



Etheridge Shire Council
The Golden Heart of the Gulf

Gilbert River **Irrigation Project**

The case for the Gilbert River Irrigation Project

In May 2020, consulting firm Jacobs delivered a detailed business case for the Gilbert River Irrigation Project to the Etheridge Shire Council.

A lack of water security has been a major factor in preventing the irrigated agriculture opportunities being realised in the region. Unlocking the opportunity of the unallocated water in the catchment and the suitable arable land that has been identified would see significant investment, economic growth and social benefits in the region.

The project, supported by local rainfall and temperatures, will suit a range of irrigated crops, such as high-value annual crops (e.g. cotton, peanuts and fodder crops including sorghum), lower-value rotation grain crops (e.g. pulses), and high-value horticultural crops (e.g. avocados, bananas, citrus and mangoes).

It will provide complementary production areas for major crops to southern areas around Murray Darling basin, which may be impacted in the future from climate change.

17,900 hectares of new irrigated agriculture will be supported by the project—equivalent of 8,850 Melbourne Cricket Grounds.

The project will be of a scale to support associated services industries and processing infrastructure (e.g. a cotton gin) and generate value-adding opportunities for agricultural sectors, including the use of cotton seed to feed livestock on cattle grazing enterprises.

Significant creation of jobs (2,285 FTEs) and significant economic growth opportunities.

Expressed demand for water from existing landholders and non-landholders exceeds the capacity of the project to supply water—securing binding water sales for this volume will raise \$310 million of private investment towards the project's \$887 million capital cost (P90 estimate).

Increased amenity of the local area by providing opportunities for activities such as fishing, kayaking, water skiing and camping for residents and tourists.

Traditional owners are supportive of the potential employment aspects and other economic benefits of the project.

No fatal flaws with approvals—Designed in compliance with the Gilbert Water Plan.



The case for the Gilbert River Irrigation Project



Net present value \$108 million & benefit cost ratio 1.15



2,250 plus on-going, full time jobs created



370 plus construction jobs created



\$528 million of farm gate revenue annually



130,000 ML of water entitlements

- 90,000 ML high priority entitlements (Feb to Dec)
- 40,000 ML medium priority entitlements (Feb to May)



Potential to be a regional agriculture and services hub for Far North Queensland



Strong demand for water demonstrated from landholder and non-landholders in a detailed demand assessment, including interviews and expression of interest forms.



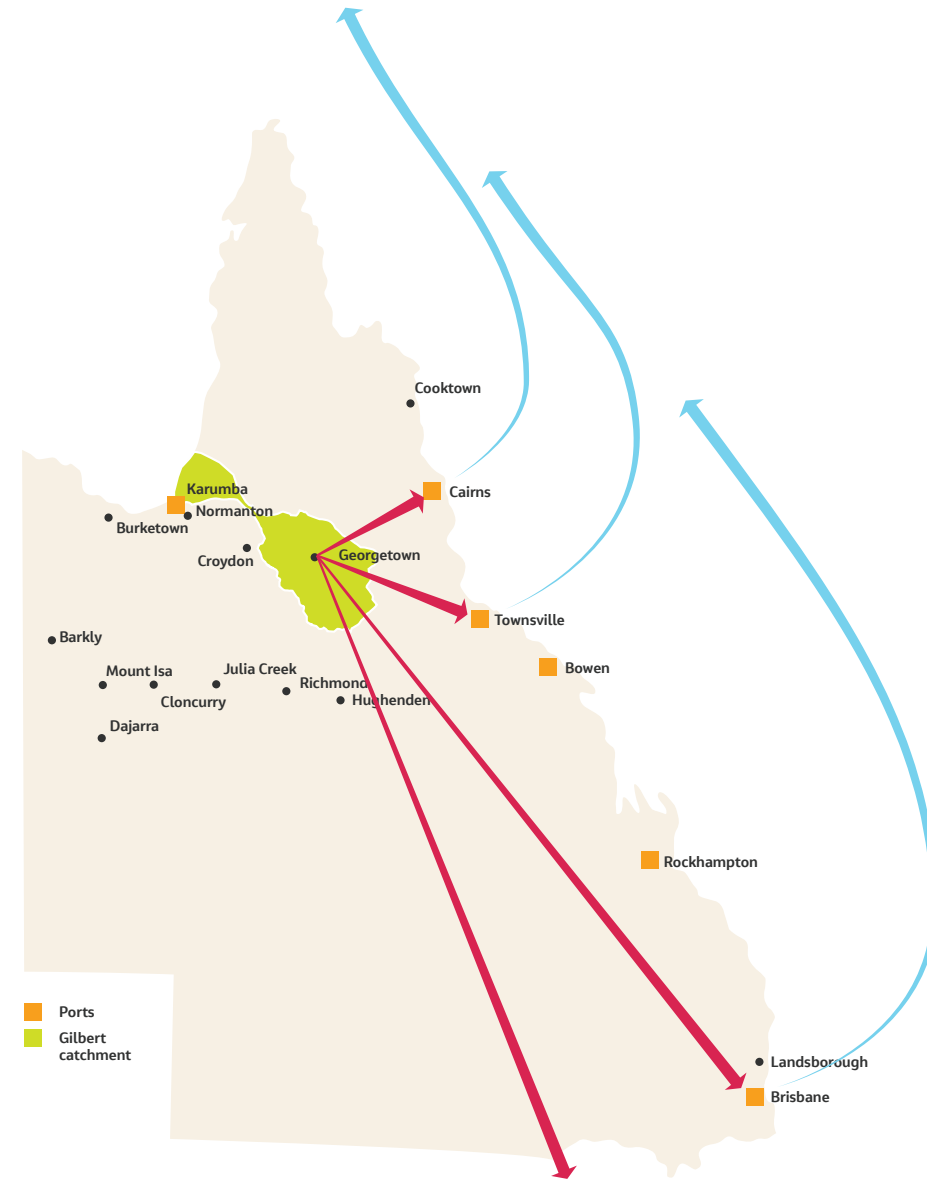
31 metre high dam, 323 GL capacity, 81.6 km distribution network



No project showstoppers identified

- No environmental fatal flaws
- Initial support from traditional owners
- Compliant with existing water plan

Access to domestic and international markets with existing supply chains – road, sea and air.



1998

The Queensland Government's Water Infrastructure Task Force recommended formal investigations of water storage options in the Gulf—13 possible water storage options were identified and subjected to preliminary economic, social, environmental, technical and cultural assessments. Two of the 13 options were identified for further investigation: Greenhills Dam in Etheridge Shire and O'Connell Creek Dam in Richmond Shire.

2001

The then Queensland Government of Department of Natural Resources and Mines developed the Natural Resource Assessment and Water Infrastructure Planning Study for the Gulf Region, which examined several options for water development in this region, including a dam located on the Gilbert River on the Greenhills property.

2007

The Water Resource (Gulf) Plan 2007 (the Gulf Water Plan) was established, with the objective of sustainably allocating and managing water to meet the future needs of this area. The plan area drains into the Gulf of Carpentaria and covers approximately 315,000 km² in Queensland. It comprises the Staaten, Gilbert, Norman, Flinders, Leichardt and Nicholson rivers, Settlement Creek and the Morning Inlet catchments.

2009

A further report was prepared—the Gilbert River Irrigation Project: Preliminary Business Case: Environmental Values. This report assessed two dam sites and inundation areas.

2009

ESC and Gulf Savannah Development (GSD) produced the first version of the Gilbert River Irrigation Area Investment Report. The report incorporated land suitability and provides detailed soil mapping of

the Gilbert River catchment. The Queensland Department of Natural Resources, Mines and Energy (DNRME) has further refined that work.

The GSD investment report highlighted deficiencies in some of the earlier assessments for the Gulf Water Resource Plan.

2010

Preliminary dam design and costings were developed by the then Queensland Department of Natural Resources and Mines (now DNRME) and Sunwater, based on a roller-compacted concrete type dam.

2013

The North Queensland Irrigated Agriculture Strategy (NQIAS) was a collaborative initiative of the Office of Northern Australia, the Queensland Government and CSIRO, which aimed to address knowledge gaps around water resource development, focusing on the Flinders and Gilbert rivers in North Queensland.

That culminated in the December 2013 CSIRO report, Flinders and Gilbert Agricultural Resource Assessment, incorporating the Agricultural Resource Assessment for the Gilbert Catchment (Petheram et al., 2013). CSIRO identified that large in-stream dams could support 20,000 to 30,000 ha of irrigation in 85 per cent of years in Gilbert catchment. Green Hills upstream site was identified as most suitable — could yield up to 200,000 ML at a reliability of 85 per cent.

2017

ESC commissioned Marsden Jacob Associates to carry out a Preliminary Economic and Financial Assessment (2017) based on a dam on the Gilbert River. The assessment indicated positive financial and economic outcomes, at scheme and farm level, for the project. The assessment estimated gross benefits from agricultural production in the region of \$536 million as a direct consequence of the scheme.

2017

ESC conducted an information day in the Georgetown Community Hall to discuss the project to those key landholders that would be directly affected. The outcome of that session was an endorsement from the group to move ahead and formulate a DBC for the project. This included the Ewamian and Tagalaka Indigenous groups who both offered in-principle support for the project.

2018

ESC submitted an application for funding under the Queensland Government's Maturing the Infrastructure Pipeline Program Stage 2 (MIPP 2) to formulate a DBC for the project. The application was successful, and a grant was received from MIPP 2.

2020

Detailed business case developed in accordance with Building Queensland guidelines. Demonstrates that the project is technically feasible, identifies no fatal flaws and will deliver a positive economic outcome with a benefit costs ratio of 1.15:1.

2 years

Final designs and approvals phase to include binding water sales, securing construction and operational approvals and to receive construction contracts within budget.

3 years

Construction and commissioning of Green Hills Dam and the distribution network.

Onwards

Operations commence and benefits realised.

Problems



Population is falling—1,500 (2001) to 800 (2016) 46 per cent



Forecasts indicate a population of 690 by 2041—a further 14 per cent and a 60 per cent population decrease over these four decades



Lacks economic diversity—overreliance on grazing exposing the shire to commodity market downturns



Grazing industry traditionally employs low numbers of workers per unit of on-farm turnover, so any expansion of the existing livestock sector will not have significant flow-on regional benefits

Opportunity



Irrigated agriculture would diversify the area's economic portfolio and reverse population decline.



On-farm dams are considered to have lower reliability and higher unit construction costs than a major dam because of their smaller catchments



On-farm dams also have larger surface areas per ML of stored water and consequently higher evaporation losses



Strong natural advantages: suitable land greater than available water, frost free and sheltered from cyclones



Project would be suited to range of crops: high-value annual crops (e.g. cotton, peanuts and fodder crops including sorghum), lower value rotation grain crops (e.g. pulses), and high-value horticultural crops (e.g. avocados, bananas, citrus and mangos)

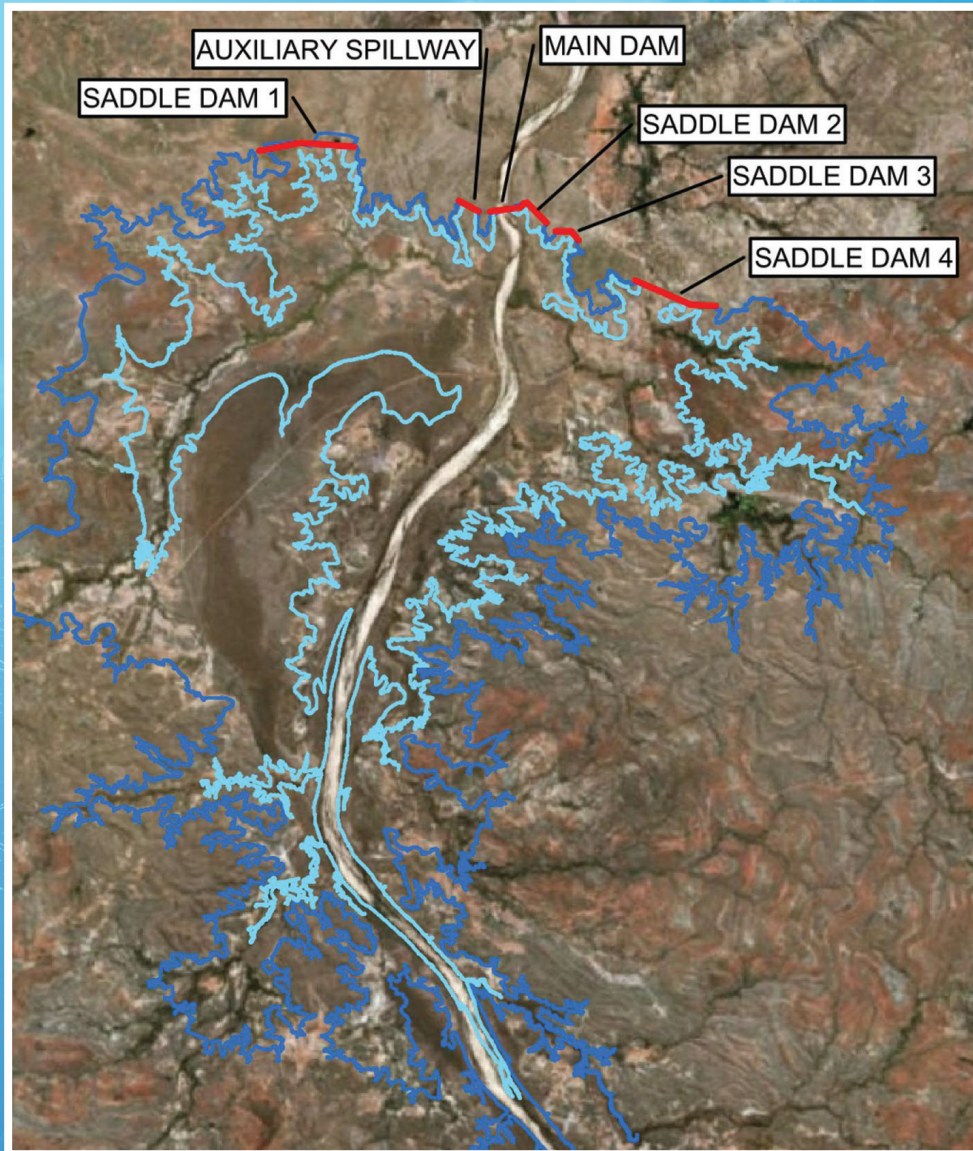


Scale of the development—likely to sustain the development of local processing facilities, such as fruit and/or nut packing sheds and a cotton gin



Significant new employment opportunities (seasonal and full time)

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The Gilbert River Dam will be on the Green Hills and Prestwood stations, 30 km south-west of Georgetown, water will be delivered to customers up to 60 km downstream (north-west) of the dam where soil suitable for irrigated agriculture is available.



31 metre high roller-compacted concrete (RCC) dam wall on the Gilbert River and the creation of a reservoir storage of 323,577 ML at a full supply level of 253 m AHD

- A catchment area of 8,300 km²
- An inundation area of 5,847 ha
- 704 m main embankment length
- 2700 mm outside diameter mild-steel cement lined (MSCL) dam outlet.



81.6 km distribution network to customers

- A pump station & a 50 ML balancing storage
- 1.6 km of transfer pipeline
- 80 km of plastic lined open channel
- One branch pipeline
- Customer supply offtakes.



The project is modelled to yield a total nominal annual volume of 130 GL

- 40 GL medium priority at 85% monthly reliability delivered between February and May (100 days)
- 90 GL high priority at 95% monthly reliability delivered between February and December (330 days).

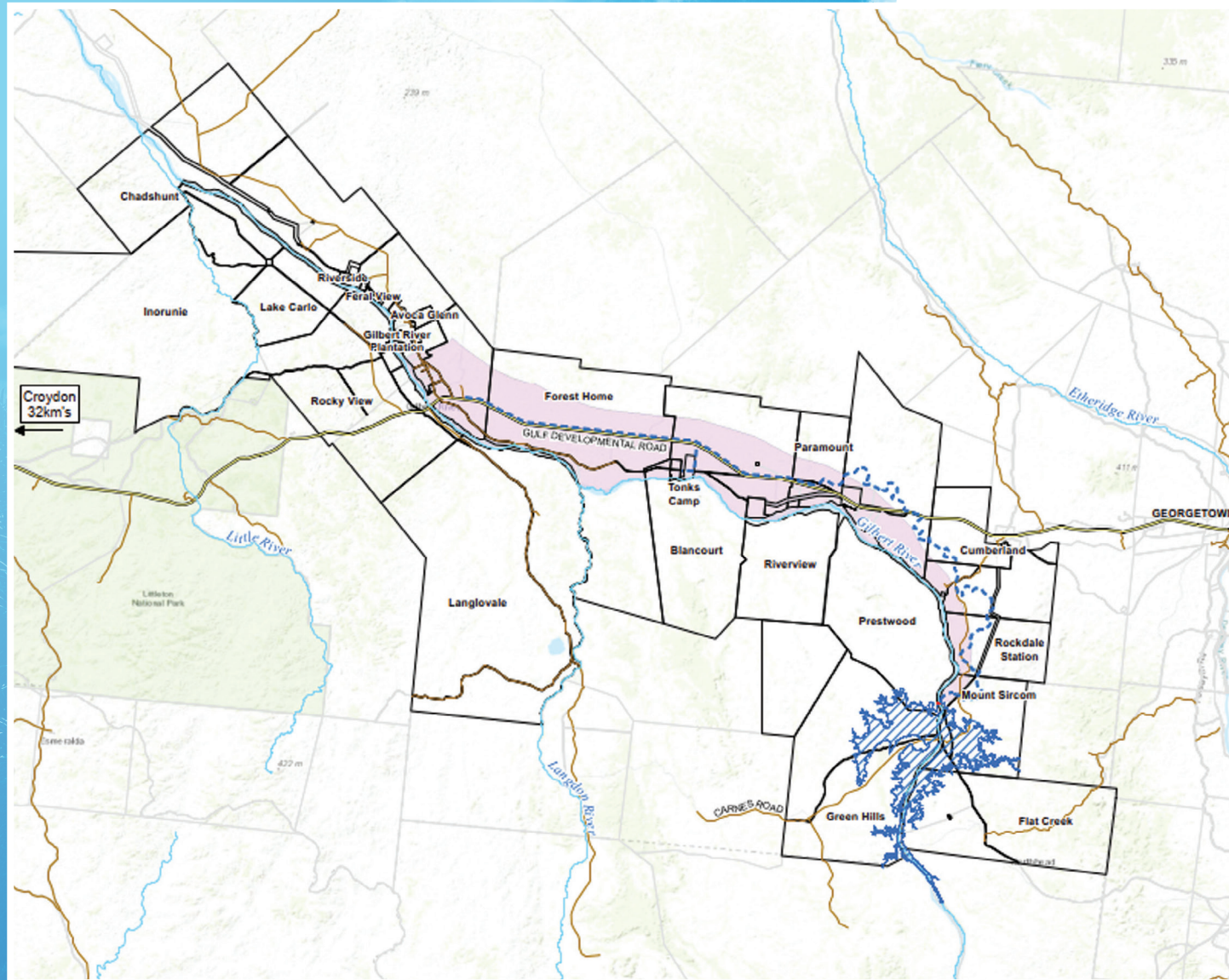


A capital cost of \$887 million when risk adjustments (P90) and contingencies are included. There is a 90 per cent likelihood that the final capital cost for the project will be lower than this estimate.

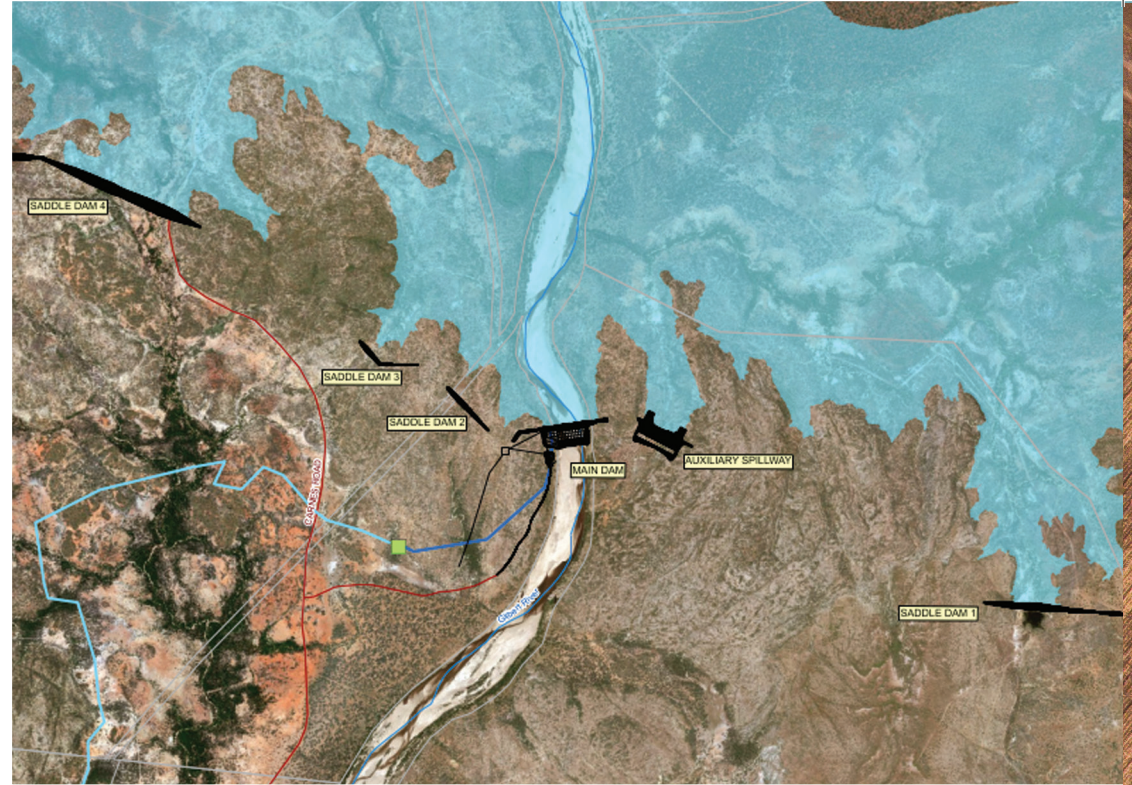


Operating cost will be funded by annual charges collected from water entitlement holders.

The case for the Gilbert River Irrigation Project



- Potential Irrigation Area
- Dam Extent
(Full Supply Level 253 AHD)
- Distribution Network Corridor
- Major Watercourse
- Secondary Roads
- Street/Local
- Main Dam Location
- Cadastre
- Rural Properties



Complies with the Gulf Water Plan and provision has been made for environmental flow releases, inc. capable of passing up to 136,830 ML per day when required.



Dam consequence hazard category has been assessed as a High C requiring dam to have an Acceptable Flood Capacity (AFC) of 1 in 20,000 Annual Exceedance Probability (AEP).



Design is based on the main dam embankment and spillway being constructed of roller-compacted concrete (RCC).



An auxiliary fuse plug spillway is in a saddle to the west of the main embankment.



Four saddle dams comprised of zoned earth and rockfill are located to the east and west of the main embankment.



Geotechnical investigations identified that the proposed site is suitable. Some localised pressure grouting and foundation treatment will be required—particularly below the central section of the existing Gilbert River.



The outlet works and fish lock are located at the right abutment of the main dam embankment.



Fish passage has been facilitated by a fish lock system.



Environmental flows and emergency releases can be made through three outlets controlled by separate 7.5 m wide by 6.0 m high, pressure radial gates.



The procurement strategy for construction will focus on maximising local and regional content to support economic benefits for the region.

Strategic context



Northern Australia comprises approximately 20 per cent of Australia's land mass but remains relatively undeveloped.



It contributes about 2 per cent to the nation's gross domestic product and accommodates around 1 per cent of the total Australian population.



The cost estimates escalate to \$887 million when risk adjustments (P90) and contingencies are included. There is a 90 per cent likelihood that the final capital cost for the project will be lower than this estimate. As the expenditure will take place over time, the present value of the capital expenditure is \$682 million.



The Gilbert catchment in North Queensland was identified as a potential area for further agricultural development.



Broad analyses of northern Australia—including the Northern Australia Land and Water Taskforce's 2009 Sustainable Development in Northern Australia and CSIRO's 2013 Flinders and Gilbert Agricultural Resource Assessment—have indicated that it can support significant additional agricultural and pastoral production, based on more intensive use of its land and water resources.



Recent focus on the shortage of water and climate-based threats to food and fibre production in the Murray- Darlin Basin and southern catchments have redirected attention towards the possible use of northern water resources and the development of the agricultural potential in northern Australia.



The Gilbert catchment is in a part of northern Australia where there has been a longstanding interest in irrigated agriculture. The government and local community believe there is opportunity for agricultural development. Pastoral settlement in these catchments dates back to the 1860s, but in recent years there have been numerous calls by local landholders, shire councils and development advocates—such as the Mount Isa to Townsville Economic Development Zone (MITEZ) and Gulf Savannah Development (GSD)—for irrigation investment in the region.



This catchment face many of the same barriers to investment as other regions across northern Australia—such as attracting appropriate levels of investment, skills and expertise and the challenges of remoteness and climate extremes. However, they have the advantage of being relatively close (a five- to six-hour drive) to the two largest population centres in northern Australia, Townsville and Cairns. The Gilbert River project has been demonstrated in the detailed business case to be suitable for large-scale investment to support sustainable irrigated agriculture.

Agricultural opportunities



The Gilbert River area has soils suitable for irrigated agriculture, and the proposed irrigation area encompasses the most suitable of those soils. Of the approximately 108,000 ha of land that was mapped, about 21,000 ha (20 per cent) were highly suitable for irrigation. CSIRO considered that there is more irrigation land available than there is water (i.e. water, not land, is the limiting factor).



The climate and location of the Gilbert River is also advantageous for irrigated agriculture—for example, the area is frost-free, which enables early flowering, and it is sheltered from cyclones. This, combined with the region's suitable soils, provide realistic commercial opportunities for crops such as avocados, bananas, citrus, mangoes, cotton, peanuts, pulses and fodder crops including sorghum.



As in other irrigation schemes, other crops may emerge; however, this intentionally conservative analysis focuses on crops that have been commercially proven locally (mangoes) and in other parts of central and northern Queensland (e.g. Emerald, Tully, Burdekin, Atherton Tablelands and Lakelands).



The effects of high temperatures on horticultural crop yields and quality can be mitigated by irrigation and suitable agronomy practices. Because of the comparative warmth of the climate, the harvesting of horticultural crops would usually be prior to the harvest of similar crops grown in other parts of Australia, which may bestow some marketing and economic benefits. Hence the Gilbert River area temperature is not seen as a major constraint to the production of the horticultural crops being considered.



If a reliable water source is not constructed in this region, however, a meaningful increase in the value of irrigated agricultural production is unlikely to occur in the Etheridge Shire. In short, a dam is needed to unlock the significant advantages of this area, which relates to the soil, climate, protected growing conditions and river flow.



The government intends for unallocated water in the Gulf to support sustainable agriculture and realise economic benefits in the region by enabling water projects to secure water entitlements. Water entitlements are available in the Gilbert River and the government could release up to 200,000 ML for this project, of the 467,000 ML allocation set by the Queensland Government for the Gilbert. However, the preferred scenario for this project is about 130,000 ML comprised of 90,000 ML of high priority water allocations (for agriculture) and 40,000 ML of medium priority water allocations.



There is no cotton gin in the Gilbert catchment. The nearest is in Emerald, 900 km to the south-east; however, Georgetown has road connections to this and other cities, including access to several ports. Moreover, the region has is already demonstrating strong potential for dryland cotton and on-farm storages used to irrigate cotton. As a result, two major cotton producers have emerged in the local area.



As a result, it is expected that significant volumes (bales) of cotton will be grown in the area prior to the Gilbert River Dam and distribution scheme being constructed. The significance of this includes that there is already emerging demand for a cotton gin in Georgetown, or nearby. The central location of Georgetown—in the midst of these three promising and emerging cotton areas in northern Queensland—makes it one of the most logical choices for the construction of a cotton gin.

Demand assessment

Strong demand for the water delivered by the project has been demonstrated with existing landholders and non-landholders through a non-binding demand assessment.

The expression of interest forms estimated an up-front customer capital contribution of \$3,000/ML for high priority and \$1,000/ML for a medium priority allocation. Annual operating costs were assumed to be covered by annual water charges of \$80/ML per annum.

The market sounding indicated that the scheme could be at least 85 per cent subscribed, as the result of a commercially astute binding water sales process that would take place prior to construction. Although the likely demand scenario indicated 100 per cent of water allocation are likely to be pre-sold prior to construction (with 137,000 ML of likely demand), if not, it is expected that the balance of the water allocations will be purchased in the first year of operations. Strong demand for reliable water from producers of cotton, peanuts, fodder producers and orchardists, is emerging in northern Queensland.

Specifically, the demand assessment interviews revealed the following trends (listed from North to South):

- On the Atherton Tablelands and in the nearby Mareeba-Dimbulah area (both areas are connected to the Mareeba-Dimbulah WSS), medium priority water is trading for \$3,000 to \$4,000/ML. Within five years the number of mature trees will be significantly higher, almost inevitably driving the price of traded water higher. Consequently, orchardists will be looking to expand south to the (proposed) Gilbert River project and north to the (proposed) Lakeland project, where water may be more affordable.
- Mareeba-Dimbulah WSS primary producers include tree crops—avocado and citrus, cotton and sugar. The sugar growers cannot move to Gilbert River area due to the driving distance being four hours from from a sugar mill, whereas about one-hour trucking distance is the industry rule of thumb (due to the weight of sugarcane). However, sugar is competing with the cotton and tree crops in the Mareeba-Dimbulah area, so there will be significant upward pressure on water values, and economic benefit arising from the avoidance of a sugar mill closure. If the Gilbert River and other project proposals offer affordable reliable water, the expansion and/or relocation of cotton and trees from the Mareeba Dimbulah WSS to these proposed projects may prevent the economic decline of the sugar industry on/near the Atherton Tablelands.
- Growers of bananas and mangoes in coastal areas of north Queensland (e.g. Burdekin, Giru and Tully) are seeking inland growing areas with suitable soils and reliable water—such as would be found in the Gilbert River project—to mitigate tropical disease (e.g. Panama) and cyclone risks.
- Peanut processing companies and peanut growers—located in north, central and southern Queensland (e.g. Tolga, Bundaberg and Burnett regions)—have for over a decade experienced chronic undersupply, resulting in the inability to meet growing consumer demand. Part of the shortfall in supply has been driven by a lack of water reliability in peanut growing areas, many of which do not have access to irrigation schemes supported by a dam. Consulting with industry as part of this project indicated a strong demand for water and soil with the characteristics offered by the Gilbert River project.
- Cotton farmers and orchardists from NSW (e.g. Border Rivers/Moree), Emerald and the Darling Downs (cotton) are migrating north (to the Burnett and north Queensland) to grow cotton and fruit trees, due to the strong agronomic advantages for cotton and tree-crops offered by these northerly areas. Growers on the Darling Downs are moving to the Burnett and growers from the Border Rivers (further south) and Emerald are investing in cotton-suited land and tree-growing soils in north Queensland.
- This migration of agri-business capital is being driven by a lack of suitable land/higher land prices in traditional (southern) irrigation areas, the absence of reliable water/declining water security in existing schemes, and competition in water trading markets resulting in rising prices for water allocations.

Consequently, the demand assessment interviews, and other stakeholder consultations conducted as part of this project, revealed an unprecedented era of interest in proposed irrigation schemes in northern Queensland. However, the final demand volume (pre-construction) will depend on factors including the modified magnitude of the required upfront capital contribution and annual charges. Prospective customers also indicated the significance of who the proponent is and whether a trusted relationship can be established with prospective customers/investors.

Environmental assessment



The dam footprint and proposed inundation area of 5,847 ha would partially impact six properties, with additional properties impacted by the water distribution network. One residential homestead would be within the inundation area.



Impacts on surface water quality during construction, such as erosion and sediment runoff, would be managed through environmental control measures. During operation, surface water quality impacts would generally be associated with changes to downstream flows.



Potential risks to the local groundwater regime are generally expected to be low.



The hydrologic analysis identified that a dam could be developed as proposed by the detailed business case in accordance with the requirements of the Gulf Water Plan.



The project is generally remote from residences; therefore, any noise, vibration and air quality impacts should be manageable.



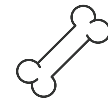
Database searches identified 26 EPBC Act listed species with potential to occur within or near the project area including threatened flora, threatened and migratory species. Three other EPBC Act listed species were also considered likely to occur in the project area.



Potential impacts on flora and fauna in the project area and downstream of the project would mainly be associated with clearing of native vegetation to facilitate construction and within the inundation area, and changes in water flow within and downstream of the project.



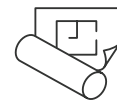
Up to about 5,847 ha of land within the inundation area would need to be cleared for the project. The clearing will need to be managed through proposing offsets that are consistent with the requirements in applicable Australian and Queensland policies.



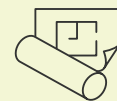
The project area has significant Aboriginal cultural heritage values within the inundation area and would be impacted. Types of cultural heritage sites expected to be found in the study area include artefacts, culturally modified trees, axe-grinding grooves, and story places and sites known in Aboriginal oral history.



No historic heritage places listed on Australian, Queensland or local government heritage registers and databases were identified in the project area.



Should the project proceed, an environmental impact statement (EIS) would be required for the project. The objective of the EIS is to ensure potential environmental, social and economic impacts of the project, within and downstream of the project area, are identified and assessed, as well as how any adverse impacts would be avoided or mitigated. The EIS would involve detailed assessments and surveys, including relating Aboriginal and historic cultural heritage, water quality, and flora and fauna.



Significant consultation will also be undertaken for the EIS, including with Traditional Owners and local and regional communities, also downstream of the project.



No fatal flaws for the project have been identified.

Conclusions, implementation plan and recommendations



There is a strong case for funding support from the Australian and Queensland governments for the project.



Strong demand for the water delivered by the project has been demonstrated from existing landholders and non-landholders through a non-binding demand assessment.



Such support is likely to lead to affordable prices, the required uptake of water allocations, a financially viable ongoing water business and a strong economic contribution to the Queensland and national economies.



Project appears to be well suited to the needs of businesses seeking to move or expand their production.



Legal entity – further work undertaken to confirm body moving project forward



Additional work between \$5 - \$8 million for the project to be ready for construction



Support from the government will provide significant encouragement for a binding water sales process

Three conditions must be met before construction can commence

1

All necessary construction approvals are obtained including for an Environmental Impact Statement and a Coordinated Project.

2

Private sector investment has been secured through binding water sales contracts for at least 85 per cent of the available water allocations from the project.

3

Conditional construction contracts have been secured within the budget constraints of the detailed business case.

Conclusions, implementation plan and recommendations



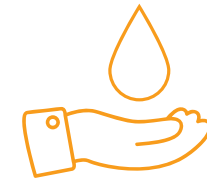
Recommended to continue to proceed with developing project.



Approach the Australian and Queensland governments for funding support for the construction of the project on the strength of the detailed business case.



Engage with the Queensland Government to endorse (and then establish) the recommend entities to be responsible for the construction, asset ownership and operational phases of the project.



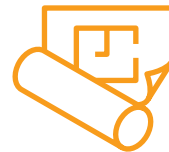
Secure the required water allocation under the Gulf Water Plan.



Undertake any additional seasonal environmental survey and other assessments during 2020 and 2021 to support the application for approvals.



Undertake an extended period of advertising and engagement with potential enterprises and investors ahead of formal water sales including facilitating access to land.



Undertaking additional soil mapping and establishing suitable parcels of land for potential investors.



Conduct a contractually binding water sales process to secure the required private investment for the project before the commencement of construction.



Brief the construction market on the prospects of the project to allow the market to prepare for the project tendering.

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