PART 2

SPECIFICATION

<table>
<thead>
<tr>
<th>Request for Tender (RFT):</th>
<th>Design &amp; Construction of Recycled Water Pipeline Extension to Warwick Industrial Estate</th>
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<tbody>
<tr>
<td>Time for Lodgement:</td>
<td>Friday, 12 July 2019</td>
</tr>
<tr>
<td>RFT Number:</td>
<td>19_142</td>
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1. BACKGROUND

Southern Downs Regional Council (The Principal) has resolved to extend the existing recycled water network within the town of Warwick. The pipeline will extend from the intersection of Wood & Canning Streets to the Warwick Industrial Estate. The pipeline is proposed to be approximately 5.3 kilometres long and be constructed both in private property and road reserve. The pipeline is to connect to multiple properties within the industrial estate.

The pipeline will provide an alternative to treated drinking water for business use within the industrial estate, and increase storage capacity for recycled water produced by the Warwick wastewater treatment plant, through the construction of a new 2ML reservoir.

The works are to be delivered as a design and construct project.

All terms defined in this Part 2 – Specification / Principal Brief will adopt the same meaning and definitions as the Contract unless expressly stated otherwise.

2. SCOPE

The scope of this project comprises investigation and survey, detailed design, installation and commissioning of new recycled water infrastructure, including new pipework, reservoir and pumping station. The work includes ordering, supply and coordination of delivery of all materials, provision of labour, equipment and plant to implement the works, and the cost of all applications, testing, commissioning, supervisions, certification, profit and overheads as required to complete the works. Certification of the works shall include 3rd party certification of each component by a Registered Professional Engineer - Queensland (RPEQ), that the works have been constructed in accordance with The Principal's Project Requirements, Design Documents and Contract Documents.

In summary, the work includes:

- Preparation of a design and construction schedule in the form of a Gantt Chart, outlining timeframes, hold points and milestones;
- Detail and cadastral survey, location of existing services and geotechnical investigations;
- Consultation with The Principal and affected residents;
- Design and documentation of water pipelines, reservoir, pump system, pump shed, site works and associated infrastructure;
- Design certification;
- Applications and obtain approvals from applicable authorities;
- Construction of water pipelines, reservoir, pump system, pump shed, site works and associated infrastructure;
- Supply and installation of electrical control and monitoring systems for remote operation of the reservoir and pump station;
- Installation of power supply to reservoir and pump station, including application to Ergon Energy for supply and metering;
- Site restoration and reinstatement;
- Construction certification;
- Testing and commissioning;
- Operation and maintenance manual for the pump station and SCADA/telemetry (including, but not limited to, drawings, specifications, manuals and flow rates); and
- As constructed drawings and data.

3. DOCUMENTATION PRECEDENCE

Design and construction of the water infrastructure shall be in accordance with the following documentation, in order of precedence:

1. Principal’s Project Requirements;
2. Technical Specifications;
3. Queensland Development Code QDC MP1.4;
5. Relevant Australian Standards.

4. APPROVALS

The Contractor shall satisfy all Legislative Requirements (including any Approvals) related to all WUC and Work carried out under this Contract. The Contractor shall pay all fees and incur all costs reasonably expected associated with complying with any related requirements.

The Contractor shall make all necessary applications and obtain approvals as required by the work, including but not limited to the following:

- Development Approval from Southern Downs Regional Council (if required);
- Operational Works Approval from Southern Downs Regional Council (if required);
- Building approval for works within the reservoir compound;
- Plumbing approval for works within the reservoir compound;
- Traffic Permits for working within the road reserve;
- Design approval from DTMR and Queensland Rail;
- Approvals for construction within State Controlled Roads;
- Wayleave approvals for construction across Rail Corridors;
- Riverine protection and crossing permit from DNRM.

The Contractor shall comply with Aboriginal Cultural Heritage Act 2003 duty of care. The Contractor shall undertake a Cultural Heritage desktop survey prior to commencing work on site. Work shall be conducted in accordance with the gazetted cultural heritage duty of care guidelines, which is available through the Department of Aboriginal and Torres Strait Islander Partnerships website.

All persons entering private property for the purpose of construction and construction related activities shall be “Authorised Persons” in accordance with the Water Supply (Safety and Reliability) Act 2008, Environmental Protection Act 1994 and the Local Government Act 2009. Training of persons will be required through Southern Downs Regional Council (approximately 1 hour in duration), with final authorisation to be obtained by Council’s CEO.

5. CONSTRUCTION TRAINING POLICY

The Contractor is required to comply with the requirements of the funding agreement included with the documents, in relation to the Building and Construction Training Policy.

6. CONSULTATION

The Contractor shall assist The Principal or Superintendent to undertake liaison with affected property owners and community groups as necessary or directed. This will also extend to consultation and notification with owners in relation to construction in roadways and across driveways etc.

Negotiation with owners for establishment of easements within private property will be undertaken by the Principal during the consultation phase, once a draft design of the alignment has been approved. Landowners will be issued with Letters of Intent and the Principal will obtain consent for survey, investigation and construction within private property. Final establishment of easements within private property will be undertaken by the Principal following the completion of construction.

The Contractor shall keep the Superintendent informed of any concerns raised by residents or community groups of which they become aware. Should any complaint be received, the Contractor shall:

1. Notify the Superintendent;
2. Contact the complainant in conjunction with the Superintendent within 24 hours of receipt of the complaint;
3. Document the discussions and resulting actions;
4. Advise the Superintendent if the complaint cannot be resolved within seven days from the time of receiving the complaint, providing reasons and expected date of resolution.

The Contractor shall provide to the Superintendent, a 24 hour contact for the duration of construction work.

7. DESIGN LIFE

The asset design life for water distribution works shall be in general accordance with WSA 03-2011, Section 3.1, Table 1.2 as follows:

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Design Life</th>
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<tbody>
<tr>
<td>Pipeline</td>
<td>50 years</td>
</tr>
<tr>
<td>Reservoir</td>
<td>100 years</td>
</tr>
<tr>
<td>Pump Station Building</td>
<td>50 years</td>
</tr>
<tr>
<td>Pumps and associated equipment</td>
<td>30 years</td>
</tr>
<tr>
<td>Valves</td>
<td>30 years</td>
</tr>
<tr>
<td>Electrical installations</td>
<td>25 years</td>
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8. RECYCLED WATER MAINS

8.1 WATER MAINS

The routes of the proposed pipelines are shown in the Warwick Effluent Pipeline Options Analysis drawings shown in Preliminary Design. This general route has been identified by the Principal as meeting current and future requirements. The Contractor is not required to investigate other proposed pipeline routes, unless specifically required by geotechnical issues, access restriction or denial, or other constraints. In such a case, the Contractor shall liaise and negotiate with the Principal, for alternative routes.

The concept layout drawings include provision for a “potential future extension”, to extend from the corner of East and Enterprise Streets, heading south along East Street. This section of pipeline is then proposed to be located within an existing road reserve (unformed), in an east direction. This section of pipe does not form part of the work. (This section of work included, extends from the pump station and the intersection of East and Enterprise Streets as shown on the layout drawing prepared by Morris Water). The Principal may seek to have this extension to the network constructed at some time in the future.

Design shall be in accordance with Water Services Association of Australia (WSAA) Water Supply Code of Australia WSA 03-2011. The pipeline must, at minimum, meet the design parameters noted below:

- Pipelines shall be designed and constructed generally using DN-150 PVC-M, coloured purple for recycled water, except where required by DTMR or Q-Rail.
- All pipework and fittings shall be minimum PN16;
- Any buried Ductile Iron Cement Lined (DICL) pipes shall be installed with polyethylene outer sleeving;
- Thrust and anchor blocks shall be provided in accordance with Water Supply Code of Australia WSA-03-2011 and WSAA requirements;
- Construction under State Controlled Roads, Railway corridors and creek crossings by trenchless techniques, unless otherwise approved;
A sampling point shall be provided on the pipework adjacent to the connection point near Slade Park, with approved tapping band, stainless steel DN50 ball valve, and 20mm hosecock in a lockable in-ground pit.

8.2 ALIGNMENT

The pipeline is proposed to be generally located within road reserve and private property. The Contractor shall take note of the particular recommendations provided for alignment and construction methods shown on the Warwick Effluent Pipeline Options Analysis drawings shown in Preliminary Design. However, this will be subject to draft design phase and detailed design by the Contractor.

Separation distances between the new pipeline and existing services shall be as follows:
- Horizontal separation: Minimum 1,000mm separation. Not to be located within the same trench.
- Vertical separation to other services – minimum 300mm separation. The pipeline must be located above sewer mains unless otherwise approved by the Superintendent.

The point of connection is the end of the existing main located on the eastern side of Canning Street, south of the intersection with Wood Street. Council’s records suggest that this existing main is DN180 PE100 pipe.

The Contractor shall supply and install 3m wide lockable gates in existing fences, where the new pipeline enters and exits private property. Locks will be fitted by the Principal at Principal’s expense.

The Contractor shall supply and install marker plates or galvanised steel driven marker posts at locations where the new pipeline crosses property boundaries. Where the pipeline crosses such property boundaries at the location of a gate, the marker post shall be offset from the gate, and provided with delineation to indicate the distance offset. Delineation shall be white lettering “RECYCLED WATER” on purple plate or post. Brass plug markers shall also be installed in any kerb at road crossings.

8.3 INSTALLATION

Typical trench details to be in accordance with the Water Supply Code of Australia WSA-03-2011 and WSAA requirements, similar to Baker Rossow standard drawing attached in Preliminary Design. Open trenching shall be permitted generally in road reserve and private property, except as nominated below, or determined by detailed design. Trenchless techniques shall be used at the following locations (but not limited to):
- Rail crossing in Canning Street;
- North east corner of the Warwick showgrounds;
- Rail crossing adjacent to reservoir and pump station site;
- South western corner of the saleyards;
- Bracker Road;
- McEvoy Street;
- Kenilworth Street;
- Old Stanthorpe Road;
- Elsewhere as determined by detailed design.

Trenchless techniques may include micro-tunnelling, pipe jacking, horizontal directional drilling as required to suit DTMR, QRail and SEQ Water Supply and Sewerage Design and Construction Code requirements, for cover as determined by detailed design. The use of HDPE and enveloper pipes is permitted for trenchless installation where required and permitted by the applicable authority.

The pipeline will be required to traverse very steep ground at the southern end of Canning Street, approaching the crossing of Bracker Creek. The pipeline in this vicinity shall be DICL, and provided with concrete bulkheads and adequate thrust blocks at top and bottom.

Minimum cover:
• 900mm within road reserves and under pavements, or as otherwise approved by the road or rail authority;
• 600mm within private property and park land;

Maximum cover:
• 1200mm, or as otherwise required and approved at road and rail crossings by the relevant authority.

8.4 FITTINGS

All pipe fitting shall be DICL PN16, FBE coated.

Air valves to be installed at all significant high points in the main, as determined by the detailed design. Similar to Baker Rossow Consulting Engineers standard drawing attached in Preliminary Design (modified to suit the diameter of DICL/PVC pipework).

Scour valves to be installed at all significant sag points in the main, as determined by the detailed design. Similar to Baker Rossow Consulting Engineers standard drawing attached in Preliminary Design (modified to suit the diameter of DICL/PVC pipework).

Stop Valves shall be suitably located along the length of the alignment in accordance with the requirements of Water Supply Code of Australia WSA-03-2011 and WSAA requirements. Maximum spacings of stop valves shall be 500m.

Principal supplied flow meters shall be installed at the following locations:
• Near the point of connection adjacent to Slade Park;
• Inlet pipework to the reservoir;
• Outlet pipework from the reservoir (two locations).

Flowmeters shall be installed with a dismantling joint, within a circular precast concrete chamber, with thrust restraints cast into the chamber wall.

9. PUMPING STATION AND RESERVOIR

A 2ML reservoir is to be designed and constructed for the purpose of storing recycled water, together with a pumping station to transfer recycled water to users within the Warwick Industrial estate.

The location for reservoir and pumping station shall be near the western boundary of the saleyards, in the approximate area nominated on the Warwick Effluent Pipeline Options Analysis drawings shown in Preliminary Design. The suggested layout is provided on the drawings prepared by Baker Rossow Consulting Engineers contained in Preliminary Design, subject to draft and detailed design.

The design of the reservoir and pumping station must be undertaken by a Registered Professional Engineer of Queensland. The design must be undertaken in accordance with all Legislative Requirements including the relevant Australian Standards, Building Code of Australia, Codes of Practice and other industry recognised Manuals. RPEQ certification must accompany the design documentation submitted to the Superintendent for review, and are to be approved prior to commencing any component of the works, including development permits were required.

The reservoir, pumping station and associated site works shall be designed, supplied, constructed and commissioned by the Contractor, with minimum requirements as set out below.

9.1 SITE WORKS

The site for the reservoir and pumping station has been identified by the Principal as being prone to overland stormwater flow. As such, the site shall be constructed on an elevated filled platform in order
to achieve free draining conditions, and divert any overland stormwater around and away from the compound.

The Contractor shall submit and be approved by the Principal as part of the design, a stormwater management plan and site stormwater scheme. The Contractor takes full responsibility of ensuring that the designed and installed site stormwater scheme / system is capable of meeting the minimum stormwater drainage requirements.

The compound shall be provided with all-weather granular pavement surfacing as a minimum. The layout shall accommodate manoeuvring for Medium Rigid Vehicles to enter and exit the reservoir and pump station compound in a forward gear.

An all-weather access shall be constructed to the reservoir and pumping station compound adjacent to the existing east-west fenceline, connecting to McEvoy Street. The access road shall be a minimum pavement width of 3m, and include pavements and all necessary drainage so as to accommodate all weather access for Medium Rigid Vehicles. The Contractor shall supply and install a new lockable, stock-proof entry gate at the McEvoy Street property boundary, consistent with existing gates elsewhere in the Saleyards site. Locks will be fitted by the Principal at the Principal’s expense.

Gated perimeter security fencing shall be provided to the compound. Fencing shall be 1.8m high mesh fencing heavy duty security fence and gate. Fencing shall comprise round hollow section complying with AS1163 and galvanised in accordance with AS1650, and powder coating black (or approved dark colour). Welding shall be as per AS1554.1. Mesh shall be heavy duty 3.25mm thick and comply with the requirements of AS1725. Other fittings shall be manufactured from steel complying with AS 3678, AS3679.1 and AS3679.2 and hot-dipped galvanised in accordance with AS1650, and powder coated black (or approved dark colour). Dual stock-proof 3m wide gates (total 6m width) shall be provided at the entry to the compound. Locks will be fitted by the Principal at the Principal’s expense.

9.2 RESERVOIR TANK

The reservoir tank shall achieve a minimum operating volume of 2ML in total. Operating volume is defined as the capacity between Top Water Level (TWL) and Bottom Water Level (BWL). The configuration of the tank to achieve the minimum storage requirement will be subject to draft design, review by the Superintendent and detailed design.

The reservoir tank shall be concrete or modular steel provided with suitable liner, as required to achieve the asset design life as provided in Section 6 of this document. Polyethylene and other thermoplastic resin tanks shall not be used.

The floor shall be generally flat, (i.e. not incorporating a scour channel or sloping floor to a collection point).

The freeboard between TWL and the lowest point of the roof structure (including roof beams, wall support brackets, and bolted connections) shall be not less than 300 mm. The roof shall be designed to fall to the wall with the sheeting projecting over the wall. Roof sheeting designs are to incorporate sliding joints or similar to allow for thermal effects.

The roof space shall be ventilated using approved wind-driven, vertical vane, corrosion resistant roof ventilators. Air entry and the number of roof ventilators for roof area shall be determined by the Contractor as part of the detailed design. The whole roof installation shall be suitably bird and vermin proofed.

A secure reservoir roof access ladder and cage is to be designed and installed by the Contractor in accordance with AS1657. Access to roof ladder is to have adequate security and be lockable to prevent access by the public. Reservoir roof access, platform and hatch design by Contractor is to have adequate fall arrest system and grating to enable four people working on the roof. The access hatch shall be lockable and comprise minimum 6mm thick aluminium chequer floor plate, and installed complete with handgrips and two (minimum) heavy duty aluminium hinges per cover.
Internal access by internal fixed ladder is not preferred as maintenance is to involve access by davit with safety harness.

A davit arm support structure shall be designed to meet the requirements of AS/NZS 1891.3. A structural design certificate for the davit arm support structure shall be provided by the designer. The reservoir wall where the davit arm base is to be mounted shall be designed to withstand all loads applied by the davit arm. The davit arm must be capable of rotating 360 degrees about its base. Ultimate tensile design load from anchorage line for the davit arm is to be confirmed during detailed design. The Contractor will be required to provide all facilities and equipment necessary for in-situ load testing of the davit arm installation in accordance with AS 1891.3. The davit arm and associated support and mount shall be manufactured from mild steel, and shall be hot dip galvanised in accordance with AS/NZS 4680 and AS/NZS 4792. Bolts joining galvanised members shall be galvanised in accordance with AS1214.

The reservoir shall be provided with a system of underfloor drainage to prevent the establishment of any hydraulic pressure under the reservoir floor, either from reservoir leakage, groundwater or pipework leakage near the reservoir.

The underfloor drainage shall be designed to collect all leakage, groundwater etc. to a blind collection pit, and discharge such drainage through a pipe into the collection pit so that flow measurements can be taken.

9.3 RESERVOIR PIPEWORK

Water pipework within the reservoir and pumping station shall be DICL (FBE coated) and have a minimum pressure rating of PN16.

Buried Ductile Iron Cement Lined (DICL) pipes shall be installed with polyethylene outer sleeving. All pipe fittings shall be DICL FBE coated. Thrust and anchor blocks shall be designed in accordance with the requirements of WSA 03.

The reservoir shall be provided with isolating valves on the inlet and outlet pipes. The valve array shall be installed above ground with pipe supports located to enable the removal of fittings. Above ground pipework shall be DICL flange jointed as per AS4087 – Table E PN16

The inlet pipework shall be fitted with an eccentric plug type control valve that is electronically actuated using a DC actuator to be operated in times of high and low demands respectively on the reservoir tanks. The control valve shall be designed to open and close in response to water levels in the reservoirs. The set points for opening shall be operator adjustable and confirmed during detailed design. The control valve shall be mounted above ground as part of a valve array.

The inlet array is to also include a gate valve and wye-type pipeline strainer upstream of the control valve.

Sampling points shall be provided on the inlet and outlet pipework, with approved tapping band, stainless steel DN50 ball valve, and 20mm hosecock mounted on a steel post.

A Flowmeter shall be installed on the inlet pipe, upstream of the control valve. A second flowmeter shall be installed on the pipework exiting the reservoir site. Flowmeters shall be ABB water master or approved equivalent.

Inlet and outlet pipes are to be arranged within the tanks so as to reduce the risk of water quality short circuiting. The inlet pipe shall be terminated at least 90 degrees around the reservoir perimeter from the outlet pipe and shall be arranged so that incoming water is directed away from the outlet pipe.

The outlet pipe shall be fitted with a bellmouth and raised a minimum of 100 mm above the level of the floor. The outlet pipe shall be covered by a grade 316 stainless steel bar screen with opening of not more than 100 mm x 100 mm, and suitably anchored.
The overflow pipe shall be fitted with a bellmouth and be capable of discharging the design maximum inflow to the reservoir with a water level a maximum of 200 mm above top water level (TWL).

Inlet and overflow pipework shall be fitted external to the reservoir tanks to avoid bracing to the internal wall, and disruption to the tank liner.

Outlet and scour pipework shall be installed through the reservoir floor, encased in concrete and shall be flange jointed, with no rubber ring joints.

Inspection chambers / pits shall be either cast in-situ or pre-cast reinforced concrete, with size to enable adequate access for operation and maintenance.

Shared trenching for the water, communications and electrical conduits will be permitted at the reservoir site, provided that safe access for operations and maintenance is provided to all services and is in accordance with WSA-03 minimum clearance requirements and the approval of the Superintendent.

9.4 MONITORING AND CONTROL

The Contractor shall undertake a radio path survey to confirm that the proposed location of the reservoir and pump station can access Council’s existing SCADA network. Should it be determined that radio signal is inadequate, an alternative to Council’s preferred method of radio communication to and from the site will justify a variation to the contract.

A level sensor, and low level and high level float alarms are to be installed within the reservoirs to generate alarm signals.

The Contractor shall supply, install, test and commission control and monitoring equipment to remotely operate the facility through Council’s SCADA network. Minimum requirements shall be:

- Monitoring of all flow meters;
- Monitoring of reservoir high level sensors;
- Monitoring of reservoir low level sensors;
- Monitoring and control of inlet valves;
- Monitoring and control of pump set.

Low level (<4m above ground level) site lighting shall be designed and installed located near the reservoir to allow for security lighting and reservoir O&M requirements during the night. Lighting shall be operated by a switch located within the pump shed, with one low level light provided adjacent to the personnel door operated by movement sensor.

Communications and electrical conduits are to be designed and installed in accordance with the Electrical Specification.

9.5 ELECTRICAL SUPPLY

The Contractor shall liaise with Ergon Energy to provide power supply for the reservoir and pumping station. The location of supply will be by detailed design, but likely from the existing Ergon overhead network in McEvoy Street.

9.6 PUMP STATION

The Contractor shall supply and construct a pumping station, for the transfer of recycled water from the reservoir to the end users. The pump design shall be determined by detailed design, in conjunction with advice from the Principal’s water modelling consultant. Design of the pump set shall be designed by the Contractor, based on water demand identified and nominated by the Principal’s water modelling consultant as part of the network modelling. Notwithstanding the above, it is advised for tender
purposes, that the station should achieve the minimum requirements as indicated in the analysis report prepared by Morris Water.

The pump set shall operate in duty standby mode, triggered by flow and pressure demand. The pump and control system manufacturer proposed by the Contractor will be subject to approval by the Superintendent, for reasons of future servicing and maintenance.

The pumping equipment shall be housed in a permanent weatherproof structure. The building shall include the following features:
- Masonry blockwork or concrete tilt panel external walls;
- Sheet metal roof;
- Painted external walls to Principal’s selection;
- Lockable personnel access door;
- Minimum 2.4m wide roller door for installation, maintenance and removal of pump set and other equipment;
- Approved wind-driven, vertical vane, corrosion resistant roof ventilators;
- Internal lighting and power outlets;
- Fire extinguisher and fire exit signage;
- Site location and identification signage.

10. SURVEY AND INVESTIGATIONS

10.1 DETAIL AND CADAstral SURVEY

The Contractor shall undertake a certified detail survey in the areas affected by the construction activities prior to detailed design, in to verify exact locations. In addition, cadastral survey is required to reinstate property boundaries along the proposed route to allow accurate alignment design and consultation with property owners.

Projection shall be based on MGA 94 Map Grid of Australia Zone 56 coordinate system.

10.2 EXISTING SERVICES

The Contractor shall undertake service locating by approved methods, including hydro-vacuum excavation, to locate all existing service infrastructure in the proposed corridor. Such service locating shall be conducted in conjunction with detail survey prior to detailed design, and shall include any Wayleave or road permit approvals required. The Contractor will be responsible for any traffic control necessary for survey and service locating.

All steps shall be taken to protect and maintain existing services during investigation and construction. This may include relocating, temporarily diverting, or temporarily supporting the services while the service is being interfered with. Plans for any such activities shall be subject to approval by the Principal and the utility owner/s.

All service locating is required to be undertaken in accordance with the service provider’s accepted methodologies.

Should any GIS information be obtained from Council, it is the responsibility of the Contractor to verify its adequacy and use for the project.

10.3 GEOTECHNICAL INVESTIGATION

The Contractor shall undertake geotechnical investigation to enable detailed design of the reservoir, pump station and pipelines.
The Geotechnical Engineer shall coordinate and arrange for any auger drilling, test pits, sampling testing etc. as they consider necessary in order to:

- Adequately predict the materials to be excavated;
- Advise on bearing capacity and soil reactivity of any foundations;
- Make recommendation for erosion and scour control;
- Any other sub-surface conditions required to enable the design.

Any geotechnical investigations shall be prepared by a RPEQ who shall have recent experience in geotechnical engineering for large structures and who is employed by a consulting engineering practice having Quality Assurance Registration to AS/NZS ISO 9001 for geotechnical engineering from an auditor accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

11. CONTRACTOR’S CONSULTANTS

Design drawings, specifications and documents relating to design of the project shall be prepared by an independent Registered Professional Engineer Queensland (RPEQ). The RPEQ must submit to the Superintendent, a Design Certificate prior to commencement of construction, and a Supervision Certificate upon completion. The Engineer must hold professional indemnity insurance to the value of $10,000,000, and a certificate of currency must be submitted to the Superintendent with the design certification.

All testing shall be carried out by a NATA registered authority, being specifically registered to undertake the particular test. This includes any geotechnical and pipeline testing.

12. SAFETY IN DESIGN

The specific requirements and expectations of entities and persons defined as a “Designer” in accordance with Work Health and Safety Act 2011 will apply. The definition of a Designer not only affects the certifying RPEQ, but also attracts duties upon all those connected with aspects of design. This includes all parties where the end product is to be used, or could be reasonably expected to be used as or at a workplace.

The Designer must ensure, so far as is reasonably practicable, that the plant, substance or structure is designed to be without risks to health and safety where the design is for the purposes of a workplace.

Under this Design and Construct contract, the Contractor must minimise risk and hazard by:

- Providing information about hazards and risks relating to the site where any construction work is proposed;
- Allocate sufficient budget commensurate with project risk, to enable legislative compliance and achievement of a quality outcome;
- Be briefed by relevant maintenance staff, and assist in minimising risks to health and safety during the construction work, operation and maintenance.

A Safety in Design assessment and certificate shall be provided to the Superintendent with the design certification.

13. CONTRACT STAGES

13.1 STAGE 1 – INVESTIGATION

The investigation phase should include but not limited to the following activities:

1. Consultation with any land owners in relation to entry to private property, state controlled roads or Q-Rail corridor
2. Detail and cadastral survey;
3. Service locating;
4. Geotechnical Investigation;
5. Radio path survey.

**13.2 STAGE 2 – DRAFT DESIGN**

The Contractor shall produce a draft design of the proposed pipeline alignment and layout for reservoir and pump station.

The Contractor shall organise a risk assessment/management workshop. The workshop will outline all of the risks associated with the design and construction stages of the project, and will include all associated stakeholders. A risk register is to be maintained throughout the contract.

**13.3 STAGE 3 – DESIGN REVIEW**

The Superintendent shall return the marked up design (1 set of drawings) or comments to the Contractor within ten working days. Dependant on the quantum of amendments identified, the Superintendent will nominate whether a further draft design is required or a final for approval by the Superintendent.

**13.4 STAGE 4 – FINAL DESIGN**

The Consultant shall amend the design and resubmit it to the Superintendent for further review or approval. The consultant shall supply 1 hard copy of the drawings package and one electronic copy in PDF format and DWG (AutoCAD) format free of any passwords or security protection.

Final drawings submitted for approval to the Superintendent are to be certified by a Registered Professional Engineer, Queensland on behalf of the Contractor as being fit for the purpose for which they are intended. Certification by a Registered Professional Engineer of Queensland RPEQ must:

- Be provided on each approved drawing;
- Contain a signature in blue ink or digital signature;
- Include the RPEQ number;
- Date of RPEQ approval;
- Company details.

**13.5 STAGE 5 – ISSUE FOR CONSTRUCTION**

If no further amendments are required, drawings shall be accepted by the Superintendent in writing and issued for construction within ten business days of receipt from the Contractor. One copy shall be returned to the Contractor with written acceptance of design by the Superintendent.

The Principal owes no duty to the Contractor to review the design submitted by the Contractor for errors, omissions or compliance with the Contract. No comments or acceptance will relieve the Contractor of liabilities and responsibilities relating to any design completed by them or any liabilities and responsibilities under the Contract.

For the avoidance of doubt, the Contractor may not commence with carrying out the WUC unless and until the final design has been approved by the Principal in writing, in which instance the Contractor must carry out the WUC and Work in accordance with the final design as approved by the Principal and/or Superintendent.

**14. DETAILING REQUIREMENTS**

**14.1 GENERAL**
All drawings shall be prepared in accordance with the requirements of the relevant Standards Association of Australia (SAA) codes and good engineering drawing practice. Drawings shall be produced at A1 size, but will be required to be used and fully legible at A3. A logical set of drawing numbers shall be developed in consultation with the Principal. All drawings shall be clearly drawn to scale by competent draftspersons, in AutoCAD version 2015 or later versions acceptable to the Principal. All submitted drawings shall be owned by the Principal. Electronic copies of drawings shall be provided to the Principal in both dwg and pdf formats to enable viewing without AutoCAD.

Drawings shall be sufficiently detailed to cover all aspects of the works construction and to allow inspection for acceptance. Full details of all services, fittings, fixtures and finishes as well civil, structural, hydraulic, process, mechanical and electrical requirements shall be included.

14.2 DETAILING OF CIVIL WORKS

Depending on the Contractor’s final design, civil drawings that may be required include:

- Earthworks drawings;
- Foundation drawings;
- Structural plans and elevation drawings;
- Reinforced concrete drawings;
- Structural steelwork and metalwork shop drawings;
- Pipework layout and detail drawings;
- Erosion and sediment control drawings.

14.3 DETAILING OF PIPE WORKS

The drawings shall feature:

- Legend describing all symbols used in the respective drawings;
- Pipeline labels including line number, pipe diameter and pipe material;
- Drawing convention shall adopt flow being left to right of drawing sheet;
- Line flags at pipe end on right-hand side of drawing sheet referring to the next relevant drawing number and destination process unit.

14.4 DETAILING OF MECHANICAL WORKS

The Contractor shall provide the following mechanical documents:

- Mechanical layout drawings;
- Equipment schedules;
- Pump schedule;
- Valve schedules; and
- Piping schedules.

14.5 DETAILING OF ELECTRICAL WORKS

The Contractor shall provide the following electrical documents:

- Single line diagrams;
- Design report;
- Lightning protection if required;
- MCC/ Switchboard general arrangement drawings;
- Electrical schematic drawings for each individual drive;
- PLC I/O module connection/termination diagrams;
- Instrument loop diagrams;
- Electrical equipment schedules;
- Cable schedules;
• Electrical equipment layout drawings;
• Earthing Arrangement Diagrams;
• Cable route drawings;
• Instrument schedules and calibration certificates;
• I/O allocation tables;
• PLC and SCADA Local Area Network Block Diagrams;
• RTU’s connection diagrams;
• SCADA system tag databases
• PLC code listings
• Detailed functional specification.

All schedules are to be provided in excel format

14.6 DETAILING OF BUILDING WORKS

The Contractor shall provide the following building drawings:

• Floor layout and elevation drawings;
• Sections and details;
• Materials details;
• Structural design details.

14.7 APPROVAL OF DRAWINGS

Approval of the Contractor’s drawings shall not relieve the Contractor of its full responsibility to comply with the requirements of the Contract and Specification. Approval by the Principal of any drawing, method of work or any information regarding materials and equipment the Contractor proposes to supply shall not relieve the Contractor of its responsibility for any errors or omissions therein, and shall not be regarded as an assumption of risks or liability by the Principal, and the Contractor shall have no claim under the Contract on account of the failure or partial failure or inefficiency of any plan or method of work or material and equipment so accepted.

Such approval shall be considered to mean that the Principal has no objection to the Contractor using, upon its own full responsibility, the plan or methods of work proposed or supplying the materials and equipment proposed.

14.8 CONTROL SYSTEM DOCUMENTATION

Upon completion of the design, and prior to commencement of works onsite, the Contractor shall provide the following control system documentation:

• Recommended SCADA alarm list;
• Reporting specification;
• Tag name coding;
• Coding standard;
• Logic diagrams;
• Sequence diagrams;
• Functional specification;
• Detailed design drawings of new equipment, including new and existing I/O;
• Project works schedule; and Acceptance test plans for factory, on-site, and operator tests. The Contractor shall allow the Principal a review period of two (2) working weeks from the date of receipt of each document.
Before the completion of the project, the Contractor shall provide the following documentation:

- As constructed amendments and new inclusions for the SCADA alarm list, reporting specification, coding standard, functional specification, logic diagrams, sequence diagrams and detailed design drawings;
- PLC/RTU data schedule and SCADA data schedule;
- Copies of onsite documentation to be left in the field PLC/RTU cabinets to enable a tradesperson to identify all equipment in the cabinet, the operation of the equipment in the cabinet, and any safety warnings;
- Software manual;
- User manual;
- System operation and maintenance manual including a spare parts list and manufacturers equipment specifications;

For the items above, the Contractor shall provide one (1) electronic and two (2) printed and bound copy of all documentation items unless otherwise specified. All hardcopies shall be bound in hard plastic cover folders. All electronic copies of documentation shall be provided in native application format and in Adobe PDF.

The Contractor shall provide the following electronic files in USB format before the completion of the project:

- All final PLC/RTU project files;
- Original PLC/RTU programming application software disks;
- All other software installation disks.

15. EXCESS MATERIAL

All excess material (soil, sand, gravel, mud, rock, concrete, etc) shall be carted away to a lawful point of disposal. Any excess material free from contamination shall be exported to Council’s Warwick Central Waste Management Facility for use as capping material. The Contractor shall liaise with Council prior to commencing construction, to make arrangements for disposal at the waste facility at no cost. The Contractor shall be responsible for all treatment and transport costs.

16. QUALITY

16.1 INSPECTION AND TEST PLAN

Inspection and Test Plans (ITP’s) shall be prepared by the Contractor, and shall contain at least the following information for each significant activity:

- Description of activity;
- Person responsible for activity;
- Hold Points and Witness Points;
- Activity checklists;
- Inspection and test type;
- Tolerances or other acceptance criteria;
- Identification of relevant procedure and quality records;
- Test/inspection frequency; and
- Work item or work lot identification.

The ITP’s shall be submitted to the Superintendent for review. Where considered necessary the Superintendent may request the Contractor to insert additional Hold Points or Witness Points. Provisions shall be made for the Contractor and Superintendent to endorse the ITP at these points.
16.2 DILAPIDATION SURVEY

Prior to the commencement of construction, the Contractor is to prepare and submit to the Superintendent, a pre-construction dilapidation survey, covering all roads and other infrastructure within 10 metres of all access routes, site compound, temporary works areas, private property, and alignment of the proposed pipeline, reservoir, and pump station.

16.3 HOLD POINTS

A Hold Point is defined as a position in the progress of work, beyond which, further work shall not be carried out until such time as inspection, verification and approval has been obtained by the Contractor’s certifying RPEQ or NATA registered testing authority.

Hold Points shall include those specified below, and shall apply to this Contract to ensure compliance with the intent of the designs and with other specified requirements, and to ensure that critical and/or irreversible activities are not constructed incorrectly.

Hold Points shall include, but not be limited to the following:
- Contractor’s submission of detailed Works Program and a projected financial statement;
- Contractor’s submission of the preliminary and final construction drawings;
- Contractor’s submission of Workplace Safety plan;
- Contractor’s submission of Quality Plan / ITP;
- Contractor’s submission of Environmental Management Plan;
- Services located and exposed;
- Installation of underground services prior to backfilling, including all water and stormwater pipework;
- Thrust blocks;
- Pressure testing of pipeline;
- Proof rolling of any subgrade and pavement layers;
- Placement of reinforcement prior to concrete pour of pavements, slab and footings and pits;
- Manufacturer’s certification of compliance;
- Test certificates as required;
- Latent Conditions;
- Practical completion after clean up.
- Final inspection.

16.4 WITNESS POINTS

A witness Point is defined as a position in the progress of the work, where the Contractor must notify the Superintendent prior to proceeding and the option for attendance for witnessing of inspection and test may be exercised. If no attendance is made, then work may nevertheless proceed, unless otherwise instructed. Witness Points shall apply to verify compliance of the constructed works with the approved design drawings.

Witness Points shall include, but not be limited to the following:
- Commencement of the WUC and Work;
- Trench depth and width;
- Pipe installation and bedding;
- Trench shoring if required;
- Backfilling of pipeline and services;
- Flushing of pipeline;
- Foundation material at reservoir site;
- Concrete curing and finishing;
- Wiring and electrical fitout;
- Prior to painting.
**16.5 CONFORMANCE REPORTS**

Conformance Reports shall be made available to the Superintendent for each designated work lot or work item, within 24 hours of completion of the work lot or work item. Conformance Reports shall include a verification statement certifying that the relevant work lots or work items have been inspected and/or tested in accordance with the Contractor’s Inspection and Test Plan(s) applicable to this Contract and that they comply with the specified requirements of the Contract Documents.

Conformance reports shall be accompanied by endorsed ITP and any checklists, and any NATA certified test results as applicable.

**16.6 NON-CONFORMANCE REPORTS**

The Contractor shall submit a Non-conformance Report to the Superintendent within 24 hours of detecting any non-conforming work. The report shall clearly detail but not be limited to the following:

- Nature and extent of the non-conformance;
- The work item number to which the non-conformance relates;
- Any relevant test results, measurements or data applicable;
- Corrective and preventive actions proposed by the Contractor;
- The timeframe for rectification.

The Project Quality plan prepared by the Contractor shall clearly define the proposed methods for identification of non-conforming work. Any proposed corrective action shall be subject to approval by the Superintendent.

**17. VACCINATION**

Due to the extent of construction work required in and around the existing livestock saleyard facility, the Contractor shall be vaccinated against Q-Fever, or have confirmed immunity through past infection. This will apply to Contractor's employees and staff, construction crews, sub-contractor’s, Contractor’s representatives and any other person which the Contractor reasonably deems will be required based on risk assessment. It is the Contractor’s responsibility to ensure that all persons required to work in or around the area the subject of the Contract, have provided proof of vaccination or confirmed immunity, and the Contractor irrevocably indemnifies the Principal for any claim, loss or damage that occurs due to non-compliance with this requirement at clause 17 of Schedule 2 – Specifications / Principal Brief. Any vaccinations, tests or medical appointments required to comply with this clause are at the Contractor’s expense. Furthermore, it will be the Contractor’s responsibility to undertake a risk assessment to determine if the commissioning process requires Hep A and B vaccinations for those involved.

**18. SITE RESTORATION**

The construction corridor and any access tracks used for delivery of materials to the construction locations shall be restored to a condition equal or greater than the pre-existing condition. The restoration works shall progress immediately behind the construction work, and be completed as soon as practicable. Where the works have impacted on private infrastructure (driveways, boundary fences, etc), the Contractor shall obtain written agreement from the owner that the restoration has been satisfactorily completed.

Any damage to roadway or footpath, existing service infrastructure, private property etc. during the construction shall be made good to the satisfaction of the Principal and the applicable authority, at the Contractor’s expense.
The Contractor shall maintain as far as possible, access to properties and public facilities. Consultation with affected property owners leading up to and during the work shall be documented and made available to the Superintendent upon request.

**19. TESTING, COMMISSIONING AND HANOVER**

The Contractor shall test and commission the works in accordance with this document, the ITP and associated specifications, including, but not limited to the following:

- Field tests;
- Factory tests;
- Commissioning of the works;
- Any training of operators;
- Handover demonstration;
- Operation and maintenance manuals including pump specifications; and
- Opening of facilities by State or Local Government representative (if required).

The Contractor shall prepare and submit ITP’s and Checklists to the Superintendent as part of the Contractor’s Project Management Plan detailing all works testing and commissioning activities. The Contractor shall ensure that the nominated Council operations personnel are fully trained in all aspects of operations of the Works.

A handover demonstration shall be undertaken following the Contractor’s successful commissioning of the works at which the Contractor shall demonstrate the works operating under their full service conditions.

Documentation provided for handover shall generally be as detailed within the Technical Specifications.

Certification of the as constructed documentation, by the independent certifying RPEQ, shall be provided by the Contractor.

**20. AS-CONSTRUCTED DATA**

Modifications for As Constructed drawings are to be made using AutoCAD with changes made highlighted in red. As Constructed survey levels are to be red and design levels to remain in black and struck out.

As Constructed drawings shall be provided in A1 hardcopy format or legible A3. In addition, the As Constructed data shall be provided in AutoCad “dwg” and “pdf” formats. The datum for all levels in As Constructed drawings shall be in Australian Height Datum in metres to three decimal places. Projection shall be based on MGA 94 Map Grid of Australia Zone 56 coordinate system.

As Constructed drawings must include a minimum of:

- Pipe materials and diameters;
- Main alignments to property boundaries;
- Locations of valves, tees, scour and air valves, bends, property connections, end caps and any other fittings;
- Invert levels along the main for comparison to design levels, at horizontal and vertical bends and elsewhere at approximately 18-20m spacing;
- Manhole and pit invert and cover levels;
- Invert levels for any underground stormwater;
- Location of reservoir tanks, buildings, fittings and electrical conduits.
As Constructed drawings shall be endorsed by the project surveyor and supervising RPEQ, as a true and accurate reflection of the works as executed. Each drawing shall include annotation in the revisions title box, clearly marked “As Constructed” with the relevant date and revision number.