CONTRACT NO. TEN/0504

Installation of Emperor Drive Sewer Pump Station

Technical Specification

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ABBREVIATIONS

- AHD – Australian Height Datum
- AS – Australian Standard
- BRC – Bundaberg Regional Council
- EMP-C – Environmental Management Plan – Construction
- GCoC – General Conditions of Contract
- GDA – Geocentric Datum of Australia
- GPS – Global Positioning System
- GB – General purpose Blended (cement)
- GP – General Purpose (cement)
- ITPs – Inspection Test Plans
- LUA – Land Use Agreement
- MH – Maintenance Hole
- NATA – National Association of Testing Authorities
- NCR – Non Conformance Report
- NZS – New Zealand Standard
- QMP – Quality Management Plan
- RPEQ – Register Professional Engineer of Queensland
- Std Dwg – Standard Drawing
- WGS – World Geodetic System
- WUC – Works Under Contract
- WSA – Water Services of Australia
1 GENERAL REQUIREMENTS

1.1 Relevant Standards and Specifications

All materials and workmanship incorporated into the Works shall comply with the requirements of the following standards and codes:

- WSA 02 – 2014 Version 3.1 – Gravity Sewerage Code of Australia
- WSA 03 – 2011 Version 3.1 – Water Supply Code of Australia
- WSA 04 – 2005 Version 2.1 – Sewage Pumping Station Code of Australia
- WSA 07 – 2007 Version 1.1 – Pressure Sewerage Code of Australia
- WSA 129 – 2011 – Industry Standard for Plastics Collection Tanks for Pressure and Vacuum Sewers
- AS 1111:2015 – ISO Metric hexagon bolts and screws
- AS 1112:2000 – ISO Metric hexagon nuts
- AS / NZS 1170.0:2002 – Structural design actions – General Principals
- AS 1237.1:2002 – Plain washers for metric bolts, screws and nuts for general purposes
- AS / NZS 1260:2009 – PVC-U pipes and fittings for drain, waste and vent applications
- AS 1289.3.8.1:2006 – Methods of testing soils for engineering purposes – Soil classification tests – Dispersion – Determination of emerson class number of a soil
- AS / NZS 1477:2006 – PVC pipes and fittings for pressure applications
- AS 1646:2007 – Elastomeric seals for waterworks purposes
- AS / NZS 2033:2008 – Installation of polyethylene pipe systems
- AS / NZS 2053.1:2001 – Conduits and fittings for electrical installations – General requirements
- AS 2129:2000 – Flanges for pipes, valves and fittings
- AS 2187.2:2006 – Explosives – Storage and use – Use of explosives
- AS / NZS 2280:2014 – Ductile iron pipes and fittings
- AS / NZS 2566.2:2011 – Buried flexible pipelines – Installation
- AS / NZS 2638.2:2011 – Gate valves for waterworks purposes – Resilient seated
- AS 3600:2009 – Concrete structures
- AS 3735:2001 – Concrete structures retaining liquids
- AS / NZS 4129:2008 – Fittings for polyethylene (PE) pipes for pressure applications
- AS / NZS 4130:2009 – Polyethylene (PE) pipes for pressure applications
- AS / NZS 4158:2003 (R2015) – Thermal-bonded polymeric coatings on valves and fittings for water industry purposes
- AS / NZS 4360:2004 – Risk management
- AS 4419:2003 – Soils for landscaping and garden use
- AS / NZS 4441:2008 – Oriented PVC (PVC-O) pipes for pressure applications
- AS / NZS 4680:2006 – Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
- AS 5200.053:2008 – Plumbing and drainage products – Stainless steel pipes and tubes for pressure applications
- AS 6401:2013 – Knife gate valves for waterworks purposes

All materials shall be approved by the Superintendent prior to the incorporation into the Works. Within seven (7) days of commencing the relevant activity, the Contractor shall submit the required documentation to the Superintendent for review, to demonstrate that the proposed materials meet the minimum requirements outlined in the contract.
2 TRAFFIC MANAGEMENT

2.1 Traffic Management Plan

The Traffic Management Plan (TMP) shall outline how the Works are to be integrated into the operation of the road network. The outcome of the TMP shall describe how all road users will be accommodated throughout the duration of the Works and the impacts on both road users and the construction process.

No traffic re-arrangements shall be carried out until the Superintendent has indicated that the Contractor’s TMP is considered suitable for use.

2.1.1 Scope

The TMP shall:

a) Describe the proposed traffic arrangements which provide the necessary sequencing of the WUC while minimising disruption and confusion to road users, local traffic, public transport, emergency services, pedestrians and cyclists.

b) Describe how the construction work area shall be physically isolated from road users and provide details of how access to adjacent private properties and businesses shall be maintained.

c) Provide details of arrangements to be made for detouring traffic, where applicable.

d) Provide details of road closures and / or restrictions required to undertake the WUC.

e) Identify arrangements for the management of oversize vehicle movements throughout the Site.

2.1.2 Implementation

The Contractor shall implement and monitor the effectiveness of the TMP in accordance with the Contract and the requirements outlined in the plan, and revise and update the plan where necessary.

2.2 Traffic Guidance Scheme

Each Traffic Guidance Scheme (TGS) shall show all the traffic control devices and their layouts on a plan, and shall be consistent with the Contractor’s approved TMP.

Where any change to existing traffic arrangements is proposed or where construction conflicts with normal traffic movements, the Contractor shall prepare a TGS which clearly details the revised traffic arrangements at all locations affected by the change or conflict. A separate TGS is required for each stage of the Works where changes are made to the traffic control devices.

2.3 Scope

All TGS’s shall be prepared by suitable qualified and experienced personnel and shall be in accordance with the Queensland Department of Transport and Main Roads Manual of Uniform Traffic Control Devices (MUTCD) Part 3 Works on Roads.

Approval of the TGS by the Superintendent is required prior to implementation and forms a construction Hold Point. All TGS shall be submitted to the Superintendent for review at least 14 days prior to the proposed implementation date.

The TGS shall show traffic control device layouts, but fully dimensioned and shall generally agree with the Contractor’s construction sequence and other requirements outlined in the Contract.

The TGS shall state the period for which the devices are to be in place (time and date) and the person who is responsible for installing, maintaining and removing them. Furthermore, the TGS shall identify the traffic control devices which are only to be in place during periods of actual work on the Site. Signs such as symbolic workers signs and speed limits, introduced due to reduced clearances to workers, should be covered or removed during periods when workers are no longer on Site (i.e. at night).

All speed limits applied as part of the TGS’s shall be strictly in accordance with the MUTCD Part 3, unless accompanied by a supporting risk assessment completed in accordance with AS / NZS 4360.
Where the TGS includes changes to regulatory signs or devices, the Contractor shall include roadwork signing records in accordance with Appendix B of the MUTCD Part 3 certified by the Nominated Traffic Officer with the TGS.

2.4 Implementation

On a daily basis, the Contractor shall ensure that all applicable traffic redirection and / or warning measures and safety requirements are implemented prior to proceeding with any relevant WUC.

The Contractor shall monitor the effectiveness of the TGS and revise it in response to incidents and / or unexpected traffic disruptions.

2.5 Provision for Traffic

2.5.1 General

Traffic shall be controlled at all times, during construction, in accordance with the provisions of the MUTCD Part 3.

2.5.2 Administration of Traffic Management

Where traffic control is required, the Contractor shall nominate the preferred Traffic Management Company to the Superintendent for review and approval at least 14 days prior to being required, and forms a construction Hold Point.

All traffic controllers shall hold an appointment as an accredited person under Section 21 of the Transport Operations (Road Use Management) Act 1995 to perform the functions of a traffic controller as prescribed by the Transport Operations (Road Use Management – Accreditation and Other Provisions) Regulation 2005.

2.5.3 Out-of-Hours Representatives

The Contractor shall nominate a minimum of two (2) representatives to address traffic management issues, one (1) of whom shall be available at all times outside of the Contractor's normal working hours. The Contractor shall notify the Superintendent of the name, address and telephone number of the nominated persons. Such persons, when requested by the Superintendent, shall co-ordinate and expedite immediate repairs to and maintenance of such part of the WUC as may be considered necessary by the Superintendent and shall carry out such work to the satisfaction of the Superintendent.

If a nominated person leaves the employ of the Contractor during the period of the Contract, the Contractor shall immediately nominate another person and provide the full details of that person.

2.5.4 Inspection and Records

The Contractor shall inspect all traffic control devices and traffic control arrangements in accordance with Appendices A and B of the MUTCD Part 3.

As an alternative to the record keeping arrangements outlined in the MUTCD Part 3, photographic and / or video evidence of the TGS is permitted. Photographic and / or video evidence shall include date and time stamps and GPS location and be of sufficient resolution to accurately identify and locate traffic control devices. GPS coordinates shall be in World Geodetic System 1984 (WGS84) format or Geocentric Datum of Australia 1994 (GDA94) format, with latitude and longitude in decimal degrees. Time and date stamping shall be in Australian Eastern Standard Time (Coordinated Universal Time + 10 hours).

Records shall be retained by the Contractor in accordance with the Limitations of Actions Act 1974, for actions associated with personal injury (plus as long as required for any claims to be resolved). Records shall be provided to the Superintendent at the end of each month or upon request.

The Contractor may be required to provide evidence in court in the event that a speeding infringement notice is challenged, or in the event of a traffic incident within the Site.

2.5.5 Traffic Crashes and Incidents

In the event of a traffic crash / incident within the Site, the Contractor shall record the date and take time and date stamped photographs of the signs / devices present in the vicinity of the crash. In the event of a traffic crash / incident that requires notification to Police and relevant Emergency Services, the Contractor shall make the appropriate notifications. All crashes / incidents shall be recorded in the incident log. A copy of the incident log shall be forwarded to the Superintendent within 24 hours of the incident, or upon request.

The Contractor shall assist with the mitigation of the impacts of incidents as much as is reasonably practicable.
2.5.6 Audits
The Superintendent may undertake performance / compliance audits of the Contractor's traffic control measures and provide feedback where necessary.

If the Superintendent is of the view that, despite a TGS being in conformance with the MUTCD Part 3 and this Specification and the implemented scheme being in conformance with the TGS, the scheme is unsafe in some way, the Contractor shall undertake the necessary modifications to the TGS to address the identified issues.

In the case of non-conformance, the Administrator will request the Contractor raise a Non-Conformance Report (NCR). All non-conformances associated with traffic management shall be remedied by the Contractor within two (2) hours of the receipt of notice requesting a NCR. Failure to remedy the non-conformance within the two (2) hour period shall entitle the Principal to carry out any remedial work deemed necessary pursuant to the Contract. All costs related to this work shall be charged to the Contractor.

2.5.7 Complaints
The Contractor shall keep a register of all complaints received and actions taken to address each complaint. The complaints register shall be forwarded to the Superintendent on a weekly basis. The Contractor shall similarly keep a register of requests for information from the public. This public information request register shall also be forwarded to the Superintendent on a weekly basis.

2.6 Restrictions to Traffic

2.6.1 Restriction on Work
Unless otherwise approved by the Superintendent, no work which impacts directly upon traffic shall be permitted on:

a) The Thursday before Easter;
b) ANZAC Day;
c) During the period from the day prior to Christmas Day until New Year’s Day, both inclusive; and / or
d) Any major commercial, sporting or cultural event, where the Superintendent considers that the scheduled works would cause an unacceptable level of disruption to the traffic operations associated with such events.

2.6.2 Traffic Lanes Restrictions
The traffic flow arrangement, number and width of traffic lanes, clearance to objects, the minimum posted speed and queuing timeframes shall be:

2.6.3 During Work Hours
Minimum Traffic Flow – single lane, one way traffic, under traffic control
Minimum Lane Width – 3m
Minimum Clearance to Objects – as per MUTCD Part 3
Minimum Posted Speed – 40km/hr or as per approved TGS
Maximum Queuing Time – 5mins

2.6.4 Out of Work Hours
Minimum Traffic Flow – two lanes, two way traffic, under traffic control devices
Minimum Lane Width – as per pre-existing lane widths
Minimum Clearance to Objects – as per MUTCD Part 3
Minimum Posted Speed – 60km/hr or as per approved TGS
Maximum Queuing Time – Nil

The Contractor shall not stop traffic simultaneously in both directions unless where prior approval has been granted by the Superintendent.

2.7 Access to Private Property
Existing accesses to private properties affected by the Work shall be maintained in useable condition during the construction, or alternative access arrangements acceptable to the property owners / tenants shall be made. The Contractor shall permit and provide for the free movement of traffic in and out of the properties at all times except as otherwise agreed to by the property owners / tenants.

The Contractor shall, at no expense to the Principal, make good any damage to accesses to private properties which results from the Contractor's operations during the construction of the WUC.
2.7.1 Pedestrian Movements

Where it is necessary to provide for pedestrian and / or cyclist access along or across portions of the WUC, the Contractor shall provide such temporary pathways as necessary in accordance with the requirements of the MUTCD Part 3.

The pathways shall be clearly delineated, signed and fenced to prevent unintended access to the remainder of the WUC. Signs shall be provided adjacent to the pathway to clearly indicate that access to the remainder of the WUC is prohibited.

Adequate illumination shall be provided during all periods of darkness.

Where a large volume of pedestrian traffic has to cross the worksite, consideration shall be given to directing pedestrians to suitably constructed and protected crossings.

Special provision for pedestrians may be required where the direction of traffic flow is opposite to that normally expected.

2.8 Implementation of Traffic Control Devices

Traffic control devices and their use shall conform to the requirements of the MUTCD Part 3.

All traffic control devices shall be securely fixed in the correct position and maintained in an effective and clean condition suitable for day and night operations whilst employed on the WUC. Devices which are damaged or worn, or which do not conform to the above requirements, shall not be used.

3  EARTHWORKS

3.1 Scope

The requirements associated with all earthworks to be undertake as part of the WUC have been outlined in Clause 3 and Clause 4 of this Technical Specification. The earthworks include, but are not limited to clearing and grubbing, stripping topsoil, general excavation, trench excavation, the placement of pipe embedment material, trench backfill, disposal of surplus material and testing requirements associated with the earthwork activities.

The Contractor shall limit its operations to legally accessible work areas defined in the Contract Drawings and / or as negotiated with adjacent land owners through separate Land Use Agreements (LUA).

3.2 Vibration

The Contractor shall ensure that the WUC do not generate vibrations to the extent that it causes property damage, environmental nuisance or harm.

3.3 Stripping and Stockpiling of Topsoil for Re-use

Where stockpiling of topsoil is required, it shall be carried out in a manner which ensures that the properties of the topsoil are not permitted to degrade such that it becomes unsuitable as planting media. To assist preservation of planting media, the Contractor shall include the following provisions in the management of topsoil stockpiles:

a) Limiting the height of stockpiles to 3m
b) Limiting the width of the base of stockpiles to 10m
c) Adopting batter slopes, protective covers and drainage which reduce potential for erosion and/or segregation
d) Limiting the period of stockpiling to a minimum practical time, and
e) Carrying out herbicide spraying or other treatment of the stockpile at intervals required to prevent weed growth and ensure the stockpile faces are weed-free prior to use.

Material shall not be removed from within drip lines of existing plants to be retained. The root systems of existing plants are to be retained and shall be preserved wherever practical.

All stripped areas outside of the immediate areas to be trenched shall be left in a neat, free-draining condition with side slopes not steeper than 1:4 unless otherwise specified, and shall be treated so as to conform with the environmental requirements of the Contract.

3.4 Surplus Material

Surplus material and material considered to be not suitable for use as planting media in accordance with the above shall be assessed for use elsewhere within the works. All surplus material shall be disposed of in accordance with all relevant Statutory Requirements.
Should the Contractor have surplus material less than 75mm in stone size at the completion of the Works, there is a potential for the Contractor to dispose of the surplus material (<75mm) at BRC’s waste facilities without incurring the relevant disposal fee. The Contractor shall liaise with the Superintendent prior to the completion of works to confirm whether the opportunity is still available. The Contractor shall be required to transport the surplus material (<75mm) from the on-site stockpile location to the waste facility, before unloading the material in a manner and location stipulated by the facility personnel.

4 TRENCH EXCAVATION, EMBEDMENT, TRENCH BACKFILL AND DISPOSAL OF SPOIL

4.1 General

Trench excavations, excavations for structures and excavations for house connections shall be carried out to the dimensions shown on the drawings or, where not so shown, to the minimum dimensions necessary to accurately and safely construct the WUC.

The Contractor shall take all necessary precautions to protect an excavation and all personnel and equipment in or about an excavation, including provision of all necessary temporary works and equipment. Upon completion of construction within an excavation, all temporary works shall be removed in such a way as not to damage any finished structure.

The use of excavated material as trench backfill shall be subject to the Contractor demonstrating conformance with the trench fill requirements outlined below Hold Point.

Excavated material which is surplus to the project requirements shall be disposed of in accordance with all relevant Statutory Requirements.

4.2 Allowable Horizontal Bearing Pressure

The bearing capacity of the in-situ material shall be inspected in accordance the WBB-SEW-1200-1 to confirm the nominated trench support type Hold Point.

Where the bearing capacity of the in-situ material does not meet the minimum requirements of the nominated trench support type, the Superintendent will advise the Contractor of the revised trench type, in manner that expedites the Works, and does not exceed three (3) hours.

Material deemed as being inadequate for the nominated trench support type shall be excavated to the depth nominated by the Superintendent. Inadequate material may be disposed of on-site, subject to the material meeting the requirements of the nominated use, or disposed of off-site in accordance with all relevant Statutory Requirements.

4.3 Embedment Material

Embedment material shall comply with the requirements of WSA 02 Part 2: Construction Hold Point

Conformance Test Requirements - 2 x Grading
Test Frequency - 2 per Material Type
Maximum Supply Lot Size - 500m³

Embedment material shall be placed in accordance with WSA 02 Part 2: Construction.

Compaction Requirements – Embedment Zone

Compaction of the embedment material shall generally be in accordance with WSA 02 Part 2: Construction, with the exception of the following embedment testing requirements:

Conformance Testing Requirements - 2 x Density (Relative / Density Index)
Maximum Lot Size - 1 Days Production
Normal Testing Frequency - 2 tests per Lot
Reduced Level of Testing - 1 test per every 3rd Lot
Minimum Compaction Value - In accordance with WSA 02 Part 2: Construction Table 21.1

Note: If embedment material is single size aggregate in accordance with WSA 02 Part 2: Construction, no embedment compaction testing is required.
4.4 Trench Fill Material
Trench fill material shall comply with the requirements of WSA 02 Part 2: Construction Hold Point
Conformance Testing Requirements – min. 2 x Grading / lot or method otherwise approved by the Superintendent
Maximum Lot Size – 500m³

4.4.1 Compaction Requirements – Trench Fill Material
Trench fill shall be placed in accordance with WSA 02 Part 2: Construction and compacted in layers, with layer thickness dependent upon available compaction equipment.
Trench fill shall generally be compacted in accordance with WSA 02 Part 2: Construction, with the exception of the following embedment testing requirements:
Conformance Testing Requirements - 2 x Density (Relative / Density Index)
Minimum Compaction Value (areas other than under roads) - 70% Non-Cohesive Materials, 95% Cohesive Materials
Minimum Compaction Value (under roads) - 90% Non-Cohesive Materials, 97% Cohesive Materials
Maximum Lot Size - 1 Days Production
Normal Testing Frequency - 2 test per lot
Reduced Level of Testing - 1 test per lot

4.5 Reduced Level of Testing
The Contractor may request a Reduced Level of Testing as stated in this Technical Specification after no non-conformances have occurred in three (3) consecutive lots and it has been demonstrated to the Superintendent that the Contractor’s processes are under control and are consistent.
Where the Contractor is operating at the Reduced Level of Testing and a non-conformance occurs for any requirement for a lot, the Contractor shall immediately revert to the Normal Testing Level for all standards and requirements.

5 SEWER GRAVITY MAINS

5.1 Materials and storage
PVC-U (SN8) and associated fittings shall be supplied and stored on-site in accordance with the Contract Drawings and WSA 02 Part 2 Construction.
PVC-U pipes intended for gravity sewerage use shall be cream in colour as per AS / NZS 1477.
Marker tape shall be detectable in nature in accordance with WSA 02 Part 2 Construction.
Pre-cast concrete manholes shall be supplied and stored on-site in accordance with the Contract Drawings and WSA 02 Part 2 Construction.

5.2 Installation
PVC-U pipes and associated fittings shall be installed as per the Contract Drawings and WSA 02 Part 2 Construction.
Concrete manholes shall be installed as per the Contract Drawings and WSA 02 Part 2 Construction.

6 SEWER PRESSURE MAINS

6.1 Materials and Storage

6.1.1 Pipes, fittings and bends
All pipework PVC-O (PN16), Ductile Iron (DI) pipes (PN35), associated fittings and bends shall be supplied and stored on-site in accordance with the Contract Drawings and WSA 03 Part 2 Clause 12.
PVC-O pipes intended for pressure sewerage uses shall be cream in colour as per AS/NZS 1477.
Marker tape shall be detectable in nature in accordance with WSA 07 Part 3 Clause 18.10.
Sealing rings are to be manufactured in accordance with AS 1646.
DI fittings shall be PN16 and internally and externally coated with a thermal bonded polymeric coating such as Polyamide (thermoplastic coating) or Fusion Bonded Epoxy (FBE – thermosetting coating) in accordance with AS / NZS 2280.

6.1.2 Flanges

All flanges shall be as per Table D of AS 2129, unless otherwise nominated by the Contractor after a review of the pressure ratings. All flanged fittings shall be provided with the appropriate flange gaskets, stainless steel bolts, nuts and washers.

6.1.3 Valves

Valves, valve chambers, scours and surface fittings shall be supplied and stored on-site in accordance with the Contract Drawings and the manufacturer’s specifications.

Isolation valves to be resilient seated, anti-clockwise closing sluice valves, conforming to AS / NZS 2638.2, with a pressure rating of 1,600kPa. Valves to be flanged to BS10 Table D and coated both internally and externally with an approved bonded epoxy. Valves shall be able operate from fully closed to fully open with no leakage occurring during the disc and body pressure test.

6.2 Installation

PVC-O and DI pipes, associated fittings and bends shall be installed as per the Contract Drawings and WSA 03 Part 2 Clause 15.

Valves, valve chambers, scours and surface fittings shall be installed as per the Contract Drawings and WSA 07 Part 3 Clause 18.13.

6.3 Testing

Pressure testing of the works shall be in accordance with WSA 07 Part 3 Clause 21.4.1 and 21.6.

6.4 Construction Tolerances

Construction tolerances associated with the sewerage pressure mains shall generally be as per WSA 07 Part 3 Clause 22, with the exception of the following section which shall supersede Clause 22.3:

*Vertical tolerances do not deviate the inverts of the sewerage pressure main, fittings and associated structures form the specified design level (or interpolated design level) by more than 50mm higher or lower, providing the depth from final ground surface level to the top of pipe exceeds the minimum cover stated in the Standard Drawings.*

7 WATER SUPPLY

7.1 Materials and Storage

7.1.1 Pipes, fittings and bends

All pipework shall be either PVC-O Series 2 PN16 to AS1477 (blue) or HDPE PE100 SDR11 (blue) to AS4130 as per the contract drawings.

DI fittings (including pipe shorts) shall be PN16 and internally and externally coated with a thermal bonded polymeric coating such as Polyamide (thermoplastic coating) or Fusion Bonded Epoxy (FBE – thermosetting coating) in accordance with AS / NZS 2280.

All pipework, fittings and bends shall be supplied and stored on-site in accordance with the Contract Drawings and WSA03-2011 Part 2: Construction Clause 12.

Marker tape and/or tracer wire shall be detectable in nature in accordance with WSA 03 Part 2: Construction Clause 15.12.2 and 15.12.3.

HDPE pipes and fittings to be connected in accordance with WSA 03 Part 2: Construction Clause 15.21.

Sealing rings are to be manufactured in accordance with AS 1646.

7.1.2 Flanges

All flanges shall be as per Table D of AS 2129, unless otherwise nominated by the Contractor after a review of the pressure ratings. All flanged fittings shall be provided with the appropriate flange gaskets, stainless steel bolts, nuts and washers.
7.1.3 Valves

Valves, valve chambers, scours and surface fittings shall be supplied and stored on-site in accordance with the Contract Drawings and the manufacturer’s specifications.

Isolation valves to be resilient seated, **anti-clockwise closing** sluice valves, conforming to AS / NZS 2638.2, with a pressure rating of 1,600kPa. Valves to be flanged to BS10 Table D and coated both internally and externally with an approved bonded epoxy. Valves shall be able operate from fully closed to fully open with no leakage occurring during the disc and body pressure test.

7.2 Installation

All works shall be undertaken in accordance with the Contract Drawings and WSA 03 Part 2: Construction.

7.3 Testing

Testing of the works shall be in accordance with WSA 03 Part 2 Clause 19.4.

All compliance testing shall be based on work lots and undertaken by a NATA registered laboratory, certified for the tests specified in the Contract.

7.4 Construction Tolerances

Construction tolerances associated with the water supply main shall be in accordance with WSA 03 Part 2 Clause 21.

8 SEWER PUMP STATION

8.1 General

With reference to the Sewer Pump Station, the Contractor shall be responsible for:

a) The unloading and installation of the FRP SPS in accordance with the contract drawings and approved installation specification.

b) All earthwork activities to excavate and backfill the SPS (including concrete ballast).

Specific design and certification requirements have been outlined in the following sub-sections.

8.2 Concrete

Earthworks and excavations shall be carried out in accordance with Clause 3 and 4 of this Technical Specification.

A polythene sheet separator of thickness not less than 100µm shall be placed between the ground / bedding and the concrete. The separator shall extend not less than 300mm beyond the concrete work. Care shall be taken to avoid puncturing or tearing the separator. Should puncturing or tearing occur, the damage shall be repaired prior to concreting. Joints in the separator shall be made by overlapping the sheets a minimum of 300mm or by overlapping and taping.

Concrete Strength shall be as nominated on the drawings.

The Contractor shall maintain a minimum of two (2) vibrators on-site at all time, capable of transmitting vibrations at a frequency not less than 150 Hz with an intensity which shall visibly affect the concrete at a radius of 300mm.

The curing of unformed surfaces of concrete shall commence as soon as finishing operations are complete. Surface finish shall be a broomed finish.

Concrete shall be cured for a period not less than seven (7) days before any other operations are carried out adjacent to the work.

Elsewhere the heights of the finished surface of concrete paving shall not vary from those specified in the Contract Drawings by more than ±10 mm and the gap under a 3.0 m long straight-edge placed anywhere on the finished surface of the concrete hardstand area shall not exceed 5 mm, with due allowance being made for the design shape.

8.3 Steel reinforcement

Steel reinforcing materials shall be supplied and placed in accordance with the Contract Drawings, approved Contractor supplied Drawings and AS / NZS 4671.

Steel Reinforcing in the ground concrete slab shall be 2 layers of SL82 mesh with minimum 50mm cover.

Any galvanising of steel reinforcements shall be carried out in accordance with AS / NZS 4680.
8.4 Pipework

Stainless steel pipes, bends, tapers, flanges, brackets and associated butt-welded fittings shall be fabricated from 316 graded, schedule (SCH) 10S stainless steel and installed in accordance with the Contract Drawings, approved Contractor supplied drawings, WSA 04 Part 3 Clause 25.3 and AS 5200.053.

Flanges shall be a minimum thickness of 13mm or 16mm, as nominated in the Contract Drawings and shall be drilled in accordance with Table D of AS 2129. All flanged fittings shall be provided with the appropriate flange gaskets, stainless steel bolts, nuts and washers. All bolts, nuts and washers shall have metric threads as per AS 1111, AS 1112 and AS 1237, respectively.

8.5 Access Lids

Access lids to the FRP SPS shall be aluminium McBern sealed safety lid (load rating B), double hinged, flush mounted (LFM), single section, including a single hinged safety grate as outlined in the Contract Drawings, and shall include:

   a) Non-slip flush mounted covers
   b) A lock box
   c) Split hinged offset safety grate
   d) Single opening arrangement for the SPS and MH

8.6 Valves

Valves, valve chambers (where required), spindle and surface box shall be supplied, stored and installed in accordance with the Contract Drawings and the manufacturer’s specifications.

The knifegate valve (body and knife), extended spindle and associated supports shall be stainless steel (316 grade) and shall be supplied, stored and installed as per the Contract Drawings, approved Contractor supplied drawings, the manufacturer’s specifications and AS 6401. A cast iron surface box shall be included in the roof slab as per the Contract Drawings to enable operation of the valve from above.

8.7 Backfill

All backfill to the SPS, MHs or associated works shall be carried out in accordance with Contract Drawings and Clause 33 of WSA 04 Part 3. The backfill zone immediately against each structure (min 300mm) shall be fill with clean sand, with the remaining backfill to meet the requirements of trench backfill as per WBB-SEW-1200-2 Rev A.

9 ELECTRICAL SUPPLY WORKS

9.1 General

The Contractor shall be responsible for the supply and installation of electrical infrastructure as to provide electricity to the Emperor Drive SPS.

9.2 Materials and Installation

Electrical conduits shall be spigotted orange heavy duty PVC-U as per AS / NZS 2053.1.

The scope of works (supply, delivery, on-site storage, installation, testing and commissioning) as outlined within the Contract Drawings, shall be carried out in accordance with the latest versions of the following documents, where applicable:

   b) Ergon Energy – Public Lighting Manual
   d) QLD Electricity Act, 1994
   e) QLD Electricity Regulation Act, 2006
   f) QLD Electrical Safety Act, 2002
   g) QLD Electrical Safety Regulation Act, 2013
   h) WSA 04 – 2005 Version 2.1 – Part 3: Construction
   i) Any other relevant industry / Australian standards applicable to the works

All works shall be completed by authorised persons with relevant qualifications associated with the works.
10 ACCEPTANCE TESTING AND TOLERANCES

Acceptance testing shall be in accordance with Clause 6.5 of the Supplementary Conditions of Contract.

All compliance testing shall be based on work lots and undertaken by a NATA registered laboratory, certified for the tests specified in the Contract.

Test locations are to be approved by the Superintendent to ensure that it representative of the lot.

All costs associated with ensuring that any subcontracted works / procured supplies are subject to the Contractor’s QMP, such that when incorporated into the Works, the subcontracted works / procured supplies comply with the requirements of the Contract.

All costs associated with the provision of test results / conformance documentation for all Works (including subcontracted works / procured supplies) to the Superintendent for review in accordance with the timeframes specified in the Contract.

Construction tolerances associated with the sewerage gravity mains (including concrete manholes) shall be carried out in accordance with the relevant WSA, TMR, Ergon, Project Drawings and Technical Specification and/or Australian Standards.