1. Purpose

The purpose of this paper is to submit for ALG approval the Project TOC Report in accordance with Clause 19.5 of the PAA for the following Project included in the Capital Works Budget for FY 2014/15.

- WP7643 – SPS59 Logan Road West Upgrade Works

2. Previous ALG Papers relating to this Work Package

The following papers relating to this Work Package have been previously approved by the ALG:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Subject</th>
<th>Outcome</th>
<th>Approved Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALG-256</td>
<td>P&amp;P Task Budget Request – Logan Road West Wastewater Pump Station Catchment Augmentation – Detailed Planning</td>
<td>Approval of Task Budget Request $41,353</td>
<td>03/08/12</td>
</tr>
<tr>
<td>ALG-294</td>
<td>P&amp;P Task Completion Report – Logan Road West Wastewater Pump Station Catchment Augmentation – Detailed Planning</td>
<td>Approval of Task Completion Report $40,500</td>
<td>25/01/13</td>
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<tr>
<td>ALG-515</td>
<td>WP7643 Logan Road West Wastewater Pump Station (SPS59) – Approval of Work Package Definition Statement and TOC Development Budget</td>
<td>Approval of Work Package Definition Statement and TOC Development Budget for a budget of $162,991</td>
<td>15/10/14</td>
</tr>
</tbody>
</table>

3. Discussion

The primary business driver for this project is growth. The pump station catchment population has increased at approximately 15% per year from 2009 to 2012, and is expected to continue at this rate until full development of the catchment by 2016. The pump station also currently fails to meet DSS for peak wet weather flows.

The objectives of this project are:

- Increase SPS59 rising main capacity to cater for ultimate wastewater load;
- Increase network storage to reduce overflows during wet weather events; and
- Increase discharge flows from SPS59

The recommended Target Outturn Cost (TOC) for the project is based on subcontractor submitted prices and a first principles estimate.
A Risk assessment has been undertaken to give a view of the likelihood and consequence of risks associated with the delivery of this Work Package. The risk register has been analysed using Monte Carlo risk modelling, and a P50 risk value of $18,982 has been included in the TOC. This represents 2.0% of the Work Package TOC. This is at the lower end of industry standards for this Project as no significant risks have been identified for the SPS59 Logan Road West Upgrade.

The TOC for the project has been endorsed by the Independent Estimator.

A high level breakdown of the cost is given below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Total $</th>
<th>% of TOC</th>
<th>Industry standard for D&amp;C (% of DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TOC Development Costs</td>
<td>$106,180</td>
<td>9%</td>
<td>5-12%</td>
</tr>
<tr>
<td>2</td>
<td>Work Package – Project Management and Site Facilities</td>
<td>$174,499</td>
<td>14%</td>
<td>12-14%</td>
</tr>
<tr>
<td>3</td>
<td>Work Package – Direct Costs</td>
<td>$917,432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Council Direct Costs</td>
<td>$6,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Risk and Opportunities</td>
<td>$18,982</td>
<td>2%</td>
<td>3 - 4%</td>
</tr>
<tr>
<td></td>
<td>WP7643 - TOC</td>
<td>$1,223,693</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Project Fee</td>
<td>$127,364</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WP7643 – TOTAL (EXCL. GST)</td>
<td>$1,351,057</td>
<td></td>
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</tr>
</tbody>
</table>

4. APMT Review
The APMT has actively participated in the development of the Project TOC Report and supports the Project Budget of $1,351,057 (Excl. GST) compared to $1,374,392 +/- 10% (Excl. GST) prepared during the preparation of the WPDS.

5. Recommendation
The APMT recommends that this Work Package 7643 Project TOC Report be approved by the ALG:

- Work Package 7643 TOC of $1,223,693
- Project Fee of $127,364
- Total including Fee $1,351,057
- Commissioning Completion date of 25 June 2015, based on Council approval to proceed date 19 December 2014.

It is noted that values shown above are exclusive of GST.
Christian Truscott  
Alliance Manager

Tony Goodhew  
Water Infrastructure Manager

Attachments

- Document Number: 7643-001-W-REP-PM-9003 – SPS59 Logan Road West Upgrade Works
WORK PACKAGE 43 PROJECT TOC REPORT
LWA JOB NO. 7643

SPS59 LOGAN ROAD WEST UPGRADE WORKS

NOVEMBER 2014
## Approval Register

<table>
<thead>
<tr>
<th>Action</th>
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</thead>
<tbody>
<tr>
<td>TOC Phase Manager – Submit to APMT for Approval</td>
<td>21/11/14</td>
</tr>
<tr>
<td>TOC Report Approved By APMT</td>
<td>25/11/14</td>
</tr>
<tr>
<td>Alliance Manager - Submit to ALG for Approval</td>
<td>05/12/14</td>
</tr>
<tr>
<td>TOC Report Approved by ALG</td>
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## Controlled Document – Change Register

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<th>Section Changed</th>
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<th>Initial</th>
<th>Date</th>
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<tbody>
<tr>
<td>1.0</td>
<td>All</td>
<td>Issued for Approval - ALG</td>
<td>GEN</td>
<td>05/12/14</td>
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</table>
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<th>Description</th>
<th>Page</th>
</tr>
</thead>
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<td>5</td>
</tr>
<tr>
<td>Table 3-1</td>
<td>WP7643 Proposed Key Milestones for this Work Package</td>
<td>8</td>
</tr>
<tr>
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<td>Property Constraints</td>
<td>13</td>
</tr>
<tr>
<td>Table 6-1</td>
<td>WP7643 Pipe Laying and Micro Tunnelling</td>
<td>15</td>
</tr>
<tr>
<td>Table 6-2</td>
<td>WP7643 TOC Breakdown</td>
<td>17</td>
</tr>
</tbody>
</table>
APPENDICES

Appendix A  Detailed Cost Estimate
Appendix B  Risk Register
Appendix C  Project Schedule
Appendix D  Drawings
Appendix E  Work Package Definition Statement
Appendix F  Geotechnical Report
Appendix G  Independent Estimator’s Report
Appendix H  Environmental Management Plan
Appendix I  Community and Stakeholder Engagement Plan
EXECUTIVE SUMMARY

The scope of this Work Package includes project management, detailed design, procurement, approvals, construction, commissioning and handover of the SPS59 Logan Road West Upgrade Works Project. The deliverables for this Project include:

- Open trench construction of 760m of DN150 Rising Main including connection to SPS59, Bypass Pump-out Arrangement, Overflow Arrangement, Thrust Restraints, Air Valve Arrangements and Manholes.
- Micro tunnelling construction of 70m of OD180 PE Rising Main beneath Stegemann and Logan Roads.
- Open trench construction of 120m of DN225 PVC Gravity Main from the Rising Main Discharge Manhole in Harris Road to the existing Manhole in Louise Road.
- Construction of DN1200 RCP Emergency Storage and Overflow adjacent to SPS59 including Maintenance Manholes, Vent Pipe, Odour Control Unit and connection to the existing Manhole SHM41280.

This Project has been included in the FY 2014/15 Council’s Capital Works Budget and, in accordance with the Project Schedule included in Appendix B of this TOC Report, will be substantially completed within the financial year 2014/15.

The relative breakdown of Project cost by estimate category with respect to Direct Costs is outlined in Table 0-1.

Table 0-1: WP7643 Cost by Estimate Category

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Total $</th>
<th>% of TOC</th>
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<td></td>
</tr>
</tbody>
</table>

The project TOC and fee is within cost estimates produced during preparation of the WPDS of $1,374,392 +/- 10% (Excluding GST).
The Work Package Direct Costs have been obtained from competitive tenders and the TOC has incorporated many cost savings in design, construction and safety initiatives, highlighted in Section 6 of this report. All subcontractors nominated have adequate resources available with few projects in the current construction market. As such, the Alliance has been able to secure a very competitive subcontract price.

The project management cost component for WP7643 is 14%, which is at the upper level of industry standard for this type of work. However given the size of this project is at the lower end of Projects undertaken by the Alliance, it is considered appropriate.

The costing of the Work Package is discussed in detail in Section 6.
1. **PURPOSE**

This TOC Project Report defines the:

- Objective of Work Package 7643 SPS59 Logan Road West Upgrade Works;
- Scope of Works required to deliver Work Package objective/s; and
- Target Outturn Cost (TOC).

2. **PROJECT BACKGROUND**

The primary business driver for this project is growth. The pump station catchment population has increased at approximately 15% per year from 2009 to 2012, and is expected to continue at this rate until full development of the catchment by 2016. In particular, development to the west of the pump station site has increased the wastewater loads by 300 EP over the past three years, and growth is expected to continue to completion (an additional 600 EP) within the next few three to four years.

The pump station also currently fails to meet DSS for peak wet weather flows, and assuming the bifurcation is plugged this situation will immediately worsen. The objectives of this project are:

- Increase SPS59 rising main capacity to cater for ultimate wastewater load;
  
  This rising main augmentation will increase the capacity of the existing pump station and the analysis of the system resistance curve indicates that the existing SPS59 pumps and a DN150 rising main will meet the projected ultimate wastewater load.

- Increase network storage to reduce overflows during wet weather events; and
  
  The existing pump station and upstream network can only accommodate 3.8 hours of dry weather flow storage. This can be increased to around 4 hours by modifying the pump station operational levels; however, these changes cannot accommodate any further growth. Additional emergency storage will be constructed in conjunction with the rising main and gravity main augmentations, including a new physical overflow structure for the pump station catchment to replace the current overflow arrangement into the QUU network.

- Increase discharge flows from SPS59
  
  The flow discharged from the rising main will increase from approximately 10.2 L/s to 24 L/s following the upgrade. This will result in significant surcharging in the existing downstream gravity main. A bifurcation at the rising main discharge manhole and a new section of DN150 gravity main will be constructed to relieve surcharging in this downstream main and meet the Desired Standards of Service.
3. PROJECT SCOPE

The scope of this work package includes project management, design, procurement, approvals, construction, commissioning and handover of the SPS59 Logan West Upgrade Works to Council.

Issued for Tender (IFT) drawings of the proposed works are provided in Appendix B. The physical scope of works to be carried out during delivery of this Work Package includes:

- Open trench construction of 760m of DN150 Rising Main including connection to SPS59, Bypass Pump-out Arrangement, Overflow Arrangement, Thrust Restraints, Air Valve Arrangements and Manholes.
- Micro tunnelling construction of 70m of OD180 PE Rising Main beneath Stegemann and Logan Roads.
- Open trench construction of 120m of DN225 PVC Gravity Main from the Rising Main Discharge Manhole in Harris Road to the existing Manhole in Louise Road.
- Construction of DN1200 RCP Emergency Storage and Overflow adjacent to SPS59 including Maintenance Manholes, Vent Pipe, Odour Control Unit and connection to the existing Manhole SHM41280.

3.5 Project Schedule

The proposed Detailed Schedule for Work Package Delivery has been included in Appendix C - Project Schedule.

Table 3-1: WP7643 Proposed Key Milestones for this Work Package

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date/Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Date for TOC Report ALG Approval</td>
<td>05/12/2014</td>
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<tr>
<td>Target Date for TOC Report Logan City Council Approval</td>
<td>19/12/2014</td>
</tr>
<tr>
<td>Target Date for Procurement Commencement</td>
<td>19/12/2014*</td>
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<tr>
<td>Target Date for Construction Commencement</td>
<td>16/02/2015*</td>
</tr>
<tr>
<td>Target Date for Commissioning and Handover</td>
<td>25/06/2015*</td>
</tr>
</tbody>
</table>

*Based on Council approval date of 19/12/2014

4. DESIGN AND TOC DEVELOPMENT

4.1 Design Development

The Logan Water Alliance (LWA) is responsible for the process and detailed design and documentation for the SPS59 Logan Road West Upgrade Works.
The design for the works has progressed to “Issued for Tender” stage. Design has been based on Airborne Laser Survey (ALS), field survey and Geotechnical Investigation. Specific deliverables from the TOC Development stage included:

- Project drawings, data sheets, functional description and specifications suitable for tendering;
- Project delivery overview including a delivery program, resource schedules and subcontracting methodologies;
- 30% and 85% design opportunity and risk (DOAR) workshop minutes;
- Safety in Design risk register; and
- Detailed TOC Estimates.

Design has been based on extensive consultation with key Council stakeholders in both Asset Management and Water Operations, together with detailed planning and options analyses.

Design for the SPS59 Logan Road West Upgrade Works Project has been reviewed through a 30% DOAR and 85% DOAR workshop held on 14 August 2014 and 26 November 2014 respectively. Design and constructability reviews have been completed by members of the Alliance team and Council Independent Estimator with consolidated design comments integrated into the project.

All Issued For Construction (IFC) drawings and all Work As Executed (WAE) drawings will be reviewed by the alliance team and RPEQ certified as applicable.

4.2 TOC Development

During the TOC development period, the design has been reviewed and amended as necessary to include changes associated with the 30% and 85% DOAR workshops.

Constructability reviews highlighted a number of opportunities to refine the completed design to bring added benefits to the project at reduced cost during the construction and commissioning stages. A highlight of these benefits are summarised in Section 6.3 below.

4.3 Early Procurement Approval

There has been no long lead time equipment or materials identified that would require procurement prior to the approval of the TOC.

4.4 Departures from Work Package Definition Statement (WPDS)

There have been no departures from the WPDS.

4.5 Survey and Geotechnical Investigation

Survey and geotechnical investigation was carried out by Cardno Bowler in November 2014 consisting of the following:
- Drilling, logging and sampling of 11 boreholes at critical points along the alignment
- Detailed survey and service location

A copy of the final geotechnical report is attached as Appendix F.

5. PROPOSED DELIVERY METHODOLOGY

Construction works on the Project are expected to commence in late January 2015, following approval from the Logan City Council, with construction completion scheduled for June 2015. The Project Schedule is attached in Appendix C. The schedule has been based on input provided by subcontractors and suppliers during the TOC Development Phase.

All works on live assets will be planned, coordinated and executed in consultation with Council operations personnel. A proactive approach has been taken in the TOC Development Phase with preliminary Interim Operations Plans and isolation and change over procedures already being drafted and reviewed for further refinement throughout the life of the project. These isolation/change over procedures have also been issued to subcontractors through the tendering process for their information. Detailed Interim Operations Plans finalising commissioning and cutover procedures will be developed throughout the project.

5.1 Procurement Philosophy

Given the size of this project, work has been combined into one subcontract covering pipe laying and micro tunnelling and the preferred subcontractor was selected from 5 tender submissions based on price, conformance with the tender documentation and previous experience delivering projects for the Alliance.

The Alliance will also directly procure the following materials and free-issue to the Subcontractor to maximise value for money to Council:

- Site Offices, Crib Room, Ablution Block including fenced compound;
- Pipe, valves, actuators, flow meters and fittings;
- Precast Pits, Manholes and Covers

5.2 Safety

All construction activities will be conducted in accordance with the relevant and current Queensland Work Health and Safety Act 2011, the Alliance Safety, Quality and Environment (SQE) Management Plan and other relevant Project Management Plans.

Safe Work Method Statements (SWMS) and Risk Assessments will be required for all construction activities. All SWMS will be reviewed and approved by the Alliance prior to commencement of works.
5.3 Environment

A project specific Environmental Management Plan (EMP) has been prepared for the project to manage project specific environmental risks. EMP includes management systems, processes and requirements for the subcontractor to ensure below mentioned risks are addressed and project is delivered with high environmental standards and in accordance with the legislative requirements. A copy of the EMP is included as Appendix H.

5.3.1 Cultural Heritage

Aboriginal Cultural Heritage search was carried out through the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA). The searches did not locate any record of items of Aboriginal cultural heritage significance. The site represents a Category 4 area ‘Areas previously subject to significant ground disturbance’ under the cultural heritage Duty of Care Guidelines. Consultation with registered aboriginal party is not required prior to construction.

A search of the Australian Heritage Database, Queensland Heritage Database and council planning schemes were undertaken. The search did not locate any record of items of non-Indigenous heritage at the project site in any of these databases or schemes.

5.3.2 Ecological Requirements

Field assessments undertaken at the project site in September 2014 confirmed that the proposed works minimises the clearance of native vegetation by utilising existing road reserves and parks.

No threatened species or Endangered Ecological Communities pursuant to Commonwealth or State Government legislation were recorded within or directly adjacent to the alignment during preliminary field assessments of the pipeline alignment. The proposed works are not located within an assessable development area under the South East Queensland Koala Conservation State Planning Regulatory Provisions and based on the Koala Habitat Values Maps (SPP_KHV19), the alignment traverses areas mapped as Low Value Rehabilitation habitat and generally not suitable.

Limited mature habitat trees and sensitive areas related to waterway and wetland habitat have been recorded along or in close proximity to the project and the impacts to these trees/areas will be avoided or minimised as far as practicable to meet requirements for ‘tampering with breeding places’ which is regulated under the NC Act. Based on the Protected Plants Flora Survey Trigger Map, the project is not located within a High risk area and therefore does not trigger further assessment with respect to clearing native plants under the provisions of the NC Act. Based on the Protected Plants Flora Survey Trigger Map, the project is not located within a High risk area and therefore does not trigger further assessment with respect to clearing native plants under the provisions of the NC Act. No formal Permit to clear of native vegetation is required under the Vegetation Management Act 1999 (VM Act), as the works are for the purposes of constructing Water Cycle Management.
Infrastructure which provides an exemption. Approval from Council parks branch will be secured prior to clearing any vegetation within council parks and street trees.

5.3.3 Other Environmental Requirements (non-ecological)

Dewatering will be required where groundwater and rainwater trapped in excavations are encountered during excavation works.

A search of the EMR and Contaminated Land Register (CLR) was undertaken. No sites were identified within a lot on the EMR or CLR.

Additional sediment and erosion control may be required at site given the proximity to adjacent waterways.

The site is located within parklands and adjacent to residential properties. Management of noise, vibration (impact to existing infrastructure) and air quality (dust and emission) will be required during construction.

Two waterway crossings will be required to be constructed using open trench technique. The site is located within a high risk fire ant zone. The project will require management actions to prevent the spread of fire ants.

5.4 Approvals

Table 3.4 outlines the property constraints for construction of the planned infrastructure within the proposed alignment.

A construction ‘permit to enter’ and private property easement is required over land at 2814-2818 Logan Road, Underwood (Lot 1 on RP92737). A report for Council’s approval to proceed with the acquisition of the easement was considered by the Road and Water Infrastructure Committee on 24 November 2014, and is expected to be endorsed at the Ordinary Council meeting on 2 December 2014. Council’s Corporate Property team has estimated the acquisition of the easement to be valued at approximately $18,500, and an additional $12,500 (approximately) should be allowed for reasonable legal fees, valuation fees and grantee costs (e.g. stamp duty, survey plan and registration fees). It is anticipated that the easement application will take 2 months to process and approval will be in place prior to commencement of micro tunnelling which is scheduled to commence late March 2015.

The alignment traverses Logan Road, and the LWA approvals team will apply to the Department of Transport and Main Roads (TMR) for a Letter of No Objection. Traffic Control Permits or QLD Police approvals will be obtained by the construction contractor (if required). Initial comments have been obtained from Council’s Road Infrastructure Planning team in relation to the proposed infrastructure with the local road reserves of Kettniss Street, Southwalk Esplanade, Stegemann Road, Frankcom Drive and Harris Road. It is assumed the construction contractor will obtain the necessary Road Excavation Permits from Council.

Works are proposed within a Reserve for Drainage (Lot 900 on SP207300) that is under trust to Council. An easement is required for the work. The Department of Natural Resources and Mines (DNRM) have advised Council’s Corporate Property team of their ‘in-principle’ approval to the easement. During construction, survey
will be undertaken over the alignment to finalise the extent of the easement, and the LWA approvals team will coordinate the submission of the survey plan to Council, who will lodge the survey plan with the DNRM.

Works to SPS59 are also proposed. An Environmental Authority for Environmentally Relevant Activity 63 (Sewage Treatment) is required for works associated with the pump station. The triggers for the need to obtain an Environmental Authority are:

1. An increase in total design capacity, from approximately 39.6KL/hr, to 86.4KL/hr.
2. A change in where wet weather overflows are discharged. Currently they are contained within the system. Wet weather overflows are now proposed to discharge into the Reserve for Drainage (Lot 900 on SP207300).

The LWA approvals team will apply to the Department of Environment and Heritage Protection for the Environmental Authority. This application is expected to take approximately two to four weeks to be processed by the Department.

Notification has been given to Council’s Corporate Property team of the proposed works within Council freehold land at 0 Logan Road, Underwood (Lot 2 on RP910633).

Table 5-1: Property Constraints

<table>
<thead>
<tr>
<th>Proposed Infrastructure</th>
<th>Site location</th>
<th>Tenure</th>
<th>Requirements</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN150 DICL Pipeline</td>
<td>0 Logan Road, Underwood (Lot 2 RP910633)</td>
<td>Freehold</td>
<td>Notification to Logan City Council’s Corporate Property team</td>
<td>LWA approvals team have notified Council’s Corporate Property team</td>
</tr>
<tr>
<td>OD180 PE100; overflow; McBerns Odour Control Unit; DN150 DICL Pipeline</td>
<td>0 Rolfe Circuit, Underwood (Lot 900 SP207300)</td>
<td>Reserve for Drainage under trust to Council</td>
<td>Obtain easement over park</td>
<td>DNRM have granted In Principle agreement to the easement. Easement to be prepared by cadastral surveyor during construction</td>
</tr>
<tr>
<td>DN150 DICL Pipeline; 9m x 3m Launch Pit; part of OD180 PE100 Carrier Pipe; Discharge Manhole</td>
<td>Kettiniss Street, Southwalk Esplanade, Stegemann Road, Frankcom Drive, Harris Road</td>
<td>Local road reserves</td>
<td>Obtain approval from Council’s Road Infrastructure Planning team</td>
<td>LWA approvals team have obtained comments from Council’s Road Infrastructure Planning team. Contractor will obtain Road Excavation Permit</td>
</tr>
</tbody>
</table>
### Proposed Infrastructure

<table>
<thead>
<tr>
<th>Site location</th>
<th>Tenure</th>
<th>Requirements</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logan Road</td>
<td>State controlled road</td>
<td>Letter of No Objection, and Traffic Control Permit from DTMR</td>
<td>LWA approvals team to submit a Road Corridor Permit application to DTMR for approval. Contractor will obtain Traffic Control Permit (if required)</td>
</tr>
<tr>
<td>2814 Logan Road, Underwood (Lot 1 RP92737)</td>
<td>Freehold to private land owner</td>
<td>Permit to Enter for construction; and Easement</td>
<td>LWA to initiate discussions with affected landowner, once report has been approved at Ordinary Council meeting (2 December 2014)</td>
</tr>
</tbody>
</table>

### 5.5 Community

The delivery of this project is expected to have a moderate level of impact on stakeholders, given works will be carried out in an urban area.

Whilst there are no significant community risks associated with the proposed works, a preliminary community and stakeholder assessment has identified a number of issues that will need to be managed during construction:

- Localised construction impacts such as noise, dust, vibration, odour and working hours
- Temporary traffic changes around work sites during construction
- Approach taken for driveway crossings and property access during works
- Impacts on / access to pedestrian footpaths and bikeways
- Compensation payments for construction access areas on private property (if required)
- Increased heavy vehicle traffic in works areas to deliver materials to / from sites
- Removal of trees / wildlife habitat at work sites to make way for construction
- Dissatisfaction at construction works being carried out in a newly established residential estate (The Grove Estate)
- Interest in site restoration to be undertaken following practical completion of the works
- Potential disruptions to the existing wastewater network and other underground services during construction
- A desire to protect the health and safety of the local community during project works.
The Alliance will implement a range of communication activities in an effort to minimise unwanted impacts on project stakeholders, and ensure that the community is informed about the project’s scope, timing, activities and benefits.

Communication activities will include briefings with local Councillors, distribution of written communication materials, posting of information on Council’s website and management of individual stakeholder issues / concerns. All activities will be conducted in accordance with the WP7643 Community & Stakeholder Engagement Plan included in Appendix I.

6. COSTINGS

6.1 Estimation Methodology

The tender package was issued to a select group of sub-contractors based on their experience in successfully completing similar works for the Alliance or on their reputation within the industry.

Following receipt of tenders for the works from all invited sub-contractors, discussions were held with three tenderers for each package of works to confirm scope coverage and delivery methodologies. All tenderers were requested to review their pricing and to make appropriate allowance for any exclusions and or omissions raised during the interviews.

A summary of the Subcontractors contacted and amendments made are detailed below:

Table 6-1: WP7643 Pipe Laying and Micro Tunnelling

<table>
<thead>
<tr>
<th>Tenderer</th>
<th>Tender</th>
<th>Final Price</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBD Constructions</td>
<td>$629,870</td>
<td>$714,350</td>
<td>Interviewed. Changes based on interview and post tender addendum.</td>
</tr>
<tr>
<td>Demacs Construction</td>
<td>$658,727</td>
<td>$774,059</td>
<td>Interviewed. Changes based on interview and post tender addendum.</td>
</tr>
<tr>
<td>Foley &amp; Kuch</td>
<td>$666,893</td>
<td>$693,221</td>
<td>Interviewed. Changes based on post tender addendum. Price included in the TOC</td>
</tr>
<tr>
<td>AWD Civil</td>
<td>$697,549</td>
<td>$796,734</td>
<td>Interviewed. Changes based on interview and post tender addendum.</td>
</tr>
<tr>
<td>NTS</td>
<td>$776,780</td>
<td></td>
<td>Not interviewed due to price</td>
</tr>
<tr>
<td>First Principles Estimate</td>
<td></td>
<td>$713,262</td>
<td></td>
</tr>
</tbody>
</table>

The Alliance has taken the price from Foley & Kuch into the TOC as they have resources available for a February 2015 commencement, submitted a conforming Tender and demonstrated full comprehension of the
Scope of Work during the interview and post interview correspondence. Our First Principles Estimate demonstrates that Foley and Kuch’s pricing is in line with the Alliances expectations.

### 6.2 Supply of Materials

Tender packages for the works were issued to suppliers to provide the following materials for the project:

- Site Offices, Crib Room, Ablution Block including fenced compound;
- Pipe, valves, actuators, flow meters and fittings;
- Precast Plts, Manholes and Covers

Pricing was obtained from a minimum of 3 vendors and the preferred vendor selected based on price and compliance with design and technical requirements.

### 6.3 Value-Added Initiatives

Within this TOC, the Alliance has included a number of value-added initiatives including:

- Under boring of driveways to reduce the impact of this work on the community.
- Micro tunnelling under Stegemann and Logan Roads to reduce traffic impact of this work on the community.
- Concrete encasement of the pipeline under waterways to protect from damage during wet weather events.
- Installation of a bifurcated discharge manhole in Harris Road to enable flows to be diverted through the existing DN150 gravity main and new DN225 gravity main.

### 6.4 Cost Break Down

The Project TOC is in line with the First Principles Estimate produced during TOC Development Phase for capital works which was priced at $1,374,392 +/- 10% (Excl. GST)

Table 6.2 below is a cost summary for this Work Package. All costs shown exclude GST. Further details of the detailed cost estimate are included in Appendix A – Detailed Cost Estimate
Table 6-2: WP7643 TOC Breakdown

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Total $</th>
<th>Tenix $</th>
<th>PB $</th>
<th>Cardno $</th>
<th>Council $</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TOC Development Costs</td>
<td>$106,180</td>
<td>$54,279</td>
<td>$36,239</td>
<td>$15,662</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Work Package - Project Management</td>
<td>$174,499</td>
<td>$174,499</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Work Package – Direct Cost</td>
<td>$917,432</td>
<td>$850,431</td>
<td>$52,527</td>
<td>$14,474</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Council Direct Costs</td>
<td>$6,600</td>
<td></td>
<td></td>
<td></td>
<td>$6,600</td>
</tr>
<tr>
<td>5</td>
<td>Risk and Opportunities</td>
<td>$18,982</td>
<td>$18,982</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>WP 7643 - TOC</td>
<td>$1,223,693</td>
<td>$1,098,191</td>
<td>$88,766</td>
<td>$30,136</td>
<td>$6,600</td>
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<td>6</td>
<td>Project Fee</td>
<td>$127,364</td>
<td>$97,739</td>
<td>$22,091</td>
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<td>$7,534</td>
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<tr>
<td></td>
<td>WP 7643 - TOTAL</td>
<td>$1,351,057</td>
<td>$1,195,930</td>
<td>$110,857</td>
<td>$37,670</td>
<td>$6,600</td>
</tr>
</tbody>
</table>

7. PROJECT RISKS

7.1 Alliance Risks and Opportunity

A risk assessment has been undertaken to give a view of the likelihood and consequence of risks associated with the delivery of this Work Package. A risk register has been completed for the project and is included in Appendix B – Risk Registers.

The risk register containing risks included in the TOC has been analysed using Monte Carlo risk modelling at a P50 level in accordance with the PAA (using @Risk software). The following risk value has been included in the TOC.

- WP7643 SPS59 Logan Road West Upgrade Works $18,982

The risk and opportunity allowance weighting represents 2% of work package direct costs for this project. This is at the lower end of industry standards for this Project as no significant risks have been identified for the SPS59 Logan Road West Upgrade.

7.2 Excluded Risks

No Excluded Risks have been identified for this project.

7.3 Provisional Sums

No Provisional Sums have been identified for this project.
Appendix A  Detailed Cost Estimate
# Submission Schedule

WP43 - Logan Road West SP 59 (Subbie, rev 6)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Rate</th>
<th>Amount (AUD)</th>
</tr>
</thead>
</table>

### A TOC DEVELOPMENT COSTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Rate</th>
<th>Amount (AUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOC Development</td>
<td>item</td>
<td>1.000</td>
<td>106,180.00</td>
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</tbody>
</table>

**Total - TOC DEVELOPMENT COST** | 106,180 |

### B Work Package - General Items

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Rate</th>
<th>Amount (AUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery Team - Project Management and Supervision</td>
<td>item</td>
<td>1.000</td>
<td>110,707.00</td>
<td>110,707</td>
</tr>
<tr>
<td>Site Facilities</td>
<td>item</td>
<td>1.000</td>
<td>57,436.00</td>
<td>57,436</td>
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<tr>
<td>Q-Leave Levy</td>
<td>item</td>
<td>1.000</td>
<td>6,356.00</td>
<td>6,356</td>
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</table>

**Total - Work Package - General Items** | 174,499 |

### C DELIVERY COST

#### Head Contractor's Cost - Logan Water Alliance

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
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<th>Unit Rate</th>
<th>Amount (AUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Team</td>
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<td>1.000</td>
<td>31,742.00</td>
<td>31,742</td>
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<tr>
<td>Environmental Team</td>
<td>item</td>
<td>1.000</td>
<td>17,003.00</td>
<td>17,003</td>
</tr>
<tr>
<td>Planning &amp; Approval Team</td>
<td>item</td>
<td>1.000</td>
<td>18,257.00</td>
<td>18,257</td>
</tr>
<tr>
<td>Easement Approval</td>
<td>item</td>
<td>1.000</td>
<td>12,000.00</td>
<td>12,000</td>
</tr>
<tr>
<td>Community</td>
<td>item</td>
<td>1.000</td>
<td>24,900.00</td>
<td>24,900</td>
</tr>
<tr>
<td>Defects Liability Period Cost Allowance</td>
<td>item</td>
<td>1.000</td>
<td>18,400.00</td>
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</table>

**Total - Head Contractor's Cost - Logan Water Alliance** | 122,302 |

### D Civil Works

#### D.1 General Items

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>Insurances</td>
<td>item</td>
<td>1.000</td>
<td>5,000.00</td>
<td>5,000</td>
</tr>
<tr>
<td>Management and Supervision</td>
<td>item</td>
<td>1.000</td>
<td>12,000.00</td>
<td>12,000</td>
</tr>
<tr>
<td>Site Mobilisation, Prelims &amp; Establishment</td>
<td>item</td>
<td>1.000</td>
<td>5,000.00</td>
<td>5,000</td>
</tr>
<tr>
<td>Preparation of site specific safety management plan</td>
<td>item</td>
<td>1.000</td>
<td>750.00</td>
<td>750</td>
</tr>
<tr>
<td>Preparation of site specific environment management plan</td>
<td>item</td>
<td>1.000</td>
<td>750.00</td>
<td>750</td>
</tr>
<tr>
<td>Prepare site-specific documentation including SWMS, JSEAs, Risk Assessments, IOPs, ITPs with witness and hold points listed</td>
<td>item</td>
<td>1.000</td>
<td>1,500.00</td>
<td>1,500</td>
</tr>
<tr>
<td>Prepare traffic management plan and traffic guidance schemes, including approvals from LCC and QPS and liaison with LWA community team</td>
<td>item</td>
<td>1.000</td>
<td>3,500.00</td>
<td>3,500</td>
</tr>
<tr>
<td>Prepare pre-construction and post-construction Arborist reports</td>
<td>item</td>
<td>1.000</td>
<td>5,000.00</td>
<td>5,000</td>
</tr>
<tr>
<td>Preparation of all other documentation required under the contract</td>
<td>item</td>
<td>1.000</td>
<td>1,500.00</td>
<td>1,500</td>
</tr>
<tr>
<td>Construct and maintain a safe all-weather access for construction and material deliveries</td>
<td>item</td>
<td>1.000</td>
<td>3,500.00</td>
<td>3,500</td>
</tr>
<tr>
<td>Construct secure compound(s) for materials (Materials shall be the subcontractors responsibility when delivered to site)</td>
<td>item</td>
<td>1.000</td>
<td>1,500.00</td>
<td>1,500</td>
</tr>
</tbody>
</table>
### WP43 - Logan Road West SP 59 (Subbie, rev 6)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Rate</th>
<th>Amount (AUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F &amp; K</td>
<td>Site Demobilisation</td>
<td>item</td>
<td>1.000</td>
<td>5,000.00</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>Total - General Items</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>45,000</strong></td>
</tr>
<tr>
<td><strong>D.2</strong></td>
<td>Construction Works</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Clear ROW in accordance with LWA's EMP, including Arborist report and fauna spotter-catcher</td>
<td>item</td>
<td>1.000</td>
<td>10,000.00</td>
<td>10,000</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Set Out of Works</td>
<td>item</td>
<td>1.000</td>
<td>5,000.00</td>
<td>5,000</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Traffic Control and Temporary Barriers/Fencing</td>
<td>item</td>
<td>1.000</td>
<td>45,000.00</td>
<td>45,000</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Environmental controls (install, maintain and remove), including erosion and sediment controls, tree protection and weed management</td>
<td>item</td>
<td>1.000</td>
<td>5,000.00</td>
<td>5,000</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Acid sulphate soil and leachate testing, treatment and disposal</td>
<td>item</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F &amp; K</td>
<td>De-watering including water testing and</td>
<td>item</td>
<td>1.000</td>
<td>3,500.00</td>
<td>3,500</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Location and ptoholing of existing services</td>
<td>item</td>
<td>1.000</td>
<td>12,500.00</td>
<td>12,500</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Daily housekeeping of site including road and pathway sweeping</td>
<td>item</td>
<td>1.000</td>
<td>3,500.00</td>
<td>3,500</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Coordination with authorities</td>
<td>item</td>
<td>1.000</td>
<td>3,000.00</td>
<td>3,000</td>
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<tr>
<td>F &amp; K</td>
<td>Prepare As-Constructed drawings certified by licensed surveyor (including red-line CAD drawings)</td>
<td>item</td>
<td>1.000</td>
<td>14,360.00</td>
<td>14,360</td>
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<tr>
<td><strong>D.2.1</strong></td>
<td>Pump Station Pipework</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Cut-in to existing SPS59 Pump Station Rising Main (Refer Drawing 7720-001-S-DWG-CI-2010 for details)</td>
<td>item</td>
<td>1.000</td>
<td>3,500.00</td>
<td>3,500</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Trench and lay DN150 DICL Rising Main Ch0.000 to Ch14.190 including: Thrust Blocks and Inline Valve Restraints (Refer Drawing 7720-001-S-DWG-CI-2010 for details) DN100 Bypass Pump out Arrangement (Refer Drawing 7720-001-S-DWG-CI-2010 for details) Cut-in to existing Manhole and construct Overflow Chamber, Outlet Headwall and Grouted Stone Pitching (Refer Drawing 7720-001-S-DWG-CI-2012 for details)</td>
<td>item</td>
<td>1.000</td>
<td>33,600.00</td>
<td>33,600</td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Trench and lay OD180 PE100 Rising Main Ch14.190 to Ch28.210 including: Concrete encasement, Thrust Block, Inline Thrust Restraint and reinstatement with Jute Mat, Site Rocks and Planting (Refer Drawing 7720-001-S-DWG-CI-2011 for details)</td>
<td>item</td>
<td>1.000</td>
<td>29,700.00</td>
<td>29,700</td>
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<tr>
<td><strong>D.2.2</strong></td>
<td>Emergency Storage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F &amp; K</td>
<td>Emergency Storage (Reference Drawing SEQ-SPS-1402-1 for further details) Trench and install DN1200 Emergency Storage including Concrete End Walls, Maintenance Holes (3-off) and internal Epoxy Coating. Connection to existing Discharge Manhole SMH1280 (Refer Drawing SEQ-SEW-1303-1 Type 'Y' for connection details) Installation of McBerns Odour Control Unit including concrete slab.</td>
<td>item</td>
<td>1.000</td>
<td>122,750.00</td>
<td>122,750</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Unit</td>
<td>Quantity</td>
<td>Unit Rate</td>
<td>Amount</td>
</tr>
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<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>Connection of concrete encased DN100 uPVC Vent Pipe from SMH41280 to Maintenance Holes and McBerns Odour Control Unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|      | **F & K**  
**Trench and lay DN150 DICL Rising Main Ch28.210 to Ch682.030 including:**  
Air Valve including McBerns Odour Control Unit and concrete slab (Refer Drawing 7720-001-S-DWG-CI-2014 for details)  
Under bore of driveway crossings as required  
Concrete encasement as required                                                                                                                                                                                                                                                                                                                                 | item | 1.000    | 124,400.00 | 124,400  |
|      | **F & K**  
**Trench and lay DN150 DICL Rising Main Ch750.000 to Ch790.023 including:**  
Decommissioning of existing DN100 Rising Main and connection of the existing DN100 Rising Main to the new Discharge Manhole (Refer Drawing 7720-001-S-DWG-CI-2005 for details)  
Discharge Manhole (Epoxy lined by Sub-contractor)  
Connection to new Discharge Manhole (Refer Drawing 7720-001-S-DWG-S-2016 for connection details)  
McBerns Odour Control Unit (Refer Drawing 7720-001-S-DWG-CI-2014 for details)                                                                                                                                                                                                                                                                               | item | 1.000    | 34,250.00  | 34,250   |
|      | **F & K**  
**Trench and lay DN225 PVC SN8 Gravity Main from Ch118.130 to Ch0.000 including:**  
Connection to new Discharge Manhole (Refer Drawing 7720-001-S-DWG-S-2016 for connection details)  
Discharge Manhole 1/1  
Connection to new Discharge Manhole 1/1 (Refer Drawing 7720-001-S-DWG-S-2016 for connection details)  
Connection to existing Discharge Manhole (Refer Drawing 7720-001-S-DWG-S-2016 for connection details)                                                                                                                                                                                                                              | item | 1.000    | 68,850.00  | 68,850   |
|      | **F & K**  
**Micro Tunnelling for OD180 PE100 PN16 Rising Main from Ch682.030 to Ch713.350 and Ch713.350 to Ch750.000 including:**  
Construction of Launch and Receiving Pits  
Enveloper Pipe (Designed and supplied by the Sub-contractor)  
Thrust Blocks and Inline Restraints  
Installation of Product Pipe into Enveloper Pipe including rubber insertion between pipe and timber runners, timber runners and grouting of void (Rubber insertion, timber runners and Gerard strapping to be supplied by the Sub-contractor)                                                                                                                                               | item | 1.000    | 82,811.00  | 82,811   |
|      | **F & K**  
Pressure test gravity sewerage pipework and vacuum test sewerage manholes                                                                                                                                                                                                                                                                                                                                                    | item | 1.000    | 1,500.00   | 1,500    |
|      | **F & K**  
Reinstatement including making good any damage to existing infrastructure and ground surfaces.                                                                                                                                                                                                                                                                                                                                 | item | 1.000    | 40,000.00  | 40,000   |
### Item Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Rate</th>
<th>Amount (AUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F &amp; K</td>
<td>Hydrostatic testing of rising main pipework including thrust restraint, temporary works, and water disposal in accordance with the EMP.</td>
<td>item</td>
<td>1.000</td>
<td>3,500.00</td>
<td>3,500</td>
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<tr>
<td>D.3</td>
<td>Commissioning</td>
<td>item</td>
<td>1.000</td>
<td>1,500.00</td>
<td>1,500</td>
</tr>
<tr>
<td>E</td>
<td>Free Issue Materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pentair Pipe &amp; Fitting Supply</td>
<td>item</td>
<td>1.000</td>
<td>64,966.00</td>
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<td>Rocla Concrete Products</td>
<td>item</td>
<td>1.000</td>
<td>26,949.00</td>
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<tr>
<td></td>
<td>McBerns Odour Control Units</td>
<td>item</td>
<td>1.000</td>
<td>8,865.00</td>
<td>8,865</td>
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<tr>
<td></td>
<td>TAS Trash Screens</td>
<td>item</td>
<td>1.000</td>
<td>1,130.00</td>
<td>1,130</td>
</tr>
<tr>
<td>F</td>
<td>Risk &amp; Opportunity</td>
<td>item</td>
<td>1.000</td>
<td>18,982.00</td>
<td>18,982</td>
</tr>
<tr>
<td>G</td>
<td>LOGAN CITY COUNCIL</td>
<td>item</td>
<td>1.000</td>
<td>6,600.00</td>
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<tr>
<td>H</td>
<td>PROJECT FEE</td>
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<td></td>
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<tr>
<td></td>
<td>Tenix Construction Fee</td>
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<td>97,739.00</td>
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<td>Parsons Brinckerhof Fee</td>
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<td>1.000</td>
<td>22,091.00</td>
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<td>Cardno Fee</td>
<td>item</td>
<td>1.000</td>
<td>7,534.00</td>
<td>7,534</td>
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</table>

**Total - Construction Works**

- 646,721

**Total - Commissioning**

- 1,500

**Total - Seperable Portion 1**

- 693,221

**TOTAL - SUBCONTRACTOR'S COST**

- 693,221

**Free Issue Materials**

- 101,910

**Total - Direct Cost**

- 795,131

**TOTAL DELIVERY COST**

- 917,433

**RISK & OPPORTUNITY**

- 18,982

**LOGAN CITY COUNCIL**

- 6,600

**Target Outturn Cost (TOC)**

- 1,223,694

**PROJECT FEE**

- 127,364

**TOTAL COST - WP 43**

- 1,351,058

**Total for project**

- 1,351,058
Appendix B  Risk Register
Workbook Name: Appendix B WP7643 SPS59 Logan Road West Upgrade Works Risk Register Rev. D 27-11-14.xlsx

Number of Simulations: 1
Number of Iterations: 10000
Number of Inputs: 9
Number of Outputs: 1
Sampling Type: Monte Carlo
Simulation Start Time: 11/27/14 12:21:09
Simulation Duration: 00:00:02
Random # Generator: Mersenne Twister
Random Seed: 2193056431

Summary Statistics for 7643 Risk Register SPS59

<table>
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<tr>
<th>Statistics</th>
<th>Percentile</th>
<th>Value</th>
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<tr>
<td>Minimum</td>
<td>0.00%</td>
<td>$0.02</td>
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<tr>
<td>Maximum</td>
<td>10.00%</td>
<td>$177,778.92</td>
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<tr>
<td>Mean</td>
<td>15.00%</td>
<td>$26,342.34</td>
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<td>Std Dev</td>
<td>20.00%</td>
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<td>Variance</td>
<td>25.00%</td>
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<td>Skewness</td>
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<td>Kurtosis</td>
<td>35.00%</td>
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<td>Median</td>
<td>40.00%</td>
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<td>50.00%</td>
<td>$4.45</td>
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<tr>
<td>Left P</td>
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<td>Right X</td>
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<td>$78,132.71</td>
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<td>Right P</td>
<td>65.00%</td>
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<tr>
<td>Diff X</td>
<td>70.00%</td>
<td>$78,128.26</td>
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<tr>
<td>Diff P</td>
<td>75.00%</td>
<td>$36,104.36</td>
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<tr>
<td>Min</td>
<td>80.00%</td>
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<tr>
<td>Filter Min</td>
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<td>Filter Max</td>
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<tr>
<td>Will by C</td>
<td>95.00%</td>
<td>$78,132.71</td>
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Regression and Rank Information for 7643 Risk Reg

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<th>Name</th>
<th>Regr</th>
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<td>B1 / B2 / Rock encr. -40M...</td>
<td>0.654</td>
<td>0.574</td>
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<td>A / A1 / Insurance coverage -exp</td>
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<td>0.467</td>
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<td>3</td>
<td>A2 / A3 / Subcontract -law</td>
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<td>B / B1 / Inclement weather -80%</td>
<td>0.265</td>
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<td>Allow 100m3 of roc</td>
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<td>Risk No. A1 / Residential cost</td>
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<td>7643 Risk Register</td>
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# 7643 RISK REGISTER SP559 LOGAN ROAD WEST UPGRADE WORKS

## COMMISSIONING, COMPLETION AND PERFORMANCE TESTING

### A1 Contact with LCC to be maintained during construction to keep them informed of critical requirements

<table>
<thead>
<tr>
<th>Element</th>
<th>Analysis</th>
<th>Consequence</th>
<th>Likelihood</th>
<th>Cost Estimate ($)</th>
<th>Delivered Cost</th>
<th>Risk Value (L x ML)</th>
<th>$ Value</th>
<th>Risk Rating</th>
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<tbody>
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<td>A1</td>
<td>Moderate</td>
<td>Minor</td>
<td>Rare</td>
<td>$8,125</td>
<td>$5,000</td>
<td>$3,125</td>
<td>$16,250</td>
<td>Minor</td>
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## NATURAL CONDITIONS & EVENTS

### B1 Inclement weather, including cyclone, prolonged wet weather, etc beyond TDC estimate including consequential damage

- **Risk Event Description**: Inclement weather, including cyclone, prolonged wet weather, etc beyond TDC estimate including consequential damage
- **Element**: B1
- **Analysis**: Moderate
- **Consequence**: Insignificant
- **Likelihood**: Unlikely
- **Cost Estimate**: $1,750
- **Delivered Cost**: $1,000
- **Risk Value**: $1,750

## APPROVALS

### C1 Reference checks carried out on subcontractor. Reasonable range of prices received (i.e. Pricing seems reasonable)

- **Risk Event Description**: Reference checks carried out on subcontractor. Reasonable range of prices received (i.e. Pricing seems reasonable)
- **Element**: C1
- **Analysis**: Moderate
- **Consequence**: Minor
- **Likelihood**: Rare
- **Cost Estimate**: $3,500
- **Delivered Cost**: $2,000
- **Risk Value**: $3,500

## COMMERCIAL AND LEGAL RELATIONSHIPS

### A1 Subcontractor claim through scope gaps in project

- **Risk Event Description**: Subcontractor claim through scope gaps in project
- **Element**: A1
- **Analysis**: Moderate
- **Consequence**: Minor
- **Likelihood**: Rare
- **Cost Estimate**: $8,125
- **Delivered Cost**: $5,000
- **Risk Value**: $8,125

## TECHNICAL ISSUES

### B4 Rock encountered >40MPa in strength

- **Risk Event Description**: Rock encountered >40MPa in strength
- **Element**: B4
- **Analysis**: Moderate
- **Consequence**: Minor
- **Likelihood**: Rare
- **Cost Estimate**: $1,750
- **Delivered Cost**: $1,000
- **Risk Value**: $1,750

## DELIVERY ISSUES

### A4 Subcontractor claim through scope gaps in project specification.

- **Risk Event Description**: Subcontractor claim through scope gaps in project specification.
- **Element**: A4
- **Analysis**: Moderate
- **Consequence**: Minor
- **Likelihood**: Rare
- **Cost Estimate**: $8,125
- **Delivered Cost**: $5,000
- **Risk Value**: $8,125
Appendix C  Project Schedule
## Task Details

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<th>ID</th>
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<th>Duration</th>
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<td>Review and Approve Subcontractor Prestart Documentation</td>
<td>10 days</td>
<td>19/01/15</td>
<td>2/02/15</td>
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<td>56</td>
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<td>Preparation and Mobilisation</td>
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<td>27/02/15</td>
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<td>20/02/15</td>
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<td>20/02/15</td>
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<td>27/02/15</td>
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<td>Co-ordination of permits and traffic plans</td>
<td>10 days</td>
<td>16/02/15</td>
<td>27/02/15</td>
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<td>1.7.2.5</td>
<td>Survey Setout</td>
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<td>27/02/15</td>
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<td>62</td>
<td>1.7</td>
<td>CH682 - CH750</td>
<td>13 days</td>
<td>23/03/15</td>
<td>10/04/15</td>
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<tr>
<td>63</td>
<td>1.7.3</td>
<td>Construction between CH682 &amp; CH750: Including thrust blocks, inline valves, etc.</td>
<td>5 days</td>
<td>2/03/15</td>
<td>6/03/15</td>
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<tr>
<td>64</td>
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<td>9/03/15</td>
<td>20/03/15</td>
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<td>CH28 - CH682</td>
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<td>23/03/15</td>
<td>10/04/15</td>
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<tr>
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<td>1.7.6</td>
<td>Including Air Valve, driveways crossings, and concrete encasement as required</td>
<td>13 days</td>
<td>23/03/15</td>
<td>10/04/15</td>
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<td>10 days</td>
<td>27/04/15</td>
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<tr>
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<td>27/04/15</td>
<td>8/05/15</td>
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<td>33 days</td>
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<td>74</td>
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<td>4 wks</td>
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## Milestone Overview

- **Critical Milestones**
- **External Milestones**
- **Start-only**
- **Finish-only**
- **Manual Summary**
- **Manual Summary Rollup**
- **External Tasks**
- **Deadline**

## Progress and Timeline

- **Construction Completion**: 6/05
- **Project Completion**: 25/06

## Timeline Details

- **Jan '14**
- **Feb '14**
- **Mar '14**
- **Apr '14**
- **May '14**
- **Jun '14**
- **Jul '14**
- **Aug '14**
- **Sep '14**
- **Oct '14**
- **Nov '14**
- **Dec '14**
- **Jan '15**
- **Feb '15**
- **Mar '15**
- **Apr '15**
- **May '15**
- **Jun '15**

## Additional Information

- **WP7643 Details**
- **Appendix D**

---

*Note: The table and diagram above represent the project's tasks, milestones, and timelines.*
Appendix D  Drawings
FOR TENDER

energex UNDERGROUND TELECOMMUNICATIONS CABLES EXIST IN THIS VICINITY. CONTACT TELSTRA FOR LOCATION PRIOR TO EXCAVATION.

LONG SECTION TO BE UPDATED

LONGITUDINAL SECTION
FOR TENDER

energex

UNDERGROUND

TELECOMMUNICATIONS CABLES

EXIST IN THIS VICINITY.

CONTACT TELSTRA FOR LOCATION PRIOR TO EXCAVATION.

energex

LONG SECTION TO BE UPDATED

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<th>KETTINISS STREET</th>
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LONGITUDINAL SECTION

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<td>A1</td>
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FOR TENDER

SP559 LOGAN ROAD WEST UPGRADE WORKS

DN150 RISING MAIN

PLAN & LONGITUDINAL SECTION

CH. 150 TO CH. 300
FOR TENDER

energex

UNDERGROUND TELECOMMUNICATIONS CABLES EXIST IN THIS VICINITY.
CONTACT TELSTRA FOR LOCATION PRIOR TO EXCAVATION.

LONG SECTION TO BE UPDATED
FOR TENDER

energex

UNDERGROUND

TELECOMMUNICATIONS CABLES EXIST IN THIS VICINITY.

CONTACT TELSTRA FOR LOCATION PRIOR TO EXCAVATION.

energex
FOR TENDER

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UNDERGROUND TELECOMMUNICATIONS CABLES EXIST IN THIS VICINITY.
CONTACT TELSTRA FOR LOCATION PRIOR TO EXCAVATION.

energex
LOCATION TO BE UPDATED

HARRIS ROAD

LONGITUDINAL SECTION

LONG SECTION TO BE UPDATED

FOR TENDER

ENERGEX

UNDERGROUND TELECOMMUNICATIONS CABLES EXIST IN THIS VICINITY.

CONTACT TELSTRA FOR LOCATION PRIOR TO EXCAVATION.
NOTES:
1. Works are within a urban fire area zone.
2. Dimensions and levels are inclusive of creek profile as shown and are subject to changes due to the contractor and manufacturer.
3. Consultants may perform surveys prior to construction.
4. Concrete encasement to extend a minimum of 0.5m on either side of the under -base."
5. Refer to Note 5.
6. Refer to Note 6.
7. Refer to Note 7.
8. Refer to Note 8.
9. Refer to Note 9.
10. Refer to Note 10.
11. Refer to Note 11.
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156. Refer to Note 156.
157. Refer to Note 157.
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159. Refer to Note 159.
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161. Refer to Note 161.
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232. Refer to Note 232.
233. Refer to Note 233.
234. Refer to Note 234.
FOR TENDER
energex
UNDERGROUND TELECOMMUNICATIONS CABLES EXIST IN THIS VICINITY.
CONTACT TELSTRA FOR LOCATION PRIOR TO EXCAVATION.
energex
Appendix E  Work Package Definition Statement
Appendix F  Geotechnical Report
Appendix G  Independent Estimator’s Report
Client: Logan Water  
Project: LWA - 7643 Logan Road West SPS59  
PS Job: 1223

### Information Received

<table>
<thead>
<tr>
<th>Information</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work package Definition Statement</td>
<td>✅ TOC report estimate numbers(costs) to be adjusted as per the final agreed value between IE and LWA</td>
</tr>
<tr>
<td>2. Draft TOC Report</td>
<td>✅</td>
</tr>
<tr>
<td>3. Plans</td>
<td>✅</td>
</tr>
<tr>
<td>4. Sub-Contract Pricing</td>
<td>✅ Vetting sheet has been provided for Pipeline construction and Mechanical items</td>
</tr>
<tr>
<td>5. Material Quotes</td>
<td>✅ LWA will provide free issue material to subcontractor value of $101,910</td>
</tr>
<tr>
<td>Date of Estimate</td>
<td>Rev 6 27-Nov-14</td>
</tr>
<tr>
<td>7. Risk Register &amp; Monte Carlo Output</td>
<td>✅</td>
</tr>
<tr>
<td>8. Time line for construction</td>
<td>✅ Program supplied</td>
</tr>
<tr>
<td>9. Quantities</td>
<td>✅ Material supply checked against drawings &amp; quotes</td>
</tr>
</tbody>
</table>

### Review Methodology

We have reviewed the above information and formed an opinion of the TOC as determined by the Alliance. This forms the basis of the Points of Difference sheet which is submitted for comment / discussion to enable us to reconcile any significant differences.

On receipt of the comment we have reviewed any changes made or explanations given in order to determine if any points of difference remain. If no further PODs then the sheet is closed out and supports this report.

If not closed out, then any point of difference are valued and further comments made.

### Review Comments

1) The Alliance and Project Support have agreed on the final quantities, costs and durations of work for the installations
2) IE and LWA agrees to consider a "Wet day" if rainfall >10mm
3) IE assumes CTC accounting data is correct as IE doesn't have access to this.
4) IE notes "Owner risks" have not been identified for this project.
5) IE notes Rock allowances appears to be trench only. However it would appears that no rates have been requested from proposed sub-contractor (F&K). IE assumes Trenchless construction includes rock allowance as possibly different plant would be needed. IE suggest to confirm sub-contractor price for latest geotech report whether, sub-contractors have excluded rock excavation or not.

### TOC Summary

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
<th>% of Direct Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOC Development Cost</td>
<td>$106,180</td>
<td>13.4</td>
</tr>
<tr>
<td>Project Management Including Design, Environment, Planning &amp; Approval, Defects Liability period cost allowance</td>
<td>$233,009</td>
<td>29.3</td>
</tr>
<tr>
<td>Overheads - Site facilities, Q-levy</td>
<td>$63,792</td>
<td>8.0</td>
</tr>
<tr>
<td>Provisional Sum</td>
<td>$ -</td>
<td>100.0</td>
</tr>
<tr>
<td>Total Direct Costs</td>
<td>$795,131</td>
<td>2.4</td>
</tr>
<tr>
<td>Risk &amp; Opportunity</td>
<td>$18,962</td>
<td>16.0</td>
</tr>
<tr>
<td>WP7643 - TOC</td>
<td>$1,217,094</td>
<td>0.8</td>
</tr>
<tr>
<td>Alliance Fees</td>
<td>$127,364</td>
<td></td>
</tr>
<tr>
<td>Logan City Council-Total Cost</td>
<td>$6,600</td>
<td></td>
</tr>
<tr>
<td>Total TOC</td>
<td>$1,351,058</td>
<td></td>
</tr>
</tbody>
</table>

**Outstanding Point of Difference**

**Percentage Difference** 0.0%

### IE Statement

IE agreement, subject to Review Comments

The Target Schedule is logically structured and has enough built in contingency so that the IE is confident that the Target Completion Dates can be achieved using the level of resources upon which the Target Cost is based.

The IE confirms that the proposed estimate is, in the opinion of the IE, a reasonable estimate of what it is likely to cost to deliver the Project within the Target Schedule, using normal good engineering design, construction and management practices.

The IE Statement is based on a detailed review undertaken by the IE of the estimates produced by the Alliance Team for the construction of the works.

IE Signature

<table>
<thead>
<tr>
<th>Name</th>
<th>Paul Bewes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>Queensland Manager</td>
</tr>
<tr>
<td>Dated</td>
<td>27/11/2014</td>
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</table>
Project: LWA - 7643 Logan Road West SPS59
IE REVIEW SHEET Rev.C Date: 27/11/2014

<table>
<thead>
<tr>
<th>Status</th>
<th>LWA</th>
<th>Note</th>
<th>IE assumed CTO accounting data is correct as IE does not have access to this.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$0 Closed</td>
</tr>
</tbody>
</table>

**IE POD adjusted in rev 6 estimate**

**EST-01**

Line 7 - TOC

Development Cost

LWA has provided an excel sheet with budget cost breakdown for TOC development cost, however this item needs to be be broken down into two separate items - Cost to date (CTO) and Cost to completion (CTC) to allow adequate review. Please supply the cost breakdown information for IE review.

Costs to date (End October) $17,425
Forecast to complete $88,740
Total forecast final cost $106,185
Note that the forecast final cost is less than the approved TOC Development Budget cost of $114,477

IE noted

**EST-02**

Line 11 - PM & Supervision

IE notes 10 days [10x3=30] of pipeline construction duration "Wet weather" allowance appears very high when compared with other projects in SE Qld. IE proposes a maximum allowance of 5 working days (5exposure), for effects of wet weather. IE reviews of BOM data and the construction program shows actual pipeline construction period falls in the period Mar 14 to Apr 14. The theoretical rain fall >10mm average in this period as per BOM data is 5 days. IE also notes site duration to reduce 20 weeks.

IE noted & Mt Lindesay Watermains as an example.

The area around SPS59 and along Rolla Court and Finlay Street is low lying with 3 creek crossings which will be impacted even with a small amount of rainfall. Site mobilisation is programmed to commence Feb 18 2015 with construction completion May 8 2015. If there is rain in Feb 2015 which is highly likely this will delay mobilisation as the site facilities and laydown area are adjacent to SPS59.

With commencement in Feb 2015 our BOM-data indicates that we can expect 18 days of rainfall >5mm during the construction period on our allowance for 15 days is considered to be reasonable.

IE POD remains

IE noted

**EST-03**

Line 11 - PM & Supervision

IE notes high value for site allowed of (2no vehicles) $16,378
IE sees only one site supervisor for 6 weeks (~1.38 months) = $2,622
IE POD = $18,998

When the duration for site supervisor was reduced, the vehicle allowance was not reduced however, the project supervisor is also allocated a vehicle. Project Engineer $19,007 months = $3,714 Total = $12,722

IE noted

**EST-04**

Line 10 - Site Facilities

IE noted as per EST-02, site duration to reduce 20 weeks.

IE POD = $60,718

The LWA accept the reduction in duration for site facilities to 20 weeks.

LWA to reduce cost of $6,676 subject to final construction period agreement between IE and LWA

IE POD remains

$0 Closed

**EST-05**

Line 13 - Q-Leave Levy

IE notes that the levy cost will be adjusted after reviewing estimates. POD to be determined after adjustments

IE noted

**EST-06**

Line 25 to 95 - Sub-contractor tender offer

IE notes second higher offer for Civil and Pipe laying sub-contractor tender offer has been considered in the estimate.

IE noted POD offer is $63,236 lower than FBD offer and not short listed for interview process?

As per TOC report note LWA has not interviewed FBD due to current workload.

IE believes FBD has to be interviewed and ask for construction strategy/methodology for the works and assess sub-contractor.

IE believes "value for money" for the project, FBD tender offer would be considered in the estimate.

IE POD = $63,236

IE noted

IE selects contractor for hourly rates classified as: 3 tender clarifications/design changes were sent to Demacs, Foley & Kuch and AWD Civil and these clarifications resulted in a price increase for all 3 subcontractors. FBD were not asked to replace price based on the post tender clarifications/design changes so comparing FBD's original price of $232,870 with Foley & Kuch's revised (increased) price is $285,221 is not correct.

Apart from other work outside the Alliance, FBD are the preferred subcontractor for the following Alliance projects:


Given their current workload, we are not confident the FBD can successfully complete the project and have not been considered.

IE POD = $63,236

$0 Closed

**EST-07**

Line 343 to 351 - Project Fees

Project fee to be adjusted as per the final agreed value between IE and LWA

IE noted

POD adjusted in rev 6 estimate

$0 Closed

**EST-08**

Note

IE has not been invited to OCMT meeting for this project. IE review purely based on LWA design drawings & information have been provided.

IE noted

Note

Sub-total for Estimate POD

$0
### LWA Risk & Opportunity

<table>
<thead>
<tr>
<th>IE No.</th>
<th>Item Reference</th>
<th>IE Comments</th>
<th>Alliance Response</th>
<th>IE Response</th>
<th>Alliance Response</th>
<th>Outcome</th>
<th>Point of Difference ($)</th>
<th>Open/Closed</th>
<th>IE Final Comments</th>
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</thead>
<tbody>
<tr>
<td>B</td>
<td>LWA Risk &amp; Opportunity</td>
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<tr>
<td></td>
<td>B.1 - Inclement Weather</td>
<td>IE notes: 10 days @ $500 = 5 days “Inclement weather” allowance appears very high. IE allows max 5 days/10 days @ $500 (no) inclement weather as wet-weather already allowed in the construction program.</td>
<td>LWA accept the removal of the inclement weather allowance from the Risk Register</td>
<td>IE noted</td>
<td>LWA to reduce cost of $2,500</td>
<td>$0</td>
<td>Closed</td>
<td>Revised LWA cost reduction of $5,250 due to calculation error</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.2 - Rock encountered &gt;400MPa in strength</td>
<td>IE notes: Rock allowance appears to be trench only. However it would appear that no rates have been requested from proposed sub-contractor (F&amp;K). IE assumes Trenchless construction includes rock allowance as possibly different plant would be needed. IE suggest to confirm sub-contractor price for latest geotech report whether sub-contractors have excluded rock excavation or not.</td>
<td>Noted</td>
<td>IE noted</td>
<td>Note</td>
<td></td>
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**Sub-total for Risk POD $0**

### TOC Report

<table>
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<tr>
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<th>TOC Report</th>
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<tbody>
<tr>
<td></td>
<td>Report-01</td>
<td>IE notes: TOC report estimate numbers(costs) to be adjusted as per the final agreed value between IE and LWA</td>
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<td>IE noted</td>
<td>Note</td>
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</table>

**Sub-total for Report POD $0**
Appendix H  Environmental Management Plan
Appendix I  Community and Stakeholder Engagement Plan