East Gippsland Water
Standard Technical Specification
Water Main Construction

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East Gippsland Water

Water Main Construction Standard Technical Specification

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1 General

1.1 Definitions

- 'Construction' includes supply, delivery, storage, handling, installation, testing and commissioning, except where this Specification defines that the Principal will supply the required materials, expertise or resources.
- 'Principal' – East Gippsland Region Water Corporation (otherwise referred to in this Specification as East Gippsland Water or EGW).
- 'Superintendent' – Contract Superintendent as appointed by the Principal in accordance with Annexure A of the General Conditions of Contract.
- 'Contractor' – Successful Tenderer awarded this Contract to perform the Works, including all their employees, sub-contractors, representatives, etc.
- 'Work' – The Works required to be performed by the Contractor under this Contract.
- 'Site' – The location/s at which the Works are to be carried out, including any adjacent or nearby areas used for activities associated with Works (such as material or equipment storage, temporary works, site amenities, etc.). The Site is shown generally on the Contract Drawings.
- 'Defects Liability Period' means the Defects Liability Period as defined in Clause 37 of the General Conditions of Contract and specified in the Annexure A of the General Conditions of Contract.
- 'Supplementary Specifications' means the hierarchy of reference standards relating to the Works, as defined in Clause 1.4.

1.2 Abbreviations

Unless a specific alternative meaning is provided, the meaning of the following abbreviations shall apply throughout this Contract:

Table 1.2.1: Standard Abbreviations

Abbreviation	Meaning
AC	Asbestos Cement pipe material
AHD	Australian Height Datum
AV	Aboriginal Victoria (Department of Premier & Cabinet)
BCA	Building Code of Australia
CFA	Country Fire Authority
CH	Cultural Heritage
CI	Cast Iron
CICL	Cast Iron Concrete Lined pipe material (to AS 1631)
CMA	Coastal Management Act 1995 (Vic)
CONC	Concrete
DELWP	Department of Environment, Land, Water & Planning Victoria

Abbreviation	Meaning
DI	Ductile Iron
DICL	Ductile Iron Concrete Lined pipe material (to AS 2280)
DN	(for mPVC pipes) refers to nominal size (based on nominal bore), in millimetres in accordance with AS/NZS 1477
DN	(for DI pipes & fittings) refers to nominal size (based on nominal bore), in millimetres in accordance with AS/NZS 2280
DN	(for PE pipes) refers to pipe outside diameter with respect to the supply of polyethylene pipelines in accordance to AS/NZS 4130
EGSC	East Gippsland Shire Council
EGW	East Gippsland Water
EPA	Environmental Protection Authority Victoria
EPBC	Environment Protection & Biodiversity Conservation Act 1999 (Commonwealth)
GIS	Geographic Information System
HDPE	High Density Polyethylene pipe material (to AS 4130)
HSE	Health, Safety & Environment
HSEMP	HSE Management Plan
IL	Invert Level, defined as the level at the bottom of the pipe (inside the pipe).
IWRG	EPA Industrial Waste Resource Guideline/s
NRV	Non Return Valve/s
NSL	Natural Surface Level (the level of the existing surface)
PE	Polyethylene pipe material
PSM	Permanent Survey Mark
PVC-M	Modified Polyvinyl Chloride pipe material (to AS 4765)
PVC-U	Unplasticised Polyvinyl Chloride pipe material (to AS 1477)
PVC-O	Oriented Unplasticised Polyvinyl Chloride pipe material (to AS 4441)
QMS	Quality Management System
RL	Reduced Level
SOP	EGW Standard Operating Procedure/s
SWMS	Safe Work Method Statement/s
TB	EGW Technical Bulletin/s
UNO	Unless Noted Otherwise
WSAA	Water Services Association of Australia

1.3 Interpretations

In this Specification, except where the context otherwise requires:

a) 'approved', directed', required, rejected', and similar expressions shall mean approved, directed, required, rejected, and the like, by the Superintendent.

b) 'give notice', 'submit', 'furnish', and similar expressions, shall mean give notice, submit, furnish, and the like, to the Superintendent.

1.4 Supplementary Specifications

The Technical Specification comprises this document and the Supplementary Specifications listed below.

Where the Technical Specification is in conflict or inconsistent with the Supplementary Specifications, the terms and provisions of the Technical Specification shall take precedence. The Contractor shall specifically bring to the attention of the Superintendent any conflict, inconsistency or doubt regarding the application of Specifications and Standards.

Where a matter is not covered in this Specification, the hierarchy of references for Supplementary Specifications is:

1. The Principal's Technical Bulletins & Standard Operating Procedures;
2. WSAA Standards, Standard Drawings & Product Specifications;
3. Australian Standards; and
4. Building Code of Australia

The Contractor shall comply with the requirements of the relevant Supplementary Specifications identified in Table 1.4.1 below as a minimum:

Table 1.4.1: List of Relevant Supplementary Specifications

REF	EGW Technical Bulletin Title
TB2	Fire Hydrant Standard
TB3	Marker Posts
TB4	Dead Ends
TB5	Marking Tape
REF	**EGW Standard Form Title**
Form F006	Planned Water Supply Interruption Co-Ordination Form
Form F126	Commissioning of New/Temporary Water Mains – Testing
REF	**EGW SOP Title**
SOP 038	Planned Shutdowns
SOP 079	Repair & Removal of Asbestos Cement Pipes
SOP 139	Supply of Data for GIS Update
SOP 144	EGW Customer Charter
SOP 145	Managing Acid Sulfate Soils

WSA Standard	Title
WSA 01-2004	Polyethylene Pipeline Code
WSA 03-2011	Water Supply Code
WSA Product Specification	**Title**
WSA PS-200	Ductile Iron Pipes (CIOD) for Pressure Applications
WSA PS-201	Ductile Iron Fittings (CIOD) for Pressure & Non-Pressure Applications
WSA PS-202	Ductile Iron Pipes & Fittings (ISO Sized) for Pressure Applications
WSA PS-203	Steel Pipes for Pressure & Non-Pressure Applications
WSA PS-204	Steel Fittings for Pressure & Non-Pressure Applications
WSA PS-207	PE Pipes for Pressure Applications
WSA PS-208	Plastics Moulded fittings for Pressure Applications with PE Pipe
WSA PS-209	PVC-M Pressure Pipes for Pressure Applications
WSA PS-211	PVC-U Pressure Pipes for Pressure Applications
WSA PS-212	Ductile Iron Fittings (CIOD) for Plastics Pressure Pipe for Pressure & Non-Pressure Applications
WSA PS-213	PVC Pressure Fittings, Moulded and Post-Formed for Pressure Applications
WSA PS-214	Copper Property Service Pipes for Pressure Applications
WSA PS-215	PE Property Service Pipes for Pressure Applications
WSA PS-216	PE Fabricated Fittings for Pressure Applications
WSA PS-244	Ductile Iron Fittings (CIOD) with Restrained Flexible Joints for Pressure & Non-Pressure Applications
WSA PS-245	Ductile Iron Fittings with Restrained Flexible Joints for PE Pipe (90≤DN≤1000) in Pressure Applications
WSA PS-246	Pre-Tapped Connectors for Pressure Applications
WSA PS-260	Gate Valves, Resilient Seated for Pressure Applications
WSA PS-262	Extension Spindles for Gate Valves
WSA PS-264	NRV for Pressure Applications
WSA PS-265	Air Valves for Pressure Applications
WSA PS-267	Hydrants (Spring) for Pressure Applications
WSA PS-270	Mechanical Couplings, Non-End Thrust Restraint for Pressure Applications
WSA PS-271	Mechanical Couplings & Flange Adaptors, End Thrust Restraint, for Pressure Applications

WSA PS-290	Ductile Iron Access Covers & Frames to WSA 132
WSA PS-310	Tapping Bands – Mechanical for Pressure Applications
WSA PS-312	Flange Gaskets & O-Rings
WSA PS-313	Repair & Off-Take Clamps for Pressure Applications
WSA PS-318	Detectable Marking Tape
WSA PS-319	Non-Detectable Marking Tape
WSA PS-320	PE Sleeving for DI Pipes & Fittings
WSA PS-327	Mechanical Tapping Bands for PE Water Mains
WSA PS-335	Pipeline Cold-Applied Liquid Adhesives & Prefabricated Tapes
WSA PS-336	Pipeline Heat-Shrinkable Cross-Linked Polyolefin Coatings
WSA PS-350	Compaction Sand for Pipe Embedment
WSA PS-351	Processed Aggregates for Pipe Embedment
WSA PS-355	Geotextile Filter Fabric
WSA PS-359	7mm Processed Aggregate for Pipe Embedment
WSA PS-360	Embedment / Concrete Sand
WSA PS-361	Embedment / 5mm Minus Fine Crushed Rock
WSA PS-363	Trench Fill Materials
WSA PS-367	Steel Reinforcing Materials for Concrete

WSA Standard Technical Drawing	Title
WAT-1102	Typical Mains Construction Reticulation Main Arrangements
WAT-1105	Typical Mains Construction Connection to Existing Mains
WAT-1106	Property Services Single Service Meter to Main
WAT-1108	Property Services Connection to Main
WAT-1200	Soil Classification Guidelines & Allowable Bearing Pressures for Anchors & Thrust Blocks
WAT-1201	Embedment & Trench Fill Typical Arrangement
WAT-1202	Standard Embedment All Types
WAT-1205	Thrust Block Details Concrete Blocks
WAT-1207	Thrust & Anchor Blocks Gate Valves & Vertical Bends
WAT-1301	Typical Valve & Hydrant Installation Valve Arrangement
WAT-1302	Typical Valve & Hydrant – Hydrants & Air Relief Valves
WAT-1303	Typical Surface Fitting Installation – Gate Valve Surface Boxes Non-Trafficable

WAT-1304	Typical Surface Fitting Installation – Gate Valve Surface Boxes Trafficable
WAT-1305	Typical Surface Fitting Installation – Hydrant Surface Boxes Trafficable & Non-Trafficable
WAT-1306	Typical Surface Fitting Installation – Hydrant Surface Boxes Trafficable
WAT-1313	Flanged Joints Bolting Details
Australian Standard	**Title**
AS 1110.1	ISO Metric Hexagon Bolts & Screws - Product Grade A or B
AS 1143	Methods for Sampling & Testing Aggregates
AS 1275	Metric Screw Threads for Fasteners
AS 1289	Methods of Testing Soils for Engineering Purposes
AS 1379	Specification & Supply of Concrete
AS 1477	PVC Pipes & Fittings for Pressure Applications
AS 1631	Cast Grey & Ductile Iron Non-Pressure Pipes & Fittings
AS 1742	Manual of Uniform Traffic Control Devices
AS 2032	Installation of PVC Pipe Systems
AS 2033	Installation of PE Pipe Systems
AS 2129	Flanges for Pipes, Valves and Fittings
AS 2280	Ductile Iron Pipe & Fittings
AS 2528	Bolts, Stud Bolts & Nuts for Flanges & Other High & Low Temperature Applications
AS 2566	Buried Flexible Pipelines
AS 3600	Concrete Structures
AS 3610	Formwork for Concrete
AS 3681	Guideline for the Application of PE Sleeving to DI Pipelines & Fittings
AS 3972	Portland and Blended Cements
AS 4041	Pressure Piping
AS 4087	Metallic Flanges for Waterworks Purposes
AS 4130	PE Pipes for Pressure Applications
AS 4131	PE Compounds for Pressure Pipes & Fittings
AS 4321	Fusion-Bonded Medium-Density PE Coating & Lining for Pipes & Fittings
AS 4441	PVC-O Pipes for Pressure Applications
AS 4671	Steel Reinforcing

AS 4765	PVC-M Pipes for Pressure Applications

The Contractor shall comply with the Supplementary Specifications that are referenced throughout this Specification or on the Contract Drawings as a minimum.

The Contractor shall comply with all relevant Safety Standards including the Occupational Health and Safety Act 2004 (Vic) or later amendments and all relevant Codes & Regulations.

The Contractor shall comply with all relevant EPA regulations associated with the Works. Any discharges as a product of or resulting from the Works may require licensing under provisions of the Environment Protection Act 1970 (Vic). It is the responsibility of the Contractor to identify, plan for and manage all potential environmental impacts of the Works.

1.5 Background

EGW undertakes construction of new water mains and related assets in order to improve services to customers. A number of key factors influence the justification process for the construction of new water mains:

- Replacement of aging water network assets to maintain high water quality standards and/or reduce the frequency of water leaks;
- Re-alignment of existing water network assets due to changes in land zoning, use or the influence of upstream or downstream network changes;
- Extension of the water network to service new customers due to residential or commercial development, or change in network boundaries.

Water main construction generally consists of a mix of open trenching and trenchless installation to reach a compromise between minimising costs and reducing the impacts of construction activities on customers, the general public and the surrounding environment.

Associated works include connections to the existing network, disconnecting existing water mains from the network, provision of valves and hydrants, as well as disconnecting and reconnecting individual property and fire service connections.

Water supply to customers must be maintained during the works. However https://www.egwater.vic.gov.au/customer-info/customer-charter/ does have a provision for temporary supply interruptions of up to four (4) hours where these are planned and managed by the Contractor in accordance with EGW SOP 038 Planned Shutdowns (https://www.egwater.vic.gov.au/wp-content/uploads/2018/11/SOP-038-Planned-shutdowns.pdf). A key requirement is advance notification by EGW to the affected properties. Minimum notification times are specified in the Contract, for the Contractor to provide the Superintendent sufficient notice of upcoming temporary service interruptions to allow EGW to notify the affected customers. Adherence to this requirement is a key condition of the Contract.

1.6 Location of the Site

The Site shall be located as shown on the Contract Drawings and the relevant authority approval notifications (e.g. Cultural Heritage Activity Area, Road Manager defined extent of works, etc.). The Contractor shall immediately notify the Superintendent if the Contract

Drawings conflict with the relevant authority approval notifications with regards to the extent of the Site.

1.7 Operation of East Gippsland Water Assets

The safe and careful operation of East Gippsland Water's existing water supply system is paramount. It is a requirement of the Contract that the operation of the water supply system has priority over the Works at all times. **The Contractor shall not make operational changes to the Principal's assets or networks without the specific written approval of, and co-ordination with, the Principal.**

1.8 Authorised Agent

The Contractor shall be entitled to act as the Principal's authorised agent when dealing with relevant third parties for the purposes of the Works. This is intended to assist the Contractor to obtain clearances from regulators in relation to the Works (for example, liaising with AusNet regarding new power supply connections). The Contractor shall provide notice to the Superintendent as soon as practicable when the Contractor has been required to act as the Principal's authorised agent.

1.9 Inspections & Notifications

The Contractor shall provide to the Superintendent a minimum of ten (10) business days' clear notice of intention to commence the Works at the Site. This includes any clearing, establishment of site facilities, fencing and/or storage of plant or equipment at the Site.

The Contractor shall provide to the Superintendent a minimum of ten (10) business days' clear notice of intention to undertake any works that may affect the operation of the Principal's existing water reticulation network. This includes temporary service interruptions to customers.

The Contractor shall not place concrete prior to inspection of the prepared formwork, reinforcement and bedding by the Superintendent.

The Contractor shall provide to the Superintendent a minimum of two (2) business days' clear notice of all testing and commissioning activities, to enable the Superintendent to attend and witness where specified herein. The Contractor shall record the methodology and results of all tests carried out, and shall provide this information to the Superintendent prior to Practical Completion.

The Contractor shall provide to the Superintendent a minimum of two (2) business days' clear notice of any pre-condition assessments to be undertaken in accordance with Clause 5.4.

Prior to acting upon any direction/request issued by the Principal, the Contractor shall confirm the direction/request with the Superintendent and indicate whether a variation or extension of time is implied by the direction/request.

Progress inspections by the Superintendent shall not in any way prejudice the rights of the Superintendent with regards to Practical Completion. Approvals of materials, workmanship, etc. by the Superintendent do not imply conclusive acceptance of the Works. The Works shall be accepted as a whole by the Superintendent only when the requirements for Practical Completion have been met.

2 Scope of Works

2.1 General

The scope of Works is detailed on the Contract Drawings (refer Appendix A). Where the Contractor has any doubt or uncertainty about any aspect of the scope of Works, the Contractor shall immediately contact the Superintendent for clarification.

The Contractor shall liaise with the Principal and the Superintendent to coordinate the Works. The Contractor shall resource the Works appropriately to ensure that completion is achieved in a timely manner and to a high standard.

This specification has been compiled in accordance with the Principal's Tendering & Contract Administration Manual and Contractor Health, Safety and Environment Management Manual.

2.2 Design

Contractors are encouraged to provide alternative design and/or alternative construction techniques and methodologies that provide technical, program, HSE or cost benefits to the Principal and its customers.

Any proposed alternative designs must meet the full intent of the project objectives whilst complying with all relevant and applicable codes, standards and specifications.

The Principal may consider alternative designs and approve or reject at its absolute discretion.

The Contractor shall make allowance in any design for review by the Principal, including addressing comments from the Principal & the Superintendent, as well as participation in a Safety in Design, HAZOP or equivalent design review process.

2.3 Labour, Plant and Materials

The Contractor shall supply everything required to complete the Works unless otherwise specifically provided for herein.

The Contractor shall provide all warranties and guarantees of plant and equipment supplied under the Contract to the Superintendent prior to Practical Completion.

The Contractor shall ensure that all materials to be supplied under this Contract are to the approval of the Superintendent prior to their incorporation in the Works. All materials supplied shall be new and shall conform to the Technical Specification and all relevant Supplementary Specifications.

The Contractor shall use, install and maintain all plant, equipment and materials in accordance with the manufacturer's recommendations.

The Contractor shall ensure that all material is adequately packed for transport and delivery to minimise the risk of damage to persons or property. The Contractor shall make good any damage that does occur, to the satisfaction of the Superintendent, prior to incorporating the materials into the Works.

The Contractor shall ensure that all transport vehicles are appropriate for purpose and all transported materials and equipment are adequately secured. The Contractor shall seek and obtain all relevant approvals for transport, hold appropriate insurances and provide necessary support and protection for transported materials and equipment, including any over-dimensional loads.

The Contractor shall provide adequate equipment for the safe and secure unloading, placement and/or storage of materials. The Contractor shall submit details of proposed storage locations (for materials and/or plant & equipment) to the Superintendent for approval prior to the commencement of the Works.

2.4 Minor Items

The Contractor shall include in their Lump Sum tendered price any minor items required for the Works that are not specified in the Contract. Minor items are defined as those that are required as part of any other items specified/shown in the Contract. For example, minor items include but are not limited to, fixings, fasteners, gaskets, bracing, supports, pilot lines, and handles.

The Contractor shall allow to design, supply and construct any minor items using materials and details consistent with the rest of the Contract. Where uncertainties exist regarding material selection, adopt materials approved by the Superintendent. All details are to be confirmed with the Superintendent unless directed otherwise.

The Contractor shall take full responsibility for the design work of minor items not detailed on the Contract Drawings, the quality and delivery of materials, construction and testing of the Works to meet the specified requirements.

2.5 Temporary Works

The Contractor shall be completely responsible for the design, maintenance, security and adequacy of temporary works.

The Contractor shall be responsible for identifying, seeking and obtaining written approval from the Superintendent for the inclusion of any temporary works which it is proposed to leave in position at the completion of the Works.

The Contractor shall be responsible for identifying, seeking and obtaining written approvals and permits from the relevant third-party authority where required for any temporary works (e.g. for AusNet approval for temporary bracing of utility poles).

The Contractor shall provide and pay for any and all temporary equipment including generators, plugs etc. necessary to undertake the Works. All such temporary equipment shall be maintained in good working order for the duration of the Works. This includes, but is not limited to, consideration of the following:

- Fit for purpose;
- Currency of inspections/approvals (e.g. electrical test and tag);
- Secured from damage/theft;
- Fitted with appropriate restraints, silencers or other fixings to enable safe and comfortable use by operators (e.g. minimise manual handling risks) and prevent or minimise nuisance impacts on, or HSE hazards to, the general public;
- Sited appropriately to minimise hazards associated with contamination (e.g. fuel spill), vehicular or pedestrian impact damage, trip hazards and access to emergency egress areas (i.e. do not place equipment in front of fire escapes).

2.6 Works by Others

The Principal will provide the following to assist the Contractor complete the Works:

a) Planning of system operation during approved temporary service interruptions associated with the Works.

b) System operation during the Works including isolating/diversion of flows during approved temporary service interruptions in accordance with EGW SOP 038 Planned Shutdowns (https://www.egwater.vic.gov.au/wp-content/uploads/2018/11/SOP-038-Planned-shutdowns.pdf). Note: any and all temporary water supplies required during service interruptions shall remain the responsibility of the Contractor to supply and maintain.

c) Water Quality Testing, flushing and bringing new assets into service following the successful completion of all testing & commissioning activities by the Contractor.

d) Communications with the public and the Principal's water service customers during the Works.

2.7 Water Supply

The Contractor shall notify the Superintendent if a water supply is required for the Works. Where this is required the Principal will supply water to the Contractor free of charge, at points on water mains nominated by the Principal. The Contractor shall not take water from any private property or connection without the written authority of the Superintendent and the owner of the relevant land supplied by the service.

The Contractor shall at all times use metered hydrants and keep accurate records of all water consumed in carrying out the Works. When requested by the Superintendent, the Contractor shall provide a copy of records of the water consumed.

The Contractor shall note that during times when water restrictions are in place the Principal may limit the supply of water to the Contractor. The Contractor shall immediately notify the Superintendent if water supply restrictions are likely to have any detrimental impact on the completion of the Works (time, cost, quality, etc.).

2.8 Preliminaries and Mobilisation

Prior to the commencement of Works at the Site, the Contractor shall:

a) Generate and submit a Proposed Order of Works (Works Program) to the Superintendent for consideration by the Principal.

b) Finalise a specific Health Safety and Environment Management Plan (HSEMP) relevant to this Contract, including Safe Work Method Statements (SWMS). For details on the requirements of the HSEMP refer to Clause 6.1.3 & Appendix B. The Contractor shall make such revisions as are specified by the Superintendent or the Principal to finalise the HSEMP.

c) Attend and participate in a Risk Assessment and planning/coordination workshop with the Principal & the Superintendent.

d) Attend and contribute to a kick-off meeting with the Principal & the Superintendent at the Site.

e) Document and implement a Project Management Plan (PMP) including Quality Plan, Contractor Health Safety and Site Environmental Management Plan & Traffic Management Plan. The PMP shall also address how road opening permits will be arranged (including co-ordinating road authority consent), payment of all statutory fees and charges, as well as any other required contract documentation and regulatory permit approvals.

f) Where relevant, prepare a Confined Space Emergency Management Plan to the satisfaction of the Superintendent.

g) Mobilise and establish the Site, including survey set out and temporary fencing.

h) Comply with all statutory requirements, including obtaining all permits and approvals with evidence of compliance to be made available to the Superintendent upon request.

i) Liaise and attend meetings with the Principal's Operations staff and the Superintendent to plan the timing of any required temporary service interruptions and any other modifications (temporary or permanent) to the Principal's operations that may be required by the Works.

j) Complete a pre-condition assessment of any infrastructure or private property that may be affected by the Works, in accordance with Clause 5.4.

2.9 Confirmation of Existing Water Network Assets

The existing water main assets provide water supply to the Principal's customers. The water network assets must remain in operation for the duration of the Contract, including supply to customers, except when the Principal has approved the Contractor's specific request/s for temporary service interruption/s for the purposes of completing the Works (in accordance with EGW SOP 038 Planned Shutdowns (https://www.egwater.vic.gov.au/wp-content/uploads/2018/11/SOP-038-Planned-shutdowns.pdf). The Contractor shall be responsible for ensuring the existing water network is protected at all times by;

a) Proving the location of water network assets accurately prior to excavating or boring in the vicinity;

b) Exposing water network assets with extreme care and sufficiently prior to any 'cutting in', to enable locations and sizing to be confirmed and appropriate fittings ordered and delivered to the Site for the completion of the Works.

2.10 Pipeline Construction

The Contractor shall complete all Works as shown on the Contract Drawings and described in this specification, including but not limited to:

a) Service proving of all existing services and utilities, investigative digging and reinstatement. This shall include allowance for any notifications, permits or utility specific requirements (e.g. working in the vicinity of fibre optic cables, WorkSafe notifications for trenching, etc.).

b) Traffic management (all inclusive). This shall include obtaining appropriate permits from the co-ordinating road authority responsible for the road (EGSC, VicRoads, etc. as appropriate).

c) Supply and laying of water network assets by open trenching and/or trenchless construction as specified, including all valves and fittings, bedding, marker tape and backfill materials and compaction, resurfacing, covers and reinstatement.

d) Installation of marker posts and/or kerbside indicators as agreed with the Superintendent.

e) Connection of the new assets to the existing network and reconnecting/replacing all affected property service connections.

f) Decommissioning of all abandoned assets made redundant by the Works, including removal of existing surface covers, fittings, spindles etc., filling (grouting) and capping

where required as well as refilling and reinstatement of surfaces to match existing surrounds.

g) Reinstatement of surfaces to equivalent or better than the pre-Works standard, including levelling and materials, for footpaths, roadways, kerbing, drainage channels and re-sowing of previously bare or grassed areas.

h) Provision of any temporary works including but not limited to:
- Temporary water supplies (as required);
- Shoring;
- Dewatering;
- Formwork;
- Fencing;
- Bracing of power poles.

i) On-site storage, control, testing, verification and off-site transport & disposal of all rubbish, surplus materials, drilling wastes etc. in accordance with the relevant regulatory requirements.

j) Maintenance of the Site during the Works to ensure cleanliness, prevent damage to property, prevent injury to personnel involved in the Works and prevent interference with or injury to the general public.

2.11 Compaction Testing

Unless otherwise agreed by the Superintendent, the frequency of compaction testing shall be as follows:

a) At non-trafficable areas: Every 1000m^2 in layers not exceeding 300mm depth;

b) At trafficable areas: Every 250m^2 in layers not exceeding 300mm depth;

c) Where trench crosses roadway: Minimum one test per road crossing (further tests if 250m^2 area criteria is exceeded).

All testing records shall be submitted to the Superintendent and approval received prior to proceeding further with the Works.

Compacted material which fails to achieve the Dry Density Ratio as prescribed in the Contract Drawings shall be removed, replaced and re-compacted by the Contractor. Minimum compaction standards shall be as prescribed in WSA 03-2011 Section 19.3.

The requirements for testing frequency may be amended if a compaction trial is successfully completed to the Superintendent's satisfaction. The trial compaction methods will establish the testing regime required for the project.

The compaction trial will demonstrate the adequacy of compaction equipment and method and be representative of the adopted compaction method. Variations without prior written approval by the Superintendent to the trial established compaction method shall result in the standard compaction testing requirements being applied to all of the project, including those materials already compacted.

2.12 Hydrostatic Pressure Testing

The Contractor shall undertake hydrostatic pressure testing after trench filling, compaction and initial curing times on concrete thrust blocks have elapsed (i.e. at least seven days

after concrete thrust blocks have been poured). Joints and fittings are to remain open for inspection during testing.

The system test pressure shall be as detailed on the Contract Drawings or minimum 1200kPa if not otherwise stated.

The Contractor shall seal the ends of each pipeline test section with Gibaults blank or fabricated blank ends. Under no circumstances shall a test section be sealed with a main line stop valve.

The Contractor shall meet the requirements of Section 19.4 of WSA03-2011, and Section 2.13 of WSA01-2004 for Polyethylene mains .

The Contractor shall note the criteria for successful completion of hydrostatic pressure test are:

a) No visible leak/weep or failure of any pipe, fitting valve, joint, anchorage or other component of the test section; and

b) No pressure loss after 15 minutes; or

c) Satisfies the requirements of the 5-hour Test Procedure as Per WSA 01-2004 section 2.13.5.

2.13 Connection to Live Water Mains

Connections to the existing water mains are to be programmed into the Works. The connections are detailed on the Contract Drawings.

Connection works are to be completed in accordance with Section 12.8 of WSA 03-2011 and co-ordinated with the Principal in accordance with EGW SOP 038 Planned Shutdowns (https://www.egwater.vic.gov.au/wp-content/uploads/2018/11/SOP-038-Planned-shutdowns.pdf). Where any properties are at risk of water supply interruption for longer than four (4) hours the Contractor shall provide temporary water supplies, meeting the requirements of EGW SOP 144 Clause 8 (https://www.egwater.vic.gov.au/wp-content/uploads/2018/10/SOP-144-East-Gippsland-Water-Customer-Charter.pdf), at no additional cost to the Principal.

Where any planned water supply interruption exceeds the maximum duration stated above, the Contractor shall be liable for the following:

a) $65 reimbursement to the Principal for each property affected; and

b) $1000 reimbursement to the Principal for each additional hour, or part thereof, until the water supply is restored.

The Contractor shall be liable for the same penalties for each unplanned water supply interruption that occurs during the Works.

The Contractor shall be exempt from the above penalties only where the Contractor can demonstrate to the satisfaction of the Superintendent that the water supply interruption was completely outside the control of the Contractor. Where investigation of the water supply interruption identifies inadequate planning or preparation by the Contractor as a key factor, the above penalties shall apply.

A minimum of ten (10) business days' clear notice to the Superintendent is required of the confirmed date and time for any planned temporary service interruption, to allow the Principal to communicate with affected customers (refer Clause 1.9).

All temporary supplies shall be constructed, flushed and tested prior to connection of any customers to the temporary supply. The Contractor shall provide a minimum of two (2) business days' notice of expected day/time of temporary supply flushing, to allow the Principal to conduct water quality testing. The Contractor shall then allow a further two (2) business days for notification of the results of water quality testing on the temporary supplies. Consequently, the minimum expected timeframe from completion of temporary supply construction to the connection of any customer to the temporary supply is four (4) business days.

The Contractor shall confirm existing conditions prior to any connection works and ordering relevant pipes and fittings.

The Contractor shall comply with EGW SOP 079 for connection to AC pipes (https://www.egwater.vic.gov.au/wp-content/uploads/2016/03/SOP079RepairAndRemovalOfAsbestosCementPipes.pdf).

All materials required for the connections shall be on site before the commencement of a temporary service interruption.

The Contractor shall note that temporary service interruptions will be programmed to occur at the most convenient time for the affected customers – this is likely to be during weekends where business customers or fire services are affected. The Contractor shall allow in their Tender submission for all temporary service interruptions to occur outside normal business hours, where commercial or industrial business customers are affected. No claim for variation will be considered where EGW directs that temporary water supply interruption/s be scheduled for outside normal business hours due to the presence of commercial/industrial customers in the affected area.

2.14 Commissioning & Testing

The Contractor shall be responsible for all commissioning and testing activities associated with the Works, including:

a) Liaising with the Principal & the Superintendent to confirm the required type, methodology and minimum acceptance standard for all commissioning & testing activities (hydrostatic pressure testing, mains flushing & compaction testing as a minimum for new water network assets).

b) Supplying all materials, labour and equipment to undertake the required commissioning & testing activities in accordance with the approved methodology with all relevant results recorded appropriately.

c) Preparing a Commissioning Plan to the satisfaction of the Superintendent, detailing the proposed procedure and timing for completing all commissioning & testing activities. The Commissioning Plan shall specifically note all required third party inputs (e.g. when the Superintendent and/or the Principal is required to attend site to witness tests, or when the Principal's Operations staff are required to implement changes to the water supply network to enable testing to occur).

d) Submitting results of all commissioning & testing of the Works to the Superintendent.

e) Making good any damage resulting from commissioning & testing activities, rectifying the Works and repeating where commissioning & testing activities are deemed to have failed the minimum standards for acceptance. The Contractor shall be responsible for all costs associated with repairing any damage, rectifying the Works and repeating failed commissioning & testing activities.

f) Providing sufficient notice (two business days) to the Principal of any water quality testing requirement. This includes all temporary supplies and new water mains.

2.15 Practical Completion

The Contractor shall note that Practical Completion for the Works will not be granted by the Superintendent until:

a) All required commissioning & testing of the Works has been completed and met or exceeded the minimum required standards;

b) All records of commissioning & testing activities have been submitted to the Superintendent and accepted as complete by the Superintendent.

c) As Constructed information has been provided to the satisfaction of the Superintendent in accordance with Clause 2.16.

d) All information relating to warranties and guarantees of plant and equipment supplied under the Contract has been provided to the Superintendent.

e) All site restoration works are completed to the satisfaction of the relevant owner (private property), authority (crown land) or co-ordinating road authority (roads including kerbing, nature strips, footpaths, etc.) and the Superintendent.

f) All surplus materials and debris have been removed and the Site has been cleaned, graded smooth and topsoil reinstated and sown with approved grass seed.

2.16 As Constructed Information

The Contractor shall maintain an up-to-date 'As Constructed' record of the Works during construction and shall submit this information to the Superintendent within two (2) business days if requested.

The Contractor shall be responsible for the completion of an ‘As Constructed’ survey of the Works at completion of the Works and subsequent generation of ‘As Constructed’ Drawings for the Works to the satisfaction of the Superintendent. Such ‘As Constructed’ information shall be submitted to the Superintendent for review within ten business days of successful completion of testing and acceptance of assets by the Principal. These drawings shall, as a minimum, contain an equivalent level of detail to the Contract Drawings. The drawings shall be clearly marked "As Constructed" with the relevant date and revision number.

The Contractor shall be responsible for submission of digital/electronic survey files for the works to allow the Principal’s GIS to be updated to reflect any and all water network modifications and additions associated with the Works. This includes any assets made redundant or abandoned during the Works.

2.17 Defects Liability Period

The Contractor shall be responsible for the maintenance of the Works for a period of 12 months commencing from the date of Practical Completion. During this period, the Principal or the Superintendent may undertake inspections of the Works at any time, and may direct the Contractor to return to site to rectify any defects in the Works. The Contractor shall be liable for all costs associated with rectifying defects, unless:

1) The Contractor can demonstrate to the satisfaction of the Superintendent that the defect is outside the scope of the Works; and

2) The Contractor can demonstrate to the satisfaction of the Superintendent that the defect was not caused by any activities carried out by the Contractor in the course of completing the Works.

The Contractor shall be responsible for maintaining all restored surfaces and other improvements/reinstatements in a satisfactory condition for the duration of the Defects Liability Period. This includes fertilising and watering of disturbed vegetation to ensure that re-planted vegetation becomes established.

The Contractor shall be responsible for updating the 'As Constructed' drawings to reflect any modifications made to the Works during the Defects Liability Period. The Contractor shall not be entitled to final payment until all such amended 'As Constructed' drawings have been accepted by the Superintendent.

At the completion of the Defects Liability Period the Superintendent shall arrange a final inspection with the Principal & the Contractor. Once any defects arising from the final inspection have been rectified to the satisfaction of the Superintendent, the Superintendent shall apply to the Principal for release of the Contractor's Security Deposit. Final Payment under the Contract shall be the return of the Contractor's Security Deposit.

3 Construction of Water Mains

The Contractor shall construct water mains and associated water network assets (valves, hydrants, property services, etc.) in accordance with the requirements of the Supplementary Specifications listed in order of hierarchy in Clause 1.4. Relevant EGW Technical Bulletins include TB002, TB003 & TB004 and WSAA Standards WSA 01-2004 & 03-2011.

3.1 Ground Conditions

It is the Contractor's responsibility to adequately inform themselves of ground conditions at any location within the Site or otherwise associated with the Works. The Contractor shall take the existing ground conditions into account when preparing for or undertaking the Works.

Where specific Geotechnical and/or Soil Testing results have not been provided to the Contractor as part of the Technical Specification, the Contractor shall nominate the expected ground conditions in its Tender Submission. This shall be based on the best information available to the Contractor at the time of tendering (historical records, previous experience, site investigations, etc.).

Where, during the Works, the Contractor can demonstrate to the satisfaction of the Superintendent that the ground conditions vary significantly from those expected at the time of tendering, the Contractor may be entitled to submit a claim to the Superintendent for any additional time & costs associated with completing the component of the Works relating to the unexpected ground conditions. The Superintendent shall determine whether the Contractor's claim is fair and reasonable. The Superintendent's determination in this regard shall be final.

Where, during the Contract, the Contractor encounters rock (that is, material that cannot be removed or disturbed by a 20T excavator), the Contractor may be entitled to submit a claim to the Superintendent for any additional time & costs associated with completing the Works in rock. The Superintendent shall determine whether the Contractor's claim is fair and reasonable. The Superintendent's determination in this regard shall be final.

The Superintendent will not consider any claim for additional time or costs if the Contractor has not made themselves familiar with the construction locations, the typical ground conditions and the nature of the Works based on the information available at the time of tendering.

3.2 Earthworks & Excavation

The Contractor shall carry out earthworks necessary for the execution of the Works in such a manner as to enable the Works to be constructed in accordance with the Technical Specification.

The Contractor shall undertake all earthworks and excavation activities in accordance with all relevant standards, requirements and industry best practices to minimise harm to persons or property and best facilitate the completion of the Works to a high standard. This includes maintenance of excavations for stability, backfilling and compaction following completion of the relevant activities, as well as storage, re-use and/or disposal of excavated materials.

The Contractor shall hold and maintain appropriate qualifications in the conduct of safe trenching activities for the duration of such activities associated with the Works. As a

minimum, the Contractor site foreman and at least one worker shall hold and maintain the 'Install Trench Support' training unit (RIICCM210D).

Relevant regulations include the Occupational Health & Safety Act 2004 (Vic), Mines Act 1958 (Vic) & Mines (Trenches) Regulations 1982. The Worksafe Victoria Compliance Code – Excavation available at https://prod.wsvdigital.com.au/sites/default/files/2018-06/ISBN-excavation-compliance-code-2018-05.PDF provides practical guidance on measures to be taken to prevent injury to persons engaged in trenching work.

The Contractor shall undertake the Works using such construction equipment and methodology that minimises the possibility of drawing the static groundwater level to the surface at any stage.

The Contractor shall minimise the extent of clearing and excavation as far as practical to ensure efficient completion of the Works.

Where any activity/s associated with the Works are proposed that may include excavations, trenching or similar exceeding 1.5m depth, the Contractor shall ensure that WorkSafe Victoria is notified at least three (3) business days prior to the commencement of the activity/s. The relevant WorkSafe Victoria notification form and instructions can be found at https://www.worksafe.vic.gov.au/resources/notice-intention-perform-construction-excavation-work.

The Contractor shall ensure that adequate supporting is provided for all trenches of depth 1.5m or greater, and all trenches in unstable ground strata. All trenches of depth 1.5m or greater shall be considered as Confined Spaces for the purposes of Part 3.4 of the Occupational Health & Safety Regulations 2017.

The Contractor shall design and construct all excavations to prevent disturbance of adjacent structures and services.

The Contractor shall ensure that the excavation aligns with the requirements of the Works, including:

a) Trench centreline to be within the specified tolerances for the design centreline of the water main or water network asset/s;

b) Length of trench open at any time to be minimised;

c) Width of trench to be minimised as far as possible while accommodating the Works and any required trench support/s;

d) Depth of trench to be minimised as far as possible while accommodating the Works including pipe bedding requirements;

e) Minimum depth of cover requirements to be satisfied following the completion of the Works;

3.3 Soil Removal

Material excavated during topsoil stripping and site levelling shall be temporarily stockpiled on the Site as directed by the Superintendent. Topsoil shall be stockpiled separately to facilitate effective restoration and surface reinstatement.

Material remaining after the completion of the Works shall be removed off site and disposed of by the Contractor. The Contractor shall collect samples and have these tested by a NATA accredited laboratory to classify the spoil in accordance with EPA Victoria Industrial Waste Resource Guideline (IWRG) 621 available at https://www.epa.vic.gov.au/our-work/publications/publication/2009/july/iwrg621 . The

cost of sampling, testing and disposal of material classified as Clean Fill shall be included in the Lump Sum tendered price. Where test results confirm the material classification as a Category A, B or C Industrial Waste, the Contractor shall dispose of in accordance with the related EPA requirements. The Contractor shall provide the results of all soil testing to the Superintendent for review prior to removal from the Site.

3.4 Open Trench Construction

3.4.1 Clearances to Other Services

The minimum clearances (barrel to barrel) shall be in accordance with the requirements of WSA03-2011-3.1 (MRWA Edition Version 2.0) Table 5.5 except where the greater clearance is required by the Other Service Authority.

Water mains shall always cross above sewers unless otherwise approved by the Superintendent.

3.4.2 Trench Floor Preparation

The Contractor shall ensure that trenches are prepared adequately to provide a solid foundation for construction of water network assets. This includes making good any soft, loose or rocky areas to prevent differential settlement in the future.

The Contractor shall compact all fill and disturbed areas to the density of the natural ground, as a minimum.

3.4.3 Bedding & Pipe Support

The Contractor shall supply and construct bedding in accordance with the Contract Drawings.

The Contractor shall not construct bedding until any adjacent concrete pipe supports or thrust/anchor blocks have been placed and have set.

The Contractor shall inform the Superintendent if actual ground conditions at the Site require alteration of the bedding or pipe support design. Any such alterations shall be approved by the Superintendent prior to construction.

The Contractor shall place, rake-in and then compact the bedding to the compaction level specified in the Contract Drawings. Where no compaction level is specified, refer to WSA 03-2011 Table 19.1.

The Contractor shall grade the bedding to ensure the water network assets are continuously supported.

3.4.4 Minor Concrete Work

The Contractor shall be responsible for ensuring that all concrete incorporated into the Works is fit for purpose, meets the requirements of the Technical Specification and complies with relevant Supplementary Specifications including AS 3600, AS 3972 & AS 1379 (refer Clause 1.4).

The Contractor shall ensure that concrete thrust and anchor blocks are appropriately strengthened by reinforcement and/or by pouring against appropriate bearing surfaces as specified. The Contractor shall complete concrete thrust and anchor blocks sufficiently in advance to allow the concrete to develop strength prior to any thrust being applied through the restrained section of pipe (or fitting).

All concrete formwork shall be to AS 3610 and shall be substantial, well supported and conform to the shape lines and dimensions required and shall in all cases be such that a plain smooth surface is obtained. The Contractor shall clean all re-used formwork appropriately prior to re-use. Prior to pouring, the Contractor shall dress all formwork with non-staining mineral oil and remove all dirt and other material from inside the formwork.

The Contractor shall accurately place all reinforcement in the specified positions and securely hold during the deposition and compaction of the concrete. All reinforcement when placed shall be free from grease, tar, paint, oil, mud, loose or thick rust and shall present a clean surface. The Contractor shall not place concrete without approval from the Superintendent.

The Contractor shall place concrete in approximately horizontal layers over the whole surface with a maximum concrete drop height of 1.25 metres. During and immediately after placing, the Contractor shall thoroughly compact the concrete with approved internal mechanical vibrators. The Contractor shall hold a spare vibrator on site at all times when concrete placing is in progress.

The Contractor shall not place concrete when the ambient air temperature exceeds 30°C or is below 5°C.

The Contractor shall not use any concrete not placed within 30 minutes of mixing or after having taken an initial set. Where directed by the Superintendent, the Contractor shall cover the concrete surfaces with thick bags and keep continually wet or otherwise cured to the satisfaction of the Superintendent for a period of up to seven (7) days.

The Contractor shall finish all concrete surfaces true and even, free from stony patches and excessive projections or depressions. While the concrete is "green", the Contractor shall render to the satisfaction of the Superintendent all surfaces to which rendering is required. If directed by the Superintendent, the Contractor shall bag down exposed surfaces, including internal surfaces (e.g. of valve pits and access shafts) and then rub with No. 16 carborundum stone to the satisfaction of the Superintendent.

3.4.5 Pipe Anchorage

The Contractor shall construct thrust blocks where specified on the Contract Drawings or where required to properly restrain the Works. The Contractor shall ensure the design and construction of thrust blocks is in accordance with the requirements specified in the Supplementary Standards (refer Clause 1.4). The Contractor shall provide thrust block design calculations to the Superintendent for approval prior to construction. Where relevant, consideration shall be given to the axial forces associated with PE pipelines subjected to changes in temperature, pressure, etc.

All thrust and anchor blocks shall be suitable to accommodate the system test pressure as outlined in the Technical Specification.

All inline thrust blocks shall be reinforced. The Contractor shall design the reinforcement and provide details and calculations to the Superintendent for approval prior to installation.

The Contractor shall provide adequate pipeline anchorage for temporary deadplates, blank ends or valves used during pipeline pressure testing.

The Contractor shall construct concrete thrust and anchor blocks by pouring the concrete against the prepared face of the adjacent undisturbed soil, which shall be vertical and free of all loose, cracked or other unsuitable material and to the satisfaction of the Superintendent.

Where, in the opinion of the Superintendent, it is not possible to pour concrete against a suitably prepared vertical soil face, the Contractor shall form up and pour the thrust or anchor block so as to provide a vertical concrete face and fill the intervening space between the concrete face and the adjoining soil with approved selected refill mechanically compacted to not less than ninety-eight percent (98%) of maximum dry density (standard). The Contractor shall prepare the adjoining soil by removing all loose and other inferior material to approval. No additional payment shall be allowed on account of any such work necessary to ensure the stability of the concrete thrust or anchor block.

3.4.6 Pipe Laying

The Contractor shall prepare, lay and joint pipes in accordance with the Contract Drawings, using the methods, materials, tools and equipment specified and in accordance with the manufacturer's instructions or recommendations. At all times the Contractor shall conduct works in accordance with the HSE requirements of the Technical Specification to prevent injury to persons and damage to materials, plant or equipment.

The Contractor shall maintain the insides of all items clean and dry during the period from delivery of materials to site through to the completion of construction, including by sealing open ends and removing any foreign materials to prevent contamination during pipe installation.

The Contractor shall clean and examine all items before installation, including inspection of joint seals for fit and flaws. The Contractor shall not use damaged, dirty or incorrect seals or sealing materials. The Contractor shall ensure that the correct joint lubricant is used for rubber seals.

3.5 Specific Requirements for Lift and Re-lay

Generally, the requirements as set out in section 3.4 for Open trench construction apply to lift and re-lay (aka 'lift and lay') construction methodology, however the following additional requirements also apply.

Where nominated on the Contract Drawings (refer Appendix A) and where agreed with the Superintendent, the Contractor shall utilise lift and re-lay construction method for installation of pipework.

This section details requirements for utilising lift and re-lay method.

3.5.1 Construction Stages

The contractor shall undertake the works in a sequential manner agreed with the Principal. An indicative construction staging approach that is agreeable to the Principal has been detailed on the Contract Drawings (refer Appendix A).

Each construction stage must be completed, tested and accepted in service by the Principal prior to commencing the subsequent construction stage. A construction stage is deemed complete upon successful pressure and water quality testing, connection of all property services, completion and compaction testing of backfill to finish surface level (FSL) and decommissioning of any temporary water supply mains.

Reinstatement of final road / verge surfaces is not a requirement for completion of a construction stage (but is a requirement for award of Practical Completion of the Contract).

3.5.2 Temporary Water Supply

To avoid prolonged service interruption to customers, the Contractor shall implement temporary water supply mains where necessary for each construction stage.

The connection of temporary water supply mains to the existing water network can be made by either:

- Live tapping upstream of the water main isolation point utilising Under Pressure Cut-In Connection (UPCIC), or
- Connection to an existing hydrant upstream of the water main isolation point. Hydrant to be operational to Country Fire Authority (CFA) / Fire Rescue Victoria (FRV) without the need of disconnecting the temporary water supply main.

Any temporary water supply main that cannot be completely removed at the completion of Works shall be converted to a hydrant or flushing point / washout. Burying a closed valve or blanked off tee is not an acceptable solution.

3.5.2.1 Hydraulic Design

Temporary water supply mains shall be sized to meet minimum pressure and flowrates as required by EGW SOP 144 Clause 8 (https://www.egwater.vic.gov.au/wp-content/uploads/2018/10/SOP-144-East-Gippsland-Water-Customer-Charter.pdf). The Contractor shall refer to EGW SOP 038 Planned Shutdowns for guidance on the arrangements for planning, notification and carrying out network changes that require customers to be temporarily disconnected from the water reticulation network (e.g. for changeover between permanent and temporary water supply mains).

Temporary water supply mains shall be constructed from fully welded DN63 PE100 SDR11 (PN16) material, unless otherwise approved by the Superintendent.

Prior to implementation of a temporary water supply main, the Contractor shall submit to the Superintendent an assessment of the length of the temporary water supply main, the number and size of property service connections, and design calculations showing the proposed temporary water supply main is appropriately sized to provide adequate supply to all connected customers. Such assessment shall be completed by a competent and appropriately experienced engineer.

Prior to implementation of a temporary water supply main, the Contractor shall submit to the Superintendent relevant details including drawings showing as a minimum pipe size, materials, thrust restraint, connection details, temporary hydrants, type and locations of traffic protection, trip hazard mitigation and driveway crossing details.

In residential areas the maximum length of temporary water supply mains shall be 300m unless otherwise approved by the Superintendent.

In industrial and commercial areas the maximum length of temporary water supply mains shall be 150m, unless otherwise approved by the Superintendent.

3.5.2.2 Hydrants

Where a permanent fire hydrant is taken offline by the Works, any related temporary water supply main shall be fitted with a temporary hydrant that provides minimum flowrate and pressure head. The temporary hydrant shall be located as near as possible to the offline permanent fire hydrant, and shall be clearly identified. The offline hydrant's marker post shall be removed as soon as the temporary water supply main is in operation. The temporary hydrant's capacity (flow, litres per second, and head) shall be tested. The date and time of testing shall be recorded with the litres per second flow achieved and submitted to the Superintendent for information.

3.5.2.3 Temporary Water Supply Main Location and Alignment

The location of temporary water supply mains shall:

- Not obstruct vehicle or pedestrian traffic without the use of a suitable crossing structure,
- be installed with suitable protection from vehicle loadings,
- be laid adjacent to the property or fence line in a manner that allows vehicular property access,
- be restrained at joints in the pipeline and at all locations as required to maintain structural support,
- have clearly visible signage & trip hazard mitigation to provide for public safety,
- have lockable vandal proof attachments fitted to any valves that are accessible by the public.

All cross kerb ramps, cable protectors, footpath and driveway crossing and ramps shall be vehicle, pram, wheelchair and bicycle safe and shall comply with any relevant Australian Standards.

Aerial temporary water supply mains are not acceptable unless specifically approved in writing by the Superintendent.

Where temporary fire hydrants are installed, they shall be marked and identified with a suitable marker post.

3.5.2.4 Electrical Safety

Prior to changing over any property connections to the temporary water supply main the Contractor shall engage a suitably qualified and experienced electrician to check all metallic lot connections to the existing water main to ensure there are no abnormalities including stray or induced currents.

The electrician shall provide a certificate to the Contractor confirming that these checks have been undertaken and detailing any corrective actions required. The Contractor shall provide a copy of this information to the Superintendent prior to changing over any property connections.

3.5.2.5 Testing of Temporary Water Supply Main

Prior to connection of any property services, the temporary water supply main shall be:

- pressure tested to the system test pressure as nominated in Section 2.12.
- flushed,
- disinfected,
- de-chlorinated,
- filled, and
- water quality results assessed.

3.6 Trenchless Pipe Installation

Where nominated on the Contract Drawings and where agreed with the Superintendent, the Contractor shall utilise trenchless construction methods for the installation of pipe work.

Prior to the commencement of trenchless construction, the Contractor shall locate all public utility or private services within 3m of the trenchless crossing or as directed by the Superintendent.

The Contractor shall confirm bore entry and exit locations that minimise the potential for damage or disruption to the public, existing assets and vegetation as far as is practicable.

3.6.1 Method Statement

The Contractor shall submit a method statement for the proposed trenchless construction activities to the Superintendent for approval. The information required in the method statement includes:

a) The proposed trenchless methodology to be adopted and calculations as necessary to confirm the design alignment can be achieved.

b) The proposed means of confirming that the design alignment has been achieved following the completion of the trenchless construction activity.

c) The proposed methodology to be adopted to protect existing services and calculations (as necessary) to confirm no damage to existing services and no settlement.

d) The layout of the working space and set-up requirements.

e) Temporary works designs and calculations.

f) Type of machine, equipment and personnel to be used.

g) The relevant personnel's (or subcontractor's) experience in completing similar works.

h) Operator's qualification and experience certificates.

i) Environmental approvals where required – example creek crossings.

j) Spoil management, treatment and disposal method, including all materials encountered in the construction.

k) Contingency plan for the event that unknown ground conditions (dense rock or open cavities), existing services or other previously unidentified hazards are encountered.

3.6.2 Ground Conditions

The Contractor shall be deemed to have satisfied themselves, including by site inspection, as to the nature of ground likely to be met during the trenchless works, including the extent and nature of the soil conditions to be encountered.

Where specific Geotechnical and/or Soil Testing results have not been provided to the Contractor as part of the Technical Specification, the Contractor shall nominate the expected ground conditions in its Tender Submission. This shall be based on the best information available to the Contractor at the time of tendering (historical records, previous experience, site investigations, etc.).

Where, during the Contract, the Contractor can demonstrate to the satisfaction of the Superintendent that the ground conditions vary significantly from those expected, the Contractor may be entitled to submit a claim to the Superintendent for any additional time & costs associated with completing the trenchless works in unexpected ground conditions. The Superintendent shall determine whether the Contractor's claim is fair and reasonable. The Superintendent's determination in this regard shall be final.

Where, during the Contract, the Contractor encounters rock (that is, material that cannot be removed or disturbed by a 20T excavator), the Contractor may be entitled to submit a claim to the Superintendent for any additional time & costs associated with completing the Works in rock. The Superintendent shall determine whether the Contractor's claim is fair and reasonable. The Superintendent's determination in this regard shall be final.

The Superintendent will not consider any claim for additional time or costs if the Contractor has not made themselves familiar with the construction locations, the typical ground conditions and the nature of the Works based on the information available at the time of tendering.

3.6.3 Equipment

All Equipment shall be in good working condition, robust with adequate safety margins for the anticipated duty, designed and manufactured to comply with all relevant safety standards.

No claim for reimbursement for the loss of equipment used by the Contractor shall be considered for any reason. The Contractor shall be deemed to have allowed for all required maintenance, operating inputs and the replacement of worn or damaged drill/cutter heads and the like in their tendered price.

3.6.4 Alignment

The Contractor shall construct the pipeline, including all valves and fittings, as per the alignment shown on the Contract Drawings. If the Contractor's proposed method of pipeline installation requires the pipeline to deviate from the alignment shown, or requires fittings to be constructed in alternative locations, or for any of the Works to extend beyond the limits of the Site, the Contractor shall provide full and accurate details of additional working areas to enable the Superintendent to accurately assess the potential financial, statutory planning and programming impact of the proposed changes.

3.6.5 Refilling of the Annulus

The Contractor shall refill the annulus around the pipe by pressure grouting with sand-lime-cement slurry. The ratio of sand, lime and cement shall be submitted to the Superintendent for approval before the commencement of the trenchless construction.

3.6.6 Drilling Fluids

The Contractor shall use an appropriate drilling fluid to suit the ground conditions and chemistry as may be encountered on site during the drilling, reaming and product pipe installation operations.

Details of any drilling fluids proposed for use and the estimated volumes to be used are to be submitted to the Superintendent prior to the commencement of drilling. Drilling fluids to be used shall be environmentally sound and biodegradable.

Drilling fluid pressures shall be limited to those necessary and shall be controlled to avoid or minimise hydraulic fracturing or over excavation. If hydraulic fracturing or excessive loss of fluid is discovered, the process shall be halted until actions are taken to control the losses.

Drilling fluids and cuttings shall be recovered and separated and the drilling fluid reused. The Contractor shall be responsible for the disposal of excavated material as well as excess drilling fluid, water, trash, and waste. Containment barriers or containers shall be used to prevent drilling fluid runoff from the construction site and frequent inspections along the bore path for upwelling drilling fluid shall be conducted. Clean-up of any inadvertent returns shall be performed in a timely manner.

The Contractor shall take extreme care in minimising the loss of drilling fluids into the ground or the environment. Returned fluids shall be properly contained, reclaimed and recirculated. The Contractor shall detail the precautionary measures to be undertaken to minimise the impact of any inadvertent spillage of fluids on return or at exit of the bore.

Cuttings and spent drilling fluids and slurry shall be disposed of properly and shall comply with all relevant regulations at the cost of the Contractor.

The Contractor shall detail the methods to meet these aforementioned requirements in the relevant SWMS.

3.6.7 Disposal of Drilling Waste

The Contractor shall capture any excess drilling slurry that is created by trenchless construction methodologies. Slurry can be captured in either a hydro excavation vehicle or in sealed, leak proof bin/s. The slurry shall then be transported to a suitable location (preferably on the Site), nominated by the Contractor and approved by the Superintendent, for drying and testing in accordance with IWRG 621 prior to disposal.

The drilling waste shall be air dried in a leak proof skip bin or equivalent structure approved by the Superintendent. Drying times are expected to vary depending on the local climate and prevailing weather conditions. Once the slurry has dried as per the Paint Filter Liquid Test or an approved equivalent field test, the Contractor shall take samples of the material and have these tested by a NATA approved accredited soils laboratory to classify the soil in accordance with IWRG 621 prior to disposal. All testing procedures and results shall be provided to the Superintendent for review prior to disposal of the dried waste. The cost of drying, sampling and testing shall be included in the Contractor's tendered Lump Sum price.

Upon test verification of 'Clean Fill' material, the Contractor may, in consultation with the Superintendent, dispose of material at a location of choice e.g. nearest landfill. The cost of transport and disposal shall be included in the Contractor's tendered Lump Sum price.

Material classified as Category A, B or C Industrial Waste shall be disposed of by the Contractor at an alternative suitably rated facility in accordance with all relevant EPA requirements at the Contractor's cost.

The Contractor shall refer to EPA Industrial Waste Resource Guidelines WRG 621 (https://www.epa.vic.gov.au/our-work/publications/publication/2009/july/iwrg621) which contains detailed information on the different categories of waste and implications for disposal.

3.6.8 Pipe Installation

The Contractor shall use equipment to install the pipe that is capable of monitoring all the installation forces imposed on the pipe. Records of these installation forces must be made available to the Superintendent upon request.

The Contractor shall ensure that the magnitude of loadings imparted onto the pipe does not result in buckling or deflection of the pipe barrels, elongation of the pipe string or excessive deflection, improper functioning or failure of the pipe joints.

The Contractor shall take all precautionary measures to avoid damaging the pipe during installation.

The Contractor shall detail pipe installation procedures in the relevant Safe Work Method Statements.

3.7 Specific Requirements for Horizontal Directional Drilling

3.7.1 Drilling Procedure

Where Horizontal Directional Drilling (HDD) is specified or proposed by the Contractor, prior to commencement of work on site the Contractor shall submit to the Superintendent the drilling procedures and detailed descriptions of the procedures including consideration of the following:

a) Pre installation loads including hydrostatic test loads and self-weight spanning between any support rollers.

b) Installation loads, including bending stresses due to radius of curvature and pipe overbend; maximum installation force on the pipe; stresses due to frictional drag between the pipe and the ground surface, the entry hole, the inside wall of the bore and bends; stresses due to frictional drag between the pipe and drilling fluid; stresses due to torsional force; hydrostatic load due to groundwater; earth overburden loads; loads resulting from drilling fluid and/or grouting; construction/installation loadings, temporary supports or interim imposed loadings.

c) Post installation loads, including design operating pressures; hydrostatic load due to groundwater; loads resulting from drilling fluid and/or grouting in annulus; live loads; internal loads due to surges and vacuum; earth overburden loads; final hydrostatic test loads.

d) Electronically generated bore plan.

e) Layout of the working space and set up at the drill rig site and the pipe fabrication site.

f) Proposed drilling methods, rigs, supporting equipment and number of personnel required.

g) Operator/crew qualifications and experience certificates.

h) Proposed tooling and the bottom hole assembly configuration, specifically for the soil formations and ground water chemistry to be encountered.

i) Diameter and material type of drill pipe and wall thickness and minimum radius of curvature.

j) Temporary or permanent casing to support the bore.

k) Diameter of pilot hole, and angle of entry and exit.

l) Proposed steering tool and surface tracking system, if any, and frequency of readings to achieve the specified tolerance from grade or target and any alternative steering/guidance systems.

m) Type and size of reamers, and the proposed number of passes.

n) Method and set up for the installation of the pipe into the reamed hole.

o) Calculations of the maximum installation force on the pipe likely to be induced during installation.

p) Total volume, type and properties of drilling fluids to be used during drilling;

q) Circulation, reclamation, treatment and disposal of drilling fluids.

r) Total volume of cuttings, wastes and excavated materials and methods for their disposal.

s) Drilled bore logs and any computer output data from steering and tracking systems for each part of the works.

t) Management of groundwater conditions during the drilling process.

u) Method of product pipe support and installation into the borehole.

v) Method of construction of any service holes, guidance holes and additional investigation holes.

w) Grouting procedures.

x) Site access and traffic management.

y) Working hours.

z) Noise and dust control.

aa) Runoff and groundwater management.

bb) Loss of drilling fluid while drilling, reaming or pipe installation is in progress.

cc) Significant water ingress to / egress from the borehole.

dd) Loss of operation of steering/guidance control while drilling/reaming is in progress and method(s) of retrieval.

ee) Loss of operation of drilling equipment (e.g. drill bits, cutters, reamers, drill rods) during construction and methods of retrieval.

ff) Pipe installation problems.

gg) Pipe failure.

hh) Borehole failure.

ii) Failure to meet design tolerances.

The Contractor shall submit SWMS to the Superintendent for comment at least two (2) weeks prior to the commencement of any site works involving HDD. The Contractor shall incorporate any reasonable revisions or comments made by the Superintendent.

3.7.2 Setting Up

Prior to commencement of boring the contractor shall ensure that:

a) Electrical strike alert is operational.

b) Earth mats are installed.

c) Boring machine is staked down as per manufacturer's requirements.

d) Boring machine is barricaded from public access.

e) Boring machine is correctly positioned and aligned.

f) The grades, clearances and hydraulic characteristics are achievable using the proposed construction methods, such that the completed pipeline will perform its intended function.

g) Entry and exit pits at correct depths and suitable starting and finish angles are achievable for linking conduits to existing or trenched/bored conduits.

h) Ensure that all batteries are fully charged prior to drilling so that the drill head can be accurately tracked.

i) All MSDS for drilling additives are on-site and all fluids mixed by experienced staff.

j) All pre operational checks must be done prior to starting and record daily inspection checklist in accordance with Quality Assurance system.

3.7.3 Pilot Hole Drilling

The Contractor shall document the drilled pilot hole path by recording the drill path as X, Y, Z coordinates during drilling.

The Contractor shall produce as-constructed drawings showing both the original bore plan, and the final bore location in plan and section.

3.7.4 Monitoring of Drill Profile

The Contractor shall monitor the drill profile and ensure that:

a) The drill head shall be tracked by experienced staff using digital tracking equipment or accurate software from the drill rig controls.

b) The bore route is monitored to ensure early identification of possible frac out areas. Widen watch area for frac outs in dry hard ground.

c) All necessary safety precautions are implemented for all monitoring staff.

d) Environmental conditions are adhered to, including river crossings and changing depth of cover.

3.7.5 Installation of Pipe

During the drilling and installation of the pipe the Contractor shall carry out the following:

a) Keep work sites cleaned and free from rubbish and debris on a daily basis.

b) Ensure bore pipe meets nominated PE standards and is appropriately labelled.

c) Ensure correct pipe size and type (including the pipe sleeve if nominated on the drawings) according to the Technical Specification.

d) Ensure that standards for pipe clearances and minimum radii are adhered to.

e) Meet minimum coverage requirement as detailed on the plans.

f) Continually monitor bore head and ensure no excessive ground swell from boring.

g) Continually monitor returns to ensure correct ratios of fluid to solids.

h) Record and register damaged services.

i) Ensure pipe ends are flush and without burrs.

j) Join pipes by butt fusion and de-beading using qualified staff and appropriate equipment.

k) Check safety measures prior to pullback to ensure maximum safety and that all areas are checked to ensure that no trees or vegetation are damaged during pullback.

l) Adopt slow and steady pullback procedures that monitor pipe entry at all times to ensure no twisting of pipe or excessive pressure on the pipe being installed.

m) Ensure pipe ends are sealed with approved product to prevent material entering conduit.

n) Reinstate all entry and exit holes to original ground condition.

3.7.6 Pipe Installation Records

Pull back forces shall be measured and recorded to confirm that the pipe has not been overloaded during installation.

3.7.7 Daily Logs

Daily logs and drilling records shall be kept and made available to the Superintendent upon request.

3.7.8 Boring Contingency Plan

The contractor shall ensure that there is a Contingency Plan in place prior to commencement of any boring works. The Contingency plan shall form part of the SWMS and include the following as a minimum:

a) The equipment and personnel required for any spills or frac outs available on site at the time of drilling.

b) The emergency response, recovery procedures and plans.

c) Plan for the continuation of drilling.

d) Notification and response times.

e) Clean-up methods and procedures.

f) Monitoring plan.

g) Disposal plan.

h) Risk management.

3.7.9 Post Installation Inspection

Once installed, the lead end of the pipe shall be inspected, and excessive gouging of the pipe wall shall be reported to the Superintendent.

3.8 Requirements for Construction of PE Pipelines

This section details specific requirements for construction of polyethylene pipe, which are in addition to other requirements detailed in sections of the Technical Specification. Specific details in this section shall take precedence for the construction of PE pipe.

All works shall be in accordance with the manufacturer's recommendations.

The total exposed storage period from date of manufacture shall not exceed 12 months.

All PE pipelines shall be butt weld unless specified otherwise. Electrofusion welds shall **not** be permitted for any portion of the Works without written approval from the Superintendent.

The Contractor shall note that compression couplings/fittings are not permitted for use on the Principal's water reticulation assets. That is, compression couplings/fittings may only be used for temporary supplies that are to be removed prior to Practical Completion.

The Contractor shall not undertake welding if ambient temperature exceeds 32°C without approval from the Superintendent.

All butt welded flanges shall be factory welded. All other welds shall be factory welded where possible.

3.8.1 Weld Pre-Qualification

Prior to the commencement of construction of any polyethylene pipeline, the Contractor shall provide pre-qualification documentation in accordance with Clause 2.12 of The Polyethylene Pipeline Code WSA 01-2004.

3.8.2 Butt Welds

Jointing shall be carried out by qualified Contractors in accordance with Plastics Industry Pipe Association of Australia Limited's document POP003. A copy of this document can be downloaded from www.pipa.com.au. In any areas where the POP003 document is silent, AS/NZS 2033 "Installation of polyethylene pipe systems" shall apply.

Any welds that are not in accordance with the requirements set out will be rejected. If a weld is rejected, the Contractor shall cut out the weld and redo the welding in accordance with the specified requirements.

All welding equipment shall be capable of accurately controlling the temperature and pressure during the welding process. The pressure gauges on the welder must be graduated in increments of no greater than 10 kPa. The heater plate temperature shall be constant over the whole plate. The Contractor shall use a portable surface probe pyrometer capable of measuring the plate surface temperature to an accuracy of 1 °C. Non-depositing alcohol shall be used to clean the heater plate before it is heated up.

Temperatures shall be measured at six (6) evenly spaced locations around the plate on the line of contact with the pipe to be welded. The plate temperature shall be that required by the pipe supplier for the pipe specified.

The end alignment for butt fusion welding shall not be stepped by more than 5-10% of the pipe wall thickness. End gaps shall not exceed the following values:

Table 3.8.2.1: PE Butt Fusion Welding

Pipe Diameter DN (mm)	Maximum Gap (mm)
Up to 225	0.3
226 to 450	0.5
451 to 630	0.6
631 to 900	0.7
Above 900	1.0

Trimmed pipe ends shall be protected until welded. This may be by placing a bag over each free end of the trimmed pipe, or other approved methods the Contractor shall propose to the Superintendent.

All welding processes shall be protected from the wind and dust and the pipe shall be protected from variations in temperature within the pipe. Welding shall be carried out at air temperatures above 4°C.

Welds shall be marked with individual identification. A written record of the conditions, including weld number, temperature, pressure and heating time shall be provided to the Superintendent for each weld.

The Contractor shall provide the Superintendent with the following prior to any joint being undertaken:

a) A copy of the welding parameters, heating and cooling times.

b) The pipe diameter, material type and wall thickness.

c) The make and model of the welding machine to be used, its cylinder area and the weld procedure to be used (e.g. single phase or dual phase).

d) The name and qualifications of the operator.

The welded joints must not be moved until after the nominated cooling time. The weld shall not be artificially cooled. Note: Pitting or bubbling on the weld bead surface is an indication of moisture or volatiles in the pipe materials and all welding shall be halted until advice is received from the pipe supplier.

3.8.3 Electrofusion Welds

All PE pipelines shall be butt weld unless specified otherwise. Electrofusion welds shall **not** be permitted for any portion of the Works without written approval from the Superintendent.

Jointing shall be carried out by qualified Contractors in accordance with Plastics Industry Pipe Association of Australia Limited's document POP001. A copy of this document can be downloaded from www.pipa.com.au. Note that whilst the requirements of POP001 Section 1.5 are not within the scope, all pipe jointer shall have the skills outlined under "objectives". In any areas where the POP001 document is silent, AS/NZS 2033 "Installation of polyethylene pipe systems" shall apply.

The maximum 'out of roundness' of the pipe shall be 2% of the internal diameter. The maximum allowable gap between butted ends within an electro-fusion fitting is 5mm. Pipe ends shall be scraped clean for a distance equal to the length of the coupling/fitting to remove dirt and oxidation and the cleaned end protected until welded. This may be by placing a bag over each free end of the trimmed pipe, or other approved methods.

Electrofusion fittings shall be installed strictly in accordance with the manufacturer's instructions, using the power source specified for the make of fitting.

The pipes shall be restrained in position during welding and joints must not be moved until after the manufacturer's nominated cooling time. The weld shall not be artificially cooled.

All PE pipe joiners shall have undertaken a course meeting the objectives set out in Section 2.5 in the POP001document referred to above.

3.8.4 De-beading

De-beading is not required, unless indicated on the contract drawings, refer Appendix A.

3.8.5 Pressure Testing of PE Pipelines

The Contractor shall test pipelines in accordance with the requirements of the WSA 01 – 2004 Polyethylene Pipeline Code Third Edition Version 3.1 Section 2.13.

Before testing, the Contractor shall allow the pipeline to settle overnight to counteract expansive effects of hot weather and butt fusion jointing, and/or elongation of the pipeline caused by trenchless installation.

The Contractor shall undertake a preliminary inspection to verify the pipe is not leaking during the pre-testing period. If the pipeline is leaking, the Contractor shall repair all leaks and re-test at the Contractor's expense.

When the Contractor is satisfied that the pre-testing has been satisfactorily completed, the Contractor shall organise for the Superintendent to attend site and inspect the pipeline. The pre-testing shall be deemed complete when the Superintendent is satisfied the pipeline is not leaking.

After completion of pre-testing, the Contractor shall undertake testing to WSA01-2004 Section 2.13.5 General Pressure Test (Technical).

The Contractor shall provide a report on testing to the Superintendent outlining all pressure and makeup details for review. The Contractor shall incorporate any changes required by the Superintendent and re-submit until the Superintendent is satisfied with the report.

4 Pipe Work, Valves & Fittings

4.1 General

This section contains the clauses applicable to the supply and testing of pipe fittings and valves for this Contract.

GENERAL SPECIFICATIONS, STANDARDS & CODES OF PRACTICE: All pipe work supplied shall be constructed in accordance with the WSAA Water Supply Code of Australia MWRA Edition Part 2: Products and Materials, unless otherwise specified and in the relevant standards and codes of practices outlined in this specification.

TEST CERTIFICATES: Provide test certificates to the Superintendent if directed.

HANDLING AND STORAGE: All pipes, valves and fittings shall be handled, stored and installed in accordance with the Manufacturer's recommendations.

PIPE CAPPING: All pipes shall be stored and transported with open ends capped to prevent intrusion of foreign materials, debris, etc. This includes transport to, and storage at, the Contractors yard and/or offsite storage location and/or on-site. All open pipe ends on the site shall be capped at all times, except when the Works requires the open pipe end to be exposed (e.g. for inspection, cleaning, preparation or welding/jointing to the pipe string).

DAMAGE: Carefully undertake handling and transportation of pipes and fittings so as to avoid damage to the pipes and fittings and in particular to their protective coatings. Make good any damage caused to the satisfaction of the Superintendent before acceptance at site.

ACCREDITATION: If requested, provide a copy of manufacturer's licence and certification to AS/NZS ISO 9001 to the Superintendent.

MARKER POSTS: Marker posts shall be installed for all valves, pits, scours etc. All marker posts shall be in accordance with EGW Technical Bulletin TB3 Marker Posts.

4.2 DI Fittings

JOINTS: All joints to be Spigot – Socketed, Rubber Ring Joint (RRJ), unless otherwise specified on the Contract Drawings.

VALVES, BENDS AND FITTINGS: All valves and fittings shall be a minimum class PN16, Ductile Iron in accordance with AS2280, AS/NZS4020 and WSA PS-202. All ductile iron valves and fittings shall be coated and lined in accordance with AS4158.

4.3 Polyethylene Pipes and Fittings

REFER TO: WSA PS – 207, WSA PS – 208

MANUFACTURE: Pipes to AS 4130 and AS 4131. Fittings: To AS/NZS 4129(Int).

MATERIALS: To be PE100 unless noted otherwise on the Contract Drawings.

PRESSURE RATING: PN 16 (SDR 11) unless specified otherwise.

COLOUR: Black with blue stripe, to WSA 01.

STORAGE: The total exposed storage period from date of manufacture, of PE pipes non-carbon-black stabilised, not to exceed 6 months.

FLANGED JOINTS:

- Bolting (FASTENERS): Selection to AS 4087, Appendix C. Torque to manufacturer's written instructions.
- Backing Rings: 316 SS and fully 3 part system Denso wrap fittings in accordance with Denso's requirements. Thickness and drilling to AS 4087 for 316 stainless steel flanges.

LUBRICANTS: Materials to meet requirements of AS 3855 or AS/NZS 4020 for potable water.

JOINTS: All joints to be butt welded unless otherwise specified on the Contract Drawings or approved otherwise.

INSTALLATION: To AS 2566.2

4.4 PVC Pipe and Fittings

REFER TO: WSA PS – 209

MATERIAL: Series 2 mPVC Class PN16 rubber ring jointed pipeline in accordance with AS/NZS4765, and AS1646, unless otherwise specified.

FLANGED CONNECTIONS: All flanged external general water supply fittings shall be rated to a minimum pressure class of PN16 in accordance with AS4087.

COLOUR: Blue for potable water pipes, valves and fittings.

JOINTS: All joints to be Spigot – Socketed, Rubber Ring Joint (RRJ), unless otherwise specified on the Contract Drawings. No pipe joints shall be installed under the bored sections of the driveways.

VALVES, BENDS AND FITTINGS: All valves and fittings shall be a minimum class PN16, Ductile Iron in accordance with AS2280, AS/NZS4020 and WSA PS-202. All ductile iron valves and fittings shall be coated and lined in accordance with AS4158.

4.5 Joint Rings and Gaskets

GASKETS AND O-RINGS: Refer to WSA PS-312. Gaskets shall be made from EPDM complying with AS 1646 suitable for PN12 pressure rating. The dimensions shall be as required in AS 4087. Gasket material shall not intrude into the bore of the pipe. The dimensions and installation requirements shall be to AS 4087.

4.6 Flanges

STANDARD: Unless otherwise specified provide flanges of grey cast iron or ductile cast iron full face or steel to AS4087. All galvanised mild steel and SS316 matching flanges shall be flat faced.

FLANGE CLASS: PN16 unless otherwise noted.

DISCREPANCY: Refer to the Superintendent for direction for any discrepancy between the temperature/pressure rating of the specified flange class and the working and field test pressures specified.

BURIED FLANGES: Wrap all buried metal to metal flanged connections using "Denso" primer, mastic and wrap system or approved equal. Polyethylene flanged connection shall not be wrapped using Denso or any other petroleum based wrapping system. Use non corrosive manufacturer approved wrapping system only.

INSTALLATION: Install flanges in accordance with the Contract Drawings and MRWA WSAA standard drawing MRWA-W-306A and MRWA-W-306B.

BOLTING: In accordance with AS 4087 Appendix C and WSAA standard drawing MRWA-W-306B.

4.7 Sluice Valves

REFER TO: WSA PS – 260

GENERAL: The following shall apply unless specifically noted otherwise on the Contract Drawings. All buried sluice valves shall be installed in accordance with MRWA-W-205A, MRWA-W-212, MRWA-W-301, MRWA-W-302 and AS2638.1.

APPROVAL: Submit the proposed valve make, model and closing direction to the Superintendent before ordering. Only order an approved model and make.

CLASS: All valves shall be rated to a minimum of Class PN16. Flanges shall be a minimum Class PN16 in accordance with AS4087.

BURIED: Provide sluice valves suitable for buried applications.

SEATING: Shall be resilient seated suitable for potable water applications.

VALVE OPERATION: Supply with key operation unless otherwise shown on the Contract Drawings.

OPERATING CONDITIONS: Valves will normally be used in the fully closed or fully open position for long periods of time. Supply valves of such design, materials and manufacture that will operate satisfactorily after such periods of in-action and provide drop-tight shut-off without distortion or damage to any part of the valve.

CLOSING MECHANISM: Supply double faced sluice valves with a non-rising stem and mechanism to secure the perfect closing of the valve.

CLOSING DIRECTION: Anti-Clockwise closing

VALVE ENDS: Supply valve ends that suit the method of jointing specified.

VALVES AND FITTINGS: All valves and fittings shall be Class 16 Ductile Iron in accordance with AS2280 and AS/NZS4020. All ductile iron valves and fittings shall be coated and lined in accordance with AS4158.

REQUIREMENT: All sluice valves shall be properly restrained when connected to non-restrained pipeline systems.

4.8 Buried Sluice Valves

All buried sluice valves shall have extension spindles and valve covers in accordance with MRWA-W-302 standard drawing as follows:

All valve covers located in trafficable areas (i.e. access track) that are accessible to vehicles shall be Type G1 as per WSA standard drawing WAT-1304 Class D; or

All areas that are non-trafficable to vehicles shall be Class B with concrete surround as per Type A1 on WSA standard drawings WAT-1303.

COLOURS AND MARKINGS: Shall be confirmed by the Superintendent prior to ordering.

4.9 Hydrant Assemblies

REQUIREMENT: All hydrant assemblies shall be in accordance with EGW Technical Bulletin TB2 Fire Hydrant Standard. All fittings shall be Ductile Iron Epoxy Lined and rated to a minimum of PN16.

All hydrant assemblies shall contain a Crevet Hydratech 2000 (or equivalent approved by the Principal).

- Hydrants installed in trafficable areas shall have Type G2 Class D trafficable covers in accordance with WSA standard drawing WAT-1306.
- Hydrants installed in areas that are non-trafficable to vehicles shall be rated to Class B (covers)

4.10 Property Connections

REQUIREMENT: All property connections shall be installed by a licenced plumber.

All existing galvanised steel property connections shall be replaced from the property meter to the new main unless noted otherwise. Existing copper or PE property connections shall be extended with the same diameter pipe or shortened to suit the location of the new mains.

In conjunction with service proving at the commencement of the project the Contractor shall identify the location, size and material of all property connections connected to the water mains being renewed or made redundant.

All uncertainties shall be referred to the Superintendent for direction prior to proceeding.

To reconnect property connections only new, PN16 minimum rated gun-metal made tapping saddles shall be used in accordance with WSA purchase specification PS-327. The connections shall be installed in accordance with WSA03-2011-3.1 – MRWA 2.0 technical specification and MRWA-W-110 and MRWA-W-111 standard drawings. Connection Ferrules shall be TPFNR (Tapping, Pressure, Ferrule Non-Return) type, PN16 minimum rated, manufactured in accordance with AS 3718:2005 and listed on MRWA approved products portal. Saddle offtakes and ferrules shall be sized to match the property connection diameter.

REFER TO: Relevant Contract Drawings showing indicative number of property connections.

Where the water main is being constructed for the purposes of future land development or subdivision, the water main shall not be tapped before the installation of water meters. This is intended to ensure that property services run directly perpendicular from the water main to the meter.

Where modifications are made to property services (e.g. installation/removal of temporary supplies, replacement of property connections, etc.) the Contractor shall leave the property stop tap / isolating valve in the ‘as found’ position (open or closed) at the completion of works.

4.11 Commissioning

Commissioning of the works shall not be undertaken until all acceptance testing has been approved by the Superintendent and to the satisfaction of EGW Operations.

REQUIREMENT: The Contractor shall coordinate with EGW Operations for the commissioning of the main. Commissioning shall include water quality testing, flushing and bringing the main into service. A minimum of five (5) business days’ notice shall be provided to the

Superintendent and the Principal of any commissioning activities. The Principal shall be responsible for pre-commissioning water quality testing and operation of network valves to bring the new main into service. The Contractor shall note that water quality test results can take up to three (3) business days to be received by the Principal and passed on to the Contractor.

WATER QUALITY: Use approved water for testing which is free from contaminants.

WATER FILL RATE: The water fill rate should not exceed 0.2 m/s velocity to avoid air locks in the new water main.

WATER DISPOSAL: Test water may be discharged to a location approved by EGW if necessary.

REQUIREMENT: All new water mains shall be flushed in accordance with WSA03-2011. The Contractor shall coordinate flushing with EGW Operations. All flushing shall be undertaken by EGW Operations.

4.12 Filling Decommissioned Water Mains

The Contractor shall not commence the decommissioning and filling of water mains until the supply service has been transferred to a new pipeline as designated in the Design Drawings.

The Contractor shall adhere to one of the following methods for filling decommissioned water mains, based on the future use of the above-pipe ground surface. Each of these methods may utilise pumps to place the fill.

The Contractor shall comply with the following for the filling of AC pipes:

- EGW SOP 079 – Repair and Removal of Asbestos Cement Pipes (https://www.egwater.vic.gov.au/wp-content/uploads/2016/03/SOP079RepairAndRemovalOfAsbestosCementPipes.pdf)
- Pumped placement of fill is to be free flowing (not pressurised) to minimise the risk of pipe bursts.

4.12.1 Under Roadways or Open Space

This method utilises a Controlled Low-Strength Non-Shrink Grout Material (sand/cement/water). The strength of this fill is to be minimum 5MPa.

This mix often requires a super-plasticiser to ensure it flows like liquid for appropriate application. The installation method outlined in Figure 3-1 below should be adhered to, in order to ensure water rises to the top, allowing for the mix to gravitate and effectively fill the decommissioned water main.

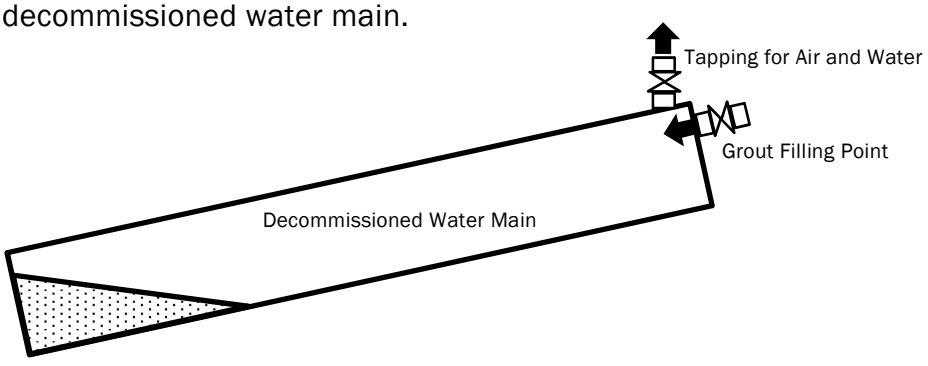

Figure 4-1: Suggested grout filling method

4.12.2 Under Proposed Structures

This method utilises a standard concrete mix (sand/aggregate/cement). The strength of this fill is to be minimum 20MPa.

This method is only suitable for short lengths of decommissioned water main and can only be utilised with EGW approval.

4.12.3 Proprietary Expansive Grouts

In lieu of flowable cement-based fills, the Contractor may nominate an alternative appropriate product. However, application of this method is only to be utilised with EGW approval.

4.13 Redundant Appurtenances

The Contractor shall remove all surface covers, marker posts and other indicators from redundant isolating valves, fire hydrants, property connections and any other redundant appurtenances.

The Contractor shall reinstate surfaces for all removed covers and marker posts, to suit the surrounding finished surface. This includes providing suitable backfill for all trafficable areas, compacting to the required standard, patching roads & footpaths, etc.

The Contractor shall obtain confirmation from the Superintendent for any appurtenances to be made redundant by the works. Do not remove surface covers or marker posts until the Superintendent has confirmed the appurtenance is redundant.

5 General Contractor Requirements

5.1 Contractor Site Facility

The Contractor shall store all materials, plant and equipment required for the Works in a suitable area approved by the Superintendent. The Contractor shall not use any other areas for the storage of plant, equipment, or materials without the Superintendent's approval. The Contractor shall be responsible for gaining all necessary approvals from the appropriate land manager for the facilities.

The Contractor shall provide the Superintendent with details of all agreements with landowners for access to, or use of, areas outside of the Site.

The Contractor shall be responsible for maintaining all facilities in a clean, tidy and hygienic state at all times. This includes the collection and weekly disposal offsite to an approved facility of all rubbish and waste materials.

No provisions need be made for site facilities for the Superintendent.

The Contractor shall provide all facilities and temporary plant required for the Works, including:

a) Site accommodation & toilets;

b) Telecommunications;

c) Power supply & lighting;

d) Water supply from the point/s nominated by the Principal (refer Clause 2.7).

There are no sanitary facilities available at the Site. The Contractor shall make all arrangements, conform to all municipal requirements and meet all costs regarding sanitary facilities for personnel at the Site during the course of the Works. Private/business sanitary conveniences in properties on or adjacent to the Site shall **not** be used by the Contractor's or subcontractors' employees.

The Contractor shall provide suitable traffic management and safety signage for all aspects of the Works.

The Contractor shall store all materials and equipment on the Site so as to prevent damage to the site and minimise hazards to persons, materials and equipment. Storage areas shall be kept neat and tidy. The Contractor shall not use roads, driveways, paths, hard-standings and the like forming part of the Works for access or storage unless prior written approval has been given by the relevant property owner and the Superintendent.

The Contractor shall progressively clean up and restore the Site during the progress of the Works and continuously remove any accumulation of waste, spoil, rubbish and unused materials.

The Contractor shall remove the site facilities including sheds, fuel, water reservoirs, surplus materials, rejected or spilled concrete and toilet facilities and restore the surfaces occupied or disturbed, including temporary access tracks, to their original condition (as a minimum) and to the satisfaction of the Superintendent.

The Contractor shall deposit all materials, spoil and rubbish removed from the site only where it is lawful to do so and after notifying the Superintendent.

5.2 Contractor Site Contact

The Contractor shall ensure that a representative at the Site can be contacted by the Superintendent at all times when work is being carried out on the Site. It is the responsibility of the Contractor to ensure that the Superintendent has the appropriate contact details at all times and that the Superintendent knows who the appropriate contact is at all times.

The Contractor shall provide contact details for 24-hour access by the public or customers of the Principal. As a minimum this should include phone and automated answering facilities.

The Contractor shall maintain a record of complaints received, together with the corrective action taken and with documentary evidence of customer satisfaction. All complaints must be addressed by the Contractor with the concerned customer within ten (10) hours of receipt. A summary sheet of the complaint register shall be provided to the Superintendent on a monthly basis. The Contractor shall notify the Superintendent of the circumstances in writing if any complaint is unresolved after five (5) working days.

5.3 Security of the Site

The Contractor shall erect and maintain fencing/barricading as required to prevent public access to potentially hazardous areas associated with the Works, particularly when the Contractor is not on the Site.

The Contractor shall erect and maintain fencing/barricading to define no-go zones within and adjacent to the Site. No-go zones include tree protection zones, other areas of native vegetation, Cultural Heritage buffer zones, etc. as identified on the Contract Drawings.

The Contractor shall ensure that access to all properties is maintained at all times during the Works unless otherwise agreed with the property owner; any restrictions to access shall be notified and agreed with property owners/occupiers in advance. The Superintendent shall be notified prior to any negotiation with property owners/occupiers regarding access restrictions.

The Contractor shall be wholly responsible for the proper and adequate safeguarding of the Works and of fixed and unfixed materials and equipment on the Site during both working and non-working hours. The Contractor shall take all reasonable measures, including payment of costs, for the employment of Watchmen and/or Safety Patrol Services or temporary security compounds as may be necessary for this purpose.

No claim for extension of time or for cost variation will be allowed in respect of damage or loss of materials or interruption of the Works due to the Contractor's failure to safeguard the Works or the Site. All losses shall be made good by the Contractor without cost to the Principal.

The Contractor shall plan the Works such that all excavations are backfilled and/or securely covered whenever the site is left unattended to prevent unauthorised entry.

The Contractor shall be wholly responsible for third party damage claims that result from:

a) Unauthorised access to any part of the Works site including excavations and the Contractor’s site facilities

b) The presence of any equipment, plant or materials associated with the Works.

5.4 Pre-condition Assessment

All damage to existing structures (roadways, kerbing, nature strips, footpaths, driveways, fences and/or private property) that occurs due to the Contractor's activities or negligence shall be repaired to the satisfaction of the Superintendent, at no additional cost to the Principal.

Prior to the commencement of the Works, the Contractor shall carry out a pre-condition assessment of any infrastructure that may be affected by the Works. The assessment shall be attended by the Superintendent and the owner or occupier of the affected infrastructure/property. The assessment shall include sufficient documentary evidence to demonstrate any pre-existing damage to assets owned by landowners, service authorities or any other third parties. A detailed photographic survey will be an important aspect of the pre-condition assessment. The Contractor shall provide the Superintendent with electronic copies of all photographs and an inventory of the photographs.

Where damage to assets exists after the Works are complete, the Contractor shall be liable for their reinstatement unless the Contractor can demonstrate that the damage is not a result of the Contractor's activities or negligence. Any repairs must be completed to the satisfaction of the Superintendent and the relevant property owner or manager, and at no additional cost to the Principal.

5.5 Existing Services

Without limiting any other provision of the Contract, the Contractor shall take special precautions where excavations are made near any other services. It is the responsibility of the Contractor to confirm the presence and location of all services in the vicinity of any excavations associated with the Works.

For the purposes of this clause 'other services' includes gas pipelines, electrical cables, overhead power cables, communication cables (including fibre optic cables), drains, sewers, septic tanks and water mains. The Contractor shall:

a) Take special care to ensure that such services are identified, located and protected in accordance with the conditions specified by the relevant authority.

b) Arrange for a representative from the relevant authority to be present, unless the authority allows otherwise, whenever the Contractor is:

- proving the locations of such services; or
- excavating within one (1) metre of such services or the minimum clearances required by the relevant authority.

c) Arrange with the relevant authority for the closure and subsequent restoration of any such services that must be shut down during the Works.

d) Adopt a method for uncovering and protecting services from damage, to the satisfaction of the relevant authority, if any service must be uncovered and left exposed.

The Contractor has been advised and acknowledges that the locations of underground services shown on the Contract Drawings or otherwise relayed to the Contractor are based on the information available at the time and any information supplied by the respective authorities where such information is available.

The Contractor acknowledges that the information regarding these services is tentative only, with respect to both details of services shown and the existence of other services not

shown. The Contractor shall verify the information provided in the Contract Drawings with regards to the presence of other services prior to the commencement of the pipe laying works and notify the Superintendent of any potential clashes or amendments required to the design.

The Contractor shall backfill trenches containing other services so that the subgrade is restored as nearly as possible to its original state of compaction. Where selected backfill has been placed by others and has had to be removed, the Contractor shall replace it with the same type of selected material. The Contractor shall carefully deposit all backfill in the trench and around the other services in layers and adequately compact it using appropriate hand rammers and tampers or by the use of effective mechanical equipment.

The Contractor shall re-compact excavations near existing underground pipework so as to restore the foundations of that pipework.

Before commencing excavation, the Contractor shall inform the Superintendent of the measures to be adopted to protect or to temporarily remove any impediments which may exist on or adjacent to the Works.

5.6 Protection of Existing Infrastructure

The Contractor shall take every reasonable precaution necessary to protect services and infrastructure, including roads, power poles, underground services and above ground private assets, during the course of the Works.

The Contractor shall comply with the requirements of any external agency when working in proximity to relevant assets, infrastructure or services (e.g. APA supervision when constructing crossings of gas pipelines).

Should any such service or infrastructure be damaged by the Contractor (or employees, representatives, sub-contractors, etc.), the Contractor shall immediately:

a) Notify the affected property owner and/or occupier of the damage to the service; and/or

b) Contact the local authority concerned and advise of the damage and arrange for turning off of the supply (for services) and temporary diversion/restoration works where there is an environmental or health and safety concern; and/or

c) Arrange repair of the service or infrastructure by properly qualified and licensed workmen, to a standard that is equal to or better than the state immediately prior to the damage. The repair work shall be undertaken in accordance with the relevant authority's standards and procedures.

All costs associated with the repair to, and restoration of, existing services and infrastructure - including damages to surrounding property and potential losses to the relevant authority - shall be borne by the Contractor.

The Contractor shall comply with all relevant regulations for work in the vicinity of power lines (on poles and towers), including the provision of a qualified and dedicated spotter where required. The Contractor shall seek and obtain permits-to-work from the relevant authorities where required.

The Contractor shall allow for any bracing of power poles (or other such protection measures) as may be required to facilitate the Works.

Prior to the commencement of the Works, the Contractor shall confirm the maximum height of any vehicle or machinery passing or working under power lines with the vehicle/machinery owner. All works shall be in accordance with the Worksafe Victoria publication 'Framework for Undertaking Work Near Overhead & Underground Assets'.

5.7 Use of Public Roads

The Contractor shall be responsible for identifying, seeking and obtaining any and all necessary permits regarding the use of roads, prior to the commencement of the Works. Any permits issued and/or agreements made shall be in writing and copies of the relevant permits and agreements shall be submitted to the Superintendent prior to the commencement of the Works. Any costs associated with such permits and/or agreements shall be deemed to be included in the Contractor's tendered Lump Sum price.

At all times the Contractor shall abide by the requirements of all relevant legislation including the Road Management Act 2004.

The Principal will not accept any responsibility for damage caused to any roads, bridges or structures by the Contractor's activities or negligence. Any such damage shall be rectified by the Contractor at his own expense, to the satisfaction of the relevant co-ordinating road authority.

The Contractor is advised that road authorities and municipal councils have legal power under their respective Acts to recover the costs of repair of damage to roads.

The Contractor shall be responsible for the safety of traffic, for the provision and maintenance of warning signs, barriers and lights and shall provide and maintain suitable detours or passing places for the use of traffic where the operation of any existing road is affected by the Works.

5.8 Right of Access

The Contractor shall have right of access over the Site of the Works.

The Contractor shall seek and obtain any permits for access including approvals as required.

The Contractor shall not trespass outside the limits of the Site without notifying the Superintendent and obtaining the specific approval of the relevant property owner.

The Contractor shall, at its own cost and prior to commencement of the Works, obtain approval and comply with all requirements imposed by the relevant authorities. These authorities include water, gas, sewer, electrical and telecommunication utilities, and relevant co-ordinating road authorities.

The Contractor shall immediately inform the owner of any damage or interference to any service or property.

Where damage to property has been caused by the Contractor's operations in lands outside the limits of the Site the Contractor shall obtain clearance in writing from the relevant property owner or authority certifying that the property owner has no claim for damage or loss against the Principal or Contractor arising from the Works. Such clearance must be obtained prior to the completion of the Defects Liability Period. This provision shall apply to all statutory and local authorities including municipal councils. Final payment will not be made in respect of any section of the Works unless the required clearances have been produced for the Superintendent's inspection or the Contractor can demonstrate to the Principal that all reasonable steps have been taken but a clearance is impossible to obtain.

When difficulty is experienced in obtaining clearances from property owners not normally residing at the property affected by the Works, the following procedure shall be followed:

a) Prior to the end of the Defects Liability Period the Contractor shall find out the name and address of the owner and write requesting the owner to submit a clearance. A copy of this letter shall be forwarded to the Superintendent;

b) If after 30 days no reply has been received, the Contractor shall again write to the owner requesting a clearance but will add to the letter a clause to the effect that if nothing is received from the owner within a 14 day period, it will be assumed that the owner has no claims arising from the Works. A copy of this letter shall also be forwarded to the Superintendent;

c) If no reply is received after this second period, the Contractor shall write to the Superintendent and request a release to be given by the Principal, after satisfying the Superintendent as to the standard of the restoration works.

5.9 Conduct of the Contractor

The Contractor shall be responsible for ensuring that the Works are carried out in such a way as to reflect as well as possible upon the Principal and shall ensure:

a) Behaviour of all employees, representatives and sub-contractors engaged on the Works is courteous, informative and helpful to customers and the general public, reflecting the Principal's image as a public utility with a high standard of service;

b) Neat and tidy work clothes and appearance, no bad language, no littering and no other actions which might reasonably be considered to be inappropriate conduct.

Refer also to the requirements of the letter in Appendix D regarding 'East Gippsland Water and Quality Customer Service'.

The Contractor shall familiarise themselves with the Principal's requirements and policies on their website at http://www.egwater.vic.gov.au/

5.10 Community Engagement

The Contractor shall work within the Principal's community engagement framework and project specific community consultation strategies with regards to:

a) Limits of responsibility with regards to contact with customers.

b) Complaints and incident response procedures.

If uncertain of any protocols / responsibilities, the Contractor shall request the input of the Superintendent.

The Contractor shall document any and all interaction with the public (including but not limited to complaints, requests for information, requests from the Contractor to access private property, etc.) and provide copies to the Superintendent as soon as practicable.

5.11 Employment Conditions

Without limiting any other provision of the Contract, in addition to the Contractor's legal obligations in respect of its employees the Contractor shall:

a) Abide by the terms and conditions of the Australian Workers Union Construction and Maintenance Award as a minimum.

b) Conclude any negotiations or agreements which the Contractor is required to enter into with unions and/or employees prior to the commencement of Works or as soon as possible after commencement of the Works.

c) Ensure adequate facilities for sub-contractors, employees and visitors either at the Site or elsewhere.

6 Health, Safety & the Environment

6.1 Occupational Health & Safety

6.1.1 Protection of Persons

The Contractor shall protect the safety of all employees and people working on or adjacent to the Site or associated with the Works in accordance with the relevant legislation, statutory requirements, regulations and codes of practice.

The Contractor shall ensure that all people on the Site have completed the relevant Site Induction programme and wear the certified safety apparel as defined in the HSEMP approved by the Principal.

The Contractor shall routinely conduct a hazard survey to identify potential hazards before mobilising to the Site, during the Works (minimum weekly frequency during the Works) and a final hazard survey after the completion of the Works. The Contractor shall assess any identified hazards and implement reasonable measures to minimise the risk of harm to persons or property.

The Contractor shall comply with the requirements of all relevant Worksafe Victoria publications, including the 'Framework for Undertaking Work Near Underground Assets'.

The Contractor shall store or leave unattended equipment, tools and materials in a condition that minimises the risk of harm to persons or property.

The Contractor shall adhere at the Principal's OH&S requirements at all times. The Contractor shall ensure that all employees and sub-contractors are suitably familiar with relevant OH&S requirements. The Contractor shall comply with all explicit and implied requirements of any relevant Acts, including the Occupational Health and Safety Act and the Health Act, any regulations, local laws and by-laws and codes of practice or standards issued by Federal or State Government agencies that are relevant to the Works.

The Contractor shall note that there is a risk of electrocution when disconnecting / cutting metallic water mains, property services and/or associated fittings. The Contractor shall implement all practical control measures and follow all relevant guidelines to minimise the risk of electrocution. This may include:

- Assessing the risk before commencement of works, by measuring the electrical potential difference (voltage) between the metallic water service/fitting and an independent earth (located at least 1.5m away from the metallic water service/fitting). Voltage reading should be less than 5.0 volts.
- Eliminating the hazard by seeking the permission of the householder to turn off the main electrical switch at the property.
- Controlling the hazard by bridging the length of property service and/or fitting/s to be removed, using a suitable bridging conductor clamped to each side of the length to be removed.
- Controlling the hazard by using appropriate PPE, such as low voltage insulated gloves and safety boots that have not been compromised (i.e. soles intact with no penetrations).

6.1.2 Safety and Protection

The Contractor shall ensure that all work performed by the Contractor's workers and sub-contractors is performed in strict compliance with the Occupational Health and Safety Act 2004, the Occupational Health and Safety Regulations 2017, WorkSafe Victoria and other current legislative requirements, accepted Safety Standards and Codes, the Principal's safety standards/requirements, any direction of the Superintendent and in compliance with any Government or Local Regulations applicable from time to time.

The Contractor shall:

a) Provide, erect and maintain suitable steel mesh covers or suitable equivalent over all shafts and trenches, as well as fencing/barricades to exclude unauthorised access to the Works;

b) Provide pedestrian walkways where the footpath is blocked;

c) Maintain excavations in a dry condition where people may gain access to the Works;

d) Ensure that all personnel on site are in possession of a current construction induction card as well as any appropriate training and/or qualifications that may be required to complete the Works in accordance with all current standards, regulations & legislation;

e) Ensure that all personnel employed on site wear appropriate PPE, as detailed in the HSEMP, at all times;

f) Where relevant, comply with the Occupational Health and Safety Regulations 2017 & the Principal's Standard Operating Procedures (SOPs) for works with or in the vicinity of asbestos (EGW SOP 079 https://www.egwater.vic.gov.au/wp-content/uploads/2016/03/SOP079RepairAndRemovalOfAsbestosCementPipes.pdf). Connections to AC mains will require staff or subcontractors with the appropriate accreditation for "Asbestos Handling and Awareness";

g) Ensure that all tools and equipment, gear, scaffolding, ladders, machines, winding arrangements and other equipment used by the Contractor or any others in connection with the Works are of adequate rating/strength and safe for use. Current testing tags shall be on all equipment where applicable. All plant and equipment used in association with the Works for lifting purposes, and all lifting procedures, shall comply with relevant Australian standards, Occupational Health and Safety Regulations 2017 and Victorian Water Industry Association Civil Construction Safety Guide; and

h) No person shall act as a Crane Driver, Crane Chaser or Dogman unless that person is the holder of the appropriate Certificate of Competency, or Learner's Permit, issued by the relevant authority.

6.1.3 Contract Specific HSEMP

The Contract Specific HSEMP submitted by the Contractor prior to the commencement of the Works shall include, as a minimum, the following items:

a) A Health and Safety Co-ordination Plan meeting all the requirements of "Part 5.1 – Construction" of the Occupational Health and Safety Regulations 2017.

b) Documented "Job Specific Safety Analysis", "Safe Work Method Statements for High Risk Construction Work", Site Training and Induction Records in accordance with the requirements of the Occupational Health and Safety Regulations 2017.

c) Daily checklists that plant operators and foreman propose to use.

d) Personal Protective Equipment rules for the Site, in line with EGW requirements (details of EGW minimum PPE requirements can be provided upon request).

e) Daily safety "tool box" meeting proposed agenda.

f) Contact names and telephone numbers for senior on-site staff who shall have responsibility for Health and Safety responsibilities for the Contract.

In respect of any such HSEMP the Contractor shall:

a) Implement the HSEMP at all times while performing the Works; and

b) When requested provide to the Superintendent evidence of the Contractor's ongoing implementation of the HSEMP.

As part of the HSEMP the Contractor shall provide detailed SWMS for all potentially hazardous activities associated with the Works. Such SWMS shall address the hazards identified by the Contractor and nominate mitigation strategies and contingencies to be implemented to minimise the risks as far as reasonably practical.

Regardless of any review or comment on the Contractor's HSEMP by the Superintendent or the Principal, the Contractor shall maintain the responsibility of undertaking the Works in a safe, environmentally friendly and socially responsible manner.

6.1.4 Incident Notification

All incident notifications shall be in accordance with the Principal's requirement as specified in the Conditions of Contract.

If the Contractor is required by the Occupational Health and Safety Regulations 2017 or by any other Legislative Requirement to give any notice of an accident/incident occurring during the Works by the Contractor or its subcontractors, the Contractor shall at the same time or as soon thereafter as possible in the circumstances give a copy of the notice to the Superintendent.

The Contractor shall notify the Superintendent as soon as possible, and within 12 hours, of any incident or injury, or property or environmental damage which occurs during the Works, including all lost time incidents. The Contractor must within two (2) calendar days of any such incident provide a report giving complete details of the incident, including results of investigations into its cause, and any recommendations or strategies for prevention in the future.

6.1.5 Risk Assessment and Coordination Workshop

The Contractor shall undertake a Risk Assessment in consultation with the Principal and the Superintendent to determine the safest method to undertake these works, while minimising the impact to overall system operation and risk of impact to the environment. The Contractor shall include the results of the Risk Assessment, and any agreed mitigation or contingency measures to be implemented, in the HSEMP.

6.1.6 Initial Hazard Identification

The Principal has undertaken a preliminary hazard assessment for the Works, which has identified the hazards nominated in the project specific documentation (refer Appendix A – Contract Drawings).

The hazards identified as a part of this initial assessment are not intended to replace or limit the detailed risk assessment to be completed by the Contractor.

The Contractor shall mitigate all hazards identified which pertain to the construction (including commissioning) phases. The Contractor shall complete its own hazard/risk assessments as part of its HSE Management Plan preparation. The Contractor shall also complete a Safety-in-Design review of its detailed design and include copies of relevant risk registers with drawing and calculation submissions.

6.1.7 Confined Space Entry

Any works within an identified Confined Space shall be conducted in accordance with WorkSafe Victoria Compliance Code for Confined Spaces, AS/NZS 2865-2001 'Safe Working in a Confined Space' and EGW SOP 058 'Confined Spaces other than Sewers' available at https://www.egwater.vic.gov.au/community/contractor-health-safety-environment/.

The Contractor shall include in their tendered Lump Sum price for the Works any and all requirements associated with Confined Space regulations including the supply of all labour, equipment, etc. required to undertake the Works.

All staff entering any identified or suspected Confined Space shall hold current Confined Space accreditation. Proof of qualification shall be presented to the Superintendent upon request.

6.1.8 Hours of Work

The standard hours of work shall be as follows:

Monday – Friday: 7.30am to 5.00pm.

Saturday: By approval of the Superintendent.

Out of Hours work may be required at certain locations and times to avoid significant inconvenience to the community or business activity.

Out of Hours work shall **not** be undertaken without prior written approval from the Superintendent.

Where the Superintendent specifically requests out of hours work, the Contractor may submit a written application for cost variation within 48 hours of receiving the request from the Superintendent. Such an application for variation will be assessed and, where reasonable, approved by the Principal. Out of hours works may include Sundays, Public Holidays and/or weekend/weekday night works.

The Contractor shall comply with EPA Noise control guidelines at all times.

6.2 Environmental Requirements

6.2.1 General

The Contractor shall complete the Works in accordance with the Principal's requirements and the Technical Specification with regards to Environmental Management. The Contractor's HSEMP shall address the Environmental Management requirements outlined in this section.

The Contractor shall be responsible for all costs associated with protection of the environment from any harm associated with the Works.

6.2.2 Environmental Compliance

The Contractor shall comply with the requirements of any statute, by-law, local regulations, standard and the like, as well as any reasonable directions issued by the Superintendent related to Environmental Management or Protection.

The Contractor shall be responsible for the Environmental Management compliance of all employees and sub-contractors associated with the Works.

The Contractor shall submit to the Superintendent proposals where required, including for traffic movement, temporary structures, cleaning up, erosion control, demolition, etc. The Contractor shall comply with the agreed proposals at all times.

6.2.3 Protection of the Environment

The Contractor shall not form new tracks, alter existing tracks, remove trees or shrubs, modify natural drainage, harm native animals or undertake any other environmental disturbance without approval from the relevant authority and the Superintendent.

Trees and vegetation not specifically approved for removal or impact in association with the Works are to be protected at all times.

The Contractor shall comply with all relevant authority requirements for mitigating pollution.

The Contractor shall implement all measures required to prevent dust and mud generation on the site and in particular to ensure containment within the Site.

Mud or dust from wheels and tracks of construction equipment shall not be carried onto roads, paved streets, footpaths and the like. Mud accidentally deposited on paved surfaces shall be removed immediately by the Contractor.

6.2.4 Odour

The Contractor shall make all necessary provisions to minimise and where possible eliminate odour emissions as a result of the Works.

6.2.5 Noise

The Contractor shall avoid practices that lead to excessive noise and disturbance to adjoining landowners and occupiers. Noise of spoil dumping into trucks and other machinery shall be minimised. Noise emissions produced by the Works shall comply at all times with any relevant EPA requirements.

The Contractor shall silence all machinery, including jackhammers, to current technical standards in order to minimise noise as far as reasonably practical. The Contractor shall fit compressors with acoustic canopies and internal combustion engines with suitable mufflers to minimise noise levels. The Contractor shall keep all machinery properly greased.

When machinery is used outside the standard hours of work (refer Clause 6.1.8) the Contractor shall only use electrically driven or fully silenced machinery.

6.2.6 Environmental Complaints

If complaints are received from adjoining landowners or occupiers concerning dust and mud disturbance, the Contractor shall notify the Superintendent as soon as possible, and within 12 hours, and shall rectify the complaint and obtain a clearance from the complainant. The Contractor shall be responsible for any and all costs of cleaning up and rectification of complaints concerning dust and mud.

If complaints are received concerning noise during the Works, the Contractor shall employ a specialist noise consultant at the Contractor's cost to take noise measurements and provide a report in accordance with the appropriate EPA requirements.

6.2.7 Erosion, Contamination & Sedimentation

The Contractor shall plan and carry out the Works in a manner that minimises the risks of erosion, contamination and sedimentation of the Site, surrounding areas and drainage systems (natural and man-made). The Contractor shall plan and implement such reasonable measures as may be required and as directed by the Superintendent for erosion control, including:

a) Progressive restoration of disturbed areas.

b) Temporary drains and catch drains.

c) Diversion and dispersal of concentrated flows to points where the water can pass through the Site without damage.

d) Construction and maintenance of silt traps to prevent discharge of scoured material to downstream areas.

The Contractor shall plan and implement reasonable measures to prevent the erosion of soil from any lands used or occupied by the Contractor and to prevent the deposition of excavated or eroded material in any stream, lake, wetland or reservoir. Such measures include:

a) Grading of areas or construction of drains to lead run-off of water away from construction batters.

b) Construction of settlement and/or retarding basins, including gypsum treatment where required, to reduce rates of discharges and volumes of sediment reaching downstream catchments.

c) Brush or timber silt traps

d) Confining construction traffic to designated roads and access ways approved by the Superintendent.

6.2.8 Environmental Water

The Contractor shall protect the Works from water damage.

The Contractor shall inspect, clean and repair temporary erosion and sediment control works after each rain event. Temporary erosion control measures shall be removed by the Contractor when they are no longer required.

The Contractor shall keep the site free of surface water by implementing and maintaining suitable protection measures including constructing embankment slopes and excavations so as to ensure complete drainage. At the completion of the Works the Site shall be free-draining; ponding of water shall not be permitted and shall be rectified by the Contractor at no additional cost to the Principal.

Under no circumstances shall the Contractor undertake activities that may result in hazardous substances or sediment-laden water entering the local drainage or waterway system (e.g. washing of equipment, etc.).

The Contractor shall control all discharges of wastewater and site drainage to minimise nuisance or damage to the public, surrounding property and the environment. The Contractor shall keep the Works dry at all times during the Contract regardless of whether work is taking place in the particular area at the time.

6.2.9 Vegetation

The Contractor shall protect from damage all trees and other vegetation which need not be removed or destroyed for the completion of the Works or which is specified to be retained in the Technical Specification. Protective measures may include:

a) If it is considered necessary to trim, lop or remove trees or shrubs specified or shown to be retained, apply to the Superintendent for permission to do so and await instructions.

b) Tree branches directed to be removed shall be properly cut back to the trunk.

c) Clean cuts and wounds on trees, including bark and roots, and paint with an approved dressing.

d) Avoid damage to tree bark. Do not attach stays, guys and the like to trees.

e) Do not store or dump oil, paint, waste concrete, clearings, boulders or other material under trees.

f) Site concrete mixers in positions where wind-blown cement cannot damage trees and plants.

g) Dumping of spoil is not to occur on native vegetation. Spoil and machinery is not to be placed beneath tree canopies.

h) Protective fencing is to be placed around native vegetation that is to be retained, at the outside edge of the tree protection zone as specified on the Contract Drawings.

The Contractor shall engage a specialist sub-contractor for any tree removal.

6.2.10 Reinstatement

The Contractor shall reinstate all areas disturbed by the Works back to their original condition or equivalent to the satisfaction of the Superintendent. Where finished levels differ from the original ground lines, the Contractor shall restore surfaces to the original levels or re-grade to provide a smooth transition to the design surface profile where permitted by the Superintendent.

Prior to Practical Completion the Contractor shall remove any surplus materials and debris, clean the site, grade smooth and reinstate topsoil with seedbank.

6.2.11 Site Specific Environmental Considerations

The Contractor shall include in the HSEMP details of the location/s and design of all environmental protection measures including:

a) Sediment and silt management controls;

b) Vegetation management techniques;

c) Spoil stockpiling ;

d) Machinery/plant locations; and

e) Exclusion fencing around native vegetation/habitat.

f) Handling, storage, testing and disposal of liquid waste including drilling fluid

g) Management of Acid sulphate soils and potential acid sulphate soils

6.2.12 Fire Prevention & Readiness

Fires are strictly prohibited on the Site.

The Contractor shall plan and implement fire protection measures during the Works and comply with all statutory requirements of the CFA and any other relevant authority.

The Contractor shall prepare a Fire Safety Plan detailing proposed responses in the event of any fire affecting the Works or the Site. The Fire Safety Plan shall be included in the HSEMP.

6.2.13 Environmental Protection of the Site

The Contractor shall remove all refuse from the Site including food scraps and the like.

The Contractor shall implement and maintain adequate facilities for the collection, transportation and disposal of wastes in accordance with the requirements of the relevant authority. This shall include liquid wastes such as portable toilet wastes, fuels, lubricants, oils, drilling fluid and greases. All waste shall be classified and disposed of in accordance with the relevant EPA guidelines at the cost of the Contractor.

Entry of oil, grease, fuel or any untreated waste into any watercourse is prohibited. The Contractor shall ensure that drainage from any area likely to be so contaminated is effectively diverted to a suitable collection point for proper disposal.

The Contractor shall ensure that servicing of plant and fuelling of machines is undertaken at locations remote from watercourses. Waste products from machine servicing shall be collected and disposed of in an acceptable manner.

6.2.14 Archaeological and Heritage Assessment

The Contractor shall undertake all works in compliance with the requirements of the *Aboriginal Heritage Act 2016* (Vic), the *Aboriginal Heritage Regulations 2007* (Vic) and the guideline on 'Discovery of Aboriginal Cultural Heritage During Works (refer Appendix D).

If any items of known or suspected Archaeological, Aboriginal or Heritage Values are found during the Works, works shall stop and the Superintendent shall be notified immediately. Works shall not progress until instructed by the Superintendent.

It is an offence to knowingly disturb or destroy Aboriginal Cultural Heritage artefacts without written authorisation from the relevant authority.

6.2.15 Severe Weather

The Contractor shall prepare a Weather Safety Plan detailing the proposed responses to the Bureau of Meteorology (BOM) Severe Weather Warnings (including Severe Thunderstorm Warnings). The Weather Safety Plan shall be included in the HSEMP.

The Contractor should regularly check the BOM (www.bom.gov.au) web site for current weather warnings. In the event of a Severe Weather Warning being posted for the area in which the Works are located, the Contractor shall make the Site safe, and implement the requirements of the Weather Safety Plan.

7 Contractor's Project Management

7.1 General

The Contractor shall be responsible for the following activities associated with project management of the Contract:

a) Attendance at regular progress meetings

b) Preparation, regular update and routine submission of a Works Program.

c) Preparation & implementation of the HSEMP (refer Clause 6.1.3).

d) Preparation & implementation of a QMS.

e) Submission of progress claims for payment on a monthly basis. In accordance with the General Conditions of Contract, claims shall cover the month up to and including the 15th day of the month, and shall be submitted to the Superintendent prior to the 20th day of the month.

f) Provision of Technical Submissions including design drawings and/or shop drawings, where a component of the Works has a design requirement and/or for requests for changes in equipment, materials, etc.

g) Preparation and submission of As Constructed information (refer Clause 2.16).

h) Notifications to all relevant authorities as required (for example high risk work notification to WorkSafe Victoria, notification of encroachment on other services, etc.).

7.2 Meetings

The Contractor shall attend and engage in meetings at the Site or at the Principal's office, with the Principal and/or Superintendent as required by the Superintendent, at intervals of not more than two weeks during the Works.

The Superintendent will issue a set of meeting minutes to all attendees as a record of discussion. If the Contractor believes that the minutes need to be amended, then the Contractor shall provide written notification of the amendments within 3 days of receipt of the minutes. Otherwise the Contractor shall respond to the Superintendent to confirm acceptance of the minutes as a true and accurate record of the relevant meeting.

7.3 Works Program

The Contractor shall submit a Works Program detailing all the activities of the Works for the acceptance of the Superintendent prior to commencement of Works.

The Works Program shall be maintained in an electronic format, such as Microsoft Project or an approved equivalent, with hard copies made available on request. Adobe Acrobat file format (.pdf) versions are acceptable for issue.

The Works Program shall include, but not be limited to, the following items:

a) Allow two business days for review by the Superintendent and at least one re-submission (plus two business days' review) prior to final acceptance.

b) Allow for applications and approvals for statutory permits or approvals and for re-submission if necessary.

c) Clearly identify the 'Critical path' and the 'float' on non-critical items.

d) Non-working days, holidays and Rostered Days and any other days that the Contractor does not anticipate working during the Contract.

e) The number of working days per week upon which the Works Program is based.

f) Submission of documentation.

g) Placing of orders and deliveries to site.

h) Stages of construction and manufacture.

i) Inspections, testing & commissioning.

j) Work by others. The Superintendent will provide relevant information where requested by the Contractor.

k) Site meetings.

l) Dates by which major sections of the Works will be completed by the Contractor.

m) Timing, duration and requirement of temporary service interruptions, shutdowns or other activities where input is required from the Principal.

n) Submission of As Constructed information.

o) Proposed date for Practical Completion of the Works.

The Contractor shall submit a revised Works Program with every progress claim for payment. Payments shall not be made by the Principal until the revised Works Program has been received.

The Contractor shall submit additional Works Programs as requested by the Superintendent for all or any portion of the Works. Additional Works Programs shall be submitted to the Superintendent within five (5) working days of the date of the request.

All works including allowance for wet weather delays must be scheduled for Practical Completion prior to the date nominated in the Conditions of Contract.

7.4 Project Management Plan

Prior to commencing the Works, the Contractor shall submit to the Superintendent a Project Management Plan specific to the Works. The Project Management Plan shall consider the specific issues relevant to the Works and shall document the systems and methods to be implemented. The Contractor's Project Management Plan shall include but not necessarily be limited to:

a) Company details including name and contact details of key personnel.

b) The Contract Specific HSEMP.

c) Inspection and test plans.

d) Reference to codes of practice to be used.

e) Sub-contractors, suppliers and other third parties.

f) Daily logs.

g) Works Program.

7.5 Quality Management System

The Contractor shall prepare and implement a QMS relevant to the Works and submit a Quality Plan prior to the commencement of the Works.

The Superintendent will assess the Quality Plan and return it to the Contractor within ten (10) working days of receipt, together with any comments, requirements or amendments for inclusion in the Quality Plan.

The Superintendent will continue to return comments to the Contractor within ten (10) working days of receipt of the relevant submission of the Contractor's updated Quality Plan until such time as the Superintendent approves the Quality Plan in writing.

Any delay by the Contractor in obtaining the approval of the Contractor's Quality Plan by the Superintendent shall be at the Contractor's expense and the Contractor shall not be entitled to any extension of time due to such delay unless the Superintendent has taken more than 14 calendar days to reply to a submission of the Contractor's Quality Plan.

The Contractor shall not commence the Works until the Superintendent has approved in writing the Contractor's Quality Plan.

The Contractor shall incorporate the following into the QMS as a minimum:

a) Such measures as are necessary to trace each product or service from receipt through to construction;

b) Quality assurance and quality control procedures covering all material supply, manufacture and construction carried out by the Contractor and any of his sub-contractors associated with the Works;

c) Quality control tests and inspections including the following:

    - The tests and inspections required in accordance with the Technical Specification. The frequency of such tests and inspections shall not be less than the requirements set out in the Technical Specification.
    - Such tests as are necessary to demonstrate that materials and equipment comply with the requirements of the Technical Specification;
    - Whenever practicable, material testing such that the results are available for review by the Superintendent prior to the materials being incorporated into the Works.

The Quality Plan shall include the following:

a) Inspection and Test Plans for all materials and construction work.

b) Hold points that require the approval of the Superintendent before proceeding.

c) Non-conformance identification and action procedures.

d) Details of personnel responsible for the quality of the Works and their relationships to the Contractor.

The Contractor shall carry out monitoring and testing in accordance with the approved QMS throughout the duration of the Contract.

Upon reaching a hold-point, work on related sections of the Works shall stop pending the approval of the Superintendent to proceed. The Superintendent will give approval, or otherwise reasons for approval not being given, within five (5) working days of notification by the Contractor, or in the case of documentation, within the specified time from submission by the Contractor. Specific hold points shall be nominated by the Contractor in the Works Program.

The Contractor shall carry out quality audits of the QMS and sub-contractor's QMS on a regular basis. Sub-contractor's QMS shall be deemed to form part of the Contractor's QMS.

The Contractor's QMS and external inspections records shall be available to the Superintendent so that audits may be carried out to ensure the Technical Specification is being complied with. If the QMS is found by the Superintendent to be not functioning successfully, the Superintendent will have the QMS externally audited and implement changes until it does function successfully. The external audits will be at the Contractor's expense.

The Contractor shall notify the Superintendent of every non-conformance, and shall notify the Superintendent within five (5) working days of the proposed corrective action/s.

The Contractor shall maintain, in a readily accessible manner, all QMS documentation and records as are necessary to provide objective information or evidence in support of the Works meeting the various requirements of the Technical Specification and shall make them available for inspection by the Superintendent upon request. On completion of the Works the Contractor shall supply all, or such proportion as may otherwise be directed, of the QMS documentation to the Superintendent.

7.6 Hold Points

The following stages of work shall be regarded as Hold Points (HP) and Witness Points (WP), as nominated. They shall form part of the Contractor’s QMS and be included in the Contractor’s program:

a) QMS Quality Plan approval – HP.

b) HSEMP approval – HP.

c) Relevant authority approvals/permits. – HP.

d) Inspection of existing conditions at the Site (with the Superintendent) – WP.

e) Handover / Possession of Site. – WP.

f) Commencement of the Works – HP.

g) Weld Pre-Qualification Testing for HDPE Pipeline Construction – HP.

h) Trenchless Construction Methodology – HP.

i) Work method statement for testing - HP

j) Hydrostatic pressure testing – WP.

k) Flushing of the pipe prior to commissioning – HP.

l) Compaction Testing – HP.

m) Inspection of connections to the existing water mains prior to backfilling – WP.

n) Relevant authority reinstatement inspections – HP and WP.

o) Submission of As Constructed Information to the satisfaction of the Superintendent – HP.

p) Practical Completion – HP.

Unless otherwise noted above or elsewhere in this specification, the Contractor shall give the Superintendent a minimum of 48 hours' notice of any of the above items reaching a Hold Point or Witness Point.

Hold Point – No further work shall be completed on the Hold Point item until the Superintendent, or a representative appointed by the Superintendent, has been given the opportunity to review or inspect the work. If the Superintendent does not respond to the Contractor's notice within five (5) working days, the Contractor may consider that the Superintendent is satisfied with the item. In any case the Contractor remains fully responsible for the entirety of the Works.

Witness Point – If the Superintendent does not attend the test or verification process and does not respond to the Contractor's notice, the Contractor may proceed with the work associated with the item if appropriate. The Contractor shall advise the Superintendent that the test or verification process has been satisfactorily passed and they intend to proceed with the work associated with the item. In any case the Contractor remains fully responsible for the entirety of the Works.

The Superintendent reserves the right to require additional Hold Points and Witness Points. No additional payments or variations shall be approved in relation to such additional points.

7.7 Traffic Management System

The Contractor shall prepare and implement a Traffic Management System (TMS) that minimises the impact of the Works and associated vehicle movements to vehicle and pedestrian traffic on adjacent main roads and thoroughfares.

This shall include communication with relevant local authorities and bodies who are responsible for roads, road safety and traffic.

The Contractor shall provide, maintain and operate approved warning signs, lights, barricades or devices in accordance with the requirements of all relevant authorities and to the minimum standards specified by AS 1742.3.

The Contractor shall be responsible for all costs associated with implementation of the TMS.

The Contractor shall submit a Traffic Management Plan (TMP) for the Contract to the satisfaction of the co-ordinating road authority and the Superintendent prior to the commencement of the Works. The TMP shall include:

a) Drawings showing the Site relative to the roads & thoroughfares to be managed.

b) Temporary access tracks to and from the site.

c) Truck routes for deliveries & removal of material.

d) Agreed storage and lay down areas.

e) Pedestrian and cyclist routes.

f) Copies of relevant road opening clearances/permits.

The Contractor shall be responsible for undertaking the works in accordance with the TMP including the supply, installation and maintenance of all signage and traffic controllers as required.

The Contractor shall also be responsible for removing all signage and traffic control devices when they are not required (e.g. when the relevant part of the Works is complete or when normal traffic access has been temporarily restored during a halt in the Works for public holidays, etc.).

Unless otherwise specified by the relevant authority, the Contractor shall allow ten (10) working days for review by the Superintendent and the relevant authority and at least one re-submission (plus 5 working day review) prior to final acceptance.

7.8 Pedestrian Management

The Contractor shall be responsible for the set up and maintenance of a safe environment surrounding the Site for the duration of the Works.

The Contractor shall also be responsible for providing safe pedestrian access around the area of the Works via detours or alternative access points to properties where required.

Appendix A Contract Drawings

Appendix B EGW Standard Detail Drawings for the Construction of Water Mains

Appendix C Guideline for Preparing HSE Management Plans

Appendix D EGW Standard Letter to Contractors (Quality Customer Service)

Appendix E Discovery of Aboriginal Cultural Heritage During Works

Appendix F EGW Standard Operating Procedure SOP 079 – Repair & Removal of Asbestos Cement Pipes

Appendix G EGW Standard Operating Procedure SOP 038 – Planned Shutdowns