

Project Evaluation Summary

Lower Fitzroy River Infrastructure Project

Proponent SunWater and Gladstone Area Water Board
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1. Summary

Infrastructure Australia has not included the **Lower Fitzroy River Infrastructure Project** as a Priority Project on the Infrastructure Priority List at this time. The business case shows that the costs of the project are likely to exceed its benefits.

The project is designed to address potential short and long-term needs. Short-term needs include protecting urban and industrial customers against a 1 per cent probability that the Lower Fitzroy supply system fails and increasing agricultural activity. The short-term need to provide an additional 4,000 megalitres (ML) of water to the Livingstone Shire Council region does not currently require the construction of a weir which could provide 76,000 ML each year.

The other driver for the project – connecting the Lower Fitzroy River to Awoonga Dam to diversify supply – is a longer-term need and most likely not required until 2037. There is significant risk with the uncertain demand for additional water, particularly for irrigated agriculture. The demand underpinning the business case needs further development with the community to establish binding customer agreements to provide greater certainty in the economic case, as identified in the business case’s conditions precedent

While the project may be required in the longer-term, there is insufficient evidence at present to show that the project is required now. A staged upgrade approach combined with demand-side measures should be investigated as a more cost-effective strategy to secure water for the Lower Fitzroy and Gladstone regions over the short- and long-term.

Water is supplied in the Lower Fitzroy and Gladstone regions to urban, industrial and irrigation customers using water infrastructure on both the Fitzroy and Boyne Rivers. The water infrastructure on the Fitzroy River system is not currently connected to the Boyne River system.

Water availability has been consistently higher than demand in the recent past, both for the region as a whole and within each of the river systems. However, increasing demand and climate change are likely to result in water reliability issues for the Lower Fitzroy and Gladstone regions at different points in the future. The Lower Fitzroy system relies on yearly wet season rainfall for its supply. In the Gladstone region, the Awoonga Dam on the Boyne River is the only water supply source for industrial and urban customers.

The Lower Fitzroy River Infrastructure Project (LFRIP) is the proponent's preferred solution to provide long-term water supply security in the Fitzroy and Gladstone regions. The project would construct a new weir on the Fitzroy River at Rookwood ("Rookwood Weir"), capable of supplying an additional 76,000 megalitres (ML) of water per annum in most years. The LFRIP is listed as a Priority Initiative on the Infrastructure Priority List in recognition of the potential for the project to support increased irrigated agriculture and the importance of water security for local communities in the short-term. The Gladstone Fitzroy Pipeline is the subject of a separate business case, but would allow water from a new Fitzroy River weir to be piped to Awoonga Dam and reduce the single supply source risk for the Gladstone region.

The proponent's stated net present value (NPV) for the LFRIP is -\$96.5 million, with a benefit cost ratio (BCR) of 0.64 using a 7% real discount rate and P90 cost estimate. Infrastructure Australia considers that, based on the current evidence available, the cost of the project outweighs its benefits. However, recognising the importance of long-term water supply planning in the Lower Fitzroy and Gladstone regions, Infrastructure Australia would welcome a revised business case for a more cost-effective solution to the problems and opportunities identified, supported by greater certainty on the future demand for water.

2. Strategic context

The Queensland Government partners with local councils and water service providers to produce Regional Water Supply Security Assessments (RWSSAs). The objective of RWSSAs is to better understand the ability of current water supply systems to supply water for future growth in regional urban areas. Infrastructure Australia commends the Queensland Government and regional water service providers for committing to long-term water supply planning in regional Queensland. RWSSAs for Gladstone and Rockhampton provide evidence of likely supply and demand scenarios in the Lower Fitzroy and Gladstone regions.

The Australian Government has committed to facilitating the construction of new or augmentation of existing water infrastructure through the National Water Infrastructure Development Fund (NWIDF). The objectives of the NWIDF are to secure Australia's water supplies and deliver regional economic development benefits.

The Australian Government has recently committed to funding the LFRIP from the NWIDF, subject to completion of a business case and matching funding commitments from the Queensland Government. Infrastructure Australia notes that the NWIDF guidelines include seven criteria, two of which state that priority will be given to projects that are economically viable and represent value-for-money for Australian Government funds. There is currently insufficient evidence to show that the LFRIP meets either of these criteria.

3. Problem description

The Fitzroy River and Boyne River water supply systems are not currently connected. The scale, causes and likely timing of water security risks is therefore different for the two systems.

Lower Fitzroy River system

The Lower Fitzroy River supplies water to industrial, irrigation and urban customers from two existing in-stream storages:

- Eden Bann Weir supplies water to Stanwell Power Station and a small number of irrigators. Observed supply and demand suggests there is no short or medium-term supply constraint for the Eden Bann Weir.

- The Fitzroy Barrage supplies water for urban customers in Rockhampton. The Rockhampton Regional Council supplies the Livingstone Shire Council in the Capricorn Coast region with up to 4,000 ML of water per annum. Between 2009 and 2014, average urban water consumption from the Fitzroy Barrage was 38 per cent of the water available.

While water consumption has been well below the available supply for urban customers, the size of the Fitzroy Barrage, combined with forecast growth in urban demand, means that both Rockhampton and the Capricorn Coast are at some risk of a supply shortage in the event of a failed wet season¹. Modelling conducted as part of the Rockhampton RWSSA estimated that, at current levels of demand, the Fitzroy Barrage could go from full to empty in approximately 16 months.

Furthermore, Livingstone Shire Council relies on the Rockhampton Regional Council for approximately 60 per cent of their annual available water supply of 6,500 ML. Population growth and reliance on water supply from Rockhampton Council means that Livingstone Shire Council are currently looking to increase their available water supply by 4,000 ML which could improve the reliability of supply for the Fitzroy Barrage.

In addition to providing long-term water supply security for urban and industrial customers in the region, the LFRIP provides an opportunity to expand irrigated agriculture next to the Fitzroy River. However, as the business case states, there is uncertainty associated with this agricultural demand.

Boyne River System (Awoonga Dam)

The Boyne River catchment is adjacent to but south of the Fitzroy River catchment. The Awoonga Dam is on the Boyne River and supplies water for urban and industrial customers in Gladstone as well as coal-fired power stations in the Callide Valley. Currently, contracted volumes from Awoonga Dam account for almost 81 per cent of the total allocation. The key issue for the Boyne River system is the water supply risk associated with a single source of supply – Awoonga Dam and the associated consequence of a supply failure for the Gladstone region. However, modelling conducted as part of the Gladstone RWSSA, which accounts for both future urban and industrial demand, indicates that it is ‘most likely’ that an investment to balance supply and demand for Awoonga Dam will not be required to be made until 2034. This would allow three years for a project to be constructed and for water to be supplied by 2037.

4. Project overview

The project would construct a new weir on the Fitzroy River at Rookwood, which could supply 76,000 ML of water in most years for urban, industrial and irrigation customers in the Lower Fitzroy and Gladstone regions. The Gladstone Fitzroy Pipeline, which is the subject of a separate business case and Environmental Impact Statement (EIS), would allow the water to be piped from the Fitzroy River to Gladstone’s existing water network and reduce the sole source supply risk for Gladstone. The project also includes:

- Upgrading existing roads and constructing new access roads: Thirsty Creek Road and the intersection with the Capricorn Highway at Gogango
- Constructing low level bridges upstream at Riverslea and Foleyvale crossings.
- Installing culverts at Hanrahan Crossing downstream of the weir to facilitate access during releases

The proponent states that the project will deliver a range of benefits, including:

- Increasing water availability to support additional agricultural and industrial production in the region.
- Increased water security for Rockhampton and the Capricorn Coast/Livingstone Shire Council community.

¹ The probability of a failed wet season is low. Modelling undertaken by the Queensland Government shows that the probability of the Fitzroy Barrage failing is 1 in 108 years. If demand increased such that all available water was used, the probability of the Fitzroy Barrage failing falls to 1 in 53 years. The Rockhampton RWSSA estimates this full demand scenario to occur in 2035, although demand modelling for this project notes that more contemporary population forecasts are lower than those that underpinned the modelling in the Rockhampton RWSSA.

- Avoiding future costs of constructing a smaller weir capable of supplying 54,000 ML in most years. Without the project, the proponent assumes that this smaller weir would become operational in 2037 and would balance long term supply and demand projections in the Gladstone region (according to the most likely scenario for when supply to Awoonga Dam needs to be supplemented).
- Avoiding the economic cost of implementing future demand management measures (i.e. water restrictions) in the Capricorn Coast region.
- Avoiding the need to update environmental and state approvals in the future if the project is deferred.
- Improving connectivity during floods through upgrades to existing roads and bridges.

5. Options identification and assessment

The options analysis was conducted in two stages. The first stage identified all options with the potential to address the strategic need for the project, which the proponent identified and defined as:

- Increasing supply security and reliability for urban and industrial users in the Rockhampton region by significantly increasing usable storage capacity (i.e. increase the number of months over which storages in the Rockhampton region have the potential to go from full to empty)
- Alleviating the single source supply risk for Awoonga Dam by providing access to high reliability water from an alternative supply source, subject to the Gladstone Fitzroy Pipeline being constructed.

Nineteen infrastructure options were identified, comprising new asset solutions, existing asset solutions, new storage and supply initiatives, as well as combination solutions. In addition to these options, demand management strategies were also considered, including pricing, educational strategies for water users and recycling and water use efficiency initiatives. However, the business case states that demand management alone is not sufficient to meet the medium to long-term needs of the region.

Each of the nineteen options were assessed using multi-criteria analysis (MCA), which assessed each option's capacity to meet the required water volumes, as well as known cost and technical implications arising from investigations over the past decade. The MCA shortlisted five infrastructure options which were considered in the second stage of options analysis.

Stage 2 involved assessing the five shortlisted infrastructure options through a more comprehensive MCA against a set of assessment criteria that included satisfaction of project need, alignment with government objectives, net financial impact (project cost), net economic impact and water delivery risk.

The proponent identified the new Rookwood Weir (76,000 ML) as the preferred Reference Project, noting:

- It was the only option assessed that has the storage volume to remove the risk of supply failure to Rockhampton from a single failed wet season
- It would provide Awoonga Dam with access to an alternative water supply source
- It would deliver up to 42,000 ML per annum of additional water for the expansion of irrigated agricultural production in the Lower Fitzroy, consistent with wider government objectives
- Delivery risks are known and manageable.

Addressing the single source supply risk for Gladstone is a longer-term problem. Infrastructure Australia considers that the process used to assess options against this longer-term need has led to a reference project capable of delivering far more water than is required to meet the short-term needs of Rockhampton and Livingstone Shire Council and 16 years before the longer-term needs of Gladstone are most likely to be required. A staged upgrade approach combined with demand-side measures would be a more cost-effective strategy to secure water for the region over the short and long-term. The Rockhampton Regional Council is currently assessing the feasibility and cost of two upgrades to the Fitzroy Barrage that could increase its usable storage volume by approximately 9,000 ML to address the short-term supply security risk for Rockhampton and Livingstone Shire Council. Infrastructure Australia considers that this option warrants further consideration on the basis that it may be a more cost-effective approach.

6. Economic evaluation

The proponent's stated net present value (NPV) for the project is -\$96.5 million, with a benefit cost ratio (BCR) of 0.64 using a 7% real discount rate and P90 cost estimate².

The economic appraisal estimates benefits from an increase in the value of agricultural production (50 per cent of total benefits) and avoiding the costs of a future infrastructure upgrade on the Lower Fitzroy River in 2037 (48 per cent of total benefits) to supply water to the Gladstone region via the Gladstone Fitzroy Pipeline. The remaining 2 per cent of total benefits are the avoided costs of severe water restrictions for urban customers on the Capricorn Coast. This includes the cost of compliance, and loss of consumer and societal welfare from reduced water use, particularly outdoor water use.

There is significant risk with the uncertain demand that underpins this project, particularly demand for water for irrigation. The business case acknowledges the potential downside risk stating that there are uncertainties associated with demand for agricultural water from this project. The proponent's sensitivity analysis shows that the BCR decreases to 0.5 under a low agricultural demand scenario and to 0.3 if there is no additional demand for irrigated agriculture. The business case also tested a 'breakeven' scenario to estimate the demand levels required for the costs and benefits of the project to balance. The proponent estimated that the volume of water taken up by irrigators needs to be approximately 73 per cent higher than the 'best estimate' of agriculture demand for a BCR of 1.0 to be realised. Infrastructure Australia recommends the proponent completes an updated demand study, which takes into account any changes to water charges given the Australian Government's additional funding commitment that was announced after the business case was completed. Infrastructure Australia supports the recommendation in the business case to establish binding customer commitments for a significant proportion of demand before the project proceeds.

In the event of a failed wet season, where the Fitzroy barrage received no inflows for 16 months, it is possible that Rockhampton and the Capricorn Coast could require access to as much as five months' additional water supply. For the purpose of the business case, the proponent assumed that this would be made available via trucking in water to Rockhampton and the Capricorn Coast from Awoonga Dam. The proponent estimated the risk-adjusted cost of this occurring between 2018 and 2037 at approximately \$40.8 million (present value). Including this benefit stream increases the BCR for the project to 0.8. However, the proponent has not included these avoided costs of a failed wet season in the central case for the economic appraisal because of the uncertainty of these estimates³. There is no other material upside to the economic evaluation as it is currently presented.

Infrastructure Australia considers that, based on the current evidence available, the cost of the project outweighs its benefits.

Capital costs and funding

Total capital cost (nominal, undiscounted)	\$322.9 million (P90)
Proponent's proposed Australian Government funding contribution	\$176.1 million [^]
Other funding (source / amount / cash flow) (nominal, undiscounted)	\$176.1 million [^] (Queensland Government)

Source: Proponent's response to Infrastructure Australia's clarification questions.

Note: [^] The \$29.5 million difference between the P90 nominal capital cost and funding reflects sunk costs to develop the project business case, EIS and other pre-feasibility assessments. Sunk costs have been excluded from the Cost Benefit Analysis.

² The proponent has used a 'best estimate' central case scenario which represents the most likely demand levels for water

³ The business case notes that the solution to truck water from Awoonga Dam may not be technically feasible.

Benefits and costs breakdown

Proponent's stated benefits and costs		Present value (\$m, 2017) @ 7% real discount rate	% of total
Benefits			
Avoided future water supply augmentation costs		\$83.57	48%
Avoided future water restrictions		\$3.55	2%
Increased economic value of agricultural production		\$86.87	50%
Total Benefits¹		\$173.99 (A)	100%
Costs			
Capital costs (P90)		\$255.81	95%
Operating costs		\$14.68	5%
Total Costs¹		\$270.49 (B)	100%
Core results	Net benefits - net present value (NPV)²	- \$96.50 (C)	n/a
	Benefit–cost ratio (BCR)^{3,4}	0.64 (D)	n/a

Source: Proponent's business case

(1) Totals may not sum due to rounding.

(2) The net present value (C) is calculated as the present value of total benefits less the present value of total costs (A – B).

(3) The benefit–cost ratio (D) is calculated as the present value of total benefits divided by the present value of total costs (A ÷ B).

(4) The proponent has estimated, as a sensitivity test, that the BCR increases to 0.8 if the avoided costs of trucking water supply for five months is included (based on the risk-adjusted cost of a failed wet season occurring between 2018 and 2037).

7. Deliverability

The proponent considered a number of delivery options using a value-for-money and multi-criteria assessment. The proponent's preferred delivery model is a construct-only approach, through an Early Tenderer Involvement (ETI) model. Under this approach, the proponent will be responsible for the early preparatory and design works.

A decision is yet to be made on who the proponent will be for this project. SunWater has expressed a preference to be the sole proponent while the Gladstone Area Water Board has expressed a preference for a Joint Venture or, failing that, to be the sole proponent.

The project would be delivered in one stage. While this approach is reasonable for this project, Infrastructure Australia recommends that, in the future, the scale and timing of the problems at the local and regional scale are identified and options to solve these problems are developed accordingly. Staged upgrades that complement demand-side measures would be a more cost-effective means of delivering regional water security in the Lower Fitzroy and Gladstone regions.

There are no significant or material legal and regulatory issues for delivering the LFRIP. An EIS has been prepared and the LFRIP has been approved with conditions by both the Queensland Coordinator General and the Commonwealth Minister for the Environment and Energy. These conditions include appropriate water quality monitoring, offset strategies to manage impacts on flora and fauna and a species management plan.

Infrastructure Australia notes that the Gladstone Fitzroy Pipeline is a key enabler to connect the new weir on the Lower Fitzroy River to Awoonga Dam. While an EIS for the Gladstone Fitzroy Pipeline has been prepared, Infrastructure Australia understands that a business case has not yet been finalised.

Infrastructure Australia supports the recommendations made in the business case that:

- The Queensland Government finalises the business case for the Gladstone Fitzroy Pipeline.
- The proponent establishes binding customer commitments for a significant proportion of demand before the project proceeds.
- The Queensland Government makes a decision on the proponent for the project.

Infrastructure Australia also recommends that:

- The proponent ensures that water charges are consistent with the National Water Initiative (NWI) and the NWI Pricing Principles and ensures full transparency on financial returns that are planned by the proponent.
- The proponent undertakes an updated demand study, which takes into account any changes to water charges given the Australian Government's additional funding commitment that was announced after the business case was completed.
- If the project proceeds, a Post Completion Review should be undertaken to assess the extent to which expected project benefits and costs have been realised, in order to inform future water project business cases.

This evaluation summary was considered by the Infrastructure Australia Board in June 2018.

Subsequent to the Board's consideration of the brief, the Queensland Government announced in early July 2017 that SunWater will be the proponent for the Rookwood Weir project. This addresses one of the key recommendations made in the business case by Building Queensland and supported by Infrastructure Australia.