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## ABBREVIATIONS

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<td>ADWF</td>
<td>Average Dry Weather Flow</td>
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<tr>
<td>ASS</td>
<td>Acid Sulphate Soils</td>
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<tr>
<td>DN</td>
<td>Diameter Nominal</td>
</tr>
<tr>
<td>DSS</td>
<td>Desired Standards of Service</td>
</tr>
<tr>
<td>DTMR</td>
<td>Department of Transport and Main Roads</td>
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<td>RIGS</td>
<td>Reduced Infiltration Gravity Sewers</td>
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<td>Variable Speed Drive</td>
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EXECUTIVE SUMMARY

This report outlines the detailed planning assessment of the upgrades required in the Carl Heck Boulevard pump station (SPS107) system in Windaroo, part of the Logan East wastewater catchment. The servicing strategy for this system was optimised as part of the Bahrs Scrub Wastewater Conveyance Detailed Planning and Preliminary Design study. This previous study identified a number of capacity constraints in the Carl Heck Boulevard pump station (SPS107) system, and recommended that this area be assessed in further detail.

The drivers for the assessment of this system are network improvement and growth. The existing system fails a number of Logan City Council (LCC) Desired Standards of Service (DSS) criteria, and the catchment population and area is projected to experience short-term growth, which will exacerbate the current capacity and reliability issues. The current Carl Heck Boulevard pump station (SPS107) catchment population is approximately 3,092 EP, and is expected to increase to 4,009 EP by 2021 (+30%), and 4,729 EP by ultimate development (+53%). This growth can be largely attributed to proposed development in the Bahrs Scrub development area and the undeveloped Emerson Road pump station (SPS116) catchment.

Figure 1 shows the configuration of the existing infrastructure in the Carl Heck Boulevard pump station (SPS107) system.

![Figure 1: Configuration of Carl Heck Boulevard pump station (SPS107) system](image)
and then splits into twin DN150 uPVC. These mains terminate in the Wilhelm Drive pump station (SPS140), a distance of approximately 730m.

An assessment of the existing infrastructure was undertaken to determine existing capacity in the system. Pump station draw-down tests, and analysis of SCADA data was also undertaken to obtain actual performance of the assets. These assessments revealed the following:

- The existing pumps (original pumps from 1987) are in poor condition, and are unable to meet current peak wet weather flow (PWWF). LCC Water Operations have revealed that these pumps require maintenance every 3-6 months to replace damaged adaptor seals. This damage makes the pumps very inefficient and is causing a significant decrease in pump capacity. These pumps are not performing reliably and hence present the risk of asset failure which could lead to dry weather wastewater spills in the catchment. LCC Water Operations have received complaints to this regard in recent times and any delay in replacing these pumps will increase the risk of future wastewater spill events and customer complaints.

- The section of single DN150 DICL rising main crossing the golf course lake fails LCC DSS maximum velocity criteria during wet weather pumping (PWWF). However, given that this is an existing main, and in accordance with Sewage Pumping Station Code of Australia WSA 04-2005 (Second Edition, Version 2.1), the maximum velocity of this rising main could be increased to 3.5 m/s. Allowing this increase in velocity criteria in the main, which will only be experienced during PWWF, will allow a deferral in augmenting this rising main to 2021 or when the catchment population reaches 4009 EP.

- The section of twin DN150 uPVC rising mains have sufficient capacity to convey all future catchment flows. However, only one of these mains is currently in operation, so these mains will need to be interconnected to realise this conveyance capacity. LCC Water Operations have undertaken pressure testing and CCTV investigation of the second main and have concluded that it is in good condition.

An assessment of “do nothing” and “non-infrastructure” options was undertaken which concluded that it would not be prudent to defer capital expenditure in the Carl Heck Boulevard pump station (SPS107) system. Replacement pumps and rising main interconnection works are required immediately (2014) to ensure that the system can operate reliably and can meet current LCC DSS requirements.

A number of timing options were assessed for the augmentation of the single DN150 DICL section. This assessment concluded that the deferral of the main to 2021 offers a Net Present Value (NPV) saving of approximately $22,177, and was preferred over constructing the augmentation in 2014.

An alignment and construction method assessment was also undertaken which concluded that horizontal directional drilling (HDD) between the pump station and road reserve on Riverview Terrace was the preferred option for augmenting this section. This option will have least environmental and community impact, requires least amount of approvals, and is likely to be the most cost effective.
Following the assessment of existing infrastructure, and the investigations undertaken in this study it is recommended that LCC:

1. Replace the existing pumps at Carl Heck Boulevard pump station (SPS107) with 2 x 30kW pumps and upsize the wet well riser pipes to DN150 in 2014. Survey of the existing well is required to ensure existing access openings are appropriate size for safe and efficient removal and installation of pumps.

2. Install bypass arrangement and flow control device downstream of Carl Heck Boulevard pump station (SPS107) in 2014.

3. Undertake modifications to the existing electrical switchboard to accommodate changes to operational philosophy at the pump station and lift the switchboard above the Q100 flood level.

4. Review the condition of the existing switchboard and equipment and the condition of the existing wet well surface to determine if any components can be replaced or the well relined during the works to achieve cost and operational efficiencies. The replacement of the valve pit pipework should also be considered.

5. Undertake the detailed design and interconnection of the existing twin DN150 uPVC rising mains in 2014.

6. Defer the augmentation of the DN150 DICL rising main across the golf course lake to 2021. Undertake further investigations regarding size of augmentation and construction method closer to time of augmentation.

7. Adopt the following expenditure profile associated with the upgrades required at Carl Heck Boulevard pump station (SPS107):

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1. INTRODUCTION

Capacity issues have previously been identified for the Carl Heck Boulevard (SPS107) pump station and rising main in the *Bahrs Scrub Wastewater Conveyance Detailed Planning and Preliminary Design* report. This system fails the Logan City Council (LCC) Desired Standards of Service (DSS) in its existing state, with forecast growth in the catchment likely to exacerbate the operational constraints being experienced at this location.

This current study outlines the detailed planning requirements for the Carl Heck Boulevard (SPS107) pump station and rising main system, assesses the limitations of the system in detail, and presents the preferred infrastructure solution to ensure this system can operate efficiently and within DSS parameters.

1.1 Task Objectives

The objectives of this task are:

- To undertake a detailed planning assessment of works required at the Carl Heck Boulevard pump station (SPS107) to ensure the system can operate efficiently and reliably to cater for future growth
- To identify the scope of short-term infrastructure works at the Carl Heck Boulevard pump station (SPS107)

1.2 Task Scope

1.2.1 Detailed Planning

The scope of this detailed planning study is limited to an assessment of the Carl Heck Boulevard pump station (SPS107) wastewater system (pump station and rising main). The assessment includes:

- Reviewing previous reports
- Analysing the existing infrastructure
- Reviewing SCADA data
- Liaising with LCC Water Operations, Water Development Services, Water Infrastructure Planning, and Water Asset Management teams
- Assessing population forecasts to determine the required infrastructure to service the future needs of the catchment
- Identifying construction options
- Undertaking a cost estimate
- Assessing non-cost implications
- Identifying a preferred strategy and scope of works for upgrading the Carl Heck Boulevard pump station (SPS107) wastewater system
The impact of any upgrades at Carl Heck Boulevard pump station (SPS107) on the downstream wastewater network will not be reviewed in detail as the downstream impacts were previously assessed in detail in the *Bahr Scrub Wastewater Conveyance Detailed Planning and Preliminary Design* report.

### 1.2.2 Scope Exclusions

The following items are excluded from the scope of this study:

- No options that would involve major reconfiguring of the Bahrs Scrub servicing strategy will be considered in this report.
- No geotechnical investigations to confirm feasibility of proposed scope of works.
- No topographical survey or service location works. All levels used in this study have been determined using GIS information or previously-surveyed assets.

### 1.3 Study Area

Carl Heck Boulevard pump station (SPS107) is located on Iolanthe Street which is adjacent to Carl Heck Boulevard in Windaroo and Windaroo Memorial Peace Park. Iolanthe Street is an unformed road adjacent to an LCC park and hence there is abundant open space in this area. The Carl Heck Boulevard pump station (SPS107) wastewater system is in the wider Logan East wastewater catchment, with this section of the network formerly operated and managed by Gold Coast City Council (GCCC). Figure 1-1 shows the location of the Carl Heck Boulevard pump station (SPS107) pump station in the Logan East wastewater catchment.

![Figure 1-1: Logan East Wastewater Catchment](image)
Carl Heck Boulevard pump station (SPS107) is adjacent to Windaroo Lakes Golf Course, and is opposite the Augusta Green residential development. The local Carl Heck Boulevard pump station (SPS107) catchment is relatively small, with an existing catchment population of approximately 1,800 EP. The pump station also services two upstream catchments, Allenby Crescent (SPS102) and Emerson Road (SPS116). Wastewater from the Carl Heck Boulevard pump station (SPS107) system discharges to the Wilhelm Drive (SPS140) catchment via a 765m rising main that is located in an easement on the eastern side of the golf course property boundary. This rising main is configured as follows:

- Approximately 35m of single DN150 DICL which crosses the golf course lake from Carl Heck Boulevard pump station (SPS107) to Riverland Drive

- Approximately 730m of twin DN150 uPVC rising main which traverse an LCC easement through Windaroo Lakes Golf Course. It is noted that only one of these mains is in operation. This is discussed in further detail in Section 5.

Figure 1-2 presents an overview of the Carl Heck Boulevard pump station (SPS107) catchment, while Figure 1-3 shows a more detailed view of the Carl Heck Boulevard pump station (SPS107) system configuration.
1.4 Business Drivers

The business drivers for this study are:

- **Improvement**: The existing system does not meet the DSS criteria in terms of capacity or operating parameters, and presents risks of uncontrolled wastewater spills in the catchment due to failure of the assets. The existing pumps are unreliable and do not meet required Peak Wet Weather Flow (PWWF). The pumps were installed in 1987 and also represent an increased risk as they are past their theoretical useful asset life. The DSS failures associated with the rising mains may be managed by monitoring of catchment growth and interconnection of the two rising mains at Riverland Drive, Windaroo. These opportunities will be investigated further in this report.

- **Growth**: While the growth in the local Carl Heck Boulevard pump station (SPS107) catchment is negligible (122 EP between 2013 and 2061), the total contributing catchment population for the pump station is forecast to grow from 3092 EP in 2013, to 4729 EP by 2051. Ultimate catchment development is forecast to be realised in 2051, with no growth forecast in the catchment between 2051 and 2061. This growth is an increase of approximately 53%, and may further exacerbate the operational issues being experienced in the Carl Heck Boulevard (SPS107) system.

Figure 1-4 shows the forecast population growth in the wider Carl Heck Boulevard pump station (SPS107) catchment and the capacity of the key wastewater assets in the existing system. The capacity calculations are based on the LCC DSS criteria as outlined in Section 4.2.
Figure 1-4: Population Growth and Existing Asset Capacity
2. PLANNING CONTEXT

This section outlines the existing infrastructure in the Carl Heck Boulevard pump station (SPS107) wastewater system, and also provides details of previous reports. The performance of the existing infrastructure assets will be assessed in further detail in Section 5.

2.1 Existing Infrastructure

The Carl Heck Boulevard pump station (SPS107) consists of a 2.4m diameter wet-well approximately six metres deep, with an above-ground switchboard and control cabinet. The pump station was constructed in the late 1980s and was originally part of the Gold Coast City Council (GCCC) wastewater network. The pump station contains the original pumps: two ABS 7.5kW pumps with 260mm impellors. These pumps are set up as duty/standby for normal dry weather operation, and duty/assist for wet weather conditions. The pump station also has a dedicated overflow which discharges to the golf course lake during wet weather when the pump capacity is exceeded. A cross-section of the pump station is shown in Figure 2-1.

Figure 2-1: Cross-section of Carl Heck Boulevard pump station (SPS107)

The condition of the pump station was assessed by Logan City Council (LCC) following the recent handover of the GCCC assets in Logan East. This assessment gave an average rating of 3 out of 5 for all infrastructure assets at the pump station, including wet well, pumps, valves, and pipework. Liaison with the LCC Water Operations staff has indicated that the pumps are in poor condition and are not operating efficiently. Both pumps have badly deteriorated adapter seals causing a large reduction in pumping capacity.
and efficiency. This issue can also cause turbulence in the wet well and possible air entrainment into the rising mains, which can lead to surge issues and foul odours being produced by the system. LCC Water Operations staff regularly (every 3-6 months) repair and replace these adaptor seals as a short-term solution for pump operation. LCC Water Operations staff have also highlighted reports of wastewater spills at manhole SMH40428 upstream of the pump station in Riverside Terrace.

Carl Heck Boulevard pump station (SPS107) pumps to the Wilhelm Drive pump station (SPS140) catchment via a rising main system as follows:

- Approximately 35m of a single DN150 DICL which crosses the golf course lake from Carl Heck Boulevard pump station (SPS107) to Riverland Drive. This section of main is in an LCC easement over the golf course lake, and a private residence at 64 Riverland Drive, Windaroo. It is assumed that this main is encased by the concrete dam on the golf course lake. Figure 2-2 shows the position of this rising main within the dam structure.

- Approximately 730m of dual DN150 uPVC rising main traverses through an LCC easement on Windaroo Lakes Golf Course. It is understood that only one of these rising mains is in current operation. The valving or connection arrangement between these two mains is currently unknown. A pressure test and CCTV investigation recently undertaken by LCC Water Operations revealed that the second rising main is in good condition and can be used for future conveyance of wastewater.

The rising main discharges to SMH38559 near Johanna Place, Windaroo into a DN300 gravity main which drains toward Wilhelm Drive pump station (SPS140).

The rising main configuration is shown in Figure 2-3.
2.2 Previous Studies

2.2.1 Priority Infrastructure Plan: Wastewater Planning Report – Logan East

This *Priority Infrastructure Plan: Wastewater Planning Report – Logan East* (PIP) involved master planning for the Logan East catchment and recommended augmentations at Carl Heck Boulevard pump station (SPS107) for the 2011 planning horizon in order to address existing system deficiencies and to service forecast population growth. The augmentations identified included a new 40.7m³ wet well and upgraded pumps (88 kW). The cost of these works were estimated at $338,011 ($2010) calculated using unit cost rates.

2.2.2 Logan East Wastewater Catchment System Verification

This report assessed the augmentations listed in the PIP report and concluded that although short-term population growth was occurring in the catchment (specifically Windaroo, Waterford and Holmview), the infrastructure upgrades could be deferred until the 2016 planning horizon. The sizes of the upgrades were unchanged in this study.

2.2.3 Bahrs Scrub Wastewater Conveyance

This report outlines the detailed wastewater planning for the Bahrs Scrub development area. Part of this development area is within the Carl Heck Boulevard pump station (SPS107) catchment. This report identified that the dual pumping capacity of the existing system is not compliant with DSS (5.9 x ADWF (actual) compared with 6.5 x ADWF (required)). Site constraints were identified which required further planning effort beyond the scope of the *Bahrs Scrub Wastewater Conveyance* study. This study recommended that the Carl Heck Boulevard pump station (SPS107) system be investigated in further detail.
3. METHODOLOGY

This project has been split into two phases, with the main tasks for each phase shown in Figure 3-1.

Phase 1 - Background Information and Assessment of Existing System

- Review previous planning and recommendations
- Confirm project drivers
- Confirm catchment servicing strategy and population projections
- Obtain relevant "As-Constructed" information
- Obtain SCADA data, and pump station draw down tests
- Assess the capacity of the existing Carl Heck Boulevard pump station (SPS107) system

Phase 2 - Detailed Planning

- Calculate system capacity requirements to ultimate development
- Develop options to meet future requirements
- Undertake site visit and option assessment to verify the feasibility of each option
- Provide a unit cost estimate and identify the scope of works for each option
- Select a preferred option and identify approvals, environmental and community impacts
- Liaise with LCC stakeholders and agree on preferred option
- Determine the required future phases of this project

Figure 3-1: Study Methodology
4. DATA SOURCES & ASSUMPTIONS

This section outlines the data sources and assumptions used as part of this current study. Should any of the information below change during the development of infrastructure upgrades (such as changes in growth projections), the outcomes of this study should be reviewed against the updated information.

4.1 Population Forecasts

The population growth projections for the local and wider Carl Heck Boulevard pump station (SPS107) catchments are based on the current Infrastructure Demand Model (IDM) and have been updated with the latest development assessment information available from the LCC Water Development Services team. Figure 4-1 shows each of the sub catchments contributing to Carl Heck Boulevard pump station (SPS107) with the current population and ultimate population forecasts.

![Figure 4-1: Carl Heck Boulevard pump station (SPS107) Catchment Development](image)

It should be noted that the majority of the forecast growth occurs in Bahrs Scrub development Area “A” (+914 EP) and in the Emerson Road pump station (SPS116) catchment (+549 EP). The Allenby Crescent pump station catchment shows a reduction in population growth, due to the number of developed properties in the catchment remaining static, and the forecast occupancy rate reducing.

Table 4-1 shows the planning horizons for each of the Carl Heck Boulevard pump station (SPS107) sub catchments, and the total catchment population. This table also shows that ultimate catchment development (which is expected to be realised by 2051).
Table 4-1: Population Forecasts for the Carl Heck Boulevard pump station (SPS107) catchment

<table>
<thead>
<tr>
<th>Catchment</th>
<th>2013</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
<th>2051</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carl Heck Boulevard (SPS107)</td>
<td>1,827</td>
<td>1,758</td>
<td>1,797</td>
<td>1,797</td>
<td>1,797</td>
<td>1,949</td>
<td>1,949</td>
</tr>
<tr>
<td>Allenby Crescent (SPS102)</td>
<td>486</td>
<td>468</td>
<td>471</td>
<td>471</td>
<td>471</td>
<td>474</td>
<td>474</td>
</tr>
<tr>
<td>Emerson Road (SPS116)</td>
<td>146</td>
<td>427</td>
<td>545</td>
<td>545</td>
<td>545</td>
<td>695</td>
<td>695</td>
</tr>
<tr>
<td>Bahrs Scrub Area “A”</td>
<td>0</td>
<td>83</td>
<td>498</td>
<td>914</td>
<td>914</td>
<td>914</td>
<td>914</td>
</tr>
<tr>
<td>Bahrs Scrub Area “B”</td>
<td>633</td>
<td>697</td>
<td>697</td>
<td>697</td>
<td>697</td>
<td>697</td>
<td>697</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>3,092</td>
<td>3,433</td>
<td>4,009</td>
<td>4,425</td>
<td>4,425</td>
<td>4,729</td>
<td>4,729</td>
</tr>
</tbody>
</table>

4.2 Desired Standards of Service

The DSS used for this study is from the Review of Desired Standards of Service, undertaken by the Logan Water Alliance (LWA) in September 2010 as part of the PIP project. Key criteria relating to this study include:

- Average Dry Weather Flow (ADWF) = 200L/EP/day
- Peak Wet Weather Flow (PWWF) = 1,300L/EP/day
- Rising Main minimum velocity = 0.9m/s (preferred = 1.5m/s)
- Rising Main maximum velocity = 2.5m/s (for proposed systems)
- Wet-well operating volume 0.9 * Q(L/s)/N where N is allowable starts/hour for each motor
- Eight starts per hour per motor rated between 15kW and 200kW

4.3 Hydraulic Modelling

All modelling used to assess existing infrastructure and future infrastructure requirements for the pump station and rising main was undertaken using InfoWorks CS Version 12.

4.4 SCADA Data

SCADA data for Carl Heck Boulevard pump station (SPS107) was used to determine recent operating performance during dry and wet weather periods. This data includes:

- Run times for Pump 1 and Pump 2
- Wet well levels

A pump station draw-down test was arranged to confirm the findings of the SCADA data and modelling.

4.5 Asset Information

“As-built” drawings, site inspections and meetings with LCC Water Operations staff, and LCC GIS information was used to confirm the details of relevant assets where necessary. As highlighted in Section 1.2.2, no topographical survey or service location was undertaken in this study.

A Q100 flood search was also undertaken to confirm the flood level at the pump station site to determine whether the existing infrastructure meets the LCC flood immunity requirements.
4.6 Stakeholder Consultation

Table 4-2 summarises the key stakeholder consultation that took place in this study.

**Table 4-2: Stakeholder Consultation**

<table>
<thead>
<tr>
<th>Date / Topic</th>
<th>Name</th>
<th>Position</th>
<th>Consultation Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>12th Sept. 2013 Population Growth</td>
<td>Marco Bonotto</td>
<td>LCC Water Development Services Program Leader</td>
<td>Population growth confirmed</td>
</tr>
<tr>
<td>16th Sept. 2013 Kick-Off Meeting</td>
<td>Sandy Veeren</td>
<td>LCC Water Infrastructure Planning Program Leader</td>
<td>Overview of project and objectives presented by LWA.</td>
</tr>
<tr>
<td></td>
<td>Sandy Stewart</td>
<td>LCC Senior Water Infrastructure Engineer</td>
<td>History of development of 64 Riverside Terrace discussed.</td>
</tr>
<tr>
<td></td>
<td>Marco Bonotto</td>
<td>LCC Water Development Services Program Leader</td>
<td>High level options discussion.</td>
</tr>
<tr>
<td>11th Oct. 2013 Specialist Contractor Meeting on site</td>
<td>David Warner</td>
<td>Operations Manager (UEA)</td>
<td>Site meeting to discuss construction options and feasibility. A number of construction options suggested.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No major constraints to feasibility of works. Geotechnical investigation required to confirm feasibility.</td>
</tr>
<tr>
<td>17th Oct. 2013 Detailed Planning Outcomes</td>
<td>Sandy Veeren</td>
<td>LCC Water Infrastructure Planning Program Leader</td>
<td>Outcomes of detailed planning presented by LWA.</td>
</tr>
<tr>
<td></td>
<td>Sandy Stewart</td>
<td>LCC Senior Water Infrastructure Engineer</td>
<td>Discussion on status and condition of existing assets.</td>
</tr>
<tr>
<td></td>
<td>Marco Bonotto</td>
<td>LCC Water Development Services Program Leader</td>
<td>Request for pressure test of unused DN150 uPVC rising main to be undertaken to confirm condition.</td>
</tr>
<tr>
<td></td>
<td>Lester Bridgham</td>
<td>LCC Mechanical and Electrical Operations Supervisor</td>
<td>Consensus that pumps need to be replaced immediately.</td>
</tr>
<tr>
<td></td>
<td>Kim Roebig</td>
<td>LCC Networks Supervisor</td>
<td>Use of existing easement highlighted as ‘Base Case’ option for augmenting rising main.</td>
</tr>
<tr>
<td></td>
<td>Darren Moore</td>
<td>LCC Asset Management</td>
<td>Consensus that rising main augmentation could be deferred, allowing for a velocity higher than DSS parameters.</td>
</tr>
</tbody>
</table>
4.7 Cost Assumptions

The assumptions used to determine the cost estimates in this study are as follows:

- Costs were estimated using a base year of 2014
- Capital costs were determined from first principles costs and estimated allowances for ancillary upgrade works

The NPV was calculated over the full planning horizon, from 2014 to ultimate development (nominally 2061, even though the catchment is forecast to be fully developed in 2051). The NPV was based on a nominal discount rate of 9.35% and an indexation rate of 4.75% per annum.

4.8 General Assumptions

The following general assumptions were adopted for this assessment:

- The twin DN150 uPVC rising mains are in good condition and can service the catchment up to ultimate development (nominally 2061)
- The single DN150 DICL rising main is fully encased by the concrete dam crossing the golf course lake
- All electrical switchboards are required to have Q100 flood immunity (bottom of switchboard to be at least 100mm above the 1 in 100 year flood level) in accordance with LCC flood immunity requirements.
- The easement through 64 Riverside Terrace is 3m in width (measured using GIS)
5. EXISTING SYSTEM ANALYSIS

This section details the analysis of the existing Carl Heck Boulevard (SPS107) wastewater system that was undertaken to:

- Determine the capacity of existing assets
- Analyse the performance of existing assets
- Identify issues or system constraints / deficiencies
- Determine infrastructure requirements to cater for ultimate catchment growth and to comply with LCC’s DSS.

5.1 Catchment Inflows and Field Testing

5.1.1 DSS Calculations

The average dry weather flow (ADWF), peak dry weather flow (PDWF) and peak wet weather flow (PWWF) have been calculated using the population forecasts listed in Table 4-1 and the DSS parameters (ADWF = 200 L/EP/day, PDWF = 2 x ADWF, and PWWF = 1,300 L/EP/day). The flow projections associated with this catchment are shown in Table 5-1. The table shows that the PWWF is forecast to grow by approximately 50%, from 47L/s (2013) to 71L/s (ultimate development).

Table 5-1: Carl Heck Boulevard pump station (SPS107) Catchment Inflows

<table>
<thead>
<tr>
<th>SPS107</th>
<th>2013</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
<th>2051</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carl Heck Boulevard (SPS107) catchment population (EP)</td>
<td>3,092</td>
<td>3,433</td>
<td>4,009</td>
<td>4,425</td>
<td>4,425</td>
<td>4,729</td>
<td>4,729</td>
</tr>
<tr>
<td>ADWF (L/s)</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>PDWF (L/s)</td>
<td>14</td>
<td>16</td>
<td>19</td>
<td>20</td>
<td>20</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>PWWF (L/s)</td>
<td>47</td>
<td>52</td>
<td>60</td>
<td>67</td>
<td>67</td>
<td>71</td>
<td>71</td>
</tr>
</tbody>
</table>

5.2 SCADA Data Analysis

An analysis of SCADA data from January and February 2013 was undertaken to confirm if the dry weather flows (ADWF) predicted in Table 5-1 represent the observed field data, and to assess the performance of the pumps. The analysis showed that the current ADWF in the catchment is approximately 4.5L/s, with a variance between 3L/s for the 5th percentile and 7L/s for the 95th percentile.

This observed flow is generally lower than the predicted flow of 7L/s (based on 200 L/EP/day). The population estimate for 2013 (Table 5-1) matches the higher end of the flows from the SCADA data, suggesting that the average water use (and therefore sewage loading per EP) is below 200 L/EP/day in this specific catchment. Average diurnal patterns and seven day patterns for the catchment have been developed from this data and are shown in Figure 5-1 and Figure 5-2 respectively.
Figure 5-1: Diurnal Pattern for the Carl Heck Boulevard pump station (SPS107) catchment

Figure 5-2: Seven Day Diurnal Pattern at Carl Heck Boulevard pump station (SPS107)
5.3 Existing Assets Capacity Assessment

5.3.1 Wet Well

The existing wet well at Carl Heck Boulevard pump station (SPS107) is 2.4m in diameter. The required operating volume for the existing catchment flow is 2.75m³, based on:

- Single pump rate of 24.5 L/s (Derived using LCC DSS)
- Volume, \( V (m^3) = \frac{0.9 \times \text{pump rate (L/s)}}{N} \), where \( N \) = acceptable no. of starts per hour.

The current settings at the pump station result in an operating volume at the pump station of 4.52m³, based on the following:

- Duty Start Level of 7.1m
- Duty Stop Level of 6.1m

As such, the wet well has adequate operating volume capacity for current catchment flow. As noted in Section 2.1, the condition of the wet well has been rated at 3 out of 5 in a recent asset audit. Although outside the scope of this study, it should be noted that there may be an opportunity to line the wet well with corrosion protection material if there are works being undertaken at this asset. This will extend the asset life of this pump station. Figure 5-3 shows the existing wet well.

Figure 5-3: Carl Heck Boulevard pump station (SPS107) Wet Well
5.3.2 Pumping Capacity

Three sources of information were used to determine the performance of each of the pumps at Carl Heck Boulevard pump station (SPS107).

- Theoretical pump data based on manufacturer's pump curves
- SCADA data was used for pump start/stop times and wet-well levels during both dry and wet weather
- Pump draw-down tests results

A comparison between these sources is shown in Table 5-2.

Table 5-2: Comparison of Pump Capacity between Model, SCADA & Draw-Down Test

<table>
<thead>
<tr>
<th></th>
<th>Theoretical Capacity</th>
<th>SCADA</th>
<th>Draw-Down Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Pump 1 (L/s)</td>
<td>28</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Pump 2 (L/s)</td>
<td>28</td>
<td>19</td>
<td>29</td>
</tr>
<tr>
<td>Parallel Pumping</td>
<td>32</td>
<td>21</td>
<td>32</td>
</tr>
<tr>
<td>(P1+P2)(L/s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013 ADWF (L/s)</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>2013 PWWF (L/s)</td>
<td>47</td>
<td>47</td>
<td>47</td>
</tr>
</tbody>
</table>

All draw-down tests showed markedly different results for the capacity of each pump. A likely explanation for these varying results is the condition of the pumps, as highlighted previously in Section 2.1. The most recent test revealed a large reduction in pumping capacity.

The results of the draw-down tests indicate that the wet weather pumping capacity at Carl Heck Boulevard pump station (SPS107) is unreliable and is reduced as a result of deteriorated adaptor seals. It should be noted that there have been no known recorded dry weather overflow incidents at this pump station and hence it can be concluded that the existing pumps are able to discharge the Peak Dry Weather Flows (PDWF).

The wet weather capacity of the pumps is significantly lower than required (47L/s) based on both field test results and population calculations. LCC Water Operations staff have also reported complaints from residents at Riverside Terrace regarding wastewater spills at SMH40428, which suggests that during wet weather, the gravity network in this area is backing up and surcharging.

Even if the pumps were in good condition, the maximum theoretical dual pumping capacity is only marginally higher than the duty pumping capacity due to the system configuration with only one rising main in operation. If both DN150 uPVC mains were in operation, the theoretical dual pumping capacity of the existing pumps should increase to approximately 64 L/s. Figure 5-4 illustrates the impact of operating the two parallel rising mains to increase the capacity of the system.
The pump operating points correlate well with Draw Down Test 1 (1st September 2012) with a single pump capacity of approximately 28L/s and parallel pumping capacity of 30L/s with only one rising main in operation.

LCC Water Operations staff investigated the condition of the second main and confirmed that it is capped at the Riverside Terrace end. It is unknown whether this main has ever been in service. The results from Draw Down Test 3 (13th September 2013) show reduced capacity due to the poor condition of the pumps, and are significantly lower than the previous tests and the theoretical pump capacity (shown in Figure 5-4), suggesting advanced deterioration of the pumps and an increased risk of overflows.

The existing riser pipes within the wet well are DN100 DICL and are also impacted by the varying pump flow rates. The theoretical velocity in these mains is approximately:

- **Single pump operation**: Velocity in riser pipe = 3.6 m/s @ 28 L/s (Theoretical single pump capacity)

- **Dual pump operation**: Velocity in riser pipes = 2.0 m/s @ 32 L/s (Theoretical dual pump capacity)

Based on the field testing that was undertaken, it is likely that the riser pipes are experiencing a much lower velocity during operation as a result of the pump efficiency issues. The velocity in the existing risers is discussed further in Section 5.3.1.
5.3.3 Rising Main Capacity
The Carl Heck Boulevard (SPS107) rising main consists of two distinct segments: a single DN150 DICL rising main from the pump station to the southern side of the golf course lake (approximately 35m long), and twin DN150 uPVC rising mains to the Wilhelm Drive pump station (SPS140) catchment.

Table 5-3 details the expected velocity for the calculated C1 (single pump) and PWWF (dual pump) flows from 2013 to ultimate development, based on growth projections. This table illustrates that the twin DN150 uPVC rising mains have sufficient capacity to service the ultimate catchment development flows; however, the velocity in the 35m section of single DN150 rising main currently exceeds the maximum velocity parameter of 2.5 m/s (as specified in the LCC DSS) during wet weather pumping.

Table 5-3: Rising Main Velocities for Various Design Flows

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
<th>2051</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 Flow (L/s) (1 pump)</td>
<td>25</td>
<td>28</td>
<td>32</td>
<td>34</td>
<td>34</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>1 x DN150 DICL Velocity (m/s) *</td>
<td>1.5</td>
<td>1.7</td>
<td>1.94</td>
<td>2.2</td>
<td>2.2</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>2 x DN150 uPVC Velocity (m/s) **</td>
<td>0.75</td>
<td>0.85</td>
<td>0.97</td>
<td>1.10</td>
<td>1.10</td>
<td>1.10</td>
<td>1.15</td>
</tr>
<tr>
<td>PWWF (L/s) (2 pumps)</td>
<td>47</td>
<td>52</td>
<td>60</td>
<td>67</td>
<td>67</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>1 x DN150 DICL Velocity (m/s) *</td>
<td>2.85</td>
<td>3.15</td>
<td>3.63</td>
<td>4.06</td>
<td>4.06</td>
<td>4.30</td>
<td>4.30</td>
</tr>
<tr>
<td>2 x DN150 uPVC Velocity (m/s) **</td>
<td>1.42</td>
<td>1.58</td>
<td>1.82</td>
<td>2.02</td>
<td>2.02</td>
<td>2.15</td>
<td>2.15</td>
</tr>
</tbody>
</table>

Note:
* Internal Diameter (ID) of uPVC assumed to be 145mm
** Internal Diameter (ID) of DICL assumed to be 152mm

5.3.4 Emergency Storage Capacity
The LCC DSS specifies that a wastewater pump station must have four hours of emergency storage during average dry weather inflow (ADWF) in the event of both pumps being unavailable for operation. Table 5-4 summarises the emergency storage requirement for each design horizon, and compares this with available emergency storage. The table shows that there is sufficient storage in the network to cater for ultimate catchment development.

Table 5-4: SPS107 Emergency Storage Requirements

<table>
<thead>
<tr>
<th></th>
<th>SPS107</th>
<th>2013</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
<th>2051</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADWF (L/s)</td>
<td>4.2</td>
<td>4.1</td>
<td>4.2</td>
<td>4.2</td>
<td>4.2</td>
<td>4.5</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Emergency Storage Required</td>
<td>61m³</td>
<td>59m³</td>
<td>60m³</td>
<td>60m³</td>
<td>60m³</td>
<td>65m³</td>
<td>65m³</td>
<td></td>
</tr>
<tr>
<td>Available Emergency Storage</td>
<td>65m³</td>
<td>65m³</td>
<td>65m³</td>
<td>65m³</td>
<td>65m³</td>
<td>65m³</td>
<td>65m³</td>
<td></td>
</tr>
<tr>
<td>Meets DSS Requirement</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>
5.3.5 Recent Operational Performance

SCADA data from January, February and March 2013 was used to examine the performance of the pump station during both dry and wet weather events. Figure 5-5 and Figure 5-6 show changes in wet-well level over the months of January and February, with rainfall data shown for a wet weather performance assessment. The assumed inflow into the wet well shown on the graphs is calculated based on a single pump capacity of 19L/s and parallel capacity of 21L/s.

Each of the figures indicates a good correlation between calculated inflow and the dry weather diurnal patterns, which suggests that the single pump capacity for both pumps is adequate during dry weather flow periods. The major rainfall event that occurred from 26\(^{th}\) to 28\(^{th}\) January 2013 shown on Figure 5-5 caused overflows in the catchment with the wet-well surcharged for approximately 2.5 days. During this period, a total of approximately 250mm of rain fell in the catchment.

Rainfall events from the 25\(^{th}\) to 27\(^{th}\) February 2013 and 2\(^{nd}\) to 4\(^{th}\) March 2013 shown in Figure 5-6 also caused the wet-well to surcharge for approximately 1.5 days. Both figures also show that the catchment has a fast response to rainfall with a large increase in inflow coinciding with the onset of rain.

This data indicates that the existing pumps cannot discharge wet weather flows, and supports the difference between the maximum theoretical dual pump flow (32L/s) and the projected maximum wet weather inflow for the catchment of 47L/s (6.5 x ADWF). Upgrading the Carl Heck Boulevard pump station (SPS107) system with new pumps to meet the LCC DSS will reduce the risk of overflows in the catchment, and will also improve the time taken for the system to respond to rainfall events.
**Figure 5-5:** Wet-Well Levels & Inflow (SPS107) – January 2013

**Figure 5-6:** Wet-Well Levels & Inflow (SPS107) – February 2013
5.3.6 Electrical Switchboard
The existing electrical switchboard at Carl Heck Boulevard (SPS107) is at a ground level of 11.90m AHD (estimated using as constructed drawings and assessment on site). A flood search was undertaken for the site which revealed a Q100 flood level of 11.91m AHD. Therefore, to achieve flood immunity in accordance with LCC requirements (electrical infrastructure to be 100mm above Q100 level), the electrical switchboard must be raised by 100mm. A cost and risk assessment should be undertaken to determine the feasibility and practicality of this exercise. Figure 5-5 shows the existing switchboard.

It is likely that modifications will be required to the existing switchboard if the existing pumps are replaced. This is discussed further in Section 6.3.

![Existing Switchboard at Carl Heck Boulevard pump station (SPS107)](image)

5.4 Future Capacity Requirements
5.4.1 Wet Well
The ultimate wet well operating volume requirement is 3.99m$^3$ based on an ultimate contributing catchment population of 4,729 EP.

The current settings at the pump station result in a satisfactory operating volume at the pump station of 4.52m$^3$, based on the following operating levels:

- Duty Start Level of 7.1m
- Duty Stop Level of 6.1m
To meet the LCC DSS PWWF, the capacity of the wet well risers has also been assessed. The capacity of the DN100 DICL mains has been considered, as well as an option to upsize these to DN150 DICL mains. This assessment was undertaken assuming DSS flows could be met by the existing pumps. Table 5-5 shows the results of this assessment:

### Table 5-5: Velocity Assessment for Wet Well Risers

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
<th>2051</th>
<th>Ult</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP</td>
<td>3,092</td>
<td>3,433</td>
<td>4,009</td>
<td>4,425</td>
<td>4,425</td>
<td>4,729</td>
<td>4,729</td>
</tr>
<tr>
<td>ADWF</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>C1 Flow (1 pump)*</td>
<td>25</td>
<td>28</td>
<td>32</td>
<td>34</td>
<td>34</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>PWWF (2 pumps)</td>
<td>47</td>
<td>52</td>
<td>60</td>
<td>67</td>
<td>67</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td><strong>DN100 DICL Risers (existing)</strong>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Velocity (Single riser – 1 pump)</td>
<td>3.06</td>
<td>3.43</td>
<td>3.92</td>
<td>4.16</td>
<td>4.16</td>
<td>4.41</td>
<td>4.41</td>
</tr>
<tr>
<td>Velocity (Dual risers – 2 pumps)</td>
<td>2.88</td>
<td>3.18</td>
<td>3.67</td>
<td>4.10</td>
<td>4.10</td>
<td>4.34</td>
<td>4.34</td>
</tr>
<tr>
<td><strong>DN150 DICL Risers (upgrade option)</strong>***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Velocity (Single riser – 1 pump)</td>
<td>1.29</td>
<td>1.44</td>
<td>1.68</td>
<td>1.85</td>
<td>1.85</td>
<td>1.98</td>
<td>1.98</td>
</tr>
<tr>
<td>Velocity (Dual risers – 2 pumps)</td>
<td>1.43</td>
<td>1.59</td>
<td>1.85</td>
<td>2.04</td>
<td>2.04</td>
<td>2.19</td>
<td>2.19</td>
</tr>
</tbody>
</table>

* C1 Flow (Single Pump Flow) derived using LCC DSS

** Internal Diameter (ID) of DN100 DICL assumed to be 102mm

*** Internal Diameter (ID) of DN150 DICL assumed to be 152mm

It can be seen from Table 5-6 that the existing DN100 DICL wet well risers do not have capacity to convey existing C1 Flow or PWWF without considerably exceeding the LCC DSS. Upsizing these risers to DN150 would provide a suitable velocity (1.5-2m/s) subject to the installed pump capacity, and should ideally be undertaken in conjunction with any major pump capacity upgrade at the pump station.

#### 5.4.2 Pumping Capacity

With reference to Table 5-3, and based on a single pump required to pump a minimum of C1 (from LCC DSS), the future pumping capacity required at Carl Heck Boulevard pump station (SPS107) is:

- **Single pump operation:** A minimum flow of 25 L/s (2013) increasing to 36 L/s (2061)
- **Dual pump operation:** A minimum flow of 47 L/s (2013) increasing to 71 L/s (2061)

As noted previously, if both DN150 uPVC rising mains were in operation, the dual pump capacity of the existing pumps would increase to approximately 64 L/s, which could cater for the design PWWF up to 2024.

#### 5.4.3 Rising Main Capacity

As noted in Table 5-3, the single DN150 DICL rising main installed through the concrete weir is undersized to cater for existing and future wet weather flows. During wet weather pumping (assuming the pumps can deliver the estimated flow), the velocity in this section of the system exceeds the LCC DSS maximum velocity criteria of 2.5 m/s for proposed systems and is likely to reduce the theoretical design life of the main. To ensure that the system meets LCC DSS for future flows, this section of the system would need to be augmented in the future.

Given that this DN150 DICL section is part of an existing system, and that the section is DICL and assumed to be encased in concrete, the risk of asset failure due to an increase in velocity is reduced. Also, this...
velocity will only be higher during wet weather pumping which is a small portion of the year, and hence operating the system at the increased velocity will be for short periods only. Furthermore, it should be noted that Section 10.3.5 of Sewage Pumping Station Code of Australia WSA 04-2005 (Second Edition, Version 2.1) states that the maximum allowable velocity of flow in a pressure main is 3.5 m/s. Based on this information, the opportunity to defer the augmentation of the rising main will be investigated in Section 6.2.

The dual DN150 uPVC rising mains (if both are connected and in operation), can cater for existing and future wet weather flows. Both mains meet LCC DSS minimum and maximum velocity criteria, and do not require future upgrading or augmentation. It is recommended that the valving / connection arrangement between the dual mains is investigated and that these mains are interconnected to convey wet weather flows.
6. SPS107 SYSTEM UPGRADE OPTIONS

Section 5 highlighted a number of deficiencies associated with the existing Carl Heck Boulevard (SPS107) wastewater system. These include:

- **Pumps**: The existing pumps fail the LCC DSS and do not have capacity to convey existing or future flows. The pumps are also believed to be in poor condition. The draw down tests conducted at this pump station concluded that the existing pumps are not operating efficiently or reliably. The pumps were installed in 1987 and are in need of immediate replacement to reduce the risk of asset failure, and possible dry weather wastewater spills to the environment. LCC Water Operations staff have confirmed the existing issues, and regularly repair adaptor seals which are worn, and other mechanical faults associated with the pumps. Pump replacement options will be discussed in this section.

- **Pump Station Upgrades**: The existing wet well risers are operating at high velocities during single pump and dual pump operation. These mains will need to be replaced to cater for projected flows and to reduce risk of asset failure. The electrical switchboard at the pump station will need to be upgraded to incorporate any operational philosophy or control changes pertaining to pump upgrades.

- **Rising mains**: The single DN150 DICL rising main which crosses the golf course lake between Iolanthe Street (LCC Park) and Riverside Terrace does not meet the LCC DSS maximum velocity parameter of 2.5 m/s during wet weather events. This rising main will require augmentation to ensure that future wet weather flows can be conveyed with low risk of asset damage or asset failure. The construction options and the opportunity to defer this augmentation in the short term will be investigated in this section.

- **Rising main interconnection**: The twin DN150 uPVC rising should be interconnected with appropriate valving to ensure that the full capacity of the installed assets is achieved.

6.1 Option Development

The following section outlines the rising main upgrade options that have been considered as part of this study.

6.1.1 Option 1 – ‘Do Nothing’

The option to ‘do nothing’ or retain the Carl Heck Boulevard (SPS107) wastewater system in its current configuration and capacity has been investigated at a high level. Avoiding system upgrades will increase the risk of:

- Uncontrolled wastewater spills to the environment
- Asset failure
- the health and safety impacts to the community of increases and more severe overflows
- Inefficient operation of assets

This option is not considered feasible as it does not meet the business drivers of this study – system improvement and supporting catchment growth, and hence will not be investigated further.

6.1.2 Option 2 – Non-Infrastructure Solutions

Given the existing operational and reliability issues at the Carl Heck Boulevard (SPS107) pump station, changes to operational procedures to avoid upgrades or capital investment would not provide any substantive improvement in the network operation and would not reduce the overall business risk of the existing undersized and unreliable wastewater infrastructure.

6.1.3 Option 3 – Inter-catchment Transfer / Diversion of Flows

Opportunities to divert contributing wastewater flows away from the Carl Heck Boulevard pump station (SPS107) has been investigated at a desktop level. The Emerson Road pump station (SPS116) catchment and the future Bahrs Scrub “Area A” catchment are the key growth areas in the catchment, catering for approximately 89% of total catchment growth. Diverting either of these catchments away from the Carl Heck Boulevard pump station (SPS107) catchment, though, will impact the Bahr Scrub wastewater servicing strategy. As mentioned in Sections 1.2.2 and 4.8 of this study, the reconfiguration of this strategy is outside of the scope of this study. Furthermore, upgrade works are necessary at the Carl Heck Boulevard pump station (SPS107) to cater for existing catchment flows regardless of the projected catchment growth.

Figure 6-1: Diversion of flow from the Carl Heck Boulevard (SPS107) pump station catchment
6.1.4 Option 4 – Infrastructure Solutions
Based on the assessment of the existing pump station and rising mains, a number of infrastructure upgrade options are required to meet the DSS. Capital investment options for the Carl Heck Boulevard (SPS107) wastewater system include:

- Interconnection of the parallel DN150 uPVC rising mains
- Duplication/Upgrade of the section of single DN150 DICL rising main that runs through the weir
- Upgrades at the pump station site (pump capacity, risers and switchboard).

6.2 Preferred Upgrade Options
Options 1, 2 and 3 are not able to meet the business needs for the wastewater system and are not able to reduce the overall risk of asset damage, failure, and impacts to the environment and community. As such, Option 4 is the only viable solution to remedy the system deficiencies and reduce the overall risk and will require a level of investment in infrastructure upgrades. Option 4 will be further developed to consider the most effective infrastructure upgrade solutions. The interconnection of the parallel rising mains is straightforward and will be discussed in Section 7.1. The following rising main DN150 DICL augmentation options have been considered in Section 7.2.

- Option 4 – (Base case) Upgrade/Duplicate the DN150 DICL rising main along the existing alignment
- Option 4A – Alternative alignment along Carl Heck Boulevard (1km)
- Option 4B – Replace existing DN150 with DN200 using HDD
- Option 4C – Replace existing DN150 with DN200 using pipe jacking
- Option 4D – Replace existing DN150 with DN200 in a new pipe bridge

The pump station upgrade options are discussed in Section 8.
7. RISING MAIN AUGMENTATION OPTIONS

7.1 Twin DN150 uPVC Rising Main Interconnection

The existing twin DN150 uPVC rising mains have adequate capacity to cater for ultimate flow in the Carl Heck Boulevard pump station (SPS107) catchment. It is understood that only one of these mains is currently in operation (based on field investigation and liaison with LCC Water Operations staff). The second rising main and connection works between both mains should be undertaken in conjunction with any short-term pump upgrades to increase the wet weather conveyance capacity of the system.

Recent pressure testing and CCTV investigation of the second DN150 uPVC rising main undertaken by LCC Water Operations has concluded that the second main is in good condition and can be used for future flows.

The scope of the interconnection works will be as follows:

- Complete survey and potholing of existing mains to verify location, size, and existing interconnectivity (if any)
- Undertake construction works to interconnect the rising mains. The arrangement of the connection and possible inclusion of valving is to be confirmed following investigation works
- Commission the second rising main in conjunction with pump upgrades

The following impacts associated with these works have been identified:

- Community disturbance due to excavation works in Riverside Terrace
- Considerable impact to property owners at 64 Riverside Terrace (both rising mains in an easement on this property)
- Disturbance to the operation of Carl Heck Boulevard pump station (SPS107)

All of these impacts can be managed and mitigated through early stakeholder consultation and construction planning.

7.2 DN150 DICL Single rising main augmentation options

7.2.1 Timing

Two timing solutions are available for the augmentation of the DN150 DICL rising main section, which is approximately 35m long. These are as follows:

- **Augment immediately**: this option involves the immediate (FY2014/15) augmentation of the DN150 DICL section. Under this option, the Carl Heck Boulevard (SPS107) system will operate within all LCC DSS parameters during dry and wet weather conditions.

- **Defer augmentation**: this option involves the deferral of the augmentation of the DN150 DICL section. Under this option, wastewater will be pumped from Carl Heck Boulevard pump station (SPS107) through the single DN150 DICL section then splits into the twin DN150 uPVC mains, as
The existing section of DN150 DICL rising main operates outside the maximum velocity parameters of the LCC DSS, but is considered to be a feasible option for the following reasons:

- The LCC DSS maximum velocity parameter applies to proposed systems
- Section 10.3.5 of *Sewage Pumping Station Code of Australia WSA 04-2005* (Second Edition, Version 2.1) states that the maximum allowable velocity of flow in a pressure main is 3.5 m/s
- The existing DN150 DICL section is assumed to be encased in concrete, lowering the risk of failure of the main. It should be noted that no historical failures of this main have been reported
- This main will only operate at the higher velocity during wet weather conditions, which is assumed to be for only a portion of the year

For the purpose of this assessment, a maximum velocity of 3.3 m/s in the existing main will be adopted, slightly under the maximum allowable velocity specified in WSA 04-2005. This equates to 60 L/s in the DN150 DICL section (or a contributing population of 4,009 EP). This allows a catchment growth of approximately 917 EP, which is projected to occur around the year 2021, based on the population projections outlined in Table 4-1. Figure 7-1 shows the growth in the Carl Heck Boulevard pump station (SPS107) catchment, and the capacity of the infrastructure assets.
From Figure 7-1, it can be seen that the option to accept a higher velocity of 3.3m/s in the rising main will delay augmentation until 2021, with a capital cost saving of approximately $22,177, based on the assumed inflation and discount rates noted in Section 4.7.

The preferred option is to defer the construction of the DN150 DICL section upgrade. Further benefits include:

- Deferring the impact on the community, particularly residents of Baum Street and Riverside Terrace
- Providing an opportunity and time to liaise with the community to mitigate and manage potential impacts
- Allowing LCC to monitor growth in the upstream catchments to optimise the timing of the augmentation, rather than an upfront capital investment

The option to defer the rising main augmentation will be carried forward in this study as the preferred strategy for servicing the Carl Heck Boulevard pump station (SPS107) catchment.

7.2.2 Size of Augmentation

To meet the ultimate PWWF of 71 L/s, the augmentation needs to have an internal diameter of at least 150mm to ensure LCC DSS parameters are achieved. Depending on material and pressure class required, this is likely to be a DN200 for uPVC, and OD180/200 for PE. This assumes that the existing DN150 DICL main will remain in operation, and that the PWWF will be split between the mains.

When this augmentation is being designed (prior to the 2021 installation date), there is an opportunity to increase the diameter of the augmentation so that the existing main can be taken out of service. Advantages of this upsizing include:

- Reducing network complexity by having only one main in operation crossing the waterway. Having two mains in operation may require additional operational and maintenance effort.
- Removing the existing main through 64 Riverside Terrace. This main is within an LCC easement, but may be difficult to access for maintenance or repair. It is possible that this easement will no longer be required (if this alignment is not used for the augmentation), and LCC may be able to arrange a return of this land to the property owner at this address. There is also an opportunity for this main to be sold as a conduit to another service provider.
- If the existing DN150 DICL is not taken out of service, it may be used as a standby main in case of asset damage or emergency

A disadvantage of upsizing this main is the financial implication. Pipe supply, fittings, and construction costs are all likely to increase as a result. A high-level cost estimate (based on NPV using unit rates) has indicated that the increase in cost could be approximately 17%, between now and 2021.
While the decision regarding the size of this future main does not need to be made immediately, it is recommended that the augmentation is sized such that the existing main can be taken out of service in the future. However, this recommendation should be discussed further within LCC closer to the time of augmentation, and it is recommended that the following teams are involved in this decision making process:

- LCC Water Infrastructure Planning
- LCC Water Asset Management
- LCC Water Development Services
- LCC Water Operations

7.2.3 Rising Main Alignment – Option 4 (Base case)

The ‘base case’ for augmenting the DN150 DICL rising main is to follow the alignment of the existing main, and to construct the additional rising main parallel to the existing main within the LCC easement.

The existing easement, shown in Figure 7-2, is approximately 3m in width, and traverses through private property at 64 Riverside Terrace, Windaroo.
Also highlighted in Figure 7-2 are the structures that have been constructed adjacent to the rising main easement, a swimming pool and a garage. These are also shown again in Figures 7-3 and 7-4.

The exact position of the existing rising main in the easement is not known, and hence the feasibility of constructing a second main in this easement is unknown. If this option is to be considered, the following is required to confirm feasibility:

- Locate existing assets including any existing valve arrangement
- Determine whether construction of additional main within easement is feasible
- Identify construction methods and prepare cost estimate
- Undertake structural assessment of pool and garage to identify area of influence
- Liaise with property owner at 64 Riverside Terrace regarding proposed works and options

The construction method for these works is dependent on whether there is adequate space within the LCC easement for the rising main augmentation.
Figure 7-3: Aerial Image showing structures adjacent to LCC easement

Figure 7-4: Image showing garage adjacent to easement
7.2.4 Rising Main Alignment – Alternative Alignments

As previously noted, four alignment option alternatives were considered (and are based on an estimated construction year of 2021). The alternative construction methods have been highlighted for the future augmentation of the DN150 DICL rising main. These are discussed further in this section. This list is not finite and it is recommended that a contractor with trenchless construction experience is consulted prior to detailed design of these works. It is possible that a combination of these options could be employed for the augmentation of the rising main. It should be noted that while this section will inform LCC of possible construction options, the recommended option will be based on the best information available at this time.

7.2.4.1 Option 4A – Construction of a main along Carl Heck Boulevard

This option would traverse along Carl Heck Boulevard and connect to SMH38557 upstream of the Wilhelm Drive pump station (SPS140)) via Wilhelm Drive, as shown in Figure 7-5.

![Figure 7-5: Alternative alignment via Carl Heck Boulevard](image)

This option is approximately 1km in length of which 700m is DN200 rising main, and 300m is a DN225 gravity main connection to the existing infrastructure. This option is likely to be constructed by open trenching. Unless there is a major issue relating to the ground conditions in the vicinity of the golf course lake, it is unlikely that this option would be preferred, because:

a) The additional length of this option represents a substantial cost. Even though open trenching can be employed for the full length of the main, the cost and time associated with construction of this option has been estimated at being double the cost of a short (50m) trenchless solution.
b) This option presents a large impact to local community including vehicular and pedestrian users of Carl Heck Boulevard. Construction of a new rising main on this alignment is likely to require partial road closures and considerable traffic management. Construction impacts to the community also include dust and noise, and general health and safety risks associated with construction in residential areas.

It is recommended that this option is not investigated further unless there are significant feasibility issues with the other rising main alignments options.

7.2.4.2 Option 4B – Replace existing DN150 with DN200 using HDD

Option 4B, 4C and 4D would involve a new rising main connection from Iolanthe Street to Riverside Terrace via an alternative alignment. A 50m direct connection between the existing assets on either side of the golf course lake would be undertaken outside the existing easements.

Based on an initial assessment, augmenting the rising main between the LCC Park and Riverside Terrace along an alternative alignment crossing the golf course lake is considered to be the most feasible due to constructability, reduced impact on the community, and reduced risks of lengthy construction or delays due to approvals issues.

Figure 7-6 shows a schematic of this option.
Constraints associated with the construction of the rising main augmentation on a new alignment include:

- Block work retaining walls (both sides of lake)
- Windaroo Lakes Golf Course lake
- Existing services – service location survey and potholing to be undertaken during design stage
- Ground conditions – geotechnical investigation to be undertaken during design stage
- Private property (both sides of lake)
- Groundwater – it is likely there will be groundwater inflow during any excavation works below the lake level. A groundwater management plan should be implemented during the construction stage.

Construction along this alignment by HDD was discussed with a specialist contractor, who indicated that this option is feasible, and possibly will be the most cost effective, shortest duration, and least disturbance option for crossing the golf course lake.

This construction method involves setting up the HDD rig on either bank of the lake, and drilling to the other side. Due to space constraints in Riverside Terrace, it is likely that this is the preferred drilling side. The drilling side will involve construction of a launch pit, with the receival side being used for stringing out the pipe and for making connections to the existing rising main. However, both options are likely to be feasible, and hence this should be investigated further during the design stage, when the HDD profile is produced.

Key risks associated with this option include:

- Unfavourable ground conditions leading to ‘frac out’ in the golf course lake
- Impact to the community on both banks

These risks can be mitigated by undertaking a geotechnical investigation, allowing appropriate depth of cover under the lake, use of biodegradable drilling fluid, and extensive community and stakeholder consultation.

7.2.4.3 Option 4C – Replace existing DN150 with DN200 using pipe jacking

This option involves trenchless construction from one side of the golf course lake to the other using pipe jacking. Advice from a specialist contractor has indicated that this option is feasible; however, may be inefficient from a cost and time perspective.

This construction method involves the construction of a launch pit and receival pit on either bank of the golf course lake. These pits are likely to be in excess of 6m in depth. The launch pit needs to be larger and due to space constraints, it is assumed that the launch pit will be on the pump station side; however this may be revised during the design stage. From the launch pit, a steel enveloper pipe will be jacked across to the receival pit. The carrier pipe (assumed to be PE) will then lowered in to the launch pit, welded, and pushed into position within the steel enveloper. Figure 7-7 shows a schematic of this option.
The key risks associated with this option include:

- Unfavourable ground conditions for this construction method
- Excessive groundwater ingress adding to construction cost and time
- Impact to the community on both banks

These risks can be mitigated by undertaking a geotechnical investigation, allowing appropriate depth of cover under the lake, and extensive community and stakeholder consultation.

7.2.4.4 **Option 4D – Replace existing DN150 with DN200 on a new pipe bridge**

This option involves the construction of a pipe bridge across the golf course lake. This option is considered to be feasible, but is likely to require additional investigations and approvals from multiple stakeholders.

This construction method involves the manufacturing of a pipe bridge (pipe rack) which would be fixed to the existing retaining walls and weir in the study area. This would require approvals from Windaroo Lakes Golf Course, and adjacent property owners, as well as undertaking a flood study to determine possible impacts of having an obstruction in the waterway. Construction of this option would require temporary platforms and support structures, and extensive health and safety considerations. Figure 7-8 shows a schematic of this option.
Figure 7-8: Pipe Bridge Option

Key risks associated with this option include:

- Health and safety of construction workers working above waterway
- Objection from stakeholders
- Impact to the watercourse
- Damage during flood events

These risks can be mitigated with early community and stakeholder consultation, careful construction planning, and undertaking a thorough risk management process.

7.2.5 Cost Estimate

A first principles cost estimate of Options 4A, 4B, 4C, and 4D was undertaken to determine the most cost effective augmentation solution. A summary of these costs is presented in Table 7-1.

Table 7-1: First Principles Cost Estimate of Rising Main Augmentation Options

<table>
<thead>
<tr>
<th>Option</th>
<th>4A – Alternative Alignment</th>
<th>4B – HDD</th>
<th>4C – Pipe Jacking</th>
<th>4D – Pipe Bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Cost ($)</td>
<td>$1,447,331</td>
<td>$138,124</td>
<td>$465,239</td>
<td>$161,701</td>
</tr>
<tr>
<td>Difference ($)</td>
<td>(+$1,309,207)</td>
<td>-</td>
<td>(+$327,115)</td>
<td>(+$23,577)</td>
</tr>
<tr>
<td>Difference (%)</td>
<td>+948%</td>
<td>-</td>
<td>+237%</td>
<td>+17%</td>
</tr>
</tbody>
</table>
Table 7-1 demonstrates that HDD has the lowest capital cost estimate by a considerable margin. The next lowest cost is Option 4D (Pipe Jacking), which carries a higher risk profile than the option to construct via HDD.

Refer to Appendix F for further cost estimate details.

7.2.6 Preferred Option

Based on the best information available at this stage, it is recommended that HDD is the construction method adopted for the augmentation of the DN150 DICL rising main for the following reasons:

- Preliminary advice from a trenchless construction specialist indicated that this option is feasible, and is likely to be most cost effective
- The first principles cost estimate indicates that it is the lowest cost option
- This option presents has least impact on the community from a visual impact point of view
- This option will have a lower environmental risk profile than the other options as it will cross beneath the waterway and will have less excavation than other trenchless methods
- This option will require least approvals and will be more acceptable to the community
8. PUMP UPGRADE OPTIONS

The existing pumps were installed in 1987 and are near the end of both their theoretical and useful asset life (based on repeated seal failures and reduced performance). The pumps are experiencing operational and reliability issues and the existing PWWF cannot be achieved. As the rising main upgrade options impact the pump upgrade, the preferred solution to interconnect the twin DN150 uPVC rising mains in FY2014/15 and to upgrade the section of single DN150 DICL rising main by approximately 2021 will be assumed for the pump upgrade assessment.

The pump upgrade considers the following design criteria:

- The new pumps must fit the existing wet well arrangement and access covers
- The new pumps must provide a minimum of 10 years operational capacity
- The new pumps must operate efficiently during single and dual pump operation

The theoretical maximum pumping capacity of the existing pump make and model is approximately 64 L/s (dual pump operation) when both DN150 uPVC mains are in operation, as shown in Figure 8-1. Replacing the existing pumps with similar units would meet capacity requirements until 2024. As discussed in Section 7.2.1, the single section of DN150 DICL provides a flow restriction, and the flow should be limited to 60 L/s (until the section is upgrade in 2021) to avoid damage to the rising main.

Figure 8-1 also indicates that during single pump operation, the existing pump units would be operating to the right of the curve once the twin uPVC rising mains are interconnected, which will impact the performance and reliability of the pump. This operation increases the risk of the pump cavitating and tripping out (especially if the motor is undersized).
To prevent these issues from occurring, it is proposed that a bypass and orifice plate is placed in the system to artificially adjust the system curve, so that the pump can operate in a more reliable operating range. An automated control valve is also required at this location for flow control.

Figure 8-2 shows the system curve with revised curve for single pump operation. From this figure, a single pump flow of approximately 40 L/s is achieved, which results in a velocity of 2.2 m/s in the single DN150 DICL section.

Figure 8-3 shows the system curve with for dual pump operation. From this figure, it is seen that dual pump operation can pump in excess of 64 L/s, which results in the pump having an asset life of at least 10 years. The velocity in the single section of DN150 DICL is acceptable until approximately 2021, when the main should be augmented. At this point, the pumping units would be able to pump in excess of 64L/s through the upgrade rising main system.
**Figure 8-2:** Pump Replacement Option including DN55 orifice plate (single pump operation)

Improved operating point for single pump.

Pump operates inefficiently in this range.

**Figure 8-3:** Pump Replacement Option (dual pump operation)

Pump operates inefficiently in this range.
Figure 8-4 shows a preliminary configuration of the required orifice plate and control valve configuration at the pump station. The preliminary sizing for the orifice plate is DN55. This may need to be adjusted on site to meet required flow and pressure conditions.

![Figure 8-4: Arrangement of Orifice Plate and Bypass Arrangement](image)

The operational philosophy for this option is as follows:

- **Single pump operation:** The control valve will be set to closed. Wastewater is pumped through the bypass arrangement and DN55 orifice plate, allowing the pump to operate closer to the best efficiency point. This scenario represents the normal pumping philosophy at the pump station (dry weather). The proposed duty point for single pump operation is approximately 40 L/s at 38.5m head.

- **Dual pump operation:** The control valve is set to open. Wastewater is pumped through the DN150 rising main. There is limited benefit in isolating the bypass arrangement and orifice plate during dual pump operation, as there will be minimal flow through this section. A short-term capacity restriction in the single DN150 DICL rising main of 60 L/s should be maintained, and so during dual pump operation, the pumps should operate at a combined flow of 60 L/s at approximately 40m head, until such time that the DN150 DICL section is augmented.

The proposed pumps are 2 x 30 kW Xylem NP3202 HT 3–454. These pumps have a 454mm diameter impellor which could be replaced in future if assumed flow conditions change. These pumps will cater for the existing PWWF with the use of the orifice and bypass system. These pumps also have a number of larger impellors that could be fitted to meet catchment growth and would delay replacement of the pump units.
Additional motor capacity and switchboard requirements may need to be considered in detailed design to accommodate any future increased impeller sizes.

Equivalent pumps could also be considered depending on LCC Water Operations preference. Further details of these pumps can be seen in Appendix B.

The proposed replacement pumps are indicated in the existing wet well based on pump station as-constructed drawings and information from the pump supplier. Further information can be found in Appendix G. Figure 8-5 shows the arrangement of the new pumps in the existing wet well.

![Figure 8-5: Arrangement of new pumps in existing wet well](image)

The pump station should be surveyed prior to purchasing the replacement pumps, so that the dimensions can be confirmed, and LCC Water Operations are satisfied that the pumps can be fitted and maintained in a safe and efficient manner.

### 8.1 Pump Station Switchboard

Modifications will be required to the existing switchboard to facilitate the operation of the replacement pumps, and to control the above operational philosophies (i.e. the operation of the control valve and bypass arrangement). New pump control cabling will also be installed when the pumps are replaced.

Given the scope of upgrades around the pump station, it would be efficient to lift the switchboard above the Q100 flood level during the pump replacement and installation of the control valves. Detailed design of the switchboard reconfiguration/upgrade will be required and should consider:

- The requirements for the new pumps
- The requirements for the control valve
- Any additional telemetry or control upgrades to meet current specifications
- The length of electrical cabling supplying the switchboard (and if new cabling is required)
- The suitability of the existing cabinet
8.2 Pump Station Risers

As detailed in Section 5.6, the existing wet well risers are undersized to cater for future flows in the SPS107 system. It is recommended that these risers are replaced at the time of pump replacement and upsized to DN150.

Replacing the pipework within the existing valve pit has not been considered at this time, as this is in good condition. However, the opportunity to upsize all of the associated pipework should be considered given that this will be relatively minor works.
9. SCOPE OF UPGRADE WORKS

The upgrade requirements for the Carl Heck Boulevard pump station (SPS107):

- **Immediate Works (FY2014)**
  - Pump Replacement (2 x 30kW – Xylem NP3202 HT 3~454)
  - Upsizing of pump station risers to 2 x DN150 DICL mains
  - Install the orifice plate, control valve, and bypass arrangement at pump station (including access manhole)
  - Upgrade and reconfiguration works at the switchboard to accommodate new pumps and control requirements
  - Raising the switchboard above Q100 flood level
  - Interconnection between twin DN150 uPVC rising mains

- **Future Works**
  - Augmentation of the single section of DN150 DICL rising main (2021) – alignment and construction method to be confirmed closer to required date
  - Pump replacement to cater for ultimate catchment flows – to be assessed at a later date depending on catchment growth and increase in system capacity due to rising main augmentation (potentially required around 2024)

As the works required for immediate implementation are considered to be relatively minor, no preliminary design is proposed.

### 9.1 Infrastructure Requirements

Table 9-1 outlines the infrastructure requirements for the proposed upgrade works at Carl Heck Boulevard pump station (SPS107).

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 30kW pumps (preliminary selection – Xylem NP3202 HT 3~454)</td>
<td>2014</td>
</tr>
<tr>
<td>2 x DN150 DICL risers (approx. 5m)</td>
<td>2014</td>
</tr>
<tr>
<td><strong>Flow control upgrades</strong></td>
<td></td>
</tr>
<tr>
<td>Bypass arrangement with DN55 orifice plate</td>
<td></td>
</tr>
<tr>
<td>DN150 motorised gate valve with on/off control in DN1500 manhole (including above ground actuator in a cabinet with supply conduits back to switchboard)</td>
<td>2014</td>
</tr>
<tr>
<td>Interconnection of the twin DN150 uPVC rising mains</td>
<td>2014</td>
</tr>
<tr>
<td>RTU code update to accommodate new control philosophy</td>
<td>2014</td>
</tr>
<tr>
<td>DN200 rising main crossing (preliminary construction method – HDD)</td>
<td>2021</td>
</tr>
<tr>
<td>New pumps to cater for ultimate catchment development (change of impellor may suffice)</td>
<td>2024</td>
</tr>
</tbody>
</table>
9.2 Cost Estimate

The costs associated with the proposed works are detailed in this section.

9.2.1 Capital Costs

Table 9-2 indicates the capital cost of the short-term works (2014), while Table 9-3 indicates the capital cost of the DN150 DICL augmentation in 2021.

Table 9-2: Capital Cost – Immediate Works (2014)

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Capital Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Development Costs</td>
<td>$8,667</td>
</tr>
<tr>
<td>Work Package – Project Management</td>
<td>$19,067</td>
</tr>
<tr>
<td>Delivery Cost</td>
<td></td>
</tr>
<tr>
<td>Indirect Construction Cost</td>
<td>$15,757</td>
</tr>
<tr>
<td>Direct Delivery Cost</td>
<td>$157,575</td>
</tr>
<tr>
<td><strong>Delivery Cost (Subtotal)</strong></td>
<td><strong>($173,332)</strong></td>
</tr>
<tr>
<td>Risk &amp; Opportunity</td>
<td>$4,727</td>
</tr>
<tr>
<td>Project Fee</td>
<td>$31,962</td>
</tr>
<tr>
<td><strong>TOTAL CAPITAL COST ESTIMATE (2014)</strong></td>
<td><strong>$237,755</strong></td>
</tr>
</tbody>
</table>

Table 9-3: Capital Cost – Future Works (2021)

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Capital Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Development Costs</td>
<td>$5,076</td>
</tr>
<tr>
<td>Work Package – Project Management</td>
<td>$11,166</td>
</tr>
<tr>
<td>Delivery Cost</td>
<td></td>
</tr>
<tr>
<td>Indirect Construction Cost</td>
<td>$9,229</td>
</tr>
<tr>
<td>Direct Delivery Cost</td>
<td>$92,285</td>
</tr>
<tr>
<td><strong>Delivery Cost (Subtotal)</strong></td>
<td><strong>($101,514)</strong></td>
</tr>
<tr>
<td>Risk &amp; Opportunity</td>
<td>$3,045</td>
</tr>
<tr>
<td>Project Fee</td>
<td>$17,323</td>
</tr>
<tr>
<td><strong>TOTAL CAPITAL COST ESTIMATE (2014)</strong></td>
<td><strong>$138,124</strong></td>
</tr>
</tbody>
</table>
9.3 Non-Cost Assessment

A non-cost assessment was also undertaken to consider the requirements and impacts of the proposed works. The following sections present a summary of the key issues and considerations for the local environment and community, and the approvals required to implement the proposed works. The full assessment and further details are available in Appendix C, D, and E.

9.3.1 Environment

The following environmental concerns have been highlighted:

- As the majority of the site has already been cleared, it is unlikely that the proposed works would require clearing permits under the Vegetation Management Act (1999) or the Nature Conservation Act (1992); however, it is recommended that any clearing on site should be kept to a minimum.

- The rising main augmentation works will trigger consideration of the Water Act (2000). This Act recommends the use of trenchless technology to prevent interferences with watercourses. This is consistent with most rising main upgrade options.

- The proposed works are within the Q100 flood zone, and hence adequate design and construction will need to be given to the flood potential of the site

- No aboriginal or non-aboriginal cultural heritage issues are expected at this site

- The proposed works are within a potential Acid Sulphate Soil area. Acid Sulphate testing should be carried out during the geotechnical investigation or during any excavation works

- An assessment of groundwater encountered at the site will need to be undertaken during design and construction

The full environmental assessment is presented in Appendix C.

9.3.2 Community and Stakeholders

The community and stakeholder assessment revealed that the proposed works are expected to have a moderate to high impact on stakeholders in the study area. The assessment identified the following concerns:

- General concerns regarding construction activity such as noise, dust, odour, and vibration, particularly at 20 and 22 Baum Court, and 43 and 64 Riverside Terrace

- Increased heavy vehicle traffic and impacts on street parking on local roads for delivery of materials to site and construction vehicles accessing the site

- Possible issues regarding the structures (swimming pool and garage) at 64 Riverside Terrace

- Access through Augusta Greens estate (which includes Riverside Terrace) will require a Permit To Enter (PTE) and community consultation

- Consideration of restoration of area following completion of works
• Consideration of public health and safety during construction works

A more detailed assessment including a list of stakeholders is presented in Appendix D.

9.3.3 Town Planning and Approvals

The town planning and statutory approvals assessment identified the following applications / negotiations that need to take place for the proposed works:

• Material change of use (Environmental Relevant Activity (ERA) 63) development application for upgrade works at Carl Heck Boulevard pump station (SPS107). It is currently unknown whether the pump station has an ERA. This will need to be verified if the proposed upgrade works are undertaken, as they will increase the capacity of the pump station

• Permit To Enter (PTE) applications to enter private property which is not covered by existing easements

• Liaison with other easement holders in the study area including Energex

• New easements are required for the augmentation of the DN150 DICL rising main, either side of the golf course lake, depending on alignment when finalised

• Notification to Department of Natural Resources and Mines (DNRM) of DN150 DICL rising main augmentation works to be given under ‘Protocol – Authorised taking of water without a water entitlement under the Water Regulation 2002’.

The full assessment is presented in Appendix E.

9.4 Opportunities and Further investigations

The following additional works have been identified throughout the course of this study. These are outside the scope of this study, but may present opportunities to increase asset life and operability and to realise operational and capital cost efficiencies.

• Relining of SPS107 wet well: Significant works are proposed within the wet well (pump and riser replacement) and to implement these changes, the wet well will need to be pumped down and cleaned. There is an opportunity to reline the wet well to protect it from future corrosion during this operation. A cost estimate and feasibility assessment of this opportunity has not been undertaken at this stage.

• Survey and Potholing works: The assets in the Carl Heck Boulevard pump station (SPS107) system have been inherited from GCCC. The arrangement of the twin DN150 uPVC rising mains in Riverside Terrace is largely unknown, particularly any interconnection or valving that may exist. Survey and potholing works are recommended during detailed design to confirm any existing valving or termination arrangements.

• Geotechnical works: The sub-surface condition in the study is largely unknown. While there are existing underground services in the area, undertaking a trenchless replacement of the DN150 DICL
augmentation in the future will require geotechnical investigation to confirm the feasibility of HDD, and to determine the depth of the lake and the various strata that will be encountered.

- **Replacement of Valve Pipework:** The opportunity to upsize the existing valve pipework has not been considered in detail. There will be an opportunity to undertake these works when the pump station is offline for pump replacement and wet well riser works. The cost and feasibility of this opportunity will need to be addressed further by LCC Water Infrastructure Asset Management.
10. CAPITAL WORKS PROGRAMME IMPLICATIONS

The current capital works program (CWP) does not contain any augmentations pertaining to the Carl Heck Boulevard pump station (SPS107) system. CWP item number LW043 is related to works upstream of Carl Heck Boulevard pump station (SPS107), and is outside of the scope of this study.

Based on this current study (and on works previously outlined in the Bahrs Scrub Wastewater Conveyance study), infrastructure upgrade works are required for the Carl Heck Boulevard pump station (SPS107) system. The implications of this study on the current capital works program (CWP) are described in Table 10-1.

Table 10-1: Capital Works Program for Carl Heck Boulevard pump station (SPS107) system

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Capital Cost</th>
<th>Year Required</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 1    | Upgrades to the Carl Heck Boulevard pump station (SPS107) system as follows:  
  • 2 x 30kW pumps (preliminary selection – Xylem NP3202 HT 3~454)  
  • 2 x DN150 DICL risers (approx. 5m)  
  • Flow control upgrades  
    o Bypass arrangement with DN55 orifice plate  
    o DN150 motorised gate valve with on/off control in DN1500 manhole (including above ground actuator in a cabinet with supply conduits back to switchboard)  
  • Interconnection of the twin DN150 uPVC rising mains  
  • RTU code update to accommodate new control philosophy | $237,755 | 2014/15 | Create new CWP item |
| 2    | DN200 rising main crossing (preliminary construction method – HDD) | $138,124 | 2021 | Create new CWP item |
| 3    | New pumps to cater for ultimate catchment development | $60,000 | 2024(1) | Create new CWP item |

(1) This is the nominal year for replacing the new pumps at Carl Heck Boulevard pump station (SPS107), based on current population projections. Growth in the catchment should be monitored to confirm the population trigger for pump upgrade.
11. CONCLUSIONS

This study involved the detailed planning for the Carl Heck Boulevard pump station (SPS107) wastewater system and involved a review of the existing infrastructure, identifying system constraints, and developing solutions to ensure that this system can operate efficiently and reliably to cater for existing and future wastewater flows.

The following conclusions have been made as a result of this study regarding the existing wastewater infrastructure:

- The existing Carl Heck Boulevard pump station (SPS107) system is experiencing performance and reliability issues as a result of aging assets and assets which do not meet required DSS criteria.

- Considerable growth has been identified in the Carl Heck Boulevard pump station (SPS107) catchment, the majority of which is contributed to a section of the Bahrs Scrub development area, and growth in an undeveloped section of the Emerson Road pump station (SPS116) catchment. An increase in population of 53% is projected for ultimate development, which is likely to exacerbate current operational issues in the catchment.

- An analysis of SCADA data and pump draw-down tests was undertaken to determine the performance of the existing system. This information was compared with the LCC DSS requirements to determine constraints in the system. It was identified that the existing pumps and rising main fail LCC DSS criteria during wet weather events. LCC Water Operations have verified this performance and highlighted customer complaints as a result of wastewater spills in the upstream contributing catchment.

- The existing pumps (original pumps from 1987) are in poor condition, and are unable to meet current peak wet weather flow (PWWF). LCC Water Operations have revealed that these pumps require maintenance every 3-6 months to replace damaged adaptor seals. This damage makes the pumps very inefficient and is causing a significant decrease in pump capacity. These pumps are not performing reliably and hence present the risk of asset failure which could lead to dry weather wastewater spills in the catchment. LCC Water Operations have received complaints to this regard in recent times and any delay in replacing these pumps will increase the risk of future wastewater spill events and customer complaints. The draw-down tests have confirmed these issues and have revealed a reduced capacity of the pumps.

- During the assessment of the existing infrastructure, it was identified that a section of single DN150 DICL rising main crosses the waterway adjacent to the pump station, and that only one of the twin DN150 uPVC rising mains on the eastern side of the waterway is in operation. Through pressure testing, a CCTV survey, and potholing investigation works, LCC Water Operations have confirmed that the second uPVC main is in good condition and can be made operational for future flows. Once interconnected, the twin DN150 uPVC sections will have adequate capacity to convey all future flows.
• The single DN150 DICL section fails LCC DSS velocity criteria during current PWWF, and requires future augmentation. This section traverses through an LCC easement on private property at 64 Riverview Terrace. Construction of a swimming pool and garage has taken place in close proximity to the LCC easement. Until the existing main is potholed in this easement, it is unknown whether the easement is wide enough to cater for an augmentation. Inspection, maintenance, or investigation works within this easement will likely cause considerable disruption to this property owner.

• A number of upgrade options were investigated to address the rising main and pump station deficiencies. An assessment of “do nothing” and “non-infrastructure” options was undertaken which concluded that it would not be prudent to defer capital expenditure in the Carl Heck Boulevard pump station (SPS107) system.

• Given the significant performance issues of the pumps and the shortfall in current PWWF capacity, short-term works are required to upgrade the pumps regardless of rising main upgrade options. These works are proposed to be undertaken in the 2014/15 Financial Year and include the replacement of the two pumps, an upgrade of the switchboard (including raising the switchboard above the Q100 flood level) and upgrading or replacing any components (as required). The installation of a control valve and orifice plate at the pump station is also required in conjunction with the commissioning of the parallel uPVC rising main to control network operation. Additional valving and cross connection works are likely to be required to commissioning the un-used section of rising main.

• Various options were investigated for the proposed augmentation of the single section of DN150 rising main that is located within the concrete weir across the golf course lake. Opportunities to delay the construction of this rising main were investigated, and the upgrade/replacement can be delayed until approximately 2021, based on operation above LCC’s DSS criteria, but below the industry benchmark maximum velocity criteria. In addition, the investigations determined that:
  
  o The new main should be sized so that the existing main can be taken out of service (i.e. a DN200 rising main)
  
  o Construction along a new alignment that avoid the easement through private property is the preferred solution. The preferred construction method (excluding detailed design considerations is HDD)
  
  o Further investigations should be undertaken to determine the optimum construction solution closer to the time of the augmentation works (and considering additional design constraints, such as geotechnical profiles)
12. RECOMMENDATIONS

Following this detailed planning assessment, it is recommended that Logan City Council:

1. Replace the existing pumps at Carl Heck Boulevard pump station (SPS107) with 2 x 30kW pumps and upsize the wet well riser pipes to DN150 in 2014. Survey of the existing well is required to ensure existing access openings are appropriate size for safe and efficient removal and installation of pumps.

2. Install bypass arrangement and flow control device downstream of Carl Heck Boulevard pump station (SPS107) in 2014.

3. Undertake modifications to the existing electrical switchboard to accommodate changes to operational philosophy at the pump station and lift the switchboard above the Q100 flood level.

4. Review the condition of the existing switchboard and equipment and the condition of the existing wet well surface to determine if any components can be replaced or the well relined during the works to achieve cost and operational efficiencies. The replacement of the valve pit pipework should also be considered.

5. Undertake the detailed design and interconnection of the existing twin DN150 uPVC rising mains in 2014.

6. Defer the augmentation of the DN150 DICL rising main across the golf course lake to 2021. Undertake further investigations regarding size of augmentation and construction method closer to time of augmentation.

7. Adopt the following expenditure profile associated with the upgrades required at Carl Heck Boulevard pump station (SPS107):

<table>
<thead>
<tr>
<th>FY2014/15 ($)</th>
<th>FY2021/2022 ($)</th>
<th>FY2024/25 ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$237,755</td>
<td>$138,124</td>
<td>$60,000</td>
</tr>
</tbody>
</table>
13. REFERENCES


• Logan Water Alliance, 2012, *Logan East Wastewater Catchment System Verification*

• Logan Water Alliance, 2013, *Bahrs Scrub Wastewater Conveyance*

Appendix A  Desired Standards of Service
# Wastewater Network DSS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sewage load</strong></td>
<td></td>
</tr>
<tr>
<td>ADWF</td>
<td>200L/EP/day</td>
</tr>
<tr>
<td>PDWF</td>
<td>2 x ADWF</td>
</tr>
</tbody>
</table>
| PWWF | Residential 1300 L/EP/d  
For CED PWWF = 660 L/EP/d  
Commercial 1300 L/EP/d  
Light Industrial 1000 L/EP/d  
Heavy Industrial 840 L/EP/d |

**Gravity sewer design**

| Flow equation | Manning’s ‘n’ or Colebrook-White can be used. For modelling Colebrook-White is preferred. |
| Pipe roughness general | Manning’s ‘n’ =0.013 or Colebrook White k = 1.5mm |
| Minimum velocity @ PDWF | 0.35 m/s |
| Maximum velocity @ PWWF | 3 m/s |
| Depth of flow @ PWWF - Existing | Up to 1m below MH surface level and no spillage through overflow structures |
| Depth of flow @ PWWF - Proposed | 75% of pipe depth |

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Grades (mm, 1 in X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>150 (80 in last section between last manholes or to an end)</td>
</tr>
<tr>
<td>225</td>
<td>290</td>
</tr>
<tr>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>375</td>
<td>500</td>
</tr>
<tr>
<td>450</td>
<td>600</td>
</tr>
<tr>
<td>525</td>
<td>700</td>
</tr>
<tr>
<td>600</td>
<td>850</td>
</tr>
<tr>
<td>675</td>
<td>925</td>
</tr>
<tr>
<td>750</td>
<td>1000</td>
</tr>
<tr>
<td>825</td>
<td>1000</td>
</tr>
<tr>
<td>900</td>
<td>1090</td>
</tr>
<tr>
<td>1050</td>
<td>1270</td>
</tr>
<tr>
<td>1200</td>
<td>1450</td>
</tr>
<tr>
<td>Sewerage pump stations</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Wet well operating requirements</strong></td>
<td></td>
</tr>
<tr>
<td>V (m³) = 0.9 x pump rate (L/s)</td>
<td></td>
</tr>
<tr>
<td>Where N is the acceptable number of starts per hour</td>
<td></td>
</tr>
<tr>
<td>Pump Rate (L/s) = capacity of the largest duty pump</td>
<td></td>
</tr>
<tr>
<td>N = 12 for motors &lt;= 15 kW</td>
<td></td>
</tr>
<tr>
<td>N = 8 for motors 15kW - 200 kW</td>
<td></td>
</tr>
<tr>
<td>N = 5 for motors &gt; 200 kW</td>
<td></td>
</tr>
<tr>
<td>Control levels shall be based on Table 5.1 of WSA04-2005. The minimum depth between duty start and duty off is 100mm and ideally should be 300mm or greater.</td>
<td></td>
</tr>
</tbody>
</table>

| **Emergency storage** |
| 4 hours of ADWF (local gravity catchment only) |
| Except where otherwise specified to meet the requirements of the overflow risk assessment |
| If there is an overflow pipe - storage in the system is measured between the alarm level and overflow pipe invert level. |
| If there is no overflow pipe - storage is measured between the alarm level and 300mm below the lowest upstream manhole or top of wet well. |

| **Pump capacity** |
| If PWWF <20L/s, then 2 pumps (duty/standby arrangement) shall be provided, with each pump being capable of delivering PWWF. |
| If PWWF >20L/s and <200L/s, then 2 pumps (duty/duty assist arrangement) shall be provided, with each pump being sized such that the two pumps running in parallel are capable of delivering PWWF. It is desirable that a single pump be sized on C₁ if appropriate. i.e. From QDNRM, C₁ = 15 x EP^{0.1587} minimum 3.5, maximum 6.5. |
| If PWWF >200L/s, then minimum of 3 pumps (duty/duty assist/standby arrangement) shall be provided. Duty/duty assist pumps being capable of delivering PWWF with each pump being sized in consultation with Allconnex Water. |

| **Pump operation** |
| VSD shall only be used, subject to special approval from Allconnex Water. If approved by Allconnex Water, the VSD operating regime shall be selected to ensure sufficient self-cleansing velocities, and shall meet the pump supplier’s requirements. |

| **NPSH** |
| Refer Clause 6.4 of WSA04-2005 |

| **Rising mains** |
| **Flow equation** |
| Hazen Williams or Colebrook-White. For modelling Colebrook - White is preferred |

| **Friction mains** |
| 100mm – 300mm diameter, C =110 |
| > 300mm diameter, C =130 |
| Colebrook-White to follow method in WSA04. The pump curve shall include the minimum static head with C=140 to confirm that the pump operates over the full range (i.e. to the overflow level) in the wet well. |

| **Minimum velocity** |
| Minimum velocity shall be not less than 0.9m/s, but preferred minimum is 1.5m/s. Refer Clause 10.3.3 of WSA04-2005 |

| **Maximum velocity** |
| 2.5 m/s proposed systems |

| **Max detention time** |
| Maximum time of detention in pressure main and SPS wet well is 6 hours [2 hours in wet well and 4 hours in rising main] (based on daily average flows) to minimise potential for odour / hydrogen sulphide generation. Where high retention times are likely to occur, odour / sulphide control measures will be required to the satisfaction of Allconnex Water. (Refer WSA 07-2007-1.1 section 3.15) |

| **Reduced infiltration gravity sewers (RIGS)** |
| As per gravity sewers except |
| Not permitted without Allconnex Water approval |

| **PWWF** |
| 1000L/EP/d |

| **Single Pump Capacity** |
| Standard: C₁ x ADWF |
| C₁ = 9.322 x EP^{0.1249} minimum 3.0, maximum 4. |

| **Total PS Capacity** |
| 1000L/EP/d |

<p>| <strong>Low pressure sewers / vacuum pumps</strong> |</p>
<table>
<thead>
<tr>
<th>Low pressure sewers / vacuum pumps</th>
<th>Are not preferred and will only be allowed subject to approval from Allconnex Water.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Private pump stations and rising mains</strong></td>
<td>Private pump stations and rising mains are permitted for single users only and no connection or sharing will be permitted without approval from Allconnex Water</td>
</tr>
<tr>
<td><strong>Common effluent discharge</strong></td>
<td>Not permitted without approval from Allconnex Water.</td>
</tr>
</tbody>
</table>
Appendix B  Replacement Pump Details
NP 3202 HT 3~ 454

Technical specification

Patented self cleaning semi-open channel impeller, ideal for pumping in most waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

**Impeller**
- Impeller material: Grey cast iron
- Outlet width: 150 mm
- Inlet diameter: 200 mm
- Impeller diameter: 344 mm
- Number of blades: 2

**Motor**
- Motor #: N3202.180 30-19-4AA-W 30KW
- Stator variant: 1
- Frequency: 50 Hz
- Rated voltage: 380 V
- Number of poles: 4
- Phases: 3~
- Rated power: 30 kW
- Rated current: 56 A
- Starting current: 340 A
- Rated speed: 1470 1/min
- Power factor: 0.90
- Efficiency: 90.0 %

**Installation:**
- P - Semi permanent, Wet

**Configuration**

Note: Picture might not correspond to the current configuration.
NP 3202 HT 3~454

Duty Analysis

<table>
<thead>
<tr>
<th>Pumps running / System</th>
<th>Individual pump</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flow</td>
<td>Head</td>
</tr>
<tr>
<td>2</td>
<td>32.1 l/s</td>
<td>40.3 m</td>
</tr>
<tr>
<td>1</td>
<td>58.7 l/s</td>
<td>34.4 m</td>
</tr>
</tbody>
</table>

Curve according to: ISO 9906

NP 3202 HT 3~454

2 Pumps

1 Pump

NP 3202 HT 3~454
NP 3202 HT 3~ 454
VFD Analysis

Curve according to: ISO 9906

<table>
<thead>
<tr>
<th>Pumps running /System</th>
<th>Frequency</th>
<th>Flow</th>
<th>Head</th>
<th>Shaft power</th>
<th>Flow</th>
<th>Head</th>
<th>Shaft power</th>
<th>Hyd. eff.</th>
<th>Specific energy</th>
<th>NPSHre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 Hz</td>
<td>32.1 l/s</td>
<td>40.3 m</td>
<td>23.2 kW</td>
<td>64.2 l/s</td>
<td>40.3 m</td>
<td>46.4 kW</td>
<td>71.5%</td>
<td>0.143 kWh/m³</td>
<td>3.58 m</td>
</tr>
<tr>
<td></td>
<td>45 Hz</td>
<td>26.5 l/s</td>
<td>32.7 m</td>
<td>16.9 kW</td>
<td>56.9 l/s</td>
<td>32.7 m</td>
<td>33.8 kW</td>
<td>54.1%</td>
<td>0.179 kWh/m³</td>
<td>2.87 m</td>
</tr>
<tr>
<td></td>
<td>40 Hz</td>
<td>24.8 l/s</td>
<td>25.9 m</td>
<td>11.6 kW</td>
<td>49.5 l/s</td>
<td>25.9 m</td>
<td>23.6 kW</td>
<td>50.4%</td>
<td>0.145 kWh/m³</td>
<td>2.36 m</td>
</tr>
<tr>
<td></td>
<td>35 Hz</td>
<td>20.9 l/s</td>
<td>20 m</td>
<td>7.84 kW</td>
<td>41.9 l/s</td>
<td>20 m</td>
<td>15.7 kW</td>
<td>52.4%</td>
<td>0.117 kWh/m³</td>
<td>1.93 m</td>
</tr>
<tr>
<td></td>
<td>30 Hz</td>
<td>17 l/s</td>
<td>14.8 m</td>
<td>4.89 kW</td>
<td>33.9 l/s</td>
<td>14.8 m</td>
<td>9.75 kW</td>
<td>50.6%</td>
<td>0.0943 kWh/m³</td>
<td>1.51 m</td>
</tr>
<tr>
<td></td>
<td>25 Hz</td>
<td>13.6 l/s</td>
<td>11.8 m</td>
<td>2.91 kW</td>
<td>27.6 l/s</td>
<td>11.8 m</td>
<td>5.54 kW</td>
<td>46.4%</td>
<td>0.0654 kWh/m³</td>
<td>1.08 m</td>
</tr>
<tr>
<td></td>
<td>20 Hz</td>
<td>9.4 l/s</td>
<td>8.8 m</td>
<td>1.11 kW</td>
<td>21.3 l/s</td>
<td>8.8 m</td>
<td>3.64 kW</td>
<td>39.2%</td>
<td>0.0341 kWh/m³</td>
<td>0.74 m</td>
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<tr>
<td></td>
<td>15 Hz</td>
<td>6.1 l/s</td>
<td>6.4 m</td>
<td>0.44 kW</td>
<td>15.7 l/s</td>
<td>6.4 m</td>
<td>2.25 kW</td>
<td>24.6%</td>
<td>0.0185 kWh/m³</td>
<td>0.36 m</td>
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<td>10 Hz</td>
<td>3.1 l/s</td>
<td>3.1 m</td>
<td>0.14 kW</td>
<td>9.4 l/s</td>
<td>3.1 m</td>
<td>0.95 kW</td>
<td>14.3%</td>
<td>0.0051 kWh/m³</td>
<td>0.07 m</td>
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</tbody>
</table>

Project | Project ID | Created by | Created on | Last update |
--------|------------|------------|-------------|-------------|
2013-12-05 |
NP 3202 HT 3~454
Dimensional drawing

* DIMENSION TO ENDS OF GUIDE BARS

Weight (kg)
Pump with cooling jacket 570
Dash 80
Pump without cooling jacket 500

Dimensional dwg
FP/NP 3202 300,305,180,185,350,390 HT
Appendix C  Environmental Assessment
<table>
<thead>
<tr>
<th>Legislation/Issue</th>
<th>TRIGGER/IMPACT</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</td>
<td>Significant impact on any Matter of National Environmental Significance (MNES) as defined by the EPBC Act.</td>
<td>Proposed works not likely to result in a significant impact on any MNES.</td>
</tr>
<tr>
<td>Vegetation Management Act 1999 (VM Act)</td>
<td>Clearance of remnant vegetation on any land tenure or clearance of non-remnant vegetation on state land, unless an exemption applies. There is no remnant RE mapped traversed by the proposed alignment, however minor clearance of non-remnant native woody vegetation may be required.</td>
<td>Due to recent exemptions in relation to clearing of native vegetation under the VM Act, no formal permits would be required under the VM Act for clearance of native vegetation for construction of the pipeline. Nonetheless, clearance of native vegetation should be limited to the minimum practical clearance.</td>
</tr>
<tr>
<td>Nature Conservation Act 1992 (NC Act)</td>
<td>Clearing of native plants where assessable under the VM Act. Clearing or pruning of threatened plants listed under the provisions of the NC Act on any land tenure. Tempering with animal breeding places protected under the provisions of the NC Act.</td>
<td>The majority of the alignment is in cleared land, and any clearance is of native plants is expected to be minimal, limited to small patches of vegetation along the watercourse and scattered trees within the park. Further assessment would be required to identify the nature and extent of breeding places to be impacted by the alignment option and advise on requirements in accordance with the DEHP Species Management Program, although it is likely that requirements would be minor. A field investigation is required to verify the presence/absence of threatened flora and fauna within the proposed alignment - see notes below.</td>
</tr>
<tr>
<td>Land Protection (Pest and Stock Route Management) Act 2002</td>
<td>Presence of declared pest plants within the proposed alignment.</td>
<td>Once the design has been confirmed, a field investigation is required to map the presence and extent declared pest plants within the proposed alignment and define mitigation requirements.</td>
</tr>
<tr>
<td>South East Queensland Koala Conservation State Planning Regulatory Provisions (SPRP)</td>
<td>Clearing of non-juvenile koala habitat trees within koala assessable development areas.</td>
<td>No action required - site is not located within a koala assessable development area.</td>
</tr>
<tr>
<td>Water Act 2000</td>
<td>Works interfering with a waterway pursuant to the Water Act 2000. Works may interfere with a waterway where there is one waterway crossing identified in the LCC Flood Regulated Map cited 21 October 2013. Refer to figure below.</td>
<td>Follow QPWS’s ‘Guideline - Activities in a watercourse, lake or spring carried out by an entity’ when working (including construction, sediment and erosion works and reinstatement) within a watercourse, lake or spring. Where possible, use trenchless technology to prevent interference with watercourses.</td>
</tr>
<tr>
<td>Fisheries Act 1994</td>
<td>Works which will affect marine plants, waterways or declared Fish Habitat Areas relevant to the act. Works should not interfere with any waterways relevant to the act, given that there are no waterway crossings identified in the spatial data layer for Queensland waterways for waterway barrier works (2012). One low risk waterway is directly adjacent the pipeline adjacent Lot 12 on RP221068 or 3 Baum Court, Windaroo.</td>
<td>No action required - site will not cross any waterways identified under the Fisheries Act 1994. The site is not identified as a declared fish habitat area. Marine plant disturbance is unlikely to be required; however a field investigation is required to confirm the presence/absence of marine plants along the waterway.</td>
</tr>
<tr>
<td>Coastal Protection and Management Act 1999 (Coastal Act)</td>
<td>Works requiring assessment and permit’s under the Queensland Coastal Plan. A search was undertaken on 25 October 2013. The site is not identified as coastal area, coastal management district or erosion prone area.</td>
<td>No action required – site is not identified in the Queensland Coastal Plan or Erosion Prone Areas plan.</td>
</tr>
<tr>
<td>Flood Regulated Area</td>
<td>Works within a Flood Regulated Area. A search of the LCC Flood Regulated Area was undertaken on 25 October 2013. The entire site, with the exception of the eastern half of Lot 700 on SP30949 or S3 Carl Heck Boulevard, Windaroo is mapped within a Flood Regulated Area. Refer to figure below.</td>
<td>Adequate design and construction management required given flood potential of site.</td>
</tr>
<tr>
<td>Aboriginal Cultural Heritage Act 2003</td>
<td>Works within an area with Indigenous cultural heritage items. The entire site is classified in Category 4 - genetically been subject to significant ground disturbance areas under the Duty of Care Guidelines. The site is considered as a Category 4 area given the previous disturbance (i.e. vegetation removal including disturbing roots and installation of Energen cables and pipes, water treatment plants, manholes and jump station; stormwater pipes and pits; and water supply bore). A search request was received from DEHP on 18 October 2013. No places or items of Indigenous cultural significance within any of the Project areas.</td>
<td>Consultation with Aboriginal party will not be required during construction. If any items are found during construction a “stop work” will be required and consultation will need to be undertaken with the nominated Aboriginal party of the area.</td>
</tr>
</tbody>
</table>
### Environmental Summary (Ecological Perspective)

#### Non-indigenous cultural heritage (Queensland Heritage Act 1992, planning scheme)

Works within an area with non-indigenous cultural heritage items. No non-indigenous cultural heritage items were recorded on the GCCC overlay maps (as input, the Queensland Heritage database or the Australia Heritage database closed 21 October 2013).

No action required - works are not in the vicinity of any recorded non-indigenous cultural heritage. If any potential cultural heritage items are found during construction, stop works and the appropriate departments will be notified.

### Acid sulphate soils

Disturbance/potential disturbance of acid sulphate soils (ASS). There is a potential for ASS, as lot 0 on SP137955 or 9 Johanna Place, Windaroo is identified in the GCCC OM14-1 as ASS hazard area. Contours are mapped as 9.5 m AHD - 14.5 m AHD. Refer to figure below.

To confirm the presence of ASS, a geotechnical investigation will be required for key works to be undertaken below 5m AHD. If tests confirm ASS, then treatments and management will be required during construction.

### Groundwater (dewatering)

Contamination to groundwater. Limited information available - potential exists for groundwater to be encountered, particularly in areas within and adjacent to waterways (as specified in the Water Act 2000 section) and flood impacted area (as specified in the Flood Regulated Area section).

Groundwater to be captured and tested prior to release into the environment (i.e. irrigation to grasslands). Further assessment required during design and construction.

### Environmental Protection Act 1994 - contaminated land

Contamination of soils or waterbodies. A search of the environmental management register (EMR) and contaminated land register (CLR) was undertaken on 8 October 2013. Results are pending.

If any of the lots traversed by the project works are on EMR/CLR. Further contaminated land testing will be required to identify the level of contamination and management requirements.

### Fire ants (Plant Protection Act 1989)

Movement of restricted items within and out of a high or low risk area. A search of the restricted area map was undertaken on 21 October 2013. The site is not identified in the fire ant restricted area.

No action required - site is not within a fire ant restricted area. If suspect fire ants are detected, then 'stop works' and contact Biosecurity Queensland immediately.

### Public amenity (odour, noise, visual impacts)

Works adjacent to residential premises. Works will be undertaken adjacent to urban residential premises.

Adequate odour, noise and visual impact mitigation measures must be implemented during design, construction and operation.

### Bushfire

Works causing or impacted by bushfires. The site is not identified as a bushfire hazard area as shown in GCCC OM10-1.

No action required - site is not within a bushfire hazard area.

### Landslip

Works within an area of landslip hazard area. The site is not shown as an area of landslip hazard as shown in the GCCC OM16-2.

No action required - site not shown in an area of landslip hazard area.

### Unexploded ordnance (UXO’s)

Working within an area known or suspected of having been used for military activity and assessed as having potential UXO contamination. A search of the UXO database on 21 October 2013 indicated that the site does not contain a known UXO contaminated area.

No action required - site not shown to contain any known UXO. Stop works if a suspicious UXO item is found. Do not touch or disturb the item. Contact LWA and the Police.

### Environmental summary (non ecological perspective)

A number of threatened species have been predicted to occur or have been previously recorded in the broader area based on database records and a detailed field investigation is required to verify the presence/absence of threatened flora and fauna under the provisions of the EPBC Act and/or NC Act. If threatened flora and/or fauna are recorded, assessments in relation to approval requirements under the EPBC Act and/or NC Act would be required. A Referral or Clearing Permit application will need to demonstrate how impacts have been avoided, or where impacts cannot be avoided, how they will be managed and mitigated.

No significant ecological areas, including remnant vegetation, refurbish wetlands or mapped areas of ecological significance will be traversed by the proposed alignment. Impacts are likely to be restricted to disturbance of vegetation along the edges of the waterway and scattered trees within the park. A field investigation will be required to ensure that the project will not impacts on any marine plants associated with the waterway. If disturbance of marine plants is required, then the area of disturbance should be limited to less than 25 m² or a permit may be required. It is recommended that the pipeline should be constructed using trenchless technologies to cross the waterway or be strapped to the existing structure in order to minimalize impacts on the waterway and avoid permit requirements.

### Environmental Summary (non ecological perspective)
There are a number of requirements including: compliance with the Water Act 2000; adequate design and construction management given the groundwater and flooding potential; and ASS investigations are required to confirm the presence of ASS. Contaminated testing and management if the lots are identified on EMR/CLR search results.
Appendix D   Community and Stakeholder Assessment
90-12-40 – SPS107 and Rising Main Upgrade
Community and stakeholder assessment

The upgrade of SPS107 (located in park area off Carl Heck Boulevard, Windaroo) and installation of a new rising main are expected to have a moderate to high level of impact on stakeholders.

Works will involve:

- Installation of a new 200mm diameter wastewater pipeline (by either HDD, pipe jacking or pipe bridge). It is noted that this section of the works is not required until 2020.
- Upgrades to SPS107 pump station (including pump replacement and pipework around the pump station).
- Pipe connection works at existing pipelines.

1.0. Summary of stakeholder impacts and issues

Whilst there are no show stoppers associated with the proposed works, a preliminary assessment of potential community and stakeholder issues has identified the following:

- Concerns about general construction impacts such as noise, dust, odour, vibration and working hours (particularly for residents of 20 and 22 Baum Court; 43 and 64 Riverside Terrace);
- Concerns about increased heavy vehicle traffic on local roads to deliver materials to / from work sites (particularly down Riverside Terrace located within Augusta Greens) during the works;
- Concerns about temporary impacts on street parking (at the end of Riverside Terrace) and pedestrian footpaths / bikeways (along Carl Heck Boulevard) during construction;
- Concerns about access to / impacts on Windaroo Memorial Peace Park during the works (whether actual or perceived);
- Concerns about impacts to structures at 64 Riverside Terrace (where pipe connection works will be conducted within an easement over the property);
- General discontentment associated with accessing work sites through the gated estate of Augusta Greens – a PTE will be required as will regular liaison with the Body Corporate;
- Concerns about any water quality impacts on the lake as a result of the works;
- Concerns about any potential vegetation removal during the works;
- Concerns about visual amenity impacts should the new pipeline be installed above-ground;
- Interest in site restoration post completion of the works;
- Concerns about potential disruptions to the existing wastewater network and other underground services during construction;
- A desire to protect community health and safety during the works;
- Interest in the provision of new / altered wastewater services across Logan City to cater for future development and growth.
## 2.0 Stakeholder analysis

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Specific issues / concerns</th>
</tr>
</thead>
</table>
| Local area Councillor – Cr Don Petersen | • Benefits of the new wastewater infrastructure to be clearly articulated.  
• Construction impacts to be minimised for local residents, and motorists, and high quality site restoration provided.  
• Safety, quality, environmental management, time and budget commitments to be met during the works. |
| Nearby residential properties:  
- Baum Court  
- Riverside Terrace  
- Lakeside Court  
- Carl Heck Boulevard | • Construction impacts such as:  
  • Noise, dust, odour, vibration and on-street parking  
  • Hours of work  
  • Possible night works  
  • Any disruption to local services (ie, underground services)  
• Increased traffic volume on local roads.  
• Interest in maintaining property access during works.  
• Visual amenity impacts (ie, should the pipeline be above-ground).  
• Water quality impacts on the nearby lake.  
• Interest in the location of site / storage compounds during works.  
• Interest in site restoration post completion of the works.  
• Works to be carried out in line with safety and quality requirements. |
| Owner of 64 Riverside Tce | • Works to consider existing structures and minimise impacts (where practical).  
• Works to be carried out within existing easement boundary. |
| Augusts Greens Body Corporate | • Construction impacts on residents (as noted above).  
• All access to / from the estate to be in line with the conditions of the PTE at all times.  
• Regular updates during the works.  
• Works to be carried out in line with safety and quality requirements. |
| Windaroo Memorial Peace Park users | • Safety of park users and pedestrians during the works.  
• Interest in restoration of the park area post practical completion. |
| Road users / commuters / residents located along truck haulage routes | • Traffic impacts during construction.  
• Damage to road infrastructure during construction.  
• Safety of motorists, pedestrians and cyclists due to heavy vehicles on the roads.  
• Noise and dust generated by heavy vehicle movements. |
| Local environmental groups | • Construction impacts on local flora / fauna.  
• Any tree clearing and vegetation removal required to make way for construction.  
• Interest in environmental management measures used during works. |
| Traditional owners | • Construction impacts on potential areas or items of cultural heritage significance. |
| Logan City Council  
• Customer Service  
• Water Operations  
• Property | • No unplanned wastewater service interruptions during construction.  
• Appropriate stakeholder notification is provided prior to the commencement of construction.  
• No adverse water quality issues in local waterways.  
• Works in private property remain within designated property easements. |
Appendix E  Town Planning and Approvals Assessment
### 90-12-40 Carl Heck Boulevard PS (SPS107) and RM Upgrade Property and Approvals Assessment

**Prepared by:** Hayley Gardner  
**Reviewed by:** Pieter van der Linde & Alex Moro  
**Date:** 31 October 2013

#### Assessment based on these drawings:
- [90-12-40 Carl Heck Boulevard PS (SPS107) and RM Upgrade Property and Approvals Assessment](#)

#### Easement documents for terms of easement and location:
- [G:\7600\000\300\303 Environment\11 Projects\PDP-90-12-40 Carl Heck Boulevard (SPS107)\Approvals\PTE Layout.pdf](#)

**Easement documents for terms of easement and location:**
- Refer to attached easement documents for terms of easement and location

#### Refer to attached easement documents for terms of easement and location:

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Address &amp; Lot description</strong></td>
<td></td>
</tr>
</tbody>
</table>
- 9 Johanna Place WINDAROO (Lot 0 SP 137955)  
- 84 Riverside Terrace WINDAROO (Lot 113 SP 179792)  
- 53C Carl Heck Boulevard WINDAROO (Lot 700 SP 208494)  
- 64 Riverside Terrace WINDAROO (Lot 113 SP 179792)  
- 52C Carl Heck Boulevard WINDAROO (Lot 700 SP 208494)  |
| **Tenure** |  
- Lot 0 & 113 - Private Freehold  
- Lot 700 - DNRM (Purpose: Park and Recreation) with LCC as Trustees  |
| **Registered Owner** |  
- Lot 0 - Body Corporate of Augusta Green Community Titles Scheme 28942  
- Lot 113 - Michael Hugh Meechan & Rita Meechan  
- Lot 700 - DNRM, with LCC as Trustees  |
| **Easements, Interests & Encumbrances** |  
- Lot 0 - Body Corporate of Augusta Green Community Titles Scheme 28942, Easement over the whole of the Common Property of Augusta Green CTS28942 in SP137955, Easements A, H, K and I benefiting LCC for the purposes of sewerage pipeline  
- Lot 113 - Easement in favour of LCC for the purposes of a sewerage pipeline  
- Lot 700 - Easement in favour of Energex over western portion of lot.  |
| **Domain designation within applicable local planning scheme (i.e. Gold Coast Planning Scheme 2003)** |  
- Lot 0 & 113 - GC Residential Choice Domain  
- Lot 700 - No Domain Designated  |
| **Logan City Council Flooding and Inundation Map 2** |  
- All located within Flooding and Inundation Area  
- Located within Flooding and Inundation Area  |

#### Applicable legislation:
- **Private Freehold**  
- **State Land with Trustee**

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material Change of Use development application under the Gold Coast Planning Scheme 2003</strong></td>
<td></td>
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</tbody>
</table>
- The works are considered to comply with the definition of ‘Public Utility’ in the Gold Coast Planning Scheme 2003 and are therefore exempt from development under all domains under the planning scheme.  
- No application required.  |
| **Operational Works (OPW) development application under the Gold Coast Planning Scheme 2003, and Sustainable Planning Regulation 2009** |  
- Pursuant to Schedule 4, Table 4, Item 1 of the Sustainable Planning Regulation 2009, the proposed operational works (pipeline installation) are exempt development, that is, “Operational work or plumbing or drainage work (including maintenance and repair work) if the work is carried out by or on behalf of a public sector entity authorised under a State law to carry out the work”.  
- In this regard, the proposed operational work is being undertaken by Logan City Council being a public sector, authorised to carry out the work without an assessment.  
- No application required.  |
| **Operational Works (OPW) development application under the Gold Coast Planning Scheme 2003, and Sustainable Planning Regulation 2009** |  
- Pursuant to Schedule 4, Table 4, Item 1 of the Sustainable Planning Regulation 2009, the proposed operational works (pipeline installation) are exempt development, that is, “Operational work or plumbing or drainage work (including maintenance and repair work) if the work is carried out by or on behalf of a public sector entity authorised under a State law to carry out the work”.  
- In this regard, the proposed operational work is being undertaken by Logan City Council being a public sector, authorised to carry out the work without an assessment.  
- No application required.  |
Logan City Council Temporary Local Planning Instrument ("TLPI") No. 1 (Logan Interim Flood Response) 2012

Notwithstanding the OPW exemption outlined above, as all of the private freehold properties are subject to flooding, it is the Alliance’s responsibility to ensure our obligation is met to mitigate adverse flooding impacts to external sites by ensuring correct flood mitigation measures are designed and implemented. If the Alliance requires confirmation to ensure the correct flood mitigation methods are implemented, plans can be provided to LCC’s Flood Team and they can informally advise what measures should be undertaken.

Should substantial cut and/or fill be required, the TLPI key items should be considered.

No application required.

Notwithstanding the OPW exemption outlined above, as all of the lot is subject to flooding, it is the Alliance’s responsibility to ensure our obligation is met to mitigate adverse flooding impacts to external sites by ensuring correct flood mitigation measures are designed and implemented. If the Alliance requires confirmation to ensure the correct flood mitigation methods are implemented, plans can be provided to LCC’s Flood Team and they can informally advise what measures should be undertaken.

Should substantial cut and/or fill be required, the TLPI key items should be considered.

No application required.

Environmental Planning Act 1994

The proposed wastewater main will not require an ERA application pursuant to Schedule 2 Section 64 of the Environmental Protection Regulation 2008.

No application required.

Wastewater Alignment

The proposed wastewater main will not require an ERA application pursuant to Schedule 2 Section 64 of the Environmental Protection Regulation 2008.

No application required.

Pump Station

The existing pump station has a pumping capacity of 30L/s (108kL/hr). The maximum proposed pumping capacity is 70L/s (252kL/hr). If the existing pump station has an ERA permit, it will be necessary to ensure the proposal will comply with the conditions of approval. The trigger for an ERA Permit is 40L/hour. If there is no ERA permit for the existing pump station, an application for an environmental authority is required for a Sewage Pumping Station.

If the proposal fully complies with the standard conditions, an Environmental Authority with Standard Conditions will be issued pursuant to the Environmental Protection (Greentape Reduction) and Other Legislation Amendment Act 2012. However, if the proposal does not fully comply with the standard conditions, a variation application will be required and an Environmental Authority with Conditions will be issued pursuant to the Environmental Protection (Greentape Reduction) and Other Legislation Amendment Act 2012.

Application required to Department of Environment and Heritage Protection as the Administering Authority if there is no existing ERA Permit or the existing ERA permit does not comply with the conditions of approval.


The sites are all outside the SPRP Koala Assessable Development Area and consequently a Development Application is not required for the proposed works. Furthermore, as the SPRP is the overarching state planning instrument that regulates new development in koala habitat value areas, assessment against SPRP 2/10 Koala Conservation in Queensland 2010 is also not required.

As the sites are not located in the Koala Assessable Development Area, the works are not referable under the Environment Protection and Biodiversity Conservation Act 1999.

No application required.

The lot is outside the SPRP Koala Assessable Development Area and consequently a Development Application is not required for the proposed works. Furthermore, as the SPRP is the overarching state planning instrument that regulates new development in koala habitat value areas, assessment against SPRP 2/10 Koala Conservation in Queensland 2010 is also not required.

As the site is not located in the Koala Assessable Development Area, the works are not referable under the Environment Protection and Biodiversity Conservation Act 1999.

No application required.

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

A waterway is located within the proposed alignment of Lot 0. The construction method through this waterway will be either HDD, pipe jacking or pipe bridge. As detailed in Schedule 3, Part 1, Table 6(3) of the Sustainable Planning Regulation 2009, ‘taking or interfering with water from a watercourse, lake or spring’ is assessable unless listed under Section 20(1)(a) to (f) or 20A(2) (old legislation references) of the Water Act 2000. The definition of ‘taking’ within the Water Act 2000 is ‘taking, for water, includes diverting water.’

Section 2(6) of the Water Act 2000 states the following:

20 Authorised taking of, or interference with, water without water entitlement 2010

A constructing authority may take water for the purpose of constructing or maintaining infrastructure that the constructing authority may lawfully construct or maintain, if—

(a) the taking of water for that purpose is prescribed under a regulation; and

(b) the constructing authority complies with each condition imposed under subsection (9).

(9) The taking of the water is subject to the conditions that—

(a) are prescribed under a regulation; or

(b) the chief executive by notice given to the constructing authority imposes on the taking of water:

Section 2 of the Acquisition of Land Act 1967 defines a ‘constructing authority’ as:

Constructing authority means—

(a) the State; or

(b) a local government; or

(c) a person authorised by an Act to take land for any purpose.

The Local Government Act 2009 is a state regulation, which outlines the following:

Powers of local governments generally

111 A local government has the power to do anything that is necessary or convenient for the good rule and local management of its local

No application required.

A waterway is not located in close proximity to the lots.

No application required.
In support of this the Local Government Act is defined below:

Local Government Act means a law under which a local government performs the local government’s responsibilities, including for example—
(a) this Act; and
(b) a local law; and
(c) the Planning Act; and
(d) a planning scheme; and
(e) the Plumbing and Drainage Act; and
(f) the Water Act 2000; and
(g) the Water Supply (Safety and Reliability) Act 2008.

Based on the above sections of legislation, the taking of water by the Logan Water Alliance is ‘not assessable’ under the Sustainable Planning Regulation 2009 as the works will be undertaken on behalf of a constructing authority (Logan City Council), for the purpose of constructing infrastructure that may be done lawfully as prescribed under a regulation, being the Local Government Act 2009.

It is noted that the taking of water will be subject to conditions that are prescribed by the Chief Executive and a 10 day notification period will be required as per the ‘Protocol - Authorised taking of water without a water entitlement under the Water Regulation 2002’.

No application required. 10 day notification to be undertaken as per ‘Protocol - Authorised taking of water without a water entitlement under the Water Regulation 2002’.

### Land Title Act 1994 and Acquisition of Land Act 1967

Lot 0 and Lot 113 (emergent works - orange circles on drawing)
As identified on the drawings, the emergent works (orange circles) appear to be located within the existing easements (Easements K, J and I). The terms of the easements are for the purposes of sewerage pipelines. If the works can be contained within the existing easements, no further easements are required over this lot. To confirm this, the easements should be overlaid on the works drawings. No new easements required for emergent works however may need to consult with ENERGEX as they are an easement holder over the Lot 0 common property.

Lot 0 (new DN200 pipe - yellow line on drawing)
The work appears to be located mostly outside the existing easements (Easement K and I). To confirm this, the easements should be overlaid on the works drawings. It is assumed that the new DN200 pipe is outside the existing easements and therefore an easement will be required over the lot to protect the proposed sewer main.

Logan City Council facilitates the easement application process, however the Alliance is involved in this process.

**Actions required:**
- Liaise with ENERGEX if required
- Undertake consultation with registered owner
- Have valuation report prepared for relevant easement area
- Seek consent from land owner via finalisation of land agreement (providing agreeable to proposed works)
- Initiate Notice of Intention to Resemble (NIR) process if land owner is not agreeable and all other alternatives have been explored
- Process can take indeterminable time to negotiate, however it is considered that 3-4 months is a reasonable expectation if the NIR process is not adopted. If the NIR process is adopted, additional time will be required to finalise the easement.
- Need to be aware of survey costs, land valuation costs and easement registration costs (allow $12,000 per easement)
- Permit to enter requests where required
- Liaise with ENERGEX if required
- New one easement application required

### Local Government Act 2009

Should construction access, or a lay down area be required for the proposed works which are outside the existing easements, a temporary agreement would be required between the relevant parties. A weekly ‘construction disturbance’ fee would more than likely be payable to the private land owner during the construction stage.

For works outside the existing easements, temporary access agreements to be formed with all private land owners to secure construction access/laydown areas specific to open trench methodology.

**As Logan City Council is trustee of Lots 999, they have the rights to issue approval for temporary use of the site for construction access and/or lay down areas. Where this is required, a simple consent application would be lodged with the LCC Property Team. Conditions of approval are likely to relate to safety, maintenance and revegetation requirements. LCC Consent required.**

### Building Act 1975

Pursuant to Schedule 3, Part 2, Table 1, any building work in relation to the Council project is self assessable development as “building work carried out by or on behalf of the State, a public sector entity or a local government” is self assessable and will not require a building approval. No application required.
### Coastal Management and Protection Act 1995 and Sustainable Planning Regulation 2009

*Tidal works* are operational works undertaken in, on or above land under tidal water or land that will or may be under tidal water because of development on or near the land. Land within tidal water (tidal land) includes land lying below the level of the MHWS within the sea or the waters of any harbour, including any navigable river up to the upstream limit of influence of the spring tide on the river.

The section of the proposed wastewater main that runs through Lot 0 does not encroach within the tidal area of the Logan River, and therefore approval for tidal works under the Coastal Protection and Management Act 1995 over these lots will not be required.

No application required.

### Native Title Act 1993

Native title can only be claimed on certain areas of land or water, for example on vacant or unallocated Crown land but not on residential freehold land or public works like roads, schools or hospitals.

No further assessment required.

### Summary

<table>
<thead>
<tr>
<th>Applications/Negotiations</th>
<th>Relevant Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Change of Use [ERA63] development application for SPS107 upgrade (may be required - see above for further discussion)</td>
<td>Department of Environment &amp; Heritage Protection (DEHP)</td>
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<tr>
<td>Permit to Enter requests from private landholders</td>
<td>Not applicable</td>
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<tr>
<td>Liaison with ENERGEX if works within ENERGEX easement</td>
<td>ENERGEX</td>
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<tr>
<td>Negotiations for creation of one easement over private property</td>
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<tr>
<td>Negotiations for temporary construction lay down/access areas over private property</td>
<td>Not applicable</td>
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<tr>
<td>10-day notification to be undertaken as per 'Protocol - Authorised taking of water without a water entitlement under the Water Regulation 2002'.</td>
<td>Department of Natural Resources and Mines (DNRM)</td>
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<tr>
<td>One DNRM easement application including LCC Trustee Consent</td>
<td>Department of Natural Resources and Mines (DNRM)</td>
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Appendix F  Cost Estimate
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<tr>
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<td>A. Design Development Costs</td>
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**Option A**

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<td>11% Total - Work Package - Project Management</td>
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**Total - Indirect Delivery Cost**

Total - Work Package - Project Management

Total - Risk and Opportunity

TOC Development

**Total - Project Fee**

**TOTAL COST - CAPITAL WORKS**

---

**Option B**

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**TOTAL DELIVERY COST**
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GOLD COAST WATER
AS CONSTRUCTED INFORMATION

Job / File Number: AHON1351
Asset Type: Water
Wastewater: X
Recycled Water-A
Recycled Water-B

Field Officer: LODSAN REF No: S1/2010/8264
Asset location: Street Lot 113 Riverside T.C.5
Suburb: Windaroo

between Lake side st. and Dead End st.

Date commenced: [redacted]
Date completed: [redacted]
Completed by (print): I. Vonderkist

Work Description: Within m/h unitid: S096-00567M install a 1000L internal Drop provide 100% connection point.

Surface Level: 10.78
Depth: 3.69
Diametre: 0
UNITID: S096-00567M

Indicate location of all components from property boundary

Comments:

Detail:

113SP175792
64 RIVERSIDE TERRACE

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External contributions to data listed at www.qrnr-qld.gov.au/gemdata CR.

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