

Queanbeyan IWCM Issues Paper – Supplementary Report

Introduction

This supplementary report provides supplementary information and explanations on the Queanbeyan Integrated Water Cycle Management (IWCM) Issues Paper. The aim is to:

Update demand projections (resulting from planning considerations with the Queanbeyan Sewerage Treatment Plant (STP)) and consequent planning issues presented in the IWCM Issues Paper, thereby providing a more current understanding of planning issues for the Queanbeyan water supply and sewerage service area.

The supplementary report does not replace the IWCM Issues Paper.

Plans and Maps provided in the IWCM Issues Paper have not been included in this prologue. When reading through this supplementary report, please refer to the IWCM Issues Paper for details of information presented.

In addition, this supplementary report only covers matters that need to be revised in relation to the water and sewerage systems. QPRC did not find any new information or reason to revise the findings presented in the IWCM Issues Paper on stormwater or ground water systems.

IWCM Issues Paper Findings

In 2017, QPRC commissioned Aecom Pty Ltd to produce an Integrated Water Cycle Management (IWCM) Issues Paper to the requirements of the Department of Planning, Industry and Environment's (DPIE), Best Practice Management of Water and Sewerage Framework.

The IWCM Issues Paper was constrained to only cover the Queanbeyan Water Supply and Sewerage service areas¹ and as such, areas in the former Palerang LGA and the new Googong Township area are excluded from the analysis. The IWCM Issues Paper was presented to DPIE and relevant stakeholders in December 2019. The key findings of the IWCM Issues Paper were as follows:

¹ The QPRC Local Government area is an amalgamation of the Palerang and Queanbeyan LGAs. A separate IWCM report was prepared by the former Palerang Council to cover services in the old Palerang LGA. Googong Township is currently covered by other planning instruments.

IWCM Issues Paper Growth Forecast

		2016	2021	2026	2031	2036
Population		41,952	42,584	43,874	46,690	46,931
Water Demand	ADD (ML/D)	11.0	11.9	11.5	12.4	12.6
	PDD (ML/D)	24.1	26.1	27.2	29.2	30.4
Sewage Flow	ADWF (ML/D)	9.4	12.7	13.4	14.3	15.1
	PDWF (L/s)	195	262	275	294	309
	PWWF (L/s)	1,031	1,385	1,456	1,557	1,636

Subsequent to the December 2019 presentation, the growth forecast was updated to reflect additional planning work undertaken in relation to concept development for the Queanbeyan STP Upgrade Project.

Need for Review

Additional planning work was undertaken for the Queanbeyan STP project, including a full review of population growth projects and water and sewerage demands. This provided variations to water and sewerage service demands from those presented in the IWCM Issues Paper. QPRC reviewed the revised demands and accepted these as the basis for identifying potential service issues over the IWCM planning horizon that will need to be addressed.

Revised Future Demands

Hunter H2O undertook additional analysis of development, population growth, and demands for water and sewerage services over a 20-year period (2018 to 2038). This analysis took into account more recent projections for development in the South Jerrabomberra and Jumping Creek areas.

		2019	2025	2039
Population		52,300	57,696	76,832
Water Demand ²				
Average Day Demand	ML/D	12.18	13.44	17.90
Peak Day Demand	ML/D	28.01	30.91	41.17
Sewerage ³				
Average Dry Weather Flow	L/s	139	154	205
Peak Wet Weather Flow	L/s	779	859	1,549

Issue: Peak daily demand for water will exceed Icon Water's maximum supply limit by 2025.

Issue: Queanbeyan STP hydraulic capacity will be exceeded by 2025.

² Based on AECOM analysis of actual consumption data of 233 Lpcd, section 6.2, and ratios of 2.3 and 1.4 for peak day and peak week, section 6.4.

³ Based on Hunter H2O analysis, Hydraulic Assessment of Jerrabomberra and Morisset Truck Mains of peaking factors of 5.5 for Jerrabomberra and 7.0 for Morisset. Design loading of 230 Lpcd has been used for ADWF.

Levels of Service

QPRC undertakes annual reporting of water and sewerage services to Department of Primary Industries and Energy (DPIE) as part of the Annual Return process.

A review of data published by DPIE indicates that the Queanbeyan water and sewerage systems perform comparably with other local water utilities (LWUs) against service benchmarks, with QPRC generally positioned around mid-range for all reported data and benchmarks.

QPRC⁴ developed a set of community based Level of Service indicators (KPIs) and provided these in its Water and Sewerage Asset Management Plans (AMPs)⁵. The Level of Service (LoS) indicators were identified but have not been tested or evaluated and its outcomes have not been reported to the community. At the time Council developed the LoS indicators and AMPs, Council did not consult the community about their views regarding acceptable criteria (LoS) for water and sewerage services.

Issue: The Community based Level of Service requirements needs to be revised and documented in future Asset Management plans (strategic, tactical, and operational).

Water Supply Capacity and Performance

Water Security

Potable water for Queanbeyan is sourced under a bulk agreement with Icon Water Ltd. Icon Water confirmed⁶ it has assessed long term security of supply and determined there will be no issues meeting supply demands within the IWCM planning horizon. Icon Water predicted additional augmentation will not be required until at least 2059.

Icon Water security modelling includes an allowance for future Queanbeyan and Googong growth as well as an allowance for growth in other surrounding NSW townships (in the Queanbeyan LGA) if required and deemed feasible.

Due to development planned for the South Jerrabomberra area, an additional bulk water supply offtake may be required, subject to finalising water supply requirements and discussions with Icon Water.

Issue: Peak daily demands for new growth areas and potential additional offtake requirements and agreements needs to be reviewed.

Issue: Additional bulk water offtake (and agreement) for the South Jerrabomberra development area needs to be investigated.

Water Quality

Bulk water supplied by Icon Water must meet the Australian Drinking Water Guidelines as specified in its bulk water agreement with QPRC. However, the quality of water supplied varies depending on which water source is used to supply Queanbeyan (Stromlo WTP or Googong WTP), and Icon

⁴ QPRC was formed by the amalgamation of the former Queanbeyan and Palerang councils circa May 2015. The level of service indicators and asset management plans referred to, were prepared by the former Queanbeyan council.

⁵ The Water Asset Management Plan and Sewer Asset Management Plan for the former Queanbeyan LGA were endorsed by the former Queanbeyan council in 2015

⁶ Private correspondence with QPRC

Water are not obliged to provide a higher standard of water than specified in its agreement with QPRC.

Although water supplied by Icon Water meets [spell out acronym] (ADWG) standards, it does not necessarily comply with QPRC adopted standards for pH and chlorine. Consequently, pH and residual chlorine values in the reticulation system can conflict with QPRC accepted standards.

Issue: Water quality standards for chlorine and pH can be exceeded.

Issue: Bulk water agreement and water quality requirements needs to be reviewed.

Non-Revenue Water

The QPRC water supply network has 18%⁷ non-revenue water, on average. This is higher than the benchmark guide of <10% and was highlighted in the IWCM Issues Paper.

Non-revenue water is attributed to mismatched meter reading data, un-metered connections to QPRC parks, gardens and sports fields, as well as leaking reticulation pipework.

As QPRC purchase all water under a bulk water agreement, any water loss results in a direct revenue loss. If non-revenue water loss could be reduce to $\leq 10\%$, the resulting water savings would be approximately 500 – 700 ML/annum.

Issue: Additional investigations to identify and reduce non-revenue water are required.

Reservoirs

Base modelling undertaken by Aecom was not reassessed in line with the revised demand projections. QPRC assumed that projected flows can be prorated to provide an indication of reservoir capacity suitability.

QPRC does not expect demands to exceed reservoir capacity (based on current modelling of the network) within the planning period. However, this should be verified through additional modelling, taking better account of the revised growth projections.

Security of supply issues were not discussed in the IWCM Issues Paper. Following further discussions with QPRC's Service Manager – Utilities, an emerging issue may present itself at both Jerrabomberra Reservoir (offtake 1) and East Queanbeyan Reservoir (offtake 2). These are critical assets within the water system and cannot be placed off-line for an extended period of time to allow major repairs and/or refurbishment to be undertaken. There is no capacity or capability to cross supply utilising alternative offtakes.

In addition, reservoirs are located within bushfire prone land, increasing the level of risk to supply security.

Issue: Additional modelling to determine reservoir limitations and options for improving security of supply is required.

Issue: Supply continuity during major repairs/refurbishment of Jerrabomberra and East Queanbeyan Reservoirs to be assessed.

Issue: There needs to be better management of bushfire prone lands.

Water Pumping Stations

Base modelling undertaken by AECOM was not reassessed in line with the revised demand projections. QPRC assumed that projected flows can be prorated to provide an indication of pump station capacity suitability.

Based on current modelling, QPRC does not expect that pump station capacity will be exceeded within the planning period. Generally, the pumps operate less than four hours per day and have capacity to operate longer to transfer additional volumes to reservoirs within the system.

All pump stations are provided with duty/standby pump arrangements. Therefore, prolonged pumping failure is not expected to be critical to supply conditions within the water reticulation network. However, this should be verified through additional modelling, taking better account of the revised growth projections.

In addition, pumping stations are located within bushfire prone land, increasing the level of risk to supply security.

Issue: Additional modelling is required to determine pumping station limitations, optimal pumping regimes and options for improving security of supply.

Issue: Better management of bushfire prone lands is required.

Distribution Network

QPRC has an existing WaterGems network model for the Queanbeyan Water supply system, which was developed circa 2002. Although QPRC has updated the model from time to time, it has not been calibrated to confirm its suitability or reliability. At this time, QPRC is unable to confirm zone boundaries due to the loss of corporate knowledge and incomplete GIS / asset information about the pipe network.

Without a current and calibrated model, it is difficult to determine the capacity and performance of the network and so determine upgrades to meet increasing development demands. This could be a significant risk in ensuring adequate flows and pressures for firefighting requirements within high density developments, particularly within the Queanbeyan business district.

QPRC has assessed the condition of the water supply network as being grade 2, based on the general age of the infrastructure. QPRC only uses asset age to assess condition as there is insufficient information to correlate asset condition to pipe bursts and other factors. Replacement / refurbishment of water mains is undertaken based on operator experience and does not take into account the age or material of water mains.

Issue: Water model is not up to date and not calibrated.

Issue: Water main asset condition assessments need to be improved.

Sewerage Scheme Capacity and Performance

Queanbeyan STP

The STP is being replaced in order to address a combination of age, capacity and work health and safety concerns.

Planning and design for the replacement of the STP is proceeding in parallel with the preparation of the Queanbeyan IWCM. The issues identified in the IWCM Issues Paper and this document will not

impact delivery of the STP Upgrade Project, which is scheduled for completion by 2025. The new STP is designed to have sufficient capacity for demands over the IWCM planning period.

QPRC will need to operate and maintain the existing STP to meet ACT EPA discharge licencing requirements until the plant is replaced.

Issue: Existing STP needs to be operated and maintained to continue to meet discharge licence conditions until the new STP is commissioned.

Sewage Pumping Stations

Morisset Sewage Pumping Station (SPS)

Morisset Sewage Pumping Station (SPS) is the major pump station in the Queanbeyan sewerage network and a critical asset within the sewerage system. Indications are that the capacity of the Morisset SPS will be exceeded within the IWCM planning period. As part of the Queanbeyan STP Upgrade Project, options are being developed to ensure this SPS will deliver uninterrupted sewage flows to the Queanbeyan STP from the Central and Western parts of Queanbeyan.

QPRC will need to optimise future design options for the Morisset SPS to ensure the pump station can meet future demands.

Issue: Design options and timing of potential upgrades for Morisset SPS needs to be reviewed as part of the Queanbeyan STP Upgrade Project.

Other Sewage Pumping Stations

The criticality of all other sewage pumping stations within the Queanbeyan Sewerage Network is lower than for the Morisset SPS, and have been fitted with duty/standby pumps. Several of the pumping stations have been identified as having limited or no emergency storage capacity and may not have adequate hydraulic capability to handle peak wet weather flows over the planning period. QPRC considers most of the pumping stations will require augmentation and/or upgrading within the planning period to provide:

- Improved wet weather storage to meet minimum four hours Average Dry Weather Flow (ADWF) requirements;
- Additional pump capacity to meet increased demands;
- Rising main replacement / augmentation to ensure flow velocities are within acceptable limits;
- Updated electrical panels and controls to comply with current safety requirements.

Anecdotal evidence (provided by operational staff) together with analysis undertaken by AECOM (for the IWCM Issues Paper) indicates receiving sewer capacity is adequate to meet some increased pumped flows without causing additional overflows. This assertion needs additional modelling to verify capacity constraints in the sewer network.

Issue: Lack of detailed knowledge of capacity constraints may lead to additional augmentation work required to meet acceptable service standards.

Sewer Network

QPRC is undertaking a review of the Morisset and Jerrabomberra Trunk Sewers as part of the Queanbeyan STP Upgrade Project. Initial investigations indicate that surcharging currently occurs within these trunk mains and will become more pronounced as peak wet weather flow events increase over the planning period.

QPRC has an XPS (spell out) (SWMS) model for the Queanbeyan sewerage system, which was developed circa 2002. While this model has been updated from time to time to account for changes to the system, QPRC has not calibrated it to confirm its suitability / reliability.

QPRC has an existing WaterGems network model for the Queanbeyan Water Supply System, which was developed circa 2002. Although QPRC updated the model from time to time to account for changes to the system, QPRC has not calibrated the model to confirm its suitability / reliability. At this time, QPRC is unable to confirm the completeness or accuracy of the model due to the loss of corporate knowledge and incomplete GIS / asset information about the sewer network.

Without a current and calibrated model it is difficult to determine the capacity and performance of the network and so determine upgrades to meet increasing development demands. This could be a significant risk for high density developments, particularly within the Queanbeyan business district, in ensuring adequate sewer capacity to avoid overflows during wet weather events.

A large proportion of the sewer network has been examined using CCTV. As a result of the CCTV inspections, a significant number of sewers, feeding Morisset SPS, have been fully or partially relined. This is reflected in revised asset conditions within the asset register. Additional data is required to correlate condition to factors causing blockages, surcharge, and overflows⁸. This will improve the ability of QPRC to identify the need for sewer upgrades or rehabilitation as well as assess the potential overflow risk in the sewer network.

Issue: Sewer model is not up to date and not calibrated,

Issue: Sewer network asset condition assessments needs to be improved.

Next Stage – Developing Options to Address Issues

This supplementary report concludes the first phase of preparing the Queanbeyan IWCM strategy and plan.

The next stage for the IWCM strategy and plan will be to identify options to resolve the issues identified in the IWCM Issues Paper (including this supplementary report). This work, together with maintenance and renewal information in the water and sewerage asset management plans, will help QPRC prepare:

- An asset information improvement plan (GIS / attribute data, network models, condition assessment protocols, etc.);
- An operation and maintenance improvement plan;
- A long term capital works plan and program;
- A Water and Sewerage Business Plan;
- A forecast of water and sewerage charges needed to sustain services.

Options to resolve the issues identified in the IWCM Issues Paper include specific matters such as:

- Augmentation / upgrading the Morisset SPS, Morisset Trunk Sewer and Jerrabomberra Trunk Sewer;
- Augmentation / upgrading other sewage pumping stations in the Queanbeyan network;

⁸ The data needs to cover a range of factors affecting the operating condition of sewers such as material, age, trench material, tree root intrusion, broken pipes, broken / dislocated joints, poor grade alignment, poor service junctions, etc.

- Improving sewer capacity, particularly in the Queanbeyan business district, to alleviate potential sewer surcharging / overflows caused by ongoing development;
- Improving continuity of supply during major maintenance of the Jerrabomberra and East Queanbeyan Reservoirs;
- Improving water supply conditions, particularly in the Queanbeyan business district, to ensure adequate flows and pressures for firefighting caused by ongoing development;
- Improving water quality conditions to ensure pH and Chlorine residual values are adequate throughout the network regardless of Icon Water source.

A Water and Sewerage Options Report on the above issues is expected to be undertaken and finalised during the 20/21 financial year.