PRINCIPAL’S PROJECT REQUIREMENTS

CONTRACT NO. WT39-16/17

DESIGN AND CONSTRUCTION OF PITTSWORTH INDUSTRIAL PRECINCT SEWERAGE ENABLING PROJECT
**Principal’s Project Requirements**

1. **Background Information**
   Pittsworth is located approximately 40km southwest of the Toowoomba CBD. The western most portion of the Pittsworth Industrial Precinct is currently unsewered and utilise onsite disposal, which limits further development opportunities. Additionally, a section of land to the west is proposed to rezoned from Rural Use to Industrial Use through a Planning Scheme amendment. The project will be delivered concurrently with the upgrade of Gap Road.

   This project will provide reticulated sewer to the existing businesses, as well as the trunk sewerage infrastructure required to serve development on the future industrial zoned land.

2. **Scope**
   The scope of this project includes the design, supply, installation and commissioning of new sewerage infrastructure to collect sewage from the existing Pittsworth Industrial area via a gravity sewerage system (including lift station) to a new sewage pumping station located on Gap Road, and transfer sewage to the Pittsworth sewerage treatment plant via a rising main discharging into the existing reticulation system on Hill Street.

2.1 **General**

2.1.1. **Pump Station Works**
   The Contractor shall design, supply, install and commission a fully operational sewage pumping station including, but not limited to, the following items:

<table>
<thead>
<tr>
<th>Zero Manhole</th>
<th>Switchboard</th>
<th>Emergency Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet well</td>
<td>Disconnection Pillar</td>
<td>Pumps and associated items</td>
</tr>
<tr>
<td>Valve Chamber</td>
<td>Flow meters and other instrumentation</td>
<td>Screening Chamber</td>
</tr>
<tr>
<td>Overflow pipework</td>
<td>Fencing around the pump station</td>
<td>Sealed access road to SPS from existing Gap Road pavement</td>
</tr>
<tr>
<td>Magnesium Hydroxide Dosing (Provisional)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Further information on the above listed items is provided within this Principal’s Project Requirements document. Sizing of the pump station shall be as per Section 3 of this Principal’s Project Requirements document. Council’s indicative pump station arrangement is provided as part of the information only documentation.

   Ground slabs and footings shall be designed to suit the ground conditions to ensure structures provide the intended function over the intended life and to control movement within acceptable limits nominated by the relevant standards.

2.1.2. **Gravity Main Works**
   The sizing for the gravity main shall be as per Section 4 of this Principal’s Project Requirements document.
2.1.3. Rising Main Works
The sizing for the rising main shall be as per Section 5 of this Principal’s Project Requirements document.

2.1.4. Lift Station Works
The design and construction of lift stations shall be as per Section 6 of this Principal’s Project Requirements document.

3. PUMP STATION – MINIMUM REQUIREMENTS

3.1. Gap Road Sewage Pump Station
TRC’s preferred pump station arrangement has been provided as an “Information Only” document (Drawing No. TRC94000). A sewage pumping station shall be designed, supplied, constructed and commissioned by the contractor complying with the following requirements:

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wet Well Diameter</td>
<td>3.0m</td>
</tr>
<tr>
<td>2</td>
<td>Wet well type</td>
<td>Precast or cast-insitu reinforced concrete</td>
</tr>
<tr>
<td>3</td>
<td>Wet Well Operating Volume Req'd.</td>
<td>2.0 kL</td>
</tr>
<tr>
<td>4</td>
<td>Emergency Storage Capacity Req'd.</td>
<td>33 kL</td>
</tr>
<tr>
<td>5</td>
<td>Number of Pumps</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Ultimate Operating Point</td>
<td>9.5L/s at 35m head (approx.)</td>
</tr>
<tr>
<td>7</td>
<td>Pump arrangement</td>
<td>Duty/Standby</td>
</tr>
<tr>
<td>8</td>
<td>Wet Well Depth</td>
<td>Minimum 4.5m, but subject to detailed design of gravity main</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Preliminary information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Incoming sewer invert level</td>
<td>Approx. 506.69m, but subject to detailed design</td>
</tr>
<tr>
<td>2</td>
<td>Preferred pump make and model</td>
<td>Flygt submersible pumps.</td>
</tr>
<tr>
<td>3</td>
<td>Pump Station Land Area</td>
<td>25m by 30m</td>
</tr>
<tr>
<td>4</td>
<td>Sewer Pump Station Surface Level</td>
<td>Approx. 513.0m AHD</td>
</tr>
</tbody>
</table>

A package pump station may be used, provided that it can be provided with the necessary level instrumentation as required by the technical specifications. The location of the sewerage pump station site is shown in Appendix 1.

3.2. Magnesium Hydroxide Dosing System (Provisional):
A Magnesium Hydroxide Liquid (MHL) dosing system shall be provided at this pump station. The Magnesium Hydroxide dosing system shall be designed, supplied, installed and commissioned by the Contractor as per the Magnesium Hydroxide Specification. The cost for the provision of the Magnesium Hydroxide Dosing System shall be listed as a Provisional Sum in the Schedule of Prices.
4. GRAVITY MAIN – MINIMUM REQUIREMENTS

A concept layout for the proposed gravity rising main is shown in Appendix 2. The gravity main shall be designed using the following parameters:

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gravity Main Diameter</td>
<td>225mm and 300mm</td>
</tr>
<tr>
<td>2</td>
<td>Gravity Main Length – DN225mm</td>
<td>1,700m (approximate)</td>
</tr>
<tr>
<td>3</td>
<td>Gravity Main Length – DN300mm</td>
<td>Stub connection to Zero Manhole to service the land to the south</td>
</tr>
<tr>
<td>4</td>
<td>Gravity Main Material</td>
<td>PVC or approved equivalent</td>
</tr>
</tbody>
</table>

The contractor shall develop a detailed design in accordance with these requirements through performing site investigation and resident consultation.

The gravity sewer must, at a minimum, also meet the below parameters with regards to serving the existing property uses:

- A 100mm dia. house connection branch shall be provided to service each property in accordance with TRC Addendum for WSA 02 (Drawing 101211-001 C). The house connection branch shall be capped with a removable cap at the house drain side of the inspection opening and shall be provided with a 19mm diameter marker conduit directly above the inspection opening extending 1m above natural surface.

- Gravity main levels shall allow for house drains to be installed by others to the house connection branch at a minimum of 1 in 60 grade from the existing upstream connection point of the septic tank / household wastewater treatment plant on the property, and where practicable serve the entire allotment.

5. RISING MAIN – MINIMUM REQUIREMENTS

A preliminary route for the proposed sewer rising main is shown in Appendix 3. The contractor shall develop a detailed design in accordance with these requirements through performing site investigations.

The rising main shall be designed using the following parameters:

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rising Main Diameter</td>
<td>100 mm</td>
</tr>
<tr>
<td>2</td>
<td>Rising Main Length (Approximate)</td>
<td>2,365 m (approx.)</td>
</tr>
<tr>
<td>3</td>
<td>Rising Main Material</td>
<td>PVC-O or approved equivalent</td>
</tr>
</tbody>
</table>

The rising main shall discharge into a discharge manhole prior to connecting into a new maintenance hole constructed on the existing gravity main sewer in Hill Street (near the intersection with Aster Street). Rising mains shall include but not limited to isolation valves at strategic locations, valves, fittings, gas release arrangements, scour arrangements, etc. The Contractor shall also ensure that the slime stripping velocity is achieved in the rising main.
6. LIFT STATION – MINIMUM REQUIREMENTS

A preliminary location of the lift station is shown on Appendix 2. A lift station shall be designed, supplied, constructed and commissioned by the contractor complying with the following requirements:

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Minimum Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Station Chamber Diameter</td>
<td>1.8m</td>
</tr>
<tr>
<td>2</td>
<td>Station Chamber type</td>
<td>Precast or cast-insitu reinforced concrete</td>
</tr>
<tr>
<td>3</td>
<td>Operating Volume Req'd.</td>
<td>1.0 kL</td>
</tr>
<tr>
<td>5</td>
<td>Number of Pumps</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Pump arrangement</td>
<td>Duty</td>
</tr>
<tr>
<td>8</td>
<td>Station Chamber Depth</td>
<td>Approx. 5.2m, but subject to detailed design of gravity mains</td>
</tr>
<tr>
<td>9</td>
<td>Discharge Pit Diameter</td>
<td>1.5m diameter</td>
</tr>
<tr>
<td>10</td>
<td>Switchboard</td>
<td>As per the Switchboard specification</td>
</tr>
</tbody>
</table>

Drawing No. 244996-208A is provided as a reference only document, and shows the general configuration of the lift station, with the following additions:

- A HDPE dropper pipe shall be installed on the inlet to the lift station chamber, immediately downstream of a knife-gate valve with extended spindle to chamber roof;
- A check valve is to be installed between the Lift Station Chamber and discharge pit, on the pumped line;
- The switchboard shall be designed and constructed to allow the installation of a second pump within the lift station chamber;

7. ALTERNATIVE ROUTES OF PIPELINES

Tenderers may investigate alternative pipeline routes for the gravity sewers and rising main,

8. DESIGN AND CONSTRUCTION REQUIREMENTS

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

1. Principal’s Project Requirements (this document)
2. Technical Specifications
4. Pressure Sewerage Code WSA-07-2007 v1.1
5. Sewage Pumping Station Code WSA-04-2005-v2.1
6. Water Services Association of Australia (WSAA) Sewerage Code of Australia WSA-02,
7. Water Supply Code of Australia WSA-03-2011 v3.1, and
8. All relevant Australian Standards.
8.1 Pipelines

The Contractor shall develop a detailed design in accordance with the following requirements based on Principal’ Project Requirements and through performing site investigations.

Pipelines must, at minimum, meet the design parameters as follows:

- Rising Main pipe material shall 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.
- PVC-O pressure main shall be Series 2 RRJ with minimum SN 12.
- Thrust and Anchor blocks shall be designed installed in accordance with the requirements of WSAA.
- Horizontal separation to other services – minimum 1,500 mm separation.
- Vertical separation to other services – minimum 600 mm separation. The pipeline must pass under water mains.
- Road crossings – to a detail approved by the relevant road authority.
- Scour valves shall be as per WSAA Drawing SPS 1602, and installed at low points along the rising main.
- Gas release valve arrangement shall be similar to drawing number 60238347-0005 provided in the reference document, and shall be installed at high points along the rising main.
- Minimum cover
  - 900 mm within private property and park land (non–trafficable area).
  - 1,200 m within road reserves and under pavements, or as otherwise approved by road authority
- Maximum cover
  - 4,500 mm or as approved by the Principal’s Representative.
- Gravity Main pipe material shall be:
  - Road verge and private property - unplasticised Polyvinylchloride (uPVC, PVC-M) Series 2, Rubber ring joint (RRJ), SN8.
  - Road pavement crossings – Ductile Iron Cement Lined, Rubber ring joint (RRJ), PN20 fitted with polyethylene outer sleeving
- Vertical grade
  - TRC Addendum to Sewerage Code of Australia WSA-02-2014-v3.1,
  - WSA-02 specified grades.
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8.1 Horizontal alignment
- Road verge - to the Institute of Public Works Engineers Queensland (IPWEAQ) standard service alignment allocations, unless it is demonstrated to the Principal that this is unachievable due to the location of other existing services in this alignment allocation.
- Private Property – generally a 1.5m parallel offset from property boundary line, unless specified otherwise.

8.2 PUMP STATION
The pump station must, at minimum, meet the design parameters noted below.
- The SPS Wet well shall be a reinforced concrete pump station with an external reinforced concrete valve chamber.
- The Contractor shall nominate the suitable efficient pump based on the detailed design. The pumps shall operate between 90% to 100% of the pump Best Efficiency Point (BEP).
- The Contractor shall advise the details of the proposed impeller, resultant pump set, power requirements, including minimum starting current and maximum run current, (when used in conjunction with variable frequency drives) and the resultant system efficiency and duty points to the Principal for approval. When approval is granted the Principal will then obtain certification for the use of the impeller and pump set within the Gap Road pump station.
- Level instrumentation shall be as per the switchboard specification.
- Emergency Storage shall be of reinforced concrete.
- The pump station sites shall be provided with 1,800 mm high galvanised 3.15mm chain wire top straight posts fence all around and a gate as shown in the SPS layout.
- The switchboard for the SPS shall be as per the Switchboard Specification. The Contractor shall be responsible for all electrical works including works required for Ergon Energy connection.
- The Contractor shall supply and install an odour control unit for the wet well. The odour control unit shall be McBerns GM375 or approved equivalent.
- ABB water master Flow meters or approved equivalent shall be installed in the rising main and overflow line.
- External valve chamber shall be similar to WSAA DRG SPS – 1307 and cover arrangement as per SPS - 1306.
- RPZ arrangement shall be as per SPS-1308 and plumbing approval requirements.
- Screening chamber shall be similar to TRC Drawing no. 94005
- Overflow pipework arrangement shall be similar to TRC Drawing no. 94002.

8.3 LIFT STATION
- The lift station chamber shall be constructed of reinforced concrete.
Principal’s Project Requirements

- The Contractor shall nominate the suitable efficient pump based on the detailed design. The pumps shall operate between 90% to 100% of the pump Best Efficiency Point (BEP).
- The Contractor shall advise the details of the proposed impeller, resultant pump set, power requirements, including minimum starting current and maximum run current, (when used in conjunction with variable frequency drives) and the resultant system efficiency and duty points to the Principal for approval. When approval is granted the Principal will then obtain certification for the use of the impeller and pump set within the Gap Road pump station.
- Level instrumentation shall be as per the switchboard specification.
- The switchboard for the lift station shall be as per the Switchboard Specification. The Contractor shall be responsible for all electrical works including works required for Ergon Energy connection.
- The Contractor shall supply and install an odour control unit for the wet well. The odour control unit shall be McBorns GM375 or approved equivalent.
- RPZ arrangement shall be as per SPS-1308 and plumbing approval requirements.

8.4 HARDSTAND AREA WITHIN SEWAGE PUMP STATION SITE

- The hard stand area pavement shall be of asphalt surfacing with concrete edges.
- The SPS shall be provided with a 3 point hardstand turning area suitable for 14 tonne Crane Trucks as a minimum.
- All the works associated with design and construction of hardstand area shall be in accordance with Toowoomba Regional Council Planning Scheme Policies SC6.2 and Transport of Main roads standards.
- The pavement shall as a minimum meet the requirements of Cul-de-sac road classification in the TRC planning scheme.
- Construct bollards where appropriate to protect equipment, structures, tanks and the like.
- Pavement shall have a minimum width of 3 metres along straight sections and wider in turning areas to suit Austroads vehicle turning templates for MR class vehicles.

8.5 MAGNESIUM HYDROXIDE DOSING UNIT

- The Contractor shall provisionally allow for the design, supply and install a Magnesium Hydroxide Liquid (MHL) dosing system as per the Magnesium Hydroxide Specification.
- The MHL dosing system shall be located within a bunded area and housed within a colour bond shed.
- All dosing piping shall be contained within a minimum 50mm PVC-U conduit for all underground service installation.

8.6 WATER SERVICE WORKS

The Contractor shall design, supply and install potable water services to the pump station in accordance with AS 3500. The potable water services pipeline shall include backflow prevention.

The mechanical water meter shall be sized to match adjacent pipework. Gate valves (50mm dia and less) shall be threaded copper in accordance with AS2638.1, complete with cover boxes and margin sets in accordance with drawing WAT-1304. It is the full responsibility of the Contractor to apply and obtain the plumbing approval from the local authority.
8.7 ELECTRICAL

- All Electrical works shall comply with the electrical and switchboard specification.
- The Contractor shall liaise with Ergon Energy to provide power supply for the sewage pump stations at Gap Road.
- Confirmation of the pump power requirements shall be provided within one (1) month of Contract Award to allow the Principal to confirm its application for Network Connection with Ergon Energy.

8.8 DESIGN LIFE

Design life requirement shall be as follows:

- Civil Structures – 50 years
- Rising mains and gravity sewers – 50 years
- Road Pavements – 20 years
- Mechanical items – 25 years
- Electrical items – 15 years

All design must be undertaken and certified by a Registered Professional Engineer of Queensland. In addition to the above, the design must be undertaken in accordance with the relevant Australian Standards, Codes of Practice including Water Services Association of Australia (WSAA), and other industry recognised Manuals.

9. TIME FOR PRACTICAL COMPLETION

The Principal intends for the work under the Contract to be completed by 23 March 2018. Accordingly, in the Tender version of the General Conditions of Contract, the period of time for practical completion has been nominated as ten (10) months from the date of the Principal’s Letter of Acceptance.

10. DESIGN REVIEW MILESTONES

Design documentation shall be provided to the Principal’s Representative at 50% and 100% completion for review as per 8A of the General Conditions of Contract. The Principal’s Representative may make comment on the design documentation at these milestones. RPEQ certification must accompany the 100% design documentation submitted to the Principal’s Representative for review.

11. SURVEY

The Contractor shall be responsible for all survey work and service location to undertake the design and construction of the pump station, lift station, rising main and gravity sewers.

12. EXCESS MATERIAL

All excess material (soil, sand, gravel, mud, rock, concrete, etc) shall be carted away to a lawful point of disposal. The Contractor shall be responsible for all treatment, transport and disposal costs.

13. APPROVALS

The Contractor shall also be responsible for approvals as per the Approval’s Register.
The Contractor shall also be responsible for all liaison with any adjacent service providers, road authorities and other agencies throughout the design to ensure the documented design complies with all third party requirements, and also obtaining and compliance with any approvals required from service providers, road authorities and other agencies to undertake the construction of the works.

14. INSPECTION AND TESTING
Inspection and testing shall generally by as detailed within the Technical Specifications.

15. COMMISSIONING
Commissioning shall generally by as detailed within the Technical Specifications.

16. HANDOVER
Documentation provided shall generally be as detailed within the Technical Specifications.

Certification of the as constructed documentation, by a Registered Professional Engineer Queensland, shall be provided by the Contractor, as per Section 17 of this document.

17. AS CONSTRUCTED DRAWINGS
As Constructed drawings shall be in accordance with the current IPWEA Asset Design As Constructed (ADAC) scheme. 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.

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 for sewer mains, pressure mains and SPS must include a minimum of:

- Pipe materials;
- Diameters;
- Main alignments to property boundaries (to a tolerance of 0.1m);
- Locations of end caps of property connections in relation to property boundaries (to a tolerance of 0.1m);
- Invert levels and finish levels of manholes, chambers, emergency storage, wet well, etc. (to a tolerance of 0.01m);
- Finished surface levels at each R.P. peg (to a tolerance of 0.01 m);
- Sewer rising main and gravity chainages;
- Sewer depths;
- Manhole sizes and type of lids e.g. bolt down, trafficable etc.

As-Constructed drawings shall be signed by the Contractor and labelled “As Constructed”, and certification provided by the Contractor’s supervising RPEQ that the “As Constructed” plans are a true and accurate reflection of the works as executed.

The Contractor shall maintain an up-to-date “As Constructed” record of the Works during construction and shall afford the Principal access to all such information at the request of the Principal’s Representative. Copies of the marked up drawings shall be available on site at all times.

These drawings shall contain a similar level of detail to the construction drawings and allow for variations in any engineering during the Project. The drawings shall be clearly marked “As-Constructed” with the relevant date and revision number.
Each sheet that has “As Constructed” details annotated must have the revisions title box annotated with the words “As Constructed details added” and the next revision number allocated for that sheet.

17.1 SUBMISSION
The Contractor shall provide 2 No. hardcopy sets of “As Constructed” documentation and electronic copies in both AutoCAD 2011 and ADAC format.

18. SITE RESTORATION
The construction corridor used by the Contractor shall be restored by equivalent materials to pre-existing, or better, condition. The restoration works shall progress immediately behind the construction face(s) and shall be completed as soon as practicable.
Appendix 1
Gap Road Sewerage Pump Station Location
Appendix 2
Gravity Main Concept Layout
Appendix 3
Rising Main Concept Layout
END OF
PRINCIPAL’S PROJECT REQUIREMENTS