

# AS-CONSTRUCTED DRAWING REQUIREMENTS

## PRESSURE MAINS

### TECHNICAL INFORMATION SHEET

The aim of this information sheet is to provide detailed information to Contractors, Consultants, Surveyors and Audit Staff involved in the production and checking of As-Constructed Drawings for SA Water's infrastructure projects. This sheet is applicable to all Water Supply Mains and Sewer Rising Mains and covers the collection of information and conversion of the Design Drawings into As-Constructed Drawings.

SA Water are recording all relevant details of its pipeline infrastructure on its in-house Geographic Information System (GIS) to allow easy location of infrastructure assets, system modelling, system performance assessment plus pipeline burst history and common fault identification. Because of this the information provided on the As-Constructed Drawings must be clear, easily identified and at a scale that can be easily read.

As-Constructed requirements are detailed in SA Water's Water Supply Construction Manual Supplementary Documentation to WSA-03 (part 2). This is available on the Internet at <http://www.sawater.com.au/NR/rdonlyres/64252DB0-53D1-4940-BA6F-F1D368840685/0/WPt2txtIss4.pdf> and a copy of the relevant information is included as part of this Information Sheet.

## Definitions

- Surveyor** All survey checking is to be carried out by a qualified surveyor (minimum qualification to be a Certificate in Surveying or equivalent).
- Certification** Certification of As-Constructed Drawings shall be done by the Consultant, a Registered Surveyor or other suitably qualified person individually authorised by SA Water.
- Centreline E.L.** The finished surface level (FSL) directly above the centreline of the main. This may be natural surface, road bitumen level or top surface of the access cover as applicable.
- Depth** The calculated distance between the Invert E.L. and the Centreline E.L.

## Individual Responsibilities

- Consultant** To produce Design Drawings that include all information necessary for the constructor to install the infrastructure pipework. Copies of the latest electronic versions of the Design Drawings (CAD or equivalent) are to be provided to the person producing the As-Constructed Drawings for conversion to the As-Constructed Drawings.
- Contractor** Install the infrastructure in accordance with the Design Drawings and provide the person producing the As-Constructed Drawings with pipe, valve and ancillary equipment details as required.

**Surveyor** Confirm that the installed infrastructure is within the specified tolerances and where it does not conform, advise the Contractor and Superintendent to determine what corrective action (if necessary) is required. Check any corrective action carried out. Advise the person producing the As-Constructed Drawings of any changes required to the information shown on the Design Drawings.

**As-Constructed Drawing Producer** The person producing the As-Constructed Drawings is required to make changes, as required, to an electronic copy (CAD or equivalent) of the latest Design Drawings.

**Superintendent** The Superintendent's Representative is responsible for making a decision on the acceptability of all infrastructure which is not within the required tolerances or where appropriate, determining the requirement for rework. They are also responsible for checking the As-Constructed Drawings for accuracy and completeness.

### **Pipework Requirements**

The Design Drawings provide a generic description of the type(s) of pipes that can be used for the individual project. The drawings are designed to allow the contractor flexibility (within the constraints of SA Water's Authorised Items List) in the areas of pipe material and the jointing system. The Contractor is required to provide the person producing the As-Constructed Drawing(s) with all relevant information necessary to identify the specific pipe type used. All necessary pipe details are generally marked on the pipe (see Attachments) unless it is pipework, which has been specially ordered and the details will have been provided to the pipe supplier.

Stop valves are generally Resilient Seated Gate Valves to AS3996-2 and have the same nominal internal diameter as the pipe downstream of the valve and in this case no details need be recorded. For all other valves, as much detail of the as possible should be provided, but as a minimum the following details shall be provided:

- Type e.g. Butterfly Valve, PRV etc;
- Manufacturer;
- Model Number;
- Size (DN) as shown on the valve;
- Joint type e.g. flanged, wafer, lugged, screwed etc.

It also necessary to identify any other special ancillaries that may have been specified on the Design Drawings e.g. backflow devices, scours. All relevant details should be included but it must include at least the items listed for valves (as shown above).

Unless authorised otherwise, all meters shall be installed as specified on the Design Drawings. All unspecified meters require a 20 mm meter with a DN 25 PE connection pipe.

If the Superintendent's Representative approves any changes to the meter or connection pipe details it is to be recorded on the As-Constructed Drawing(s).

If any doubt exists, all available information should be included. If necessary, this information can be included as an attached table with the item number referred to on the As-Constructed Drawing.

**Attachments**

- Copy of Attachment A to SA Water Supplementary Documentation to WSA 03 Part 2
- Copy of Attachment B to SA Water Supplementary Documentation to WSA 03 Part 2
- Copy of Attachment C to SA Water Supplementary Documentation to WSA 03 Part 2

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## Work As-Constructed Details

A survey check shall be carried out to ensure the location of all newly constructed water reticulation systems, including (but not limited to) water mains, stop valves, fire plugs, main cocks, connection nipples, water connections, branches, bends and any salient feature on the mains etc, have been constructed in accordance with this Code of Practice and the Design Drawings.

All survey checking and recording work shall be done to a standard acceptable to the Superintendent's Representative. The updated original of the Drawings shall incorporate the As-Constructed information as detailed below.

Symbols to be used on the "As-Constructed Plan" are shown in Attachment A to this document. Additional pipe, valve and ancillary information, as detailed in Attachment B, are required to be included on the As-Constructed Plan

An example of a completed "As-Constructed Plan" is attached to this document in Attachment C.

### Extent of Backfill before Survey Checking

For water mains and water connections, embedment material shall not be placed to cover the pipe joints and fittings until the As-Constructed survey checking has been carried out.

### Survey Checking

The surveyor shall carry out, or cause to be carried out, a survey check of the locations of the constructed Works. If the locations of the constructed Works are in accordance with this Code of Practice and the Design Drawings, the surveyor shall certify (signature) on the drawings that the Works comply.

If the As-Constructed works fall outside the tolerances specified below, the Constructor shall notify the Superintendent's Representative of the exact nature of the departure from the Drawings. The Superintendent's Representative shall determine the corrective action to be taken.

Distances (and ties where marked \*) shall be checked at all:-

- Valve chambers\*;
- Water connection inlet risers\*;
- Water connection off-takes from the water mains.

The Superintendent's Representative reserves the right to check the work of the Constructor at any time.

**Should there be a difference of opinion regarding the measurements checked, the opinion of the Superintendent's Representative shall prevail.**

### Measurements

Horizontal measurements shall be surveyed to the accuracy specified in Regulation 16, Survey Regulations 2007 and shown on the Drawings to 0.01 metre. Slope distances shall not be used. Running measurements shall be recorded along the main starting from a branch or existing fitting, and picking up all stop valves, fire plugs, main cocks, connection nipples, boundaries, etc. Where a new connection is installed on an existing main a

distance shall be shown to the new main cock or connection nipple from the nearest fire plug or stop valve.

The surveyor shall record the measurements:

- (i) To locate the start of the new main in relation to existing fittings, that is, from the nearest fire plug or stop valve;
- (ii) To locate each branch, bend, stop valve, fire plug, taper and water connection in relation to allotment boundaries;
- (iii) Where a change in distance from a boundary to the water main occurs.

Preferably, measurements should be recorded perpendicular to water mains or boundaries, however, fittings may be located by recording at least two direct measurements from the road alignment (or boundary) intersection points to the fittings.

The Surveyor shall record pertinent and adjacent land marks such as cadastral data, railway lines, bridges, culverts etc.

At vertical bends, the running measurements shall give the horizontal projection of the water main. The Surveyor shall prepare an enlargement of the vertical bend giving details of the deflection.

### **Construction Accuracy**

The accuracy of all measurements of completed work shall be:-

#### Horizontal Tolerances

- Measured and recorded to 50 mm per 100 metres to two decimal places of a metre, but within 100 mm of true location;
- The maximum accumulated errors shall not exceed 250 mm.

#### Vertical Tolerances

- The maximum deviation per metre rise in any direction shall not exceed 10mm.

### **Compliance with the Design Drawings**

Water mains and water connections shall be deemed to comply with the Design Drawings if all of the Works comply with the construction tolerances detailed on page 23 of this section.

### **Recording As-Constructed Information and Certification**

The surveyor shall mark up the 'original' of the latest issue of the Design Drawings with all As-Constructed data where there is a variance with the latest Design Drawings. Details added to the As-Constructed Drawings shall be in accordance with the requirements detailed in SA Water Corporation Supplementary Documentation to WSA 03.

Details added to the As-Constructed Drawings shall also be in accordance with the following :-

- Attachment A to this document - Symbols to be used on the "As-Constructed Plan";
- Attachment B to this document - "As-Constructed Mains Reporting Data" requirements;
- Attachment C to this document - Typical "As-Constructed Plans and Drawing Templates".

The Surveyor shall submit the As-Constructed Drawings, whether altered or not, to the Superintendent's Representative together with the field survey information.

Certification - The Surveyor shall certify (signature) these As-Constructed Drawings are correct and include all relevant As-Constructed information and the date of completion of the As-Constructed Drawings. The date of completion of construction of the works shall also be shown on these Drawings.

Any errors or deficiencies in the As-Constructed information discovered before the issue of the Final Certificate shall be corrected or remedied by the surveyor.

### **Recording As-Constructed Information for decommissioned water mains**

The details of decommissioned pressure mains shall be included in As-Constructed Drawings, identified by the symbols in attachment A of this document and shall include the following;

- What has been decommissioned (e.g. size, material, length, fittings etc);
- Location of where the main has been disconnected from infrastructure;
- Date of when pipe was decommissioned;
- Whether pipe has been removed or is still present.

### **Survey Requirements**

#### **Private Sector Land Development Contracts**

The Consultant shall carry out, or arrange for a suitably qualified surveyor to carry out, the As-Constructed survey checks, record all variances and certify (signature) that the As-Constructed Drawings are correct.

These As-Constructed Drawings shall be forwarded to the SA Water Manager responsible for the contract inspection/administration of the project:-

- The Manager, Water and Wastewater Networks - Engineering  
(250 Victoria Square, Adelaide SA 5000, for contracts within the Adelaide Metropolitan Area and SA Water's Outer Metro Areas);
- The Manager, 'SA Water Region' (for contracts within the Regional Areas).

The relevant manager will ensure the information is included on asset management records.

#### **SA Water Administered Contracts**

SA Water technical staff shall carry out (or SA Water shall arrange for a suitably qualified surveyor to carry out) the As-Constructed survey checks, record all variances and certify (signature) that the As-Constructed Drawings are correct. The original As-Constructed Drawings are to be completed by, or forwarded to, SA Water prior to the issue of the Certificate of Practical Completion. SA Water technical staff shall ensure the information is included on asset management records.

## **SA Water's Alliance Partner's Administered Contracts**

SA Water's Alliance Partner's technical staff shall carry out (or SA Waters Alliance Partner shall arrange for a suitably qualified surveyor to carry out) the As-Constructed survey checks, record all variances and certify (signature) that the As-Constructed Drawings are correct. The certified As-Constructed Drawings are to be completed by, or forwarded to, SA Waters Alliance Partner prior to the issue of the Certificate of Practical Completion. SA Waters Alliance Partner shall forward the information to SA Water for inclusion on asset management records.

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## SYMBOLS AND ABBREVIATIONS FOR DRAWINGS AND AS-CONSTRUCTED AMENDMENTS

ITEM	SYMBOL	TEXT	SIZE
Air Valve		AV	1.0 mm
Bend and angle of deflection		x° Bend (eg 22.5°)	
Boundary Cock		BC	
Branch or Tee		Br or Tee	
Branch with Scour Valve		Sc	1.0 mm
Branch with Stop Valve		SV	1.0 mm
Bypass		BP	
Cathodic Protection Rectifier		CPR	
Cathodic Protection Test Point		CPTP	1.0 mm
Change of Type			
Change of Size - in line		x dia/y dia Taper	1.0 mm
- at junction		x dia/y dia Taper	1.0 mm
Connection			0.5 mm
Connection Nipple		CN	
Cross Over			
Fire Plug		FP	1.0 mm
Fire Plug Air Valve		FPAV	1.0 mm
Fire Plug Scour		FP Sc	1.0 mm
Fire Plug Connector (with thrust block)		FP Con	1.0 mm
Locked Stop Valve		LSV	1.0 mm
Main Cock		MC	
Meter		Meter	
Pillar Hydrant		PH	1.0 mm
Pressure Reducing Valve		PRV	1.0 mm
Reflux Valve		RV	1.0 mm
Stop Valve		SV	1.0 mm
Water Main - new			1.0 mm
- existing			0.35mm
- decommissioned			0.35mm
Water Main - material type :- Ductile Iron Concrete Lined Ductile Iron Concrete Lined with 'Tyton-Lok' Jointing Rings PolyEthylene Mild Steel Concrete Lined PolyVinyl Chloride		DICL  DCTJ PE MSCL PVC	

**AS-CONSTRUCTED MAINS REPORTING DATA  
PRESSURE MAINS**

PIPE MATERIAL	PIPE ABBREVIATION	PIPE MATERIAL or TYPE	COATING	OTHER	EXAMPLE PIPE DESCRIPTOR FOR AS-CON DRG	PIPE DIAMETER (DN)	PIPE PRESSURE RATING (PN)	AUSTRALIAN STANDARD
DATA INPUT REQUIREMENT	Standard Symbol	Compulsory -Select as required	As Applicable	As Applicable	Compulsory	Compulsory	Compulsory	Informative
Ductile Iron Cement Lined	DICL	K series (KS) 2100 Series (21)	x	x	DICL - KS	√	√	AS 2280
DICL with Restrained Joint (eg Tyton-Lok)	DCTJ	K series (KS) 2100 Series (21)	x	x	DICL - 21 DCTJ - KS	√	√	Draft Standard AS 2280
Polyethylene (PE)	PE80	Type A (A) Type B (B)	x	x	DCTJ - 21 PE80 (A) PE80 (B)	√	√	Draft Standard AS 4130
PVC-M	PE100 PVC-M	PE100 Series 1 Series 2	x	x	PE100 PVC-M (2)	√	√	AS 4130 AS/NZS 4765
PVC-O	PVC-O	Series 1 Series 2 Material Classification • 315 • 355 • 400 • 450 • 500	x	x	PVC-O (2) (400)	√	√	AS 4441
PVC-U	PVC-U	Series 1 Series 2	x	x	PVC-U (2)	√	√	AS/NZS 1477

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## AS-CONSTRUCTED MAINS REPORTING DATA PRESSURE MAINS

PIPE MATERIAL	PIPE ABBREVIATION	PIPE MATERIAL or TYPE	COATING	OTHER	EXAMPLE PIPE DESCRIPTOR FOR AS-CON DRG	PIPE DIAMETER (DN)	PIPE PRESSURE RATING (PN)	AUSTRALIAN STANDARD
DATA INPUT REQUIREMENT	Standard Symbol	Compulsory -Select as required	As Applicable	As Applicable	Compulsory	Compulsory	Compulsory	Informative
<i>The following format is to be used where special, project based, approval has been given for the specific pipe system to be installed.</i>								
Glass Reinforced Plastic	GRP	Manufacturer	x	x	GRP	√	√	AS 3571
Mild Steel Cement Lined	MSCL	Jointing system • Rubber Ring (RRJ) • Spherical Slip in Joint (SSJ) • Ball and Socket (B&S) • Collars (COL) • Butt Weld (BUTT) • Flanged (F) • Insulated Flanges (IF)	Coating • Sintakote (S) • Inorganic Zinc Silicate (ZS) • Other (O)	Corrosion Protection (CP)	MSCL (BUTT) (S) (CP)  Note Omit (CP) marking if CP not installed	Outside Diameter (Show actual OD dimension)  Show OD of pipe eg 597 mm	Plate Thickness • 5 mm • 6 mm • 8 mm • 10 mm • 12 mm Show plate thickness in PN column eg 6 mm	Various
Acrylonitrile Butadiene Styrene	ABS	Manufacturer Tradename Jointing System • Solvent Weld (SWJ) • Rubber Ring (RRJ)	x	x	ABS (Eurapipe) (RRJ)	√	√	AS3518

**Legend:**

- √ Value to be supplied
- x No information required

For any pipes other than the above provide the following details:  
Material, DN, PN, lining, external coating, jointing method, manufacturer

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## AS-CONSTRUCTED MAINS REPORTING DATA PRESSURE MAINS

Australian Standards pipe identification markings.

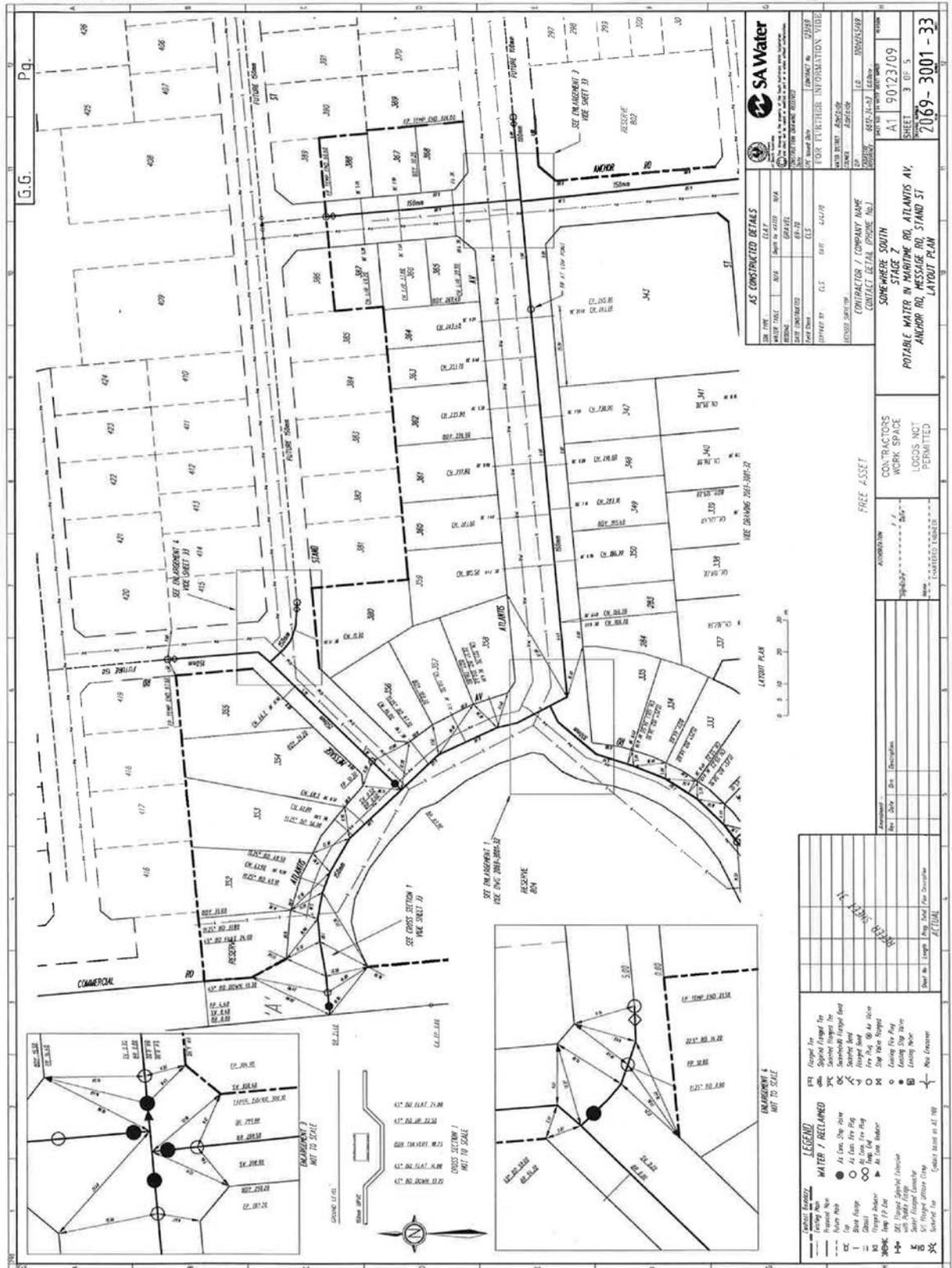
Marking details are shown as follows

<b>DICL pipe to AS2280</b>	Manufacturer, DN, Class of pipe or Pressure Rating (PN), Number of Standard eg Trade Name <b>150 K9</b> AS2280
<b>DICL pipe to T2100</b>	Manufacturer, DN, Class of pipe or Pressure Rating (PN), Number of Standard eg Trade Name <b>150 20</b> AS2280(Standard being updated)
<b>PE pipe</b>	Manufacturer, DN (as a number only), wall thickness (as a number only), PN, PE Class and Type, Date of manufacture, Factory ID eg Trade Name <b>25 x 1.6 PE80 Type A</b> 04 02 25 F1
<b>PVC-M pipe</b>	Manufacturer, Pipe Series, Pipe material, DN (as a number only), Pressure Class (PN), Angle of deflection, Date of manufacture, Factory ID, Number of Standard eg Trade Name <b>S2 PVC-M 150 PN16</b> MAX DEFL 3° 04.02.25 F1 AS/NZS 4765
<b>PVC-O pipe</b>	Manufacturer, Pipe material and Material Classification, Pipe Series Number, DN (as a number only), Number of Standard, PN (as a number only), Date of manufacture, Factory ID, Angle of deflection. eg Trade Name <b>PVC-O 400 Series 2 150</b> AS4441 <b>PN16</b> 04.02.25 F1 MAX DEFL 3°
<b>PVC -U pipe</b>	Manufacturer, Pipe Series, Pipe material, DN (as a number only), Pressure Class (PN), Angle of deflection, Date of manufacture, Factory ID, Number of Standard eg Trade Name <b>S2 PVC 150 PN16</b> MAX DEFL 3° 04.02.25 F1 AS/NZS 1477
<b>GRP pipe</b>	Manufacturer, DN (as a number only), PN, Stiffness Class (SN), Words "NOT FOR SEWERAGE", Date of manufacture, Factory ID eg Trade Name <b>200 SN 5000</b> NOT FOR SEWERAGE 04 02 25 F1
<b>MSCL pipe</b>	No specific Standard details. To be obtained from supplier
<b>ABS Pipe</b>	Manufacturer, Pipe Series, Pipe material, DN, PN, Angle of deflection at socket, Date of manufacture, Factory ID eg Trade Name <b>S1 ABS 160 DN450 PN 16 3°</b> 04 02 25 P1

Typical As-Constructed Plan



Typical As-Constructed Plan



Example of Water Main Extension Detail





Blank A3 Water Drawing Template

<p><i>Unless Notified Otherwise</i></p> <ul style="list-style-type: none"> <li>. All connections to be shown - refer to Section 2</li> <li>. All connections to be shown - refer to Section 2</li> <li>. All connections to be shown - refer to Section 2</li> <li>. All connections to be shown - refer to Section 2</li> </ul>	<p>ISSUED TO CONTRACTOR DATE</p> <p>CONTRACTOR</p> <p>CONTACT PERSON</p>	<p>TARGET SUBSTANTIAL COMPLETION DATE</p> <p>CONTRACT NO.</p> <p>PH:</p>	<p>AUDIT GROUP</p> <p>CONTRACT AREA</p> <p>BOOK</p> <p>Pg.</p>																																								
																																											
<p><b>SUMMARY OF WORK TO INCLUDE BUT NOT BE LIMITED TO:</b></p> <ol style="list-style-type: none"> <li>1. EXTENSION</li> <li>2. CONNECTIONS</li> <li>3. It is the Contractors responsibility to determine if underground services are present and have all services located prior to commencing works.</li> </ol>																																											
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<p>This drawing is the property of the South Australian Water Corporation and shall not be copied or modified in part or in whole without authorization.</p>																																											
																																											

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