establish hold and witness points during the installation and commissioning of non-drinking water mains, including non-drinking water main to meter services. The ITP shall specifically address commissioning procedures to identify any possible cross-contamination. Refer to EPA Victoria Draft Guidelines for Dual Pipe Water Recycling Schemes – Health and Environmental Risk Management.

A commissioning process for the drinking and non-drinking water services is provided in Appendix B. This system integrity inspection shall be conducted as part of the commissioning of the dual water supply system. The system integrity inspection is designed to eliminate the potential for cross contamination caused when a drinking water service is connected to a non-drinking water main.

NDW 8.3  Testing Independently of Reticulation Main

Unless tested in conjunction with the drinking water or non-drinking water main (Refer to Clause NDW 8.2), each property service up to the meter valve shall be pressure tested to 1.5 MPa (as per AS/NZS 3500.1).
**NDW 8.4 Non-Drinking Water – Backflow Protection**

*Any permanent cross-connection between a drinking and non-drinking water supply is a high a hazard rating.*

A high hazard rating requires the selection of a reduced pressure zone device(s) (RPZD) to mitigate the potential for non-drinking water to enter the drinking water supply.

Installation of the RPZD on the permanent cross-connection arrangement shall comply with AS/NZS 3500 Part 1 and drawing Number WAT–1827–M.

All backflow protection device(s) must be installed by a licensed plumber with water supply licences and or registration.

All backflow prevention device(s) must be commissioned and tested by a licensed plumber with backflow prevention accreditation. AS/NSZ 3500. Part 1 requires that all RPZD’s are commissioned and tested after installation and prior to service by an authorised licensed tester.

A backflow prevention device Inspection and Maintenance Report must be completed by an authorised licensed tester and submitted to the Water Agency.

Only backflow prevention device(s) manufactured and quality assured to AS/NZS 2845.1 are to be installed on any cross-connection between a drinking and non-drinking water supply within the Water Agency’s area of responsibility.

It will be the Water Agency’s responsibility to ensure that any testable device is inspected and tested at least annually.

Training in backflow prevention is available from registered training organisations or recognised organisations with appropriately qualified and experienced trainers and assessors.
### APPENDIX NDW A  Equivalent Pipe Sizes for Commonly Used Materials

<table>
<thead>
<tr>
<th>Commonly Specified Water Pipes</th>
<th>Equivalent PE Pipes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material and Pressure class</strong></td>
<td><strong>Pipe size</strong></td>
</tr>
<tr>
<td>Copper-Type B</td>
<td>DN</td>
</tr>
<tr>
<td>PVC-M-PN 12/16 DICL-PN 35</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>50</td>
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<td></td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td>PVC-M - PN 12/16 DICL – PN 35</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>150</td>
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<tr>
<td></td>
<td>200</td>
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<tr>
<td></td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>375</td>
</tr>
</tbody>
</table>

* No equivalent pipe size
APPENDIX NDW B. System Integrity Inspection on Dual Water Supply Systems

The procedure for system integrity inspection on Dual Water Supply reticulation mains to termination ball valve at end of property service for dry tapping is described below:

1. Close any cross connection between drinking and non-drinking water systems.
2. Charge drinking water system with potable water.
3. Have each gate valve on the drinking water system physically checked to ensure it is OPEN.
4. Open, successively, all hydrants/fire plug and scours on drinking water system. Check that all outlets run with water.
5. Check that all hydrants/fire plug covers, hydrants/fire plug surrounds and marker posts, reflective pavement markers are marked in accordance with the Supplement to the MRWA Edition of the WSAA Water Supply Code.
6. Check that all property services and ball valve handles on the drinking water system meet the requirements of the Supplement to the MRWA Edition of the WSAA Water Supply Code and are not coloured purple.
7. Check that all property service pipes and ball valve handles on non-drinking water system are coloured purple.
8. Drain the non-drinking water system by successively opening all hydrants/fire plug and scours on the non-drinking water system.
9. Open, successively, all termination ball valves on the drinking water property services. Check that all outlets run with water.
10. If no water is detected through the termination ball valves on the drinking water system ensure the property service is connected to the drinking water system and/or main tap ball valve is in open position.
11. Open, successively, all termination ball valves on the non-drinking property service line. All outlets should run dry after a short time.
12. If any of the tests prove to be unsatisfactory, detect and rectify the fault, and re-test.
13. Continue to rectify and re-test until a satisfactory test result is achieved.
14. Recharge non-drinking water supply system.
Part 4

Standard Drawings and Drawings
NDW 9 INTRODUCTION

NDW 9.1 General

Standard Drawings are included in this Supplement to the Water Supply Code of Australia to assist in understanding the principles and methodology involved in construction of dual water supply systems and to enhance the design and construction parts of this Code. The Drawings should be read in conjunction with the balance of the Code.

The Standard Drawings refer to “recycled water” throughout as an example of “non-drinking water”.

The Drawings included in this Part of the Code provide “deemed-to-comply” solutions for the installation of most elements of a dual water supply system. However, they will not suit all circumstances or overcome all problems. To meet special needs, Designers and Constructors are encouraged to identify improved construction methods and other variations from the requirements set out in the Standard Drawings. Authorisation by the Water Agency may be necessary before any major departure from the principles outlined in the drawings is implemented. Successful initiatives will be considered by WSAA for inclusion in future editions of this Code.

All Design Drawings should include the name of the Water Agency and have a signature block to allow confirmation that each drawing complies with Water Agency requirements.

The symbols and markings used on these Drawings are typical only, although they have been based on drawings supplied by Gold Coast Water and Sydney Water.

Individual Water Agencies may have specific information and presentation requirements, which should be determined before commencing any project. Any additional information, layout or format requirements specified by the Water Agency take precedence over these Drawings.

All special requirements including, but not limited to geotechnical requirements, embedment and compaction details, should be shown in the Design Drawings and/or the Specification.
NDW 9.2  

**Drawing Commentary**

This informative commentary preceding the Drawings provides background information on the purpose and content of the Standard Drawings and serves as a general guide for Designers and Constructors, as well as a training aid. The use of separate commentary avoids excessive detail and complexity in the Drawing notes.

The Designer is responsible for ensuring that Design Drawings and Specifications clearly address the issues of a particular project. It is the Designer’s responsibility to provide detailed requirements such as trench depth, embedment and fill materials, anchor block design, concrete type and reinforcement in the Design Drawings.

Both the Designer and Constructor should understand information relevant to selecting a feasible solution to a design and/or construction problem. Many of the Standard Drawings are “typical” and are not suitable for use without further design detail.

NDW 9.3  

**Varied Standard Drawings**

In some WSAA Dual Water Supply Standard Drawings, changes have been made to notes and/or technical detail to ensure the Drawings conform to MRWA requirements. Such varied drawings replace the original WSAA Dual Water Supply Standard Drawing. The varied drawing bears the same WAT prefix and number but with an added “-V” suffix.

No WSAA Dual Water Supply Standard Drawing has been varied if the only necessary change is the addition of a “-V” suffix to the number of another drawing cross-referenced within the notes or elsewhere on that Drawing. Notwithstanding, in such cases the varied MRWA version of such cross-referenced drawing shall be followed.

NDW 9.4  

**Supplementary (Additional) Drawings**

The WSAA Dual Water Supply Standard Drawings have been supplemented with a number of additional Drawings. Such Drawings address aspects not otherwise covered by the WSAA Dual Water Supply Standard Drawings. Supplementary drawings complement and in some instances replace WSAA Dual Water Supply Standard Drawings. Supplementary drawings are differentiated from WAT drawings by number and an “-M” suffix.
### NDW 10

**LISTING OF STANDARD DRAWINGS**

#### Table 10.1 Dual Water Supply System

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<tr>
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<th>Activity</th>
<th>Title</th>
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<tbody>
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<td>WAT–1800-V</td>
<td>Typical Mains Construction</td>
<td>Reticulation Main Arrangement for Dual Water Supply Systems</td>
</tr>
<tr>
<td>WAT–1801-V</td>
<td>Typical Mains Construction</td>
<td>Main Arrangement for Cul-de-sacs and Court Bowls</td>
</tr>
<tr>
<td>WAT–1802-V</td>
<td>Typical Mains Construction</td>
<td>Offtake Main Details</td>
</tr>
<tr>
<td>WAT–1803-V</td>
<td>Property Services</td>
<td>Typical Service Layouts and Alternative Marking Systems</td>
</tr>
<tr>
<td>WAT–1804-V</td>
<td>Property Services</td>
<td>Typical Service Arrangement</td>
</tr>
<tr>
<td>WAT–1805-V</td>
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<td>Standard Tapping Methods</td>
</tr>
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<td>WAT–1806-V</td>
<td>Property Services</td>
<td>Single and Split Services Across Carriageways</td>
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<td>WAT–1807-V</td>
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<td>Typical Above-Ground Meter Arrangements</td>
</tr>
<tr>
<td>WAT–1808-V</td>
<td>Property Services</td>
<td>Typical In-Ground Meter Arrangement</td>
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<tr>
<td>WAT–1810-V</td>
<td>Embedment and Trench Fill</td>
<td>Main Arrangement for Dual Water Supply Systems</td>
</tr>
<tr>
<td>WAT–1811-V</td>
<td>Thrust Block Details</td>
<td>Concrete Thrust Blocks for Adjacent Dual Water Mains</td>
</tr>
<tr>
<td>WAT–1820-V</td>
<td>Hydrant Identification</td>
<td>Identification Markers and Marker Posts</td>
</tr>
<tr>
<td>WAT–1821-V</td>
<td>Valve Identification</td>
<td>Identification Markers and Marker Posts</td>
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NDW 11

COMMENTARY ON WAT–1800 SERIES – DUAL WATER SUPPLY SYSTEMS

The 1800 series of Drawings deals with the construction of dual water supply mains and property services and associated appurtenances and surface fittings, as well as marking of the non-drinking water supply system.

AS 1100 Part 401-1984, which specifies standard drawing symbols for water supply, has not been adopted by WSAA. A consensus standard is yet to be developed. Water Agencies should specify their individual requirements.

NDW 11.1

WAT–1800–V – Typical Mains Construction – Main Arrangement for Dual Water Supply

Drawing WAT–1800–V shows two adjacent water mains laid in a common trench in the footway allocation with the drinking water main closest to the kerb.

The drinking water main has been shown constructed in PE pipes in which case the thrust block shown at the tee is not needed. The thrust block shown at the tee on the recycled water main extends beyond the adjacent main which assumes that the recycled water main has been laid with deeper cover than the adjacent drinking water main (Refer to WAT–1802–V).

Where approved by the Water Agency, restrained joint pipeline systems such as welded PE and restrained joint DICL may be used to avoid the need for thrust and anchor blocks especially in common trench installations. The use of restrained joint pipeline systems should be thoroughly investigated since it has the potential to avoid difficult construction practices and increased construction costs, not to mention the future difficulties that could be faced by maintenance personnel.

Valves, hydrants and other appurtenances should be located so that access to each item for maintenance and repair purposes is not restricted e.g. to provide adequate access, hydrants may need to be offset from the mains located adjacent to the property boundary. This requirement particularly applies to installation of dual water reticulation in common trenching.

NDW 11.2

WAT–1801–V – Typical Mains Construction – Main Arrangement for Cul-De-Sacs and Court Bowls

WAT–1801–V shows typical layouts for mains in cul-de-sacs and court bowls where the fire fighting supply is shown from the recycled water main. It could equally have been on the drinking
water main. Looped mains are preferred because the potential for
deterioration of water quality is reduced and water for fire fighting
can be supplied at the court bowl at the end of the cul-de-sac,
which is particularly relevant for deep cul-de-sacs.

Where reduced diameter mains are used, the length and placement
of the larger diameter (≥DN 100) feeder main should be extended
to ensure the serviced houses can all be reached by fire hoses
attached to the nearest hydrant.

The flushing point valves at the end of reduced diameter mains
should have the handles removed or locked or otherwise secured to
prevent illegal use of water.

NDW 11.3

WAT–1802–V – Typical Mains Construction –
Main Arrangement Offtake Main Details

WAT–1802–V shows typical offtake main details using
“traditional” installation methods. Under pressure cut-in
connections may also be used where the size of offtakes and type
and condition of main to be cut into are appropriate to this
technique. This has the advantage of not requiring the connected
main to be shut down.

While the mains are generally laid to a common obvert depth to
facilitate property service connections, the trench depths and
widths will need to be increased to accommodate offtake pipework
so that the thrust block on the inside main does not directly load
the outer adjoining main. The use of a restrained joint pipeline
system for at least one of the mains may alleviate some of the
difficulties constructing thrust blocks at offtakes, bends etc.

Extension spindles may be need on the offtake valve on the deeper
main.

NDW 11.4

WAT–1803–V – Property Services – Typical Service
Layouts and Alternative Marking Systems

WAT–1803–V shows the typical service layouts for single and split
property services that terminate at isolation ball valves buried
beneath the ground or meters, both located inside property
boundaries.

Utilising split property services is subject to Water Agency
approval. The Water Agency may permit split property services
under the following criteria:

- Width of property fronting the road reserve is less than or
equal to width of road
Width of road exceeds 16.5 m
Connection is in line with service from one of the properties served
Single residential sites only

Where the Water Agency has approved the use of split property services, the property services should be laid in line with the common boundary to service two adjacent properties or in the middle of the front property boundary to service properties side-by-side on duplex lots or at the boundary of the access way to service two properties one behind the other in battle axe lots. Where the access way services more than two battle axe lots provide split and single property services to suit the number of battle axe lots.

It is preferable that property services are installed at the same time as tapping and before completing embedment, embedment compaction and placement of trench fill.

Main tap location markers are not required by the MRWA. Duct and Service marker locations have been adopted by the MRWA to identify the location of service ducts under the road carriageway and the locations of the property services. If there is no kerb on which to place markers alternative marking systems will need to be devised.

The sizes of single and split property service pipes are provided for PE pipes along with their relevant purchase specifications which can be downloaded from the WSAA website.

NDW 11.5

WAT–1804–V – Property Services – Typical Service Arrangement

NOTE: WAT–1804–V is subject to Water Agency approval.

WAT–1804–V shows the boundary offset dimensions and spacings for split property services that terminate at meters inside property boundaries and in the footways. The bifurcation positions for meter in property split services are also shown.

Property service crossovers show that property services should be laid from the connected main over the adjoining main with a 150 mm minimum clearance.

A table of minimum bending radii for PE and copper pipes is also provided to assist the constructor. It is obvious that in tight pipe corridors copper pipe offers considerable advantages in being able to be bent in much tighter radii than PE.
NDW 11.6

**WAT–1805–V – Property Services – Standard Tapping Methods**

This Drawing has been generally varied for MRWA requirements.

WAT–1805–V shows typical details for connecting a property service to a (reticulation) main and is similar in detail to WAT 1108–V.

The method of connection is dependent on the pipeline material. Direct tapping of water mains (i.e. without use of a tapping band/saddle/tee) is not permitted.

The tappings may be performed at surface level before the section of pipe is lowered into the trench.

Pre-tapped connectors are the preferred option for all connections installed during construction of the reticulation main because they are an integral part of the pipeline system rather than an add-on component. Pre-tapped connectors reduce the likelihood of leakage, external corrosion of DI mains and external damage to PVC mains.

Tapping bands used on PVC pipe should be full circle clamping to prevent over tightening and subsequent compression of the pipe. Stainless steel tapping band clamps should not be used on PVC-M and PVC-O pipes if tapping is conducted under pressure, since there is a risk that once depressurised the clamp type tapping bands will not reseal to provide a watertight connection.

Electrofusion welded tapping saddles should be used at all times with new installations of PE pipe. Tapping of curved PE pipe should take place only at the top of the pipe to minimise stress around the tapping hole. Where dry tapping is performed, a plug cutter should be used, and all swarf removed. Under pressure tapping should be used only with systems that utilise plug cutters that retain the PE pipe wall plug within the cutter. Where welded tapping systems are used, the assembly should be allowed to fully cool naturally before cutting the mainline PE plug.

SEW approved mechanical tapping saddles shall be used at all times with new installation of PE pipe.

Ball valves at the water main are not necessary where electrofusion tapping saddles are used, since electrofusion tapping systems have an integral service isolation valve.

Type and application for alternative tapping products are provided, together with their relevant purchase specifications, which can be downloaded from the website. Product information
available on the WSAA website is intended to be a guide, only products specifically approved by the Water Agency shall be used.

Note: The Water Agency’s requirements for “dry” or “under-pressure” tapping should be outlined in the Specification.

NDW 11.7 WAT–1806–V  – Property Services – Single and split services across carriageways

WAT–1806–V shows typical details for single and split property services across carriageways which terminate in property. The Drawing applies equally to services that terminate in footway.

Drinking water and non-drinking water property services are placed in the same duct, which should have minimum fall away from the mains. The duct should be constructed in solvent cement jointed PVC stormwater or sewer pipe with minimum stiffness SN4. Where the duct is provided using trenchless techniques such as directional boring a continuous length of PE duct pipe may be preferred.

NDW 11.8 WAT–1807–V  – Property Services – Typical Above-Ground Meter Arrangement

Note: WAT–1807–V is subject to Water Agency approval.

A licensed plumber or Water Agency authorised contractor to install above ground meter assembly arrangement.

WAT–1807–V shows a typical above-ground meter arrangement that is used at Rouse Hill, Sydney. The meter spacing dimensions may vary depending on the type of meter used.

The most important aspect of meter installation is to minimise the likelihood of cross-connections between the drinking water supply and the non-drinking water supply. Procedures should be put in place to ensure cross-connections do not occur.

NDW 11.9 WAT–1808–V  – Property Services – Typical In-Ground Meter Arrangements

Note: WAT–1808–V is subject to Water Agency approval.

WAT–1808–V shows a typical in-ground meter arrangement that is used on the Gold Coast and Brisbane. The meter spacing dimensions may vary depending on the type of meter used.

The most important aspect of meter installation is to minimise the
likelihood of cross-connections between the drinking water supply and the non-drinking water supply. Procedures should be put in place to ensure cross-connections do not occur.

**NDW 11.10**


Trench fill material in road surface locations to comply with road owner’s requirements or the Water Agency’s requirements and specified on the Design Drawings.

WAT–1810–V shows typical trench installations for same and different diameter mains in a common trench. The mains are laid obvert to obvert. The minimum clearance between the mains is given together with standard trench depths for non-trafficable and trafficable local road carriageways assuming Series 2 pipes are used.

It is important to maintain clearances between the pipes and the trench walls to permit embedment compaction.

**NDW 11.11**


It may be necessary to lay mains at different depths to facilitate construction of separate thrust/anchor blocks and/or to facilitate water main branching.

WAT–1811–V shows typical manipulation of depths of adjacent mains within a common trench so as to enable construction of thrust blocks with the deeper main thrust block of the inner main being below the outer main thrust block.

Protection between the barrel of the main and the concrete thrust block also needs to be provided to prevent damage to the pipe.

Thrust blocks cast one on top of the other should also be separated using PE sheet to aid their selective removal should the need ever arise.

The construction technique shown is only suitable for mains ≤DN 300 where the allowable horizontal bearing pressure (Refer to WAT–1200) permits.

Detailed design drawings for thrust block installation should be provided to the Constructor. Alternative thrust block installation designs may be equally applicable.
NDW 11.12 **WAT–1820–V – Hydrant Identification – Identification Markers and Marker Posts**

WAT–1820–V shows deemed-to-comply identification and marker post systems for hydrants used for fire fighting and/or operational purposes.

The most important aspect of hydrant markers is to allow easy identification by emergency service and operation and maintenance personnel. Positive identification of drinking and non-drinking water mains is achieved once the surface fitting has been located and the surface fitting markings and/or colour is noted.

Water Agencies may have varying standard systems and these should be determined prior to commencing the project.

Hydrants on the non-designated fire system to have black cover with no means of CFA marker identification.

With respect to the subdivision referral process to the CFA, only designated fire fighting hydrants need to be provided to the CFA for their database recording.

NDW 11.13 **WAT–1821–V – Valve Identification – Identification Markers and Marker Posts**

*Note:* WAT–1821–V is not used by the MRWA.

WAT–1821–V shows deemed-to-comply identification and marker post systems for valves used for operational purposes.

The most important aspect of valve markers is to allow easy identification by operation and maintenance personnel. Positive identification of drinking and non-drinking water mains is achieved once the surface fitting has been located and the surface fitting markings and/or colour is noted.

Water Agencies may have varying standard systems and these should be determined prior to commencing the project.


WAT–1822–V shows typical installation configurations for hydrants, valves and flushing points in various parts of the reticulation system including in-line and end-of-line and bowls of cul-de-sacs using compression fittings designed for use with PE pipe.
The PE riser components used for the DN 63 flushing point shows deemed-to-comply solution. Alternative designs may be equally applicable. Detailed design drawings for installation should be provided to the Constructor following verification that all components are readily available at local stockists.

Where colour differentiation of hydrant claws, valve stem caps and/or flushing valves is also required for operational purposes, to minimise the likelihood of cross-connections between the drinking water supply and the non-drinking water supply, the Constructor needs to have procedures in place to ensure the correctly coloured components are used.

**NDW 11.15**

**WAT–1823–V – Typical Appurtenance Installation – Hydrant, Valve and Flushing Installation on PE Mains Using Electrofusion Fittings**

WAT–1823–V shows typical installation configurations for hydrants, valves and flushing points in various parts of the reticulation system including in-line and end-of-line and bowls of cul-de-sacs using electrofusion fittings designed for use with PE pipe.

The electrofusion components nominated show deemed-to-comply solutions. Alternative designs may be equally applicable. Detailed design drawings for installation should be provided to the Constructor following verification that all components are readily available at local stockists.

Where colour differentiation of hydrant claws, valve stem caps and/or flushing valves is also required for operational purposes, to minimise the likelihood of cross-connections between the drinking water supply and the non-drinking water supply, the Constructor needs to have procedures in place to ensure the correctly coloured components are used.

**NDW 11.16**

**WAT–1824–V – Typical Appurtenance Installation – Temporary Cross Connections**

WAT–1824–V shows the valve and fittings arrangements required for temporary cross connection between drinking water and non-drinking (recycled) water mains of different materials. The mains should be laid at the same depth to enable the connection to be made more easily.

The temporary connection should be installed in such a way as to facilitate easy and permanent removal once the non-drinking (recycled) water supply system has been commissioned. The
temporary cross connection arrangement may be installed in a valve chamber, although this is not completely necessary, as long as there is access to the valve and the embedment material can be easily excavated when the cross connection and access cover and frame is permanently removed and restoration can be made. If a valve chamber is required refer to Standard Drawings WAT–1308 and WAT–1309.

WAT–1824–V shows connections on PVC and DI pipes made using “traditional” cut-in installation methods using a tee and mechanical couplings. Under pressure cut-in connections are not appropriate for this type of installation given the proximity of the adjacent mains.

The flanged offtake tees shown for connection to PE mains have end thrust restraint connections. The Constructor needs to make sure that the flange drillings of the valve match the offtake tee. Where a PE main (Series 1–ISO sized) is cross connected to a PVC or DI main (Series 2 CIOD sized), the flange drillings of the valve will most likely be different (Figure B5 of AS 4087 versus AS/NZS 4331.2) due to the dimensional series of the pipes being cross connected and the likelihood that the flanged offtake tees with end thrust restraint are Series 1 with ISO flange drillings.

Type and application for products needed to make the cross connection are provided, together with their relevant purchase specifications, which can be downloaded from the WSAA website.


WAT–1825–V shows the marking of recycled water surface fittings. Typical trafficable (Classes D and E, heavy duty) and non-trafficable (Class B, light duty) DN 375 and DN 600 access covers and valve and hydrant boxes are shown and should be considered as indicative only.

Each Water Agency has an authorised range of covers and frames and a range of associated support material. Each cover shown has been given a type letter to allow easy identification. Prior to commencing projects, the appropriate covers and associated materials should be obtained and the correct method of installation determined.

Painting of surface surrounds of non-trafficable surface fittings with road marking paint may also be required.

For further guidance on typical surface fitting installation refer to WAT–1303 to WAT–1306 inclusive.
NDW 11.18  WAT–1826–M – Miscellaneous Connection Details

WAT-1826-M shows deem-to-comply alternative connection arrangements for non drinking water main only that are being used at the Aurora Estate, Melbourne. Alternative designs may be equally applicable. Detailed design drawings for the installation should be provided to the constructor following verification that all components are readily available.

NDW 11.19  WAT–1827–M – Cross Connection Between Dual Water Supply Systems

WAT-1827-M shows deem-to-comply cross connection arrangements between drinking water mains and non-drinking water mains. Installation of Water Agency approved Backflow Preventers must be performed by qualified, licensed personnel.
This arrangement depicts a PE drinking water main, however any approved material can be used for drinking or non-drinking water mains.
NOTES
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. SUPPLY OF WATER FOR FIRE FIGHTING SHOWN FROM NON-DRINKING WATER MAIN.
3. LOCATE FLUSHING POINTS AND CONNECTION POINTS FOR PROPERTY SEPARATE TAP DIZPING BANDS TO AVOID EXISTING AND PROPOSED DRAINAGE AND OTHER CONSTRUCTIONS.
4. ANY APPROVED FIRE SYSTEM AS APPROPRIATE TO DRINKING WATER OR RECYCLED WATER MAY BE USED FOR LOOPED MAINS.
5. REFER TO TABLE 6.4 MAXIMUM HYDRANT SPACING: MRWA EDITION NOAA WATER SUPPLY CODE WSA03-2002.

LEGEND
DRINKING WATER MAIN
NON-DRINKING WATER MAIN

DUAL WATER SUPPLY SUPPLEMENT
TYPICAL MAINS CONSTRUCTION
MAIN ARRANGEMENT FOR CUL-DE-SACs AND COURT BOWLS

* THIS IS A SUPPLEMENT TO THE MRWA EDITION OF THE WSA03-2002
OFFTAKE DETAIL A
(REFER WAT-1810 FOR EMBREMENT DETAIL)

OFFTAKE DETAIL B
(REFER WAT-1810-V FOR EMBREMENT DETAIL)

NOTES
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. ONLY STANDARD EMBREMENT TYPES 'A' OR 'B' SUPPORT SHOWN. REFER TO WAT-1202-V.
3. FOR EMBREMENTS WITH INADEQUATE SIDE SUPPORT AND/ OR FOUNDATION REFER TO WAT-1203.
4. FOR EMBREMENTS WITH INADEQUATE TRENCH WALL STIFFNESS AND WHERE GROUNDWATER SEEPAGE EXISTS REFER TO WAT-1204-V.
5. TIMBER THUST NOT PERMITTED FOR COMBINED TRENCHING INSTALLATION

* THIS IS A SUPPLEMENT TO THE MRWA EDITION OF THE WSA03-2002
**TYPICAL PLAN**

**SINGLE PROPERTY SERVICES PRELAID ACROSS CARRIAGEWAY**

- Service duct kerb marking (refer note 6)
- Pe pipes shown
- Pvc, dk or crp pipes shown
- Duct for DN 20 drinking water and DN 25 non-drinking water property services (refer note 6)

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**TYPICAL ELEVATION**

**NOTES**

1. All dimensions in millimetres unless otherwise noted.
2. All drinking to be read in conjunction with WAT-1505-V, WAT-1504-V, WAT-1505-V, WAT-1507-V and WAT-1207-V.
3. For service duct kerb marking and property service layout details refer to WAT-1803-V.
4. Depths in other than local roads to be in accordance with road owner and water agency.
5. Provide marking duct over services in footway and tied to the service connection valve and run vertically to surface. Provide tracer wire where service is in duct.
6. For property services prelaid across carriageways:
   - Install dk and new services in same duct.
   - No joints within duct.
   - Lay duct between kerb lines at minimum depth in accordance with WAT-1207-V measured from channel of kerb to top of duct.
   - Use on or en 100 scj pipe of minimum stiffness sn3 for duct.
   - For split property services, duct to be prelaied directly in line with common boundary of properties to be serviced.
7. Lay split property services where approved by WAT.
8. Locate property services from main to water in the one street only, at frontage of properties.
9. Where specified by the water authority, place on and non meters together (200 mm) either near the one boundary or in the middle of the frontage of the property. Typical on property service valves shown, refer to WAT-1804-V for location of footway property service valves.

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**TYPICAL PLAN**

**SPLIT PROPERTY SERVICES PRELAID ACROSS CARRIAGEWAY**

(SUBJECT TO WATER AGENCY APPROVAL)

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*This is a supplement to the MRWA Edition of the WSA03-2002*
TYPICAL DN 20 IN-GROUND METER INSTALLATION — DRINKING WATER

SUBJECT TO WATER AGENCY APPROVAL

1. DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. FOR GENERAL INSTALLATION REQUIREMENTS REFER WAT-1803-V AND WAT-1804-V.
3. LOCATE THE METER INSTALLATION WITHIN THE FOOTWAY PERPENDICULAR TO THE FOOTWAY AS NEAR AS PRACTICAL;
4. LOCATE WATER SERVICES & METERS CLEAR OF ELECTRICAL SERVICES.
5. DO NOT SURROUND OR COVER ANY COMPONENTS WITHIN THE METER BOX WITH EMBEDEMENT MATERIAL.
6. FOR WATER SERVICE DUCT INSTALLATION DETAILS REFER WAT-1806-V.
7. IF USING PRE-TAPPED CONNECTORS OR ELECTROFUSION TAPPING SADDLES, FOLLOW METER ASSEMBLY AND METER BOX ONLY.
8. STANDARD BSP THREADED COMPONENTS SHOWN IN SPECIAL INSTALLATIONS OTHER APPROVED COMPONENTS MAY BE USED, LIASE WITH SUPPLIERS.
9. WHERE HARD SURFACE EXISTS, PROVIDE INSTALLATIONS WITH PATH OR ROAD BOX TO SUIT, USING A ROAD BOX SUPPORT SYSTEM SIMILAR TO STANDARD HYDRANT & VALVE BOX SUPPORT SYSTEM.
10. CHECK THAT EMBEDEMENT MATERIAL AROUND THE METER BOX IS FREE OF ROCKS OR LUMPS OF MATERIAL THAT MAY PREVENT REMOVAL OR FUTURE HEIGHT ADJUSTMENT OF THE BOX TO MATCH FINAL FOOTWAY PROFILE.
11. ALIGN THE DIRECTIONAL ARROW ON THE METER TO POINT DOWNSTREAM TOWARDS PROPERTY.
12. WORKS SHOULDN'T GIVE WAY TO PLUMBING INDUSTRY COMMISSION STANDARDS (PIC).
13. DUAL CHECK VALVES WILL BE REQUIRED ON THE OUTLET OF THE DRINKING WATER METER. THE DUAL CHECK VALVE IS TO BE VISIBLE, ACCESSIBLE AND FITTED IN THE HORIZONTAL SECTION OF THE METER ASSEMBLY.

* THIS IS A SUPPLEMENT TO THE MRWA EDITION OF THE WSA03-2002

NOT TO SCALE

DUAL WATER SUPPLY SUPPLEMENT

PROPERTY SERVICES

TYPICAL IN-GROUND METER ARRANGEMENT

FOOTWAYS AND CARRIAGEWAY

WAT-1808-V

ISSUED 2004 V1.1
TYPICAL TRENCH INSTALLATION
FOR SAME DIAMETER MAINS

TYPICAL TRENCH INSTALLATION
FOR DIFFERENT DIAMETER MAINS

NOTES
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH WAT-1201-V.
3. SPECIFY BEDDING - SPECIAL BEDDING TO SUIT THE CONDITIONS IF TRENCH FLOOR WAS:
   - IRREGULAR OUTCROPS OF ROCK;
   - KNP OF 450 KPA (REFER TO WAT-1200-V); OR
   - UNCONTROLLED GROUND WATER HAS DISTURBED THE FLOOR OF THE TRENCH.
4. USE EMBEDMENT, TRENCH FILL AND COMPACTATION THAT MEETS THE REQUIREMENTS OF WMA WSA G3 PART 3 AND THE ROAD OWNER AND WATER AGENCY AS APPROPRIATE.
5. KEEP SIDES OF THE EXCAVATION VERTICAL TO AT LEAST 150 ABOVE THE PIPES IN STRATA OTHER THAN SAND. FOR TRENCHES IN SAND STRATA REFER TO WAT-1202-V.
6. WHERE BOTH D1 AND D2 ARE < ON 200, MANTAIN 300 MINIMUM CLEARANCE BETWEEN MAINS, WHERE ONE OR BOTH OF MAINS ARE > ON 200 MANTAIN 450 MINIMUM CLEARANCE.
7. LAY MARKING TAPE ALONG ROUTE OF EACH MAIN AS SPECIFIED (REFER TO CLAIRE 15.10 OF WMA WSA D2).
8. MANTAIN MINIMUM CLEARANCES BETWEEN MAINS AND OTHER SERVICES IN ACCORDANCE WITH TABLE 4.1 OF WMA WSA D2.

<table>
<thead>
<tr>
<th>NOMINAL SIZE DN</th>
<th>TRENCH WIDTH (REFER NOTE 9)</th>
<th>STANDARD TRENCH DEPTH*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>NON-TRAFFICABLE</td>
</tr>
<tr>
<td>100</td>
<td>W=500+DN1+DN2</td>
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</tr>
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</tr>
<tr>
<td>375</td>
<td>W=850+DN1+DN2</td>
<td>1200</td>
</tr>
</tbody>
</table>

* STANDARD TRENCH DEPTHS AS SHOWN ARE FOR INSTALLATIONS IN LOCAL ROADS ONLY.

TABLE 1 TRENCH DETAILS
(SERIES 3 PIPES LISTED)

* THIS IS A SUPPLEMENT TO THE MRWA EDITION OF THE WSA03-2002
NOTES
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. THIS DRAWING APPLIES TO NON-JOINT RESTRICTED PIPELINES.
3. THE MAIN ON THE OUTSIDE OF THE BEND IS THE HIGHER MAIN.
4. MAINTAIN MAXIMUM PIPE COVER BY DEEPENING THE TRENCH.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH WAT-1205-V.
6. DETERMINE THE SEPARATE THRUST AREA FOR EACH WATER MAIN (DRINKING AND NON-DRINKING) UNLESS A SPECIAL DESIGN IS PREPARED AND ITS USE AUTHORIZED.
7. WHERE THRUST BLOCKS ARE CAST ONE ON TOP OF THE OTHER, SEPARATE USING A MINIMUM THICK P.E SHEET.
8. ENCREMNT, TRENCH FILL AND COMPACTION SHALL MEET THE REQUIREMENTS OF WAT-10A-V, PART 3 AND THE ROAD OWNER AND WATER AGENCY AS APPROPRIATE.
9. MAINTAIN MINIMUM CLEARANCES BETWEEN MAINS AND OTHER SERVICES IN ACCORDANCE WITH TABLE 4.1 OF WAT-10A-V.
10. WHERE BOTH D1 AND D2 ARE > 200, MAINTAIN 300 MINIMUM CLEARANCE BETWEEN MAINS EXCEPT WHERE ONE OR BOTH OF MAINS ARE > 200 MINIMUM 450 CLEARANCE.
11. DESIGN AND CAST THRUST BLOCKS TO TRANSFER THRUST TO UNDISTURBED STRATA, CLEAR OF OTHER SERVICES.
12. REBATE THRUST BLOCKS INTO TRENCH WALL, REFER TO WAT-1205-V.

LEGEND
- DRINKING WATER MAIN
- NON-DRINKING WATER MAIN

* THIS IS A SUPPLEMENT TO THE MRWA EDITION OF THE WSA03-2002

DUAL WATER SUPPLY SUPPLEMENT
THRUSTR BLOCK DETAILS
CONCRETE THRUST BLOCKS FOR ADJACENT DUAL WATER MAINS

WAT-1811-V
ISSUED 2004 V1.1
**NOTES**

1. All dimensions in millimetres unless otherwise noted.

2. Marking of hydrants in developed areas:

   Place indicator plate such that it faces direction of hydrant.

   **Primary Indicators**

   PUNCH PRIMARY INDICATOR PLATES WITH TWO SETS OF NUMBERS.

   TOP NUMBER TO GIVE DISTANCE IN METRES FROM PLATE TO HYDRANT, AND BOTTOM NUMBER TO GIVE NOMINAL SIZE OF MAIN ON WHICH HYDRANT IS LOCATED.

   APPLY SELF ADHESIVE BLACK TAPE TO PLATE BETWEEN THE TWO PUNCHED NUMBERS IF HYDRANT IS ON OPPOSITE SIDE OF ROAD.

   RETURN INDICATOR PLATE AROUND EDGES OF PLATE WHERE PRACTICABLE.

   **Secondary Indicators**

   USE SECONDARY INDICATORS IN CASES WHERE PRIMARY INDICATOR CANNOT BE SEEN FROM A VEHICLE TRAVELLING ALONG A STREET IN A PARTICULAR DIRECTION.

   SECONDARY INDICATORS TO FACE DIRECTION OR APPROACH FROM WHICH THE PRIMARY CANNOT BE SEEN.

   PLACE BOTH PRIMARY AND SECONDARY INDICATORS 2100 ABove GROUND LEVEL.

   POSITION INDICATORS ABOVE RATHER THAN BELOW 2100, IF AN OBLIQUE PREVENTS FIXING AT SPECIFIED HEIGHT.

   ALL INDICATORS ON ONE POLE TO BE AT ONE HEIGHT.

4. Punch plates on hard metal surface with 12 HIGH ICE STAMPS BEFORE PLATES ARE ATTACHED TO POLES.

   TAKE CARE NOT TO PUNCH STAMP THROUGH PAINTED SURFACE OF PLATE TO EXPOSE METAL.

5. WHERE IT IS NOT POSSIBLE TO USE METAL PLATE INDICATORS, USE SELF-ADHESIVE INDICATORS.

6. IN AREAS WHERE HYDRANT INDICATORS CANNOT BE PLACED ON POLES, PLACE A PRIMARY INDICATOR DIRECTLY OPPOSITE THE HYDRANT ON:

   (i) A PROPERTY BOUNDARY FENCE OF FACE OF A BUILDING ON THE PROPERTY BOUNDARY, OR

   (ii) A WASTE HANDMADE POST OR RECYCLED PLASTIC POST (MAKE SURE THERE ARE NO FENCES) ON THE PROPERTY BOUNDARY LINE.

7. LOCKT HYDRANTS FOR FIRE FIGHTING ON NON-DRAWING WATER MAINS. HYDRANTS ON DRINKING WATER MAINS MAY ALSO BE USED FOR FIREFIGHTING.

8. FOR DRINKING WATER MAINS, WHERE HYDRANTS ARE DESIGN FOR FIRE FIGHTING PURPOSES ONLY FOR A DUAL PURPOSE, I.E., FIREFIGHTING AND OPERATIONAL PURPOSES, SEE NOTES 10-12 AND 13. FOR WATER MAINS, WHERE HYDRANTS ARE USED FOR OPERATIONAL PURPOSES ONLY, NO MARKER POST IS REQUIRED.

9. FOR NON-DRAWING WATER MAINS, WHERE HYDRANTS ARE DESIGN FOR FIREFIGHTING PURPOSES OR FOR A DUAL PURPOSE (I.E. FIREFIGHTING AND OPERATIONAL PURPOSES) SEE NOTES 10, 11, 12 AND 13. FOR NON-DRAWING WATER MAINS, WHERE HYDRANTS ARE DESIGN FOR OPERATIONAL PURPOSES ONLY, NO MARKER POST IS REQUIRED.

10. COLOURED MARKER TOPS ON TYPE "A" & "B" POSTS TO BE:

    WATER (CONCRETE) — BLUE/WHITE (1:4)

    HYDRANTS — RED NON-REFLECTIVE MARKING OF AT LEAST 200MM AROUND TOP OF POST, OR THE DEFINED HEIGHT OF THE HYDRANT BODY OR COVER. THE RED, NON-REFLECTIVE MARKING TO BE EITHER FACTORY PAINTED, BONDED, RED, ELLIPSE WASHED RED OR EQUIVALENT.

11. METAL TYPE "A" & "B" MARKER POSTS SPECIFIED BY WATER AGENCY.

12. TYPE "A & B" MARKER POSTS SHALL HAVE TWO BLUE REFLECTIVE MARKERS EACH WITH A SURFACE AREA OF AT LEAST 300 SQCM AND ATTACHED TO ACCESSORIES.

13. TYPE "A & B" MARKER POSTS SHALL HAVE REFLECTORS PLACED TO BE VISIBLE FROM BOTH DIRECTIONS OF APPROACH AND MAY BE RECESSED TO ADDED SECURITY. HYDRANT RETRO-REFLECTIVE PAYMENT MARKERS REQUIRED WHEN MESSAGES ARE BEING USED FOR FIREFIGHTING PURPOSES (REFER WAT-1300-V).

*This is a supplement to the MRWA Edition of the WSA03-2002*
DETAIL A
IN-LINE CONNECTION DN 63 PE PIPE

NON-DRINKING VALVE COVER AND SURROUND TO WATER AGENCY REQUIREMENTS
(REFER TO NOTE 4)

FEMALE CAMLOCK DUST CAP
CAMLOCK MALE ADAPTOR TO FEMALE BSP THREAD
DN50 HEXAGONAL NIPPLE
DN50 BALL VALVE (FEMALE THREAD) - LOCKING DEVICE REQUIRED
DN50 HEXAGONAL NIPPLE
TRANSITION COUPLING (FEMALE BSP OUTLET)
DN 63 PE
50 GATE VALVE WITH FALSE SPINDLE

DETAIL B
DN 63 PE FLUSHING POINT AT END OF LINE AND BOWL OF CUL-DE-SAC

1000 MIN. TO GATE VALVE
150 DIA. SPINDLE PROTECTION PVC PIPE PN 4.5

HYDRANT SURFACE BOX AND SURROUND TO WATER AGENCY REQUIREMENTS
(REFER TO NOTES 2 & 2)

HYDRANT RISER (100 x 300 OR SPECIFY LENGTH AS REQUIRED)
100 x 3 INSERTION GASKET, STAINLESS STEEL NUTS, BOLTS AND WASHERS GRADE 316 SS
100 x 50 BLANKED FLANGE TAPPED OFF CENTRE

100 X 900 LONG FL-SCC CONNECTOR
100 X 3 INSERTION GASKET, STAINLESS STEEL NUTS, BOLTS AND WASHERS GRADE 316 SS
RED GUM BLOCK AND WEDGES WHERE SHOWN (600 x 300 x 50, 300 x 100 x 75)

DETAIL C
IN-LINE VALVE AND FLUSHING POINT
DN 63 PE PIPE

50 GATE VALVE WITH FALSE SPINDLE
PE PIPE END CAP
RED GUM BLOCK AND WEDGES WHERE SHOWN (600 x 300 x 50, 300 x 100 x 75)
MALE ADAPTOR 63 x 2"

DETAIL D
PE TEE AND IN-LINE VALVE

NOTES:
1. ALL DIMENSIONS IN MILLMETRES UNLESS OTHERWISE NOTED.
2. REFER TO WAT-1305-V AND WAT-1306-V FOR ADDITIONAL DETAILS.
3. SURFACE BOX SURROUND TO BE PAINTED WITH PURPLE ROAD MARKING PAINT TO MATCH AC 3700 COLOURS AS FOLLOWS:
   - NO DARKER THAN PS24 JACARANDA OR PS16 PURPLE, AND
   - NO LIGHTER THAN PS3 ULC.
4. REFER TO WAT-1825-V, DN 375 COVERS TO WSA PS-2918M MAY BE SUITABLE FOR FLUSHING POINTS.
5. F/C NON-DRINKING WATER HYDRANT REFER TO WSA PS-2679M.
6. FIT THE FLUSHING POINT VALVE IN SUCH A WAY AS TO PREVENT MOVEMENT OR Rotation OF THE VALVE BODY AND PROVIDE A SURFACE PLUG OR CAP TO KEEP OUT DIRT AND DUST.
7. SELECT THIS DIMENSION TO ALIGN THE RESIDENT SEATED VALVE (RSV) WITHIN THE FOOTWAY TANGENTIAL TO THE LOT FRONT BOUNDARY.
8. USE SUFFICIENT LENGTH OF RISER PIPE TO SUIT THE INSTALLATION DEPTH.
9. ALL BACKING PLATES, NUTS BOLTS AND WASHERS TO BE MINIMUM GRADE 316 STAINLESS STEEL.
10. INSTALLATION OF PE PIPE AND FITTINGS TO WSA 01.
11. ONLY USE WATER AGENCY APPROVED TAPPING BOLTS.
12. CONCRETE, TANNER OR RECYCLED PLASTIC THRUST RESTRAINT IS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING WAT-1205.
**NOTES:**

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. REFER TO WAT-1303-V OR WAT-1306-V FOR ADDITIONAL DETAILS.
3. SURFACE BOX SURROUND TO BE PAINTED WITH PURPLE ROAD MARKING PAINT TO MATCH AS 2700 COLOURS AS FOLLOWS:
   - NO DARKER THAN P24 JACARANDA OR P24 PURPLE, AND
   - NO LIGHTER THAN P23 ULTR.
4. REFER TO WAT-1825-V, DN 375 CONNECTS TO WSA PS-2919M MAY BE SUITABLE FOR FLUSHING POINTS.
5. FOR NON-DRINKING WATER HYDRANT REFER TO WSA PS-2579M.
6. FIT THE FLUSHING POINT VALVE IN SUCH A WAY AS TO PREVENT MOVEMENT OR ROTATION OF THE VALVE BODY AND PROVIDE A SUITABLE PLUG OR CAP TO KEEP OUT DIRT AND GRAVEL.
7. SELECT THIS DIVISION TO ALIGN THE RESIDENTIAL SEAT VALVE (DIN) WITHIN THE FOOTPATH SENSITRAL TO THE LOT FRONT BOUNDARY.
8. PE RISER COMPONENTS LISTED ARE BASED ON INCH SERIES PRODUCTS BECAUSE OF AVAILABILITY; EQUIVALENT METRIC PRODUCTS COULD BE USED.
9. USE SUFFICIENT LENGTH OF RISER PIPE TO SUIT THE INSTALLATION DEPTH.
10. ALL BACKING PLATES, NUTS BOLTS AND WASHERS TO BE MINIMUM GRADE 316 STAINLESS STEEL.
11. GASKETS COUPLING WITH AS 4087 TO BE USED FOR ALL FLANDED CONNECTIONS.
12. FOR FULL RANGE OF PE FITTINGS SEE MANUFACTURERS AND WATER AGENCY CATALOGUES.
NOT APPROVED BY WATER AGENCY

NOTES:
1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. ADJUST PIPE SEPARATION OVER 13000 OR LESS I.E. APPROXIMATELY TWO PIPE LENGTHS FOR STANDARD LENGTH GOOD PVC AND DI PIPES. REFER TO CLAUSUS 4.103.2, TABLE 4.1 AND FIGURE 4.4 OF WSA 03. FOR PE PIPE DO NOT USE A RING INDEX OF LESS THAN 33 X PE PIPES.
3. OTHER RESIDENT SEATED VALVE (RSV) END CONFIGURATIONS MAY BE USED DEPENDENT ON THE SEPARATION DISTANCE BETWEEN THE MAINS AND ANCHORAGE ARRANGEMENTS.
4. LOCATE THE TOP OF THE SPINDLE CAP AT LEAST 150 BELLOW THE UMBRIDGE OF THE ACCESS COVER.
5. REFER TO WAT-1335 AND WAT-1336 FOR ADDITIONAL DETAILS.
6. PAINT ACCESS COVER SURROUND WITH PURPLE ROAD WORK PAINT TO MATCH AS FOLLOWS:
   - NO DARKER THAN P14 DARK PURPLE OR P12 PURPLE;
   - NO LIGHTER THAN P23 LACQUER.
7. DN 375 ACCESS COVERS TO WSA PS-2016M MAY BE SUITABLE FOR CROSS CONNECTION RSVS.
8. END THRUST RESTRAINT MECHANICAL COUPLINGS MAY ALSO BE USED WITH PVC PIPES.
9. WATER SERVICE ASSOCIATION

* THIS IS A SUPPLEMENT TO THE MRWA EDITION OF THE WSA 03-2002
TYPICAL INSTALLATION
OPTION 1

TYPICAL INSTALLATION
OPTION 1 - SECTION A-A

TYPICAL INSTALLATION
OPTION 2A

TYPICAL INSTALLATION
OPTION 2B

NOTE: ANCHORAGE SIZING IN ACCORDANCE WITH WSAA CODE

NOTES
1. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL INSTALLATION DETAILS ARE TO WSAA AND AUTHORITY REQUIREMENTS.
2. ALL NON DRINKING WATER RETICULATION MAINS AND FITTINGS SHALL BE COLOURED LILAC OR ALTERNATIVELY SLEEVED WITH LILAC COLOURED POLYETHYLENE. COLOUR SHALL BE SHADE P23 AS DEFINED IN AS2700.
3. VALVE COVERS FOR THE NON DRINKING WATER SYSTEM ARE TO BE PAINTED LILAC.
4. TAG INDICATING REUSE VALVE TO BE ATTACHED TO VALVE RISER.
5. PE ELECTROFUSION FITTINGS TO BE CLASS PN 16

* THIS IS A SUPPLEMENT TO THE MRWA EDITION OF THE WSA03-2002

ADDITIONAL INFORMATION PROVIDED IN WAT-1200 SERIES COMMENTARY

DUAL WATER SUPPLY SUPPLEMENT

DICL TO PE MAIN CONNECTION

NOT TO SCALE

WAT - 1826 - M

ISSUED 2004

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