Ordinary Meeting of Council

22 February 2023

UNDER SEPARATE COVER ATTACHMENTS

ITEMS 9.3 TO 9.12

SECTION 4.55(1A) – ASSESSMENT REPORT - MOD.2011.077.B

EXECUTIVE SUMMARY

The application seeks to modify the approved development consent TSC/80/2002.DA (MOD.2011.077.A) to remove conditions requiring the supply and maintenance of electricity supply infrastructure to three lots within the approved subdivision.

The subdivision has physically commenced and the consent is active.

The previous modification MOD.2011.077.A was approved, permitting the installation of ground-mounted solar systems for electricity supply to three concessional lots (Lots 2, 3 and 4). These lots anticipate a future dwelling and were subdivided for a residential purpose.

The remaining large lots (Lots 1 and 5 to 7) were originally approved for agricultural purposes under Clause 13 of the Tallaganda LEP 1991. No specific power requirements were required to service agricultural lots.

The proponent has not proposed any electricity supply infrastructure to Lots 2, 3 & 4. The request to modify the consent conditions lack the necessary information to demonstrate how electricity supply will be provided to satisfy the requirement of Clause 6.11 of the Palerang Local Environmental Plan 2014.

Accordingly, Condition 9 for ground mounted solar panels for each concessional allotment (Lots 2, 3 & 4) within the approved subdivision is proposed to remain. Condition 10A which requires a section 88B instrument be registered over those lots requiring the ongoing maintenance of those systems is also proposed to remain to ensure effective supply is maintained. Similarly, Condition 10 which notifies prospective purchasers of Lots 1, 5 & 7 that there is no power supplied to the land will remain unchanged.

Council has determined through recent decisions that a solar array can be provided as an alternative to reticulated power however the installation is to occur or the work subject to a bond to ensure the actual delivery of an electricity supply prior to the release of the subdivision certificate.

This modification application also seeks Council reconsider the current requirement for rural fencing to all lot boundaries. The Palerang Development Control Plan currently only seeks fencing to public roads. Accordingly, an amendment to Condition 8 is able to be supported to provide fencing only to lot boundaries to Nerriga Road (Lots 2 and 4) and the frontages of the lots to the new internal road.

The modification was notified pursuant to the QPRC Community Engagement and Notification Plan from 28 July 2022 to 15 August 2022. No submissions were received.

BACKGROUND

TSC/80/2002.DA – Seven lot Torrens title subdivision of land and construction of a road.

MOD.2011.077 – Minor amendment to correct an error on the lot and deposited plan number.

MOD.2011.077.A – Modification to conditions to remove requirement for reticulated power supply to Lots 2, 3 & 4).

DESCRIPTION OF THE SITE AND LOCALITY

The subject site is legally described as Lot 3 DP 1063771, and is commonly known as No. 7123 Nerriga Road, Corang. The site is located on the western side of Nerriga Road and has an area of 175.5 Ha. There is no existing development on the site except for clearing and construction of internal roads associated with the subdivision. Vehicular access is provided to the site via a constructed road which connects to Nerriga Road and was approved under the initial development application for the subdivision. Existing development within the locality consists of a mixture of rural residential and agricultural uses.

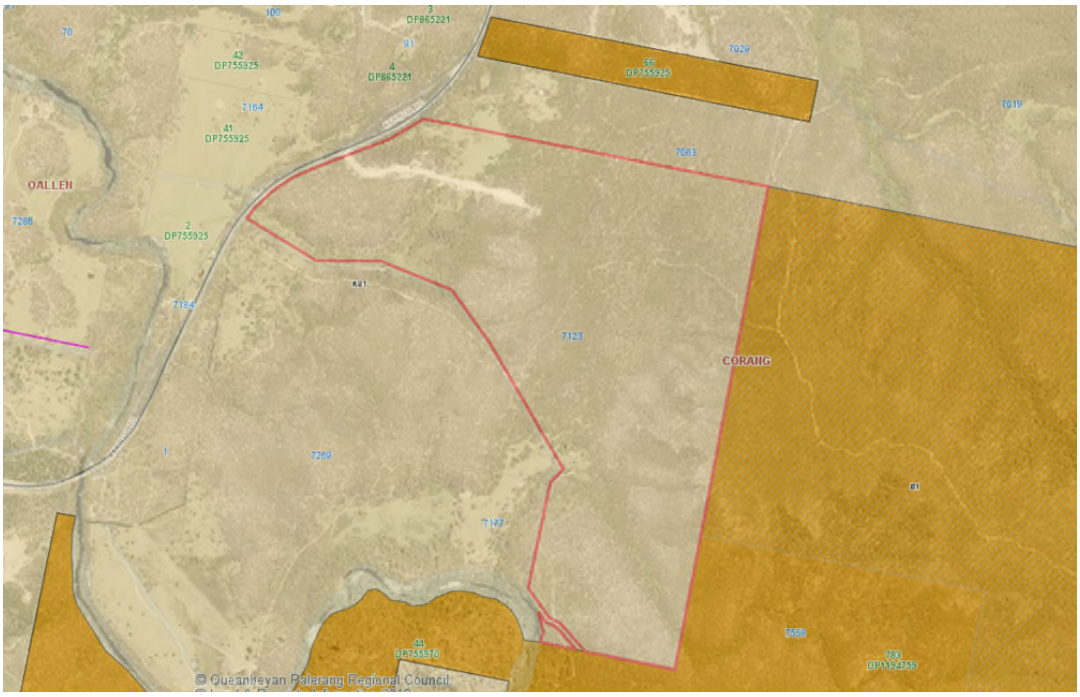

Figure 1: Subject Site and Locality

PROPERTY BURDENS AND CONSTRAINTS

There are no easements or burdens on the land which could affect, or be affected by, the proposed development.

DESCRIPTION OF THE PROPOSED DEVELOPMENT

Proposed Development

Original Subdivision application (TSC/80/2002/DA)
TSC/80/2002/DA approved the Torrens title subdivision of land to create seven (7) lots ranging in size from 3.5ha to 40ha.

Lots 2, 3, and 4 were approved as 'concessional lots'. This form of development allowed lots to be created for residential purposes below the minimum lot size where they were excised from a large rural holding.

The development also includes the construction of a new internal road from Nerriga Road to provide vehicular access to each lot within the subdivision. Fencing and the supply of electricity were sought through conditions.

Lots 2, 3, and 4 to which the modification application primarily relates are located closest to Nerriga Road. Lot 2 is 3.5ha, Lot 3 is 6.1ha, and Lot 4 is 8ha.

MOD.2011.077

TSC/80/2002/DA was modified in September 2011 under MOD.2011.077 but the only change was to correct an error in the Lot and DP description. The conditions of consent remained unchanged.

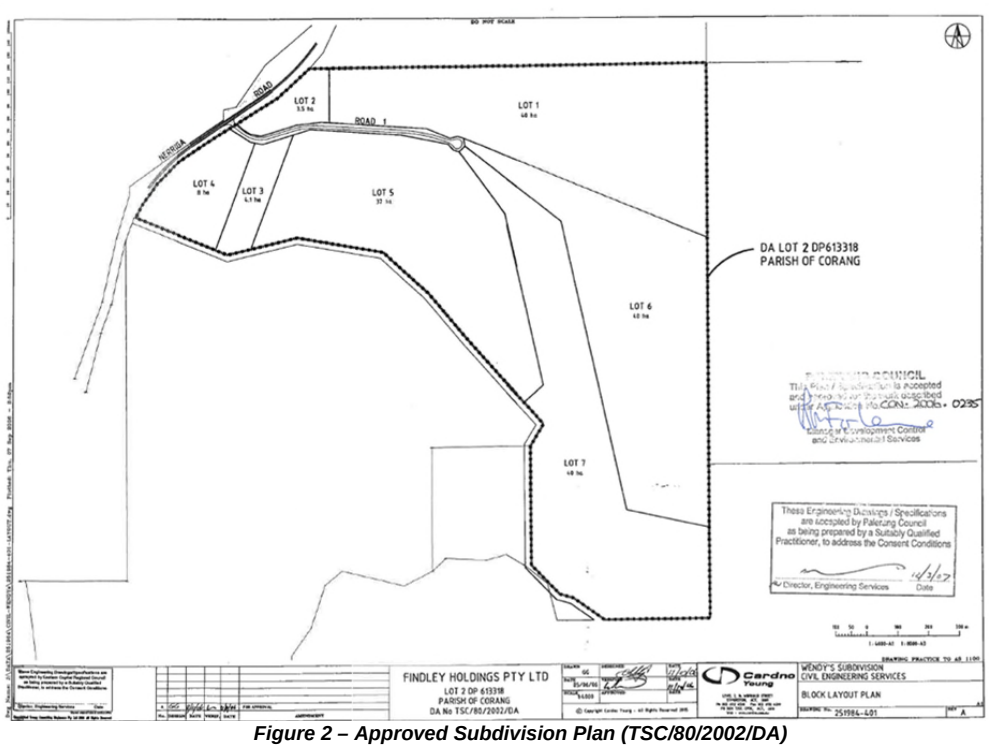

Figure 2 – Approved Subdivision Plan (TSC/80/2002/DA)

MOD.2011.077.A

MOD.2011.077.A amended Condition 9 to remove the requirement for reticulated electricity to be supplied to Lots 2, 3, and 4 with a solar power system to be provided as an alternative. Figure 4 shows the indicative location of ground mounted solar installations on the nominated Lots.

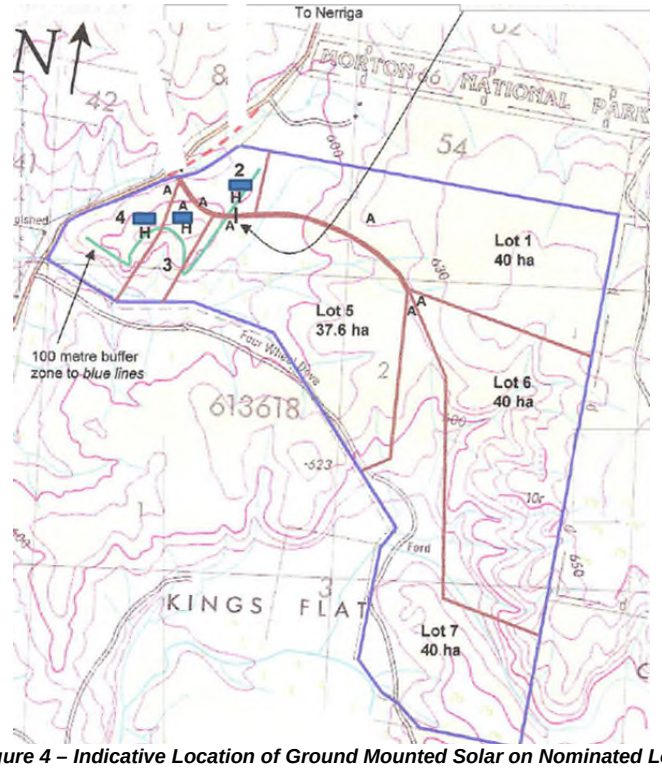

Figure 4 – Indicative Location of Ground Mounted Solar on Nominated Lots

Modification now proposed (MOD.2011.077.B)
Conditions 9 is proposed to be deleted. It seeks the provision of ground mounted solar electricity system be installed to Lots 2, 3 and 4 and reads:

Condition 9:
The applicant is to provide a ground mounted solar electricity system with a minimum generating capacity of 7.5kW to each of the concessional lots (i.e. proposed Lots 2, 3 and 4). No infrastructure is to be installed if tree removal is required without prior consent from Queanbeyan-Palerang Regional Council. The applicant shall install the systems at their own cost and prior to the issue of a Subdivision Certificate for the land. A specification document for each system should be provided to Council prior to the release of a Subdivision Certificate.

The significant issue relating to this proposal is whether a variation to this should be approved which would result in no electricity supply infrastructure being installed in Lots 2, 3 and 4. This is discussed further in this report in relation to the Local Environmental Plan and Development Control Plan compliance.

The applicant also proposes Condition 10A be deleted. This condition seeks that the system installed as a requirement of Condition 9 be maintained. Condition 10A and reads:

Condition 10A:
A section 88B legal instrument burdening each of the three approved concessional allotments is to be created prior to issue of a Subdivision Certificate. It is to specify that the owner of the lot at any point in time is responsible for the on-going maintenance and replacement of any panels, batteries, inverters, and any parts that form part of the operation of the solar electricity supply system and that it must be maintained in good order and condition in perpetuity. Prior to any sale, evidence as to the age of the system and its maintenance status is to be provided to any potential purchasers.

Given the applicants intention that no electricity supply be provided, they propose that Condition 10 be amended. It currently seeks that prospective purchasers of the larger rural lots 1, 5 and 7 be advised there is no power to the lot and reads:

Condition 10:
A section 88B legal instrument burdening proposed lots 1 and 5 to 7 is to be created prior to issue of a Subdivision Certificate. It is to specify that prospective purchasers of the property will need to provide an on site system of power generation at their own cost as the land is unlikely to be able to be serviced by a reticulated electricity supply system.

The applicant proposes Condition 10 be amended to refer to all lots in the subdivision, advising prospective purchasers that the lot does not have an electricity supply.

By way of background, Lots 1, 5 to 7 were approved under clause 13 of the Tallaganda LEP 1991 for an agricultural purpose. These lots were not created for a residential purpose and as agricultural lots there was no obligation to supply electricity.

The applicant has not proposed any electricity infrastructure be provided prior to the release of the Subdivision Certificate. Council officers do not support the deletion of Conditions 9 and 10A nor any change to Condition 10.

The applicant has also sought that Condition 8 requiring rural fencing be amended to require fencing to Nerriga Road only. The applicant argues that having to provide fencing to the lot boundaries will require the removal of native vegetation. Condition 8 reads:

Condition 8 currently reads
All Rural 1(a) subdivision blocks must be fenced to the following minimum standard:
(a) 1200 mm high;
(b) Consist of 5 plain wires evenly spaced with one barbed wire on top;
(c) Star steel stakes at 4-metre maximum centres, and
(d) Strainer post at appropriate intervals, taking into account the terrain, topography and distance.
The fence is to be strained to a tension to prevent stock access. Posts must have a minimum life of 20 years.

The applicant has argued that part of the site accommodates native vegetation and an amendment to the fencing condition will limit vegetation clearing.

Council officers recognise that the current rural fencing requirements in the Palerang Development Control plan are less onerous than imposed as a condition of the original consent. Accordingly, officers are able to support an amendment to the rural fencing condition to only be required to the existing or proposed road frontages.

Native vegetation is not mapped along the frontage to the site nor adjoining the proposed internal road.

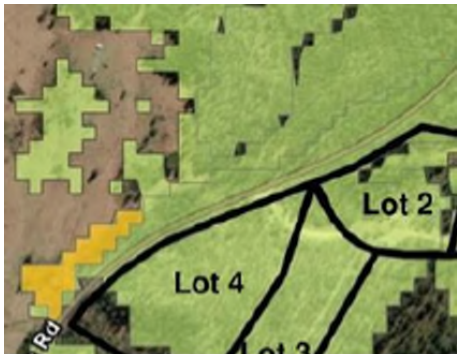

Figure 5 – no mapped native vegetation to Nerriga Road frontage

Figure 6 – Native vegetation mapped near new internal road.

Figure 7 –Cleared area for new internal road

The applicant has suggested Condition 8 be amended to provide stock proof fencing along the lot frontages to Nerriga Road only.

The suggested wording does not include fencing to the lot fronting the new internal road. Council's standard condition for rural fencing will be required to all lot frontages to a public road and Condition 8 is proposed to be amended to read:

Provide fencing to all road frontages (Nerriga Road and new internal road) to the following standard:
- *Fence height 1.2 m,*
- *Strainers - spacing 100 m to 120 m depending on terrain,*
- *Steel posts at 6 m centres,*
- *Steel droppers, one at centre of span between steel posts,*
- *One 4.0 mm high tensile high visibility ('horsesighter' or similar) wire on top,*
- *One carry 2.5 mm high tensile wire at least 300 mm below the top wire,*
- *One bottom 2.5 mm high tensile wire at least 150 mm above the ground,*
- *6/70/30 hinged joint netting with each horizontal wire tied to each post and dropper and*
- *one standard galvanised steel farm gate with steel mesh (minimum 3.65 m) at approved entrance.*

CONSENT AUTHORITY

In accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act) the proposal is considered local development and Council is the Consent Authority.

SECTION 4.10 DESIGNATED DEVELOPMENT – EP&A Act, 1979

The proposal is not designated development.

SECTION 4.47 INTEGRATED DEVELOPMENT – EP&A Act, 1979

The proposal is not integrated development.

REFERRALS

INTERNAL REFERRALS

Engineering Comments

Council's Development Engineer do not support the removal of a reticulated electricity supply.

The site is zoned RU1 Primary Production and Clause B7.9 of the Palerang DCP 2015 requires that suitable power is provided to all lots at subdivision stage "except where adequate provision can be made for alternative power." Part 6.11 of the Palerang LEP 2014 similarly requires that development consent must not be granted to development unless the consent authority is satisfied that electricity supply is available or that adequate arrangements have been made to make the service available.

Under these considerations, the previous modification MOD.2011.077.B was approved, permitting installation of ground-mounted solar systems for energy supply to the three concessional lots (Lots 2, 3 and 4). The remaining large lots (Lots 1 and 5 to 7) were originally approved as land for the purpose of agriculture under Clause 13 of the Tallaganda LEP 1991. Electricity supply was not required, however condition 10A requires creation of a S88B to inform future property owners that on-site energy supply would be required.

The modification application seeks removal of condition 9A and 10B, which detail supply and maintenance of the on-site solar systems, and the amendment of condition 10A to include all lots. The applicant argues that "It is evident with today's technology adequate provision can be made for alternative power."

While this may be the case, the modification application is not supported by Development Engineering as adequate provisions should be provided at subdivision stage rather that placing the burden on future property owners. Conditions 9A, 10A and 10B as they read in consent MOD.2011.077.A to remain unchanged.

EXTERNAL REFERRAL

Essential Energy
Essential Energy was referred the application. They advised that should reticulated electricity be provided it is to be located within an easement. using Essential Energy's standard easement terms current at the time of registration of the plan of subdivision.

SECTION 4.55 MODIFICATIONS – GENERALLY EP&A ACT, 1979

4.55(1A) Modifications involving minimal environmental impact

A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:

(a) it is satisfied that the proposed modification is of minimal environmental impact, and
(b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and
(c) it has notified the application in accordance with: (i) the regulations, if the regulations so require, or (ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and
(d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be. Subsections (1), and (2) do not apply to such a modification."

Comment:

Regarding subclause 'a', it is considered that the modifications sought as part of this application is of minimal environmental impact as the proposal is still substantially the same development.

Regarding subclause 'b', Council is satisfied that the development to which the consent as modified relates is substantially the same development for which consent was originally granted.

With regards to subclause 'c' and 'd', the application was notified in accordance with the QPRC Community Engagement and Participation Plan. No submissions were received.

SECTION 4.15 CONSIDERATIONS – EP&A Act, 1979

In determining a development application, the consent authority is to take into consideration the following matters of consideration contained within section 4.15 of the *Environmental Planning and Assessment Act, 1979* as relevant to the development application:

4.15(1)(a) the provisions of:

(i) any environmental planning instrument

1. State Environmental Planning Policy (Transport and Infrastructure) 2021
2. State Environmental Planning Policy (Biodiversity and Conservation) 2021
3. State Environmental Planning Policy (Resilience and Hazards) 2021

The proposed modification does not impact on the relevant state environmental planning policies. Council is the consent authority and has to determine if it is satisfied the relevant controls in the Local Environmental Plan are satisfied. Brubuddy3

PALERANG LOCAL ENVIRONMENTAL PLAN (PLEP) 2014

An assessment of the proposal against the general aims of *PLEP 2014* is included below:

Cl. 1.2(2)	*Aims*	*Complies*
(a)	*to protect and improve the economic, environmental, social and cultural resources and prospects of the Palerang community,*	**Yes**
(b)	*to encourage development that supports the long-term economic sustainability of the local community, by ensuring that development does not unreasonably increase the demand for public services or public facilities,*	**Yes**
(c)	*to retain, protect and encourage sustainable primary industry and commerce,*	**Yes**
(d)	*to ensure the orderly, innovative and appropriate use of resources in Palerang through the effective application of the principles of ecologically sustainable development,*	**Yes**
(e)	*to retain and protect wetlands, watercourses and water quality and enhance biodiversity and habitat corridors by encouraging the linking of fragmented core habitat areas within Palerang,*	**Yes**
(f)	*to identify, protect and provide areas used for community health and recreational activities,*	**Yes**
(g)	*to ensure that innovative environmental design is encouraged in residential development.*	**Yes**

Comments: The proposed modification is inconsistent with the aims of the *PLEP 2014*.

Permissibility

The subject site is Zoned RU1 Primary Production zone under *Palerang Local Environmental Plan 2014*.

Subdivision is permissible under clause 2.6 of the *PLEP 2014*. The modification does not result in changes in the subdivision arrangement.

Zone Objectives

An assessment of the proposal against the objectives of the RU1 Primary Production zone is included below:

Objectives	*Complies*
➢ To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.	**N/A**
➢ To encourage diversity in primary industry enterprises and systems appropriate for the area.	**N/A**
➢ To minimise the fragmentation and alienation of resource lands.	**N/A**
➢ To minimise conflict between land uses within this zone and land uses within adjoining zones.	**N/A**
➢ To minimise the impact of any development on the natural environment.	**Yes**
➢ To ensure that development does not unreasonably increase the demand for public services or facilities.	**No**

The proposed development, if modified as sought, would not satisfy the objectives of the zone. Electricity supply must be provided to lots created for a residential purpose.

Part 6: Local Provisions

The relevant provisions contained within Part 6 of the *PLEP 2014* are addressed below as part of this assessment:

6.11 Essential services

Clause 6.11 of the *PLEP 2014* requires satisfactory arrangements to be made for water supply, stormwater drainage, solid domestic waste, sewage, and the treatment and disposal of effluent. Along with the supply of electricity and suitable vehicle access.

Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the development are available or that adequate arrangements have been made to make them available when required—

(a) the supply of water,

(b) the supply of electricity,

(c) the disposal and management of sewage,

(d) stormwater drainage or on-site conservation,

(e) suitable vehicular access.

It is considered that clause 6.11 of the LEP will be not be satisfied should this application be approved. The provision of an alternate electricity supply is able to be approved, as demonstrated by the current conditions, however the supply infrastructure must be installed to effectively provide that essential service.

The clause itself does not specify the specific means of electricity supply however supply must be achieved to Council's satisfaction.

4.15(1)(a)(ii) any draft environmental planning instruments

The draft comprehensive Queanbeyan-Palerang Regional Local Environmental Plan was in place when this application was lodged. The draft LEP continues the relevant development standards applicable to electricity supply.

4.15(1)(a)(iii) any development control plan

Section C1.2.9 includes relevant provisions for electricity supply associated with the approval of the subdivision of land.

C1.2.9 Electricity

Objective

a) To provide logical, efficient and environmentally sensitive extensions to electricity supply networks

b) To promote opportunities for on-site generation of power

Control

1) Suitable power shall be provided by the developer to the boundary of all additional lots created in accordance with the requirements of the electricity supply body

2) Written evidence from the electricity supply body that the electricity infrastructure is satisfactory will be required prior to release of subdivision certificate

3) Consideration will be given to renewable energy sources in lieu of connection to the network in land use zones RU1 Primary Production, E3 Environmental Management and E4 Environmental Living.

4) Refer to section B7 Engineering requirements in this DCP

Council's policy stance is to have reticulated electricity supply to all new subdivisions. The control under Section C1.2.9 (3) provides Council with the ability to consider alternate power supply options for development within certain nominated zones. The subject site is located within the RU1 Primary Production Zone consistent with control C1.2.9 (3).

It is considered that the provision of ground mounted solar supply for the 3 concessional allotments, satisfies Control 3 and should remain.

4.15(1)(a)(iiia) any planning agreement or draft planning agreement

No planning agreement has been entered into under section 7.4 of the *Environmental Planning and Assessment Act 1979*.

4.15(1)(a)(iv) matters prescribed by the regulations

Clause 92 of the *Environmental Planning and Assessment (EP&A) Regulation 2000* requires Council to take into consideration Australian Standard *AS2601–1991: The Demolition of Structures*, in the determination of a development application.

Having regard to these prescribed matters, the proposed development does not involve the demolition of a building for the purposes of *AS 2601 – 1991: The Demolition of Structures*.

Should this application be approved, appropriate conditions of consent are included within the recommended to ensure compliance with any relevant regulations.

4.15(1)(a)(v) any coastal zone management plan

Council is not subject to a coastal zone management plan.

4.15(1)(b) the likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality

The proposed modification is not able to be supported as proposed by the applicant. Not providing electricity to the lots created for a residential purpose would defer the cost of supply infrastructure to future land owners which is considered an unacceptable economic impact.

4.15(1)(c) the suitability of the site for the development

The subject site is relatively unconstrained and is considered suitable in its current state for the purposes of the proposed development. The site will be suitable for use when conditions are met, including for electricity supply and fencing.

4.15(1)(d) any submissions made in accordance with this Act or the regulations

The application was notified from 28 July 2022 to 15 August 2022 with no submissions received.

4.15(1)(e) the public interest

The public interest is served through the detailed assessment of this development application under the relevant local planning controls and legislation and consideration of any submissions received relating to it by Council. The proposed development is not considered to be contrary to the public interest where the condition of the previous consent remain and essential services and fencing is provided.

SECTION 64 CONTRIBUTIONS

Section 64 of the *Local Government Act 1993* allows contributions to be levied towards the provision of water, sewerage, and stormwater infrastructure.

Section 64 Contributions are not applicable to the modification.

SECTION 7.11 CONTRIBUTIONS

Section 7.11 of the *Environmental Planning & Assessment Act 1979* permits councils to require as a condition of development consent, the reasonable dedication of land or the payment of monies, or both, for development that is likely to require the provision of, or increase the demand for public amenities and public services within the area.

Section 7.11 Contributions are not applicable to the modification.

CONCLUSION

The submitted proposal for a modification to Development Consent TSC/80/2002/DA (MOD.2011.077.A) on Lot 3 DP 1063771, 7123 Nerriga Road, Corang, has been assessed under Section 4.55(1A) of the Environmental Planning & Assessment Act 1979 including the relevant provisions of the *Palerang Local Environmental Plan 2014* and Palerang Development Control Plan 2015.

The development does not satisfy the relevant requirement for the delivery of essential services. The variation request is also inconsistent with section C1.2.9 (3) of the PDCP.

The variation request is therefore not able to be supported and the existing conditions of consent subject to this review being Condition 9, 10A and 10 are to remain.

Condition 8 is approved to be amended to reflect Council's current rural fencing requirements.

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Final Business Case

Final Business Case

DESIGNED FOR USE IN NSW GOVERNMENT CAPITAL PROJECTS

Queanbeyan Sewage Treatment Plant Upgrade

Queanbeyan-Palerang Regional Council

10 February 2023

Document Information

	Position
Project Name:	Queanbeyan Sewage Treatment Plant Upgrade
Senior Responsible Officer:	Phil Hansen
Agency Head:	Rebecca Ryan
Delivery Agency:	Queanbeyan-Palerang Regional Council
Gateway Review Process:	QPRC Business Case Gate 3

Document Version Control

Project specific document history			
Version	**Amendment**	**Amendment Date**	**Amended by**
A	Draft for QRPC review	2/09/2022	David Perry
B	Initial Issue – Endorsed by Council meeting 9/11/22	24/10/2022	David Perry
C	Revised Issue with editorial corrections	10/11/2022	David Perry
D	Revised with February 2023 pre-tender cost estimate	10/02/2023	David Perry

Supporting Documentation

Project-specific documentation (other than this report)			
Version	**Title**	**Amendment Date**	**Amended by**
Rev B	Queanbeyan Sewage Treatment Plant Upgrade Project – Options Selection Report	November 2019	Hunter H2O
Rev C	Queanbeyan Sewage Treatment Plant Upgrade Project – Concept Design Report	October 2020	Hunter H2O
Rev B	Queanbeyan Sewage Treatment Plant Upgrade Project – Concept Design Addendum	April 2022	Hunter H2O
	Queanbeyan Sewage Treatment Plant – Environmental Impact Statement - Revised EIS	April 2022	Arup
	Queanbeyan Sewage Treatment Plant – Environmental Impact Statement – Revised EIS Amendment Report	September 2022	Arup
Rev 3	Integrated Water Cycle Management Strategy and Financial Plan	16 October 2022	GHD

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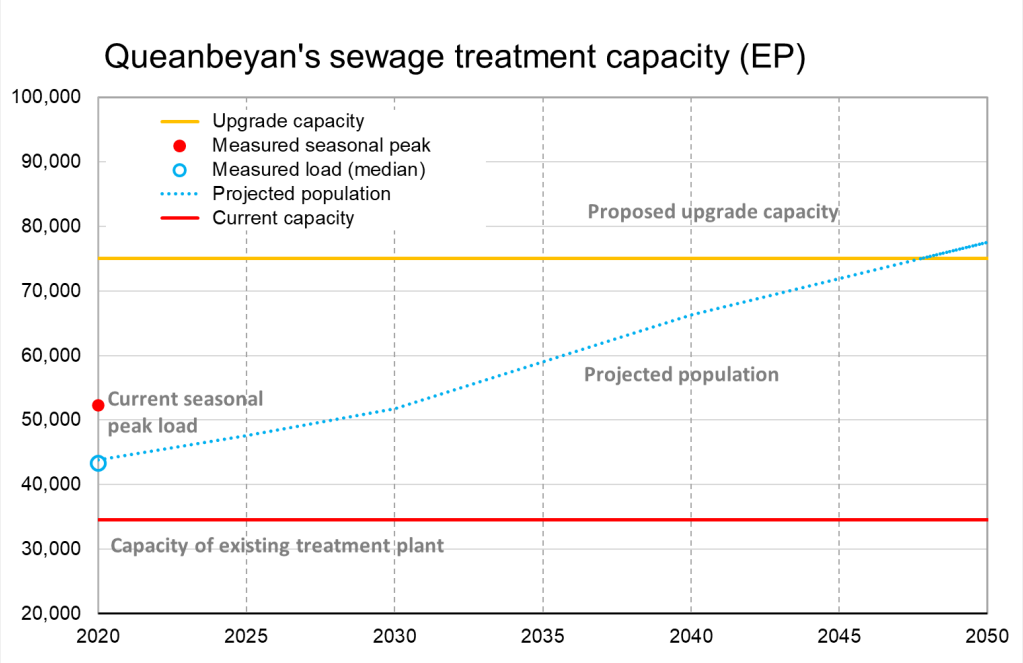
1. EXECUTIVE SUMMARY

Project need

Queanbeyan-Palerang Regional Council (QPRC) is responsible for the management and operation of the Queanbeyan Sewage Treatment Plant (QSTP) that provides treatment to sewage from Queanbeyan prior to discharge into the Molonglo River approximately 9 km upstream of Lake Burley Griffin.

Queanbeyan's existing sewage treatment plant was initially constructed in the 1930's with the most recent major upgrade being completed in the 1980's. The existing treatment plant is overloaded and at the end its service life and needs replacing. Due to its age, the plant is experiencing structural failure, reduced equipment reliability and maintenance issues.



Current sewage inflows exceed the treatment capacity of the existing treatment plant

Queanbeyan's existing sewage treatment plant is overloaded and operating well above its design capacity which limits the ability of the plant to achieve the treatment levels required prior to discharge into the Molonglo River. The existing treatment plant has an assessed capacity to treat sewage from an equivalent population (EP) of 34,500 EP. An assessment of inflow completed in 2019 estimated that the plant was receiving a median load of 43,400 EP and a seasonal peak load of 52,000 EP. The population served by the QSTP is forecast to continue to increase as new and already approved developments connect to sewer. This will increasingly overload the existing STP. An assessment of future needs estimates that the QSTP will be required to treat an equivalent population of 73,000 EP by 2045.

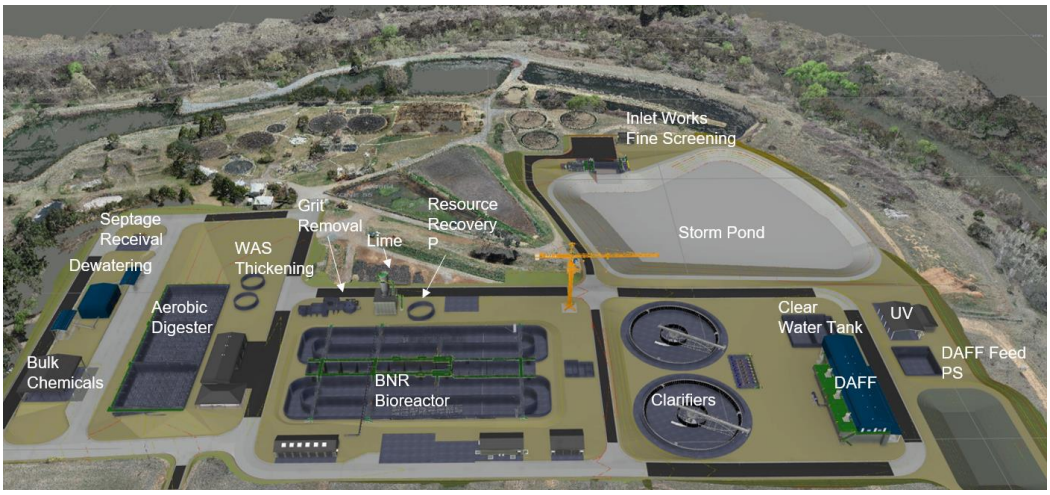
QPRC operates the Queanbeyan STP under the terms of an Environmental Authorisation granted by the EPA under the Environmental Protection Act 1997. During the most recent annual reporting period (2021/22) the effluent discharged into the Molonglo River from QSTP failed to meet the water quality requirements of this authorisation on multiple occasions for thermotolerant coliforms, suspended solids and ammonia.

Continued operation of the existing treatment plant as Queanbeyan's population grows presents an increasing risk that the STP continue to fail to meet the EPA regulatory Environmental Authorisation requirements for effluent discharged to the Molonglo River. The resulting pollution could result in adverse impacts on aquatic species in the Molonglo River and Lake Burley Griffin, environmental prosecution, and substantial reputational damage.

Project description

The Queanbeyan STP upgrade project will replace the existing sewage treatment plant with a modern robust and reliable treatment facility that will provide additional capacity and improve treatment reliability. The upgrade provides 75,000 EP of treatment capacity to support growth and development in Queanbeyan including currently approved development.

The upgrade provides a tertiary treatment standard including filtration and UV disinfection that will improve the quality of the treated effluent discharged into the Molonglo River upstream of Lake Burley Griffin and enable QPRC to continue to meet its regulatory requirements. The treatment plant has been designed to be expandable by 50% to a total of 112,500 EP if required in the future.



The proposed Queanbeyan STP Upgrade is located above flood level on the existing site

The QSTP will be constructed on the existing lease area that is located above the nominated flood level for the site, reducing the risk of damage to assets during flooding. The location enables the existing STP to continue to provide treatment during the construction, testing and commissioning of the new facility, which is estimated to take two years.

Cost and funding

Preliminary cost estimates for the QSTP upgrade have been developed from a risk-based engineering cost estimate during the design phase. The P90 cost estimate for the total project cost including contingency and escalation allowance is $182M as summarised in the table below.

Sub-Project	Budget Request ($ ex. GST))
Construction Costs	129,683,000
QPRC Costs	29,944,000
Base Estimate	**159,627,000**
Contingency for Risks (P90)	14,354,000
Project Estimate (P90)	**173,981,000**
Escalation	8,237,000
Total Outturn Cost (P90)	**182,218,000**

A cost benefit analysis has been conducted to estimate whether the economic benefits generated exceed the project costs. The analysis returned a Benefit to Cost Ratio of 1.2 which supports the project.

Funding for the replacement of the Queanbeyan STP has been considered in QPRC's Integrated Water Cycle Management (IWCM) Plan for Queanbeyan which is the strategic planning instrument that provides a framework for Council to determine long-term strategic planning for water and wastewater management.

The project will be funded through contributions from QPRC's Sewer Fund, Section 64 developer charges, loan funding and government grants as summarised below. QPRC has received a $3M grant from the NSW Government through the Safe and Secure Water Program (SSWP). Financial modelling completed for the IWCM has found that QPRC will require a minimum additional grant funding of $56M for the construction phase.

Income source	Income source contribution ($)
Sewage fund	76,218,000
Section 64 Developer Contributions	7,000,000
Loan	40,000,000
NSW Government Safe and Secure Water Program grant	3,000,000
Additional grant funding	56,000,000
Total	**182,218,000**

The IWCM includes a financial analysis that assesses the impact of proposed water and sewer capital expenditure programs on the financial position of the Council over a twenty-year period and the impact to the water and wastewater typical residential bill (TRB) to deliver the service. The analysis also considers the forecast cashflow and account balances under external funding scenarios for 0%, 25% and 50% for specific QSTP asset support only.

The IWCM recommends that that the project be funded by:

- Grant funding of $36M in 2023/24 and 2024/25
- Loan funding of $40M over the two-year period 2023/24 and 2024/25
- Rate increases across two stages: an initial increase of 6.5% for six years followed thereafter by annual rate increases aligned to the consumer price index (2.5%)

Since the IWCM modelling was undertaken project delivery has been delayed and the design has been progressed. Based on the latest cost estimate the project would require an additional $20M of grant funding, bringing the total grant funding requirement to $56M. The additional grant funding means no changes to the loan funding amount or sewer rate rises proposed in the IWCM.

Project status and next steps

QPRC has completed the detailed design and tender documentation for the upgrade and will be in a position to advertise a call for expressions of interest for construction of the work as early as June 2023 or whenever funding and planning approvals are confirmed. Early vendor engagement has been used to select and establish contracts for the supply and delivery of key equipment packages for the upgrade to minimise procurement delay risks.

A final Environmental Impact Statement for the project has been submitted and a development application for the work can be lodged with the ACT Government once the EIS has been determined. Approval for the EIS is anticipated to be received in February 2023.

The project team will continue to progress work to assist the project becoming ready for construction. Key actions include:

- Seeking additional grant funding contributions from both the NSW and ACT Governments
- Obtaining development approval from the ACT Government
- Progressing discussion with the ACT EPA regarding the operating and licencing requirements for the new facility
- Undertaking further early vendor engagement and tendering for equipment supply for the works
- Progressing early works design, approval and construction for items including power supply upgrade and potable water supply that facilitates construction of the upgrade

- Progressing design and approval of the Mountain Road upgrade including land acquisition of Nimrod Road and part of Mountain Road.
- Confirming client resources for managing the construction phase.

2. DESCRIPTION OF PROBLEM, SERVICE NEED OR OPPORTUNITY

2.1 Background

Queanbeyan-Palerang Regional Council

The Queanbeyan-Palerang Reginal Council local government area is located in the southern tablelands adjacent to Canberra and 250 km southwest of Sydney. The area's population is approximately 64,000 and is expected to grow to around 82,000 by 2036.

Queanbeyan-Palerang Reginal Council (QPRC) is an independent, statutory body responsible for administering its local government area under the Local Government Act 1993 (NSW).

The city of Queanbeyan is located on the ACT boarder, approximately 15 km south-east of Canberra and 10 km from Canberra Airport.

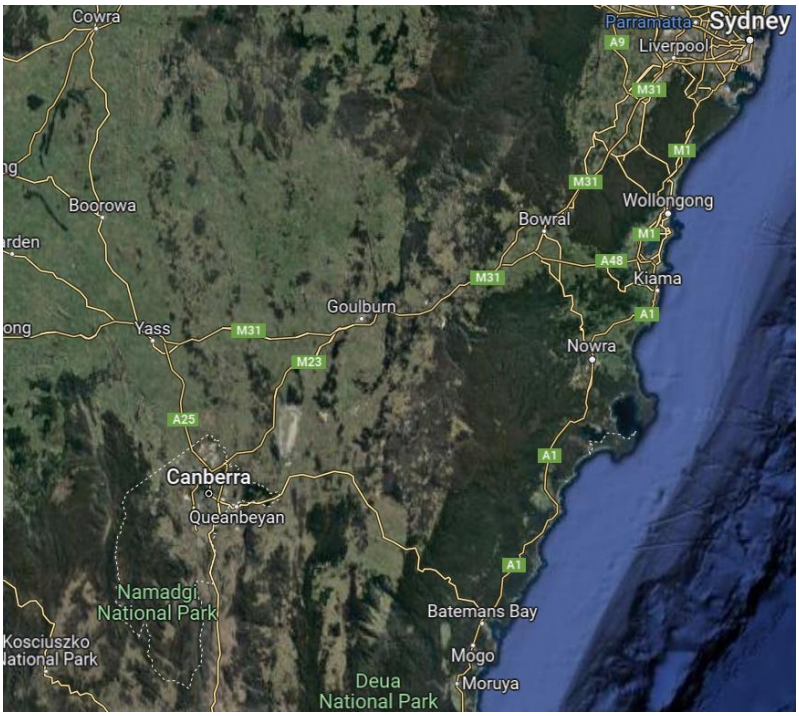


Figure 1: Location of Queanbeyan

Queanbeyan's sewerage treatment system

QPRC is responsible for the management and operation of the sewerage system that serves Queanbeyan. This includes the:

- Queanbeyan sewerage collection network and pumping stations
- Morisset and Jerrabomberra sewerage trunk mains; and
- Queanbeyan sewage treatment plant.

The Queanbeyan sewage treatment plant (QSTP) is located on the banks of the Molonglo River in Jerrabomberra ACT and treats sewage from both Queanbeyan and Oaks Estate in the ACT. Treated effluent from QSTP is discharged to the Molonglo River approximately 9 km upstream of Lake Burley Griffin.

QSTP provides treatment to a catchment that includes urban, light commercial, light industrial and some rural residential properties, including the NSW neighbourhoods of Crestwood, Jerrabomberra, Karabar, Queanbeyan, Queanbeyan East, Queanbeyan West, and Greenleigh, and the ACT suburb of Oaks Estate. The Queanbeyan sewerage collection network includes a gravity collection system with 15 pump stations, approximately 286 km of pipeline and two major trunk mains that convey sewage to the QSTP. Googong Township located about five kilometres south of Queanbeyan has its own water recycling plant and does not contribute to the QSTP.

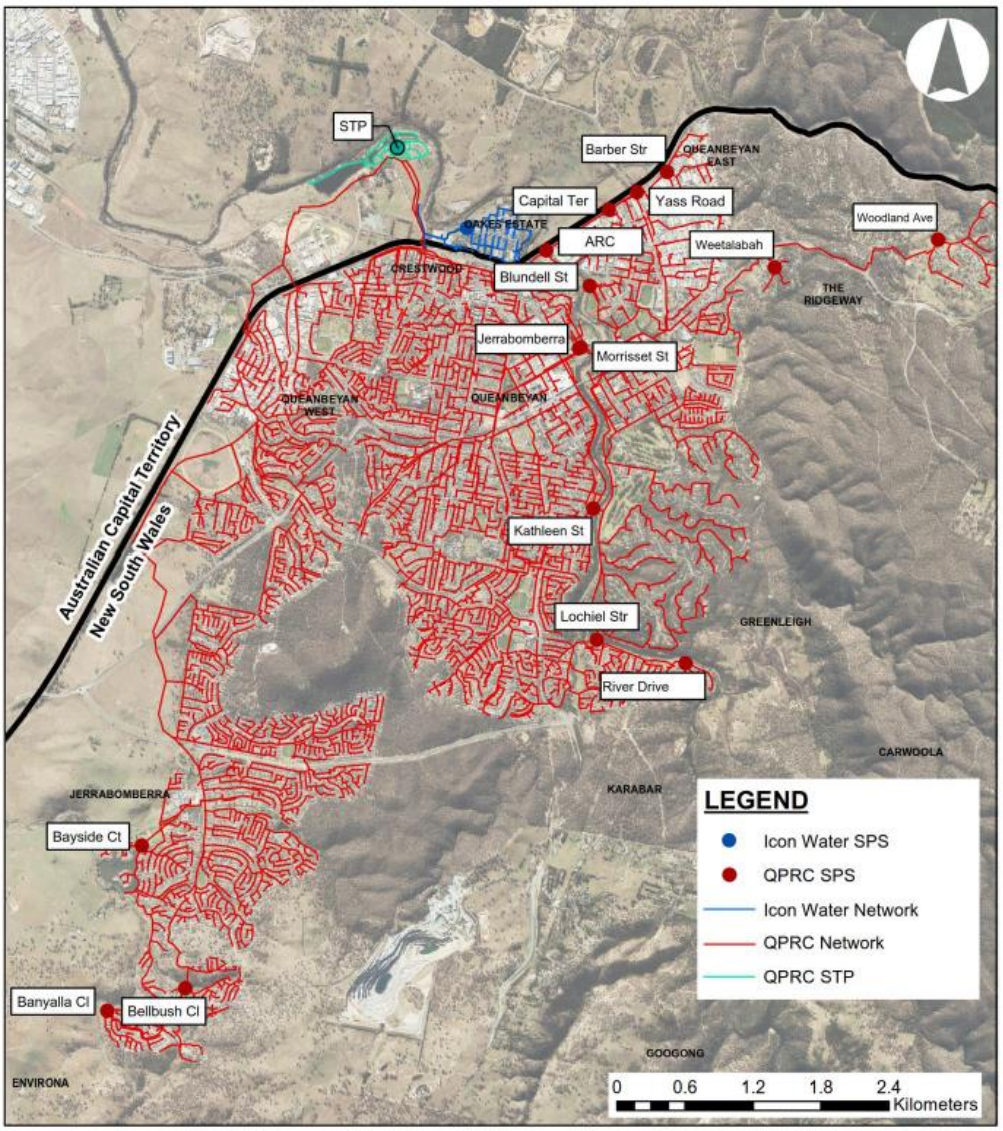


Figure 2: The Queanbeyan sewerage collection network and location of QSTP. QSTP also treats sewage collected from the Icon Water sewage collection network within Oaks Estate.

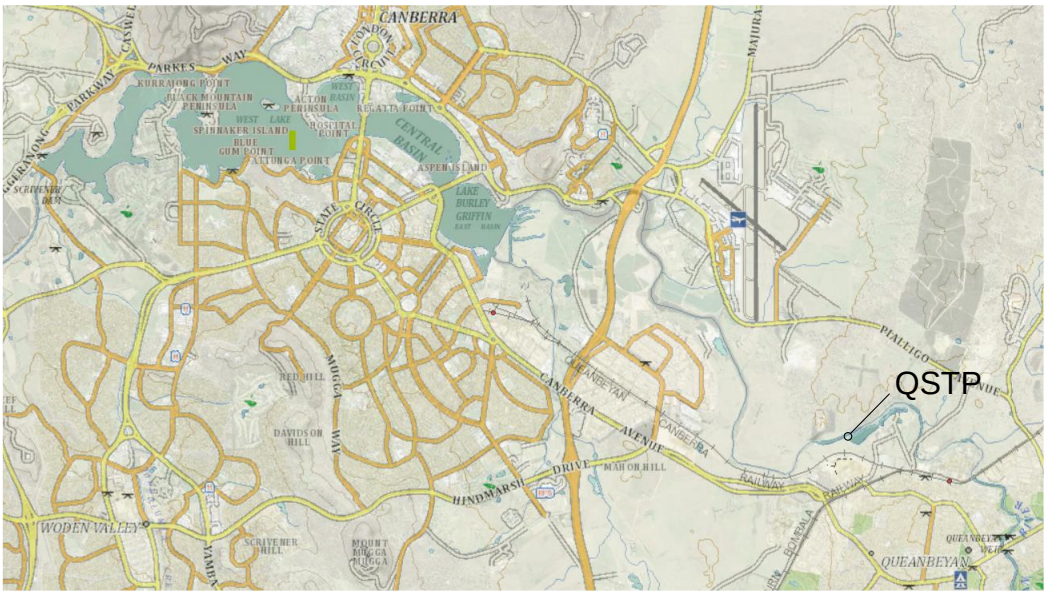


Figure 3: Treated effluent from QSTP is discharged to the Molonglo River approximately 9 km upstream of Lake Burley Griffin.

2.2 Description of Problem, Service Need or Opportunity

Why is the upgrade needed?

Queanbeyan's existing sewage treatment plant is overloaded and operating above its capacity. The QSTP upgrade project is required to provide sewage treatment capacity to support the continued growth and development of Queanbeyan and to provide ongoing protection of the environment.

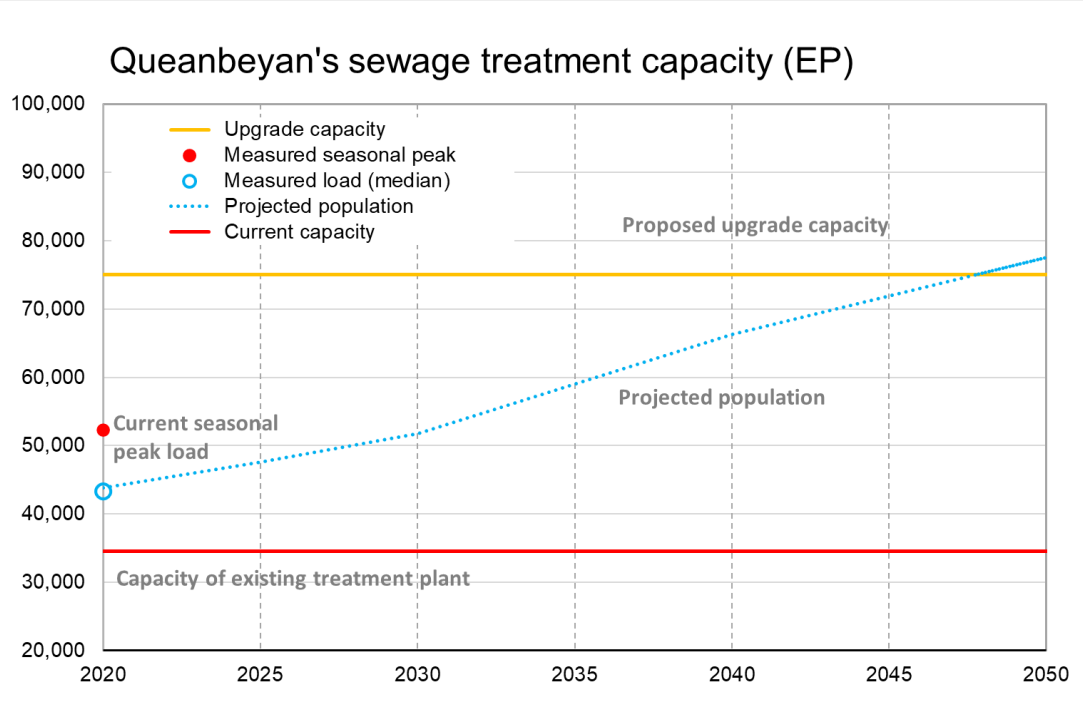


Figure 4: Queanbeyan sewage treatment capacity requirements. Current loads exceed the capacity of the existing treatment plant.

Queanbeyan's existing sewage treatment plant was constructed in the 1930s and was last upgraded in the 1980s. With population growth, the existing treatment plant currently treats sewage from a population that exceeds its capacity.

The capacity of a sewage treatment plant is expressed in terms of an equivalent population (EP):

- The existing treatment plant has an assessed capacity of 34,500 EP
- A 2019 assessment of sewage data estimated that the existing treatment plant receives a median sewage load of 43,400 EP
- Queanbeyan's sewage load varies seasonally with an estimated peak load of 52,300 EP.

An assessment of the future needs undertaken as part of the Integrated Water Cycle Management Plan (IWCM) estimates that the QSTP will be required to service a projected population of 73,000 EP by 2045 and 77,000 EP by 2050.

Queanbeyan's population is projected to grow at a rate of approximately 1.7% per annum. This growth is anticipated to occur as a result of both infill development as well as the extension of the sewage network to new growth areas including South Jerrabomberra, Jumping Creek, Tralee, The Poplars and Environa. These areas are expected to be connected over the next 25 years, with the first allotments in South Jerrabomberra coming on-line in 2022.

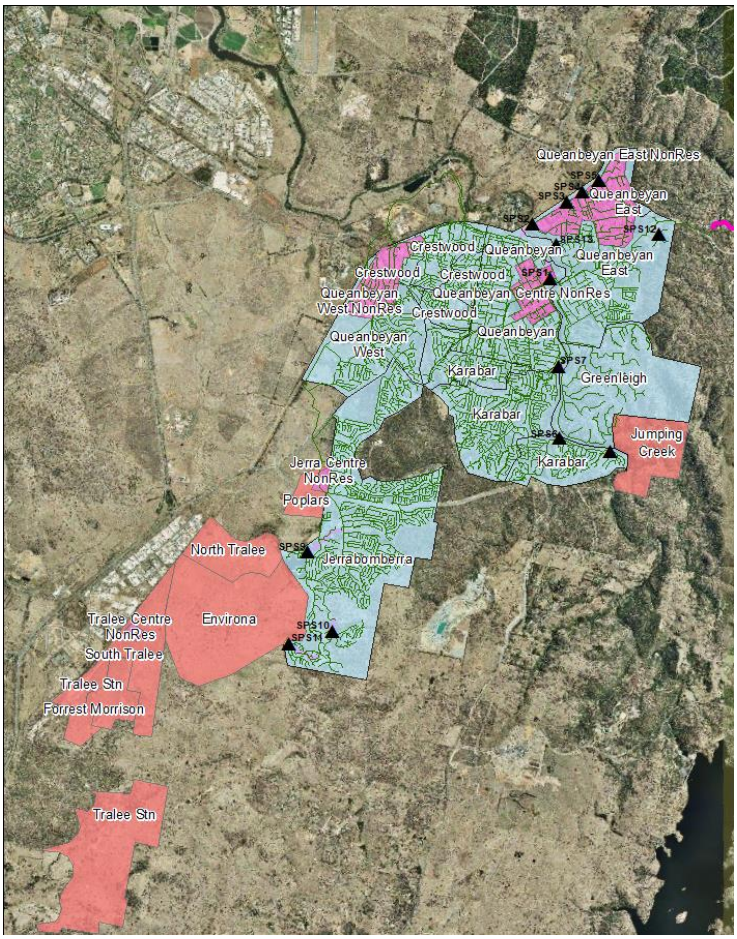


Figure 5: Identified growth areas included in the QSTP Master Plan and IWCM.

Treated effluent from QSTP is discharged to the Molonglo River upstream of Lake Burley Griffin. QSTP has been identified as the only significant point source discharging upstream of the Lake. Ongoing operation of the existing treatment plant presents a risk that the existing treatment systems may be overloaded as a result of either continued population growth, or high flow events, resulting in the discharge of partially treated effluent causing pollution of the Molonglo River and Lake Burley Griffin. This risk of deferring the upgrade is discussed further in the subsequent sections of this chapter.

2.3 Existing Level of Service

Queanbeyan's existing sewage treatment plant

QSTP was initially constructed in the 1930's and has been progressively added to over time with the most recent major upgrade being completed in the 1980's. The treatment plant includes a combination of different technologies from different eras. Parts of the plant, such as the trickling filter process are original and some parts (anaerobic digestion) have been shut down due to asset issues.

The existing treatment assets are at the end of their service life and need replacing. A condition assessment of the STP undertaken in 2015 to inform the Masterplan identified that all stages of the treatment process would be redundant or require significant refurbishment within a 25-year timeframe (GHD, 2016).

While maintenance and works have been regularly undertaken on the QSTP, the plant is no longer fit-for-purpose and is experiencing structural failure, reduced equipment reliability, obsolescence, and maintenance issues.

QPRC operates the Queanbeyan sewage treatment plant under the terms of an Environmental Authorisation granted under the ACT Environmental Protection Act 1997. During the most recent annual reporting period (2001/22) the QSTP failed to meet the water quality requirements of this authorisation on multiple occasions for thermotolerant coliforms, suspended solids and ammonia. These failures relate to the condition of the current asset and its capacity limitations to treat the flows currently being received.

The maturation ponds are a key asset in achieving effluent quality and there is a risk that these lagoons may fail again as occurred in 2010 due to flooding.

Figure 6: Queanbeyan's existing sewage treatment plant

Process capacity constraints

An engineering assessment of the process capacity of the existing treatment facility is provided in the attached *Queanbeyan Sewage Treatment Plant – Process Capacity Assessment* (Hunter H2O, 2022). The assessment identified that the process capacity of the existing facility is challenged in many areas and continued operation of the existing facility presents a risk of the facility failing to meet the treated effluent quality requirements required by the facilities EPA licence conditions.

Ammonia is an acute toxicant present in treated effluent and can affect many fish and macroinvertebrate species. The ammonia concentration from the QSTP is regulated by ACT EPA based on the condition of the receiving waters. The capacity assessment identified that the treatment processes that remove ammonia are currently at capacity with QPRC's operating data showing evidence that ammonia removal performance is already degrading. There is a reasonable risk that ammonia in treated effluent discharged to the Molonglo River from QSTP may fail to meet the regulatory licence limits required by the EPA as the incoming sewage load on the treatment plant increases further with population growth, or if critical equipment fails or is out of service. This may lead to adverse impacts on aquatic species near the discharge location.

Specific capacity issues identified by the review included:

- Installed aeration is at capacity when stable nitrogen removal is considered
- The activated sludge reactors can just sustain the biomass necessary for ammonia removal. The reactors are not large enough to support further load increases with population growth
- The clarifier system is at capacity and is likely to just be able to reliably treat the peak dry weather flows for the current population. There is insufficient clarifier capacity to treat flows that occur in wet weather. In wet weather the operators will likely need to strategically bypass the activated sludge reactors so the ammonia removal process is not lost as a result of the treatment biomass being washed out from the clarifiers.
- The sludge lagoons which stabilise sludge have a low sludge retention time and may fail to stabilise sludge as loads increase which will increase the risk of odour and return more soluble organic load to the activated sludge plant
- The maturation ponds which provide disinfection are currently meeting the licence with some reserve. However, a significant failure of the upstream secondary treatment process may limit the ability of the maturation ponds to provide required treatment and cause their capacity limit to be reached earlier.
- The maturation ponds are located within the 1 in 100 flood level and could be damaged in flood events. Damage to the maturation ponds during flooding may result in the release of effluent and accumulated sludge to the river. There is a risk that disinfection would limits may not be met if the ponds were damaged, depending on the extent of repairs necessary.
- Provided the maturation ponds are available it is expected phosphorus removal will continue to meet the current EPA licence limits provided the upgrade occurs within 4 years (i.e., by 2026).

In addition to these process capacity constraints, the existing STP is also operating beyond its intended hydraulic capacity. This results in screened sewage routinely bypassing the treatment process during wet weather conditions. Bypassing occurs as a result of higher wet weather flows. Screened sewage is diluted with treated effluent in maturation ponds before discharging to the Molonglo River.

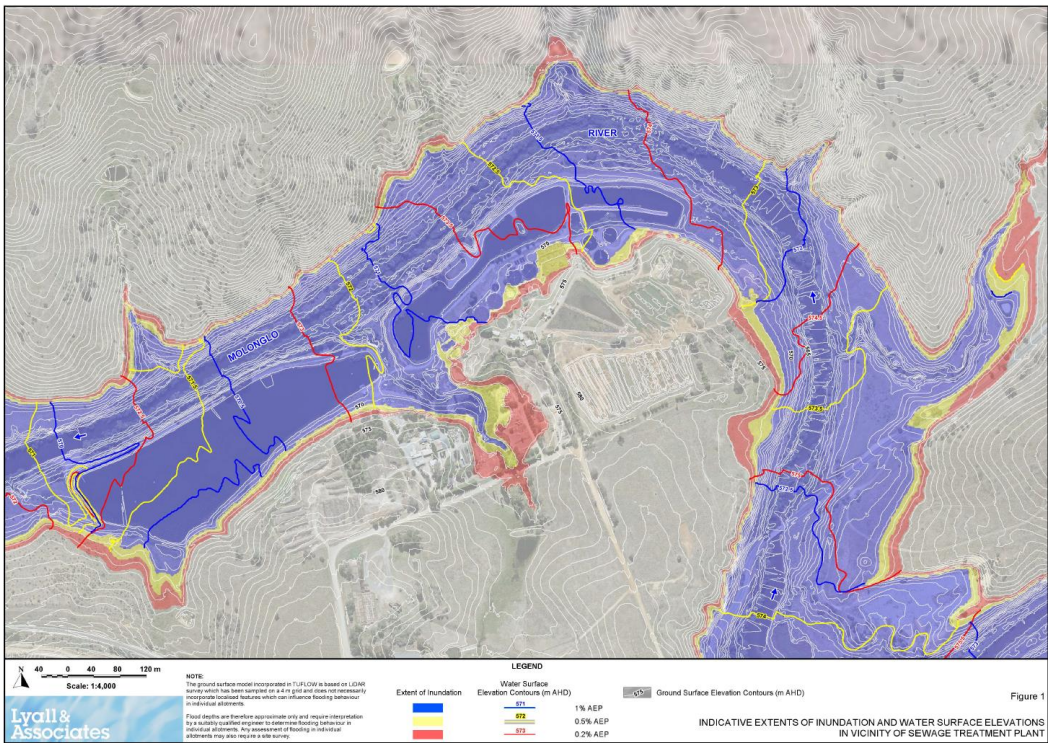


Figure 7: Indicative extents of inundation during flooding. Areas of the existing STP affected by a 1% AEP flood event are shaded blue.

2.4 Consequences of Deferral

Due to the apparent capacity constraints of Queanbeyan's existing sewage treatment plant and the continued population growth within the sewerage service area, the QSTP Upgrade should proceed with some urgency.

Should the QSTP Upgrade be deferred, Queanbeyan's existing sewage treatment plant will continue operating above its capacity in an overloaded state. There will be no sewage treatment capacity available for further population growth within Queanbeyan, or to connect additional development areas to Queanbeyan sewerage network. QPRC may be required to halt future development to prevent further overloading of the existing STP.

Continued operation of the existing treatment plant with continued population growth presents an increasing risk that the STP will fail to provide the level of treatment required to meet the EPA regulatory licence conditions for effluent discharged to the Molonglo River. The resulting pollution could result in adverse impacts on aquatic species in the Molonglo River, environmental prosecution, and substantial reputational damage.

Other impacts of deferring the upgrade:

- Increasing sewage bypassing of treatment facilities during wet weather due to hydraulic capacity constraints as the population continues to grow and sewage flows increase
- Increasing risk of poor effluent quality discharged to the Molonglo River and breaches of environmental operating requirements due to process capacity constraints which limit the ability of the facility to effectively treat nitrogen, phosphorus, solids and pathogens as the population continues to grow and sewage flows increase
- Increasing risk of environmental harm of poorly treated or untreated sewage entering the Molonglo River and Lake Burley Griffin
- Additional sewage treatment capacity is unavailable for areas connected to QSTP and may restrict further growth and development of these areas
- Higher operating costs associated with the poor plant condition and operating constraints
- Continued risk exposure to asset and environmental damage during flood events
- Continued risk of mechanical and electrical plant as these assets are at the end of operating life.

2.5 Previous Studies

Supporting studies

Planning for the QSTP Upgrade has been underway since 1995, when Queanbeyan City Council engaged MWH to report on the capacity of the existing STP and options to upgrade the facility to provide for population growth.

A summary of six planning reports investigating the need to upgrade the Queanbeyan's STP between 1995 and 2011 is provided in the appendices. These investigations have been used as background to support the identification of the preferred upgrade option by the major studies discussed below.

2016 Masterplan for Sewage Treatment Plant Upgrade

In 2014, Queanbeyan City Council engaged GHD to prepare a masterplan for the QSTP Upgrade project that was subsequently published in 2016 (GHD, 2016). The masterplan identified that the preferred for providing sewage treatment facilities for Queanbeyan was to construct of a new 60,000 EP capacity STP on the existing site.

The masterplan study was wide-ranging. It confirmed the need and drivers for the upgrade of QSTP, set out an initial design basis in terms of capacity and water quality objectives and treatment standards, investigated the feasibility of providing treatment of sewage currently treated by Icon Water's Fyshwick STP, and included an assessment of upgrade options. The masterplan study confirmed that the preferred approach was to locate the treatment facility on the existing STP site.

The masterplan discussed three alternatives for the Queanbeyan STP:

- The Base Case - Do Nothing
- Build a new STP
- Restore the STP and expand as needed to provide sufficient capacity.

The Base Case - Do Nothing option was not considered feasible due to the significant environmental and human health impacts associated with not upgrading the existing treatment facility. Risks and consequences of not proceeding with the project have been discussed in section 2.3 and 2.4 of this Business Case.

A condition assessment of existing asset condition was undertaken to inform the option of augmenting the capacity of the existing facility by reusing existing treatment structures. The assessment identified only limited components of the existing STP that could plausibly be used as structures. Many parts of the plants were considered not fit for reuse due to poor condition and being in areas affected by a 100-year average recurrence interval (ARI) flood.

A Multi Criteria Assessment confirmed that building a new STP on the existing site was the preferred option based on whole of life cost, constructability, operability, sustainability, future proofing and community acceptance and affordability. The whole life net present value of costs of the options were similar and in order of $100 M. The option of reusing assets showed no significant capital investment saving compared to the build new options. The selection of treatment technology was not significant to the outcome.

The masterplan was placed on public exhibition in November 2016 for a period of six weeks. Submissions on the masterplan were received from key NSW and ACT regulators, as well as ACT and Region Catchment Management Group, Professor Ian Falconer and Icon Water.

QPRC endorsed the masterplan recommendation to construct a new treatment facility on the existing STP site.

Option Selection, Concept Design and EIS

In 2019, Hunter H2O was engaged as the principal design consultant to prepare the design and tender documentation for construction of the QSTP upgrade.

Under Section 60 of the NSW *Local Government Act* 1993, QPRC requires ministerial approval for the construction or modification of water or sewage treatment works. The selection of treatment technology and development of the Concept Design has been undertaken following the Section 60 approval pathway prescribed by the NSW Department of Planning and Environment (DPE).

The Concept Design development pathway included the following stages:

- Confirmation of capacity requirements and design criteria - Queanbeyan Sewage Treatment Plant Upgrade Project Design Criteria and Assumptions Report (Hunter H2O, 2019)
- Options study and selection of the treatment technology - Queanbeyan Sewage Treatment Plant Upgrade Project Options Selection Report (Hunter H2O, 2019)
- Concept design of the selected option – Queanbeyan Sewage Treatment Plant Upgrade Project Concept Design Report (Hunter H2O, 2020)
- Safety in design review of WHS aspects (including HAZOP and CHAIR principles)
- Environmental Impact Statement (ARUP, 2020)
- Amendment of the proposed concept to address issues raised through the EIS consultation process - Queanbeyan Sewage Treatment Plant Upgrade Project Concept Design Addendum (Hunter H2O, 2022).

Three secondary treatment technology options were developed for the upgrade:

- Oxidation ditch with continuous gravity clarification
- Membrane Bioreactor (MBR)
- Intermittently Decanted Extended Aeration (IDEA).

The 2019 review of capacity requirements and design criteria identified that the upgrade should provide treatment capacity for an equivalent population (EP) of 75,000 and be designed to meet the water quality objectives of the existing Environmental Authorisation licence.

An Options Selection workshop held with NSW DPE reviewed the treatment options using an MCA that considered whole of life cost, effluent quality, operating complexity, maintainability, robustness, power and chemical use. The preferred process for the QSTP upgrade was identified as an oxidation ditch with gravity clarifiers, tertiary granular filter media filter, UV disinfection, aerobic sludge digestion and biosolids dewatering. Further details are provided in the Queanbeyan Sewage Treatment Plant Upgrade Project Options Selection Report (Hunter H2O, 2019)

The treatment process proposed for the upgrade was refined through the development of a Concept Design and Environmental Impact Statement. Consultation with regulators and key stakeholders during this period identified that the treated effluent discharged to the Molonglo River from QSTP would be required to have very low concentrations of phosphorus to minimise the potential impact of the facility on the water quality in Lake Burley Griffin.

Further refinements to the upgrade made to address feedback received from key regulators and stakeholders and the findings of the EIS included:

- Designing the upgrade to enable the treatment capacity to be expanded in the future by an additional 50% from 70,000 to 112,000 EP
- Upgrading the filtration process to a dissolved air flotation filter (DAFF) to further reduce phosphorus in the effluent
- Upgrading the secondary treatment to provide enhanced biological phosphorus removal to reduce the ongoing operating cost of providing low phosphorus in the effluent
- Adding a lime dosing facility and lime clarifier were added to the process to provide enhanced chemical phosphorus removal to further reduce the operating costs associated with producing treated effluent with very low soluble phosphorus concentrations. The phosphorus recovered from the treatment process remains bioavailable for agriculture, providing a benefit to the circular economy.

3. POLICY AND STRATEGIC ALIGNMENT

3.1 Policy Context

The QSTP Upgrade aligns with key policy directions and government priorities/outcomes. The tables below describe the alignment of this project with various Government strategic policies.

Table 1: QPRC strategic policies and alignment

QPRC Policy	Alignment
QPRC Strategic Directions Paper 2017 • Improve infrastructure, with appropriate and well-maintained assets and major projects delivered in growth areas • Deliver quality services which meet community needs, interests and ability to pay	The project is aligned with QPRC's identified strategies by: • Providing essential infrastructure required for the community • Providing sewage treatment with capacity that responds existing and future growth of Queanbeyan • Providing treatment infrastructure that responds to community needs for reliable and sustainable treatment • Affordable wastewater treatment in terms of both capital and operational costs • Improving infrastructure by decommissioning assets at end of life that no longer provide cost effective value.
The Queanbeyan-Palerang Regional Economic Development Strategy Aims to drive economic growth and to deliver a dynamic and globally competitive regional economy. It also focuses on actions to address challenges and opportunities in Regional NSW. Goals to enable regional economic development, include • Strategy 3: Grow the Population and Internal Markets of the Region. This outlines the opportunity to *Provide enabling infrastructure for new industrial and housing developments*	The Project contributes to the delivery of this goal by: • Providing essential wastewater treatment services with capacity to enabling growth for industrial and housing developments • Improving State productivity and creating a stronger regional community by enabling economic activity that would otherwise be constrained by failing wastewater service infrastructure

The Community Strategic Plan 2018-2028 • 3.1.4 We actively promote and implement sound resource conservation and good environmental practice • 3.1.5 We ensure the future planning for the region is well coordinated and provides for its sustainable management • 4.1.3 We plan for and provide for the management of sewage, stormwater and recycled water within the communities of our region • 4.1.4 We actively promote and implement sound resource conservation and good environmental practice for our waste management systems • 4.1.6 We undertake planning to ensure infrastructure is prepared for future growth.	The project contributes to achieving these Service Objectives by: • Improving the reliability of treatment to produce an effluent that minimises impacts to the receiving environment. • Providing treatment capacity based on planning for the region including the ability to expand capacity in the future. • Providing a level of treatment that provides recycled water and is suitable for future expansion as additional recycled water users are identified. • Implementing biological phosphorus removal that minimises chemical use and recovers phosphorus in a form that is biologically available for agriculture. • Producing a biosolids product that is suitable for agricultural reuse as a soil conditioner and source of nutrients. • Identifying climate change risks and implementing climate adaptation measures • Removing the treatment infrastructure from within the 1 in 100 year flood plain

Table 2:: NSW Government strategic policies and alignment

NSW Government Policy	Alignment
The 2017 NSW Government's (Planning and Environment) South East and Tablelands Regional Plan 2036 states the following priorities for QPRC: • Work with the ACT Government to improve road and active transport connectivity and public transport integration; manage water, sewage, waste and renewable energy on a regional scale; plan and collaborate on major contiguous developments; plan for infrastructure requirements to support population growth; and support major events. • Protect and enhance the area's high environmental value lands, waterways and water catchments.	The project is aligned with the identified strategies and their aims to improve waterways and catchments, supply, and security, by providing: • Improved wastewater treatment plant capacity, reliability, and security of supply to enable the community to be more liveable and more attractive for tourism and industry etc. • Affordable wastewater treatment in terms of both capital and ultimately reducing operational costs; and • A high-quality wastewater treatment that more reliably meets relevant EPA and health standards and reduces risks to noncompliance.
The Infrastructure NSW Making it Happen in the Regions: Regional Development Framework includes the following as a priority: • Aligning effort to support growing regional centres.	The Project contributes to the delivery of this priority by: • Providing essential wastewater treatment services with capacity to enabling growth for industrial and housing developments • Improving State productivity and creating a stronger regional community by enabling economic activity that would otherwise be constrained by failing wastewater service infrastructure

The **NSW Regional Development Framework** is the overarching document that "*provides a scaffold for better coordination, decision making and effort on the ground*" for coordinating investment throughout regional NSW. The framework highlights the NSW Governments commitment to regional NSW towns and the infrastructure required to support economic growth. Throughout the NSW Regional Development Framework document there are many themes, commitments, and initiatives which both support regional development, public health, and essential services notably: • "We want to ensure that the people of regional NSW have the best access to essential services and infrastructure in regional Australia." • "All people in regional NSW should and will have access to essential services and infrastructure including hospitals, schools, roads, water, police and emergency services. This is our commitment to ensuring that no one in regional NSW should have to choose between where they live and work and having access to the most essential services."	The Project is aligned with the themes, commitments, and initiatives of the NSW Regional Development Framework by providing regional NSW residents with essential service infrastructure. The essential sewage treatment service infrastructure delivered by the project maintains and improves: • The public health and wellbeing of the Queanbeyan region • Investment and community growth within the Queanbeyan by attracting new industries and businesses. • Economic growth by providing good quality essential services.
The **Infrastructure NSW State Infrastructure Strategy Update 2014** identified an NSW Government strategic objective to "*Ensure that drinking water and wastewater services in all regional NSW towns meet contemporary standards"* In addition, the State Infrastructure Strategy Update 2014 acknowledges that "*A lack of or inadequate water supply and sewerage services are the single most important factors in protecting public health and reducing faecal pollution in receiving waters.".*	The Project contributes to the delivery of the objective by: • Planning for the future, including achieving long-term wastewater treatment capacity, building resilience and redundancy into the wastewater infrastructure in Queanbeyan.
The NSW State Plan identifies Premier and State Priorities for safer communities, building infrastructure, increasing housing supply, creating jobs and encouraging business investment.	The Project contributes to Premier and State Priorities by: • Improving wastewater treatment ability, quality and safety to ensure the safety of the community's health. • Construction of long-term infrastructure assets for the region and local community. • Supporting increasing housing supply in the catchment. • Supporting business investment in new business park developments the catchment. • Supporting the creation of jobs.

Table 3: Federal Government/NCA strategic policies and alignment

Federal Government Policy	Alignment
The National Capital Plan includes the following Principles to achieve its Objectives: • 2.3.1 Sustainability Objective One – Environmental sustainability and open space: – Ecological communities, threatened flora and fauna species, water catchments and water quality will be protected and supported by sustainable resource management. – Development will respect environmental values including water catchments and water quality and ensure resilience to the impacts of climate change. • 2.4.2 Liveability Objective One – Urban Design and Heritage: – New development, including public spaces, should: – exemplify sustainability principles	The project is aligned with the Principles contained in the National Capital Plan by: • Improved wastewater treatment plant capacity, reliability, and security of supply to enable the community to be more livable and more attractive for tourism and industry etc. • Affordable wastewater treatment in terms of both capital and ultimately reducing operational costs; and • A high-quality wastewater treatment that more reliably meets relevant EPA and health standards and reduces risks to noncompliance.
The Lake Burley Griffin Water Quality Management Plan 2011 requires the NCA to implement the following actions arising from the management of pollutants**:** • Respond quickly to reported events of sewer overflow and implement control measures. • Liaise with relevant regulatory bodies to ensure adequate controls on treated sewer discharges into the river, and for compliance. • The NCA will ensure liaison with the ACT Environment Protection Authority and other ACT authorities with regard to sewage entering the catchment, and compliance with management standards within the catchment.	The project is aligned with the actions contained in the Lake Burley Griffin Water Quality Management Plan by: • Improving the reliability of treatment plant and reducing the occurrence of untreated sewage overflows • Incorporating the issues and concerns raised by the NCA and ACT Government into the level of treatment included in the design.

Table 4: ACT Government strategic policies and alignment

ACT Government Policy	Alignment
The QPRC and ACT Government Letter of Intent around the ACT-NSW Memorandum of Understanding for Regional Collaboration contains the following principles and priorities for engagement: • Optimising best of region outcomes • Pursuing borderless approach to key infrastructure • Sharing information and data to inform planning and policy development and initiatives • Collaboration on policy and planning opportunities to consider management of water, sewage, waste and renewable energy on a regional scale • Understanding the infrastructure requirements to support population growth	The project is aligned with the principles and priorities of the MOU by: • Work was undertaken early in the project with Icon Water to assess the opportunity for a regional sewage treatment plant. • Contribution to the ACT Government's Lake Burley Griffin hydrological model to assess impacts of STP effluent on the receiving environment • Designing a high-quality wastewater treatment that more reliably meets relevant EPA and health standards and reduces risks to noncompliance improving the environmental outcome for the receiving waters in the ACT.
The ACT and Region Catchment Strategy 2016 – 2046 includes the Regional Development Theme with a goal to 'Make human settlement across the ACT and Region resilient and sustainable and ensure that human impacts on downstream catchments are manageable.' The strategy notes that Wastewater and sewage management capacity will continue to be a challenge for a growing region and sewage treatment can be a constraint.	The Project contributes to this Strategy by: • Designing a high-quality wastewater treatment that more reliably meets relevant EPA and health standards and reduces risks to noncompliance improving the environmental outcome for the receiving waters in the ACT. • Supporting increasing housing supply in the catchment. • Developing coordinated approach to provide cost effective infrastructure with greater economies of scale.

3.2 Place Based Considerations

The QSTP Upgrade project provides essential infrastructure that supports Queanbeyan as a connected and prosperous economy. This supports Queanbeyan's position in in the region outlined in the *NSW Planning and Environment South East and Tablelands Regional Plan* with:

- Connections with Canberra for jobs and services
- Access to Canberra Airport as a tourism and export gateway and
- Support of tourism to Kosciusko National Park, ski resorts and Snowy Mountains region.

The project provides treatment capacity to support projects in the QSTP catchment that the NSW Government has committed investment funding:

- The South Jerrabomberra Regional Jobs Precinct located within the Poplars Innovation Precinct
- $23M investment to improve infrastructure within the business park via the Growing Local Economies Fund
- $7.5M investment for water and sewer services (ie pipework to connect into the existing network) to fast track housing development (1,500 lots) in South Jerrabomberra via the Housing Acceleration Fund
- Construction of a new 500 student high school in Jerrabomberra
- $10M towards the $30M regional sports complex to be constructed in South Jerrabomberra via the Regional Sports Infrastructure Fund.

These infrastructure projects drive an increased load on the Queanbeyan STP and have been accounted for in the base case assumptions.

3.3 Principles, Objectives and Critical Success Factors

Project Principles

The project will be delivered in line with the following Principles:

- Overall Project:
  - The STP upgrade will use proven technology that creates an opportunity to enhance water quality in the Molonglo River and Lake Burley Griffin and continue to make this environmental flow available for climate change resilience.
  - Through the creation of the STP we will work to ensure a process for treated water now and into the future, catering for population growth and the expansion of the plant.
  - In a unique collaboration with three jurisdictions, this project will bring several arms of government together to create an upgraded sewage treatment plant catering for a variety of users into the future.
  - The project enables improved resource recovery for biosolids produced from the STP. The proposed technology recovers phosphorus from the wastewater in a from which remains biologically available for use in agriculture. Improvements in biosolids management including reuse of historical biosolid stockpiles will provide a healthier and cleaner environment for our residents now and into the future.
  - We want to secure wastewater treatment needs now and into the future.
- Project costs:
  - We will balance water quality, operator, and cost factors in design.
  - Be transparent and open about costs and funding.
  - Consult stakeholders on the effect of costs on rates and charges and the impact on user charges and fees, especially those residents living outside the Queanbeyan area.
  - We will engage with residents and ratepayers about the impacts on costs and funding for Council in a transparent and honest way. Our aim is to give a complete picture of the impacts on costs.
- Water quality, environment and sustainability:
  - QPRC is committed to an upgraded STP that serves our community well into the future.
  - QPRC will consider environmental impacts during construction and long-term operations, adopting environmental measures along the design journey.
  - The upgraded STP will ensure all environmental standards are met or exceeded.
  - A high level of water quality, the biodiversity of receiving waterways and Lake Burley Griffin recreational activities will be protected. The upgraded STP will enhanced control and resilience over water quality outcomes.
  - We will enhance the riparian environment through extended landscaping options along the Molonglo River corridor after decommissioning the maturation ponds which will be no longer required for treatment. Returning the riparian zone to their natural state as river floodplain ecology.
  - The Golden Sun Moth ecological habitat on the site will be protected.
  - Indigenous and European heritage of the area will be communicated through installation of signage in an area along the river corridor that is accessible to the public.
  - This STP upgrade will seek to achieve an Infrastructure Sustainability rating standard of 65-75 (excellent), ensuring this facility will meet Council's sustainability goals now and into the future.
- Construction and project staging:
  - The design, construction and commissioning of the STP will take place over several years. At each stage of the project, QPRC is committed to sharing information about the regulatory requirements for the project and key decisions.
  - We will work closely with stakeholders and community to minimise impacts from construction of the upgrade STP. We will ensure construction is managed so it's not disruptive, for example staging our work, or notifying you in advance. Some night work may be required during construction. We will provide advance notice and actionable tips to those impacted.
- Long term operations:
  - We are designing with the long term in mind. This facility will be operational for decades to come and is able to be expanded further to extend that lifespan. We consider reliability, maintenance and access aspects when designing key attributes for safe and friendly operations.
  - We seek to mitigate energy costs of the treatment process through designing to minimise energy where possible, selection of energy efficient equipment, and manage energy use through the use of accessible dashboards.

- We will look to design flexibility and agility to change and adapt to and respond during the future.
- We will look to balance and minimise the use and type of chemicals and waste for operations.
- We will develop a cost benefit analysis to provide a best value outcome.

Project Objectives

The objective of the Proposal is to provide a robust, reliable and sustainable STP that protects public health and the environment for future generations. The Proposal will deliver a robust and reliable sewage treatment solution that provides for both immediate and medium term needs whilst pragmatically considering future needs.

The upgrade proposed represents a solution that provides value for money, achieves targeted sustainability and public health outcomes, and would continue to meet regulatory requirements.

The new STP shall meet regulator and stakeholder requirements, and to achieve an Infrastructure Sustainability Council (ISC) rating of 'Excellent'.

QPRC have identified additional benefits of the Proposal, including**:**

- Securing Queanbeyan's sewage treatment needs for future growth
- Improved ability to control the water quality discharged to the environment and to protect public health
- Improved odour and noise outcomes
- Improved workplace health and safety for workers and visitors to the facility
- Providing improved treatment reliability
- Providing improved protection of the treatment plant against flooding and climate change sustainability
- Providing a source of recycled water that can be used for applications such as dust suppression
- Providing a local facility to receive and treat septage waste collected from domestic septic tanks and aerated wastewater treatment systems
- Improved treatment of the biosolids produced by the treatment process to a quality that is suitable for agricultural reuse
- Providing improved treatment of the waste screening and grit materials generated during the treatment process
- Providing improved traffic access to the treatment plant by sealing the access road.

Key Performance Indicators (KPIs)

Critical Success Factors for the project are summarised in the table below.

Table 5: Critical Success Factors

KPIs	Benefit Owner	Measure	Data Source	Metric Type
Meeting Queanbeyan's sewage treatment needs for future population and economic growth	QPRC	Providing sewage treatment for Queanbeyan population to 2048	ABS Census Inflow measurement	Financial
Improved control the water quality discharged to the environment and to protect public health	ACT / NCA	Reduced number of licence exceedances per annum Fewer closures of LBG per annum Fewer algal blooms in LBG per annum	QSTP annual EPA reporting NCA LBG management data	Non-financial

KPIs	Benefit Owner	Measure	Data Source	Metric Type
Improved workplace health and safety for workers and visitors to the facility	QPRC	Reduced LTIs, incidents and near misses	QPRC WHS records	Non-financial
Improved treatment reliability	QPRC	Effluent quality consistently within regulatory limits Reduced maintenance costs No fines for failure of treatment process	QPRC financial records ACT EPA non-compliance records	Financial
Improved protection of the treatment plant against flooding and climate change sustainability	QPRC	Achievement of Excellent ISC rating Zero inundations of treatment processes up to the 1% AEP flood event	Records from flood events	Non-financial
Provision of a source of recycled water that can be used for applications such as dust suppression	QPRC	Recycled water usage	Recycled water usage records	Non-financial
Provision of a local facility to receive and treat septage waste collected from domestic septic tanks and aerated wastewater treatment systems from within the QPRC LGA	Septage tank owners and septage removal operators	Septage receival sales	Septage receival sales records	Non-financial
Improved treatment of the biosolids produced by the treatment process to a quality that is suitable for agricultural reuse	QPRC / third party biosolids users	Quality records of biosolids testing Uptake of biosolids by third parties other than landfill	Biosolids testing and disposal records	
Improved traffic access to the treatment plant by sealing the access road	ACT TCCS	Reduced maintenance costs	ACT TCCS financial records	Financial
Provision of a sustainable sewage treatment solution	QPRC	Achievement of Excellent ISC rating	ISC Rating	Non-financial

KPIs	Benefit Owner	Measure	Data Source	Metric Type
Existing plant does not fail	QPRC	New plant operational prior to failure of existing plant	ACT EPA annual reporting records	Non-financial
New solution is affordable	Rate payers	Rate increases to pay for new plant are affordable	Rate rise data	Financial
		Project delivered within approved budget	QPRC financial records	

3.4 Project Alignment with Principles, Objectives and Critical Success Factors

Table 6: Project work benefits alignment

Policy or Plan	Strategic Objective	Project Alignment			
		A robust and "Best for Region" solution	Represents value for money	Achieves targeted sustainability and public health outcomes	Meets regulatory requirements
QTSP Master Plan	Capacity required for current and future population growth	✓			
	New STP to provide a level of service that conforms to industry best practice for the protection of public health and the environment	✓	✓	✓	✓
	STP design that meets regulator/stakeholder concerns/requirements			✓	✓
	Optimisation of STP design to achieve Infrastructure Sustainability Council of Australia (ISCA) rating of 'Excellent' or 'Leading'.	✓		✓	
QPRC Strategic Directions Paper 2017	Improve infrastructure, with appropriate and well maintained assets and major projects delivered in growth areas	✓	✓		
	Deliver quality services which meet community needs, interests and ability to pay	✓	✓	✓	
Infrastructure NSW South East and Tablelands Regional Plan 2036	Work with the ACT Government to improve road and active transport connectivity and public transport integration; manage water, sewage, waste and renewable energy on a regional scale; plan and collaborate on major contiguous developments; plan for	✓	✓		✓

	infrastructure requirements to support population growth; and support major events				
	Protect and enhance the area's high environmental value lands, waterways and water catchment			✓	✓
NSW Regional Development Framework	People of regional NSW have the best access to essential services and infrastructure in regional Australia	✓		✓	✓
	All people in regional NSW should and will have access to essential services and infrastructure			✓	✓
Infrastructure NSW State Infrastructure Strategy Update 2014	Ensure that drinking water and wastewater services in all regional NSW towns meet contemporary standards	✓		✓	
	A lack of or inadequate water supply and sewerage services are the single most important factors in protecting public health and reducing faecal pollution in receiving waters	✓		✓	
Premier and State Priorities	Priorities for safer communities, building infrastructure and encouraging business investment	✓	✓		

4. PROJECT OPTIONS

4.1 Description of Proposed Project

Overview

The previous studies outlined in section 2.5 identified that the preferred option for the project was to upgrade the QSTP at the existing site.

The QSTP Upgrade will replace the existing sewage treatment plant which is approaching the end of its asset life with a modern treatment facility that provide reliable treatment. The upgrade provides 75,000 EP of treatment capacity allowing for growth and development in Queanbeyan and will improve the quality of the treated effluent discharged into the Molonglo River upstream of Lake Burley Griffin.

The facility has been designed to provide a simple and robust process that provides reliable treatment, removal of nitrogen and phosphorus and treatment of storm flows.

An overview of the process showing major treatment processes is shown below. The treatment facility includes screening and grit removal, storage and return of storm flows, activated sludge providing biological nitrogen and phosphorus removal, gravity clarifiers, tertiary filtration using a dissolved air flotation filter (DAFF) and UV disinfection. Treated effluent is discharged via an on-bank discharge structure adjacent to the Molonglo River.

The project produces recycled water that will be used onsite for process water and hose points. The project includes a recycled water fill point to supply water to tankers for offsite uses such as dust suppression.

Waste sludge produced by the treatment process will be stabilised in an aerobic digester and dewatered with centrifuges to produce a biosolids product that is suitable for reuse. Phosphorus removed from the wastewater is captured in the biosolids in a form that is biologically available for agricultural use.

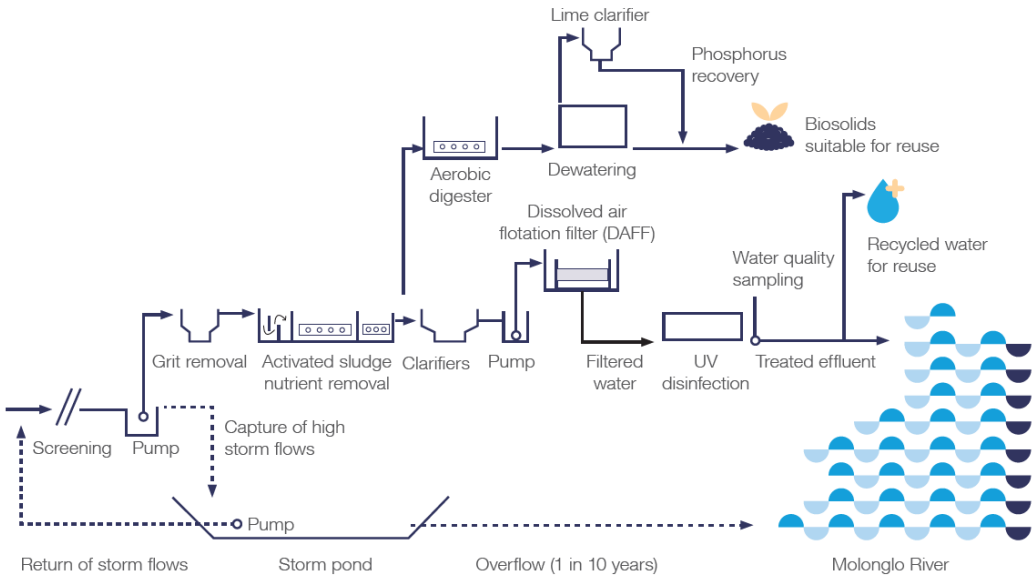


Figure 8: Overview of the proposed QSTP treatment process - the treatment process produces a disinfected effluent with low nitrogen and phosphorus concentrations.

Table 7: Summary of treatment units included in the upgrade

Process stage	Details
Inlet works screening	Band screen – fully automated 5 mm 2-dimensional screening of all flows Collected screenings are washed and dewatered, then stored in skip bins for disposal
Inlet pump station	Lifts screened flow to treatment
Storm pond	30 ML storm pond stores screened flows during storm flow events where the inflow exceeds the treatment capacity. Stored storm flows are returned to treatment during lower flow periods
Grit removal	Grit vortex system – removes grit from the sewage. Grit is washed and dewatered, then stored in skip bins for disposal
Bioreactor	Biological phosphorus removal configured reactor. Anaerobic zones followed by two oxidation ditches and two final aerobic zones. Provides biological nitrogen and phosphorus removal.
Clarification	Two 40 m clarifiers provide settling and clarified effluent. The clarifiers are also designed to provide treatment of storm flows using the solids contact process.
Filter lift pump station	Lifts flow to filtration
Tertiary DAF and filtration	Tertiary treatment dissolved air flotation and granular media filtration using dual coal / sand media – this tertiary treatment removes fine solid particles producing a polished effluent.
Disinfection for river discharge	Ultraviolet (UV) disinfection is provided to the polished final effluent before discharge to the Molonglo River.
Disinfection for Recycled Water	Recycled water receives filtration, UV disinfection and chlorination. Recycled water is suitable for use around site and for offsite uses approved by QPRC.
Aerobic digestion	Waste sludge is thickened and then stabilised using an aerobic digestion process. The process produces a stable biosolids produce that is suitable for reuse.
Biosolids dewatering and handling	Two centrifuges dewater the biosolids. Dewatered biosolids are out-loaded into truck bodies for transport offsite.
Septage receival facility	The STP facility includes a septage receival facility that is designed to receive septage pumped out from domestic septic tanks and domestic aerated wastewater treatment systems. The septage is delivered to site by licenced operators. The facility is not suitable to receive other liquid trade waste.
Recycled water facility	Standpipe facility providing recycled water for approved offsite use

Phosphorus removal

Phosphorus is a key contaminant of concern for the receiving environment of the Molonglo River and Lake Burley Griffin. The treatment process removes phosphorus using a combination of the following processes:

- The bioreactor and clarifier system provides both biological and chemical phosphorus removal to remove the bulk of the phosphorus.
- Lime and ferric dosing systems are dosed at multiple locations to provide enhanced chemical phosphorus removal.
- Dissolved air flotation and dual media filtration (DAFF) provides tertiary filtration to further remove particulate phosphorus and provide effluent polishing to the very low phosphorus concentrations required.

Site arrangement and civil works

The new QSTP will be constructed on the existing lease area to the southeast of the existing treatment process. The selected site location provides a predominantly level area where the new treatment process may be constructed while maintaining operation of the existing STP throughout the construction period.

The location QSTP Upgrade is primarily situated above the nominated design flood level, reducing the risk of damage to major structures, mechanical and electrical equipment during flood events.

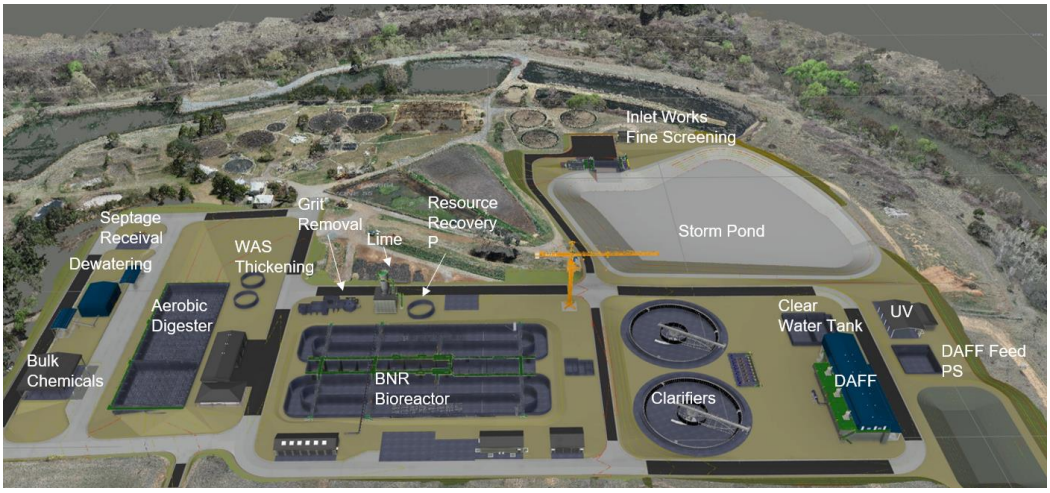


Figure 9: Overview of the Queanbeyan STP Upgrade (existing plant in background)

The site layout has been developed in consultation with QPRC and informed by site investigations including survey, services location, geotechnical, ecological, contamination and heritage investigations. Key considerations in development of the layout include:

- Locating the hydraulic grade line and height of structures to ensure bioreactor, clarifiers and UV are positioned at ground level (i.e. top of structure is at handrail height generally) to simplify operation and reduce costs associated with access to elevated structures and lift pumping
- Minimising hydraulic losses of major pipe runs through the treatment process to minimise ongoing operating costs
- Providing adequate space for operation and maintenance access and below ground pipework and electrical conduit service corridors
- Site operation, monitoring and security requirements
- Construction sequencing
- Avoiding disturbance of an area to the south of the site identified as potential habitat for the critically endangered Golden Sun Moth.

Sewage is conveyed to the existing site from the sewerage network through the Jerrabomberra trunk main from the west and the Morisset trunk main from the south. The project includes connecting to these two trunk mains within the site and installing connecting mains to transfer sewage to the new inlet works. The location of the cut-in to the Morisset trunk main has been located outside the identified Golden Sun Moth zone.

The area to the south of the proposed build area is available to be used as the contractor compound during the construction phase. Other areas of the site will be used for stockpiling of excavated material during construction.

Consideration of future expansion requirements

The QSTP upgrade provides a treatment capacity of 75,000 EP. Design of the upgrade has also given consideration to the needs of a future stage 2 upgrade to expand the QSTP treatment capacity by 50% to 112,500 EP. The considerations included in the current project include:

- Consideration of space requirements, hydraulic requirements and connection points of future processes
- Consideration of environmental constraints for the Stage 2 upgrade
- Installing stage 2 capacity now for treatment units that would be difficult to retrofit later such as the inlet works, grit removal and UV disinfection unit hydraulic capacity.

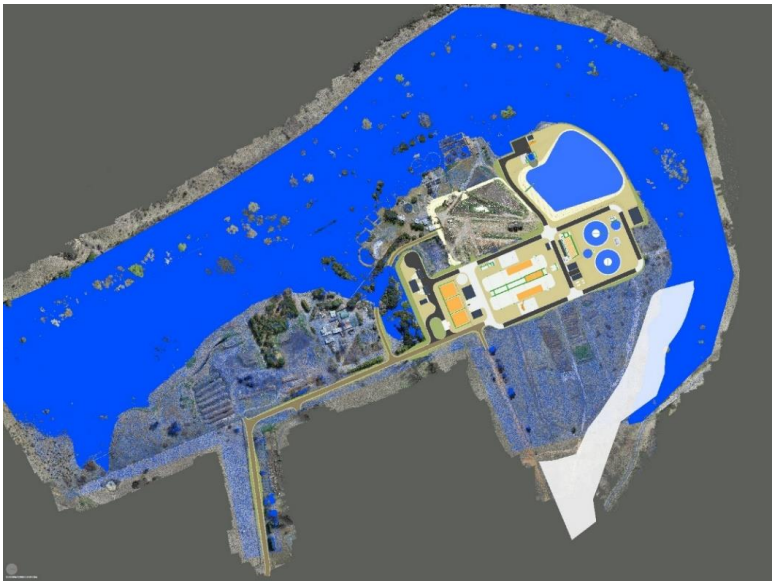


Figure 10: QSTP Upgrade site layout relative to the nominated design flood level of a 1% AEP flood. The design has additionally considered an allowance for climate change.

Decommissioning and removal of Maturation Ponds

The existing treatment plant includes three maturation ponds located on the southern bank of the Molonglo River. The three maturation ponds have an area in the order of 7.6 ha and a volume approaching 200 ML.

The maturation ponds are located within the extents of the 1% AEP flood zone and are at risk of failure during flood events.

The maturation ponds will not form part of the treatment process once the new treatment plant has been constructed and commissioned. As part of the project, the ponds are to be decommissioned, accumulated sludge removed and infilled. Vegetation will be planted in the remediated maturation pond area to extend the Molonglo River riparian zone. QPRC has developed a landscape plan for the area in consultation with the community.

Figure 11: The existing QSTP Site.

Mountain Road upgrade

QSTP is accessed via Mountain Road. The existing access road is unsealed and is in poor condition.

The project includes an upgrade of Mountain Road from the existing intersection with Railway St to accommodate access for larger vehicles and provide suitable road conditions for the increase in operational traffic associated with the upgraded treatment facility.

The key features of the Mountain Road upgrade work are:

- Road widening
- Pavement reconstruction including subsurface drainage
- Construction of swale drainage along the road
- Reconstruction of an existing culvert
- Construction of a cul-de-sac prior to the QSTP entry gate.

The road upgrade work is being developed in consultation with ACT Transport Canberra and City Services (TCCS) and will become their asset.

Power supply upgrade

The power supply authority for the site (Evoenergy) has advised that there is insufficient power supply capacity for the new plant and an upgrade of the high voltage power supply to the site is required. A scope of work for the high voltage power supply has been developed in consultation with Evoenergy. The work required includes:

- Replacement of the existing 11 kV overhead power lines along Mountain Road and across the site with a diverted underground service to provide clear access to the proposed construction areas and safe access for construction vehicles during construction.
- Removal of redundant overhead power lines that cross the existing site.
- Installation of a temporary underground power supply to maintain power supply to the existing QSTP during the construction period.
- Installation of a temporary power supply to the proposed contractor compound area for construction power.

Potable water supply upgrade

Potable water is supplied to the existing STP by a 100mm water main along Nimrod which is owned and operated by Icon Water. Icon Water has advised that there is insufficient water supply pressure at the site to meet ACT firefighting requirements. As part of the project, the potable water main will be upgraded from 100mm to 150mm.

Decommissioning of the existing STP

During commissioning of the new facility, sewage flows will be cut over from the existing STP to the facility. As part of the scope of the project, the existing STP facility is to be decommissioned and made safe. This includes management and removal of residual sludge and grit from the process, cleaning and removal and disposal of mechanical and electrical plant. The scope of the project does not include demolition of the existing STP structures.

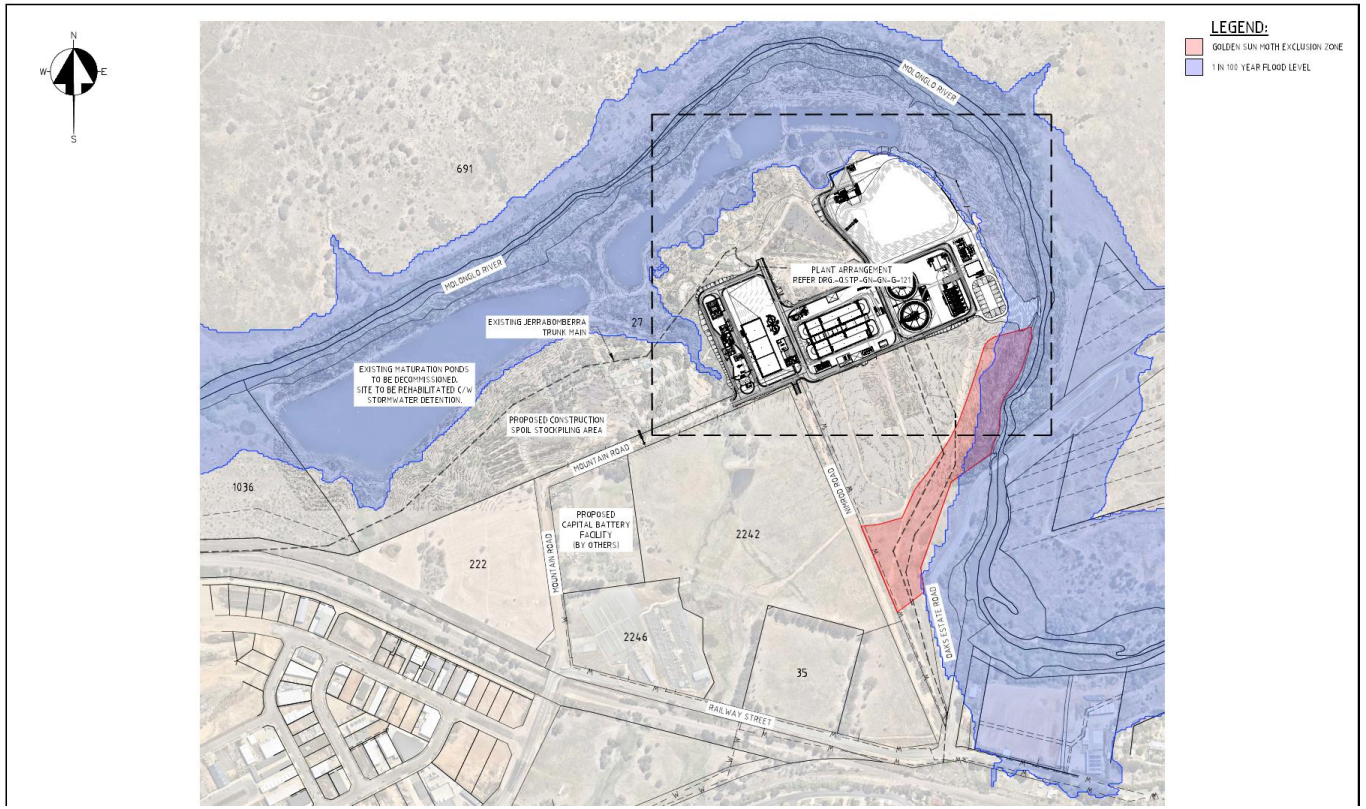
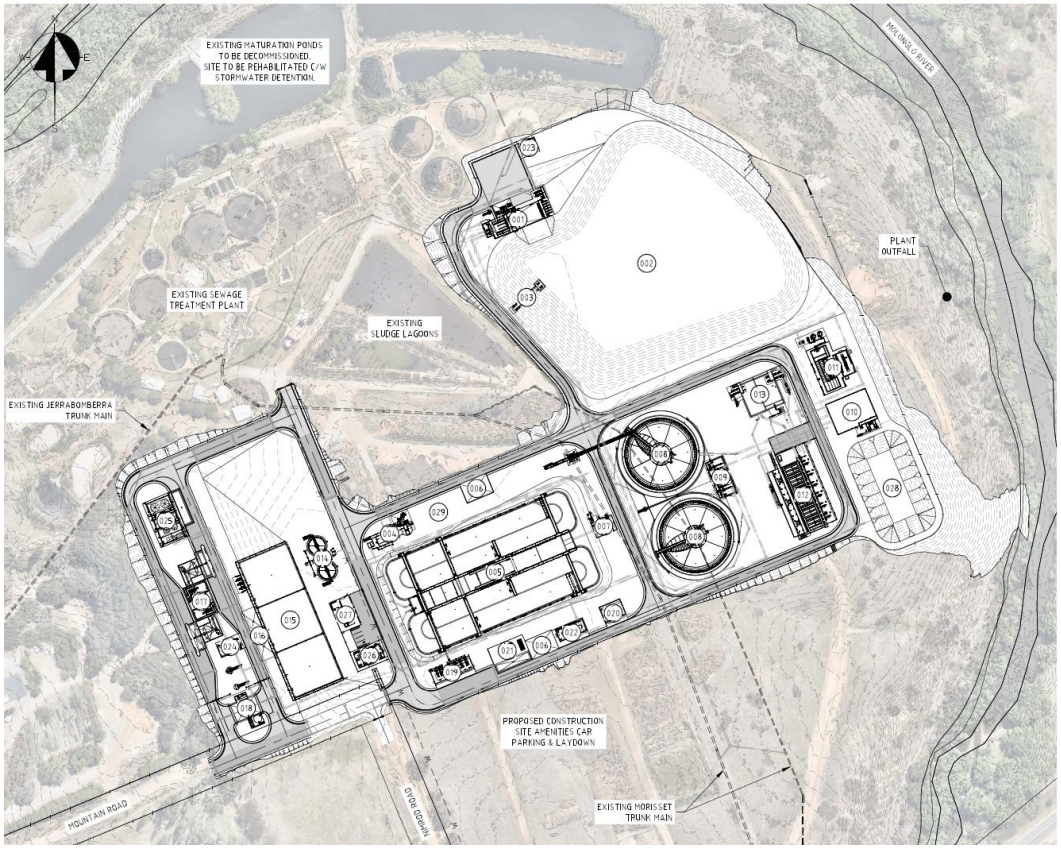


Figure 12: Proposed location for construction of the QSTP upgrade. The location has been selected with consideration of flooding constraints, potential archaeological deposits and endangered Golden Sun Moths.



STRUCTURE LIST	
ITEM NUMBER	DESCRIPTION
001	INLET WORKS
002	STORM POND (30 ML)
003	STORM RETURN PUMPING STATION
004	GRIT REMOVAL FACILITY
005	BIOREACTOR
006	BIOREACTOR AERATION GRID WASH DOWN AREA
007	MIXED LIQUOR SPLITTER
008	CLARIFIERS
009	RAS PUMPING STATION
010	FILTER LIFT PUMPING STATION
011	UV DISINFECTION FACILITY/ELECTRICAL SWITCHROOM
012	DAFF (DISSOLVED AIR FLOTATION FILTERS)
013	DIRTY BACKWASH TANK/CLEAR WATER TANK
014	WAS THICKENERS
015	AEROBIC DIGESTER
016	AEROBIC DIGESTER AERATION GRID WASH DOWN AREA
017	DEWATERING FACILITY
018	SEPTAGE RECEIVAL/RECYCLE WATER FILL STATION
019	BLOWER FACILITY
020	CHAMBERED ELECTRICAL SUBSTATION
021	ELECTRICAL GENERATOR & DIESEL STORAGE
022	MAIN ELECTRICAL SWITCHROOM
023	INLET SWITCHROOM
024	SLUDGE HANDLING SWITCHROOM
025	CHEMICAL DOSING FACILITY
026	AMENITIES
027	WORKSHOP
028	STORMWATER DETENTION BASIN
029	LIME CLARIFIER/LIME SILO

Figure 13: Site arrangement of the QSTP Upgrade

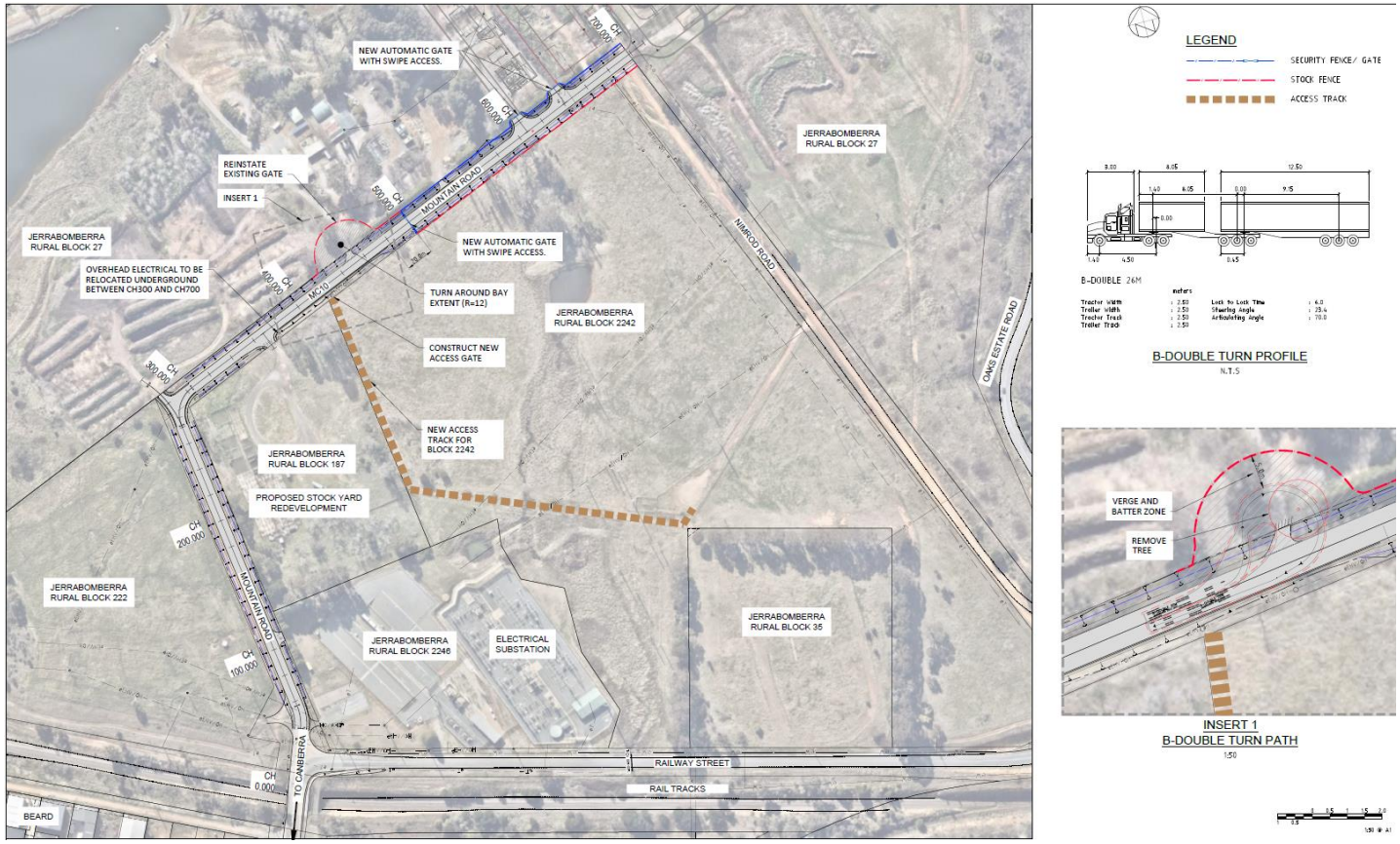


Figure 14: Planned upgrade to the Mountain Road access road to the QSTP

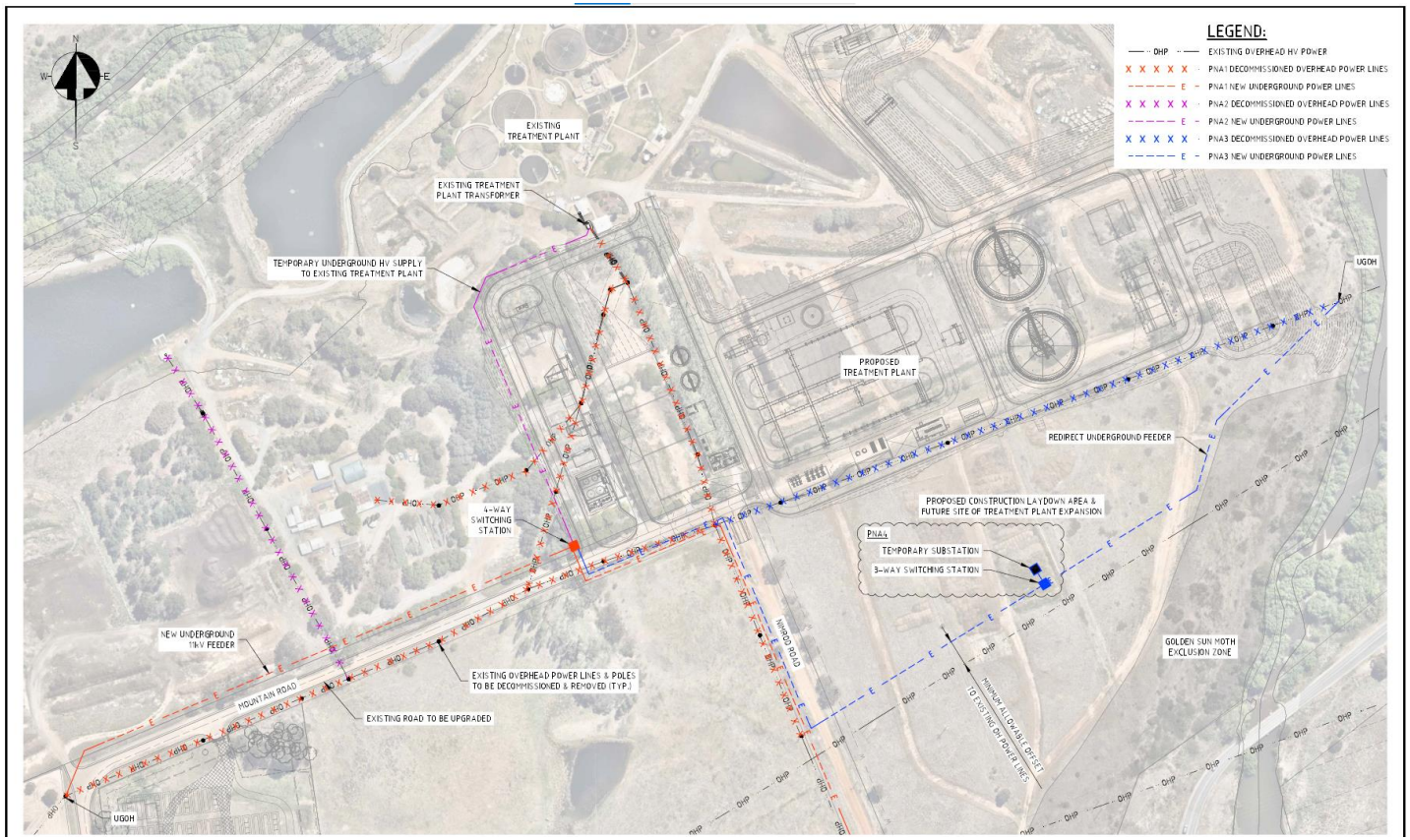


Figure 15: Power supply upgrade requirements of the QSTP Upgrade

4.2 Related Projects and Decisions

The QSTP upgrade project is interrelated to the following government decisions and projects that are being progressed separately.

Development Application Approvals

The QSTP upgrade provides treatment capacity for new connections to the Queanbeyan sewerage system. This additional treatment capacity services new development applications approved by QPRC as well as developments that are already approved but have not yet connected. This includes developments in the South Jerrabomberra area.

STP Site Lease Renewal

The site of the existing and proposed QSTP is Block 27 Jerrabomberra ACT is located in the ACT. QPRC has a 99 year lease on the block that commenced in 1 April 1938 and expires 31 March 2037.

To secure QPRC's investment in the new STP on the site, QPRC has requested a lease extension from the ACT Government. Negotiations on the new lease are ongoing as there are historical boundary survey issues that are being addressed as well as the previous construction of an ACT road across the existing STP site.

Consolidation of Nimrod Road and part of Mountain Road into Block 27 Jerrabomberra ACT

QPRC has made a Direct Sale application to the ACT to close Nimrod Road and part of Mountain Road and consolidate these areas into the existing leased area. If the purchase were to proceed, Nimrod Road would be closed to traffic but would be maintained as an emergency egress and for access to the power supply easement.

The approximate timeframe for consideration of the direct sale application by the ACT Minister for Planning and Land Management is November 2022.

Deregistration of the Maturation Ponds

The two larger maturation ponds at the QSTP site are registered as dams under the ACT Utilities Technical Regulation Act. Prior to decommissioning the maturation ponds, they must be de-registered as dams.

The Utilities (Technical Regulation) (ACT Dam Safety Code) Approval 2018 stipulates the steps to be undertaken to decommission dams, including the requirement to seek approval from the UTR. Information to be provided to the UTR includes details of significant adverse risks to the community during dam decommissioning, and how QPRC will mitigate these risks so as to be acceptable. This may include the preparation of a Dam Safety Emergency Plan or similar.

Once the UTR has approved the proposed methodology, the UTR will delist the dams and remove them from the ACT Dam Register.

Augmentation of the Queanbeyan Sewerage Network

QPRC is preparing an Integrated Water Catchment Management Strategy (IWCM Strategy) to comply with NSW Department of Planning and Environment requirements. The IWCM Strategy will address regional issues relating to provision of sewerage services. Work completed to date on QPRC's IWCM has identified that augmentations to Queanbeyan's sewerage network including an upgrade to the Jerrabomberra trunk sewer will be required as a separate future project.

4.3 Impact and Integration with other Government Assets and Services

The Project will integrate with the existing Queanbeyan sewerage network operated by QPRC and the Oaks Estate sewerage network operated by Icon Water. The project includes works within the site to divert the incoming mains from these networks to the new facility.

As outlined in the project description, the works also integrates with the following assets and service:

- EVO Energy electricity network – the high voltage power supply will be upgraded to supply the new facility as part of the project
- ICON (ACT Government) potable water mains – the water supply will be upgraded as part of the project
- ACT TCCS (Roads ACT) Mountain and Nimrod Roads – Mountain Road will be upgraded as part of the project. Nimrod Road would be closed and incorporated into the leased site.

The project is not expected to impact any other government assets or services.

Plans for mitigating disruption to the service provided by the existing QSTP during the project are discussed in Disruption Management in Section 4.5.

4.4 Enabling or Ancillary Works

Enabling works for the main treatment plant upgrade include:

- The upgrade to Evoenergy's high voltage power supply to the site
- The upgrade of the potable water supply to the site
- The upgrade to Mountain Road
- Relocation of surface artefacts identified as part of aboriginal heritage investigations at the site.

4.5 Disruption Management

The construction of the new QSTP has been planned to ensure minimal impact on the continued operation of the existing STP works. The site for construction of the new facility has been located so that the existing facility can continue to operate during construction. Construction has been staged and planned to ensure the treatment of sewage and compliance with the existing environmental requirements will not be compromised by the construction activities. Construction planning will include preparation of a detailed cut-over plan to ensure continued treatment services during the cut over from the existing facility to the new treatment plant.

Early works will include the relocation of services including a number of power poles along Mountain Road and the power supply to the existing site. These works will be undertaken in order to provide clear site access for construction phase. Disruptions to other customers will be managed by EvoEnergy, in consultation with QPRC.

The Mountain Road upgrade will include road closures and disruptions to traffic. This will be managed by QPRC, in consultation with Transport Canberra & City Services (TCCS). Initial consultation has already occurred with TCCS and this will continue.

As the project develops the project action register will be continually reviewed and revised to capture potential disruptions and associated mitigation/management strategies. The full current extent of expected impacts to current government assets, services and the wider community as a result of the construction of the proposed project together with management strategies are summarised in Table 8.

Table 8: Impacted Stakeholders

Impacted Asset or Stakeholder	Impact	Financial Impact to Stakeholder	Management Strategy
Trunk sewers from sewerage network	Temporary stoppage of flows to the works required at times for essential cut-in work to the network.	Internal cost risk.	Shutdown plans to be developed using temporary pumping, storage and night works as required.
High voltage power supply - EvoEnergy network	Re-alignment of power supply may result in interruptions to supply to Evoenergy customers.	Evoenergy to manage	Evoenergy to manage this impact as they will be engaged to undertake the work.
Power supply to existing STP	Potential interruptions to power supply to existing QSTP	Internal cost risk.	Install new temporary power supply to existing STP. Utilise existing STP back-up generator if required. Ensure adequate diesel supply for back-up generator during cut-over of new temporary power supply.
Mountain and Nimrod Road	Disruption to traffic access. Damage to road surface from construction vehicle movements. (Note there are only three properties accessed via these two roads.)	Cost to reinstate road to pre-construction condition. Cost to implement traffic controls on the road.	Coordinate road works with TCCS and adjoining land users. Provide alternate access for surrounding land users if required. Implement Traffic Management Plan.
ICON Potable Water Main	Water supply to adjacent horse paddock and QSTP during cut-over of new water supply main.	Cost to provide alternative water supply to horse paddock.	Coordinate timing of cut-over with existing STP operations and adjacent horse paddock.
Existing STP Operations	Land currently used for biosolids drying is required to site the new STP. Considerable site land is required for shifting of excavated material.	Internal cost risk.	Relocate existing biosolids. Have backup for off-site disposal in place for biosolids generated during construction.
Capital Battery	Disruption to site access. Road upgrade affects Capital Battery site access. Dust from QSTP works vehicle movements on Mountain Road impacts Capital Battery site.	Nil.	Cross agreement between QPRC and Capital Battery.
ACT Rural Services / Territory Agistment	Impact access to their site.	Potential cost to provide alternate site access.	Provide alternative access to their site if required.
Oaks Estate Residents (ACT) Beard Industrial Estate (ACT)	Noise, dust and odour emitted during construction	Potential cost of addressing complaints.	Construction contractor to prepare and implement a CEMP including ESCP. Undertake site

Queanbeyan Residents (NSW)			surveillance to ensure contractor is implementing the CEMP and controls are effective.
Molonglo River and Lake Burley Griffin	Lake closures for recreational activities and reduced visual amenity due to release of contaminants from the site as a result of construction activities	Loss of economic activity from cancelled events and reduced tourism.	Require contractor to prepare and implement CEMP including WQMP. Undertake site surveillance to ensure contractor is implementing the CEMP and controls are effective. QPRC to continue to maintain and operate the existing QSTP.
Canberra Airport	Cranes required for construction.	Impacted to airport flight schedules.	Obtain Canberra Airport/CASA approval for cranes.

5. COST AND FUNDING

5.1 Budget Request

A pre-tender cost estimate for the QSTP upgrade has been developed using a line item bill of quantities prepared by a quantity surveyor and a Monte Carlo simulation to achieve a risk-based cost estimate for the QSTP Upgrade project. The simulation uses lower and upper bounds that vary depending on the confidence (and risk) levels of each estimated line item. Typical lower bounds for inbuilt contingency are -5% and upper bounds are +15%. For this stage of estimate, a medium to high confidence level has been used.

Using the Monte Carlo simulation, the P90 cost estimate for total project cost is $182.2M (refer to Table 9).

Table 9: Total outturn cost estimate summary

Sub-Project	Budget Request ($ ex. GST))
Construction Costs	129,683,000
QPRC Costs	29,944,000
Base Estimate	**159,627,000**
Contingency for Risks (P90)	14,354,000
Project Estimate (P90)	**173,981,000**
Escalation	8,237,000
Total Outturn Cost (P90)	**182,218,000**

Further breakdown of the project cost estimate is provided in Table 11 below.

5.2 Proposed Funding

QPRC Funding sources

Existing Income Streams

Funding for QPRCs sewer operations comes from a dedicated sewerage business of Council. The Business income is from the following sources:

- Sewerage rates – annual fees per sewerage connection
- Developer contributions – Developer charges are up-front charges that QPRC can levy under section 64 of the Local Government Act 1993 to recover part of the infrastructure costs incurred in servicing new development or additions and changes to existing development
- User charges and fees
- Interest.

The income of the sewer fund from the above sources for the 2021-22 financial year was $15m.

We note that the expected income from the sale of recycled water (via the recycled water standpipe) and disposal of septage (via the septage receival facility) would be negligible and have not been included above.

The amount charged for each of the above may be varied by QPRC from time to time to recover the costs required for operation, maintenance, renewal and upgrade of the sewerage system.

The Sewer fund currently holds reserves that have been collected for the purposes of asset replacement, operation and maintenance. The current value of the Queanbeyan sewer fund reserve attributed to the QSTP catchment is $58m. The Sewer fund currently holds property in the Queanbeyan CBD that could be sold with the income returned to the Sewer Fund. The reserve does not hold enough funds to cover the entire cost of the project, nor can it expend all of its funds on this project alone. A separate Integrated Water Cycle Management (IWCM) Plan project is currently reviewing the long-term operations cost requirements for the part of the business

that sits within the catchment for the QSTP. The IWCM has reviewed the required charges for sewerage rates to meet the projected operation, maintenance, renewal and upgrade costs.

Loan Funding

The Sewer fund can take out and repay loans to cover the cost of works. Loan repayment would be covered by the Sewer fund income streams.

QPRC proposes to utilise loan funding to cover the gap between other funding sources and the CAPEX cost required for the STP upgrade. The source of loan funding for this project would be NSW Treasury Corporation.

There are limits on how much QPRC can borrow based on all of its operations. QPRC's long term financial plan allows for loan funding of $40m for the sewer fund.

External Funding Sources

QPRC was successful in receiving a grant from the NSW Government through the Safe and Secure Water Program (SSWP) in 2019 for the preparation of a Business Case. The SSWP will contribute up to $3M towards the estimated $13.8M cost of this project phase.

The IWCM financial modelling found that QPRC will require a minimum grant funding of $36M for the project to proceed. Since the IWCM modelling was undertaken, project delivery has been delayed and the design has been further progressed. Based on the latest cost estimate, the project would require an additional $20M of grant funding, bringing the total grant funding requirement to $56M.

The increase in funding is needed to account for cost increases due to:

- Escalation that has occurred in the market since the earlier project estimates
- Further escalation as a result of the additional 12-month delay to expected construction commencement of the project
- More accurate and inclusive scope and quantities based on progression from the concept to detailed design for the upgrade works
- Industry observed higher rates from contractors based on increased costs and risk allowances.

Additional grant funding would mean no changes to the loan funding amount or sewer rate rises proposed in the IWCM.

QPRC is continuing to approach various levels of Government for grant funding opportunities with this project with a view to minimising the impact to rates. Government funding opportunities that are being explored include:

- NSW Government:
    - Accelerated Infrastructure Fund Round 3
    - Safe and Secure Water Program construction funding
    - Election promise
- ACT Government:
    - ACT Government contribution through TCCS for the Mountain Road upgrade
    - ACT Government contribution towards the higher treatment standards (above NSW best practice) being required as part of the ACT approvals and regulation process benefiting water quality in Lake Burley Griffin
- Federal Government contribution towards the higher treatment standards (above NSW best practice) being required to benefit water quality in Lake Burley Griffin.

CAPEX Funding Allocation

Table 10 outlines the proposed allocation of funding sources for each phase of the project. All costs exclude GST.

Table 10: CAPEX funding allocation across project lifecycle

Project Phase	Budget ($)	Income Source	Income Source Contribution ($)	Phase Status
IDENTIFY	222,000	Sewer fund	222,000	Complete
PLAN – Masterplan, Concept Design and Business Case	7,111,000	Sewer fund	5,461,000	Complete except for business case
		SSWP	1,650,000	
DEVELOP – Reference Design, EIS, DA and Detailed Design	8,375,000	Sewer fund	7,025,000	In progress
		SSWP	1,350,000	
DELIVER – Construction	143,700,000	Sewer fund	40,700,000	Not started
		Section 64 Contributions	7,000,000	
		Loan	40,000,000	
		Grants	56,000,000	
CLOSE	219,000	Sewer fund	219,000	Not started
Contingency	14,354,000	Sewer fund	14,354,000	N/A
Escalation	8,237,000	Sewer fund	8,237,000	
TOTAL	182,218,000		182,218,000	

5.3 Cost Planning, Contingency and Management (P90/50 real and outturn)

A risk-based engineering cost estimate for the QSTP Upgrade Project was developed during the design phase of works. The cost estimate includes both direct and indirect costs, including construction management, contractor profit, project management, commissioning, and project contingency. Sunk costs have been included in QPRCs Costs.

Detailed quantities have been extracted from the detailed 3D model of the proposed upgrade. Costs have been developed using the following primarily first principle methods and the following sources:

- Rawlinson's Construction Handbook 2020 and other first principle estimating tools
- Supplier quotes sourced specifically for the proposed upgrade and this estimate
- Known contract rates and quotes from previous relevant wastewater plant construction projects
- Rates from independent estimator and contractor databases.

Where appropriate, Building Price Indices have been applied to bring rates in line with financially current values. An estimate for electrical, control and instrumentation (ECI) costs have been made using 20% of the total civil and mechanical works which is consistent with a design of this level.

The cost estimate is based on the procurement model indicated by QPRC and assumes that the project will be delivered in Construct Only model by a Principal contractor.

The base cost estimate breakdown is provided in Table 11 below.

Sensitivity: General

Table 11: Base cost estimate breakdown

Item	Costs	
CONSTRUCTION COSTS		
STP Upgrade	$	93,832,000
Bulk Earthworks	$	6,251,500
Plant Pipework	$	7,128,000
Worklot 1: Inlet Works and Inlet Lift Pumping Station	$	3,996,500
Worklot 2: Storm Pond (30ML)	$	1,319,500
Worklot 3: Storm Return Pumping Station	$	930,000
Worklot 4: Grit Removal Facility	$	1,058,500
Worklot 5: Bioreactor	$	16,865,500
Worklot 6: Bioreactor Aeration Grid Washdown Area	$	198,000
Worklot 7: Mixed Liquor Splitter	$	1,661,500
Worklot 8: Clarifiers (incl. Mixed Liquor Chamber)	$	4,974,500
Worklot 9: RAS Pumping Station	$	669,000
Worklot 10: Filter Lift Pumping Station	$	2,256,500
Worklot 11: UV Disinfection Facility/Electrical Switchroom	$	3,013,000
Worklot 12: DAFF(Disolved Air Flotation Filters)	$	11,271,500
Worklot 13: Dirty Backwash Tank/Clear Water Tank	$	704,500
Worklot 14: WAS Thickener	$	1,021,000
Worklot 15: Aerobic Digester	$	4,606,000
Worklot 16: Aerobic Digester Aeration Grid Wash Down Area	$	100,000
Worklot 17: Dewatering Facility	$	3,107,000
Worklot 18: Septage Receival/Recycle Water Facility	$	409,000
Worklot 19: Blower Facility	$	1,021,500
Worklot 20: Chambered Electrical Substation (included in HV upgrade)	$	-
Worklot 21: Electrical Generator & Diesel Storage	$	1,660,500
Worklot 22: Main Electrical Switchroom and site power reticulation	$	13,229,500
Worklot 23: Inlet Switchroom	$	261,500
Worklot 24: Sludge Handling Switchroom	$	158,500
Worklot 25: Chemical Dosing Facility	$	1,746,500
Worklot 26: Amenities	$	427,000
Worklot 27: Workshop	$	454,500
Worklot 28: Stormwater Detention Basin	$	239,000
Worklot 29: Lime Clarifier/Lime Silo	$	1,464,000
Roadworks & Restoration	$	1,628,500
Other Works	**$**	**9,605,500**
Mountain Road Upgrade	$	2,330,000

Sensitivity: General

Maturation Pond & Sludge Lagoon Decommissioning and Landscaping	$	4,819,000
Upgrade of HV Power Supply to Site	$	2,456,500
Indirect Costs	**$**	**13,025,500**
Contractor Margin	**$**	**13,220,000**
Total Construction Cost	**$**	**129,683,000**
QPRC PROJECT DELIVERY COSTS		
Investigation, Design and Approvals, Project Management and Construction Management	$	29,944,000
BASE ESTIMATE	**$**	**159,627,000**

5.4 Ongoing Maintenance, Operating and Service Costs

Ongoing Operating and Maintenance Costs

The estimated operating costs include chemical purchases, electricity, biosolid costs, and operational labour and laboratory costs.

The power unit rate used of $0.2 / kWh was based on a review of QSTPs existing power costs.

Market rates were used for chemical purchases and biosolids, these included:

- Caustic soda (50%) $395/tonne
- Ferric Chloride $486/tonne
- Polymer $7.25/kg
- Sodium Hypochlorite (12%) $340/tonne
- Lime Slaked $232/tonne
- Biosolids Transport $20/WT
- Biosolids Reuse $85/WT

The estimated maintenance cost is based on a nominal percentage of project costs. Maintenance was set at 3 % of capital cost per year for Mechanical and Electrical, and 0.3 % for Civil.

The operating, maintenance and lifecycle costs are presented in 6.2.

5.5 Commercial Off-set

Opportunities for commercial off-set, beyond development Section 64 contributions, have not been considered for this project as part of this business case.

However, the design of the treatment plant will allow for commercial off-set opportunities to be investigated by QPRC in the future, including:

- Supply of large scale recycled water – subject to financially and regulatorily feasible demand (other schemes have locally failed due to the excessive cost to produce and transport recycled water to end users)
- Supply of biosolids for reuse – subject to sourcing an interested third party.

5.6 Cost Planning and Management

Cost Planning Management

The project cost management is aligned to the delivery stage of the project and QPRCs Project Framework. Under QPRCs Project Framework, project cost are prepared and reviewed as follows:

- Project identification (order of magnitude) – complete
- Strategic options estimate (unit rates) – complete
- Preliminary concept estimate (unit rates) – complete
- Detailed estimate (hybrid unit rates/first principles) – used for this business case
- Pre-tender estimate (hybrid unit rates/first principles) – prepared prior to tendering at completion of detailed design.

A special feature of this project is procurement including early vendor engagement for 3D design and purchase of specialist equipment in advance of the engagement of a Principal contractor. This method of procurement has allowed the designers to work with the equipment suppliers to make the design highly bespoke with lower risk of changes during construction due to the contractor's selection of the equipment varying to the designer's assumptions. The Project currently has nine early vendor engagements executed that have allowed for greater certainty in equipment pricing as the costs are locked in now. The early vendor pricing has been included in the detailed estimate.

QPRC is actively engaged in monitoring actual project costs compared with the project budget. Between the major estimating milestones above and then during construction, QPRC undertakes the two following activities:

1. Monthly progress reporting on project expenditure with a comparison of baseline budget, current budget and actual costs; and
2. Updating the current project budget to incorporate project cost changes through QPRCs change management process.

The final check in QPRCs cost planning is to ensure that the final project costs and ongoing operational costs meet the estimates. This process is undertaken during project closure documented in a project closure report and as part of QPRCs Benefits Realisation Plan discussed further in Section 8.8 of this report.

Contingency Management

The project has adopted a probabilistic risk-based cost estimating approach for capital costs. Risk has been accounted for in the cost estimate through the use of line item ranging and discrete risk events. The contingency has been calculated for varying probabilities via Monte Carlo simulation.

Cost risk events included in the cost estimate are identified through the project risk management processes (described in Section 8.5). The project risk assessment is updated progressively throughout the project and principally at major delivery milestones including Masterplan, concept design, reference design and detailed design. Risks are also identified through the project change procedures. This approach to identifying cost risks means that as the project progresses cost risk are reviewed, removed and added based on the current design and stage of the project. Additionally, throughout the construction phase of the project, the value of contingency can be monitored via the cost risks that remain active.

The contingency is owned by QPRC. Approval to release contingency is done through QPRCs Project Board via monthly progress reporting and financial delegation contract variation approvals processes.

The remaining contingency is reported on via QPRCs monthly project reports.

Milestone Payments

Project lifecycle costs have been projected over a 30 year period in Section 6.5. Detailing these costs allows QPRC to ensure it has secured sufficient funds each financial year to support the project for a 30-year period, with a particular focus on the timing for larger payments.

6. VALUE FOR MONEY ASSESSMENT

6.1 Demand Assessment

The existing STP is estimated to have a design equivalent population (EP) of 34,500 and is currently aged and overloaded.

Hunter H2O developed estimations of sewage loading as part of the Design Criteria and Assumptions Report completed in 2019 which found that the plant was servicing approximately 52,000 EP, with the service population expected to grow to 77,000 by 2050, the sewage load on the QSTP is expected to increase steadily with infill and increased population density. The existing plant is considerably under designed for the current population; the issues associated with this overloading will continue to be exacerbated as the population grows. The plant is also contending with a number of age-related issues. The overloading of the plant and infrastructure issues pose a significant environmental risk to Lake Burley Griffin, as well as a regulatory and reputational risk to QRPC.

The proposed upgrade will have capacity to service 75,000 EP and is not expected to require augmentation or upgrade for at least 15-20 years. The adopted design also allows for future expansion to the treatment train to service up to 112,500 EP.

6.2 Cost Benefit Analysis

A Cost Benefit Analysis (CBA) has been undertaken to estimate whether the economic benefits generated as a result of the new treatment plant exceed the associated project costs. The CBA compares the Project Case, against the Base Case, which represents current condition. This is to capture the impact of avoidance of failure scenarios and other impacts that result from the existing treatment plant continuing to be operated at current capacity.

Benefits and costs are in real terms; a real discount rate has been applied to reflect the long-term social opportunity cost of capital.

Assumptions

The economics modelling approach was compliant with the *Infrastructure Australia (IA) Assessment Framework* as well as the *NSW Safe and Secure Water Program Guidelines*.

Table **12** outlines key assumptions and parameters applied within modelling calculations.

*Table **12**: Key model assumptions*

Element	Value	Unit	Notes / Source
Economic Factors			
Price base	FY2022	*date*	The analysis has been undertaken in real, FY2022 dollars.
Analysis Period	30	*years*	IA Assessment Framework
Escalation factors	Where inputs were not in the price base year, the parameter was escalated to FY2022.	*%*	ABS CPI Sydney (Index Numbers; All groups CPI; Sydney; A2325806K)
Project Timeline Inputs			
Capital costs start date	01 Jan 2024	*date*	QPRC
Construction end date	31 Oct 2026	*months*	QPRC
Operations start date	01 Mar 2026	*date*	Decommissioning of maturation ponds to occur between March– October 2025
Discount rate			
Discount rate	7%	*%*	IA Assessment Framework

Assumptions and limitations

Due to limitations around data availability, and accurately capturing the failure scenarios, there are several failures and impacts that could not be captured within the CBA. These impacts would likely contribute significantly to the economic viability of the project. It should also be noted that the loss of economic growth associated with the Base Case would be substantially larger than the proxy values adopted in this analysis.

Options

Four options were developed and assessed for suitability in the QPRC QSTP Upgrade Project Masterplan (GHD, 2016). A multi-criteria analysis (MCA) was used that tested a variety of weighted criteria to compare the options.

The MCA considered whole of life cost estimates, constructability, operability, sustainability, future proofing, and overall delivery risk. A "Build New" strategy was identified as the preferred option. This is the Project Case within this economic analysis.

Base Case

The Base Case represents a "Do Minimum" scenario in which the existing infrastructure is retained, without alteration, at its design capacity of 34,500 EP.

Project Case

The Project Case involves building a new STP that would service an EP of 75,000. The location of the upgraded plant will be integrated onto the existing site, and the existing plant decommissioned.

Capital and Operating Costs

Capital Costs

A summary of capital costs is shown below in Table **13**. Note that escalation was removed from the costs, and they are therefore expressed in real terms.

*Table **13**: Capital costs (real, $m June 2022) – Source: **QSTP - Engineering Cost Estimate – Rev B.pdf***

Cost Element	Value ($m, 2022)
Direct Construction Costs	103.44
Indirect Costs	13.03
Contractor's Margin	13.22
Client's Costs	29.94
Contingency	14.35
Total Cost (P90)	173.98

Capital costs have been distributed in alignment with the construction period outlined in Table 11.

Operating & Maintenance Costs

The operating (opex) cost profile has been assumed to increase with the projected population growth and the resulting incoming flow. Opex costs as provided are inclusive of the following items:

Operational costs

- Power
- Chemicals
- Biosolids
- Labour
- Laboratory

Major Maintenance

- UV lamp replacement
- UV Service
- Diffuser Membranes
- Blower Filters
- Inlet Works
- Centrifuge - minor

- Centrifuge - major
- Clarifier and WAS Thickener.

Maintenance costs

- Civil
- Mechanical
- Electrical

Lifecycle replacement

- Mechanical

Project benefits

Table **14** summarises the project impacts assessed as part of this economic analysis. This is made up of two main benefit groups:

- **Failure scenarios**: As the current STP is operating beyond capacity, it presents risks around plant failure.
- **Downstream benefits**: These are the impacts to the wider community that are associated with operating the plant at its current capacity.
- **Other benefits**

*Table **14**: CBA Benefits*

Benefit	Description
Failure scenarios	
Plant Capacity Failure	This benefit assesses the avoided cost from the current capacity exceedance as a result of additional population or critical equipment failure. This could lead to release of ammonia into the river which is toxic to aquatic life, and result in significant costs due to the number of fish affected, civil fines and reputational damage.
Maturation Pond Failure	This benefit captures the avoided costs of maturation pond bank failure from flooding events that can result in mass releases to the Molonglo River. The two rainfall events captured for this failure were a 1 in 20-year and a 1 in 100-year event.
Downstream benefits	
Ecology and Biodiversity Protection	This benefit measures the willingness to pay for the prevention of the loss of riverine habitat.
Recycled Water Schemes	This benefit measures willingness to pay to contribute to recycled water to improve environmental outcomes.
Social Cost of Water Borne Disease	This benefit measures the prevention of waterborne diseases. The difference between this cost in the Base Case and Project Case becomes a cost saving used in the CBA.
Economic Growth	To measure this benefit, a proxy has been applied. This has been captured through measuring the Council's inability to approve development and housing growth due to insufficient services. As such council rates and developer charges have been used as a proxy.
Biosolid Value Add	This benefit measures the value through the creation of productive outputs from the treatment facility. Although resulting biosolids from the facility are unlikely to be sold, they represent a productive outcome.
Receiving 10% Water Quality Change	This benefit measures willingness to pay to receive water quality improvement. It was assumed that there would be a moderate improvement in water quality, resulting in an improvement of 10%.
Other	

Sensitivity: General

Benefit	Description
Residual Value	This benefit measures the value of the QSTP at the end of the appraisal period based on the estimated asset life and a straight-line depreciation

Summary Results

Table 15 below summarises the Central Case BCR results using a 7% discount rate.

*Table **15**: Central Case, Summary Table (PV $, millions)*

Item	Summary ($, millions)
Costs (discounted)	
Construction Cost	142.80
Incremental Operational Costs	(12.29)
Benefits (discounted)	
Plant Capacity Failure [Avoided Costs]	11.96
Maturation Pond Failure [Avoided Costs]	12.27
Ecology and biodiversity protection	1.01
Recycled Water Schemes	1.49
Social Cost of Water Borne Disease	79.03
Economic Growth	4.72
Biosolid Value Added	11.19
Residual Value Profile	11.66
Receiving 10% Water Quality Change	22.81
Total (discounted)	
Total Costs	130.51
Total Benefits	**156.13**
Analysis	
NPV	25.62
BCR	1.20

Sensitivity: General

Findings

Over the 30-year appraisal period, the Project Case provided a total benefit value of $156 million against a total cost of $130 million, resulting in a BCR of **1.2** and an NPV of $26 million.

These results should not be taken as an isolated assessment and should be read in conjunction with the case for change outlined in Section 2 to gain a full appreciation of the benefits gained through the upgraded plant.

Sensitivity Analysis

Sensitivity testing was undertaken on key assumptions and inputs to reflect the inherent uncertainty associated with the Project and future conditions.

The table below summarises the sensitivity analysis tests undertaken along with the Central Case results. The analysis indicated that the Project Case returned a BCR of 1 or above under all sensitivity tests except when a discount rate of 10% or benefits of -20% are applied.

*Table **16**: Sensitivity Analysis Results*

Element	NPV ($, millions)	BCR
Central Case	25.62	1.20
Discount Rate (4%)	124.68	1.93
Discount Rate (10%)	(21.65)	0.83
Costs (-20%)	51.72	1.50
Costs (+20%)	(0.48)	1.00
Benefits (-20%)	(5.61)	0.96
Benefits (+20%)	56.85	1.44

Applying a 4% discount rate resulted in the highest BCR with a value of 1.93 while a 10% discount rate gave the lowest BCR value of 0.83.

6.3 Value Management

Value management has been undertaken throughout the lifecycle of the QSTP Upgrade Project, prior to completion of each phase of the Project.

This has included:

- Project challenge review
- Client reviews / operator review.
- DPIE independent review
- Consultation with Suppliers about value management opportunities
- Design of the upgrade allows for a future stage 2 for key structures enabling a longer lifetime.

6.4 Financial Appraisal

Drafting Note:

The financial appraisal in the remainder of this section was prepared as part of the draft Business Case published in September 2022. This has been superseded by QPRC's Integrated Water Cycle Management Strategy and Financial Plan.

A financial appraisal has been undertaken on the proposed QSTP upgrade. Per arrangements for the existing STP, the project's required revenue will be realised through levying sewage charges on households within QPRC's jurisdiction. The quantum of levies at household level will be determined under a separate analysis being undertaken by QPRC[1]. As such, the financial appraisal herein is focused on determining:

1. The aggregate annual revenue requirement for QSTP to ensure the plant can operate sustainably and without further cash injection throughout its life. The revenue requirement will be used to inform the further determination of levies to be charged to ratepayers, and which is a separate exercise from this business case, and
2. The sustainability of QPRC's proposed financing mix for the QSTP, including quantifying the equity contribution required from QPRC.

Financial vs. economic appraisal

The financial appraisal's focus is on the cash flows and funding / financing need of QSTP. It aims to determine whether the project is financially viable (i.e., that projected revenues are sufficient to cover all costs of the project during the operating phase), and that upfront project funding / financing has been properly considered.

In contrast, the economic appraisal in this business case has a wider focus on societal impacts of the QSTP.

Table 17 below summarises the main differences between the financial and economic appraisals.

*Table **17**: Comparison of focus of financial vs. economic appraisal*

	Economic appraisal	Financial appraisal
Focus	Demonstrate Value for Money and return to society of options – relative to the base case	Demonstrate affordability and funding implications
Perspective	Society	Queanbeyan-Palerang Regional Council
Flows	Benefits and costs in real terms	Revenues and costs in nominal terms
Discount rates	Real discount rate – reflects long term social opportunity cost of capital	Nominal discount rate – reflects the cost of capital of the funding entity

Approach to the financial appraisal

To align with the operating model of the existing QSTP and with QPRC's mandate, the financial appraisal was developed on the assumption of a need for full cost recovery over the assumed life of the plant. In line with existing arrangements, the project sponsor has been assumed to be QPRC.

[1] QPRC is developing the "Integrated Water Cycle Management – Strategy and Financial Plan" with assistance from GHD

Based on the above, the analysis has been centred around developing an understanding of the whole-of-life costs of the QSTP, including their quantum and timing. These costs include upfront capital costs, ongoing operating costs and the periodic costs of refurbishing or replacing any assets and equipment in line with their useful lives. Debt service obligations resulting from QPRC's proposed financing mix were also incorporated.

A fixed annual revenue requirement, which would be subject to CPI adjustment, was determined under a principle of ensuring the project should be breakeven, on a whole-of-life basis, by the end of its useful life. Analysis of resulting annual cash flow was then undertaken and adjustment made to the revenue requirement in each year where the unadjusted project cash flow was negative.

Procurement model

Per the discussion on procurement and delivery strategy as outlined in Section 7 of this business case document, the financial appraisal has been based on the assumption that the QSTP would be delivered as a traditional government project, with QPRC being the responsible agency or project sponsor. Under this approach, it has been assumed that QPRC would retain responsibility for the design, construction, financing, and operations and maintenance of QSTP.

The procurement approach considered in the financial assessment is summarised in Figure 16.

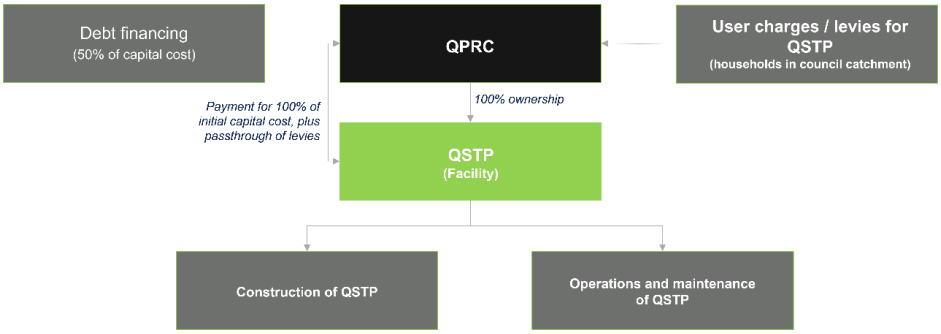


*Figure **16**: Proposed procurement model structure for QSTP*

General assumptions

The following table outlines general assumptions that were used in financial modelling of the project, such as timeline, inflation, discount rate and revenue assumptions. Detailed assumptions for capital and operating costs estimates, and associated contingencies, are outlined in Section 5, with summarised costs shown given below.

The separate IWCM analysis to determine QSTP's impact to household rates will be based on consistent assumptions.

*Table **18**: General financial appraisal assumptions*

Parameter	Value	Source
Weighted Average Cost of Capital (WACC)	5.9%	NSW Treasury 2020-21 Annual Report
Price base year	FY 2022	Current year
Model frequency	Annual (Financial year – 01 July to 30 June)	Assumption
Evaluation period	30-year operational period	Infrastructure Australia Assessment Framework
Inflation	**Revenues:** 2.14% per annum aligned to CPI **Capital and Operating cost:** 2.14% per annum aligned to CPI	NSW CPI (5-yr historical average), Australian Bureau of Statistics

Asset life and depreciation	**Civil works** have an 80-year asset lifetime, depreciated using the straight-line depreciation method. **Mechanical** and **Electrical works** have a 20-year asset lifetime, depreciated using the straight-line depreciation method.	QSTP Engineering Cost Estimate, Hunter H2O
Construction start date	01 Jan 2023	QPRC
Construction end date	31 Oct 2025	QPRC
Operations start date	01 Mar 2025	QPRC
Financing mix	Capital costs to be financed as follows: • 50% financed by debt, to be raised by QPRC, and • 50% financed by equity, to be provided by QPRC and/or state government contributions from NSW and ACT	QPRC, supported by preliminary discussions between QPRC and NSW TCorp
Interest rate on debt	5.5%	QPRC

QPRC has based this business case on financing 50% of capital costs of the project with debt to be procured through TCorp. Equity finance will comprise the remaining 50%. Subject to agreement with the NSW and/or ACT governments for co-contributions (refer Section 5.2), QPRC has access to the following funds to cover the equity requirement, totalling $83.0 million.

*Table **19**: Possible sources of funding for QPRC's equity contribution to QSTP*

Funding type	Value	Source
SSWP Business Case Grant	$3,000,000	QPRC
Section 64 Contributions	$7,500,000	QPRC
QPRC Sewer Fund	$72,500,000	QPRC

Costs

Capital costs

Construction costs and associated contingency adjustments have been derived by QPRC and its engineering consultant and are summarised in Table 20 below. Total construction costs are estimated at $143.4 million in 2022 values. Detailed discussion on the costs, how they were established, and the approach to estimating an appropriate contingency to determine a P90 estimate, is provided in Section 5.3 of this document.

Per analysis undertaken by QPRC and its engineering consultant, the construction period will be from FY2023 to FY2025, and as such construction costs have been escalated at CPI to reflect anticipated nominal capital costs. An adjustment to reflect the high labour and materials costs in the current construction market have been included in base costs outlined in Section 5.3 and CPI was therefore seen as an appropriate escalation factor to apply for the purposes of the financial appraisal.

*Table **20**: Capital and construction cost estimates*

Description	Value	Source / rationale
Direct Construction Costs	$88,880,000	QSTP Engineering Cost Estimate, Hunter H2O
Indirect Costs	$6,990,000	
Contractor's Margin	$5,580,000	

Client's Costs	$26,450,000	
Contingency (11%)	$15,480,000	
Total QSTP Construction Cost (P90) ($, 2022)	**$143,390,000**	
Escalation (@ CPI)	$10,770,000	Arup modelling
Interest During Construction (IDC)	$8,057,000	Arup modelling
Total Capital Cost (nominal $)	**$162,217,000**	

QPRC and its engineering consultant consider that construction costs are expected to be incurred in line with the following spend profile:

- 18% in FY2023
- 35% in FY2024
- 35% in FY2025, and
- 12% in FY 2026.

Goods and Services Tax (GST) has been added to the nominal construction cost of the QSTP.

It has been assumed that 50% of total capital costs would be financed by debt raised by QPRC, which in turn would incur interest charges during the project's construction term and before revenue generation commences. This would give rise to interest during construction (IDC). IDC has been calculated and added to total capital cost. This required an iterative calculation given the circular relationship between capital cost and IDC.

Total capital cost in nominal terms, including inflation and IDC, is expected to be $162.2 million.

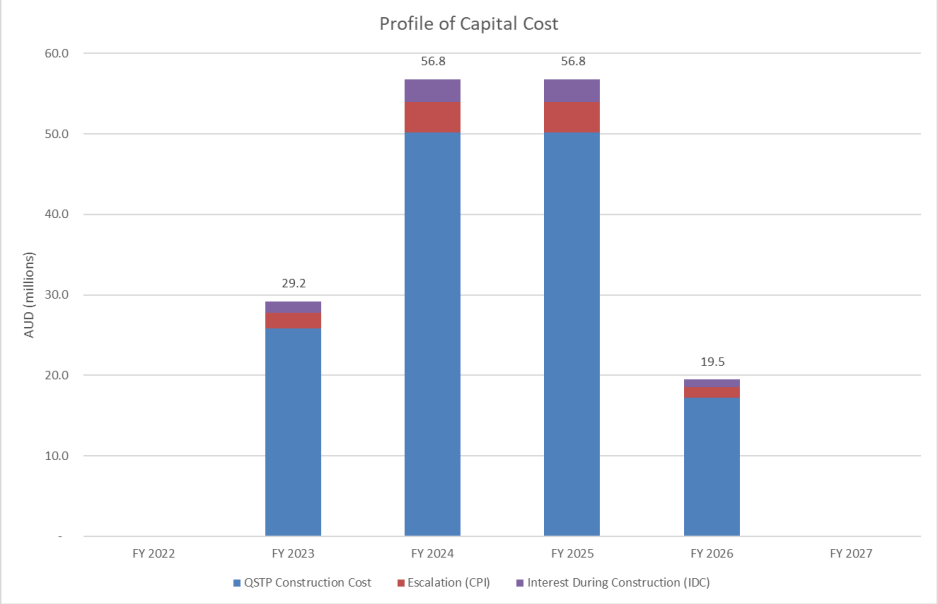


*Figure **17**: Capital cost spend profile*

Operating costs

An operating cost profile has been developed by QPRC and its engineering consultant with cost expected to increase over the operating period, in line with the projected increase in population and the resulting incoming sewage flow to the plant.

A summary of operating cost estimates is presented in Table **21** below. Note that figures in Table **21** reflect costs as at the start of the operating period in 2023, and for the purpose of the financial assessment were escalated at CPI thereafter for the remainder of the 30-year operating period.

*Table **21**: Operating cost estimates ($, 2023)*

Description	Value	Source / rationale
Power cost	$736,852	QSTP Engineering Cost Estimate, Hunter H2O
Chemicals cost	$547,667	
Biosolids cost	$541,452	
Labour cost	$240,000	
Laboratory cost	$250,000	
Civil cost	$168,885	
Mechanical cost	$270,981	
Electrical cost	$352,962	

Figure **18** below shows the anticipated operating cost profile over the 30-year operating term, which has been aligned with anticipated population growth in the QPRC catchment.

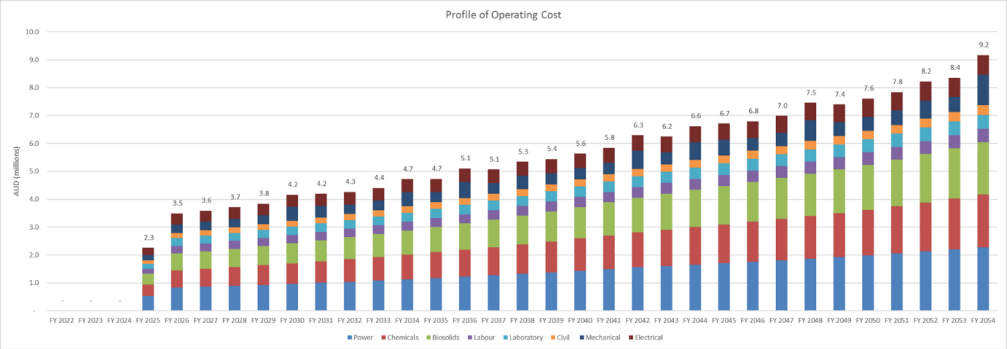


*Figure **18**: Profile of Operating Costs*

Power, Chemicals and Biosolids in aggregate represent approximately 65% of QSTP's total annual operating cost. Operating costs are estimated at approx. $3.5 million in FY2026, the first full year of operations, growing to $9.2m by FY2054 from a combination of cost escalation and growth in underlying population. The aggregate nominal operating cost across the model period is $171.5m.

Lifecycle replacement costs

The equipment and assets that make up the QSTP are anticipated to require periodic replacement at regular intervals. QPRC and its engineering consultant estimate that a series of minor replacement works ranging from every one to seven years will be required as summarised in the top part of Table **22**. In addition, a significant lifecycle cost associated with replacement of mechanical plant will be required in FY2045, around 20 years into the operating term, as shown in the lower part of Table **22**.

*Table **22**: Lifecycle replacement cost estimates ($, 2022)*

Description	Value and frequency	Source / rationale
Lifecycle replacement costs		
UV lamp cost	$151,296 every 6 year(s)	QSTP Engineering Cost Estimate
UV Service cost	$10,278 every 1 year(s)	QSTP Engineering Cost Estimate
Diffuser Membranes cost	$63,920 every 7 year(s)	QSTP Engineering Cost Estimate
Blower Filters cost	$12,656 every 1 year(s)	QSTP Engineering Cost Estimate
Inlet Works cost	$12,877 every 1 year(s)	QSTP Engineering Cost Estimate
Centrifuge – minor cost	$11,000 every 2 year(s)	QSTP Engineering Cost Estimate
Centrifuge – major cost	$31,000 every 5 year(s)	QSTP Engineering Cost Estimate
Clarifier and WAS Thickener cost	$4,800 every 2 year(s)	QSTP Engineering Cost Estimate
Major lifecycle replacement cost		
Mechanical plant replacement cost	$25,277,135 ($ nominal) in FY 2045	QSTP Engineering Cost Estimate

Total lifecycle replacement costs are estimated at $28.7 million across the 30-year operating term, with mechanical replacement reflecting the majority of this, at $25.3 million in FY2045.

CPI escalation has been applied to the above costs in line with estimated timing of spend.

Figure 19 and Figure 20 below show the anticipated spend profile (quantum and timing of spend) for each of the replacement cost items in Table 20.

*Figure **19**: Profile of lifecycle replacement costs*

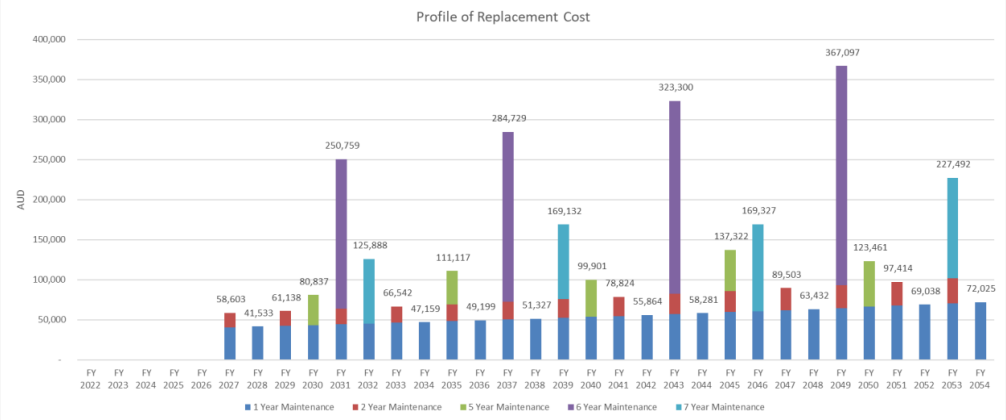
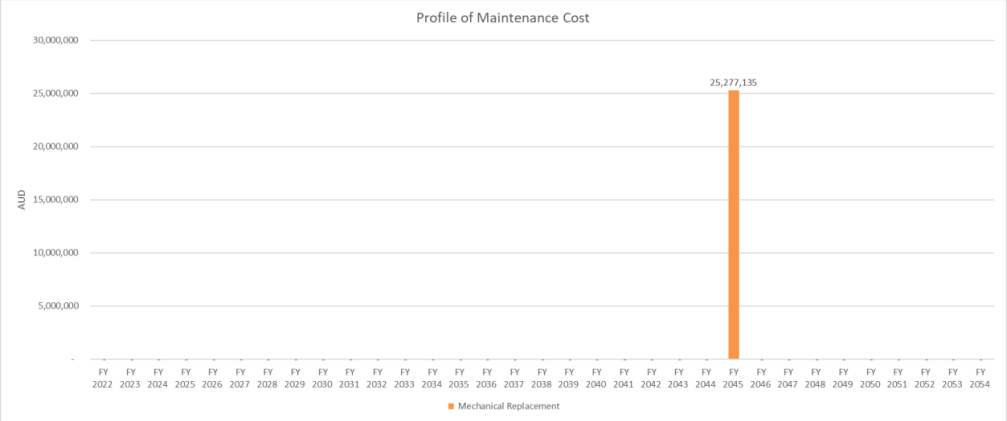


*Figure **20**: Profile of Maintenance Costs*



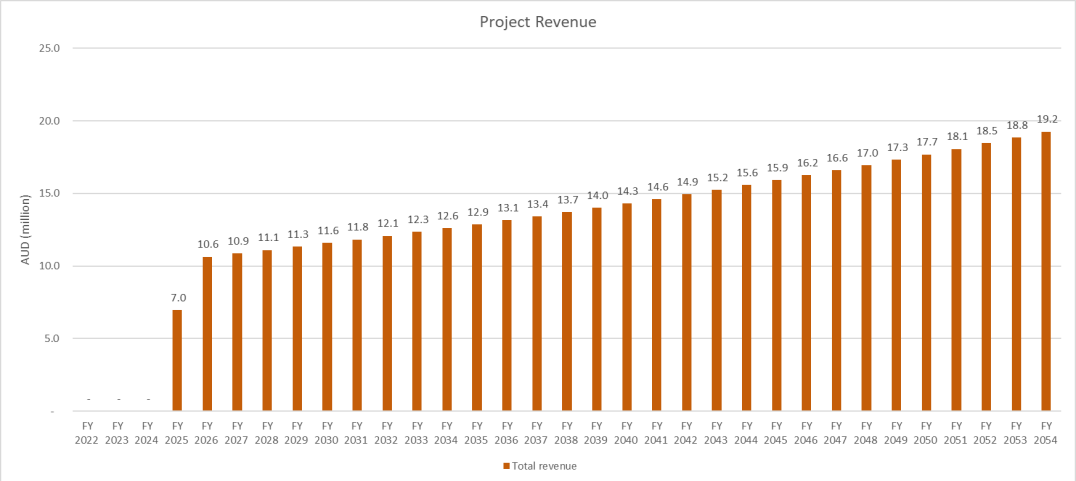
Revenue requirement

The approach to the financial appraisal was to determine the revenue required to cover all costs of the project, including debt service. QPRC has advised no return would be required on its equity contribution.

Therefore, the financial model was used to solve backwards for a year one revenue, that when escalated at CPI over the operating term, would meet all project costs as outlined in the preceding sections, and result in a net cumulative cash position of zero.

Under this scenario, required revenues would be approx. $10.6 million (nominal) in FY2026, being the first full year of operations, escalating to $19.2 million by FY2054. See Figure **21** below.

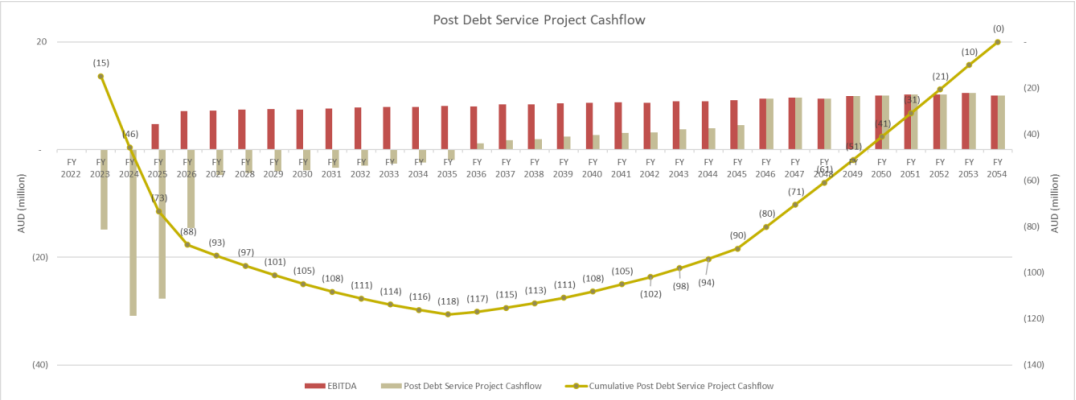
*Figure **21**: Revenue across model period*



However, in looking at year-on-year post debt service cash flows of the project under this revenue scenario, the first several years of the QSTP's operating period would see negative cash flow outcomes which would not be practically sustainable. Figure **22** below demonstrates this.

*Figure **22**: Post debt service nominal and cumulative cash flow*

Sensitivity: General

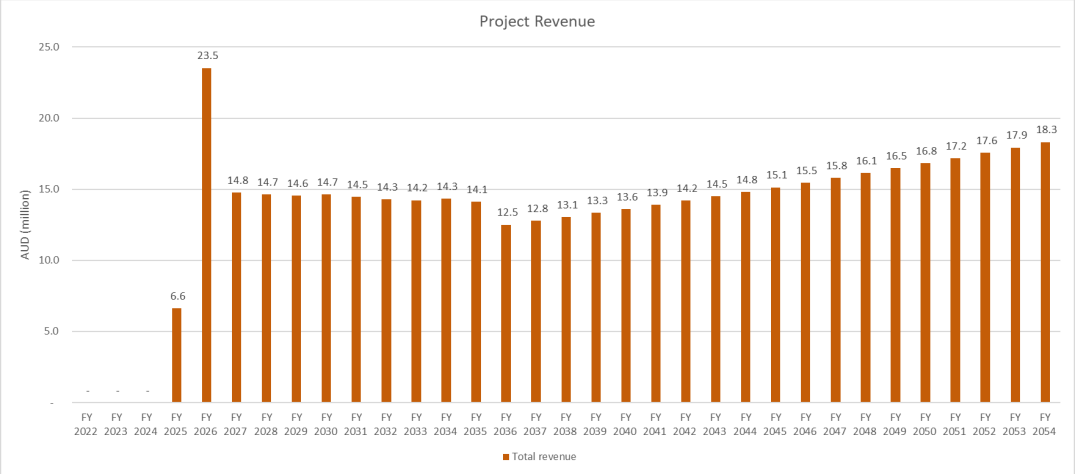


The cumulative negative cash flow during the operating period based on this revenue scenario is anticipated to be approx. $31.9 million. If additional upfront funding was available to the project in this amount (e.g., by way of a capital grant), then no further adjustment to revenue would be required.

In the absence of an upfront grant, an uplift was applied to revenues between FY2025 and FY2035 to ensure a minimum breakeven cash position was achieved across these years.

Figure 23 shows the revised required revenue profile after an adjustment is applied to the first 10 years of operations. Unless otherwise financed by QPRC, household levies would likely be higher in the QSTP's first 10 years as a result, then reduce over time as the revenue adjustment is no longer required and as the number of households in the QPRC catchment grows over time.

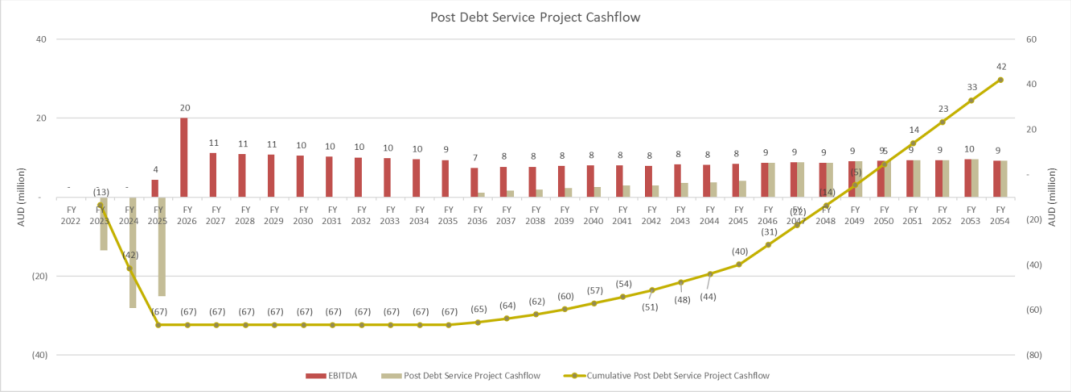
*Figure **23**: Revenue across model period – uplift across FY2025 and FY2035*



The resulting post debt service cash flow is shown in Figure **24** and demonstrates the project would not generate negative cash flow during the operating period.

*Figure **24**: Post debt service nominal and cumulative cash flow – after applying revenue adjustments in first 10 years*

Sensitivity: General



Given upwards revenue adjustments in the first 10 years of operations, the project would accumulate approximately $42 million of cash by the end of the 30-year operating term. While it would be possible to reduce rates (and therefore project revenue) in the final 10 or so years to achieve an aggregate project cash flow position of zero, it may be prudent to allow the project to generate this anticipated surplus to provide ability to deal with any risk events that may occur, or else to undertake necessary lifecycle upgrades required at or soon after FY2054.

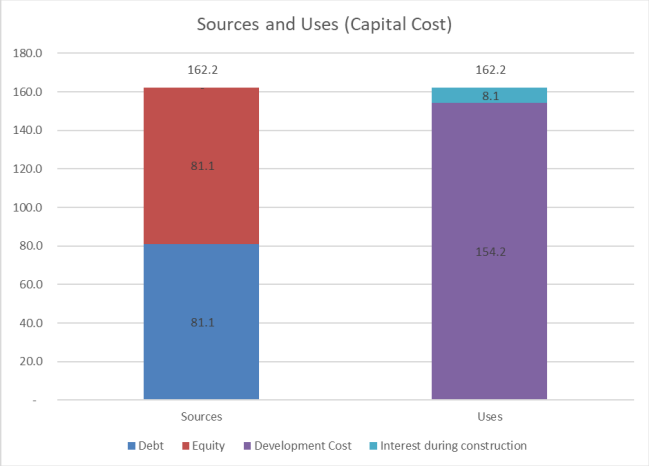
Outcomes of financial appraisal

The total capital cost for this project is estimated at $162.2 million with the equity portion of 50% amounting to $81.1 million.

The project would need to generate aggregate revenues of $449.8 million over its life, realised through levies charged to households in the QPRC catchment, in order to cover all operating expenses, lifecycle replacement costs and debt service obligations.

There may be opportunity to reduce the revenue requirement and resulting household rates. Specifically, in the event funding from the NSW and ACT governments is made available, QPRC would be able to reduce the amount of upfront debt financing employed. This in turn would reduce the associated debt service obligations during the operating term, resulting in lower required revenues and lower rates to households in the QPRC catchment.

*Figure **25**: Sources and uses of financing*



Sensitivity analysis

Due to the early stage of project development, a detailed sensitivity analysis has been completed to understand the impact that uncertainties around the project and its parameters may have.

Table **23** summarises the sensitivity analysis undertaken with respect to the Base Case, as presented above (Figure **24**), and applying a WACC of 5.9%. The analysis demonstrates the project's revenue requirement and funding shortfall are most sensitive to movements in capital costs.

*Table **23**: Sensitivity analysis ($ nominal, unless otherwise stated)*

Sensitivity	Project NPV	FY2025 revenue	FY2026 revenue	Aggregate revenue	Funding shortfall
Central Case	($57.2m)	$6.6m	$23.5m	$449.8m	$0.0m
WACC (+2%)	($67.9m)	$6.6m	$23.5m	$449.8m	$0.0m
WACC (-2%)	($37.7m)	$6.6m	$23.5m	$449.8m	$0.0m
Capital Costs (+20%)	($69.1m)	$7.4m	$27.5m	$505.4m	$14.3m
Capital Costs (-20%)	($45.3m)	$5.9m	$19.6m	$394.1m	$0.0m
Maintenance and Operating Costs (+20%)	($56.8m)	$7.2m	$24.3m	$484.1m	$0.0m
Maintenance and Operating Costs (-20%)	($57.6m)	$6.0m	$22.8m	$415.4m	$0.0m

6.5 Financial Impact Statement

QPRC has prepared a draft Integrated Water Cycle Management (IWCM) Plan for Queanbeyan. The NSW IWCM strategic planning instrument provides a framework for Council to determine long-term strategic planning for water and wastewater management. The IWCM only addresses the QSTP catchment of the former Queanbeyan City Council (QCC) local government area (LGA) as the Palerang LGA already has separate IWCM strategies.

The IWCM includes a financial analysis to assess the impact of the proposed water and sewer capital expenditure programs on the financial position of the Council over a twenty-year period. The IWCM financial analysis identifies the impact to the water and wastewater typical residential bill (TRB) to deliver the service. The analysis also considers the forecast cashflow and account balances under external funding scenarios for 0%, 25% and 50% for specific QSTP asset support only.

The IWCM recommends that:

- 25% grant funding sought QSTP upgrades in 2023/24 and 2024/25 in addition to the $2.7m already granted for 2022/23
- Loan funding of $40m over the two-year period 2023/24 and 2024/25
- Rate increases budget for across two stages;
- Initial increase of 6.5% for six years.
- Balance (14 years) annual rate increase aligned to consumer price index (2.5%).

A Financial Impact Statement (FIS) for the proposed funding model is displayed figureTable **24** below. This statement aims to ascertain the budget impact for the current financial year and five subsequent forecast financial years. It is based on the impacts to the entire sewer fund.

In interpreting the FIS, the following should be noted:

- All monetary values are escalated (i.e. reflect nominal values)
- 'Future years' are for the period FY2023 to FY2041
- The profile of project costs in forecast years is subject to change in line with actual population growth in QPRC's catchment
- All project costs include contingency and reflect P90 outcomes, and

Sensitivity: General

- Depreciation costs have not been included as this is a non-cash item.

Table 2 *Recommended Sewer funding scenario*

Sewer Scenarios	Recommended Scenario
	25% Grant request, $40m Loans
Opening Balance - Section 64	$7,000,000
Opening Balance - Sewer Fund	$58,000,000
Interest Rate - Debt	6.00%
Interest Rate - Earnt	1.00%
Loan Term (years)	20
Rate increases	6yrs/0 yrs/14 years
Rate Increase - Initial period	6.50%
Rate Increase - second period	
Rate increases - balance of 20 years	2.50%
CPI - Sewer	2.50%
Capital cost CPI (CPI+Margin	1.00%
Grant Funding - Percentage ask of eligible	0.00%
Grant Funding - Net Percentage	16.72%

	Grant Funding	Loan Funding	Closing Balance
2021/22	0	0	59,604,903
2022/23	2,700,000	0	70,493,332
2023/24	17,648,432	20,000,000	44,233,581
2024/25	18,543,306	20,000,000	13,879,918
2025/26	0	0	11,502,257
2026/27	0	0	17,206,724
2027/28	0	0	8,949,438
2028/29	0	0	18,032,995
2029/30	0	0	27,566,075
2030/31	0	0	15,562,936
2031/32	0	0	11,402,223
2032/33	0	0	6,191,701
2033/34	0	0	10,440,744
2034/35	0	0	23,269,450
2035/36	0	0	36,733,177
2036/37	0	0	51,827,066
2037/38	0	0	61,502,430
2038/39	0	0	77,556,785
2039/40	0	0	94,338,828
2040/41	0	0	113,318,603
	$38,891,738	$40,000,000	

Sensitivity: General

*Table **24**: Financial Impact Statement ($m nominal, reflects P90 costs)*

	FY 2021-22	FY2022-23	FY2023-24	FY2024-25	FY2025-26	FY2026-27	Future years beyond FY2027-28	Total
Operating								
Maintenance Cost [1]	-	-	-	-	-	($0.1m)	($28.6m)	(28.7m)
Depreciation [2]	-	-	-	-	-	-	-	-
Third Party Assets [3]	-	-	-	-	-	-	-	-
Other Operating Expenses [4]	-	-	-	($2.3)	($11.2m)	($12.7m)	($284.4m)	($310.6m)
Revenue (if any) [5]	-	-	-	$7.0m	$25.2m	$15.6m	$425.4m	$473.2m
Net operating Expenditure [6] = (1+2+3+4 - 5)	-	-	-	$4.7m	$14.0m	$2.8m	$112.4m	$133.9m
Funding provisions (budget) [7]	-	-	-	-	-	-	-	-
Surplus/(Shortfall) - Operating [8] = (7-6)	-	-	-	$4.7m	$14.0m	$2.8m	$112.4m	($33.5m)
Capital								
Is the project Tier 1 rating?								
Project Costs [9]	-	($29.7m)	($61.7m)	($64.7m)	($22.3m)	-	-	($178.4m)
Contingency [10]	-	-	-	-	-	-	-	-
Savings/Benefits [11]	-	-	-	-	-	-	-	-

Sensitivity: General

	FY 2021-22	FY2022-23	FY2023-24	FY2024-25	FY2025-26	FY2026-27	Future years beyond FY2027-28	Total
Net Cash flow Required (12) = (9+10 -11)	-	($29.7m)	($61.7m)	($64.7m)	($22.3m)	-	-	($178.4m)
Confund (13)	-	-	-	-	-	-	-	-
Restart/Rebuild NSW (14)	-	-	-	-	-	-	-	-
Approved/Released (14a)	-	-	-	-	-	-	-	-
Reservation (14b)	-	-	-	-	-	-	-	-
SIC or HAF (15)	-	-	-	-	-	-	-	-
Existing State funding provisions (16) = (13+14+15)	-	-	-	-	-	-	-	-
Existing Federal Funding (17)	-	-	-	-	-	-	-	-
Others including Local Government (18)	-	$29.7m	$61.7m	$64.7m	$16.1m	-	-	$172.2m
Total Existing funding provisions (19) = (sum of 16 to 18)	-	$29.7m	$61.7m	$64.7m	$16.1m	-	-	$172.2m
Surplus/(Shortfall) - Capital (20) = (19-12)	-	-	-	-	($6.2m)	-	-	($6.2m)
Total Surplus/(Shortfall) (21) = (8+20)	-	-	-	**$4.7m**	**$7.8m**	**$2.8m**	**112.4m**	**$127.7m**

7. COMMERCIAL ANALYSIS

7.1 Procurement and Delivery Strategy

A Procurement Plan for the project was prepared in June 2020 as part of the PLAN phase of project delivery and has been reviewed as the project progressed. The Procurement Plan considered alternative delivery systems that were suitable for the characteristics and risks of delivering this project. The adopted procurement strategy is summarised in Table 25.

The key features of the procurement strategy are:

- The project will predominantly be delivered using a single contract using a Design – Bid – Build delivery approach.
- A Detailed Design will be prepared to document the project technical requirements and facilitate review by regulatory stakeholders
- The project will be delivered using a Construct Only contract using a Principal Contractor
- Council undertake early engagement with suppliers and award contracts for supply of equipment without installation for key equipment with equipment to be installed by the Principal Contractor
- Council will nominate subcontractors in selected specialist areas to be engaged and managed by the Principal Contractor
- New South Wales Government GC21 General Conditions of Contract will be used for the contract
- Council will invite open Expressions of Interest for the purpose of establishing a list of three prequalified tenderers (with a reserve) who will be invited to tender for the Construct Only contract.
- The prequalified tenderers will participate in an Early Tender Involvement process consisting of a small number of briefing workshops to ensure appropriate allocation of risk (technical and commercial) and address constructability issues.
- Tenders for the Construct Only contract will be evaluated based on price and non-price evaluation criteria.
- Equipment supply contracts will be novated to the Principal Contractor
- Contract supervision and technical support by QPRC and Hunter H2O.

Table 25: Summary of the QSTP procurement strategy

	Item	Adopted Strategy
Design	Contract system	Detailed design and construct only by a principal contractor
	Equipment selection	QPRC will use an early vendor engagement approach to select key equipment for the works: • An open tender will be used to invite tenders for key equipment packages • Equipment suppliers will be engaged using AS 4911 General conditions of contract for the supply of equipment without installation • Suppliers will provide certified equipment data that will be included in the design and operating system for the plant • Equipment supply contracts will be novated to the principal contractor under the construction contract for installation, testing and commissioning.
	General conditions of contract	GC21
Tender	Tendering	2-stage tender with an EOI to establish a panel of prequalified contractors who will be invited to submit tenders for construction of the works.

		A targeted early tenderer involvement (ETI) phase will be held prior to requesting a priced tender. The ETI phase is to assist briefing selected tenderers on the works and to ensure appropriate allocation of technical and commercial risk and address constructability issues.
Construction	Staging / early works	There are opportunities for early work. Identified early works packages that provide advantage to QPRC: • Equipment Supply Packages (noted above) – there is opportunity for QPRC if required to accelerate program by commencing fabrication of key equipment. • Realignment of High Voltage power lines • Installation of upgrade to ICON potable water supply • Removal of existing waste and asbestos from site • Service diversions (water/communications/broadband)
	Subcontractors	Consideration will be given to nominating a limited number of subcontractors where there is overall advantage to the project, for example: • Pre-approval of a panel of concrete providers • Nomination of QPRC telemetry provider panel • Nomination of specialist subcontractors such as protective coatings
	Construction resources	Construction contract supervision, quality control, inspections and engineering support. Training and commissioning support.

Early Vendor Engagement

As part of the procurement strategy, QPRC will use an early vendor engagement approach to select key equipment that will form part of the ungraded sewage treatment plant. This approach gives QPRC control over the selection of equipment that they will own and operate and provides an open and competitive procurement process for equipment suppliers.

As part of the early vendor engagement approach:

- Procurement for key equipment packages will be undertaken in accordance with QPRCs Procurement Policy by either an open tender or Request for Quotation
- QPRC will assess equipment supply tenders and select equipment suppliers
- Equipment suppliers will be engaged by QPRC using AS4911 General Conditions of Contract for the Supply of Equipment Without Installation
- Suppliers will provide certified equipment data for the selected equipment that will be incorporated in the detailed design and operating system for the plant
- Equipment supply contracts will be novated to the principal contractor under the construction contract for installation, testing and commissioning.

The equipment supply packages identified for early vendor engagement are identified in Table 26. QPRC has already entered into several of these contracts.

Table 26: Early vendor engagement equipment supply packages

Proposed Equipment Supply Package	Procurement Method	Status
Screening and screening washing equipment	Open tendering	Contract awarded to Hydroflux Epco Pty Ltd
Grit removal and grit washing equipment	Open tendering	Contract awarded to VoR Environmental Australia Pty Ltd
Bioreactor and digester aeration, mixer systems and air scour blowers equipment	Open tendering	Contract awarded to Xylem Water Solutions Australia Limited
Clarifier equipment	Open tendering	Contract awarded to Hydroflux Epco Pty Ltd
Scum harvester equipment	Open tendering	Contract awarded to VoR Environmental Australia Pty Ltd
UV disinfection equipment	Open tendering	Contract awarded to Xylem Water Solutions Australia Limited
WAS thickener equipment	Open tendering	Contract awarded to Hydroflux Epco Pty Ltd
Chemical dosing skid equipment	Open tendering	Contract awarded to Trility Solutions Australia Pty Ltd
Centrifuge equipment	Open tendering	Contract awarded to GEA Westfalia Separator Pty Ltd
Lime silo and dosing equipment	Open tendering	Not yet advertised
Chemical storage tanks	3 written quotes via formal RFQ process. May be publicly advertised.	Not yet advertised
Diesel storage and conditioning system	3 written quotes via formal RFQ process. May be publicly advertised.	Not yet advertised

8. PROJECT MANAGEMENT

8.1 Project Management, Program and Milestones

Project framework

The Project is being delivered in accordance with QPRC's Project Framework. The Project Framework is consistent with a gateway approach to project delivery with completion of the project in five phases as outlined in Figure 26. The initial phases of Identify and Plan have been completed and work is proceeding on the Develop phase.

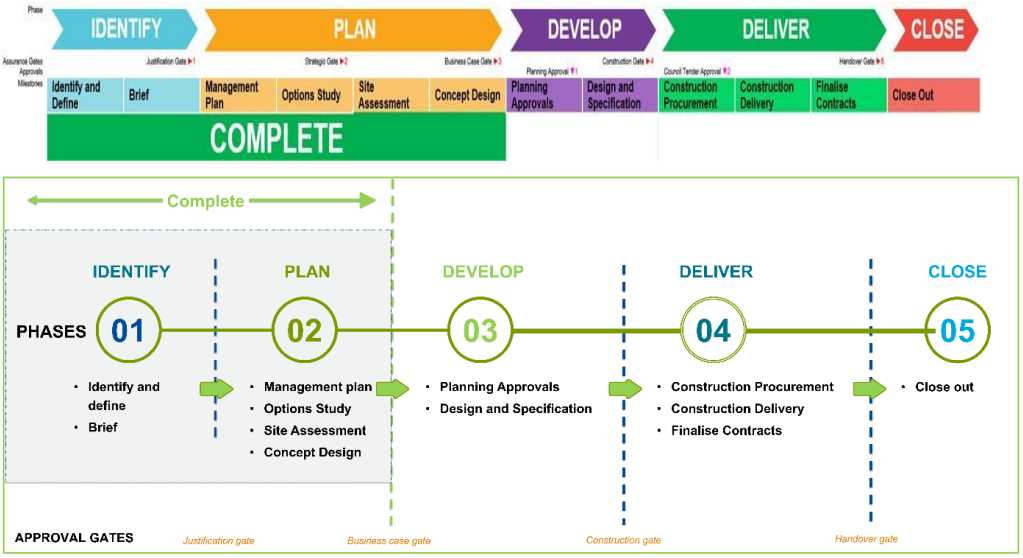


Figure 26: Project stages and progression

Figure 27 provides further details of the current project activities. The project is currently seeking planning approval for the Environmental Impact Statement (EIS) and completing detailed design and tender documentation to enable construction tendering to commence.

Sensitivity: General

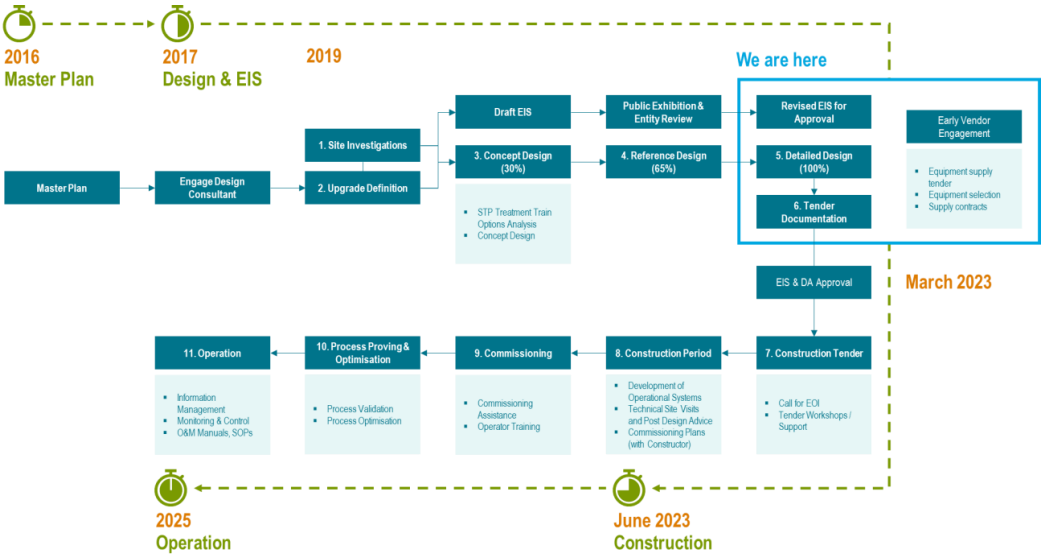


Figure 27: Project Activity Timeline

Milestones

Major project milestones are shown in Table 27.

Table 27: Project milestones

Project Milestones	Target Completion Date	Completion Date
Concept Design complete		Jun 2020
Environmental Impact Statement (EIS)		
Draft EIS submission		Dec 2020
Revised EIS submission		Apr 2022
EIS approval	Feb 2023	
Detailed Design and Tender Documentation complete	Mar 2023	
ACT UTR D&C Operating Certificate issued	Feb 2023	
Development Application approval	May 2023	
NSW DPE Section 60 approval	Apr 2023	
ISC Design Rating obtained	Jun 2023	
Construction Contract award	Apr 2024	
Plant commissioning complete	Sep 2025	
ACT UTR Provision of Service Operating Certificate issued	Mar 2026	
Maturation pond decommissioning, landscaping and project completion	Jul 2026	
ISC As-built Rating obtained	Aug 2026	

Construction phase resource plan

The construction of the QSTP upgrade will be undertaken by a Principal Contractor. QPRC's Projects and Contracts team will manage the construction phase with contract management and technical support from consultants. QPRC's Utilities team will continue to operate the existing QSTP throughout construction and will participate in training and commissioning of the new facility.

QPRC's resource plan for the construction and commissioning phase is summarised in Table 28.

Table 28: Construction phase resource plan

Role	Tasks	Resource	Timing
Project Management	• Project management • Project reporting • Consultant contract administration • Coordination with Regulators • Coordination of stakeholder and community engagement • Coordination with internal QPRC functions	QPRC QSTP Project Manager	Duration of construction
Principal's Senior Executive	• Input to GC21 contract requirements as required	QPRC Manager, Contracts and Projects	Duration of construction
Principal's Approved Person (PAP)	• Contract management – management of the GC21 contract on behalf of the Principal. • Manage communications, RFI, meetings, issuing instructions, release of hold points • GC21 monthly meeting and minutes • Assessment of payment claims etc. • Progress reporting	QPRC and consultant resources	Duration of construction
Project/Contract Administration Support	• Administration • Record keeping	QPRC and consultant resources	Duration of construction
Site Engineer	• Assist PAP	QPRC and consultant resources	Duration of construction
Site Surveillance	• Site surveillance and records	QPRC and consultant resources	Duration of construction
Survey	• Record construction progress • Review of Contractor survey submissions • Input to works as executed documentation	Consultant / Subcontractor	Duration of construction
Existing STP Operations Liaison	• Coordinate interface with existing operation • Site access to existing STP • Interruptions to service • Input to selected RFI	QPRC – Utilities Team	Duration of construction

Role	Tasks	Resource	Timing
	• Review of cut-over plans / commissioning • Coordination of attendance of operator training • Preparation for asset handover to operations team		
Owner's Engineer	• Site liaison with QPRC contract management • Verification that construction conforms to the design • Change management • Respond to contractor RFI • Clarifications / advice • Attend GC21 monthly meetings • Visual records / dilapidation • Management of ISC data • Review of shop drawings • Witness hold-point inspections • Factory acceptance testing • Site acceptance testing • WAC – As built drawings	Hunter H2O through existing contract	Duration of construction
Testing and Commissioning Decommissioning of existing STP	• Prepare commissioning plan • Witness the testing and pre-commissioning by Contractor • Facilitate proof of performance testing • Assist in process optimisation • Oversight of decommissioning of the STP • Training	Hunter H2O commissioning team QPRC operations staff Contractor resources (leading hand, mechanical, electrical, automation)	Testing and pre-commissioning during construction Commissioning (3-4 month cut-over, commissioning & proof of performance period)

8.3 Project Governance

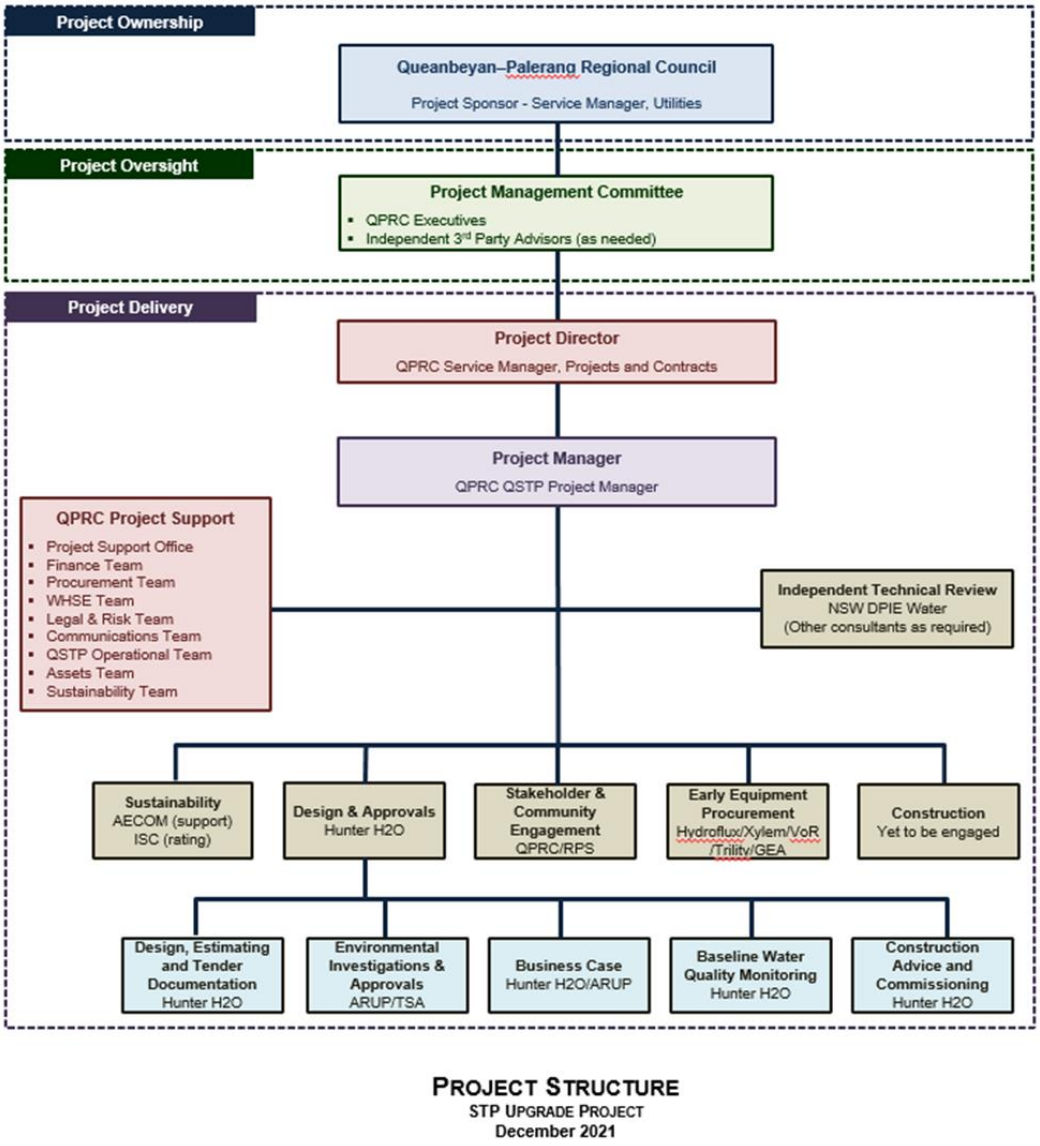


Figure 28: Project governance structure

Figure 28 illustrates QPRC's governance structure for the project.

QPRC's Service Manager Utilities is responsible for the delivery of sewer services including operation and maintenance of the Queanbeyan STP and management of the Queanbeyan sewer fund. The Service Manager Utilities holds the role of Project Sponsor. As Project Sponsor, the Service Manager Utilities is responsible for directing the scope and requirements of the project and approving acceptance of assets within this area.

Project delivery is provided by QPRC's Contracts and Projects service area, who have appointed a Project Director and Project Manager for project delivery.

QPRC has engaged several consultants to assist in delivering the project. These engagements include:

- Hunter H2O to complete the QSTP upgrade design, approvals, technical construction input and commissioning
- AECOM to oversee the ISC design and as-built ratings submissions
- RPS to assist with community engagement.

QPRC will also engage a competent contractor for QSTP upgrade construction.

A Project Management Committee provide oversight of the project including reviewing progress, project issues and changes.

The ACT Utilities Technical Regulation requires QPRC to appoint an Independent Certifier for the project. The NSW Department of Planning and Environment Water Group has agreed to fulfil this role in parallel with their technical review role as part of the NSW Local Government Act Section 60 approval process.

Project roles and responsibilities are further detailed in Table 29.

Table 29: Project roles and responsibilities

Role	Personnel	Responsibilities
Queanbeyan-Palerang Regional Council	Councillors (via Council Meeting)	• Approve budget and funding • Approve engagement of service providers (consultants / contractors) engaged by tender • Approval of dealings in land
Project Management Committee (PMC)	Council Executive	• Reviewing and approving project deliverables where required by the Project Framework • Approve project budget allocation • Approve gateway and hold point release recommendations • Point of escalation for matters raised by Project Director • Resolve issues outside the Project Director's delegated authority
QPRC Project Sponsor	Service Manager – Utilities, Gordon Cunningham	• Endorsing the project scope definition • Endorsing changes to the project scope • Endorsing the Basis of Design • Reviewing deliverables • Liaising with regulators • Approving asset acceptance process (for assets within their control)

Role	Personnel	Responsibilities
QPRC Project Director	Service Manager – Projects and Contracts, Derek Tooth	• Overseeing delivery of the Project in accordance with QPRCs Project Framework and the QPRC Project Sponsor's requirements • Monitoring project performance • Establish project delivery structure and strategy • Establish project goals and KPIs • Facilitate gateway and hold point reviews and recommend release • Approve communications with external stakeholders and community • Approve project expenditures and cash flow • Approve changes to delivery strategy / approach, scope, schedule, budget • Ensure project controls are implemented and maintained (time, cost, quality, risk) • Approve acceptance of project deliverables (on recommendation by Project Manager) • Point of escalation for matters raised by Project Manager • Resolve issues outside the Project Manager's delegated authority

Sensitivity: General

Role	Personnel	Responsibilities
Project Manager	QSTP Project Manager, Simon Boulton	• Delivering the project in accordance with the requirements of the Project Framework and the Project Management Plan • Focal point of all communication • Ensuring that the Project Sponsor, Project Director and PMC are consulted in accordance with the requirements of the Project Framework • Prepare risk-based project budgets and submit for review and approval • Procure service providers as needed • Administer service provider contracts • Ensure service providers comply with Council policies (including Environment, QA, WHS, Sustainability, Procurement) • Undertake audits and reviews in compliance with approved assurance plans • Approve tender evaluation reports and prepare report to Council for resolution • Plan, coordinate, oversee service provider inputs (timetable, cashflow, outputs etc) • Prepare, implement and manage the approved risk management plan • Oversee (as needed) third party technical reviews • Review and recommend endorsement (acceptance) of project outputs • Monitor and report project progress performance to the Project Director • Prepare gateway and hold point release documents • Prepare regulator approval applications / documents • Oversee / coordinate sustainability reviews • Oversee / coordinate stakeholder and community engagement • Ensure project achieves appropriate sustainability outcomes • Ensure project outputs comply with approved objectives and KPIs
Key QPRC Project Support Staff	Sponsor Representative Utilities, Brenden Belcher Sponsor Representative Operations, Victoria Corling Assets Specialist, Andrew Grant Sustainability Project Officer	• Providing speciality support to the team • Reviewing and advising on Design • Reviewing and advising on assets acceptance process • Reviewing and advising on proposed changes in scope • Providing advice from the IWCM to support the project Business Case • Assisting with the provision of information to support the sustainability ratings

Role	Personnel	Responsibilities
Design, Approvals, Technical Construction Input and Commissioning	Hunter H2O	Design consulting services including: • Site Investigations • Basis of Design • Concept Design • Reference Design • Detailed Design • Regulatory Approvals • Tender Documentation • Tender Period Services • Construction Phase Services • Baseline Water Quality Monitoring
Sustainability Rating Authority	Infrastructure Sustainability Council	• Provide Design and As-Built sustainability ratings assessment
Sustainability Rating Support Services	AECOM	• Assist and advise QPRC to obtain Infrastructure Sustainability Council Design and As-Built ratings
Independent Technical Review	NSW DPE, Water - Utilities	• NSW Section 60 approval • Independent Certifier for the ACT Utilities Technical Regulator Design and Construct Operating Certificate
Community Engagement Consultant	QPRC Engagement Team assisted by RPS	• Undertake community engagement activities as directed by the Project Manager • Maintain complaints register • Maintain project website • Provide customer service first point of enquiry • Prepare and assist in implementing the Stakeholder and Community Engagement Plan • Provide progress reports as directed by the Project Manager
Contractor	TBA	• Construct the works, including completing any design, as required • Provide progress reports as directed by the Project Manager

8.4 Asset Ownership and Management Plan

Asset Management

The project is being delivered in accordance with QPRCs Asset Management Policy, Capital Work Projects Asset Information Requirements Directive and Sewerage Asset Management Plan.

The key elements of infrastructure asset management identified in the Sewerage Asset Management Plan are:

- Taking a life cycle approach
- Developing cost-effective management strategies for the long term
- Providing a defined level of service and monitoring performance
- Understanding and meeting the demands of growth through demand management and infrastructure investment
- Managing risks associated with asset failures
- Sustainable use of physical resources
- Continuous improvement in asset management practices.

Additionally, QPRC is giving consideration to the following elements in delivering this project:

- Whole of life costs, including option, equipment and materials selection
- Deconstruction, disassembly and adaptability of infrastructure in the future
- Robustness and reliability
- Compatibility with QPRCs existing fleet
- Ability of QPRC to operate equipment.

The project will produce the following deliverables to assist with management of the assets in the future:

- Decommissioning plan for the existing STP
- Operation and maintenance manuals for the new STP, including operator training
- Work as executed documentation, including an asset schedule and capitalisation costs
- Deconstruction plan for the new STP.

Assets

The asset register in Table 30 shows details of the asset owner, operator and maintainer for all assets delivered through this project. The register also identifies assets that will be retired as a result of the project.

QPRC are the owners, operators and maintainers of the existing QSTP and will be for the proposed QSTP upgrade.

Assets that will be retired as part of the project include the three maturation ponds located within the extents of the 1% annual exceedance probability (AEP) flood zone and are at risk of failure during flood events. The maturation ponds will not form part of the treatment process once the new treatment plant has been constructed and commissioned. As part of the upgrade project, it is proposed that the ponds (and their associated equipment) are decommissioned, and the area remediated to extend the riparian zone along the Molonglo Riverbank.

All current infrastructure associated with the existing STP will also be retired following commissioning of the new STP and deconstructed in a subsequent project. The land made available through the later decommissioning of the existing STP will be earmarked for an additional storm pond during a planned, future plant expansion.

The project impacts assets owned by others, including roads owned by the ACT Government, the electricity network infrastructure owned by EVO Energy and the potable water supply owned and operated by ICON Water.

Table 30: Asset register showing new and retired assets

Asset	Owner	Operator	Maintainer
New or upgraded assets			
Sewage Treatment Plan, including treatment process, roads, buildings, services, utilities and landscaping	QPRC	QPRC	QPRC
HV Electricity Network	Evo Energy	Evo Energy	Evo Energy
Upgraded Mountain Road (road reserve)	ACT Government (TCCS)	ACT Government (TCCS)	ACT Government (TCCS)
Upgraded Mountain Road (within proposed lease boundary)	QPRC	QPRC	QPRC
Nimrod Road (within proposed lease boundary)	QPRC	QPRC	QPRC
200mm potable water main to meter	ICON Water	ICON Water	ICON Water
Retired Assets			
Existing STP, including buildings and treatments processes	QPRC	n/a	n/a
HV electricity network	Evo Energy	n/a	n/a
Electricity supply to existing STP	QPRC	n/a	n/a
100mm potable water main to meter	ICON Water	n/a	n/a

8.5 Stakeholder Management Plan

QPRC has recognised the importance of engaging with its communities to deliver services and infrastructure, and collaboratively plan for the future. The *QPRC Sewage Treatment Plant Upgrade Project Stakeholder Communications and Engagement Plan* (RPS, 2022) has been prepared to set out the strategic approach the communications and public engagement tasks required to support the design, selection and commissioning of the upgraded STP. The plan ensures appropriate information and opportunities to contribute to project outcomes are available at each stage. The plan provides detailed action plans for each stage of the project that describe the audiences, tools, key messages, risks and timetable for delivering communications and engagement activities. The QPRC Community Engagement Team will oversee and approve the development of the detailed action plans. The plan will be revised and updated at critical project milestones to reflect feedback and learning from engagement activities.

Stakeholders

People, organisations and agencies who are directly or indirectly impacted by the project as well as agencies and institutions with regulatory or decision-making roles for the project and are presented in Table 31 and Table 32.

Table 31: External Stakeholders

Stakeholder	Interests or impacts arising from project
Political	
Federal Member Eden Monaro State Member for Monaro Mayor and Councillors QPRC Funding providers ACT Government	• Progress of the STP project • Management of community feedback and complaints • Ministerial requests relating to the project
Federal Government	
National Capital Authority	• Manages the water surface of Lake Burley Griffin and perimeter areas on National Land such as Commonwealth Park and the Parliamentary Triangle • Manages a comprehensive water quality program to monitor the environmental status of Lake Burley Griffin and advise users about changes in the water quality conditions arising from floods, droughts, elevated bacteria, and algal condition • Treated effluent discharged from QSTP may affect waterways managed by the NCA. • National Capital Plan • Australian Capital Territory (Planning and Land Management) Act 1988 • Commonwealth Places (Application of Laws) Act 1970-1973
Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW)	• Custodian of the Environment Protection and Biodiversity Conservation Act 1999, which establishes a requirement for, and a system of, environmental assessment and approval by the Commonwealth government. • Consultation will be determined if there is a significant impact on matters of national environmental significance
State Government (ACT and NSW)	
Environment, Planning and Sustainable Development Directorate (EPSDD)	• Continued engagement in particular reference to the Environmental Impact Statement and Development Application. • Custodians of the Lake Burley Griffin Management Plan 2011 - Also now incorporates previous ACTPLA roles, such as

	governance of the Planning and Development Regulations 2008, the Heritage Act 2004, the Tree Protection Act 2005, and the ACT Territory Plan • EPSD maintains several roles in relation to the management of water, heritage, sustainability, and nature conservation in the ACT • Planning and Development Act 2007 • Planning and Development Regulation 2008 • ACT Territory Plan • Environment Protection Act 1997 • Environment Protection Regulation 2005 • Nature Conservation Act 2014 • Fisheries Act 2000 • Heritage Act 2004 • Lakes Act 1976 • Climate Change and Greenhouse Gas Reduction Act 2010 • Water Resources Act 2007 • Public Unleased Land Act 2013
ACT Utilities Technical Regulator (ACT UTR)	• Technical regulation is provided by the Technical Regulator under the Utilities (Technical Regulation) Act 2014. Technical regulation is concerned with the operation of utility services and the protection and maintenance of their networks. • Issues operating certificates under the Utilities (Technical Regulation) Act 2014.
ACT Environment Protection Authority (ACT EPA)	• Custodian of the Environment Protection Act 1997, which provides for the protection of the environment including heritage, noise, odour, waste, wastewater, air, contaminated sites, hazardous materials and water quality. • Key stakeholder for approval process • Continued engagement and consultation required
NSW Environment Protection Authority (NSW EPA)	• Custodian of the Protection of the Environment Operations Act 1997, which defines and specifies licence conditions. • Continued engagement as stakeholder for operation and activities in NSW.
ACT Waste Regulator	• Continued engagement with regard to operation of the existing composting facility until such time as this operation ceases
ACT Transport Canberra and City Services Directorate (TCCS)	• Continued engagement as stakeholder for the Mountain Road Upgrade and other aspects • Tree Protection Act 2005 • Waste Management and Resource Recovery Act 2016 • Waste Management and Resource Recovery Act 2017 • ACT Waste Management Strategy 2011-2025
ACT Health	• Consultation required as stakeholder • Custodian of the Public Health Act 1997 • Consultation with regard to public health aspects of reuse of recycled water offsite
ACT Economic Development Directorate	• Focus on land release and development, and works to facilitate business development, investment, sporting, tourism and events • Focused on economic performance of ACT and its link to the built environment

	• Consultation is required
NSW Health	• Referral in association with Recycled Water use and Section 60 under the Local Government Act • Continued engagement as stakeholder • Public Health Act 2010 • Local Government Act 1993 • Australian Guidelines for Water Recycling (AGWR) Phase 1, 2006
NSW Department of Planning, Environment and Industry (DPIE), including Crown Lands	• Continued engagement as stakeholder • Environment Protection and Biodiversity Conservation Act 1999 • Approval for modification of a sewage treatment plant under Section 60 of the Local Government Act 1993 • Interests in technical suitability and value for money • Provides terms and limits on approvals and the obligations for the construction of the project • Custodian of the Environmental Planning and Assessment Regulations 2000, which defines the nature of the infrastructure in terms of statutory obligations - Part 4 and Part 5. • Continued engagement as regulator • Local Government Act 1993 • Australian Guidelines for Water Recycling (AGWR) Phase 1, 2006 (if recycled water is produced)
NSW Cross Border Commissioner	• Consultation required due to cross-border nature of the STP Project • The office of the NSW Cross Border Commissioner identifies and helps resolve issues that occur by being located near a state border
Local Councils	
Queanbeyan-Palerang Regional Council	• Design, Construction and operation of the STP • Environmental management plans relevant to QPRC responsibility • Community Engagement Plan – design, construction • The project team management of feedback and complaints
Council committees: First Nations Consultative Committee Environment and Sustainability Advisory Committee	• Design, Construction and operation of the STP • Environmental management plans relevant to QPRC responsibility • Community Engagement Plan – design, construction
Affected Regional Utility Providers	
ActewAGL	• Concerns for network once constructed • Inform and involve in STP Upgrade Project
Indigenous Groups	
Aboriginal and Torres Strait Islander peoples Ngambri and Ngunnawal Local Communities as traditional owners of the land Buru Ngunnawal Aboriginal Corporation	• Management of previously identified heritage sites (if identified) • Management of heritage artefacts (if identified) • Construction and operational impacts on heritage sites (if identified)
Environmental Groups	
Molonglo Catchment Group Queanbeyan Landcare Inc	• Management of flora and fauna in accordance with environmental management plans and protected species management plans

	• Water quality monitoring plans and results • Future construction and operation impact on local flora and fauna
Local Community Groups	
Oaks Estate	• Nearby residents • Potential concerns about impacts such as visual, noise, dust, truck movements • Positive odour reduction as a result of the work
Oaks Estate Progress Association	• Provided comment on Heritage Report
Lake Burley Griffin Users Rowing ACT	• Recreation users of the Lake • Advocates for clean water
Canberra Anglers Association	• Fishing Club based in Canberra • Recreation and advocates for safe water ways
Queanbeyan residents and ratepayers Jerrabomberra Residents Association	• Cost of the project • Protection of water quality • Design construction and operation impacts of the STP e.g., traffic, vibration, visual, amenity, flora and fauna (if any) • Management of Molonglo River and rehabilitation of current site • Continued engagement and consultation are required.
Friends of Jerrabomberra Wetlands	• Collaborate with local residents and conservation, management, heritage, education, Aboriginal and Torres Strait Islander, and recreational groups in the restoration and maintenance of the wetlands.
Capital Woodlands and Wetlands Conservation Trust / Jerrabomberra Wetlands	• Established to ensure the Mulligans Flat Woodland Sanctuary and Jerrabomberra Wetland Nature Reserve are sustainably managed to provide rich and diverse environments for current and future generations • Jerrabomberra Wetlands are near the STP site, therefore • there is potential for the discharge to impact these wetlands
Molonglo Catchment Group	• Molonglo Catchment Strategy 2004-2024 • Umbrella organisation for existing Landcare and other natural resource management organisation who facility and support local groups across the region.
Canberra Ornithologists Group	• Encourage interest in, and develop knowledge of, the birds of the Canberra region. • Promote and coordinate the study of birds and promote the conservation of native birds and their habitats
Waterwatch	• Part of a national community water quality monitoring program that brings together people from all parts of the community to raise awareness, educate, monitor, restore and protect waterways.
Business	
Canberra Airport	• Canberra airport is a key stakeholder, mainly interested in minimising bird strikes to aeroplanes • Communication and engagement is required
Media	
Queanbeyan Age/Chronicle Regional Independent Canberra Times	• STP Project Progress • STP Project Cost

ABC radio and television WIN TV City News Canberra Weekly Other radio channels	• Management of complaints • Design and environmental impacts on the STP project (if any)

Table 32: Internal Stakeholders

Stakeholder	Interest and responsibilities for the project
QPRC Staff	
Councillors	• Approval of scope & budget in Council's strategic, delivery and operational plans and as proposed in the business case • Progress of the STP (including time, cost and environment) • Acceptance of tenders • Management of community feedback and complaints
Sustainability Officer	• Designs meet ISC sustainability requirements • Progress of the STP (Including time, cost and environment)
Utilities Staff	• Ensure operations comply with relevant regulatory and STP project requirements • Ensure timely notification is provided to the project team/comms team on operational activities • Ensure the team understands their requirements with relation to engaging with the local community, stakeholders and media
Operators	• Ensure operations and training are efficient through transition of services • Be informed and involved of the STP design and construction
Project Support (Various)	• Provide advice and support on technical aspects of procurement, design, construction and operation of the STP project specifically regarding risk, WHS, audit, Environment and Finance
QPRC customer service staff	• Provided with adequate information to respond to simple enquiries (Q&A)
Service Manager, Finance Portfolio General Manager, Organisation Capability	• Responsible for financing of the project, including loans and grant acquittal
Service Manager, Workforce Portfolio General Manager, Organisation Capability	• Responsible for the management of QPRC staff, including the impact the new STP will have on current employees
QPRC staff	• Be informed of progress of the upgrade

Engagement Approach

The communications and engagement activities for the project are based on providing a clear and consistent project narrative and ongoing information is to build a sense of trust amongst stakeholders and the community.

The program diagram below shows the main communications and engagement activities planned for each stage of the project.

Project consultation during formation of the project included consultation during development of the Master Plan and Concept Design. Further consultation activities have been undertaken as part of the Environmental Impact Track which included public exhibition of the project Environmental Impact Statement and targeted engagement with interested stakeholders.

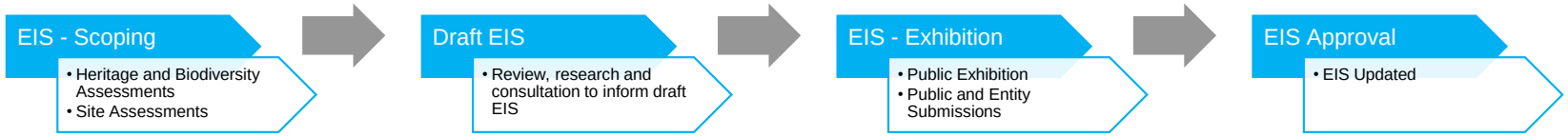
Sensitivity: General

FINAL BUSINESS CASE

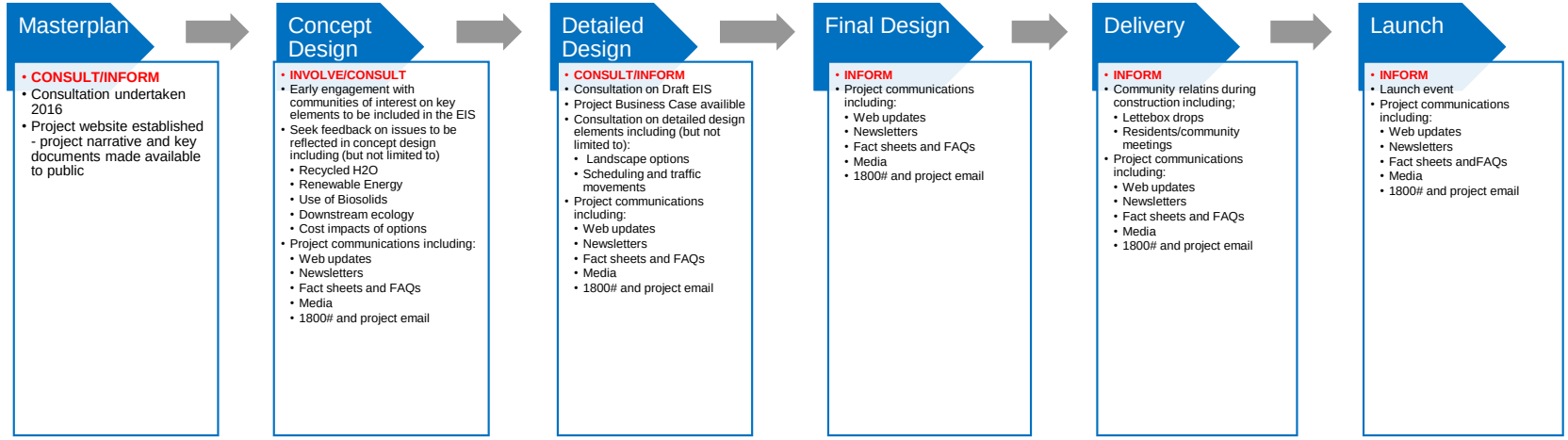
INSW Infrastructure New South Wales

0 1 2 3 4 5 6
INFRASTRUCTURE INVESTOR ASSURANCE

Environmental Impact Assessment Track



Public Communications and Engagement



Key stakeholder issues

Consultation and engagement with stakeholders is ongoing. Table 33 gives a summary some of the key issues raised by stakeholders to date and how they have been integrated into the proposed project. Due to the nature of the project, project stakeholders often have overlapping interests and issues.

Table 33: Engagement approach at each phase of the project

Issue raised	Stakeholder	How this is addressed by the project
• Sewage bypassing treatment during high wet weather flows	• ACT EPA	• Additional storm treatment capability included in the treatment process. • Two-dimensional screening of all flows. • 30 ML Storm Pond included to capture and return storm flows • Solids contact process enables a higher flowrate to be treated.
• A high quality of treated effluent is required due to the receiving environment	• ACT EPA	• Tertiary treatment upgraded to DAFF process to provide higher solids capture and filtration performance.
• The existing maturation ponds are within the flood zone and present a risk of pollution	• ACT UTR • ACT EPA	• Existing maturation ponds to be decommissioned by the project
• Soluble phosphorus is a key pollutant of concern as it is linked to an increased risk of blue green algae in Lake Burley Griffin	• ACT EPA • NCA • ACT Healthy Waterways • ACT & Region Catchment Coordination Management Group • Community representations	• The proposal as outlined in the Draft EIS has been amended with additional processes added to facilitate biological phosphorus removal and enhanced chemical phosphorus removal including phosphorus recovery. • An additional receiving water quality impact assessment study has been completed including modelling of Lake Burley Griffin.
• Wildlife in the area needs to be managed to minimise the risk to aircraft at Canberra Airport	• Canberra Airport	• A wildlife landscaping plan has been prepared in consultation with the community. The proposed landscaping minimises the risk of attracting large birds that may pose a risk to aircraft.

8.6 Project Risk Management

Project risk is being managed in accordance with Council's Risk Management Policy and Directive.

A project risk register has been prepared for the Queanbeyan STP Upgrade Project and has been updated throughout the lifecycle of the Project, at the end of each phase.

Risk Identification and Assessment

Risks were originally identified during the project initial and planning phases and reviewed during the master planning phase.

Following the master planning phase and during the implementation of QPRCs Project Framework, the project team developed a risk breakdown structure which was developed then workshopped on 10 May 2017. From the risk breakdown workshop the risk register, and assessment was reviewed and updated.

A further risk workshop was facilitated at the commencement of the design process on 28 March 2019 and included key internal staff, consultants and the ACT EPA. Following this workshop the risk register and assessment was updated.

The risk register has continued to be reviewed and updated as the project has progressed, with key reviews undertaken at the completion of the concept design, during reference design and during detailed design.

The following risk areas were adopted for the project:

- Scope
- Time
- Quality
- WHS
- Sustainability
- Interdependency
- Regulatory
- Stakeholder
- Environmental
- Site Conditions
- Governance
- Procurement
- Resources
- Financial
- External
- Other.

Assessment of risks has been determined in accordance with QPRC's likelihood and consequence matrix as shown in Figure 29. The likelihood and consequence rating criteria were developed to be project specific.

RISK ASSESSMENT REGISTER MATRIX

LIKELIHOOD	CONSEQUENCE 1 Very Low	2 Low	3 Medium	4 High	5 Very High
1 Rare	Low	Low	Low	Moderate	Moderate
2 Unlikely	Low	Low	Moderate	Moderate	High
3 Possible	Low	Moderate	Moderate	High	High
4 Likely	Moderate	Moderate	High	High	Extreme
5 Almost Certain	Moderate	High	High	Extreme	Extreme

Figure 29: Likelihood consequence risk rating matrix, QPRC Risk Management Directive 2019

As a local government authority, QPRC has an obligation to its stakeholders to ensure that it does not accept high levels of risk that might impact on community wellbeing and amenity, or the ongoing viability of QPRC. Accordingly, QPRC generally has a low appetite for unmitigated risks across all of its day to day operations.

QPRCs risk appetite is documented in the Risk Management Directive and presented below in Figure 30

Risk Rating & Control Approach		
Initial Risk Rating		Control Measure
L	Low	Withinh Council's risk appetite - monitor through in place management and operational controls.
M	Moderate	A decision by the Portfolio Geenral Manager is required on whether to accept the level of risk or implement further controls. Responsibility for managing the risk must be assigned
H	High	A decision by the Portfolio General Manager and Chief Executive Officer is required on whether to accept the level of risk or implement further controls. Responsibility for managing the risk must be assigned including reuiqred frequency for reviewing and updating the risk assessments.
E	Extreme	Critical Risk - The risk level exceeds Council's risk appetite - further treatments are required and risk management strategy must be developed and responsibility for its application assigned.

Figure 30: Risk appetite, QPRC Risk Management Directive 2019

Risks which fall outside of QPRCs risk appetite have been mitigated within the risk assessment until they fall within QPRCs risk appetite.

The risk register is presented in Appendix C.

Implementing Mitigations

The Project Manager will ensure that the planned risk controls are implemented, their effectiveness monitored, and corrective actions taken where the effectiveness of the controls needs improvement.

Reporting

Key risks and emerging issues are reported on monthly to the Project Management Committee.

Review

The risk breakdown structure, risk assessment and control measures will be reviewed and updated in accordance with the schedule given in Table 34.

Table 34: Risk Assessment Review Schedule

Review Schedule	Extent	Responsibility
At the end of each milestone during Plan and Develop Phases	Entire risk register Pass updated risk register to estimating team to update the project contingency	Project Manager
Monthly during Delivery Phase	Review risks with initial ratings greater than medium Review risks with residual ratings greater than medium Add any new risks Pass updated risk register to estimating team to update the project contingency	Project Manager

8.7 Compliance

QPRC are responsible for the following sewerage services:

- Making a sewage network available for connection in areas within NSW
- The collection and conveyance of sewage through the Queanbeyan sewerage network and Morisset and Jerrabomberra Trunk mains
- Treatment and disposal of sewage at the QSTP.

QPRC is regulated under Part 3, Division 2 of the *NSW Local Government Act 1993* for the provision of sewage services including sewage collection, conveyance, treatment and disposal. This applies to QPRC regardless of whether the activities are carried out in NSW or the ACT and includes regulation of the QSTP. This regulation is administered by NSW Department of Planning Industry and Environment (DPIE) and its successors.

Under Section 60 of the *Local Government Act 1993*, QPRC are required to obtain ministerial approval for the construction the QSTP project. The Section 60 approval provides an independent assessment of the proposed works to ensure they are fit for purpose and provide robust, safe, cost-effective and sound solutions that meet public health and environmental requirements. DPIE has been consulted and involved in the review process during the project options, concept design and detailed design stages of the project as required to receive Section 60 approval. DPIE will continue to be involved in the project as required.

QPRC operate the Queanbeyan STP which is located on ACT land in accordance with the terms and conditions of the Crown Lease that was granted to Queanbeyan City Council in 1938 by the Commonwealth Government.

The Utilities Technical Regulator (UTR), under *ACT Utilities (Technical Regulation) Act 2014*, are responsible for granting the Design and Construct operating certificate and the Provision of Service operating certificate for the utility services provided by the Queanbeyan Sewage Treatment Plant provided the application reasonably satisfies Section 46 of the Utilities (Technical Regulation) Act 2014. To meet this requirement QPRC has prepared a Regulatory Plan for the design and construction of QSTP.

QPRC has been granted an exemption from the requirement for a licence in relation to the Utilities Act 2000. QPRC has additional record keeping and reporting requirements as part of the *Utilities (Licencing) Exemption 2021 Disallowable instrument DI2021-24* in relation to this agreement.

The ACT Environmental Authority, under the *Environmental Protection Act 1997*, authorises QPRC to provide treatment of wastewater from Queanbeyan's sewer network and discharge effluent to the Molonglo River in accordance with the Environmental Authorisation 0417 in accordance with the approved Environmental Management Plan. ACT EPA have been consulted during the design process. QPRC will continue to consult with ACT EPA throughout the upgrade process as necessary. The project will prepare a commissioning plan to demonstrate that the new treatment plant process is able to achieve compliance with the environmental authorisation. Once the upgrade is commissioned, QPRC will develop an Environmental Management Plan for the new QSTP in collaboration with ACT NSW.

The NSW Environmental Authority, under the *Protection of the Environment Operations Act 1997 (POEO Act)*, provides environmental regulation of the QSTP network located in NSW. NSW EPA have been consulted during the design process. QPRC will continue to consult with NSW EPA throughout the upgrade process as necessary.

The design and construction will be in accordance with the appropriate Australian Standards, including the following:

- AS1170.1 Permanent, Imposed and other Actions
- AS1170.2 Wind Loads
- AS1170.3 Earthquake Actions in Australia
- AS2159 Piling – Design and Installation
- AS2870 Residential Slabs and Footings
- AS3600 Concrete Structures
- AS3735 Concrete Structures for Retaining Liquids
- AS3700 Masonry Structures
- AS4100 Steel Structures.

All structures for this project are being designed for Importance Level 3 (Wastewater Treatment Facility), in accordance with Table 3.1 of AS/NZS 1170.0:2002: Structural Design Actions – General Principles.

All buildings including prefabricated structures are required to be constructed in accordance with the Building Code of Australia (BCA) and relevant Australian Standards. A deemed to satisfy review of each building design will be undertaken in the reference design phase to establish relevant building classifications and clauses applicable under the BCA. Final BCA compliance and certification responsibility would be included in the Construction Contractors scope by a private certifier for all buildings.

Recycled water treatment and usage will meet the requirements in the NSW Guidelines for Recycled Water Management Systems (NSW Department of Primary Industries, Office of Water, May 2015) and in the Australian Guidelines for Water Recycling (AGWR) (NRMMC, 2006).

All works must be undertaking in compliance with NSW and ACT Work Health and Safety Laws, and QPRCs Health Safety Environmental and Quality Policy. On-site ACT laws apply.

ACT Municipal infrastructure design standards apply to the development and the road upgrade.

Achievement of Infrastructure Sustainability Council target rating of Excellent.

8.8 Change Management

The major changes associated with the project and their management controls are presented in Table 35.

Table 35: Change elements and management controls

Change Element	Management Controls	Responsible Role
New STP processes, operation, maintenance and control software	• Involvement of operation team in design • Plain English functional description • Operator training • Prepare operation and maintenance manual • Engage designer/commissioning team to provide post-handover support	Project Manager
Changes to environmental authorisation (EA) discharge limits, sampling and reporting requirements	• Involvement of operational team in Environmental Authorisation negotiations • Engagement with the EPA to confirm requirements • Operator training	Project Manager
Changes to environmental authorisation requirements during commissioning of the new STP and decommissioning of the existing STP	• Involvement of operational team in Environmental Authorisation negotiations • Engagement with the EPA to confirm requirements • Operator training	Project Manager
Changes to Provision of Service Operating Certificate requirements	• Involvement of operational team in preparation of Regulatory Plan • Engagement with the UTR to confirm requirements • Operator training	Project Manager
Changes to the Operational Environmental Management Plan (OEMP) due to changes to EA and DA conditions	• Involvement of operational team in preparation of the OEMP • Engagement with the EPA to confirm requirements • Operator training	Project Manager
Obligations of the ISC Rating	• Operator training • Embedding the ISC obligations within the O&M manuals and QPRC processes	Project Manager
Changes to landscape	• Include obligations and management practices in OEMP • Prepare landscape management plan • Operator training	Project Manager
Impacts to QPRCs sewer fund	• Undertake a financial analysis to determine the impact of the project on the sewerage fund and the need to increase sewage rates • Engage with the Utilities team, Finance team and assets team • Incorporate the funding model into the IWCM Plan • Develop a business case	Project Manager
Decommissioning of the existing STP	• Develop a decommissioning plan • Involve the operational team in development of the decommissioning plan • Briefing between the decommissioning team and the operational team on the plan	Project Manager

	• Coordinate between the decommissioning team and operational team	
Changes to land boundaries	• Liaise with all impacted stakeholders/adjoining landowners to understand their needs • Update QPRCs records • Include any new assets in asset register • Include new assets in maintenance schedules • Brief operational team on new boundaries and assets	Project Manager
Changes to access roads	• Liaise with all impacted stakeholders/adjoining landowners to understand their needs in design development • Communicate with stakeholders on implementation timeline and impacts • Coordinate with the road authority • Provide as constructed assert data to the road authority	Project Manager
Changes to site access and security	• Liaise with stakeholders who require access to the site to understand their needs during design • Operator training • Brief other stakeholders who require access on the new protocols/systems	Project Manager
Changes to workplace	• Involvement of operational team, security team, digital team, buildings team in preparation of the design to understand needs • Involvement of operational team, security team, digital team, buildings team in set up of the workspaces • Operator training	Project Manager
Changes to power supply	• Involvement of operational team in preparation of the design • Engagement with EVO Energy to confirm requirements • Operator training • Provision of as constructed asset data to EVO Energy • Engagement of suitably qualified maintenance contractors	Project Manager
Changes to potable water supply	• Involvement of operational team in preparation of the design • Engagement with ICON Water to confirm requirements • Operator training • Provision of as constructed asset data to ICON Water	Project Manager
Changes to waste disposal and recycling	• Involvement of operational team, waste team in preparation of the waste and recycling plan • Operator training • Advise existing waste contractors of changes • Engage new waste contractors if required	Project Manager
Changes to operational and maintenance supply needs	• Involvement of operational team in preparation of the design • Operator training • Advise existing supply and maintenance contractors of changes to delivery and maintenance requirements • Engage new supply and maintenance contractors if required	Project Manager

Change to QPRC assets	• Engage with assets team during the design to document asset requirements in contract documentation • Provide record of new, decommissioned and altered	Project Manager

8.9 Benefits Realisation Plan

QPRC has prepared a Benefits Management Plan (BMP) that is consistent with the NSW Government Benefits Realisation Management Framework (2018) and supplements the Project Business Case. The BMP outlines the governance structure, benefits and plan to manage, report on and evaluate benefits.

The key project benefits and dis-benefits have been incorporated onto a Benefits Register and include;

- Benefits:
  - Meeting Queanbeyan's sewage treatment needs for future population and economic growth
  - Improved control over the water quality discharged to the environment and to protect public health
  - Improved odour and noise outcomes
  - Improved workplace health and safety for workers and visitors to the facility
  - Improved treatment reliability
  - Improved protection of the treatment plant against flooding and climate change sustainability
  - Provision of a source of recycled water that can be used for applications such as dust suppression
  - Provision of a local facility to receive and treat septage waste collected from domestic septic tanks and aerated wastewater treatment systems
  - Improved treatment of the biosolids produced by the treatment process to a quality that is suitable for agricultural reuse
  - Improved traffic access to the treatment plant by sealing the access road
  - Provision of a sustainable sewage treatment solution
  - Existing plant does not fail
- Dis-benefits:
  - QPRC will need to raise sewer rates above current levels to pay for the loan.

The benefits register includes details of the metric, data source and measurement targets for each benefit.

The Project Manager will monitor the implementation of the BMP as the project progresses. Tracking of benefits realisation progress will be recorded by the Project manager in the Benefits Register.

The Project Manager will report on implementation of the BMP as part of the monthly project reporting.

The BMP will be reviewed:

- With any review of the Project Management Plan and/or risk management plan
- Following any changes to the project scope
- Prior to completion of works and commissioning of the asset.

8.10 Sustainability

QPRC has a strong commitment to delivering on the principles of ecologically sustainable development and has an extensive legislative and policy framework that highlights this commitment for providing services to its customers. Additionally, QPRC has become a member of the Infrastructure Sustainability Council (ISC) and has committed to pursue Infrastructure Sustainability (IS) ratings under the IS Rating Scheme for the delivery of the Queanbeyan STP Upgrade (the Project). This will drive a culture of sustainable decision-making to benefit the wider Queanbeyan community.

QPRC has adopted the ISC Rating Tool and aims to achieve an "Excellent" Design and As-Built Ratings for the STP with a score in the range of 65 to 75.

To manage this process and ensure that the sustainability objectives are achieved, the project will follow the requirements laid out in the QPRC Queanbeyan STP Upgrade Project Sustainability Management Plan (SMP).

Key Sustainability Targets

Council's Sustainable Design Policy for Council Buildings sets out seven goals. Table 36 outlines project specific targets (and related IS credits) that align with each of the goals. Specific targets are identified related to energy, water and waste goals. Achieving the range of credits required for an Excellent IS rating will support the broader policy goals related to sustainability leadership, reduced operating costs, reduced environmental footprint and increasing sustainability awareness.

Table 36: Sustainability Targets

Goal	Target	Relevant IS Credit
Reduced energy consumption, water use and waste	15% reduction in GHG emissions compared to the base case through modelling (design) and monitoring (construction). 10% reduction in total water use compared to the base case. Opportunities to reuse spoil are identified and implemented, targeting a >80% (by volume) of spoil to be reused. Minimise total waste to landfill through waste avoidance initiatives and prioritisation of reuse and recycling, targeting >40% by volume of office waste to be recycled.	Ene-1 Wat-1 Was-1 Was-2
Demonstrating community leadership in implementing renewable energy and passive solar design	20% substitution of non-renewable energy using renewable energy.	Ene-2
Using alternative water sources and improving stormwater quality	50% substitution of potable water use using non-potable water.	Wat-2
Continued Council growth and development with reduced environmental footprint	Embedding consideration of environmental, social and economic factors when selecting suppliers/services using multicriteria analysis.	Pro-1, Pro-2
Reduced on-going operating and maintenance costs	"Excellent" IS Design and As-Built Rating.	Ene, Wat, Was credits Eco-1 and Eco-2 Sta-3

Sustainability in Design

The design will be completed by HH2O who will produce a fully detailed and documented design to achieve the targeted "Excellent" Design Rating with a score in the range of 65 to 75.

A "Sustainability in Design" workshop (slides and minutes provided in Appendix B) with HH2O was held on 15 May 2019, when the designers were first contracted, to develop sustainability initiatives to be embedded in planning and design.

During detailed design, the design team, with the support of AECOM and QPRC, will develop minimum sustainability requirements to include in the terms of reference for the construction contractor to achieve the As-Built rating. This will include a section on the Construction and Environmental Management Plan requirements as well as materials and equipment specifications.

Sustainability in Procurement

Project procurement will align with QPRC's Procurement Policy and the IS V1.2 criteria for procurement (Pro-1, Pro-2, Pro-3 and Pro-4). HH2O have identified sustainability opportunities with QPRC early in the design process. This

early identification of opportunities has allowed for forward commitment procurement and early identification of supply chains to make more informed, sustainable decisions, particularly when selecting materials.

Decision makers will seek to prioritise local procurement and recycled or environmentally labelled materials where cost effective. Suppliers will be requested to provide details of their sustainability policy and its implementation and should also be compared for social, environmental and financial appropriateness using multi-criteria analysis to select the most sustainable option. Finally, supplier sustainability performance will be monitored for the duration of contract against sustainability targets and non-compliance should be actively managed.

Sustainability in Construction

The main works construction package will be delivered through a Construct Only contract where the Detailed Design is managed by the Owner (QPRC) with early tenderer involvement then Construct by Contractor. This delivery model means that suitable contractors can participate in the design review which should increase the collaboration between designers and the contractors leading to better sustainability outcomes. At the beginning of construction, the SMP will be handed over to the construction contractor to be updated with their input.

Similar to the sustainability in design workshop, a sustainability in construction workshop will allow QPRC and the contractor to identify where key efficiencies can be made in construction methodology. These efficiencies, combined with following the specifications outlined in their contract, will help the contractor achieve the IS As-Built rating. The contractor will need to provide evidence for the IS credits to assist in delivering the As-Built rating.

8.11 Stakeholder Endorsement

Stakeholder endorsements for the project are presented in Table 37.

Table 37: Stakeholder Endorsements

Stakeholder	Related Outcome Interest	Endorsement
NSW Office of Water	NSW Regulator of QPRCs sewerage network under Section 60 of the Local Government Act 1993. Required to approve the project.	
ACT Utilities Technical Regulator	ACT Regulator of QPRCs STP operation under the Utilities (Technical Regulation) Act 2014. Required to issue operating certificate for design and construction, and operation.	
QPRC Councillors	QPRC budget and tendering approval	
ACT Environment Protection Authority	Issues QPRC with an Environmental Authorisation to discharge effluent to the environment in the ACT under the Environment Protection Act 1997	
ACT Transport Canberra and City Services	Asset Owner of Mountain Road which will be upgraded as part of the proposal	
EVO Energy	Owner of the electricity supply network for the STP which requires upgrading and adjustment as part of the proposal	

9. REFERENCES

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10. APPENDIX A – SUMMARY OF PREVIOUS STUDIES

This appendix provides a summary of early planning studies investigating the need to upgrade the Queanbeyan STP.

MONTGOMERY WATSON (JULY 1995) "QUEANBEYAN WPCC FUTURE NEEDS"

In 1995, Montgomery Watson prepared a report outlining upgrade options for the Queanbeyan STP. The following conclusions were drawn for the STP:

- Augmentation may be required to meet increasing populations and possible new discharge limits. Overall, it was highlighted that the STP is most restricted on its ability to meet total nitrogen requirement.
- Hydraulically, it was found that the STP could treat up to an average dry weather flow (ADWF) of up to 10.7ML/d.
- A 4-stage Bardenpho activated sludge process was recommended for long term secondary treatment if a more stringent total nitrogen requirement needs to be met. A stage-wise implementation strategy with interim operation was recommended. Addition of plastic media to the activated sludge plant was identified as a short-term strategy to provide some additional treatment capacity.
- For wet weather flow treatment, it was recommended that a fourth secondary clarifier be provided for peak flows.
- Disinfection of the maturation pond effluent was suggested to reduce the risk of bacteriological problems in wet weather.
- It was further suggested that the disused sludge lagoon could be used for flow equalization.

Finally, three wastewater management strategy / options were investigated, including both centralized and decentralized treatment options. A centralized system was recommended to reduce the number of operating plants and provide a more operable solution. Some on-site package plant could be employed to meet local needs if required.

SKM (DECEMBER 1995) "CRITICAL APPRAISAL OF QUEANBEYAN WPCC FUTURE NEEDS REPORT"

In 1995, SKM conducted a critical appraisal of the Montgomery Watson report based on further information that were available between the two reports. The report provides recommendations on minor, short term upgrades as well as longer term upgrades. It also provides a capacity assessment of the existing plant. The following conclusions were drawn:

- The trickling filters could handle a flow of 3.8 ML/d whilst achieving their original function of nitrification. It is noted that media characteristics and structural integrity of the trickling filters were not discussed.
- It was suggested a reduction of SVI (200 to 100 mL/g) could potentially increase the capacity of the activated sludge plant from 11.2 ML/d to 14.3ML/d. Addition of selector tanks at the head of the activated sludge plant was suggested as a potential measure to improve sludge settleability.

SKM (NOVEMBER 1996) "QUEANBEYAN WPCC WET WEATHER FLOW TREATMENT STRATEGY"

In 1996, QCC commissioned SKM to prepare a position paper on "Wet Weather Flow Treatment Strategy" for Queanbeyan STP. The paper examines treatment strategy to deal with wet weather flow in light of its potential impact on the downstream water quality, namely Molonglo River and Lake Burley Griffin. As part of the report, a number of previous water quality investigations were reviewed. The following conclusions were drawn with regard to the impacts of pollutant loads:

- Phosphorus loads (both diffused and point sources) were identified as the principal cause for eutrophication in Lake Burley Griffin
- Nitrogen (inclusive of nitrogen oxides, total Kjedahl nitrogen and ammonia) have been found to be of secondary concern to phosphorus with respect to limiting algal growth in downstream waterways
- Most of the sediments in Lake Burley Griffin originate from the Molonglo River. Secondary release of phosphorus from sediment, especially after a flood event, was identified as potential cause for eutrophication.

The paper highlighted the following:

- Phosphorus is the key parameter in terms of treatment objective for the STP

- Secondary treatment objectives for the STP include removal of suspended solids and ammonia (as a result of toxicity impact).

As a result of these previous water quality investigations, Queanbeyan STP has gone through a number of phosphorus discharge reduction programs in the 1980's and 1990's. At the time of SKM's study, the effluent phosphorus level was at the very low range of 0.1-0.2 mg/L. It was estimated that Queanbeyan STP contributed less than 4% of the total phosphorus loads to Lake Burley Griffin, of which only 18% of this is due to wet weather bypasses. Bypass events was noted to occur between 5 to 10 times in a year. In fact, water quality monitoring both upstream and downstream of the STP suggested that the STP exerted relatively minor impacts on the river system.

Nonetheless the report went on to assess the benefits of providing extra secondary treatment capacity to handle storm flow of up to 3, 5 and 7 ADWF's. The analysis in the report was hindered by the lack of peak hourly flow data. It was concluded that there is a diminished return in providing treatment exceeding 3 to 5 ADWF's. Treatment of flows up to 3 average dry weather flow (ADWF) was suggested to be a reasonable target to minimize the impact of wet weather bypasses.

Overall this paper highlights the importance of phosphorus removal for the STP and the importance of a critical assessment (based on hourly data) of the peak hydraulic capacity of the secondary treatment system, especially with regard to the solids and hydraulic capacity of the secondary clarifiers.

MWH (December 2008) "Queanbeyan Sewage Treatment Plant Future Needs Study"

In 2007 QCC commissioned MWH to prepare a report of the Queanbeyan STP Future Needs to cater for population growth to 40,000EP within the next 20 years. The report examined the existing STP treatment capacity and condition. The report recommended a number of upgrades to the existing facility be considered, including decommissioning and replacement of several existing processes, the installation of new additional processes and the expansion fo some existing processes to cater for a future inflow of 11.6ML/day for a 40,000EP population and full treatment of up to 3 time the average dry weather flow (ie 34.8ML/day) . It also recommended further studies be undertaken and a concept design be prepared to finalise details of the upgrade works.

Hunter Water Australia (HWA) (May 2010) "Queanbeyan STP Options Report"

In 2010 HWA were engaged to review the recommendations of the MWH 2008 report and explore other options. The report identified that the MWH strategy would only provide QPRC minor additional capacity and improved effluent quality whilst relying on ageing infrastructure.

The report recommended in order to assess "value for money" the MWH option be further developed and costed. It should then be assessed against modern technology full activated sludge plants designed for a high level of nitrogen as well as phosphorus removal. All options should be assessed against a common set of criteria which includes life cycle cost and a range of non-financial criteria relevant to QCC.

Hunter Water Australia (August 2011) "Queanbeyan Sewage Treatment Plant Upgrade Options Assessment Summary Report"

In 2011 HWA were engaged to undertake an upgrade options assessment. Building on HWAs 2010 report, this report reviewed the upgrade drivers, developed the MWH proposed upgrade solution and compared it via a multicriteria analysis against other upgrade options.

The report identified a preferred upgrade for Queanbeyan STP comprises of the following components;

- Abandonment of the existing inlet works and construction of a new inlet works facility
- Either expansion of the existing sludge drying beds or construction of new mechanical dewatering infrastructure (to be determined during subsequent design stages)
- A MBR activated sludge process using best biological design principles with combined biological/chemical phosphorus removal, single sludge stream and aerobic sludge digestion.

The preferred upgrade was recommended to provide treatment for 43,780 EP population and up to 3 x ADFW in the secondary process with inlet works capacity of 5.5 x ADWF.

GHD (September 2016) "Queanbeyan Sewage Treatment Plant Upgrade Project: Masterplan for Sewage Treatment Plant Upgrade"

In 2014 QCC engaged GHD to prepare a Masterplan for Sewage Treatment Plant Upgrade. The Masterplan provided a more detailed rand current review of sewage treatment needs in the Queanbeyan and the surrounding areas, providing an update of both the current population and future population growth aligned with more recent planning documents. The Masterplan sets out the design basis for proceeding with the upgrade of the STP, including consideration of:

- Best for region solution including future growth
- Existing and future sewage infrastructure
- Sustainability, including environmental constraints, water quality and solids management
- Approvals
- Treatment technologies
- Upgrade options:
  - Option 1 - Build new (existing STP fully decommissioned)
  - Option 2 - Build new and reuse existing components where feasible
  - Option 3 - Renew existing and augment

Multi Criteria Analysis (MCA) was undertaken of the options considered for 60,000 EP capacity (including growth predicted within 10-15 years). Six criteria were used being:

- Cost (NPV 50 yrs)
- Constructability, including quality, environmental and safety risks, timeframe for completion, likelihood of exceeding discharge licence conditions and extent of temporary works.
- Operability, including potential for increase in operating costs, ability to operate, WHS for operational staff, extent of autonomy and remote capability.
- Sustainability, including impact on environment, ability to reuse effluent and biosolids and ability to capture gas and resource recovery.
- Future Proofing, including achieving licence, increasing capacity and accommodating unexpected increases in flows or influent quality.
- Community Acceptance and Affordability, including impact on rates and QPRC financial position and QPRC reputation.

The criteria were weighted via a workshop which resulted in the following weightings for the selected criteria below.

Table 38: MCA criteria weighting

Table 12-2 MCA Criteria Weighting

Criteria	Weighting
Cost	14%
Constructability	4%
Operability	15%
Sustainability	13%
Future Proofing	17%
Community Acceptance and Affordability	37%

The criteria were then scored by the participants of the workshop with results and ranking as shown below.

Table 39: MCA results and rank

Table 12-3 MCA Results and Rank

Criteria	Options					
	Option 1A	Option 1B	Option 2A	Option 2B	Option 3A	Option 3B
Cost	4.9	4.9	4.8	4.9	5.0	4.9
Constructability	4.3	4.3	2.7	2.7	2.3	2.3
Operability	4.3	4.0	3.3	3.0	3.3	3.0
Sustainability	4.3	4.3	4.0	4.0	4.0	4.0
Future Proofing	3.7	4.3	3.7	4.3	3.7	4.3
Community Acceptance and Affordability	3.7	3.7	2.7	2.7	2.2	2.2
Normalised Score	99	100	83	85	79	80
Rank	2	1	4	3	6	5

The MCA normalised scores indicate that Options 1A and 1B are difficult to separate and represent the preferred options. Options 2A and 2B similarly have close scores but are clearly separated in their ranking at 3rd and 4th and Options 3A and 3B also have close scores and are 5th and 6th in their ranking. The sub options of A and B based on the process selection can be seen to have no impact on the selection of the upgrade approach.

The sensitivity of the MCA outcome was then tested for the following criteria weighting scenarios:

- All criteria equally weighted
- Each criterion in turn considered the most important with 50% weighting and all other criteria with 10% weighting each.

Irrespective of the scenario selected above, the Options 1A and 1B always ranked the highest indicating that the selection is not particularly sensitive to the weightings adopted for the various criteria.

The “Build New (existing STP fully decommissioned)” upgrade approach was adopted by QPRC as the preferred option for concept design and planning approvals.

Hunter H2O (December 2019) “Queanbeyan Sewage Treatment Plant Upgrade Project Design Criteria and Assumptions Report”

In 2019 Hunter H2O were engaged by QPRC to undertake design work for the proposed new Queanbeyan STP based on the preferred option from the Masterplan. Design work commenced with a review of the design criteria and assumptions which are documented in this report. Critically, a significant review of the EP projections was undertaken. The EP review identified that given the expected completion timeframe for the project of 2024 that there would only be 6 more years before 60,000 EP would be reached and a further upgrade would be required. The report recommended proceeding with concept design for the project based on a 75,000 EP population providing for population projects 15 years after the plant is constructed.

Hunter H2O (November 2019) “Queanbeyan Sewage Treatment Plant Upgrade Project Options Selection Report”

In 2019 Hunter H2O as part of their design engagement with QPRC prepared an options selection report. This report identified the various treatment options available and compared them via a multi criteria analysis that considered whole of life cost, effluent quality, operability / complexity, maintainability, robustness, power and chemical use. Primarily, three secondary treatment options were developed for the upgrade for comparison:

- Oxidation ditch with continuous gravity clarification
- Membrane Bioreactor (MBR) and
- Intermittently Decanted Extended Aeration (IDEA).

The preferred secondary treatment process selected for the Queanbeyan STP upgrade is an oxidation ditch with gravity clarifiers, tertiary granular media filter, UV disinfection, aerobic sludge digestion and sludge dewatering. The plant will be configured to adopt full biological phosphorus removal in future.

Key benefits of the selected process are:

- High ammonia removal to meet regulatory requirements
- Potential high total nitrogen removal or high nitrate production if required to protect Lake Burley Griffin
- Good treatment of storm flows
- Simple and robust process with many examples of successful implementation
- Multiple suppliers are available to provide replacement parts and equipment servicing
- Fewer chemicals are required than an MBR option and the same number of chemicals required as the IDEA option.

11. APPENDIX B - QUEANBEYAN SEWAGE TREATMENT PLANT – PROCESS CAPACITY ASSESSMENT

hunterh2O

Queanbeyan Sewage Treatment Plant

Process Capacity Assessment

Queanbeyan Palerang Regional Council

JULY 2022

ABN 16 602 201 552

Report Details

Report Title	QSTP - Process Capacity Assessment
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A	Initial Issue	Craig White	David Perry	Jeremy Smith	15/7/2022

hunterh2o Queanbeyan Sewage **Treatment Plant** Process Capacity **Assessment**

Executive Summary

The Queanbeyan Sewage Treatment Plant (QSTP) was initially constructed in the 1930's and has been progressively added to over time. The assets are aged and are at the end of their life. The treatment plant includes a combination of different technologies from different eras. Parts of the plant such as the trickling filter process are original and some parts (anaerobic digestion) have been shut down due to asset issues.

The QSTP treats sewage from Queanbeyan NSW, however is located in the ACT and discharges into the Molonglo River upstream of Lake Burley Griffin. The plant's effluent quality discharge is regulated by the ACT Environment Protection Authority (EPA). The EPA set effluent concentration and load limits which requires the QSTP to provide significant phosphorus and ammonia removal. The licence also requires organic and solids removal and disinfection of effluent prior to discharge.

The purpose of this report is to assess the capacity of the treatment plant and the level of urgency of the need to upgrade the STP. The capacity review has been limited to the process aspects only and excludes an assessment of the hydraulic capacity.

The process capacity assessment has identified that treatment capacity is challenged in many areas and QSTP is operating at or near capacity. The treatment processes that remove ammonia in particular are at capacity and operating data provided shows a degradation in ammonia removal performance is already being observed in the clarifier effluent. There is a reasonable risk that ammonia in treated effluent discharged to the Molonglo River may fail to meet the licence limits as the load on the treatment plant increases further with population growth, especially if key equipment such as the aerators, RAS pumps or clarifier drives fail or are out of service.

Ammonia is an acute toxicant and can affect many fish and macroinvertebrate species. The ammonia concertation from the plant is regulated by ACT EPA based on the condition of the receiving waters. A key concern is that as the plant reaches capacity the ammonia concentrations in discharged effluent could start increasing and may lead to an adverse impact on aquatic species near the discharge location.

The specific capacity issues identified by this review are:

- Installed aeration is at capacity when stable nitrogen removal is considered. A minor amount of extra capacity could potential be extracted by not trying to remove nitrate. However, this may lead clarifier effluent solids issues.
- The activated sludge reactors can just sustain the biomass necessary for ammonia removal. They are not large enough for further load increases.
- The clarifier system is at capacity and is likely to just be able to reliably treat peak dry weather flows. There is insufficient clarifier capacity to treat wet weather flows. In wet weather the operators will likely need to strategically bypass the activated sludge reactors to prevent sludge blanket loss in the clarifier. This is necessary so the ammonia removal process is not lost due to biomass washout from the clarifiers.
- The sludge lagoons which provide sludge stabilisation have a low sludge retention time. It is possible they may fail to stabilise the sludge at higher as loads increase which will return more soluble organic load to the activated sludge plant.
- The maturation ponds which provide disinfection are currently meeting the licence with some reserve. The pond capacity is expected to be higher than the secondary treatment plant. However, a significant failure of the secondary treatment process may limit the ability of the maturation ponds to provide required treatment and cause their capacity limit to be reached earlier.
- The maturation ponds are located within the 1 in 100 flood level and could be damaged in flood events. Therefore, there is a risk that disinfection to meet the limits may not be possible after such an event depending on the extent of repairs necessary.
- Provided the maturation ponds are available it is expected phosphorus removal to meet the current EPA licence limits will be possible provided the upgrade occurs within 4 years.

In summary the plant is close the capacity and the upgrade of the plant should proceed with some urgency. It is not practical to provide a temporary capacity increase to the plant as key assets are not larger enough. Significant investment would be required to provide a temporary capacity increase with lead times similar to a new plant upgrade.

Contents

Figures

Tables

1 Introduction

The Queanbeyan Sewage Treatment Plant (QSTP) was initially constructed in the 1930's and has been progressively added to over time. The assets are aged at the end of their life.

The plant consists of coarse screening, grit removal, secondary treatment with trickling filters and two trains of activated sludge reactors and three secondary clarifiers. The trickling filters treat part of the load prior to directing it to the activated sludge process for further polishing. Effluent from the secondary process passes to a series of three maturation pond for disinfection.

Sludge is wasted from the activated sludge process and digested anaerobically in two sludge lagoons. Sludge is periodically extracted from the lagoons and dewatered using a third-party contract mobile centrifuge. The dewatered biosolids is taken offsite periodically.

The purpose of this report is to assess the capacity of the treatment plant. The treatment assets are old and there is a concern that the upgrade of the plant cannot be delayed as it is at capacity.

2 Flow and Loads

The current Average Dry Weather Flow (ADWF) on the plant is in the order of 10 to 11 ML/d. It appears to seasonally increase to 11 ML/d throughout the years.

Hunter H2O undertook an extensive review of the sewage quality and flows in a separate report titled Queanbeyan Sewage Treatment Plant Upgrade Project – Design Criteria and Assumptions Report. The flow and sewage loads discussed in this report were used in this capacity assessment. Refer to this report for a detailed discussion on flow and loads.

3 Plant Overview and Quality Limits for the Existing Treatment Plant

3.1 Overview of the Existing Plant

A process flow diagram is provided in Figure 1 which describes the process unit operations. Flow is divided after the inlet works in roughly these ratios:

- 19% each to Train 1
- 19 % to Train 2
- 19 % to Train 3 (Aerations Tanks 1 & 2)
- 43% to Train 4 (Aeration Tank 3)

A detailed description of each unit operation is provided in Table 1.

Table 1 Description of Existing STP Assets

Item	Size/Capacity		Units	Notes
Train 1 Trickling Filter				
Primary Sedimentation	Diameter 16.5		m	Depth unknown Sludge is wasted to drying pans
Trickling filter 1 and 2	Diameter 24.5	24.5	m	
	Depth media 1.98	1.98	m	From drawing
	Media surface area	50	m^2/m^3	Estimated based on typical rock value
Humus tank	Diameter	10.5	m	Depth unknown
Digester	Decommissioned			
Train 2 Trickling Filter				
Primary Sedimentation	2 x rectangular	7.8 x 7.4	m	Depth unknown
	1 x Imhoff	5.4 x 5.4	m	Manual sludge removal. Sludge is wasted to drying pans
Trickling filter 1 and 2	Diameter 24.5	24.5	m	
	Depth media 1.98	1.98	m	From drawing
	Media surface area	50	m^2/m^3	Estimated based on typical rock value
Humus tank	2 x rectangular	6.3 x 6.3	m	Depth unknown.
Digester	Decommissioned			
Train 3 Activated Sludge				
Aeration Tank 1	Total volume	1,400	m^3	Includes anoxic volume
	Anoxic volume	112	m^3	Anoxic 3 cells mixed
	Number surface aerators	4		
	Aerator size	14	kW	
Aeration Tank 2	Total volume	1,400	m^3	Includes anoxic volume
	Anoxic volume	112	m^3	Anoxic 3 cells mixed
	Number surface aerators	4		
	Aerator size	14	kW	
Train 4 Activated Sludge				
Aeration Tank 3	Total volume	3,800	m^3	Includes anoxic volume
	Anoxic volume	0	m^3	No defined anoxic

Item	Size/Capacity		Units	Notes
	Number surface aerators	3		
	Aerator size	55	kW	S&L FGMA60
	Depth			
Clarifiers				
Circular secondary	Number	3		
	Diameter	22	m	
	Depth	5.2	m	
Return activated sludge Pit 1 Pit 2	 1 x 110 1 x 72 1 x 110 1 x 72	 L/s @ 5.5m L/s @ 4.8m L/s @ 5.5m L/s @ 4.8m		Pits 1 and 2 are connected. Pit 1 picks up Clarifiers 1 and 2. Pit 2 picks up Clarifier 3. Pit 1 only one pump runs. Pit 2 both pumps run. Pit 1 is directed to Aeration Tanks 1 and 2 Pit 2 is directed to Aeration Tank 3
Maturation Ponds	Number Total Volume	3 195	 ML	First is mostly full of sludge. Pond 2 is partly full of sludge.
Sludge Lagoons				
Lagoon 1	4,230	m^3		
Lagoon 2	4,090	m^3		

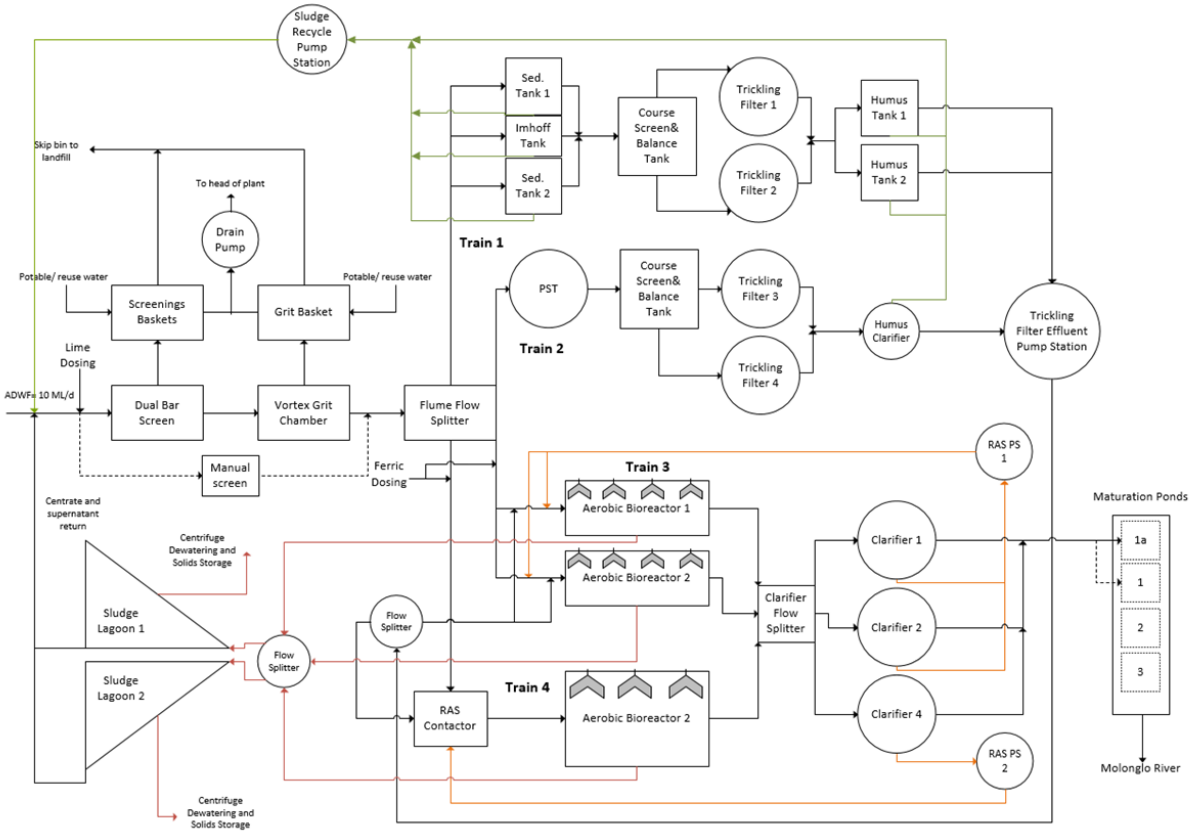


Figure 1 – Process Flow Diagram for the Queanbeyan Sewage Treatment Plant

3.2 Effluent Quality Requirements

The ACT EPA has an Environmental Authorisation No 0417 which set effluent quality limits for the discharge from the QSTP. The limits are documented in Table 2 and 3. Note that the values in bold in Table 3 appear to be mistyped in the Environmental Authorisation. It appears that the first number should be zero and not one in both instances. In earlier versions of the Environmental Authorisation they appear correct.

Table 2 - Allowable Concentrations and Loads in Wastewater under existing ACT EPA Environmental Authorisation No. 0417

Parameter	Concentration 50%ile Limit (mg/L)	Concentration 90%ile Limit (mg/L)	Average Daily Load Limit (kg/d)	Average Performance Period (months)	Sample Method
Biological oxygen demand (BOD_5)	5	10	50	3	24 hr composite
Total phosphorous (TP)	0.2	0.3	6	3	24 hr composite*
Total nitrogen (TN)	30	35	300	12	24 hr composite*
Suspended solids (SS)	8	20	90	3	24 hr composite
Total dissolved solids (TDS)	600	650	6000	12	24 hr composite

Parameter	Concentration 50%ile Limit (cfu/100 mL)	Concentration 80%ile Limit (cfu/100 mL)	Performance Period (days)	Sample Method
Thermotolerant coliforms	200	1000	35 days	Grab

Parameter	Lower Limit (pH value)	Upper Limit (pH value)	Sample Method
pH	6.5	8.5	Average of continuous daily (via online analyser)

Table 3 - Maximum Allowable Ammonia in Wastewater as a Function of Receiving Water pH and Temperature

Temperature	pH of Receiving Waters					
of receiving waters °C	6.5	7.0	7.5	8.0	8.5	9.0
	Ammonia as N mg/L (Monitored Daily)					
0	2.53	2.53	2.53	1.53	0.49	0.16
5	2.36	2.40	2.40	1.44	**1.47**	0.16
10	2.24	2.20	2.20	1.37	0.45	0.16
15	2.15	2.16	2.17	1.33	0.44	0.16
20	1.46	1.49	1.50	0.93	0.32	0.12
25	1.03	1.04	1.05	0.66	0.23	**1.10**
30	0.73	0.74	0.75	0.47	0.17	0.08

Effluent quality from the plant must be analysed in accordance with the frequency as outlined in Table 4

Table 4- Required Sampling Frequency for Routine Wastewater Quality Monitoring under current ACT EPA Environmental Authorisation No. 0417

Parameter	Unit	Wastewater Quality Monitoring
Acidity	pH value	Daily average from continuous monitoring
Ammonia	mg/L	Daily (24 hr composite)
Biochemical oxygen demand (BOD_5)	mg/L	Weekly (24 hr composite)
Total nitrogen (TN)	mg/L	Daily (24 hr composite)*
Total phosphorous (TP)	mg/L	Daily (24 hr composite)*
Suspended solids (SS)	mg/L	Daily (24 hr composite)
Temperature	°C	Daily Grab
Thermotolerant coliforms	cfu/100 mL	Weekly
Total dissolved solids (TDS)	mg/L	Weekly
Total daily flow	ML/day	Daily
Peak daily flow	L/s	Daily
Monthly irrigation volume	ML	Monthly

*Nitrogen and phosphorous samples are stored and analysed weekly.

3.3 Biosolids Quality

Biosolids produced from the plant if reused in NSW must meet the NSW Environmental Guidelines for Use and Disposal of Biosolids Products. Currently the biosolids produced are treated as a Grade C stabilisation product (not suitable for reuse) and are sent to the Woodlawn Mechanical and Biological Treatment facility for reprocessing.

If the plant was to achieve a grade B stabilisation rating, it would likely require a 20 day active sludge retention time plus 6 months of sludge lagoon storage. As noted in this report the plant cannot meet either the 20 day or the 6-month requirement and will need offsite reprocessing.

4 Capacity Assessment

This process capacity assessment reviews the key process unit operations which include aeration, bioreactor, clarifier, sludge digestion and maturation pond lagoon sizing.

The review is limited to a process capacity assessment only. A hydraulic capacity assessment has not been undertaken. However, a report prepared by Montgomery Watson in 2008 rated the inlet works hydraulics capacity at 700 L/s. However, the report notes practical capacity is limited to 500 L/s due to sludge settling issues in the secondary clarifiers.

4.1 Aeration

Each aeration tank is mostly populated fully with a series of surface aerators. To ensure stable operation the first set of aerators need to be maintained mostly offline. This is to ensure the nitrate produced by the nitrification process (i.e. ammonia oxidation) can be removed biologically in a non-aerated anoxic condition at the start of the plant. This is necessary to ensure the clarifiers do not suffer from sludge flotation and poor TSS capture due to nitrate forming nitrogen gas bubbles in the clarifier.

Table 5 outlines the current aeration available (with one of the aerators in each tank offline) versus the modelled required aeration power. The plant currently has enough capacity for average conditions but there is just enough capacity to manage the diurnal peak. All aeration less one aerator up front will need to be used at these times. In essence the aeration has reached the practical capacity limit of the process.

Table 5 Required Aeration Power versus Available for Controlled Denitrification

Aeration Required	Aeration Available	Notes
Train 3		
93 kW (peak) 72 kW (average)	84 kW(peak)	Standard Aeration Efficiency (SAE) = 1.5 kg/kWh and alpha factor is 0.75
Train 4		
117 (peak) 90 kW (Average)	110 kW(peak)	Standard Aeration Efficiency (SAE) = 1.5 kg/kWh and alpha factor is 0.75

When aeration starts to reach capacity, the first issue normally observed is an increase in the ammonia levels in the effluent. Dissolved oxygen from aeration is required by bacteria to oxidise the ammonia. Figure 2 shows recent effluent ammonia concentrations measured in effluent from the clarifiers. There is a notable increase in ammonia with time which supports the modelled observation that aeration is limiting.

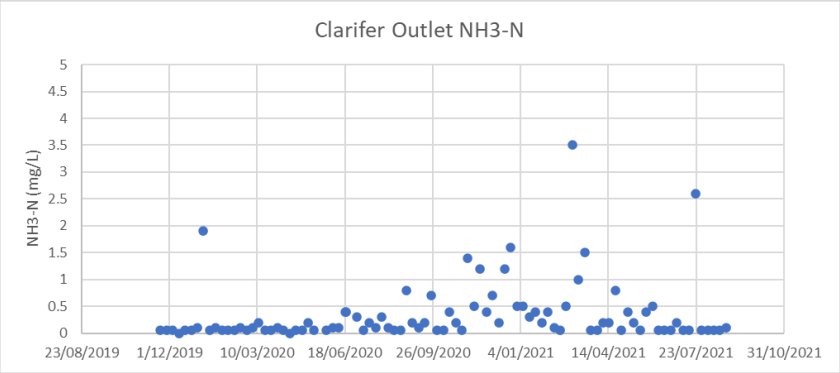


Figure 2 – Lagoon 1 near Clarifier Outlet Ammonia Levels

Over time QPRC will need to use the upfront aerators to ensure ammonia oxidation. This will likely increase the effluent nitrate leading to clarification issues (refer below). With all aeration available and no controlled denitrification, the aeration capacity will be reached at an ADWF of 12 to 13 ML/d. The current ADWF is 11 ML/d.

In essence the aeration system is at its practical capacity limit; however could be stretched at little to 12 to 13 ML/d provided no surface aeration machine fails.

4.2 Denitrification and Clarifier Effluent Quality

As denitrification (oxidised nitrogen removal to nitrogen gas) is not specially designed to occur in the activated sludge reactor, the plant produces high nitrate in the order of 8 to 14 mg/L out of the clarifiers. This high level of nitrate is known to form nitrogen gas in the sludge blanket of the clarifier. At nitrate levels as high as recorded at this plant, nitrogen gas forming in the clarifiers can cause floatation of sludge and poor solids effluent quality. Figure 3 shows the recent historical TSS. The levels are relatively elevated.

The dry weather loading rate of 0.5 m/h on the clarifiers should generally produce an effluent TSS < 5 mg/L. The observed performance is much poorer. The limitations of the aeration system and an inability to easily manage aeration to produce both nitrification and denitrification is likely to be the cause of the elevated TSS.

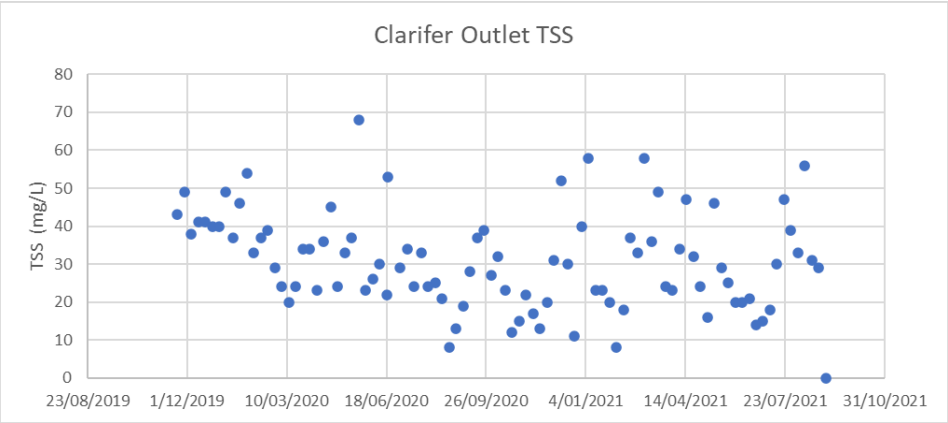


Figure 3 – Lagoon 1 near Clarifier Outlet TSS Levels

4.3 Solids Retention Time for Nitrification

While aeration is required for nitrification there is also a minimum Solids Retention Time (SRT) in the activated sludge reactors necessary to sustain full nitrification to meet the effluent quality limits. To enable nitrification during winter temperatures the SRT must be maintained at or above 12 days in the activated sludge part of the plant.

The SRT for nitrification is not a capacity constraint. However, it determines the reactor solids concentration or Mixed Liquor Suspended Solids (MLSS) that must be settled by the clarifiers. The SRT along with the settling characteristics of the sludge impact on the clarifier capacity discussed below.

4.4 Clarification Capacity

The secondary clarifiers play an important function in that they settle most of the biomass and return it to the activated sludge reactors so the treatment processes can be sustained.

The solids concentration in any bioreactor is typically high and settles slowly as a blanket within the clarifiers. The clarifier capacity is determined by four key factors which include:

- The MLSS concertation. The sludge settles exponentially slower as MLSS increase.
- The Sludge Volume Index (SVI). This is an indirect measure of how many filamentous bacteria are present. Filamentous bacteria act to bulk up the sludge making it settle slower for any given MLSS.
- Return Activated Sludge (RAS) flow. A certain minimum return rate is required to send the settled MLSS back to the bioreactor.
- Applied Flow. Too high an applied flow can overload the ability to settle the sludge.

Plant data available to us indicated the SVI is in the order of 150 ml/g historically. Using this value and a range of ADWFs and SRTs the peak possible flow before solids flux failure occurs in the clarifier is shown in Table 6.

Solids flux failure is a condition where the sludge blanket will no longer settle near the base of the clarifier and it starts to rise. Sometimes this does not lead to clarifier failure as the sludge from the bioreactor moves to the clarifier. In doing so the MLSS will decrease and the clarifier may reach a new equilibrium and the blanket no longer rises. However, solids flux failure can also lead to significant sludge loss if the blanket approaches the clarifier weir. Regardless of if solids loss occurs, solids flux failure is not ideal as it move biomass inventory into the clarifier and reduces the effective SRT for nitrification. This can lead to elevated ammonia even if the aeration capacity has not been reached.

At the minimum SRT required for nitrification (12 days) the plant can only reliably treat 1.75 x ADWF before a sludge blanket rise in the clarifier may occur. Figure 4 shows the historical variation in flow in dry weather. The 75%ile peak dry weather flow is at 1.75 ADWF. Therefore, based on this assessment the plant can only just treat the current dry weather peak diurnal flow at 225 L/s. As load increase the plant is likely to reach solids flux failure more readily in dry weather.

Until the plant can be upgraded it is recommended there be strategy of bypassing of the plant in wet weather. If the sludge blanket is observed to rise near the weir the plant should bypass sewage to the maturation pond system to avoid losing the biomass inventory from the plant. A significant loss of biomass inventory in wet weather may stop the nitrification process and it may take some time (weeks) to re-establish.

Table 6 Peak Possible Clarifier Flow at a 150 ml/g SVI for 12- and 14-day SRTs

ADWF (ML/d)	SRT (days)	MLSS Bioreactor (mg/L)	Peak Possible Flow before Flux Failure (x ADWF)
10	12	4,980	2.20
11	**12**	**5,480**	**1.75**
12	12	5,980	1.35
10	**14**	**5,650**	**1.75**
11	14	6,215	1.35
12	14	6,780	0.95

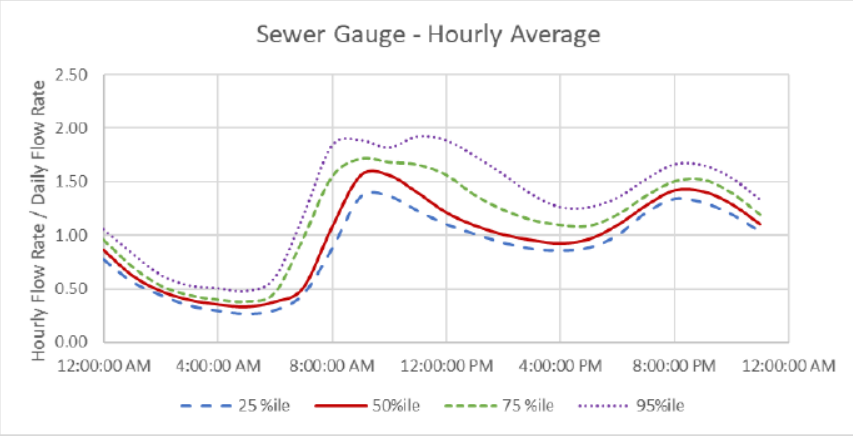


Figure 4 – Diurnal Flow Variation

4.4.1 Sludge Lagoons

At current loading the sludge lagoons will fill within 3.5 months. Such a short fill time will not enable the sludge to meet the stabilisation requirements for Grade B biosolids. Therefore, the biosolids produced from the plant cannot be reused and will need to be either disposed in a landfill or continue the current practice of reprocessing at the Woodlawn facility.

While production of a grade B stabilised sludge is not a capacity issue the limited capacity of the sludge lagoons can increase the load of organics that is returned to the bioreactor. The lagoons are close to their capacity as the sludge retention time in each lagoon is low at 1.75 months on filling. Too low a retention time can prevent the growth of methane forming bacteria. These bacteria are needed to achieve effective stabilisation. If they are not enabled to grow at a low retention time the organics applied to them will not be removed by stabilisation. If this occurs soluble organics will be retuned bioreactor. This will increase the effective load on the plant exacerbating the aeration and clarifier capacity issues noted above.

4.5 Maturation Ponds

Recent historical faecal coliform data from the final maturation pond is provided below. The median is currently below the licence value of 200 org/100ml. Decay modelling indicates the final effluent faecal coliform concentrations will continue to climb as flow increases. Under current operating conditions, it is likely that the capacity limit of the maturation ponds will be reached later than the capacity limits of the secondary treatment plant discussed above. However, the need to bypass more flows in wet weather and extra solids load from a failing secondary plant may bring this estimated capacity limit of the maturation ponds forward.

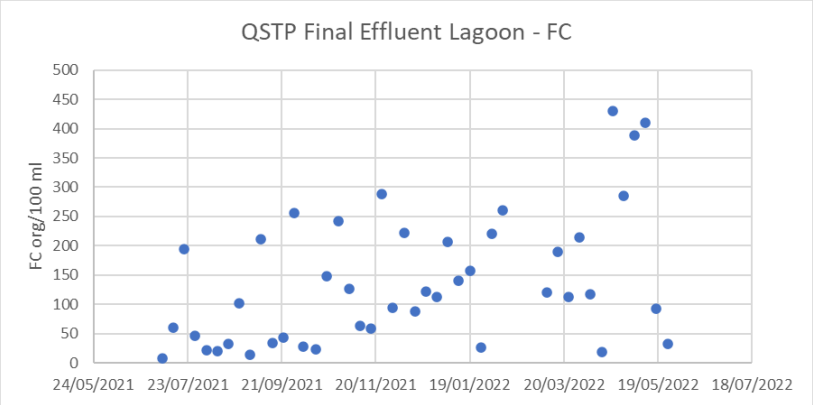


Figure 5 – Final Lagoon Faecal Coliforms

The maturation ponds are low lying and below the 1 in 100 flood level. It is possible the ponds could be damaged in a flood event. Depending on the damage disinfection processes may be lost or significantly impacted if such an event occurs.

4.6 Phosphorus Removal

Phosphorus removal is achieved by dosing ferric chloride and lime and chemically precipitating iron phosphate in the secondary plant and maturation ponds. Provide the maturation ponds are available it is expected the current licence phosphorus limits will be able to be meet until a plant upgrade occurs within 4 years.

5 Conclusions

A process capacity review of the current treatment plant was undertaken. This excluded a hydraulic capacity assessment.

The capacity review identified the treatment capacity is challenged in many areas and is at or near capacity. The unit operations of the plant that enable ammonia removal are at capacity and a degradation in ammonia removal performance has been observed in the clarifier effluent. There is a reasonable risk that ammonia in the final effluent discharged to the Molonglo River may fail to meet the licence limits as load increases further with population growth in Queanbeyan, especially if key unit operations fail (i.e. aerators, RAS pump and clarifiers fail).

The TSS quality performance from the plant is expected to degrade as the load increases with population growth as it will become more difficult to control denitrification in the activated sludge reactors. This may cause more nitrogen bubble formation and sludge flotation in the clarifiers.

Specific capacity issues are noted below:

- The aeration is at capacity when stable nitrogen removal is considered. A minor amount of extra capacity could potential be extracted by not trying to remove nitrate. However, this may lead clarifier effluent solids issues.
- The activated sludge reactors can just sustain the biomass necessary for ammonia removal. They are not large enough for further load increases.
- The clarifier system is at capacity and is likely just to be able to reliably treat peak dry weather flows only. In wet weather the operators will likely need to strategically bypass the activated sludge reactors to prevent sludge blanket loss from the clarifiers. This is necessary so the ammonia removal process is not lost due to biomass washout from the clarifiers.
- The sludge lagoons which provide sludge stabilisation have a low sludge retention time. It is possible they may fail to stabilise the sludge at higher loads which will return more soluble organic load to the activated sludge plant.
- The maturation ponds are currently meeting the licence with some reserve. The pond capacity is expected to be higher than the secondary treatment plant. However, a significant failure of the secondary treatment process may cause the capacity to be reached earlier. This may occur due to volume loss as a result of solids accumulation in the maturation ponds.
- The maturation ponds are below the 1 in 100 flood level and could be damaged in flood events. Therefore, there is a risk that disinfection to meet the limits may not be possible after such an event depending on the extent of repairs necessary.
- Provided the maturation ponds are available it is expected phosphorus removal to meet the current EPA licence limits will be possible provided the upgrade occurs within 4 years.

In summary the plant is close the capacity and the upgrade of the plant should continue to proceed with some urgency. It is not practical to provide a temporary capacity increase to the plant as key assets are not larger enough. Significant investment would be required to provide a temporary capacity increase with lead times similar to a new plant upgrade.

6 References

Hunter H2O 2019, Queanbeyan Sewage Treatment Plant Upgrade Project Design Criteria and Assumptions Report.

Montgomery Watson 2008, Queanbeyan Sewage Treatment Plant Future Needs Study

12. APPENDIX C – PROJECT RISK REGISTER

PF-38 PROJECT RISK ASSESSMENT AND REGISTER

Project Code:	100123	**Project Name:**	Queanbeyan STP Upgrade
Contract Number:	N/A	**Date Commenced:**	18/01/2019
Completed by:	David Perry	**Role:**	Design - Project Manager
Revision:	Revised EIS approaching submission	**Revision Date:**	10/11/2022
Aconex Number:	QSTPU-TT-REGST-PM-0002		

ID	Risk Author	Date Registered	Type	Key Risk Category	Source of Risk or Opportunity	Description of the Risk or Opportunity	Event/triggers that may cause the risk to be realised	Potential consequence on the project	Timing of the Event	Initial Likelihood	Initial Consequence	Initial Rating	Mitigation Measures	Responsible Entity	When (By End of Phase)	Risk Status	Responsible Officer	Risk based on current status: Residual Likelihood	Residual Consequence	Residual Rating	Date of review	Notes
4.1	David Perry	18/05/2020	Risk	Financial	Project scope, market conditions, inflation/escallation	The tendered price for construction of QSTP exceeds budget	Construction tenders	Funding for the project is not available	Develop	Almost Certain	High	Extreme	(1) Hunter H2O - develop cost estimate (completed) (2) Early vendor engagement - provides improved price certainty. (3) Update of cost estimate prior to tendering (H2O)	HH2O	DEVELOP	Active	David Perry	Likely	High	High	17/03/2021	
19	David Perry	18/05/2020	Risk	Resources	QPRC resources	Inadequate QPRC resources for operation	Commissioning	Operation and maintenance issues	Operation	Likely	High	High	1) Prepare operational resource plan in advance 2) Review staff suitability for treatment plant 3) Consider training opportunities / involve in commissioning	QPRC	DEVELOP	Active	Gordon Cunningham	Likely	High	High	17/03/2021	
4.2	David Perry	18/05/2020	Risk	Financial	QPRC funding	The tendered price for construction of QSTP exceeds budget	Construction tenders	Funding for the project is not available	Develop	Almost Certain	High	Extreme	(1) Seek ACT funding (2) Seek Commonwealth funding (3) Prepare Business Case for NSW funding	QPRC	DEVELOP	Active	Simon Boulton	Possible	High	High	17/03/2021	
8	David Perry	18/05/2020	Risk	Procurement	Market conditions	High market demand for construction during the tendering and construction phases	Competing projects	Higher prices and project delays due to limited resource availability in market	Develop	Likely	High	High	Procurement plan includes market engagement through an expression of interest and early tender involvement to engage the market.	HH2O	DEVELOP	Active	David Perry	Possible	High	High	17/03/2021	
10	David Perry	18/05/2020	Risk	Procurement	Supply chain issues (Covid-19)	Supply chain & shipping delays delay delivery of equipment to site	Contractor procurement	Delays in equipment delivery delays project construction	Deliver	Likely	Medium	High	1. Include clauses in Equipment supply contract 2. Monitor situation with Equipment suppliers 3. Discuss at ETI 4. Contingent opportunity for QPRC to notifiy suppliers to manufacture early	HH2O	DEVELOP	Active	David Perry	Likely	Medium	High	17/03/2021	
18	David Perry	18/05/2020	Risk	Resources	QPRC resources	Inadequate QPRC resources to support construction phase	Construction	Delays in project Sponsor tasks (provide information, grant funding, review & coordination)	Deliver	Almost Certain	High	Extreme	1) Review construction phase through workshop. Plan resources for construction & contract supervision. 2) Formalise arrangments for resources ahead of ETI	QPRC	DEVELOP	Active	Simon Boulton	Possible	High	High	17/03/2021	
1	David Perry	18/05/2020	Risk	External	Catchment development	New liquid trade waste in catchment discharges toxins or inhibitors	New or change in business discharging	Potential inhibition of treatement - effluent quality criteria breach	Anytime	Possible	High	High	Follow QPRC trade waste policy. Notify design team of any new significant trade waste discharges.	QPRC	ALL	Active	Simon Boulton	Unlikely	High	Moderate	17/03/2021	
9	David Perry	18/05/2020	Risk	Procurement	Equipment contracts	Equipment supplied does not meet requirements during design, testing or commissioning.	Ambiguity over responsibility for equipment performance	Contractual dispute over equipment / STP performance.	Deliver	Possible	Medium	Moderate	1. Review scope & responsibility with engaged Suppliers 2. Contracts provided to tenderer at time of Construction Tender 3. Include in Tender evaluation / negotiation	HH2O	DEVELOP	Active	David Perry	Possible	Medium	Moderate	17/03/2021	
12	David Perry	18/05/2020	Risk	Quality	Equipment supplied	Equipment supplied is poor quality or does not meet requirements during design, testing or commissioning.	Equipment testing Commissioning	Poor ongoing operational performance, construction variations, delays	Deliver	Likely	High	High	1) Early vendor engagement to review quality of equipment provided 2) Request certified equipment supply data 3) FAT and SAT	HH2O	DEVELOP	Active	David Perry	Possible	Medium	Moderate	17/03/2021	
13	David Perry	18/05/2020	Risk	Quality	Market constraints	Lack of skilled applicators capable of meeting quality requirements results in poor quality concrete coating application	Application of coatings during construction	Poor quality concrete lining.	Deliver	Almost Certain	Medium	High	Evaluate separately and include a nominated subcontractor.	HH2O	DEVELOP	Active	David Perry	Likely	Low	Moderate	17/03/2021	
30	David Perry	18/05/2020		Scope	Infrastructure	Construction of new STP	QPRC opportunity	Opportunity to close Nimrod Road to improve security / access arrangements	Develop	Likely	Medium	High	Progress application to purchase land, design to consider opportunities for access optimisation	QPRC	DEVELOP	Active	Derek Tooth	Possible	Medium	Moderate	17/03/2021	
5	David Perry	18/05/2020	Opportunity	Financial	NSW, ACT and Commonweath Funding	Grant funding becomes available for QSTP	Government stimulus packages	Opportunity for funding project or partial project	Develop	Likely	Medium	High	(1) Monitor funding opportunities suitable for the scope and site. (2) Prepare Business Case	QPRC	DEVELOP	Active	Simon Boulton	Unlikely	Medium	Moderate	17/03/2021	
6	David Perry	18/05/2020	Risk	Interdependancy	Existing power supply	There is limited power supply available. A delay in upgrading the high voltage network delays the connection of power to the site.	Testing and commissioning	Potential delay to commissioning if power supply is unvailable.	Develop	Possible	High	High	1. Submit application to EvoEnergy for connection 2. Consultation with EvoEnergy 3. Have backup generators available for early commissioing.	HH2O	DEVELOP	Active	David Perry	Possible	Low	Moderate	17/03/2021	
7	David Perry	18/05/2020	Risk	Interdependancy	NSW DPE and Section 60 regulation	DPE delay project funding or approval under Section 60 because the project is not supported by an IWCM	Design report submission to DPE	Potential regulatory delays to NSW DPE approval for construction	Develop	Possible	Medium	Moderate	1. Prepare IWCM in time for Final EIS 2. Consultation with NSW DPIE through design phase	HH2O	DEVELOP	Active	David Perry	Unlikely	Medium	Moderate	17/03/2021	
11	David Perry	18/05/2020	Risk	Quality	Designer processes Client information Equipment information	Design errors, ommissions or incorrect information in for construction documentation	Construction tendering and construction	Potential delays / rework	Develop	Possible	Medium	Moderate	1). Follow HSEQ plan - including quality resources and signoff 2) Allow sufficient time in program for design and	HH2O	DEVELOP	Active	David Perry	Unlikely	Medium	Moderate	17/03/2021	
14	David Perry	18/05/2020	Risk	Quality	Market constraints	Limitations of contractor expertise / resource availability to undertake commissioning to required quality standards	Testing and commissioning	Delays during commissioning	Deliver	Almost Certain	Medium	High	Develop a dedicated commissioning team to act for the Principal to assist commissioning.	HH2O	DEVELOP	Active	David Perry	Possible	Low	Moderate	17/03/2021	
15	David Perry	18/05/2020	Risk	Quality	DPE	Regulator / funding partners drive removal of operator scope to drive value for money	Review of Design Report	Scope reductions result in greater difficulty operating the STP or greater operating costs / missed opportunity	Develop	Possible	Medium	Moderate	Engage DPE through the detailed design stage.	HH2O	DEVELOP	Active	David Perry	Unlikely	Medium	Moderate	17/03/2021	
17	David Perry	18/05/2020	Risk	Resources	QPRC resources	Inadequate QPRC resources to support design and tender	Detailed design and tendering	Delays in project Sponsor tasks (provide information, grant funding, review & coordination)	Develop	Possible	Medium	Moderate	1) Review resources. Consider additional resource requirements. 2) Adopt staged, workshop style reviews for operator team and owner reviews. 3) Plan resources for EOI phase 4) Include consultant resources in tendering phases	QPRC	DEVELOP	Active	Simon Boulton	Possible	Low	Moderate	17/03/2021	
24	David Perry	18/05/2020		Scope	Regulators	Concept design review	Design development	Build area, impact during construction and scope of work for EIS has expanded - design and deliver cost impacts	Develop	Almost Certain	Medium	High	Revise WBS and scope to deliver additional design. Revise and update budget	HH2O	DEVELOP	Active	David Perry	Possible	Low	Moderate	17/03/2021	
27	David Perry	18/05/2020		Scope	QPRC	Construction of new STP	Decommissioning existing STP	Opportunity to decommission / demolish and make save existing STP as part of construction contract	Develop	Likely	Medium	High	Develop decommissioning plan Include price estimate as separte project Check EIS triggers and planning approval requirements	HH2O	DEVELOP	Active	David Perry	Unlikely	Medium	Moderate	17/03/2021	
23	David Perry	18/05/2020		Scope	Regulators	Concept design review	DPIE feedback on digestion	Larger digester requires rework of concept layout	Develop	Almost Certain	Low	High	Complete rework	HH2O	DEVELOP	Closed	David Perry	Rare	Very Low	Low	17/03/2021	
25	David Perry	18/05/2020		Scope	Regulators	Draft EIS	Regulator or stakeholder feedback on EIS	Additional water quality & dispersion modelling scope / delays	EIS consultation	Possible	High	High	c] Plan for additional WQ modelling ci Run in parrallel to project delivery	HH2O	DEVELOP	Closed	David Perry	Rare	Very Low	Low	17/03/2021	
29	David Perry	18/05/2020		Scope	Infrastructure	Design flows exceed the hydraulic capacity of the Jerrabomberra or Morisset Trunk sewers	Existing hydraulic capacity, population growth, wet weather flow factors	Additional network upgrade may be required to transfer flows to the STP. Additional scope / cost / planning requirements	Develop	Likely	Medium	High	Undertake trunk network model Allow for connections as part of upgrade work	HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
31	David Perry	18/05/2020		Scope	Regulators	Consultation with ACT Roads	EIS consultation	ACT Roads may request an upgrade to the intersection of Railway St and Mountain Rd. Additional project cost.	Develop	Likely	Medium	High	Engage with ACT Roads	HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
32	David Perry	18/05/2020		Scope	Regulators	Odour impact assessment	EIS consultation	Odour control at inlet works	Develop	Possible	Medium	Moderate	Monitor impact of zoning on need for odour control	HH2O	DEVELOP	Closed	David Perry	Rare	Very Low	Low	17/03/2021	
33	Therese Flapper	18/05/2020		Scope	Regulators	EIS Consultation	Existing biosolids onsite	Additional costs associated with earthworks and contaminated soil handling	Develop	Possible	Low	Moderate	Review EIS conitions for biosolids management	HH2O	DEVELOP	Closed	David Perry	Rare	Very Low	Low	17/03/2021	

ID	Risk Author	Date Registered	Type	Key Risk Category	Source of Risk or Opportunity	Description of the Risk or Opportunity	Event/triggers that may cause the risk to be realised	Potential consequence on the project	Timing of the Event	Initial Likelihood	Initial Consequence	Initial Rating	Mitigation Measures	Responsible Entity	When (By End of Phase)	Risk Status	Responsible Officer	Residual Likelihood	Residual Consequence	Residual Rating	Date of review	Notes
34	David Perry	18/05/2020		Scope	Regulators	Decomissioning of maturation ponds	Competing stakeholder drivers	Further scope development of river bank work along maturation ponds needed.	Develop	Rare	Very Low	Low	Further confirm scope during EIS revision with Allison Rowel to meet Airport and ecologist scope.	HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
35	David Perry	18/05/2020		Scope	Regulators	Regulatory feedback on Draft EIS requests tighter **ammonia**	Uncertainty of environmental impact mitigation requirements	For design / ongoing operation (ammonia)	Exhibition of Drat EIS	Possible	High	High		HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
36	David Perry	18/05/2020		Scope	Regulators	Regulatory feedback on Draft EIS requests tighter **TP**	Uncertainty of environmental impact mitigation requirements	Tighter operating conditions imposed	Exhibition of Drat EIS	Possible	Medium	Moderate		HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
37	David Perry	18/05/2020		Scope	Regulators	Regulatory feedback on Draft EIS requests lower **BOD** to meet **load limits**	Uncertainty of environmental impact mitigation requirements	Load limits BOD	Exhibition of Drat EIS	Possible	Medium	Moderate		HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
38	David Perry	18/05/2020		Scope	Regulators	Regulatory feedback on Draft EIS requests **lower TDS**	Uncertainty of environmental impact mitigation requirements	TDS	Exhibition of Drat EIS	Unlikely	Medium	Moderate		HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
40	David Perry	18/05/2020		Scope	Regulators	Scope requirement to provide reliable treatement to satisfy EPA and UTR	Concept scope development	Additional scope - deisel transfer and storage.	Develop	Almost Certain	Low	High	Assess and incorporate scope into project.	HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
41	David Perry	18/05/2020		Scope	Brief	Proposed work along river bank (mat ponds, outfall)	Construction	River bank may require bank stabilisation. Additional design and construction costs.	Develop	Unlikely	High	Moderate	Assess if required	HH2O	DEVELOP	Closed	David Perry	Rare	Very Low	Low	17/03/2021	
42	David Perry	18/05/2020		Site Conditions	Existing conditions	Earthworks for construction & decommissioning work on existing STP	Discovery of ACM - fragments in soil etc	Construction delays & costs	Deliver	Likely	Very Low	Moderate	Brief contractors in ETI Rate based pricing or other risk sharing Unidentified finds procedure in place	HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
43	David Perry	18/05/2020		Site Conditions	Existing conditions	Earthworks for construction	Discovery of primary sludge, screening material other burried waste	Construction delays & costs	Deliver	Likely	Very Low	Moderate	Brief contractors in ETI Rate based pricing or other risk sharing Unidentified finds procedure in place	HH2O	DEVELOP	Active	David Perry	Rare	Very Low	Low	17/03/2021	
44	David Perry	18/05/2020		Site Conditions	Land ownership	Feedback on Draft EIS	STP site is owned by ACT with a lease in place to QPRC		Develop	Rare	High	Moderate	Obtain confirmation of extention of lease	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
45	David Perry	18/05/2020		Site Conditions		Geotechnical	Adverse conditions	Design changes / cost increase	Deliver	Unlikely	Medium	Moderate	Support design with geotechnical investigations	HH2O	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
46	David Perry	18/05/2020		Site Conditions		Ground water		Contamination / construction management	Develop	Possible	Low	Moderate	Continue operational monitoring	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
47	David Perry	18/05/2020		Stakeholder		Interest group / birds / ponds	DA consultation	Potential community objection	Develop	Likely	Very Low	Moderate	Engage during delivery of stakeholder engagement	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
48	David Perry	18/05/2020		Stakeholder		Solar panels / air plume modelling - may not be acceptable to Canberra Airport		Potential stakeholder objection	Develop	Unlikely	Very Low	Low	Engage during delivery of stakeholder engagement	QPRC	DEVELOP	Closed		Rare	Very Low	Low	17/03/2021	Discussions with QPRC progressing on WAE document management options.
50	David Perry	18/05/2020		Sustainability		Inclusion too late	Delay in engagement of AECOM	Late opportunities may not be able to be included in the project.	Develop	Possible	Low	Moderate	Staged focus on initiatives plan. Raise initiatives prior to design progress	AECOM	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
51	David Perry	18/05/2020		Sustainability		Lack of stakeholder suport for sustainability	Funding constraints	Sustainability inititives may be removed from the project	Develop	Possible	Low	Moderate	Focus on sustainability inititives that add value to the project and plant operators.	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	ACT WHS requirements were reviewed as part of preparation of the Project HSEQ plan.
52	David Perry	18/05/2020		Sustainability		Removed from scope by Value for Money	Funding constraints	Sustainability inititives may be removed from the project	Develop	Possible	Low	Moderate	Focus on sustainability inititives that add value to the project and plant operators.	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
53	David Perry	18/05/2020		Time		Delay in community consultation		Potentail delay in submission of Draft EIS	Develop	Unlikely	Low	Low	Undertake targeted community consultation to support EIS	QPRC	DEVELOP	Closed		Rare	Very Low	Low	17/03/2021	
54	David Perry	18/05/2020		Time		(Blank)			Develop	Rare	Very Low	Low			DEVELOP	Closed		Rare	Very Low	Low	17/03/2021	
55	David Perry	18/05/2020		Time		Opportunity to fast track	Plant failing licence	Opportunity for design & tender Early works, within planning requirements	Develop	Possible	Very High	High	Use of early vendor engagement contracts to enable accellerated construction program.	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
56	David Perry	18/05/2020		Time		Funding	Insufficient funding	Delay or rescoping	Develop	Likely	Very High	Extreme	Progress Business Case and funding applications	QPRC	DEVELOP	Closed		Rare	Very Low	Low	17/03/2021	
57	David Perry	18/05/2020		WHS		WHS communication with QPRC Operators on existing	Resource	Operators not engaged in new STP	Develop	Possible	Low	Moderate	Include operations staff in project development and workshops.	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
58	David Perry	18/05/2020		WHS		WHS communication to contractor	Documentation and tender processes	WHS Risks not communicated	Deliver	Unlikely	Medium	Moderate	Use of Safety in Design Registers Tender briefing procedures.	HH2O	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	Briefing meeting - November 2019 with invitation to keep informed.
59	David Perry	18/05/2020		WHS		WHS communication to end users Operator / maintainer	Documentation and training processes	WHS Risks not communicated	Deliver	Possible	High	High	Use of Safety in Design Registers & Training	HH2O	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
60	David Perry	18/05/2020		WHS		ACM on site	Existing site conditions	WHS risk	Deliver	Almost Certain	Very Low	Moderate	Use of Safety in Design Registers & Training	QPRC	DEVELOP	Closed		Rare	Very Low	Low	17/03/2021	
61	David Perry	18/05/2020		WHS		Delinquents - Nimrod Rd		Site safety	Operation	Likely	Low	Moderate	Site Security. Progress closing of Nimrod Road.	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
62	David Perry	26/06/2020		Regulatory	ACT EPA	EPA modify the Environmental Authority to provide 100%ile limits	EPA policy	Plant fails to comply with EA during wet weather flow	Operation	Almost Certain	High	Extreme	Engage with EPA on licence requirements. Avoid 100%ile limits that cannot be realistically achieved. Propose alternative maximum or alternative conditions - e.o maximum applies only to 3 ADWF.	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
63	David Perry	30/09/2020		Stakeholder	ACT Governement	Development close to the STP	ACT land planning	Could trigger odour complaints or the need to install odour control on the inlet works.	Anytime	Possible	Medium	Moderate	Get more information on proposed development. Check against odour model. Establish planning buffer around STP.	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	Review of ACT Heritage Register undertaken (May 2019). Heritage site work complete.
64	David Perry	18/02/2021		Scope	ICON Water	Renewal of ICON biosolids treatment process	ICON water investigation into regional biosolids disposal facility	Opportunitiy for QSTP to reduce upgrade scope - remove aerobic doester. imorove bioP removal.	Develop	Possible	High	High	Monitor ICON Water investigation and recommendations. Adaptive planning for QSTP duestion.	QPRC	DEVELOP	Active		Rare	Very Low	Low	17/03/2021	
65	David Perry	6/04/2021		Environmental		Department of Agriculture, Water and Environement request EPBC referal for indirect impact on golden sun moth habitat		Delay in approvals		Rare	Very Low	Low				Active		Rare	Very Low	Low	17/03/2021	Updated 6/11 based on EPSDD Scoping Study & improve clarify of mitigation required. DP

Investment Report Pack

Queanbeyan-Palerang Regional Council

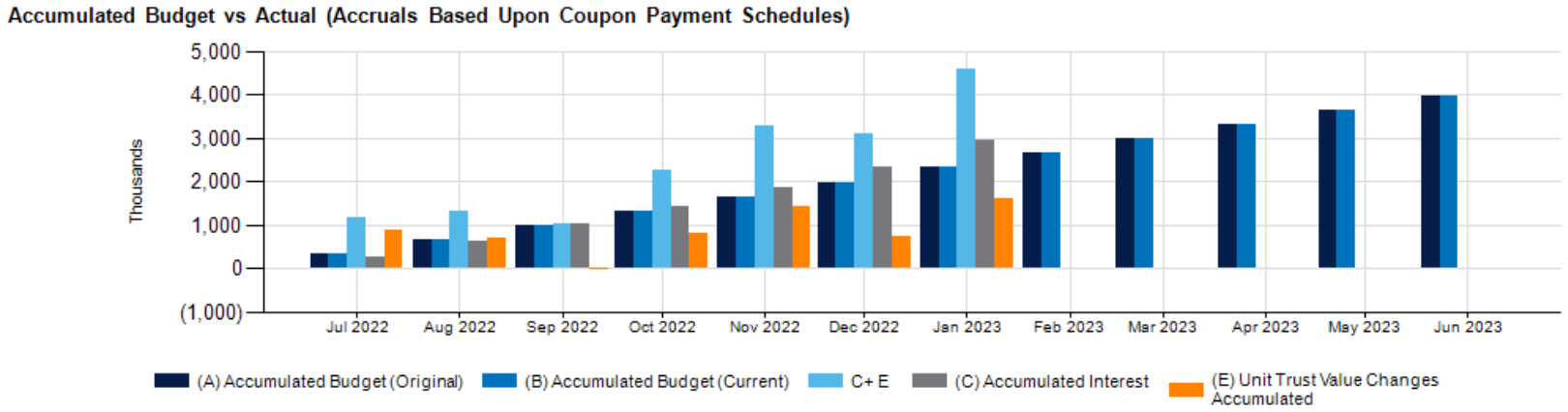
At 31 January 2023

Contents

1. Budget vs Actual Interest Income 1 July 2022 to 30 June 2023

Month / Year	(A) Income Interest Budget (Original) Running Total	Interest Income Budget (Current) For Month	(B) Interest Income Budget (Current) Running Total	(T) Interest Income Received/Accrued For Month	(C) Interest Income Received/Accrued Running Total	Accrued Interest Acquired For Month	Accrued Interest Acquired Running Total	(U) Unit Trust Market Value Changes	(E) Unit Trust Market Value Changes Running Total	'Return' For Month (T +U)
Jul 2022	332,064.00	332,064.00	332,064.00	285,276.10	285,276.10	0.00	0.00	892,068.77	892,068.77	1,177,344.87
Aug 2022	664,128.00	332,064.00	664,128.00	345,376.21	630,652.31	0.00	0.00	(191,495.87)	700,572.90	153,880.34
Sep 2022	996,192.00	332,064.00	996,192.00	388,432.77	1,019,085.08	0.00	0.00	(716,656.66)	(16,083.76)	(328,223.89)
Oct 2022	1,328,256.00	332,064.00	1,328,256.00	416,330.48	1,435,415.56	0.00	0.00	825,485.66	809,401.90	1,241,816.14
Nov 2022	1,660,320.00	332,064.00	1,660,320.00	413,311.06	1,848,726.62	0.00	0.00	634,379.94	1,443,781.84	1,047,691.00
Dec 2022	1,992,384.00	332,064.00	1,992,384.00	497,971.07	2,346,697.69	0.00	0.00	(690,353.64)	753,428.20	(192,382.55)
Jan 2023	2,324,448.00	332,064.00	2,324,448.00	615,901.24	2,962,598.93	0.00	0.00	878,003.73	1,631,431.94	1,493,904.96
Feb 2023	2,656,512.00	332,064.00	2,656,512.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar 2023	2,988,576.00	332,064.00	2,988,576.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Apr 2023	3,320,640.00	332,064.00	3,320,640.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May 2023	3,652,704.00	332,064.00	3,652,704.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jun 2023	3,984,768.00	332,064.00	3,984,768.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		3,984,768.00		2,962,598.93		0.00		1,631,431.94		4,594,030.87

Notes on Table Above
1A. The numbers shown in Column T are the accrual interest amounts for that month combined with the At Call Deposit, Unit Trust and Unassigned interest and distribution income received during that month.
1B. The accruals shown in this section have been calculated using each security's coupon schedule.



2. Portfolio Valuation At 31 January 2023

	Fixed Interest Security	Security Rating	ISIN	Face Value Original	Bond Factor	Face Value Current	Capital Price	Accrued Interest Price	Unit Price Notional	Unit Count	Market Value	% Total Value	Running Yield	Weighted Running Yield
At Call Deposit														
	AMP QPRC At Call	S&P ST A2		873,946.68	1.00000000	873,946.68	100.000	0.000			**873,946.68**	0.36%	1.50%	
	BENAU At Call	Moodys A3		17,356.38	1.00000000	17,356.38	100.000	0.000			**17,356.38**	0.01%	3.05%	
	BENAU transaction At Call	Moodys A3		143,059.45	1.00000000	143,059.45	100.000	0.000			**143,059.45**	0.06%	0.00%	
	NAB At Call	S&P AA-		4,274,396.96	1.00000000	4,274,396.96	100.000	0.000			**4,274,396.96**	1.76%	3.40%	
	NAB General At Call	S&P AA-		6,222,758.20	1.00000000	6,222,758.20	100.000	0.000			**6,222,758.20**	2.56%	3.10%	
	NAB Links At Call	S&P AA-		337,706.35	1.00000000	337,706.35	100.000	0.000			**337,706.35**	0.14%	3.10%	
				11,869,224.02		11,869,224.02					**11,869,224.02**	4.88%		3.05%
Covered Floating Bond														
	ING 0.98 08 Dec 2025 COVEREDFLO	Moodys Aaa	AU3FN0074175	3,500,000.00	1.00000000	3,500,000.00	100.229	0.607			**3,529,260.00**	1.45%	4.10%	
				3,500,000.00		3,500,000.00					**3,529,260.00**	1.45%		4.10%
Fixed Rate Bond														
	MACQ 1.7 12 Feb 2025 Fixed	S&P A+	AU3CB0270387	6,000,000.00	1.00000000	6,000,000.00	94.451	0.795			**5,714,760.00**	2.35%	1.66%	
	NTTC 0.8 15 Jun 2024 - Issued 16 Mar 2021 - Queanbeyan Regional Council Fixed	Moodys Aa3		5,000,000.00	1.00000000	5,000,000.00	100.000	0.504			**5,025,200.00**	2.07%	0.80%	
	NTTC 1.1 15 Dec 2024 - Issued 16 Sep 2020 Fixed	Moodys Aa3		3,000,000.00	1.00000000	3,000,000.00	100.000	0.142			**3,004,260.00**	1.24%	1.10%	
	NTTC 1.1 15 Jun 2025 - Issued 16 Mar 2021 - Queanbeyan Regional Council Fixed	Moodys Aa3		5,000,000.00	1.00000000	5,000,000.00	100.000	0.693			**5,034,650.00**	2.07%	1.10%	
	SunBank 2.5 25 Jan 2027 Fixed	S&P A+	AU3CB0285955	5,000,000.00	1.00000000	5,000,000.00	91.892	0.041			**4,596,650.00**	1.89%	2.66%	
				24,000,000.00		24,000,000.00					**23,375,520.00**	9.62%		1.49%
Floating Rate Deposit														
	Westpac 1.01 17 Apr 2024 1827DAY FRD	S&P AA-		3,000,000.00	1.00000000	3,000,000.00	100.000	0.157			**3,004,706.31**	1.24%	4.09%	
	Westpac 1 29 Apr 2024 1827DAY FRD	S&P AA-		4,000,000.00	1.00000000	4,000,000.00	100.000	0.011			**4,000,458.48**	1.65%	4.18%	
	Westpac 0.98 03 Jul 2024 1827DAY FRD	S&P AA-		5,000,000.00	1.00000000	5,000,000.00	100.000	0.306			**5,015,323.30**	2.06%	4.00%	
				12,000,000.00		12,000,000.00					**12,020,488.09**	4.95%		4.08%
Floating Rate Note														
	Auswide 1.05 17 Mar 2023 FRN	Moodys Baa2	AU3FN0053567	2,500,000.00	1.00000000	2,500,000.00	100.044	0.501			**2,513,625.00**	1.03%	4.25%	
	CBA 0.93 16 Aug 2023 FRN	S&P AA-	AU3FN0044046	1,500,000.00	1.00000000	1,500,000.00	100.278	0.829			**1,516,605.00**	0.62%	3.98%	
	CBA 1.13 11 Jan 2024 FRN	S&P AA-	AU3FN0046561	5,000,000.00	1.00000000	5,000,000.00	100.631	0.245			**5,043,800.00**	2.08%	4.47%	
	CBA 1.15 13 Jan 2028 FRN	S&P AA-	AU3FN0074514	3,500,000.00	1.00000000	3,500,000.00	100.614	0.220			**3,529,190.00**	1.45%	4.46%	
	CUA 0.9 21 Feb 2023 FRN	Moodys Baa1	AU3FN0052924	1,100,000.00	1.00000000	1,100,000.00	100.014	0.772			**1,108,646.00**	0.46%	3.97%	

	HSBCSyd 0.83 27 Sep 2024 FRN	S&P AA-	AU3FN0050498	4,000,000.00	1.00000000	4,000,000.00	100.045	0.380			**4,017,000.00**	1.65%	4.08%
	HSBCSyd 1.1 25 Aug 2027 FRN	Moodys Aa3	AU3FN0071015	3,750,000.00	1.00000000	3,750,000.00	100.196	0.770			**3,786,225.00**	1.56%	4.20%
	MACQ 0.84 12 Feb 2025 FRN	S&P A+	AU3FN0052908	3,000,000.00	1.00000000	3,000,000.00	99.956	0.828			**3,023,520.00**	1.24%	3.87%
	MACQ 0.48 09 Dec 2025 FRN	Moodys A2	AU3FN0057709	2,000,000.00	1.00000000	2,000,000.00	98.713	0.524			**1,984,740.00**	0.82%	3.61%
	RACB 0.93 24 Feb 2023 FRN	Moodys Baa1	AU3FN0053146	1,850,000.00	1.00000000	1,850,000.00	100.012	0.750			**1,864,097.00**	0.77%	4.03%
	NAB 0.93 26 Sep 2023 FRN	S&P AA-	AU3FN0044996	3,000,000.00	1.00000000	3,000,000.00	100.343	0.389			**3,021,960.00**	1.24%	4.18%
	NAB 1.04 26 Feb 2024 FRN	S&P AA-	AU3FN0046777	2,000,000.00	1.00000000	2,000,000.00	100.599	0.728			**2,026,540.00**	0.83%	4.15%
	NAB 0.92 19 Jun 2024 FRN	S&P AA-	AU3FN0048724	3,200,000.00	1.00000000	3,200,000.00	100.501	0.486			**3,231,584.00**	1.33%	4.12%
	NAB 0.72 25 Feb 2027 FRN	S&P AA-	AU3FN0066528	4,000,000.00	1.00000000	4,000,000.00	99.107	0.700			**3,992,280.00**	1.64%	3.82%
	NAB 1.2 25 Nov 2027 FRN	S&P AA-	AU3FN0073896	4,400,000.00	1.00000000	4,400,000.00	100.849	0.789			**4,472,072.00**	1.84%	4.30%
	NPBS 1.4 06 Feb 2023 FRN	S&P BBB	AU3FN0040606	1,250,000.00	1.00000000	1,250,000.00	100.011	1.039			**1,263,125.00**	0.52%	4.46%
	SunBank 0.93 22 Aug 2025 FRN	S&P A+	AU3FN0070892	2,200,000.00	1.00000000	2,200,000.00	100.186	0.768			**2,220,988.00**	0.91%	4.01%
	SunBank 0.48 15 Sep 2026 FRN	S&P A+	AU3FN0062964	2,000,000.00	1.00000000	2,000,000.00	98.335	0.470			**1,976,100.00**	0.81%	3.65%
	SunBank 0.78 25 Jan 2027 FRN	S&P A+	AU3FN0065694	5,000,000.00	1.00000000	5,000,000.00	99.039	0.066			**4,955,250.00**	2.04%	4.04%
	SunBank 1.25 14 Dec 2027 FRN	S&P A+	AU3FN0074241	2,850,000.00	1.00000000	2,850,000.00	100.766	0.579			**2,888,332.50**	1.19%	4.40%
				58,100,000.00		58,100,000.00					**58,435,679.50**	24.05%	4.10%
Term Deposit													
	AMP 1 08 Mar 2023 364DAY TD	S&P ST A2		2,000,000.00	1.00000000	2,000,000.00	100.000	0.899			**2,017,972.60**	0.83%	1.00%
	BOQ 1.65 29 Mar 2023 364DAY TD	Moodys ST P-2		10,000,000.00	1.00000000	10,000,000.00	100.000	1.388			**10,138,780.80**	4.17%	1.65%
	BOQ 3.7 08 May 2024 728DAY TD	Moodys A3		10,000,000.00	1.00000000	10,000,000.00	100.000	2.686			**10,268,630.10**	4.23%	3.70%
	BVIC 4.5 12 Jul 2023 183DAY TD	S&P ST A2		10,000,000.00	1.00000000	10,000,000.00	100.000	0.259			**10,025,890.40**	4.13%	4.50%
	CBA 3.91 15 Mar 2023 91DAY TD	S&P ST A1+		10,000,000.00	1.00000000	10,000,000.00	100.000	0.514			**10,051,419.20**	4.14%	3.91%
	CBA 4.08 12 Apr 2023 92DAY TD	S&P ST A1+		30,000,000.00	1.00000000	30,000,000.00	100.000	0.235			**30,070,422.00**	12.37%	4.08%
	ME Bank 0.85 03 Feb 2023 365DAY TD	Moodys ST P-2		2,000,000.00	1.00000000	2,000,000.00	100.000	0.843			**2,016,860.28**	0.83%	0.85%
	MYS 1.1 08 Mar 2023 364DAY TD	Moodys ST P-2		5,000,000.00	1.00000000	5,000,000.00	100.000	0.988			**5,049,424.65**	2.08%	1.10%
	MYS 3.08 10 May 2023 364DAY TD	Moodys ST P-2		10,000,000.00	1.00000000	10,000,000.00	100.000	2.236			**10,223,616.40**	4.21%	3.08%
	NAB 0.65 04 Oct 2023 728DAY TD	S&P ST A1+		6,000,000.00	1.00000000	6,000,000.00	100.000	0.208			**6,012,501.36**	2.47%	0.65%
	NAB 0.8 28 Aug 2024 1098DAY TD	S&P AA-		3,000,000.00	1.00000000	3,000,000.00	100.000	0.346			**3,010,389.03**	1.24%	0.80%
	Westpac 1.11 10 Nov 2023 730DAY TD	S&P ST A1+		7,000,000.00	1.00000000	7,000,000.00	100.000	0.249			**7,017,455.90**	2.89%	1.11%
				105,000,000.00		105,000,000.00					**105,903,362.72**	43.58%	2.99%
Unit Trust													
	NSWTC Long Term Growth Fund UT	S&P AA+		16,545,447.02		16,545,447.02			0.9825	16,840,321.0410	**16,545,447.02**	6.81%	
	NSWTC Medium Term Growth Fund UT	S&P AA+		11,319,823.57		11,319,823.57			0.9610	11,779,825.7612	**11,319,823.57**	4.66%	

	27,865,270.59	27,865,270.59	**27,865,270.59**	11.47%	
Portfolio Total	242,334,494.61	242,334,494.61	**242,998,804.92**	100.00%	3.22%

Note: For holdings in unit funds and similar securities, the face value (original and current) columns will display market values.

3. Portfolio Compliance At 31 January 2023

Short Term Issuer/Security Rating Group	Market Value	% Total Value
A2	**40,346,491.81**	16.60%
A1+	**53,151,798.46**	21.87%
Portfolio Total	**93,498,290.27**	38.48%

Market Value by Security Rating Group (Short Term)

Long Term Issuer/Security Rating Group	Market Value	% Total Value
BBB+ to BBB-	**6,749,493.00**	2.78%
A+ to A-	**37,789,386.43**	15.55%
AA+ to AA-	**101,432,375.21**	41.74%
AAA	**3,529,260.00**	1.45%
Portfolio Total	**149,500,514.64**	61.52%

Market Value by Security Rating Group (Long Term)

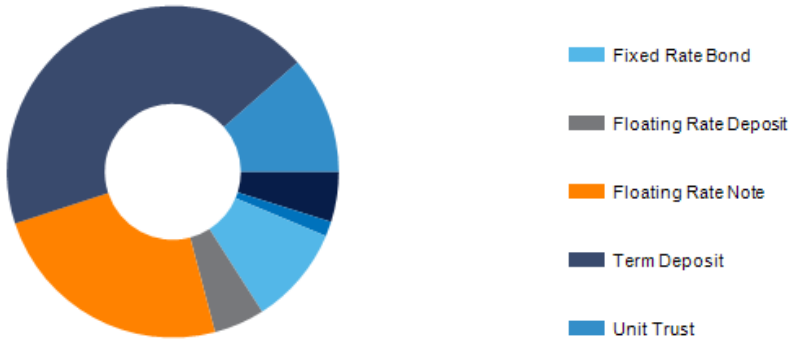
Issuer	Market Value	% Total Value
AMP Bank Ltd	2,891,919.28	1.19%
Auswide Bank Limited	2,513,625.00	1.03%
Bank of Queensland Ltd	20,407,410.90	8.40%
BankVic	10,025,890.40	4.13%
Bendigo & Adelaide Bank Ltd	160,415.83	0.07%
Commonwealth Bank of Australia Ltd	50,211,436.20	20.66%
Credit Union Australia Ltd t/as Great Southern Bank	1,108,646.00	0.46%
HSBC Sydney Branch	7,803,225.00	3.21%
ING Bank Australia Limited	3,529,260.00	1.45%
Macquarie Bank	10,723,020.00	4.41%
Members Banking Group Limited t/as RACQ Bank	1,864,097.00	0.77%
Members Equity Bank Ltd	2,016,860.28	0.83%
MyState Bank Ltd	15,273,041.05	6.29%
National Australia Bank Ltd	36,602,187.90	15.06%
Newcastle Permanent Building Society Ltd	1,263,125.00	0.52%
Northern Territory Treasury Corporation	13,064,110.00	5.38%
NSW Treasury Corporation	27,865,270.58	11.47%
Suncorp-Metway Ltd	16,637,320.50	6.85%
Westpac Banking Corporation Ltd	19,037,943.99	7.83%
Portfolio Total	242,998,804.91	100.00%

Market Value by Issuer

AMP Bank Ltd
Auswide Bank Limited
Bank of Queensland Ltd
BankVic
Bendigo & Adelaide Bank Ltd
Commonwealth Bank of Australia Ltd
Credit Union Australia Ltd t/as Great Southern Bank
HSBC Sydney Branch
ING Bank Australia Limited
Macquarie Bank
Members Banking Group Limited t/as RACQ Bank
Members Equity Bank Ltd
MyState Bank Ltd
National Australia Bank Ltd
Newcastle Permanent Building Society Ltd
Northern Territory Treasury Corporation
NSW Treasury Corporation
Suncorp-Metway Ltd
Westpac Banking Corporation Ltd

Security Type	Market Value	% Total Value
At Call Deposit	**11,869,224.02**	4.88%
Covered Floating Bond	**3,529,260.00**	1.45%
Fixed Rate Bond	**23,375,520.00**	9.62%
Floating Rate Deposit	**12,020,488.09**	4.95%
Floating Rate Note	**58,435,679.50**	24.05%
Term Deposit	**105,903,362.72**	43.58%
Unit Trust	**27,865,270.58**	11.47%
Portfolio Total	**242,998,804.91**	100.00%

Market Value by Security Type



Market Value by Term Remaining

Term Remaining	Market Value	% Total Value
0 to < 1 Year	**148,690,696.19**	61.19%
1 to < 3 Years	**64,112,009.22**	26.38%
3 to < 5 Years	**30,196,099.50**	12.43%
Portfolio Total	**242,998,804.91**	100.00%

Note: Term Remaining is calculated using a weighted average life date (WAL) where appropriate and available otherwise the interim (initial) maturity date is used.

Investment Policy Compliance	
Legislative Requirements	Fully compliant
Issuer	Fully compliant (34 limits)
Security Rating Group	Fully compliant (9 limits)
Term Group	Fully compliant (4 limits)

4. Portfolio Statistics For Period Ending 31 January 2023

Trading Book		1 Month	3 Month	12 Month	Since Inception
Queanbeyan-Palerang Regional Council					
	Portfolio Return (1)	0.59%	1.06%	0.73%	2.00%
	Performance Index (2)	0.27%	0.77%	1.52%	0.96%
	Excess Performance (3)	0.32%	0.29%	-0.79%	1.04%

Notes

1 Portfolio performance is the rate of return of the portfolio over the specified period

2 The Performance Index is the Bloomberg AusBond Bank Bill Index (Bloomberg Page BAUBIL)

3 Excess performance is the rate of return of the portfolio in excess of the Performance Index

Trading Book	Weighted Average Running Yield
Queanbeyan-Palerang Regional Council	3.22

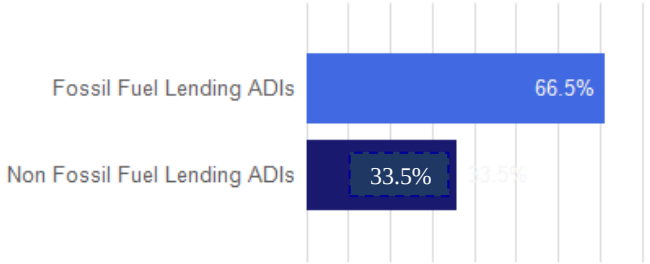
5. Portfolio Fossil Fuel Summary For Period Ending 31 January 2023

Portfolio Summaries At 31 January 2023

Portfolio Summary by Fossil Fuel Lending ADIs

ADI Lending Status	% Total	Current Period	% Total	Prior Period
Fossil Fuel Lending ADIs				
AMP Bank Ltd	1.3%	2,873,946.68	1.2%	2,873,264.82
Bank of Queensland Ltd	9.3%	20,000,000.00	8.6%	20,000,000.00
Commonwealth Bank of Australia Ltd	23.3%	50,000,000.00	7.1%	16,500,000.00
HSBC Sydney Branch	3.6%	7,750,000.00	3.3%	7,750,000.00
ING Bank Australia Limited	1.6%	3,500,000.00	1.5%	3,500,000.00
Macquarie Bank	5.1%	11,000,000.00	4.7%	11,000,000.00
National Australia Bank Ltd	17.0%	36,434,861.51	41.5%	96,450,764.64
Westpac Banking Corporation Ltd	5.1%	11,000,000.00	4.7%	11,000,000.00
	66.5%	142,558,808.19	72.7%	169,074,029.46
Non-Fossil Fuel Lending ADIs				
Auswide Bank Limited	1.2%	2,500,000.00	1.1%	2,500,000.00
BankVic	4.7%	10,000,000.00	0.0%	0.00
Bendigo & Adelaide Bank Ltd	0.1%	160,415.83	0.7%	1,651,037.48
Credit Union Australia Ltd t/as Great Southern Bank	0.5%	1,100,000.00	0.5%	1,100,000.00
Members Banking Group Limited t/as RACQ Bank	0.9%	1,850,000.00	0.8%	1,850,000.00
Members Equity Bank Ltd	0.9%	2,000,000.00	0.9%	2,000,000.00
MyState Bank Ltd	7.0%	15,000,000.00	6.5%	15,000,000.00
Newcastle Permanent	0.6%	1,250,000.00	0.5%	1,250,000.00

Fossil Fuel vs Non-Fossil Fuel Lending ADI



Building Society Ltd					
Northern Territory Treasury Corporation	6.1%	13,000,000.00	5.6%	13,000,000.00	
Suncorp-Metway Ltd	8.0%	17,050,000.00	7.3%	17,050,000.00	
Westpac Banking Corporation Ltd	3.7%	8,000,000.00	3.4%	8,000,000.00	
	33.5%	71,910,415.83	27.3%	63,401,037.48	
Total Portfolio		214,469,224.02		232,475,066.94	

All amounts shown in the table and charts are Current Face Values for fixed interest holdings and Market Values for unit trust holdings (if included).
The above percentages are relative to the portfolio total and may be affected by rounding.
A fossil fuel lending ADI appearing in the non-fossil fuel related table will indicate that the portfolio contains a "green bond" issued by that ADI.

Running Yields by Fossil Fuel Ratings At 31 January 2023

Trading Book	Weighted Average Running Yield
Queanbeyan-Palerang Regional Council	3.22
Fossil Fuel Support - Simple Interest Only	3.02
Non-Fossil Fuel Support - Simple Interest Only	3.29
Fossil Fuel Support - All Securities	3.31
Non-Fossil Fuel Support - All Securities	3.04

Note: If unit trust holdings are included in the report and multiple trading books hold the same unit trust security, reported IRRs can be misleading.

Fossil Fuel vs Non-Fossil Fuel Running Total

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