Modification to Approved Project: Googong Township Integrated Water Cycle Project

Proposed Discharge Point at Googong Creek

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Document Status

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Glossary and abbreviations

Acronym	Meaning
BOB	Bush on Boundary – group established for Googong that includes representatives from local environment groups and catchment management authority
CCP	Critical Control Point
CDR	Concept Design Report – prepared by MWH for the IWC (MWH, 2010)
CEMP	Construction Environmental Management Plan
CIC	Canberra Infrastructure Corporation
CoA	Condition/s of Approval (issued for the IWC Project under Part 3A of the EP&A Act)
DP&I	Department of Planning and Infrastructure (DP&I)
DSEWPaC	Former Department of Sustainability, Environment, Water, Populations and Communities (now Department of the Environment)
EA	Environmental Assessment – prepared by Manidis Roberts to assess IWC proposal under Part 3A of the EP&A Act (Manidis Roberts, 2010)
EDT	Emergency Discharge Tank – part of the WRP and used to store recycled water that does not meet operational criteria
EP	Equivalent population – term used to described sewage generation based on the average person in residential setting with other filtration factors
EPA	Environment Protection Authority (NSW)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPL	Environment Protection Licence (issued under POEO Act)
GTPL	Googong Township Pty Ltd
IWC	Integrated Water Cycle
NOW	NSW Office of Water
OEH	Office of Environment and Heritage (NSW)
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
PVC	Polyvinyl chloride
QCC	Queanbeyan City Council
RWQMP	Recycled Water Quality Management Plan – prepared by QCC in accordance with the *Australian Recycled Water Guidelines* (QCC, 2013)
SPS	Sewage pumping station
UV	Ultra violet
WRP	Water Recycling Plant

1.0 Introduction

1.1 Overview

Googong Township Proprietary Limited (GTPL) – a partnership between Canberra Investment Corporation (CIC) and Mirvac – is responsible for the development of the new Googong Township that will be located in the Canberra region, around 7 km south of Queanbeyan in NSW. The new Googong Township will be home to about 16,000 people and developed over the next 25 years. The township is designed around an integrated water cycle (IWC), with a dedicated Water Recycling Plant (WRP) that will reduce the consumption of potable water in the community by around 60 per cent and recycle the township's water for non-potable use.

The *Googong Township Water Cycle Project Environmental Assessment* (Manidis Roberts, 2010) (EA) was prepared under (the now repealed) Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) to assess the impacts of construction and operation of infrastructure for the potable water, recycled water and sewage system required to service the township.

Concept Approval for the ultimate development (Stage 1 and Stage 2) and a Project Approval for Stage 1 of the Googong Township IWC Project were granted by the NSW Planning Assessment Commission, under delegation from the Minister for Planning and Infrastructure on 24 November 2011.

The Googong Township IWC Project is being constructed and operated in stages to ensure the infrastructure is correctly sized to meet the incremental level of demand. Stage 1 of the IWC Project comprises new infrastructure to deliver potable drinking water to the township, treat wastewater and supply recycled water for re-use in the township and for environmental discharge. Stage 1 includes a new WRP, interim reservoirs for recycled and potable water, pumping stations and mains pipework (including rising and distribution mains) for sewage, recycled water and potable water. Stage 1 has been designed to service an equivalent population of 3,600 (3,600 EP).

GTPL is responsible for the planning and construction of the IWC Project and Queanbeyan City Council (QCC) will be responsible for the operation of Stage 1 (including the WRP) and future stages of the IWC Project.

1.2 Planning and statutory framework

1.2.1 Environmental Planning and Assessment Act 1979

Part 3A was repealed by the *Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011* (Part 3A Repeal Act), which commenced 1 October 2011. Under the Part 3A Repeal Act, projects deemed to be 'transitional Part 3A projects' will continue to be subject to Part 3A of the EP&A Act (as in force immediately before the repeal and as modified by the Part 3A Repeal Act).

Transitional Part 3A projects include certain projects that were the subject of an existing approval under Part 3A. As Stage 1 of the IWC Project has was issued a Project Approval under Part 3A of the EP&A Act, it is understood to be a transitional Part 3A project. The provisions of Part 3A (as in force immediately prior to its repeal) continue to be applicable to the proposed modifications.

Section 75W of the EP&A Act enables the Minister to modify a project approval granted under Part 3A of the EP&A Act. In determining whether changes to a Part 3A project can be modified under Section 75W of the EP&A Act, consideration is given to the proposed modifications and any possible change in potential associated environmental impacts.

1.2.2 *Environment Protection and Biodiversity Conservation Act 1999*

The Googong Township Project was referred to the Department of Sustainability Environment Water Populations and Communities (DSEWPaC, now Department of the Environment) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to potential impacts on matters of national environmental significance, including migratory species, threatened species and communities. The Googong Township Project (including water cycle infrastructure) was declared a controlled action under the EPBC Act, and approved on 19 May 2011, subject to conditions.

The proposed modification would not have any additional impacts on any matters of national environmental significance, and would not result in an inability to meet any EPBC Act conditions of approval. No additional impacts on ecology are expected as a result of the modification. Section 5.0 provides a detailed assessment of likely environmental impacts.

1.3 Purpose of this report

The EA and *Googong Township Water Cycle Project Environmental assessment – Submissions Report* (Manidis Roberts, 2011) (Submissions Report) discussed discharge points for recycled water, excess recycled water and emergency discharges during operation and these form part of the Approved Project. However, these reports did not include detail on the discharge of:

- Water produced during commissioning of the WRP that meets environmental discharge criteria but is not approved for distribution to the township for use.
- Water produced during operation of the WRP that does not meet requirements for use in the township but meets environmental discharge criteria.

GTPL is seeking approval from the Department of Planning and Infrastructure (DP&I) to construct and operate a third discharge point that does not form part of the Approved Project. This report accompanies the application for a modification to the Approved Project, in accordance with Section 75W of the EP&A Act, as a transitional Part 3A Project.

The purpose of this report is to:

- Provide discussion of alternatives considered for the discharge of recycled water not addressed in the EA or Submissions Report.
- Provide detail on the construction and operation of the preferred option.
- Undertake an environmental assessment and detail proposed mitigation measures for the preferred option.
- Provide a summary of the consultation with stakeholders undertaken to date.

2.0 Approved project

2.1 Regulatory requirements

2.1.1 Regulatory requirements for the use of recycled water in the township

The WRP will be designed and built to treat sewage and produce recycled water that is suitable for use in the township. Acceptable uses of recycled water in the township include toilet flushing, fire fighting, irrigation of public spaces, washing pavements/cleaning of public domain areas, residential garden use and public domain water features (eg the ponds incorporated in the stormwater management system).

As the future operator of the IWC Project, QCC has prepared the *Googong Township Essential Sewage and Recycled Water Quality Management Plan* (QCC, 2013) (RWQMP) to support its application under Section 60 of the *Local Government Act 1993* to construct and operate the WRP.

The RWQMP has been prepared in accordance with the *National Water Quality Management Strategy – Australian Guidelines for Water Recycling Guidelines: Managing Health and Environmental Risks* (NRMMC, EPHC & AHMC, 2006). Condition of Approval (CoA) D4 of the Part 3A Project Approval also requires recycled water supplied to the township to comply with these guidelines.

Table 2-7 of the RWQMP lists the criteria for recycled water which includes levels for total coliforms, viruses, parasites among others to ensure that recycled water produced by the WRP is suitable for its intended uses and does not pose an unacceptable health risk. Table 2-7 of the RWQMP is reproduced below.

Table 2-7 Effluent Criteria for the WRP (All Stages)

Parameter	Criteria		
	Recycled Water[1] (90 %ile)	Discharge to Environment	
		50 %ile [2] (Operational)	90 %ile[3]
BOD	10 mg/L	5 mg/L	10 mg/L
SS	10 mg/L	5 mg/L	10 mg/L
TDS	–	650 mg/L	700 mg/L
TN	–	7 mg/L	10 mg/L
TP	–	0.3 mg/L	0.5 mg/L
Nitrogen Ammonia	–	1 mg/L	2 mg/L
Oil and Grease	–	1	2 mg/L
pH	6.5 – 8.0		6.5 – 8.5
Faecal Coliform	< 1 CFU/100 mL		150 CFU/100 mL
E. Coli	< 1 CFU/100 mL		
Total Coliform	< 10 CFU/100 mL (95 %ile)		
Virus	< 1 cell/50 L		
Parasites	< 1 cyst/50 L		
Turbidity	0.2 NTU		
Colour	15 TCU		
Free Chlorine Residual	0.5 to 2.0 mg/L		0.1 mg/L

[1] *Not in the Draft Effluent Consent Conditions (September 2011) but are likely to be a requirement of the recycled water supply*
[2] *based on likely operational needs to achieve the 90 %ile conditions*
[3] *based on Part 3A conditions.*

2.1.2 Regulatory requirements for discharge to the environment

Traditional methods of sewage treatment involve a range of biological and physical processes before treated effluent is discharged to the environment in a creek, river, estuary or the ocean. The IWC Project will treat and recycle much of the sewage but there is a need to discharge recycled water to the environment under certain scenarios.

The Project Approval for Stage 1 of the IWC Project issued under 75J of the EP&A Act includes a number of CoA. Firstly, CoA 1 requires that the Proponent carry out the project generally in accordance with the EA, Statement of Commitments, Project Modifications and conditions of approval. CoA D5 states that water discharged to the environment shall not exceed the water quality parameters identified in Table D1 (reproduced below).

Table D1: Effluent Quality Limits

Parameter	Effluent discharge limits to environment	
	Units	90th Percentile
BOD	mg/L	10
Suspended Solids	mg/L	10
TN	mg/L	10
TP	mg/L	0.5
TDS	mg/L	700
Faecal Coliforms	cfu/100mL	150
pH		6.5-8.0
Free Chlorine (residual)	mg/L	0.1
Nitrogen – Ammonia	mg/L	2
Oil & Grease	mg/L	2

In addition, the IWC Project and the WRP are classified as a scheduled activity (premise based) under Section 48 and Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act). An Environment Protection Licence/s (EPL) covering the commissioning and operation of the WRP will need to be issued by the Environment Protection Authority (EPA) prior to discharging.

The discharge limits prescribed in CoA D5 will be included as conditions of the EPL and after an initial operating period, the EPA will look to set 100th percentile (absolute maximum) limits. The EPA has advised that these limits will apply to the discharge of recycled water (not emergency flows)

GTPL and QCC will be required to provide monitoring data to demonstrate compliance with the EPL conditions. The WRP will be fitted with monitoring equipment to regularly test water quality parameters at several locations within the WRP, including at the discharge points.

2.2 Approved discharge points for excess and emergency flows

2.2.1 Background

The EA and *Googong Integrated Water Cycle Water and Wastewater Concept Design Report* (MWH, 2011) (CDR) that was included as Appendix B to the EA, nominated discharge points for excess recycled water and emergency flows.

Excess recycled water was initially to be discharged at the stormwater basin at Beltana Park and into Googong Creek before the recycled water main to the interim reservoirs was constructed. Once the recycled water main was constructed then excess recycled water would be discharged at the interim reservoirs (refer Section 5.2.1 of the EA and Section 4.2 of the CDR). Emergency flows would be directed to Montgomery Creek (refer Section 5.3.3 of the EA).

The Submissions Report refined the location for the discharge of excess recycled water following consultation with DP&I, the Office of Environment and Heritage (OEH) and the Murrumbidgee Catchment Management Authority. The Submissions Report noted that all excess recycled water would be discharged at the interim reservoirs, as this option would provide the most efficient and effective method to achieve high environmental outcomes of water quality and stream health. There were no changes to the emergency discharge location.

The discharge points for excess recycled water (as described in the Submissions Report) and for emergency flows (as described in the EA) form part of the approved project. The locations are shown in Figure 1, and are described in more detail below.

2.2.2 Discharge point 1

Discharge point 1 is an approved discharge point located at the interim reservoirs. Flows of excess recycled water will be directed via a discharge structure and through the township's stormwater management system (chain-of-ponds), and ultimately into Googong Creek and Queanbeyan River. The Submissions Report (Section 3.3.4 and Figure 4) nominated this location for the discharge of excess recycled water.

Excess recycled water will have been treated by the WRP to meet the requirements for use in the township including public domain water features (ie meets RWQMP criteria).

2.2.3 Discharge point 2

Discharge point 2 is an approved discharge point located adjacent to the WRP, with flows to Montgomery Creek. The EA (Section 5.3.3) nominated this location for emergency discharges from the WRP. Emergency flows are unlikely to meet the environmental discharge criteria (hence classified as emergency) but would be screened and de-gritted prior to discharge.

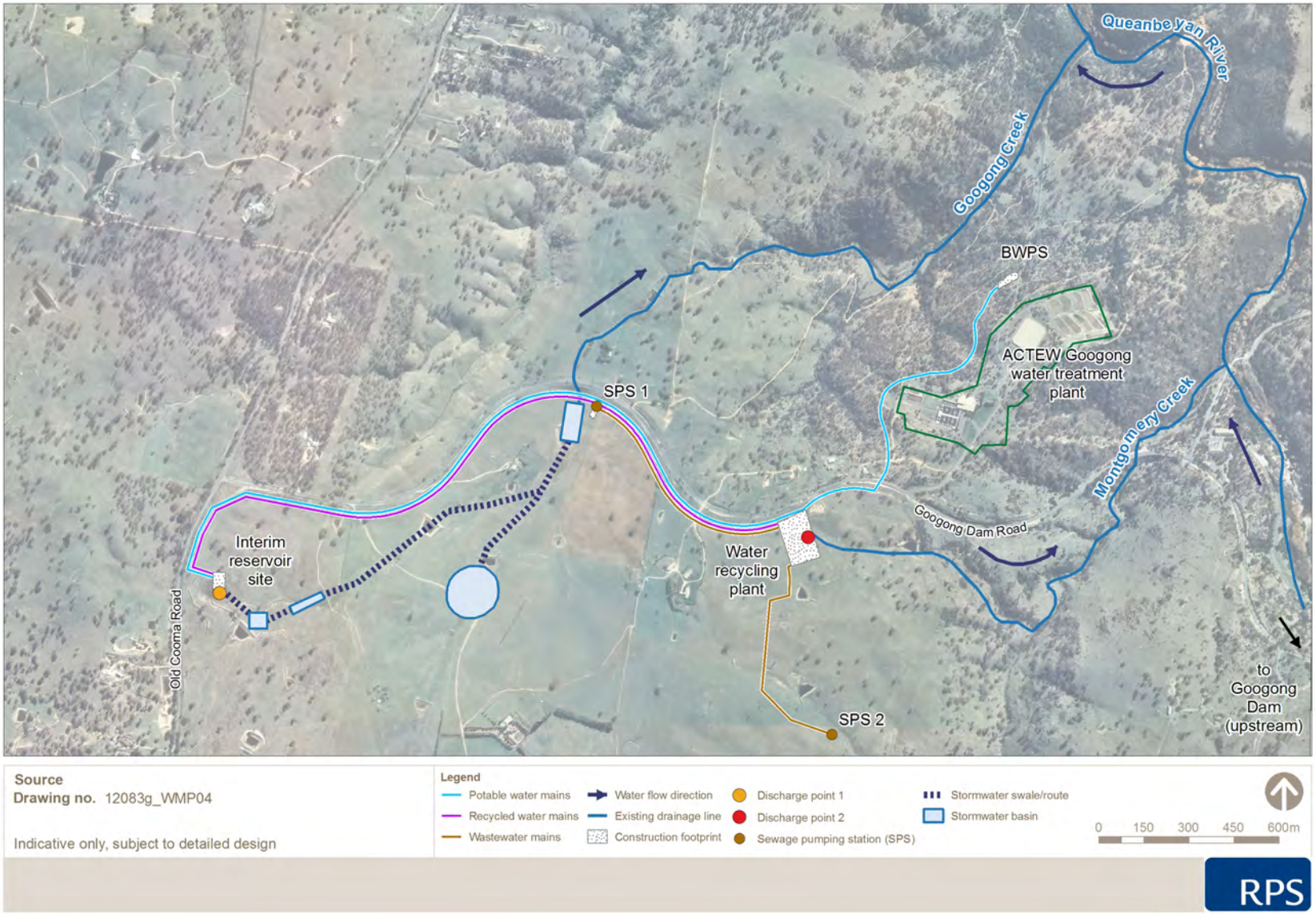


Figure 1 Discharge locations – Approved Project

3.0 Discharge of recycled water

3.1 Background

As design has progressed from concept design to preliminary/detailed design and the planning for commissioning and operations has advanced, GTPL and QCC have developed a better understanding of the potential discharge scenarios from the IWC Project.

GTPL and QCC have identified the following scenarios when discharges from the IWC Project to the environment will be required:

- Scenario 1: Recycled water produced by the WRP during process verification as part of commissioning, will not yet be approved for distribution to the township for use, but would meet the environmental discharge criteria.
- Scenario 2: Recycled water produced during operation of the WRP, which is suitable for use and meets the RWQMP criteria, but is discharged to the environment when supply exceeds demand from the township (excess recycled water).
- Scenario 3: Recycled water produced during operation of the WRP that does not meet the RWQMP criteria (ie due to failure of a Critical Control Point, CCP) and is not suitable for use in the township, but would meet environmental discharge criteria.
- Scenario 4: Emergency discharges to the environment when there is a failure of the WRP (eg due to a prolonged power outage) or component of the treatment process, and the storage capacity of the WRP is exceeded. Emergency flows would be screened and de-gritted only.

The EA and the Submissions Report for the IWC Project considered the discharge of water associated with the typical operations of a WRP, which includes the discharge of excess recycled water (2) and emergency overflows (4) from the WRP from Discharge point 1 and Discharge point 2 respectively (refer Section 2.2). No change to these approved discharge points or operating scenarios is proposed.

However, the EA and the Submissions Report did not address the more complex scenarios for discharge for where the recycled water produced does not meet the RWQMP criteria (ie during the process verification phase (Scenario 1), or in the event of a failure of one of the CCPs during operation (Scenario 3)). These scenarios, and options considered for discharge, are described in more detail in the next sections.

3.1.1 Scenario 1: Recycled water produced during process verification of the WRP

The stage of commissioning where sewage is first introduced into the WRP is referred to as ‘process commissioning’. During this seven-week stage the treatment processes will be stabilising and the recycled water produced may not meet the environmental discharge or RWQMP criteria. During this stage, recycled water will be removed from the site by tanker for disposal at a suitable location within an existing sewage treatment system.

Once the water produced by the WRP meets the environmental discharge requirements (CoA D5) and approval is granted by the EPA to discharge in accordance with the conditions of an EPL, the WRP will enter the next stage of commissioning referred to as the ‘process verification’ stage. During this phase, GTPL and their contractors will be required to demonstrate that the IWC Project (and in particular the WRP) is able to consistently meet the requirements for use of recycled water in the township (ie meets the RWQMP criteria). It is anticipated that the process verification phase will be approximately 20 weeks in duration.

At the end of the process verification stage, the WRP will be handed over to QCC, who will have sought approval from the NSW Office of Water under Section 60 of the *Local Government Act 1993* to operate and distribute recycled water to the township for use.

Based on the predicted growth of the township and assumed timing of commissioning the expected volumes of water produced during commissioning are between approximately 126 kL/day (for 600 EP) and 315 kL/day (for 1,000 EP). The estimated volume of recycled water that would need to be discharged per day during process verification is approximately 150 kL.

Recycled water produced during the process verification phase would meet the environmental discharge requirements (CoA D5), and need to be discharged to the environment under an EPL for the operation of the IWC Project.

3.1.2 Scenario 2: Recycled water produced during operation of the WRP, which is suitable for use and meets RWQMP criteria

Under normal operations, the WRP will produce excess recycled water that will be discharged from the recycled water reservoir at Discharge point 1, through the chain-of-ponds and downstream to Googong Creek and Queanbeyan River. This activity forms part of the Approved Project and no changes are proposed to this operating scenario.

3.1.3 Scenario 3: Recycled water produced during operation of the WRP that does not meet requirements for use in the township

During operation, there may be instances where the recycled water does not meet the RWQMP criteria that are a requirement for use of recycled water in the township. This could be as a result of a failure of one the five health-based critical control points (CCPs) identified in the RWQMP in the WRP treatment process. These are:

(1) Membrane bioreactor.

(2) Ultra violet (UV) light disinfection.

(3) Chlorination disinfection.

(4) Quality of final effluent in storage tank.

(5) Re-chlorination at interim recycled water reservoir.

Operational safeguards will be included in the detailed design and installed to minimise the risk of failure of a CCP. However in the event of a failure, recycled water produced by the WRP may not meet the requirements for recycled water use in the township and will not be able to be used for the intended uses prescribed in the RWQMP (including use in public domain water features). It is noted that the recycled water produced during the failure of a CCP would still meet the environmental discharge requirements, and need to be discharged to the environment under an EPL for the operation of the IWC Project. This water can meet environmental discharge requirements in the event of a CCP failure because the CCPs relate to the control of pollutants such as viruses and other pathogens that are not included in the environmental discharge requirements.

In the event of failure of one of the first three CCPs, the recycled water would be diverted to an Off-Spec Water Tank (with a capacity of 30 kL) and then to an Emergency Discharge Tank (EDT) that has a capacity of 330 kL, which is at least 8 hours storage (for average dry weather flows for the 3,600 EP capacity of Stage 1 of the IWC Project). If the CCP failure is rectified before the capacity of the EDT is exceeded, then the recycled water will be returned to the inlet works of the WRP for treatment and no discharge will be required.

If the CCP failure has not been rectified by the time the capacity of the EDT is reached then the incoming flows from the WRP would be pumped directly from the Off-Spec Water Tank along the discharge pipeline and released to the environment. Note that the available storage time in the EDT will be greater, earlier in Stage 1 when sewage flows to the WRP are lower. For example, at 1,500 EP the EDT will provide greater than 24 hours storage time.

3.1.4 Scenario 4: Emergency discharges to the environment when there is a failure of the WRP

Under emergency circumstances, the WRP may need to discharge flows (that will be screened and de-gritted but not fully treated) via an emergency overflow structure at Discharge point 2 to Montgomery Creek. This activity forms part of the Approved Project and no changes are proposed for this operating scenario.

3.2 Options considered for discharge

The existing discharge locations (1, 2) and a new proposed discharge location (location 3) were all considered for the more complex scenarios relating to the discharge of recycled water produced during the process verification stage; and during operation and the failure of a CCP (refer Section 3.1.1 and 3.1.3). Refer Table 1 and Table 2 for a discussion the potential options.

It should be noted that the option of tankering the recycled water produced during the process verification stage to an appropriate facility (eg Queanbeyan sewage treatment plant) was also considered. However, as this water will meet the requirements for discharge to the environment and given the costs, procedural mechanics and heightened spillage risks all associated with tankering, this option was not pursued.

The proposed Discharge point 3 is located at Googong Creek, immediately downstream of the pond at Beltana Park (see Figure 2). There is an existing storage chamber and outlet structure for stormwater and emergency overflows from sewage pumping station 1 (SPS1) located at this point that could be used to transfer flows to Googong Creek.

Table 1 Discharge of recycled water produced during process verification that does not meet RWQMP criteria

Discharge point options	Assessment of option
Discharge point 1 (interim reservoirs to chain-of-ponds)	Recycled water produced during process verification of the WRP would meet environmental discharge criteria but will not have yet been approved by NSW Office of Water (NOW) for distribution and use in the township. Water produced during this phase may not meet the necessary log reductions for viruses, protozoa and bacteria and would pose a human health risk if exposure occurs. As such, it would not be suitable for any of the intended uses listed in the RWQMP (prepared by QCC in accordance with CoA D4 and the *Australian Guidelines for Recycled Water*), which includes public domain water features such as the chain-of-ponds that Discharge point 1 flows to. The risks associated with discharge of recycled water not approved for use in the township to the stormwater management system (that incorporates ponds accessible to the community, especially the pond in Beltana Park) is not considered acceptable and would be inconsistent with the RWQMP and health objectives for the IWC Project. Therefore Discharge point 1 is not considered to be a feasible option for discharge of recycled water produced during process verification of the WRP.
Discharge point 2 (Montgomery Creek)	Recycled water produced during process verification of the WRP will not be under emergency conditions, given the continuous and planned nature of the discharge for the 20-week process. It is also noted that a swimming hole is located on Queanbeyan River downstream of the confluence with Montgomery Creek and there could be human health risks associated with the discharge of water upstream of this location during process verification. Therefore Discharge point 2 is not considered to be a feasible option for discharge of recycled water produced during process verification of the WRP.

Discharge point options	Assessment of option
Discharge point 3 (Googong Creek immediately downstream of Beltane Park)	Given the arguments listed above it is proposed that recycled water produced during process verification of the WRP is discharged to Googong Creek at Discharge point 3, immediately downstream of Beltana Park. Discharge at this location would avoid potential human health risks of discharging recycled water at the other two locations.

Table 2 Discharge of recycled water produced during operation that does not meet RWQMP criteria

Discharge point options	Receiving waterway
Discharge point 1 (interim reservoirs to chain-of-ponds)	Water produced during operation that does not meet requirements for use in the township (during a failure of one of the CCPs) may not have the necessary log reductions for viruses, protozoa and bacteria and would pose a human health risk if exposure occurs. As such, it would not be suitable for any of the intended uses listed in the RWQMP (prepared by QCC in accordance with CoA D4 and the *Australian Guidelines for Recycled Water*), which includes public domain water features such as the chain-of-ponds that Discharge point 1 flows to. The risks associated with discharge of recycled water not approved for use in the township to the stormwater management system (that incorporates ponds accessible to the community, especially the pond in Beltana Park) is not considered acceptable and would be inconsistent with the RWQMP and health objectives for the IWC Project. Therefore Discharge point 1 is not considered to be a feasible option for discharge of recycled water produced during process verification of the WRP. In addition, there is an element of operational complexity that would be required if water that does not meet requirements for use in the township was discharged at Discharge point 1. In the event that this water was discharged at the interim reservoirs, the recycled water pumping station, pipeline and the interim recycled water reservoir would be considered to be "contaminated" by water that does not meet the requirements for use within the township. Once functioning correctly, the recycled water pumping station, pipeline and reservoir would need to be "decontaminated" before being able to supply recycled water for use in the township. The management of recycled water during this "decontamination" event would likely entail continuous discharge from Discharge point 2 while the pipeline and tanks are cleaned which could take up to a week. The additional operational complexity associated with this option is inconsistent with one of the key objectives of the IWC Project, namely to design and build a system that QCC can operate simply and efficiently.
Discharge point 2 (Montgomery Creek)	Discharge point 2 is approved for emergency discharges, which could occur from such an event like a prolonged power outage, or major wet weather event where the capacity of the WRP is exceeded. While a CCP in the WRP may fail several times a year (based on experience at similar plants currently operating), this is unlikely to constitute an 'emergency' as in most cases the situation will be able to be rectified through replacement of equipment (eg UV lamps). It is also noted that a swimming hole is located on Queanbeyan River downstream of the confluence with Montgomery Creek and there could be human health risks associated with the discharge of water upstream of this location during process verification. Therefore, Discharge point 2 is not considered to be a feasible option for discharge of this water for this scenario.
Discharge point 3 (Googong Creek immediately downstream of chain-of-ponds)	Given the arguments listed above it is proposed that recycled water produced during operation that does not meet the requirements for use in the township due to a failure of a CCP is discharged to Googong Creek at Discharge point 3. Discharge at this location would avoid potential human health risks of discharge to the stormwater management system and to Montgomery Creek upstream of the swimming hole on the Queanbeyan River. In addition, the discharge of this water at Discharge point 3 would avoid the operational complexity associated with discharge at Discharge point 1 and would also avoid energy use and costs associated with pumping water that does not meet the requirements for use in the township to the interim recycled water reservoir.

3.3 Preferred option

To achieve the environmental and public health objectives of the IWC Project, the preferred option is to progress a modification to the Approved Project for a new pipeline to be constructed and a third discharge point to be operated as part of the IWC Project. It is proposed to utilise the existing outlet structure at Beltana Park, which would flow into Googong Creek and into Queanbeyan River (Discharge point 3). The other approved discharge points were discounted, as they would pose a public health risk given that the recycled water produced during these scenarios would not be approved for use in the township.

3.4 Consistency with Approved Project

A consistency assessment of the proposed Discharge point 3 against the Approved Project was carried out by GTPL (refer Appendix 1). It concluded that the proposed Discharge point 3 was inconsistent with the description of the Approved Project in the EA and Submissions Report, which allow for two discharge points. It was also noted that more information was required to better understand the potential environmental impacts that may be associated with the construction and operation of a new discharge point.

This report has been prepared to provide detailed information on the proposed modification to the IWC Project to increase the number of licenced discharge points. Changes to the IWC Project's CoA are not considered necessary for this modification.

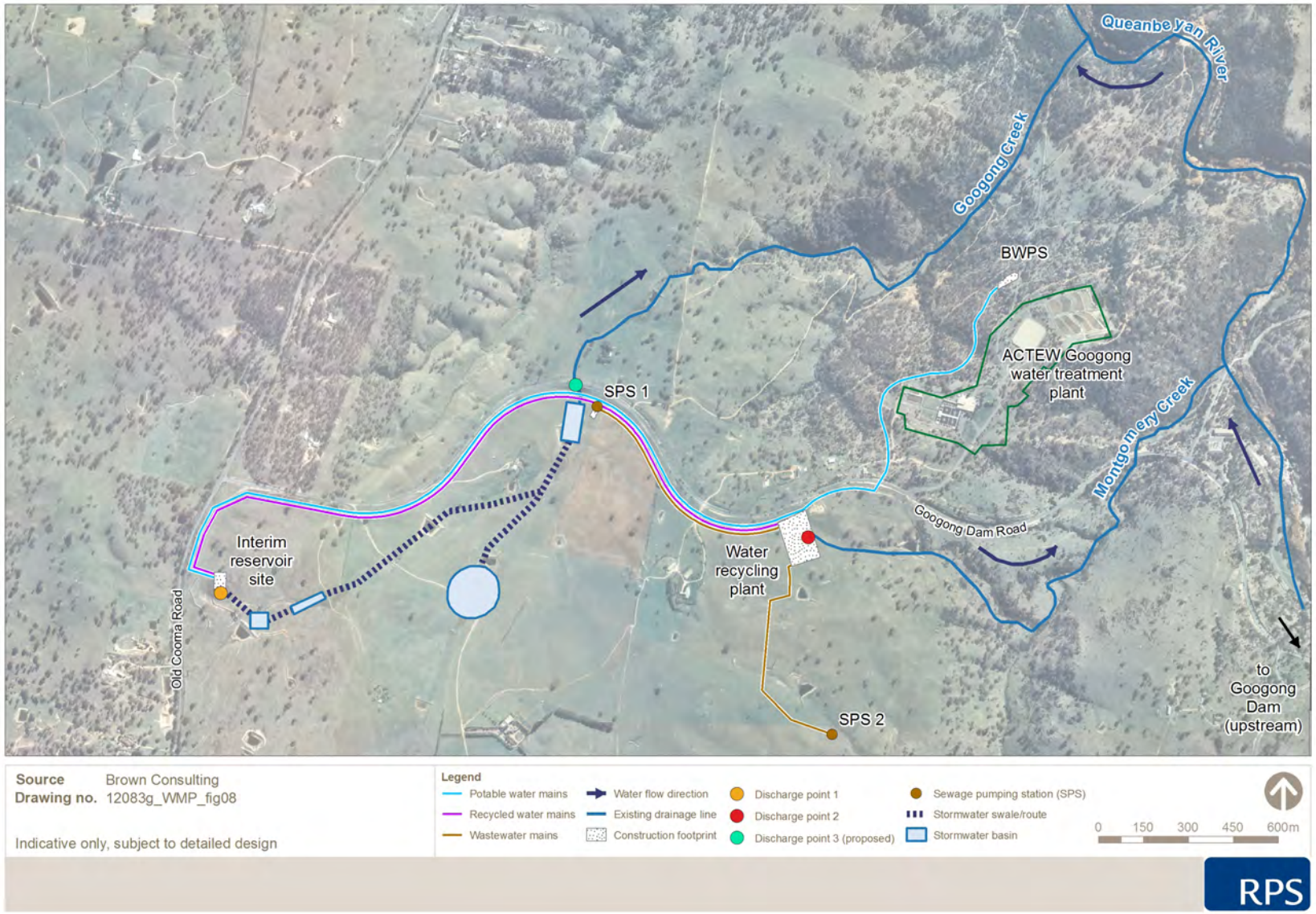


Figure 2 Proposed location of Discharge point 3

4.0 Description of proposed modification

4.1 Overview

There are no changes proposed to the approved operating scenarios. Excess recycled water will still continue to be discharged at Discharge point 1 and any emergency flows would be discharged to Discharge point 2.

The proposed modification to the Approved Project to construct and operate Discharge point 3 is necessary to avoid the public health risks associated with discharging recycled water that is not approved for use at Discharge points 1 and 2. These scenarios are not typical operating scenarios and as such had not been considered in detail during earlier planning phases.

In summary, recycled water produced by the WRP that does not meet the RWQMP criteria (ie during the process verification phase in commissioning, or during the failure of a CCP during operation) would be diverted to an Off-Spec Water Tank at the WRP and then pumped along a new separate pipeline that would follow the alignment of the existing recycled water pipeline along Googong Dam Road. The recycled water would then be discharged into Googong Creek via the existing chamber and outlet structure at Beltana Park, immediately downstream of the pond at Beltana Park. Figure 3 shows the proposed layout.

The proposed discharge would be an EPA-licenced discharge point and recycled water discharged at this location would be required to meet the effluent criteria in CoA D5 and the other conditions of the operational EPL. More detail on the construction and operation of the proposed modification are described in the sections below.

4.2 Construction

4.2.1 General

The proposal would be constructed by a contractor on behalf of GTPL, as part of Stage AB WRP that will take place over 2014 and 2015, however the works associated with the proposed modification are expected to take only 30 days and require six full-time staff. Construction hours would be limited to 7am to 6pm Monday to Friday, 8am to 1pm Saturday with no works on Sunday or public holidays unless otherwise approved by the Director-General. The proposal would also be subject to the CEMP prepared for the construction of Stage AB WRP. The construction costs for the proposal have been estimated at approximately $500,000.

4.2.2 Connection from WRP to new pipeline

Recycled water that does not meet RWQMP criteria would be de-chlorinated and diverted to a concrete circular tank with a capacity of 30 kL (Off-Spec Water Tank) that would be constructed as part of the WRP before it is either pumped back to the WRP for re-treatment or is pumped to a discharge location. Monitoring sensors and odour controls would also be installed at the Off-Spec Water Tank. To allow for recycled water to be pumped to the proposed discharge location at Beltana Park, two new pumps and associated valves, including a scour valve for maintenance would also be constructed.

4.2.3 Trenching along the existing pipe alignment from the WRP to Beltana Park

From the scour valve at the Off-Spec Water Tank, polyvinylchloride (PVC) pipe would be installed via open trenching using a small excavator along the existing pipeline alignment on Googong Dam Road. The new pipeline would be used to transfer recycled water not suitable for use in the township to the existing outlet structure at Beltana Park.

The new pipeline would consist of an approximately 326 m long rising main, 300 mm in diameter (where water is pumped from the WRP to the high point) that connects to a 630 m long gravity main, 450 mm in diameter (where water would flow from the high point down to Beltana Park). A total of 12 maintenance holes would be installed along the alignment.

For the rising main section the minimum trench width would be approximately 0.7 m with a minimum depth of 1.2 m. For the gravity section of the pipeline, the trench would be at least 1 m wide and 1.2 m deep. In some parts the trench may need to be as wide as 4 m and up to 1.5 m deep. The pipe alignment would be progressively trenched and backfilled at the end of each day, or covered with steel plates and fenced.

To mitigate against potential odour impacts from IWC infrastructure, a new 6-14 m high vent stack, 250 mm in diameter would be installed over the end of the rising main as it connects to the gravity main. The vent stack would be painted in colours sympathetic to the surrounding environment and are typical of those used in sewer networks across Australia. The height of the vent stack would be determined during detailed design.

A number of native trees along Googong Dam Road may need to be removed. However no additional land clearing would be required for the proposal beyond that which has already been surveyed and approved as part of the Stage A Network – West works. Refer to Section 5.6 for more detail on ecological impacts.

4.2.4 Connection to the existing outlet structure at Beltana Park

Stormwater from the pond at Beltana Park and emergency overflows from SPS1 are directed to an underground chamber and then discharged to Googong Creek via two 1650 mm diameter reinforced concrete pipes that extend under Googong Dam Road. The chamber and outlet structure have already been constructed as part of the Stage A Network – West and subdivision works. Construction for the proposed modification would require breaking into the existing chamber under dry conditions to connect the pipe, so that flows can discharge via the existing outlet structure.

4.3 Operation

4.3.1 Process verification

During the process verification stage, which will extend for 140 days, all recycled water produced by the WRP would be pumped via the new pipeline to the existing chamber and outlet structure at Beltana Park, as the recycled water will not yet have been approved for use in the township. The recycled water would meet the effluent discharge criteria as required by CoA D5.

The recycled water (along with any stormwater) would be discharged from the chamber to Googong Creek that eventually flows into Queanbeyan River. It has been estimated that an average 150 kL/day of recycled water would be discharged to the environment during process verification. The total volume likely to be discharged during this stage is 21 ML.

4.3.2 Failure of CCP during operation

During operation, if there is a failure of one of the CCPs and recycled water does not meet the RWQMP criteria, it would be pumped from the Off-Spec Water Tank for discharge at the Beltana Park outlet structure.

It is difficult to estimate the frequency and volume of recycled water for such an event as such scenarios are dependent on the operation of the WRP. However for most CCP failures, the problem is likely to be able to be rectified within an 8-hour period, which is the minimum amount of storage capacity at the WRP. This means that the stored water in the EDT can be re-processed at the WRP and discharge will not occur. The RWQMP consider the CCPs and appropriate mitigation measures to minimise such occurrences (eg supply of UV lamps on site that can be replaced in timely fashion).

However a scenario for where discharges to the environment may be required during a worse-case CCP failure have been considered as part of the environmental assessment for the proposal to better understand the potential effects of such discharges. Refer Section 5.2 for more information on the modelling undertaken.

4.3.3 Excess recycled water and emergency flows

There are no changes proposed to the approved operating scenarios. Excess recycled water will still continue to be discharged at Discharge point 1 and any emergency flows would be discharged to Discharge point 2. These flows will not be processed by the new discharge pipeline or Discharge point 3.

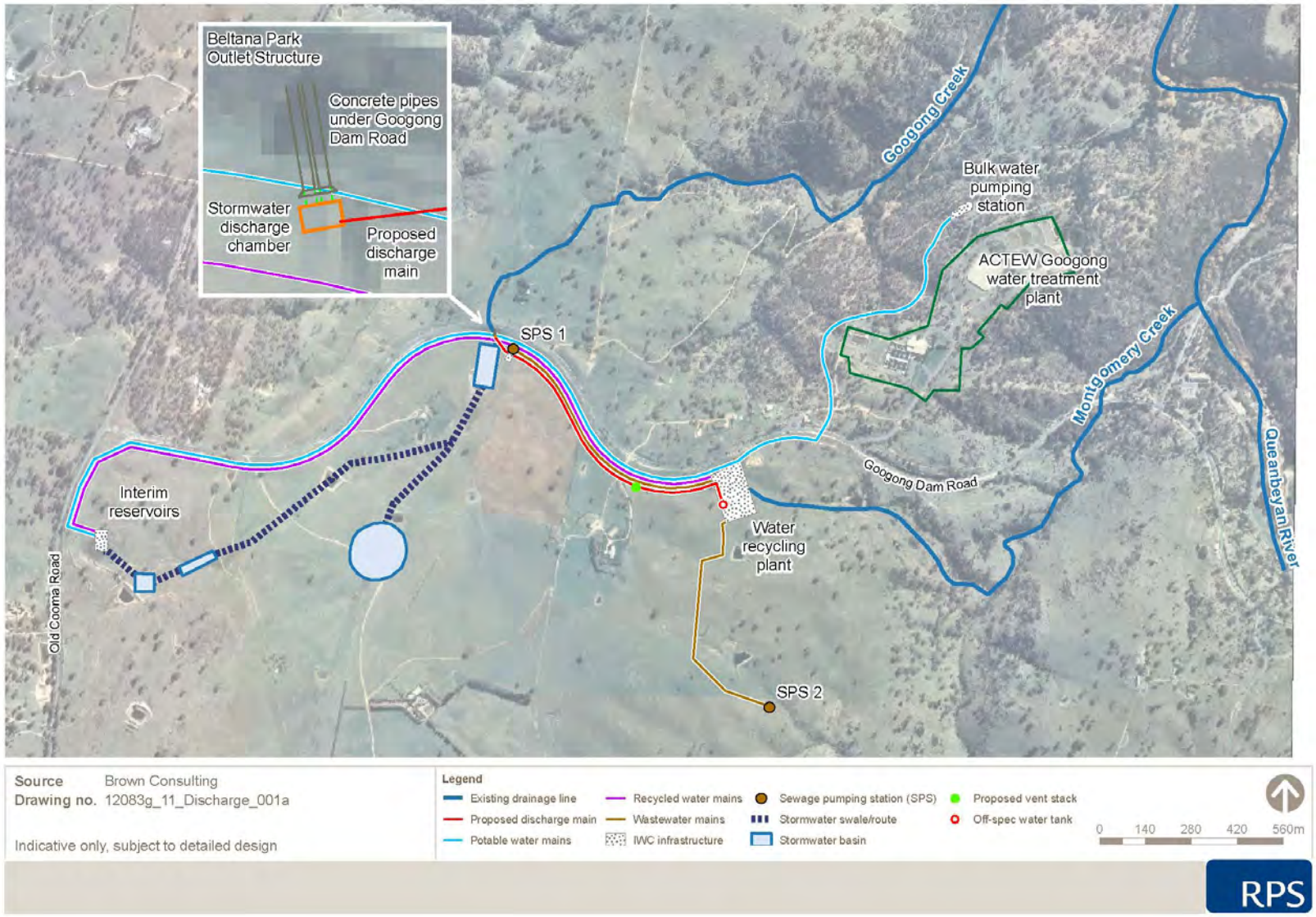


Figure 3 Proposed layout for discharge pipeline

5.0 Environmental assessment

5.1 Overview

This section provides an environmental assessment for the proposed modification and discusses the potential environmental impacts associated with construction and operation.

Following the consistency review (refer Appendix 1) and this assessment, it is considered that the construction impacts are consistent with that of the Approved Project and that the management of environmental risks associated with the construction of the proposed modification will be addressed in the CEMP for the WRP.

A CEMP has been prepared for the WRP and was approved by DP&I on 11 December 2013, however should this modification be approved, then the CEMP will be reviewed and updated to ensure that the additional construction activities are described and that the environmental controls are appropriate for the proposed works. The updated CEMP would be issued to the Environmental Representative (or DP&I) for approval, prior to works commencing.

With regards to operation, while it is considered that the proposed third discharge is required to achieve the environmental and public health objectives of the IWC Project, the consistency review also identified that there was a need to better understand the potential operational impacts, especially with regards to water quality, to determine if the potential impacts would be similar or different to those predicted for the Approved Project. As such an environmental assessment for the operation of the proposed modification is also provided in the following sections.

In summary, the discharge of recycled water at Discharge point 3 during these scenarios would moderately increase the annual environmental pollutant load in the short term for process verification and with only a very minor increase during a CCP failure. However discharging recycled water that is not approved for use at the alternate discharge points would pose a public health risk and such operating scenarios would be inconsistent with the objectives of the IWC Project.

The volume of recycled water discharge during a CCP failure would comprise a small percentage of the total water that would flow to Googong Creek in an average year from the Beltana Park catchment (approximately 0.5%). It is estimated that 150 kL/day would need to be discharged for a period of seven weeks (ie a total of 21 ML) during process verification which also comprises a small percentage of the total water that would flow to Googong Creek in an average year from the Beltana Park catchment (approximately 3.5%).

Given the small volumes, subsequent dilution at Queanbeyan River, and infrequency of such events (which are outside the normal operating scenarios for the WRP), it is considered that the discharge of recycled water during process verification or a CCP failure would not significantly increase the potential risks to downstream users of Queanbeyan River.

5.2 Water quality

Works associated with breaking into the existing chamber and nearby trenching for the new pipeline will take place in proximity to Googong Creek. Googong Creek is an ephemeral creek that will soon receive stormwater flows from the township. Construction work in this area can pose a risk of increased sedimentation, or spills of oils and other chemicals required for construction. A range of measures to ensure the risk of erosion/sedimentation and spills is reduced are contained in the Soil and Water Management Plan and Hazards, Risk and Safety Management Plan which would be reviewed and updated, if necessary, should the modification be approved.

A MUSIC (Model for Urban Stormwater Improvement Conceptualisation) stormwater model was developed by Brown Consulting (2014) for the Googong Township during the environmental assessment phase to investigate receiving waters and the potential impacts of recycled water and stormwater discharged to the environment (for Neighbourhood 1A). The MUSIC model has been updated and reviewed to consider the proposed modification. Two scenarios have been modelled in the context of the existing water flows and likely stormwater and recycled water discharges, and are discussed below.

5.2.1 Process verification

The existing MUSIC was reconfigured to determine the impact on water quality from the discharge of the recycled water that is not yet approved for use in the township over the 20-week process verification period (total estimated volume of recycled water to be discharged is 21 ML). The impact on water quality (considered over a year) was determined at two locations on Googong Creek, being:

- Immediately downstream of Beltana Park, where the discharge would occur.
- At the discharge of Googong Creek to the Queanbeyan River.

Three water quality parameters were modelled– Total Suspended Solids, Total Nitrogen and Total Phosphorus. All are indicators of waterway health and elevated levels can adversely affect aquatic ecology and increase the potential for algal blooms.

Anticipated pollutant concentrations sourced from the discharge of recycled water during process verification (that meets the CoA D5 discharge criteria) were compared to expected pollutant loads in surface water runoff over a 40-year period, from 1967-2007 (see Table 3). Note that discharges of excess recycled water at the interim reservoir site were not included in the modelling, as these discharges will not have commenced at the time of process verification.

Table 3 Water quality summary for process verification (20 weeks)

	Googong Creek (downstream of Beltana Park)				Googong Creek and Queanbeyan River			
	Background (kg/year)	Contribution (kg/20 weeks)	% Increase	Total (kg/year)	Background (kg/year)	Contribution (kg/20 weeks)	% Increase	Total pollutant load (kg/year)
Total Suspended Solids	24,500	210	0.8	24,710	56,100	210	0.3	56,310
Total Nitrogen	839	210	25	1,049	1,390	210	15	1600
Total Phosphorus	57	10.5	18	67.5	91.3	10.5	11	101.8

It is noted that the contribution of the pollutants would be experienced in a consecutive 20-week period, however annual pollutant loads are typically expressed over the period of a year as per the table above.

The modelling indicated that discharging treated recycled water during the process verification phase is likely to have the following impacts:

- Total Suspended Solids loads would only marginally increase (0.8% downstream of Beltana Park and 0.3% upstream of Queanbeyan River – ie contribution/background = %increase)
- Total Nitrogen loads would increase 25% compared to the average annual waterway pollutants downstream of Beltana Park and 15% upstream of Queanbeyan River
- Total Phosphorus loads would increase 18% compared to the average annual waterway pollutants downstream of Beltana Park Pond and 11% upstream of Queanbeyan River.

Whilst the increases in Nitrogen and Phosphorus are moderate, any changes would be for a relatively short period (20 weeks) and still relatively minor compared with annual pollutant loads that would otherwise flow down Googong Creek towards the Queanbeyan River. A detailed water quality model for Queanbeyan River has not been prepared however based on the significantly larger catchment it could be expected that the increases in Nitrogen and Phosphorous pollutants in the river would be minimal further downstream.

It is also noted that while there would be a temporary increase in pollutant load to the receiving environment for a process verification scenario – the alternative, to discharge recycled water at Discharge points 1 and 2, would pose a public health risk.

5.2.2 Failure of CCP

During a CCP failure, recycled water that does not meet the RWQMP would be directed to the EDT at the WRP and can be stored for a period of up to 8 hours. Most CCP failures would be able to be rectified within this 8-hour period provided that the mitigation measures contained in the RWQMP are implemented (eg requirement to store UV lamps on site for quick replacement).

For the purposes of this assessment, a worse-case scenario has been modeled which assumes that a CCP failure could not be quickly resolved (eg restricted availability of crane required to change the membrane cassettes) and recycled water that does not meet the RWQMP criteria would need to be discharged for up to 72 hours at a rate of 42 kL/hour (total of up to 3 ML) until resolved.

Adopting a similar procedure outlined for the process verification modeling in Section 5.2.1, the expected pollutant loads for a 72-hour CCP failure are outlined in Table 4. Note that discharges of excess recycled water at the interim reservoir site were not included in the modelling, as these discharges would not occur in the event of a CCP failure as recycled water would not be pumped from the WRP at this time.

Table 4 Water quality summary for CCP failure (72 hours)

	Googong Creek (downstream of Beltana Park)				Googong Creek and Queanbeyan River			
	Background (kg/year)	Contribution (kg/72 hours)	% Increase	Total (kg/year)	Background (kg/year)	Contribution (kg/72 hours)	% Increase	Total pollutant load (kg/year)
Total Suspended Solids	24,500	32	0.13	24,532	56,100	32	0.05	56,132
Total Nitrogen	839	32	3.8	871	1,390	32	2.3	1,422
Total Phosphorus	57.0	1.6	2.8	58.6	91.3	1.6	1.7	92.9

The analysis indicated that discharging during a worse-case 72 hour CCP failure was likely to have the following impacts:

- Total Suspended Solids loads would only marginally increase (0.13% downstream of Beltana Park, and 0.05% upstream of Queanbeyan River).
- Total Nitrogen loads would increase 3.8% compared to the average annual waterway pollutants downstream of Beltana Park and 2.3% upstream of Queanbeyan River.
- Total Phosphorus loads would increase 2.8% compared to the average annual waterway pollutants downstream of Beltana Park and 1.7% upstream of Queanbeyan River.

The additional pollution loading attributable to a CCP failure is also considerably less when compared with process verification given that the volumes of recycled water generated during a CCP failure are also much less.

Brown Consulting (2014) concluded that the estimated increase in pollutants during a CPP failure would be insignificant when compared to typical annual pollutants from the catchment due to rainfall, and given the rare circumstance where a 72-hour discharge would be required, the impacts to Googong Creek are considered to be insignificant. In addition, such an operating scenario would allow for the public health objectives of the RWQMP to be met.

5.2.3 Water Management Plan

The key management plan that addresses the potential impacts of discharges from the IWC Project on receiving waterways is the Water Management Plan, which is also a Condition of Approval (CoA D8).

The objective of the Water Management Plan is to describe how the IWC Project's operator will manage and protect water quality (both surface and groundwater) and aquatic ecology throughout the operational life of the IWC Project, in accordance with the relevant regulatory requirements.

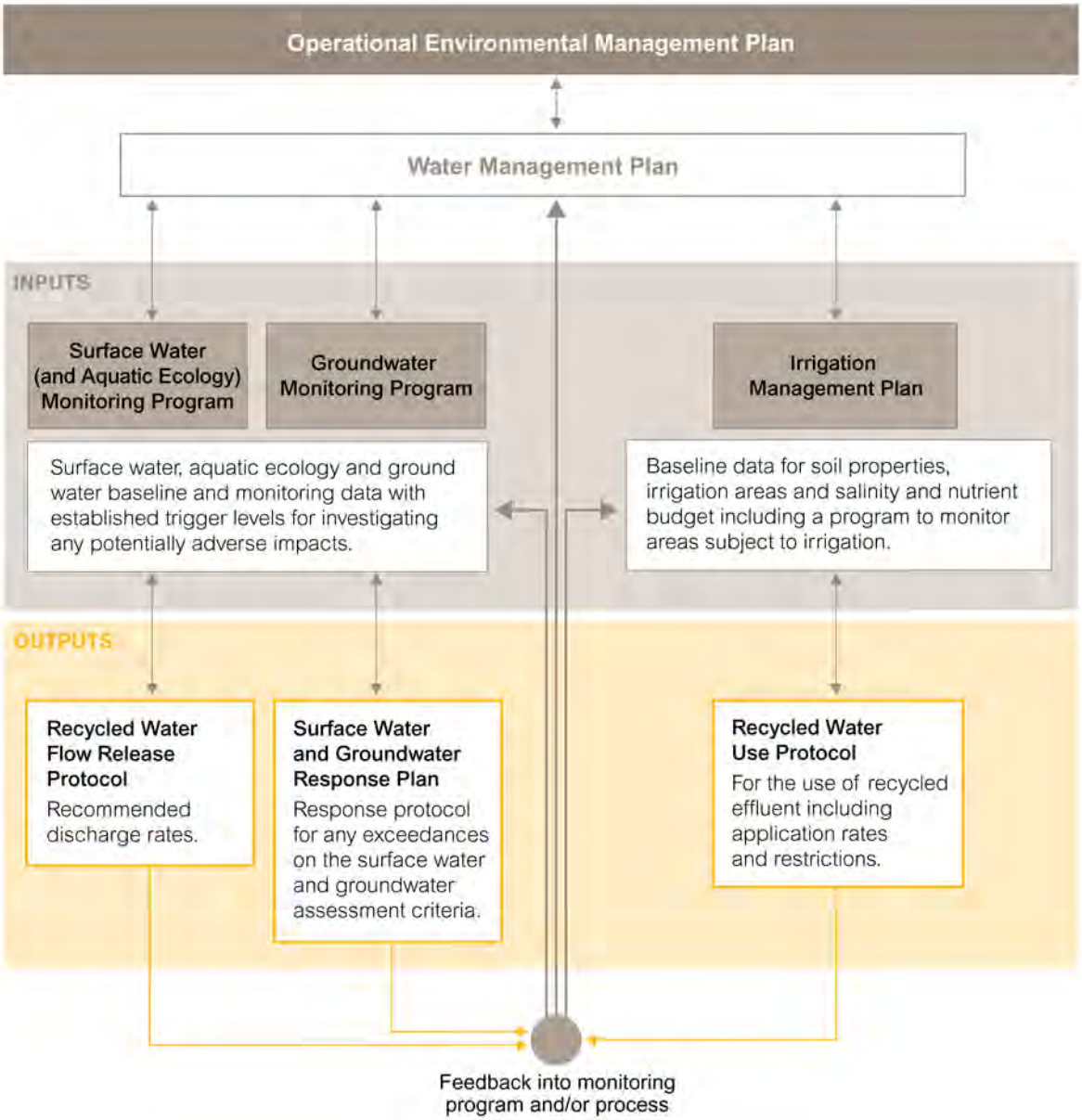
To realise this objective the Water Management Plan will:

- Ensure appropriate measures are implemented to address the relevant CoA and SoC, and safeguards detailed in the EA and Submissions Report.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements.
- Ensure appropriate controls and procedures are implemented during the operation of the IWC Project to avoid or minimise potential adverse impacts to receiving waters and surrounding landscapes.

The Water Management Plan includes a series of sub-plans that cover both inputs (eg baseline data collection and ongoing monitoring) and outputs (eg management protocols) as shown in Figure 4. These sub-plans include a Recycled Water Flow Release Protocol that will address the discharge of recycled water from the IWC Project during operations, including the discharges addressed in this report.

The current version of the Water Management Plan was submitted to the Department of Planning and Infrastructure in December 2013. This version was a draft document that was submitted to agencies for review and to the Department for information, pending the collection of 12 months of surface water and groundwater quality data.

Figure 4 Water Management Plan and sub-plans



5.3 Hydrology and groundwater

During construction there may be a risk of encountering groundwater through excavation activities for the new pipeline. Any groundwater would be managed in accordance with the Soil and Water Management Plan for the WRP, and the contractor would be responsible for obtaining a groundwater licence (as required by the *Water Act 1912*). The proposed modification would not significantly increase risks to groundwater. Operational risks associated with groundwater for the IWC Project will be monitored and managed through the implementation of the Water Management Plan (CoA D8).

The proposed modification would not be affected by flooding, as assets would be installed mostly underground. The proposed modification would involve the discharge of recycled water down Googong Creek, however the volumes to be discharged during process verification and during operation would form only a small percentage of the total flows to Googong Creek during Stage 1 of the IWC Project, and as such would not adversely increase the effects of flooding or downstream erosion already considered in the EA and Submissions Report (refer also to Section 5.2 for details on estimated volumes).

Brown Consulting (2014), as part of the modelling (refer Section 5.2) also considered potential scour impacts as a result of the proposed modification. During a year of average rainfall, the Beltana Park catchment could be expected to receive 588 ML/year of runoff. The total estimated volume from the proposal during the process verification phase would be approximately 21 ML. This represents a relatively small increase of 3.5% when compared with an average year of rainfall runoff. This percentage increase is considered insignificant when compared to the variability of rainfall patterns, and Brown Consulting (2014) concluded that no impact due to scour from the discharge of process verification flows would be anticipated.

Similarly for the failure of a CCP, Brown Consulting (2014) noted that the estimated flows of 3 ML when compared with annual flows of 588 mL/year represented a relatively small increase (about 0.5%) which would be insignificant when compared to the variability of rainfall patterns and no scour impacts would be anticipated.

5.4 Aquatic ecology

Poor water quality can adversely affect aquatic environments and the organisms and animals that exist in these habitats. The risks of sedimentation and spills which could adversely affect water quality and aquatic ecology is considered in Section 5.3.

The operation of the new pipeline would see recycled water discharged to Googong Creek and into Queanbeyan River. The impacts of discharging to Googong Creek were investigated and considered in the EA and Submissions Report. Following this, government regulators set effluent discharge criteria (CoA D5) for the IWC Project to ensure that water discharged would not adversely affect downstream water quality and aquatic ecology. The effluent discharge limits will form part of the conditions for the operational EPL for the WRP. The recycled water that would be discharged as part of the proposed modification would still meet the environmental discharge criteria, so there would be no change to the risk for aquatic ecology. Potential impacts to aquatic ecology will be monitored through the implementation of a Water Management Plan for the IWC Project (CoA D8).

5.5 Soil

During construction of the proposed modification the risks to soil would include erosion from excavation and stockpiling; and oil leaks and spills from the operation of construction machinery. Such risks would be managed through the implementation of the Soil and Water Management Plan prepared for the WRP and that would be reviewed and updated, should the modification be approved. There are no known contaminated areas in the proposed modification works area. The potential risks to soil are considered minor and consistent with the Approved Project.

There would be no operational impacts to soils associated with the proposed modification.

5.6 Terrestrial ecology

A pre-clearing survey was undertaken in July 2012 prior to the construction of Stage A Network – West that follows the same alignment as the new pipeline. A review of this survey indicates that no threatened flora or Endangered Ecological Communities were identified along the alignment and it was noted that the study area comprised mainly of scattered native planted trees. The hollow bearing trees that were identified have been removed as part of the Stage A Network – West works and ten replacement nest boxes have been installed.

A small number of native trees remaining along the surveyed alignment may need to be removed as a result of trenching, and if not already removed as part of the Stage A Network – West works. However no

additional land clearing would be required for the proposal beyond that which has already been surveyed and approved as part of the Stage A Network – West works.

In addition, where practical tree barriers would be used and the trenching footprint would be minimised, and the Project Ecologist would be consulted prior to any tree removal to check for native fauna. Re-vegetation and rehabilitation would be undertaken in accordance with the Landscape Management Plan prepared for Stage A Network – West.

There would be a risk to native fauna that may be impacted by machinery or become trapped in open trenches. However, such risks would be mitigated through conducting pre-start checks and ensuring that trenches are covered every night. A range of mitigation measures to minimise risks to vegetation and native fauna have been included as part of the Flora and Fauna Management Plan for the CEMP for the WRP, which would be reviewed should the modification be approved, to ensure that the measures are appropriate for these works.

Operation of the proposed modification would not impose any risks to terrestrial flora and fauna. Overall, it is considered that the potential ecological impacts resulting from the construction and operation of the proposed modification would be minor and consistent with the impacts of the Approved Project.

5.7 Noise

Noise impacts to sensitive receivers as a result of the construction of the WRP have been considered and a range of mitigation measures have been incorporated into the Noise and Vibration Management Plan. The proposed modification would require the operation of machinery such as an excavator along the pipeline route to Beltana Park. The trenching would be undertaken progressively along the route and the estimated duration of works is 30 days.

It is not considered that the noise sourced from the construction of the new pipeline would adversely increase the overall noise impacts associated with the WRP or the IWC Project, given the relatively minor scale of the additional works and short time-frame. A review of the Noise and Vibration Management Plan would be undertaken should the modification be approved to ensure that the proposed measures are appropriate to minimise noise impacts and include any additional measures as required.

Operational noise impacts for the proposed modification would be associated with the operation of pumps at the WRP. CoA D1 limits operational noise from project infrastructure at the nearest residential receiver to 35 dB(A) $L_{Aeq(15min)}$ and the operation of the new pumps would also be considered as part of this requirement, and attenuation provided as required. Details for noise attenuation for the WRP and proposed modification will be competed during detailed design.

5.8 Air

The potential for air quality impacts for the proposed modification are concerned with trenching activities and stockpiles that have the potential to cause dust if not appropriately managed. Poorly maintained vehicles and equipment can also release pollutants into the air. Such risks would be managed through the implementation of the Air Quality Management Plan prepared for the WRP that would be reviewed and updated, should the modification be approved.

Odour impacts are a consideration for the operation of the proposed modification, and a 6-14 m vent shaft would be installed above the end of the rising main (refer Figure 3), adjacent to Googong Dam Road to mitigate against potential impacts.

5.9 Traffic

Construction of the proposed modification may require works along the southern alignment of Googong Dam Road, which is under the control of QCC. A Section 138 certificate under the *Roads Act 1993* for the WRP works (including modification) would be obtained prior to works on the road occurring.

There may be minor impacts to road users and pedestrians as part of Googong Dam Road is accessed to install the new pipeline however it is unlikely that property access would be affected. Road control and safety measures would be implemented under the Traffic Management Protocol for the WRP that would be reviewed and updated accordingly, should the modification be approved.

Road restoration would be undertaken as part of the WRP works as set out in the Traffic Management Protocol for the WRP. In summary, construction of the proposed modification would have short-term low to moderate traffic impacts consistent with the impacts of the Approved Project.

There would be no change to operational traffic impacts as a result of the proposed modification.

5.10 Heritage

There are no known heritage items located along the new pipeline alignment. The potential to uncover previously unknown artefacts is very low given the disturbed nature of the area resulting from the construction of the other parts of the IWC Project and subdivision works. The Heritage Management Plan for the WRP, which would be reviewed and updated to include the proposed modification, includes procedures for dealing with unexpected heritage finds.

There would be no change to heritage impacts as a result of the operation of the proposed modification.

5.11 Visual

During construction of the proposed modification there would be additional trucks, machinery and fencing along Googong Dam Road however such machinery would only be present for the duration of works (about 30 days). Visual impacts resulting from the construction of the proposed modification are therefore considered to be minor and consistent with the impacts of the Approved Project.

The proposed modification would introduce a new vent stack, with a nominal height of between 6 m and 14 m (to be determined during detailed design) installed above where the rising main and gravity main connect along Googong Dam Road to mitigate against odour from the IWC infrastructure. The new 250 mm diameter stack would be located along the road alignment and in the vicinity of other infrastructure-related poles such as street lighting and the nearby 36 m high Telstra tower. The vent stack would be painted in colours sympathetic to the surrounding environment. It is considered in the context of the surrounding infrastructure on the streetscape, that the visual impact is low and consistent with the impacts of the Approved Project.

5.12 Socio-economic including public health

The Googong Township is a new master-planned community that is being constructed over the next 20-25 years and will eventually create around 5,550 homes serviced by the IWC Project. The development helps to fulfil many planning objectives for NSW and the ACT, which includes the provision of more housing in the greater Canberra region.

Construction of the proposed modification has the potential to affect nearby receivers in the short-term through noise, traffic and air quality changes. However there will be other construction works as part of the

approved Part 3A and Part 4 works in the township and the proposed construction works associated with the modification would only represent an incremental increase in these impact areas. In addition, the number of receivers in the immediate area is relatively low, although the number will begin to increase as people begin to move into township.

Communication with affected receivers is a requirement of the IWC Project, and a Community Information Plan (CoA A14) and Complaints Management Procedure (CoA A15) have been prepared and will continue to be implemented as part of the WRP and proposed modification works, if approved. Such measures are considered adequate to manage the potential community impacts associated with the proposed modification. The proposed works are a relatively minor component of the WRP and overall IWC Project and would be constructed in a short period of time (30 days).

The proposed modification is required to ensure that public health risks are minimised and to deliver recycled water to the township in accordance with the CoA for the IWC Project and the *Australian Guidelines for Water Recycling.* As explained in Section 0, the distribution of recycled water that does not meet the RWQMP criteria is not an acceptable operational scenario, as the processes of the WRP may not be working to effectively reduce pathogens in the recycled water. The proposed modification seeks to discharge recycled water further downstream where there is no immediate direct human contact so to achieve the objectives of the RWQMP.

It is noted that there is a small community further downstream along the Queanbeyan River off Wickerslack Lane that withdraw water for their personal use (approximately 3 km from the Beltana Park outlet structure). While the Queanbeyan River is not endorsed as a supply of water for personal use by QCC, it is acknowledged that there the residents along Wickerslack Lane have withdrawal entitlements along this part of the river.

During the long-term operation of the WRP, excess recycled water and stormwater will be discharged and flow along Googong Creek into the Queanbeyan River. The various impacts of this were considered as part of the EA and Submissions Report and no changes to this arrangement are proposed.

The proposed modification seeks to discharge water that does not meet the RWQMP criteria during failures of the CCPs. As noted in Section 5.2 and Section 5.3, the likelihood of such events, where the failure of the CCP cannot be rectified before the storage capacity of the WRP is exceeded and there is a need to discharge, would be infrequent. The volume to be discharged would comprise a small percentage of the total water that would flow to Googong Creek in an average year from the Beltana Park catchment (approximately 0.5%).

With regards to the process verification phase, it is estimated that 150 kL/day would need to be discharged for a period of seven weeks. This comprises a small percentage of the total water that would flow to Googong Creek in an average year from the Beltana Park catchment (approximately 3.5%).

Given the small volume, subsequent dilution at Queanbeyan River, and infrequency of such events, it is considered that the discharge of recycled water for this scenario would not significantly increase the potential risks to downstream users of Queanbeyan River.

It is noted that CoA B3 of the Project Approval states:

The Proponent shall provide a compensatory water supply to any land owner whose water entitlements are adversely impacted (other than an impact that is negligible) as a result of the project, in accordance with the criteria established in the Water Management Plan in condition D8.

The compensatory water supply measures shall provide an alternate water supply for the duration of the impact attributed to the project. The alternate water supply shall at least be of an equivalent quality and quantity to the affected supply and be provided within 24 hours of the loss being identified, or as otherwise agreed by the affected resident/land owner.

If the Proponent is unable to provide an alternative supply of water, then it shall provide reasonable alternative compensation in consultation with the affected land owner. If the Proponent and the land owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

As required, the Water Management Plan will address this issue once finalised.

5.13 Waste

Waste streams generated by construction of the proposed modification would be similar to the wastes being generated by the construction of the WRP and may include:

- Liquid waste: Fuels, oils, greases, engine coolant from machinery and plant.
- General solid waste: Concrete, PVC pipe, metallic materials, rubble, soils (topsoil, fill materials).
- General solid water – recyclables: glass, aluminum cans, plastic bottles, scrap metal and off-cuts, paper and cardboard.
- General solid waste: vegetation and spoil.

The management of waste would be implemented as per the Waste Management Plan for the WRP that would be reviewed and updated, should the modification be approved. It includes procedures for the classifying and removal of waste.

The operation of the proposed modification and new pipeline would involve discharge of recycled water produced by the WRP, which can be considered as a waste stream. The discharge of recycled water will be regulated by the conditions of the IWC Project and the operational EPL issued by the EPA. Impacts relating to the discharge of recycled water have been considered as part of this assessment. No additional waste streams as a result of the operation of the proposed modification have been identified.

5.14 Utilities and services

There are a number of services that extend along Googong Dam Road and would need to be crossed. This includes existing electrical and telecommunications services, and water, sewer and recycled water mains that have been recently installed for the township.

The contractor would determine the exact location for the services during detailed design, and the appropriate safeguards and consultation would be implemented. Such measures are included in the Hazards, Risk and Safety Management Plan for the construction of the WRP that would be reviewed and updated, should the modification be approved.

There would be no change to impacts to utilities as a result of the operation of the proposed modification.

5.15 Cumulative impacts

The proposed modification would form part of the WRP construction package, which is one of several past, current and future stages of the Googong IWC Project. In addition there are subdivision works and individual house construction also occurring in the township area. The proposed modification would not significantly create or add to the cumulative impacts of the Googong Township given the minor nature of the works

(trenching and installation of a pipeline and other ancillary infrastructure) and short duration (30 days). A range of mitigation measures would be in place as part of the CEMP to reduce pollution risks.

With regard to greenhouse gases, there would be the generation of such gases from the operation of machinery and plant during construction and from the production of electricity to pump the recycled water. Such volumes would be negligible. Measures have been included in the Air Quality Management Plan for the construction of the WRP to minimise idling time and ensure machinery is maintained and operated efficiently.

Lastly, the proposed modification would not significantly contribute to, or be affected by, the effects of climate change (eg increase in flooding or bushfires). GTPL are progressing a number of green initiatives as part of the development of the township (dedicated parklands, energy plan and social sustainability).

6.0 Consultation

6.1 Consultation with government agencies and community groups

GTPL has consulted with the following stakeholders on the options for discharge of recycled water produced during the process verification phase and during operation and the failure of a CCP:

- QCC (ongoing through fortnightly meetings of a QCC/GTPL steering committee).
- EPA (meeting held 5 November 2013).
- NOW (via email and meeting held 25 November 2013).
- DP&I (meeting held 26 November 2013).

There were no objections raised with regards to the preferred option. The EPA and NSW Office of Water (Dubbo branch) have provided written feedback following the consultation that is included at Appendix 2.

In addition, GTPL will present information on the proposed modification to the Googong Bush on Boundary (BOB) community group in early 2014 and which includes resident from Wickerslack Lane. Consultation with government agencies and the BOB group will be ongoing throughout the IWC Project and progress on the application for the proposed modification will be provided. General information on the IWC Project is provided on the compliance.googong.net website and through other written notifications in accordance with the Community Information Plan (CoA A14).

6.2 Exhibition of proposed modification

To meet the requirements of the EP&A Act and EP&A Regulation the proposed modification will be placed on public exhibition. Advance notice of the exhibition will be provided to the public via advertisement in the local newspaper on at least two occasions (clause 239 EP&A Reg) and the Modification Report will be exhibited at the following locations (clause 240 EP&A Reg):

(a) at the principal office of the proponent and the Department, and

(b) at the office of the proponent and the Department closest to the locality in which the proposed modified activity is to be carried out, and

(c) at the principal office of the council for the area in which the proposed modified activity is to be carried out, and

(d) at the Sydney office of the Environment Centre (New South Wales) Pty Ltd.

The Modification Report will be placed on public exhibition for a period of fourteen days, during which members of the public may make submissions (clause 241 and 242, EP&A Reg).

7.0 Conclusion

The proposed modification involves the construction and operation of a new pipeline from the WRP to transfer recycled water that does not meet the RWQMP criteria and discharge it to Googong Creek through the existing outlet structure immediately downstream of Beltana Park. There are no proposed changes to the approved operating scenarios for excess recycled and emergency flows, which are the normal operating scenarios for the WRP in the longer term.

The proposal is driven by a need to address the more complex operating scenarios of process verification and a CCP failure, along with the requirement to provide recycled water to the township that meets health requirements and is in accordance with Australian Guidelines for Recycled Water (CoA D4). The proposed modification has the support of QCC as the eventual operator and other government agencies.

It is important to note that alternative options for the management of recycled water produced during process verification or a CCP failure would result in the discharge of water that does meet the RWQMP criteria to waterways that are exposed to the public immediately downstream of these discharge locations. There would be a moderate increase in the pollutant load during process verification as a result of the proposed modification, however the discharge of recycled water from Discharge point 3 would be temporary and the pollutant levels would remain within acceptable limits for the catchment. With regards to volumes, the additional water to be discharged represents a minor increase from a whole of catchment perspective (0.5% for CCP failure, and 3.5% for process verification).

In order to progress the proposed modification, a consistency review was undertaken and it was considered that the proposal was materially different to the Approved Project and an assessment of the potential changes to environmental impacts was required. This report has considered the potential environmental effects resulting from the construction and operation of the proposed modification. In particular it has been shown that the potential changes to overall water quality would be minor. Existing Project Approval conditions to monitor waterway health and manage potential water impacts will continue to be the responsibility of GTPL and QCC through the implementation of the Water Management Plan currently being prepared for the IWC Project. Other construction-related risks can be managed through the implementation of the CEMP.

In conclusion, GTPL considers that the proposed modification would not result in significant changes to the environmental impacts that form part of the Approved Project.

8.0 References

Brown Consulting (2014) *Googong IWC – Discharge of treated effluent during process verification and critical control point failure*. Letter to Googong Township Pty Ltd.

Manidis Roberts (2010) *Googong Township Water Cycle Project Environmental Assessment.* Prepared for Canberra Infrastructure Corporation.

Manidis Roberts (2011) *Googong Township Water Cycle Project Environmental Assessment – Submissions Report.* Prepared for Canberra Infrastructure Corporation.

MWH (2010) *Googong Integrated Water Cycle – Water and Wastewater Concept Design – Volume 1 Main Report.* Prepared for Canberra Infrastructure Corporation.

NRMMC, EPHC & AHMC (2006) *National Water Quality Management Strategy – Australian Guidelines for Water Recycling Guidelines: Managing Health and Environmental Risks*.

Queanbeyan City Council (2013) *Googong Township Essential Sewage and Recycled Water Quality Management Plan.*

Appendix 1

Consistency Review

A1 Environmental Review

This initial environmental review has been completed for a proposed change to the Approved Project. The proposed change includes:

- Construction of a new pipeline extending from the Water Recycling Plant (WRP) to the outlet structure at Beltana Park along the existing alignment of the recycled water main pipeline.
- Operation of the new pipeline to transfer recycled water produced at the WRP that is not suitable for use in the township for discharge to the environment (ie during the process verification phase in commissioning, and during the failure of a Critical Control Point in operation (eg membrane)). Note that the recycled water would be suitable for discharge to the environment and would meet the effluent requirements stipulated in Condition of Approval (CoA) D5.
- Discharge of recycled water that is not suitable for use in the township would occur at the new discharge location via the existing outlet structure at Beltana Park into Googong Creek that flows to Queanbeyan River.
- Typical volumes and the frequency of discharges to Googong Creek have been estimated but the potential changes to downstream water quality have not yet been investigated.
- Recycled water that is suitable for use in the township will be pumped along a separate pipeline to the interim recycled water reservoir as described in the Environmental Assessment (EA) and Submissions Report for the IWC Project. No changes to this scenario are proposed.
- Emergency flows from the WRP (eg as a result of a prolong power outage) that have been screened and de-gritted will be discharged via an emergency discharge structure to Montgomery Creek as described in the Environmental Assessment (EA) and Submissions Report for the IWC Project. No changes to this scenario are proposed.

Should any response to the questions be 'yes', further assessment will be required. This may include a consistency assessment and/or modification report.

Aspect	Yes	No
Approved project		
Will the proposal move any infrastructure outside the Approved Project boundary?		X
Key issues		
Ecology		
Will the proposal result in additional land clearing?		X
Will the proposal have any impact on any threatened flora species or endangered ecological communities listed pursuant in the *Threatened Species Conservation Act 1995* or the *Environment Protection and Biodiversity Conservation Act 1999*?		X
Will the proposal impact on potential or actual habitat for threatened fauna species or populations?		X
Traffic and access		
Will the proposal substantially increase the number of vehicle movements required to complete construction?		X
Contamination		
Will the proposal impact on any contaminated land beyond that already approved?		X
Geology, Soils and Water		
Does the proposal have the potential to result in contaminated or sediment-laden runoff, or spills entering waterways that standard mitigation measures would not prevent if implemented?		X
Will the proposal result in an increased risk of erosion beyond that already approved?		X

Aspect	Yes	No
Noise and Vibration		
Will the proposal have any additional noise and vibration impacts beyond those already approved?		X
Visual Amenity		
Will the proposal result in additional visual amenity impact beyond that already approved?		X
Heritage		
Will the proposal have any direct impact on locally, regionally or State listed heritage items beyond that already approved?		X
Will the proposal have any direct impact on Aboriginal heritage beyond that already approved?		X
Air Quality		
Will the proposal result in a substantial increase of dust or vehicle exhaust emissions, which cannot be managed by through implementation of standard mitigation measures?		X
Waste		
Will the proposal result in the excessive generation of waste?		X
Socio-economic		
Will the proposal impact on the socio-economic activities of the region, including access to infrastructure and public facilities?		X
Hazards and risk (including human health)		
Will the proposal impact on existing safety arrangements?		X
Will the proposal result in the increased risk of human or environmental exposure to harmful chemicals that could not be managed by standard mitigation measures?		X
Utilities and services		
Will the proposal impact any additional utilities or services beyond that already approved?		X
Other		
Will the proposal result in an operational change that reduces the environmental performance of the plant and associated infrastructure in any way? The EA and Submissions Report prepared for the Approved Project did not address the discharge of recycled water produced during commissioning or recycled water produced during the failure of a Critical Control Point (eg membrane) during operation. During these times water treated by the WRP would not meet the Recycled Water Quality Management Plan (RWQMP) criteria (developed as part of the Australian Guidelines for Water Recycling and also a condition of approval – CoA D4), and it is proposed to discharge this water from a third location (not approved) to avoid the health risks of discharging at the approved discharge locations (ie the water would be discharge downstream of the ponds at Beltana Park ad into Googong Creek instead of discharging at the interim reservoirs and through the stormwater chain-of-ponds). GTPL considers that while such a change is necessary to meet the IWC Project's objectives, a modification to the Project Approval is also required to allow for the operation of a third discharge (not described in the EA or Submission Report) and to ensure that the potential environmental impacts of the proposal are considered and assessed. It is not known what changes to the predicted downstream impacts (if any) would occur as a result of this proposed modification and more investigation would be required.	Not known – more info required	
Will the proposal have any other unspecified environmental impacts?		X
Comment and conclusion		
It is considered that the proposal is materially different to that which is described in the EA and Submissions Report and that a modification to the Approved Project is required in order to describe and understand the potential environmental and public health implications of the construction and operation of a third discharge location.		

Appendix 2

Agency Consultation

Memo to:	Phil Hansen	of:	Queanbeyan City Council
From:	Julian Thompson	of:	Environment Protection Authority
Phone:	62297002		
cc:	Craig Harris (Googong Township P/L), Therese Flapper (GHD)		
Date:	6 November 2013	No of pages (including this page):	2

RE: Googong IWC Project – Update and progress review of WRP Concept Design

Phil,
Thanks for your time today to discuss the progression of the Googong IWC project - Water Recycling Plant (WRP) concept design. In summary the following comments reflect EPA's review of the Wastewater Modelling Report and discussions during today's meeting.

1. EPA has reviewed the Wastewater Modelling Report ('the report") prepared for GTPL by MWH (dated 11 October 2013) for the proposed wastewater collection and treatment system to be constructed at the Googong Township development. We are satisfied with the approach taken in the modelling and assumptions proposed in the report to test the adequacy of the proposed design in terms of the following:

- System designed to fully capture and treat all flows up to 1:10 year ARI, 2hr rainfall event – the critical storm event for the catchment;
- Assumed 3% infiltration;
- Inflows (DWF + WWF) modelled results in system by-passes for 2 events exceeding 1:10 yr ARI (of approximately 2 and 5 ML) during the 10 years of actual rainfall from 1985 – 1995. EPA would expect a high dilution factor during such a rain event;
- Emergency storage capacity for inflows at the WRP to be expanded from 600 kL to 2800kL at the WRP.

EPA recommends the report should be amended to:

- Quantify the assumed peaking factor in terms of an maximum ADWF equivalent (6x) treatment capacity; and
- Quote the actual rainfall figures for the two modelled by-passes (in the 1985-1995 rainfall dataset) in relation to the intensity and duration of these rain events.

EPA supports the change in the configuration of sewage pumping stations proposed in the report given the design of SPS 1 has been identified as not meeting specifications if it were to accept flows from the future SPS 2.

2. EPA supports the proposed addition of a 'discharge point 3' to Googong Creek below the Beltana Pond to address issues with discharges to the environment that do not meet recycled water specifications (and therefore discharge criteria for recycled water at Point 1) but do meet environmental discharge criteria. This failure to meet a recycled water spec may be the result of a failure arising at one of the critical control points or during the recycled water verification process. The current project approval does not cater for distribution of these 'off-spec' recycled water discharges to the township for reuse (through the chain of ponds) where potential health impacts

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could arise from human contact. The EPA understands the preferred option is to install a separate pipeline from the WRP to the proposed discharge point 3 to avoid potential cross-contamination issues with 'on-spec' recycled water to be delivered to point 1 for discharge. Council will need to approach the Department of Planning for a modification of the Part 3A approval conditions before EPA could vary the licence discharge points.

3. Performance Verification – EPA supports the proposed 21 day reliability test in relation to the performance monitoring data for determining/confirming the ability of the WRP to achieve environmental discharge limits prior to the EPA making 'operational' the discharges at Point 1 (and a proposed future Point 3). We would appreciate receiving a commissioning monitoring program which outlines the nature and frequency of proposed testing during the commissioning process – so that when the data become available we are able to permit licensed discharges to commence promptly (assuming commissioning indicates the WRP is meeting licence limits).

NOTE: The EPA does not have a statutory approval role in the design of the Googong WRP. Other approvals are required for this stage (eg. s.60 *Local Government Act* approval from the Office of Water). We provide these comments only as a help to Council (and GTPL) in delivering the project, to help ensure the system can reliably meet EPA licence limits once it is operational. As a performance based regulator, the EPA will regulate compliance with licence discharge limits once the licence is in force – it is up to the licensee to ensure the designed and constructed infrastructure meets those limits.

I trust these comments are useful. Please call me on 6229 7002 if you have any queries.

Regards

JULIAN THOMPSON
Unit Head – South East Region

Department of Primary Industries
Office of Water

Contact Tim Baker
Phone 02 6841 7403
Mobile 0428 162 097
Fax 02 6884 0096
Email Tim.Baker@water.nsw.gov.au

Our ref ER20439

Natalie Green
RPS Australia
GPO Box 91
SYDNEY NSW 2001

Dear Natalie,

Googong Township Water Cycle Project – Change in Discharge Location

I refer to your email dated 14th November 2013 requesting comment from the NSW Office of Water in relation to a proposed change in discharge location for the Googong Integrated Water Cycle Project. The Office of Water has reviewed the document and provides the following comments:

- It is recommended the design and construction of the discharge location and works within 40m of the watercourse be carried out in accordance with the NSW Office of Water "*Guidelines for Controlled Activities on Waterfront Land*". These guidelines can be accessed at the following link: http://www.water.nsw.gov.au/Water-Licensing/Approvals/Controlled-activities/default.aspx
- It is recommended water quality downstream of discharge point 3 be monitored to aid in minimising impacts to the aquatic environment and downstream water users. The development of contingency options is recommended to mitigate potential impacts. It is recognised an Environment Protection Licence (EPL) will be required to regulate the water quality of discharged recycled water.

Should you have any further queries in relation to this submission please do not hesitate to contact Tim Baker on (02) 6841 7403.

Yours sincerely

Mitchell Isaacs
Manager Strategic Stakeholder Liaison
4 December 2013