



**DUBBO
REGIONAL
COUNCIL**

TECHNICAL SCHEDULE

DRC-W208

PIPE BURSTING OF WATER MAINS

TECHNICAL SCHEDULE DRC-W208 – PIPE BURSTING OF WATER MAINS

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DRC-W208: PIPE BURSTING OF WATER MAINS

DRC-W207.1 SCOPE

This Specification applies to the replacement of existing water supply mains using apparatus which travels along the existing main, destroying it as it goes, while drawing a replacement pipe into the space previously occupied by the pre-existing main (pipe bursting).

The process is to be completed with minimal excavation.

The replacement pipe may be required to have an internal diameter similarly sized to the pre-existing pipe or may be required to have a larger internal diameter than the pre-existing pipe.

All live connections and side lines are to be reinstated.

The work required to be performed under this Contract shall comply with the referenced documents in Clause DRC-W207.2, unless specified otherwise herein.

Details of the mains covered by the Contract will be provided by the Principal

DRC-W207.2 REFERENCED DOCUMENTS

The following documents are referred to in this Specification. The latest version of the document including any published amendments, shall apply unless noted otherwise. Where the drawings or a project specific specification are in conflict or inconsistent with these referenced documents or this Specification, then the details on the drawings or project specific specification shall apply.

Australian Standards

Replacement pipe shall be designed in accordance with the following Codes, Standards and Manuals, where relevant:

- AS 2566 Buried Flexible Pipelines
- AS 4130 Polyethylene (PE) pipes for pressure applications

Works shall also comply with the current versions all relevant Australian Standards.

Water Services Association of Australia Standards

- WSA01 Polyethylene Pipeline Code
- WSA03 Water Supply Code of Australia

DRC-W207.3 LABOUR, PLANT AND MATERIALS

The Contractor shall provide at its own cost and expense all labour, materials, plant, tools and equipment necessary for the proper and complete performance of the Contract.

DRC-W207.4 WORKPLACE HEALTH AND SAFETY (WHS)

All costs associated with ensuring a safe work environment for the implementation of the works shall be deemed to be included in the tender price.

The Contractor shall ensure that in the performance of the works, the Contractor's employees, Sub-contractors and employees of such Sub-contractors shall observe the statutory Safety Regulations and Site Conditions for Contractors.

Within 28 days of the 'Date of Acceptance' and prior to the commencement of work, the Contractor shall submit to the Superintendent details of the Contractor's WHS Management System including a Hazard and Risk Assessment and a Safety Plan specific to the Contract covering all of the Contractor's activities for the duration of the Contract.

The Contractor's Safety Plan shall include, but not necessarily be limited to:

- Safety inductions.
- Identification and accountability of personnel having specific responsibilities for safety and security matters.
- Safety procedures (including Confined Space Entry and Fall Protection).
- Accident and loss reporting.
- Safety equipment.
- Statutory requirements.
- Safe working incentives and leadership.
- Occupational health and hygiene.
- Fire prevention.
- Storage and issue of materials.
- Confined space entry procedures, with valid confined space permits.
- Fall from heights procedures.
- Emergency procedures and contingency plans.
- Safety disputes procedures.

The Contractor is to conform to the requirements of the Work Health and Safety Act 2011.

The Contractor shall provide medical treatment facilities and first-aid personnel to at least the minimum standards required by Workplace Health and Safety legislation.

As soon as possible following their occurrence, the Contractor shall report to the Superintendent any injuries likely to require medical treatment or involving lost time. In addition, the Contractor shall report to the Superintendent all injuries and near misses.

The Contractor shall manage and report all safety and security matters relating to his Sub-contractors as if they were his own personnel.

Copies of the Safety Plan and records of all safety and security reporting over the duration of the Contract shall be held onsite, readily accessible for inspection by the Superintendent. The Superintendent shall carry out, from time to time, ad-hoc audits of the Contractor's safety systems onsite. The Contractor shall attend all safety audits. The cost for participation in safety audits shall be included in the tender price.

DRC-W207.5 TRAFFIC

The Contractor shall carry out the work in such a manner as to minimise interference to the flow of traffic and pedestrians and shall comply with the standard Principal requirements.

The Contractor shall develop and maintain a traffic management system that complies with the Transport for NSW (TfNSW) manual for *Traffic Control at Work Sites*, AS1742, SAA HB81 and satisfies the requirements of the relevant road authorities. The Contractor shall submit the Traffic Management Plan to the relevant road authority and the Superintendent at least seven days prior to the commencement of works.

Traffic control and public safety devices are to be provided by the Contractor. Methods and devices are to comply with Australian Standards, WorkCover Authority requirements, RMS requirements, and any other relevant standards of practice.

The Contractor shall not divert traffic onto any temporary routes or close any roadway without prior written approval from the Superintendent.

Where traffic or parked vehicles make it impracticable or hazardous to carry out the work during normal working hours the Contractor may apply to the Superintendent for approval to perform the work outside of normal working hours.

DRC-W207.6 PROTECTION OF THE ENVIRONMENT

All work shall be carried out in such a manner as to avoid nuisance and/or damage to the environment. The Contractor shall comply with the requirements of the conditions of approval imposed by Council and the NSW Environment Protection Authority. No variation in costs or extensions of time will be considered due to these requirements.

Toxic chemicals shall not be used without the prior written approval of the Superintendent.

DRC-W207.7 NOISE

The Contractor shall conduct operations such that noise and other objectionable nuisance associated with the works are minimised. Where in the opinion of the Superintendent, operations are such as to warrant complaints on account of excessive noise or other nuisances, the Superintendent shall have the power to instruct that all work will cease until such time as the problem is rectified by the Contractor.

DRC-W207.8 CUSTOMER NOTIFICATION

If a water supply interruption is necessary under this Contract the Principal shall be responsible for placing media advertisements advising affected customers according to the work program supplied by the Contractor.

The Contractor shall give the Superintendent seven days' notice of the proposed work so that the Principal can arrange notification to affected customers.

The Superintendent will also arrange for notices to be published in a local newspaper (and electronic media?) indicating the water mains to be cleaned, the anticipated start date and the likely duration of the cleaning.

DRC-W207.9 ENTRY TO PRIVATE PROPERTY

If entry to private property is required, the Contractor is to advise the property owner a minimum of two clear working days in advance of the work proceeding. This advice is to be in the form of a signed letter which the Principal will supply in this regard. The Contractor shall be responsible for duplication and all associated costs. In addition to this written advice, the Contractor shall also verbally advise the resident on the day that the work is programmed and the day work is about to commence. If there is not a resident in attendance at the time the Contractor's personnel have arrived onsite, then the Contractor shall proceed with the work provided that the letter of notification had been previously sent the required timeframe in advance of entry to the property.

On completion of work the Contractor shall leave a Calling Card in the letterbox of the property. The Principal shall provide to the Contractor the necessary cards. The Contractor is responsible for all duplication and associated costs.

The Contractor shall not, without prior approval of the Superintendent, enter private property outside the hours of 8.00 am to 5.00 pm Monday to Friday or at any time on public holidays.

DRC-W207.10 CUSTOMER COMPLAINTS

The Contractor shall be the point of contact for all customer or resident queries and complaints associated with works carried out under this Contract. Queries and complaints shall be resolved promptly by the Contractor and as a minimum:

- The Contractor shall respond to the customer within 24 hours of receiving a complaint/query.
- The Contractor shall resolve all complaints within five working days.
- Where a complaint cannot be resolved within five working days, the Contractor shall notify the Superintendent of the issue, progress and expected date of resolution.
- If a complaint cannot be resolved within seven working days, the Superintendent may without any further notice undertake to resolve the complaint at the Contractor's cost.

The Contractor must notify the Superintendent if any customer complaints are received by the Contractor. Notification must be received by the Superintendent as soon as practicable, no later than the close of business (5.00 pm) on the day of receipt of the complaint. Wherever possible the Principal wishes to be notified by the Contractor prior to receiving complaints directly from a customer.

The Contractor shall keep a record of all customer contact relating to complaints, queries and out of hours access including date/time, name/address of contact, method of contact, issue raised and actions taken.

DRC-W207.11 DAMAGE TO PROPERTY

The Contractor is entirely responsible for any damage caused to any property, including any existing utility services by its operations. The Contractor shall immediately carry out or arrange for any repairs and pay for the full cost of such repairs and any associated damages.

Damage shall not be caused in order to obtain access to a property. Access to a property must be by an appropriate route such as a driveway or path where these exist.

Where the safety and access to an existing utility service is likely to be endangered, the Contractor shall request the attendance of an officer of the utility concerned, to advise the precautions to be taken, and shall take such actions as may be recommended by that officer.

DRC-W207.12 DEALING WITH DOGS

Dogs can inflict serious injury and, in some cases, death. This procedure details the general procedure when dealing with dogs.

Dogs tend to be protective of both people and property and may turn savage when confronted. Where dogs are present on private property, the Contractor shall arrange for the dog owner to restrain the dog. This shall comprise of having the dog tied or put in an area from which it cannot escape whilst works are carried out. Do not accept the owner's advice that "it will be okay".

Where the dog owner is not present to be able to restrain the dog on private property, the Contractor shall leave a Customer Notification Card and defer works until the owner is available. If a suitable time cannot be arranged with the dog owner, the Contractor shall refer the matter to the Superintendent for direction.

Where the owner/controller of the dog is available but is unwilling or unable to control the dog, or the dog is uncontrolled on public property, the Contractor shall report this to the Superintendent who will arrange for the Principal's Animal and Ranger Services to assist.

DRC-W207.13 LOCATION OF WATER MAINS

Recorded water main and surface fitting locations will be shown on the plans supplied by the Principal. The Contractor is responsible for the locating the water main and surface fittings onsite.

If work cannot be undertaken by the Contractor due to failure to locate a surface fitting after all reasonable effort has been made by the Contractor, notification is to be given to the Superintendent who will then arrange for the surface fitting to be located by the Principal's staff. If the Principal's staff locate the fitting within 2 m and less than 300 mm below the surface, the Principal reserves the right to charge the Contractor a fee to cover the Principal's staff time for the location works.

DRC-W207.14 WATER SUPPLY

Water is available for the purposes of this Contract from the Principal's hydrants at no charge to the Contractor for water used. The Contractor may supply its own Council approved metered standpipe fitted with a reduced pressure zone (RPZ) backflow device or he may hire a standpipe and RPZ backflow prevention valve from the Principal for use with this Contract. The RPZ valve is to be fitted whenever the standpipe is in use.

The Superintendent may direct where standpipes are to be affixed.

The Contractor is to take all due care whilst using standpipes to ensure that no damage is done to the hydrant or main. The cost of repairing any damage to any of the Principal's assets shall be borne by the Contractor.

DRC-W207.15 ISOLATION OF WATER MAINS

The Principal shall operate valves to isolate the subject water main prior to the cleaning operation and shall operate valves to recharge the subject water main at the completion of the cleaning operation.

Any single incidence of water supply interruption under this Contract is not to exceed six hours, and is not to occur outside the hours of 9.00 am to 3.00 pm Monday to Friday. The Contractor shall implement a temporary water supply system or other approved approach to limit any disruption to the water supply to customers to six hours.

DRC-W207.16 REPLACEMENT PIPE

The replacement pipe shall be PE pipe (and fittings) compliant with WSAA Product Specifications WSA PS-207, WSA PS-208 and WSA PS-215 and shall be:

- PE100.
- Manufactured in accordance with AS 4130.
- Minimum pressure class PN16.
- Coloured black with blue stripes for potable water
- Electrofusion or butt welded jointed.
- Installed with detectable marker tape to assist with future pipe location.

The replacement pipe shall be capable of withstanding scoring damage as it is drawn into place, or otherwise a sacrificial outer casing pipe shall be utilised.

DRC-W207.17 PIPE BURSTING

The Contractor shall launch and recover the bursting head by removing a section of pipe from the conduit to be replaced. The bursting head shall travel along the conduit, breaking the conduit as it goes, and pushing the broken pieces into the surrounding ground.

The bursting head shall draw behind it a replacement pipe which shall occupy the space previously occupied by the burst conduit.

The bursting process shall cause minimal disturbance to the surface.

The pulling end and intermediate points of the pipe shall be protected against damage.

All work shall be carried out under the technical direction of a qualified and experienced person who has had suitable training and experience in the installation of the liner, nominated by the Contractor in its tender and accepted by the Principal.

The Contractor shall have submitted with its tender full details of the installation procedure and the Installation Quality Plan for the lining to the Superintendent for approval based on the proposal made in its tender. The Contractor shall provide all the equipment for the safety of its workforce and for installing the replacement pipe in accordance with the procedures approved by the Superintendent.

The Contractor shall ensure that the pipe bursting equipment has the capability of limiting the bursting force during the installation, so as not to exceed the manufacturers recommended tension loads for the pipe. This is to ensure the newly installed pipe is not damaged by the excessive pulling force.

DRC-W207.18 EXISTING SERVICES

The Contractor shall be responsible for the identification and protection of existing services where these are crossed by pipe bursting activities.

The Contractor shall ensure that all utilities crossing within 600 mm of the existing bursting pipe have soil excavated and removed to relieve pressure caused by heaving during the bursting operation.

DRC-W207.19 SETTLEMENT AND SURFACE HEAVE MONITORING

The Contractor shall take all care and necessary precautions to protect existing structures, utilities and services in planning and execution of the works. All potentially affected work areas shall be visually inspected to document condition prior to any work conducted. Any damage to adjacent properties caused by all or part of this work shall be repaired and restored to its original condition at the Contractor's expense.

The Contractor shall ensure that the pipe bursting system is monitored by the operator at all times. The minimum information that must be monitored shall include, rate of advance length of conduit installed, thrust or pull force, deviation from line and gradient and valve positions.

Where crossing of roadways and railways are involved, the Contractor shall be required to record and report any ground settlement to the satisfaction of the respective controlling agencies.

Where crossing any utilities and pipelines during the pipe bursting process, the Contractor shall monitor ground settlement or heave directly above, and 3 m before and after the utility, or pipeline intersection.

The Contractor shall cease operations when monitoring points indicate any surface disruption that exceeds the degreed specification. The Contractor shall propose immediate action for review and approval by the Client to remedy the problem.

Should voids in the ground occur during the pipe bursting operation, the voids shall be backfilled promptly to the extent practicable with soil. Where the local ground material is not suitable for this purpose, the Contractor shall import suitable materials.

DRC-W207.20 PIPE JOINTING

All pipe jointing of PE pipe shall be undertaken in accordance with WSA01 and the manufacturer's recommendations and specifications.

All PE pipes shall be jointed using the butt-fusion method, with the exception of connections to existing pipes that may be undertaken using electrofusion. All joints shall be leak-free, straight and true and have uniform roll-back beads within limits specified by the manufacturer. All butt-fusion joints for water mains do not require that the internal bead be removed.

Should pre-inspection of the pipe material reveal defects, the defective section shall be cut out of the pipe. Similarly, should a joint be found to be defective, the joint shall be cut out and a new joint made. All such work shall be at the cost of the Contractor.

DRC-W207.21 CONNECTION TO EXISTING LINES

The Contractor shall connect the new PE pipe to existing lines at each end of the job and at all live property connections in accordance with Principal's standard specifications using approved fittings and practices, to the satisfaction of the Superintendent.

DRC-W207.22 RE-ESTABLISHMENT OF EXISTING FITTINGS

The Contractor shall re-establish all pre-existing hydrants, valves and other fittings on the new MDPE pipe in accordance with the Principals' standard specifications using approved fittings and practices, to the satisfaction of the Superintendent.

DRC-W207.23 ADDITIONAL ACTIVITIES INCLUDED IN SCOPE

The following activities are deemed to be included in the scope of work:

- Removal of any obstructions necessary to provide access to any water main and replacement if necessary following completion of the work.
- Locating, uncovering and 'freeing' of all surface fitting covers such that they are accessible for the carrying out of the works (refer to Clause DRC-W207.13 if any surface fitting cannot be located after all reasonable effort).
- Rebuilding of surface fittings where removal of fitting lid, surround or components are necessary during any part of the Contract.
- All existing lines, adjacent to the line to be replaced are to be plugged to prevent debris, runoff, etc from entering.

DRC-W207.24 EQUIPMENT STUCK IN CONDUITS

If any of the Contractor's equipment becomes stuck in a conduit such that it cannot be removed without excavation, the Contractor is to notify the Superintendent immediately upon becoming aware of the problem.

The Contractor shall be responsible for removal of any trapped equipment and shall wear all risks and bear all costs associated with the removal of the equipment. The Contractor is permitted to use his own or subcontracted resources for excavation and breaking into the conduit to retrieve equipment. Any conduit damaged by this operation is to be reinstated to the satisfaction of the Superintendent and must be inspected by the Superintendent's representative prior to being backfilled. The Contractor shall restore all surfaces to the satisfaction of the Superintendent

DRC-W207.25 EXCAVATION

Should excavation be necessary for any reason, it is to be carried out in accordance with Principal's standard specifications. Particular attention is drawn to the following:

- Prior to the commencement of any excavation, the Contractor is to determine the location of any services in the vicinity of the proposed excavation. The Contractor shall take all actions and provide all things necessary to protect and maintain existing services to the satisfaction of the relevant authority or owner. This may include arranging or performing relocation, temporary diversion or support of the service. If the Contractor damages a service the Contractor is to immediately contact the relevant authority or owner and arrange repairs to the satisfaction of the authority or owner. The Contractor is to obtain from the authority or owner a certificate stating that the repair has been carried out to their satisfaction. If the owner of the service cannot be determined the Contractor is seek further advice from the Superintendent. All costs associated with the location and repair of services are to be borne by the Contractor.
- The Contractor is not to commence any excavation until all materials necessary to make the excavation safe are onsite and available for use. This includes any necessary fencing and barriers as well as trench support systems.
- Excavation is to be kept to the minimum possible to allow efficient execution of the works.
- If excavation of bitumen, asphalt or concrete surfaces is involved the Contractor is to saw cut neat straight lines at the outer limits of the excavation. Any affected pavers, blocks or brick pavements shall be removed by hand, cleaned and set aside for later replacement.
- The Contractor is to adequately support all excavations as the work proceeds to meet the requirements of the WorkCover Authority.
- The Contractor is to promptly remove and dispose of excavated material which is not required for reuse. The material is to be disposed of at a Principal approved tipping site.
- The Contractor is to backfill in accordance with the Principals standard specifications.

DRC-W207.26 RESTORATION

The Contractor shall restore all public and private property to a condition equal to that before work onsite began. Restoration where possible should be carried out prior to leaving the site.

All restoration works shall be completed within two weeks of the completion of works.

Restoration of pavements is to be in accordance with the appropriate Principal's standard specification to suit original material.

DRC-W207.27 SWABBING

Swabbing of constructed pipelines shall be undertaken in accordance with WSA03-2011 Clause 18, unless otherwise approved by the Superintendent.

DRC-W207.28 HYDROSTATIC PRESSURE TESTING

All replacement pipelines greater than 20 m in length shall be hydrostatically pressure tested after any concrete thrust restraint curing times have elapsed. Hydrostatic pressure testing shall be undertaken in accordance with WSA03-2011 Clause 19.4.

The Contractor shall provide the Superintendent with a minimum of three clear working days written notice prior to carrying out hydrostatic pressure testing. This notice must be in writing and specify the pipeline sections to be tested, as well as the time, date and location of the test and equipment to be used (refer to Appendix A for an example notification form).

Pressure testing shall not be carried out during wet weather unless otherwise approved by the Superintendent.

Before testing a pipeline section, it shall be cleaned to the satisfaction of the Superintendent and filled slowly with water, taking care that all air is expelled. Purging of air from rising mains shall be promoted by opening air valves. In order to achieve conditions as stable as possible for testing, allowing for absorption, movement of the pipeline and the escape of entrapped air, the section shall be kept full of water for a period of not less than 24 hours prior to the commencement of the pressure testing.

Hydrostatic pressure testing shall be conducted in accordance with the method detailed in Clause 2.13 of WSA01-2004.

The test pressure shall be as per WSA03-2011 and shall be no lower than 1200 kPa and no higher than the pressure rating of the pipeline system components including pipes, valves, fittings and thrust blocks.

The pressure testing of a section shall be considered to be satisfactory if all the following are achieved:

- (a) There is no failure of any thrust block, pipe, fitting, valve, joint or any other pipeline component;
- (b) There is no visible leakage; and
- (c) The quantity of make-up water necessary to maintain the test pressure does not exceed the allowable quantity of make-up water.

Any failure, defect, visible leakage and/or excessive leakage rate, which is detected during the pressure testing of the pipeline or during the Defects Liability Period shall be made good by the Contractor at their expense.

A testing report similar to that shown in Appendix A shall be prepared and signed off by the Contractor and Superintendent witnessing the tests. This report shall be submitted to the Superintendent within five working days of the completion of testing.

DRC-W207.29 DISINFECTION

Following a satisfactory hydrostatic pressure test and where required by the Project Specification or Superintendent, the Contractor shall disinfect all replacement pipelines and existing mains taken out of service during construction in accordance with WSA03-2011 Clause 20.

DRC-W207.30 PRACTICAL COMPLETION

A Certificate of Practical Completion will not be issued by the Superintendent until the Superintendent is satisfied that the work complies with the requirements of this Specification and the Contract in all respects (subject to such minor omissions as may be accepted by the Superintendent) and that the Contractor has carried out all of his obligations under the Contract except as regards his obligations during the Defects Liability Period.

DRC-W207.31 APPENDIX A HYDROSTATIC TESTING FORMS

Part A - Notification of Hydrostatic Testing by Contractor

CONTRACTOR

CONTRACT

Proposed Hydrostatic Testing

Section	Start Chainage	End Chainage	Size (DN)	Material	Date and Time of Test
A					
B					
C					
D					
E					
F					
G					

Contractor (Signature)

..... (Date)

Received by - Superintendent (Signature)

..... (Date)

- Principal (Signature)

..... (Date)

Part B Report of Hydrostatic Pressure Testing – PE Mains

CONTRACTOR

CONTRACT

Results of Hydrostatic Testing – PE Testing as per WSA01-2004 Section 2.13

SECTION

TEST DATE WATER TEMPERATURE.....

TEST START TIME TEST FINISH TIME

TEST PRESSURE

Section	1 hour	2 hours	3 hours	4 hours	5 hours
Make-up water added L (ΔV)					

Permitted make-up water is determined by the formula $V_{all} (L/h) = 0.14LDH$ where L = pipeline length (km), D = pipeline diameter (m) and H = average test head over pipeline (m).

ALLOWABLE MAKE-UP (V_{all})

$0.55 \times \Delta V_{(3h-2h)}$ at 3rd hour + ALLOWABLE MAKE-UP (V_{all})

$\Delta V_{(5h-4h)}$ at 5th hour

PASS/FAIL

Witnessed by Superintendent.....(Signature)

.....Date

Contractor.....(Signature)

.....Date