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TOONDAH HARBOUR

APPENDIX 2 - R

ECONOMIC MATTERS
TECHNICAL REPORT

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Economic analysis of the Toondah Harbour Development Project

Final Report to Walker Group Holdings

December 2020

Synergies Economic Consulting Pty Ltd
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Executive Summary

The Toondah Harbour Development Project involves a $1.5 billion development of mixed-use residential, commercial and retail facilities, in addition to foreshore parklands, a marina and ferry terminal facilities, to support an enhanced ferry service between the mainland and North Stradbroke Island (NSI) (Minjerribah). Synergies Economic Consulting (Synergies) has been engaged by Walker Group Holdings (the Proponent) to undertake one of the components of the Environmental Impact Statement (EIS) – the Economic Impact Assessment (EIA). The EIA for the project involves two key components:

1) Cost-benefit analysis – a comprehensive assessment of the economic benefits and costs to the community attributable to the project; and

2) Economic impact analysis – assessment of the regional economic impacts of the project during both the construction and operational phase on economic activity.

Cost-benefit analysis

The purpose of cost-benefit analysis is to assess the net impact of a proposed project or policy on the economic wellbeing of the community. Cost-benefit analysis is the most widely used method for appraising the net economic impact of a project proposal.

The first step in undertaking the cost-benefit analysis is to define the base case against which the development is to be assessed. As there are no viable or agreed alternative plans for the development of land within the Toondah Harbour Priority Development Area (PDA), for the purpose of the cost-benefit analysis, the base case is defined as the continuation of existing land uses within the PDA and surrounding areas. That is:

- the continued operation of vehicle and passenger ferry services between the Toondah Harbour Ferry Terminal and Minjerribah and other destinations, with associated use of the swing basin and car parking facilities;
- continued provision of the parkland facilities located in the GJ Walter Park;
- continued use of the Toondah Harbour public boat ramp; and
- the continuation of current activities within the Council-owned office facilities.

In terms of tourist visitations to Minjerribah, due to the constraints associated with the frequency and size of the ferry services operating between Minjerribah and Redlands, it has been assumed that ferry services will be unable to accommodate growth in tourist visitations and expenditure on Minjerribah from 2026 onwards. There is also not

expected to be any material tourism-related developments elsewhere in the Redland City Council region under the base case.

The PDA also overlaps with 42 hectares of the Moreton Bay Ramsar wetland site. Moreton Bay is one of the largest estuarine bays in Australia and more than 120,000 hectares of the Bay are designated a Ramsar site.

Based on the environmental assessment conducted as part of the EIS process, the development has been identified as having the potential to impact on the following environmental attributes:

- permanent impact on approximately 35 hectares of intertidal habitats as a result of reclamation works and temporary impact on approximately 6.2 hectares as a result of dredging works on the Moreton Bay Ramsar Site;
- the reclamation area contains a range of intertidal habitat types including mudflat, seagrass and mangroves. Habitats likely to be impacted by the development include:
  - approximately 35 hectares of seagrass and mudflat representing less than 0.7 per cent of this type of habitat in central western Moreton Bay;
  - approximately 4 hectares of mangroves representing less than 0.1 per cent of this type of habitat in central western Moreton Bay;
  - approximately 0.15 hectares of saltmarsh representing less than 0.03 per cent of this type of habitat in central western Moreton Bay;
- the PDA contains intertidal feeding habitat for several migratory shorebird species including the critically endangered Eastern Curlew and Vulnerable Bar-tailed Godwit. The site provides less than 0.1 per cent of the total available feeding habitat for these species in the Moreton Bay Ramsar site. Two high tide roost sites are located adjacent to the PDA and provide high value habitat for migratory shorebirds. Neither of the roost sites will be significantly impacted by the development;
- while potential habitat for 21 migratory marine species has been identified within five kilometres of the PDA, similar or better habitat is present throughout Moreton Bay; and
- while some impacts may occur to migratory shorebirds, they are expected to be temporary and short term. Temporary impacts to a small number of protected species are difficult to quantify as an economic cost and would not be large enough to alter the outcomes of the cost benefit analysis.

It is important to note that the habitat within the PDA is highly disturbed by activities in developed areas along the foreshore. Furthermore, water quality monitoring undertaken in Moreton Bay has identified significant increases in nutrient loads over the past 20 years. As the population of South East Queensland (SEQ) continues to grow, it is expected that water quality will continue to deteriorate, adversely affecting the ecological value of habitat within Moreton Bay. Any adverse impacts on the ecological value of this habitat as a result of the development must be assessed against this baseline.

The comparison of the project case against the base case resulted in the identification of the following economic benefits:

- value of reclaimed land for retail, commercial, and residential use;
- value of marina berths;
- economic benefit derived from increased tourism expenditure in the region (both on Minjerribah and on the mainland);
- avoided maintenance dredging costs incurred under the base case;
- catalytic benefits for the region attributable to the development; and
- economic benefit derived from enhanced common-use facilities to be provided as part of the development (e.g. plaza and parklands).

The assessment and quantification of these benefits is summarised in the table below.

Summary of economic benefits under the project case

Benefit	Description	Estimate ($Present Value)
Value of retail, commercial, and residential development	• Economic benefit derived from the retail, commercial, and residential space to be created by the development • Quantified based on expected market value of these facilities • Timing of benefits based on development profile provided by Proponent	$1,241.1 million
Value of marina berths	• Economic benefit derived from use of marina berths by vessel (commercial and recreational) owners • Quantified based on expected market value of marina berths	$10.7 million
Value of increased tourism expenditure	• Value add on additional expenditure by tourist visitors to Minjerribah and the mainland under the project case • Benefit quantified based on moderate growth (5 per cent per annum) in day-tripper and overnight visitations to Minjerribah from 2026 to 2030 (assumed growth to 2025 can be accommodated under the base case). • Quantification of the benefit limited to 'incremental' international tourist visitors to the region under the project case • Benefits from increased expenditure at Toondah Harbour and other destinations throughout southern Moreton Bay limited to qualitative assessment given significant uncertainty regarding timing and magnitude	$9.1 million

Benefit	Description	Estimate ($Present Value)
Avoided maintenance dredging costs	• Under the base case, maintenance dredging will be required to maintain the existing channel and swing basin • These costs will be avoided under the project case (noting the full cost of maintenance dredging has been included in the estimation of economic costs under the project case)	$11.14 million
Catalytic benefits	• Flow-on benefits for the Toondah Harbour and surrounding area attributable to demand and supply-side catalytic impacts	Not quantified
Value of enhanced common use facilities	• Economic benefit derived from users of common-use facilities within the development (parklands, public plaza, boat ramp, etc.)	Not quantified
Total economic benefits		**$1,272.0 million**

Source: Synergies modelling.

As noted in the table above, the potential catalytic benefits from the development and the economic benefit derived from the enhanced common use facilities under the project case have not been quantified in the cost-benefit analysis. For the catalytic benefits, this is due to the significant uncertainty associated with the timing and magnitude of these benefits, while for the enhanced common use facilities, it is due to the significant cost associated with quantifying this benefit (given they are unlikely to be material to the economic feasibility of the project).

Noting the above, both of these benefits, while not quantified, represent benefits to the local community and users of the common use facilities and should be considered in assessing the overall economic feasibility of the development.

The following economic costs have been identified in relation to the development:

- capital costs associated with the development project;
- the cost of up-front and ongoing dredging works;
- operational costs to be incurred in operating and maintaining common use facilities to be developed as part of the project; and
- adverse environmental impacts associated with the loss of Ramsar wetland as a result of the development project.

The assessment and quantification of these costs is summarised in the table below.

Summary of economic costs under the project case

Cost	Description	Estimate ($Present Value)
Capital costs	• Costs incurred in construction of development, including buildings, marina, ferry terminal, and other common-use facilities • Timing of costs based on the development profile provided by Proponent	$803.94 million
Relocation of trade college	• Relocation of trade college to alternative premises • Quantified assuming 50 per cent of the market value of commercial space to be created by the development	$3.51 million
Maintenance dredging costs	• Maintenance dredging costs to be incurred as a result of the dredging of the Fison Channel and swing basin	$12.96 million
Maintenance of common-use infrastructure	• Incremental costs to be incurred in maintaining the common-use infrastructure, including the bus interchange and car parking facilities, parklands, etc.	$34.43 million
Environmental costs	• Economic cost attributable to loss of habitat and adverse impacts on threatened and migratory shorebird species and other marine flora and fauna	$4.59 million
Total economic costs		**$859.4 million**

Note: Totals may not add due to rounding.

Source: Synergies modelling.

A key issue in assessing the economic cost attributable to the development was in relation to the environmental cost associated with the loss of wetland habitat. Of the three impacts assessed (see above), an economic cost was only attributed to the loss of wetland habitat. This cost – estimated at $4.59 million in Present Value (PV) terms – was quantified having regard to the results of studies that have estimated the economic value of comparable wetlands.

No economic cost was attributed to the other environmental impacts identified under the base case as:

- the development is not expected to significantly impact on the population of migratory shorebirds, as:
  - the PDA provides less than 0.1 per cent of total available feeding habitat for shorebird species in the Moreton Bay Ramsar site;
  - the carrying capacity of the Moreton Bay wetlands for migratory shorebirds is significantly underutilised and constrained by factors unrelated to the development;
  - neither of the two high tide roost sites located adjacent to the PDA will be significantly impacted by the development; and
- with regards to the impact on the 21 migratory marine species identified within five kilometres of the PDA, the environmental assessment identified that similar or better habitat is present throughout Moreton Bay.

While some impacts may occur to migratory shorebirds, they are expected to be temporary and short term. Temporary impacts to a small number of protected species are difficult to quantify as an economic cost and would not be large enough to alter the outcomes of the cost benefit analysis.

The net economic impact of a project is assessed through two key metrics:

- Net Present Value (NPV) – calculated by subtracting total economic costs from total economic benefits; and
- Benefit Cost Ratio (BCR) – calculated by dividing total economic benefits by total economic costs.

These metrics are calculated by applying a discount rate to future economic benefits and costs attributable to the development. The discount rate accounts for the social opportunity cost of capital. A real social discount rate of 7 per cent is typically applied by government assessment entities (e.g. Infrastructure Australia, Building Queensland, Queensland Treasury), with sensitivity analysis performed at discount rates at 4 and 10 per cent. It is important to note that 10 per cent is a particularly high discount rate and is highly unlikely to represent an appropriate measure of the social opportunity cost of capital. The following table summarises the NPV and BCR estimates for the project case under the central real discount rate of 7 per cent, with sensitivity analysis undertaken based on discount rates of 4 per cent and 10 per cent.

Cost-benefit analysis results ($'000s 2020)

Economic impact	Discount rate		
	4 per cent	7 per cent	10 per cent
Economic benefits			
Value of retail, commercial, and residential development	$1,705,337	$1,241,076	$924,479
Value of marina berths	$14,118	$10,646	$8,126
Value of increased tourism expenditure on Minjerribah	$19,495	$9,132	$5,277
Avoided maintenance dredging costs	$19,500	$11,143	$7,800
Catalytic benefits		Not quantified	
Value of enhanced common use facilities		Not quantified	
Total economic benefits	**$1,758,450**	**$1,271,996**	**$945,682**
Economic costs			
Capital costs	$1,044,189	$803,941	$637,595
Maintenance dredging costs	$22,967	$12,962	$8,972
Maintenance of common-use infrastructure	$61,658	$34,431	$23,600
Trade college relocation Costs	$3,606	$3,505	$3,409
Environmental costs	$4,719	$4,587	$4,462
Total economic costs	**$1,137,139**	**$859,426**	**$678,039**

Economic impact	Discount rate		
	4 per cent	7 per cent	10 per cent
NET PRESENT VALUE	$621,311	$412,570	$267,643
BENEFIT COST RATIO	1.55	1.48	1.39

These results show that under the central discount rate of 7 per cent, the project results in a positive NPV of $412.6 million, which is a BCR of 1.48. The results improve to $621.3 million and 1.55 under a lower discount rate of 4 per cent. Even at a discount rate of 10 per cent (noting this is unlikely to be a reasonable discount rate), the development is assessed as resulting in an NPV $267.6 million with a BCR of 1.39. This means that, under a central discount rate of 7 per cent, for every dollar invested, the economic return from the development is $1.48.

Sensitivity analysis was conducted to assess the sensitivity of the results of the cost-benefit analysis to changes in key assumptions and parameters. As anticipated given the breakdown of the costs and benefits presented above, in addition to the discount rate, the economic feasibility of the development is most impacted by changes to the value of residential dwellings to be created by the development and the capital cost incurred. The project was found to be economically feasible for all sensitivities tested.

Given environmental impact assessment identified the development will generally minimise disturbance outside the direct footprint, in particular the adjacent roost sites, the results of the cost-benefit analysis were not sensitive to environmental impacts. As such, the environmental impacts of the development are unlikely to affect the overall outcomes of the cost-benefit analysis.

Regional economic impact analysis

Synergies estimated the economic contribution of the development project by:

1. Developing nonlinear Input Output (I-O) models for the economies of Queensland, Minjerribah, and the Redland City Council Local Government Area (LGA);
2. Estimating economic activity in terms of capital costs and total output (turnover) to determine the incremental economic stimulus of the project during the construction and operational periods respectively; and
3. Introducing the economic stimulus amounts into respective I-O models to assess the direct and flow-on economic impacts of the project.

Construction impacts

The construction period impacts have been modelled for the Queensland economy, having regard to the scale of the development. The construction activity occurs from

2021 to 2040. Final demand shocks were obtained by summing all construction expenditure over this period and discounting back to a Present Value estimate (at a rate of 7 per cent).[1]

The results highlight substantial positive direct impacts, with the sum of the flow-on impacts (indirect and induced impacts) being commensurate in magnitude. The results demonstrate that the direct impacts would:

- increase overall gross output by $1,560 million
- increase overall GSP by $550 million
- increase overall labour income by $270 million.

Employment represents the peak annual construction jobs impact over the period. The results suggest that at peak construction, the proposed project would support 390 annual jobs in the initial/direct impact stage, 200 jobs through indirect industrial support effects and 180 jobs from induced consumption effects. This gives a total possible annual employment impact of 770 jobs at peak in supplying industries and in other sectors supplying consumers. When combined with the estimated employment impacts on Minjerribah (see below), this equates to peak employment well in excess of 1,000 FTEs.

Construction period – Queensland economic impacts

Indicator	Unit	Final demand	Industry effects	Consumption effects	Total impacts	Flow-on impacts
Gross output (turnover)	$ million	790	480	290	**1,560**	**770**
GSP	$ million	220	210	120	**550**	**330**
Income (wages paid)	$ million	100	110	60	**270**	**170**
Employment	Annual FTEs (Peak)	390	200	180	**770**	**380**

Notes: Expenditures discounted to 2020 dollars at 7 per cent per annum. Numbers may not sum due to rounding.
Source: Synergies analysis.

Operational impacts

The operational impacts of the development have been modelled based on the additional expenditure by tourist visitations to the region expected to eventuate as a result of the development. This includes:

[1] This approach is considered to be appropriate, having regard to the number of years over which capital expenditure is to be incurred, the lumpiness of the expenditure over this period, and the inherent limitations of modelling impacts into the future in a changing economy.

- additional tourist expenditure on Minjerribah due to the establishment of a mainland gateway to southern Moreton Bay and the alleviation of the constraints on the capacity and frequency of ferry services during peak periods; and
- additional tourist expenditure at Toondah Harbour and other locations throughout southern Moreton Bay attributable to the development of a mainland tourism hub.

Minjerribah

To estimate the economic impacts attributable to additional tourist expenditure on Minjerribah, a specialised Minjerribah I-O model was developed based on available employment and industry structure data. This model was then applied to estimate the impact of increased tourism expenditure on the Minjerribah economy over the 2026 to 2030 period (being the period in which there is additional tourist visitation and expenditure to the island as a result of the development). The results of this modelling are presented in the table below.

Operational period – Minjerribah economic impacts

Indicator	Unit	2026	2027	2028	2029	2030
Additional expenditure	$ million	15.98	32.77	50.40	68.90	88.32
Gross output (turnover)	$ million	26.65	56.69	86.69	118.51	151.91
GRP	$ million	15.20	31.00	47.68	65.18	83.53
Income (wages paid)	$ million	7.85	16.10	24.62	33.66	43.14
Employment	FTEs	65	133	204	279	357

Source: Synergies NSI Input-Output model.

According to the 2016 ABS Census, 844 people living on Minjerribah were employed in 2016, of which 53 per cent were employment full time. The modelling results indicate that alleviating the constraints on increased tourism visitation and expenditure had the potential to create an additional 357 jobs (in FTE terms) out to 2030. This represents a critical source of growth for the Minjerribah economy, noting the loss of economic activity and employment following the cessation of sand mining in 2019.[2]

Rest of Redland LGA

The impacts of increased tourist expenditure attributable to the development at Toondah Harbour and other locations throughout southern Moreton Bay were estimated using a

[2] Noting that the ongoing mining rehabilitation activity on NSI (Minjerribah) is generating a small amount of economic activity and employment.

nonlinear I-O model for the Redland LGA. Growth in tourist expenditure attributable to the development was estimated by applying a five per cent annual growth rate to day-tripper and overnight tourist visitations from 2026 and 2032 respectively.

As with the construction impacts, given the long time period over which the impacts of increased tourist expenditure will accrue, the impacts of the increased expenditure on the Redland economy were modelled by discounting future additional tourist expenditure at 7 per cent to produce a Present Value estimate for total additional expenditure attributable to the development. This was then applied to the Redland LGA nonlinear I-O model to estimate impacts.

The table below summarises the results of the I-O modelling, showing that based on assumed profile of increased tourist visitations and expenditure, the development will result in an increase of $440 million in gross regional output, $140 million in Gross Regional Product, and create additional employment of up to 135 FTEs.

Operating period – Redland LGA economic impacts

	Indicator	Unit	Final demand	Industry effects	Consumption effects	Total impacts	Flow-on impacts
	Gross output (turnover)	$ million	280	70	90	**440**	**160**
	GSP	$ million	100	20	20	**140**	**40**
	Income (wages paid)	$ million	70	10	10	**90**	**20**
	Employment	Annual FTEs (Peak)	107	14	14	**135**	**28**

Notes: Expenditures discounted to 2020 dollars at 7 per cent per annum. Numbers may not sum due to rounding.
Source: Synergies analysis.

These beneficial impacts are particularly significant given the importance of facilitating the growth of the Minjerribah tourism industry following the cessation of sand mining, and subsequent loss of economic activity and employment, in 2019 and the limited alternative drivers of employment growth throughout the Redland LGA.

Contents

Figures and Tables

1 Introduction

The Toondah Harbour Development Project involves a $1.5 billion development of mixed-use residential and retail facilities, in addition to a marina and ferry terminal facilities, to support an enhanced ferry service between the mainland and North Stradbroke Island (Minjerribah) (NSI). The project also involves the development of public open spaces and a community wetlands education centre.

Following the identification of Walker Group Holdings (the Proponent) as the project's preferred developer in September 2015, the Federal Minister for the Environment issued draft guidelines for the completion of an Environmental Impact Statement (EIS) for the project. Synergies Economic Consulting (Synergies) has been engaged by the Proponent to undertake one of the components of the EIS – the Economic Impact Assessment (EIA). The EIA for the project involves two key components:

3) Cost-benefit analysis of the development project – a comprehensive assessment of the economic benefits and costs to the community attributable to the project. All costs and benefits are assessed incremental to the base case (i.e. the scenario in which the development project does not proceed); and

4) Economic impact analysis – assessment of the regional economic impacts of the project during both the construction and operational phase on economic activity (output), value added, and employment. This involves applying the nonlinear input-output methodology to the key project impacts.

This report details the application of these methodologies to assess the economic impact of the development project. The rest of the report is structured as follows:

- section 2 sets out the requirements of the EIA
- section 3 details the information on the project relevant to the EIA
- section 4 contains the cost-benefit analysis
- section 5 contains the economic impact analysis
- section 6 summarises the report.

The report also includes the following attachments:

- Attachment A summarises key studies assessing the economic value of wetlands
- Attachment B provides further technical detail on the Input-Output modelling.

2 Requirements of the Economic Impact Assessment

On 5 June 2018, the Toondah Harbour Development Project was referred to the Minister for the Environment and Energy under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The Minister subsequently determined that the project be assessed by EIS, due in large part to the potential form the project to have a significant impact on Matters of National Environmental Significance (MNES) protected under Part 3 of the EPBC Act. The specific MNES referred to were:

- the ecological character of the MBRS
- listed threatened species and communities
- listed migratory species.

Section 16 of the Commonwealth Government's guidelines for the preparation of an EIS for the project detail the key requirements in relation to the EIA. These are set out in the box below.

Box 1 Commonwealth Government guidelines relevant to the EIA

The economic and social impacts of the action, both positive and negative, must be analysed. Matters of interest may include:

- Project economic and social costs and benefits of the project, including the basis for their estimation through cost/benefit analysis or similar studies
- Employment opportunities expected to be generated by the project (including construction and operational phases).

Economic and social impacts should be considered at the local, regional and national levels. Details of the relevant cost and benefits of alternative options to the proposed action should also be included.

In addition, there are also several requirements detailed in the Queensland Government's guidance for the EIS that are relevant to the EIA. These are set out in the box below.

Box 2 Queensland Government requirements relevant to the EIA

Description of the project

The description of the project is to include the anticipated number of residents, on-site employees and visitor numbers on a typical day.

Description of the environment

The EIA is to describe the economic resources of the area that are likely to have an influence on, or be influenced by, the project.

Planning framework and land uses

The EIA is to discuss the proposal in the context of the North Stradbroke Island (Minjerribah) Transition Strategy and the Shaping SEQ Regional Plan 2017.

Social and Economic outcomes

The EIA is to:

1) Describe the likely positive and negative impacts of the various elements of the construction and operation of the project on economies materially impacted by the project. The analysis should describe both the potential and direct economic impacts including estimated costs, if material, on industry and the community.

2) Prepare a benefit cost analysis for the proposed development of the ferry terminal, bus interchange, residential, commercial, hotel and marina development. This analysis should capture the economic impact of the loss of Moreton Bay Marine Park. It should also include a justification of the extent of Marine Park revocation required to offer the costs of the ferry terminal upgrade and Fison Channel improvements.

Having regard to the above requirements, the EIA to be included in the EIS for the project has been undertaken applying two methodologies:

- cost-benefit analysis, to assess the net economic impact of the development project, taking into account all economic and social benefits and costs, as per the Commonwealth and Queensland Government's requirements in assessing the project's social and economic impacts; and
- economic impact analysis, involving the development and application of nonlinear input-output models for both Queensland and Minjerribah to assess the regional economic impacts of the project to the state and regional economies, including how the flow-on impacts from the development will impact on economic activity on Minjerribah.

3 Project information

3.1 Background

The $1.5 billion Toondah Harbour Development Project was declared a Priority Development Area (PDA) in July 2013. Its development scheme, which was approved in May 2014 by the Queensland Government, highlighted a suite of planning and mixed-use development strategies to innovate, attract and grow tourism in Moreton Bay as well as Minjerribah. Importantly, it underlined the opportunity to support the economic transition of Minjerribah from sand mining to ecotourism.

Table 1 provides a summary of key infrastructure components associated with the project, in addition to other key elements of information.

Table 1 Key infrastructure associated with the Toondah Harbour Development Project

Infrastructure	Elements
Harbour precinct upgrades and new ferry terminal	• Three vehicle vessel berths and two passenger vessel berths. • 1,010 ferry public car parks, with provision for Redland City Council to deliver a further 500 in a multi-deck car park subject to demand. • Charter boat facility to facilitate culture and nature-based tourism experiences as well as operations or commute for the local area, Minjerribah and the Bay. • Bus-ferry interchange and central ticket as well as tourism information facility. • A ferry plaza.
Marina development with accompanying marine services	• Approximately 210 new berths for recreational and commercial vessels. • Marine services building • A marina plaza, with an adjoining boardwalk promenade. • New deepwater public pontoon adjacent to the marina plaza.
Network of open spaces and community facilities development	• A 3.5 ha foreshore parkland that provides new public parklands, lagoon pool/water park and boat launching facilities for non-motorised recreational vessels. • A wetland education and cultural centre.
Mixed-use precinct development	• Includes residential development, retail, tourism, and commercial-based developments. Specifically: – Up to 3,600 dwellings in small 'village style' precincts of three to four buildings. – A retail and dining precinct (maximum gross floor area of 5,000 metres squared). – Commercial office space (maximum gross floor area of 2,500 metres squared). – Hotel/convention centres providing, for example, leisure accommodation and meeting as well as function facilities.

In September 2015, Walker Group Holdings (the Proponent) was announced as the project's preferred developer for designing, financing, and delivering all infrastructure requirements (including development and environmental approvals). Because of this, there is no cost to the taxpayer, the Redland City Council (the Council) or the State of Queensland. Capital and/or maintenance dredging of the existing access channel (Fison Channel) and swing basin, which is considered integral to the development project, will be financed and overseen by the Proponent to improve the future of ferry operation services.

3.2 Location

The Toondah Harbour PDA is located in Redland City at Cleveland, which is 30 kilometres from the Brisbane central business district (CBD) in south east Queensland. The PDA has an area of 67.4 ha, encompassing 17.9 ha over land (only 6.9 ha being developable) and 49.5 ha over water (within the Moreton Bay Marine Park). The figure below includes a map of the PDA.

Figure 1 Map of the Toondah Harbour development project master plan

Source: Walker Group Holdings.

3.3 Overlap with Ramsar Site

An area of 42 hectares within the PDA overlaps the Moreton Bay Ramsar Site (MBRS) – a wetland of international importance designated under the Ramsar Convention in 1993. Dredging and other activities to be undertaken as part of the development project have the potential to impact the wetland and species listed as Threatened or Migratory under the EPBC Act.

The potential environmental impacts are being assessed through the EIS process. While final outcomes of this assessment were not available at the time of this study discussions with technical consultants have identified the following key impacts (conservatively estimated):

- direct impact as a result of reclamation works on up to 40 hectares of estuarine and intertidal habitat including mangroves, seagrass and mudflat;
- direct impact as a result of reclamation works on up to 40 hectares of migratory shorebird feeding habitat;
- minor indirect impacts to adjacent shorebird roosting habitat at Cassim Island and the Nandeebie Claypan; and
- minor and temporary impacts to marine fauna habitat outside of the development footprint as a result of dredge plumes and other short-term water quality impacts.

Whilst dredging activities as well as developments will have detrimental effects on the ecological value of the MBRS, it is important to note that only a small proportion (0.04 per cent) of the overall wetland will be affected as it covers a large area of approximately 120,654 hectares.

Section 4.6.4 of this report provides a detailed assessment of the outcomes from the environmental assessment of the project, in addition to the information available to assist with quantifying the economic impact of the loss of ecological value.

4 Cost-benefit analysis

This section details the cost-benefit analysis undertaken for the Toondah Harbour Development Project.

4.1 Overview of cost-benefit analysis

The purpose of cost-benefit analysis is to assess the net impact of a proposed project or policy on the economic wellbeing of the community. Cost-benefit analysis is the most widely used method for appraising the net economic impact of a project proposal and involves systematically identifying and quantifying all economic benefits and costs related to the project or policy. Economic benefits and costs are valued based on the standard principles of welfare economics (i.e. individuals' willingness to pay for and willingness to accept change).

4.2 Approach

The following step-by-step approach was applied in undertaking the cost-benefit of the Toondah Harbour Development Project:

- **Step 1** – Define the base case against which the economic benefits and costs of the project are to be assessed. The base case is defined taking into consideration the key characteristics of the project and the nature of the economic benefits and costs.
- **Step 2** – Define the project case, being the case to be assessed against the base case for the purpose of identifying the economic benefits and costs to be assessed and quantified.
- **Step 3** – Identify the economic benefits and costs attributable to the project case.
- **Step 4** – Develop and apply an approach to quantifying each economic benefit and cost identified in Step 3.
- **Step 5** – Undertake detailed qualitative assessments for all economic benefits and costs that were not able to be quantified in Step 4.
- **Step 6** – Conduct cost-benefit modelling (i.e. discounted cashflow analysis) to estimate the net economic impact of the project. The results of the cost-benefit analysis are to be presented in terms of the project's Net Present Value (NPV) and Benefit Cost Ratio (BCR).
- **Step 7** – Conduct sensitivity and scenario analysis on the results of the cost-benefit analysis to assess the sensitivity of the results of the cost-benefit analysis to changes to key parameters and assumptions.

4.3 Base case

The base case is the scenario against which the economic impacts of the project are assessed. The definition of the base case requires consideration of the most likely scenario under the status quo, being the scenario under which the project does not proceed.

For the economic analysis of the Toondah Harbour Development Project, the appropriate base case is the continuation of prevailing circumstances in terms of:

- land use within the Toondah Harbour PDA (i.e. no commercial or residential development that impacts on the current value of land in the PDA);
- operating, maintenance and refurbishment costs associated with the continued operation of the current common use facilities within the Toondah Harbour PDA, including the existing ferry terminal, car park facilities, and public boat ramp;
- continued operation of the ferry service operating between the mainland and Minjerribah; and
- condition of environmental assets with the PDA.

4.3.1 Current land uses within the PDA

Table 2 sets out the current land uses within the PDA and details the economic value currently derived from the land uses and how they are to be impacted under the project scenario.

Table 2 Overview of economic value derived from current land uses and implications under project scenario

Land use	Economic value derived under the base case	Implications under project scenario
GJ Walter Park	• Seafront park containing fields, picnic and BBQ facilities, children's playground and dog off-leash area • Utility derived from recreational park users.	• Development is to include 3.5 hectares of foreshore parkland that provides new public parkland facilities • GJ Walter Park is not intended for redevelopment, with the development plans detailing improvements to the existing park facilities.
Toondah Harbour Ferry Terminal	• Ferry terminals providing access for the following ferry services: – Stradbroke Passenger Ferry Service, operating 7 days per week with up to 14 return services daily – Stradbroke Vehicle Ferry Service, operating 11 services to and from Dunwich Monday to Thursday, with one additional service on Sundays and two additional services on Friday. – Stradbroke Flyer water taxi service, operating 7 days per week with 15 return	• Development is to include an upgraded harbour and ferry terminal facility, including three vehicle vessel berths and two passenger vessel berths. • Development will facilitate the provision of larger and more frequent ferry services on the existing routes.

Land use	Economic value derived under the base case	Implications under project scenario
	services daily (14 on Saturdays, Sundays and public holidays) • Facilitates utility derived by tourist visitors to Minjerribah and recreational (and non-recreational) ferry travellers, including commuters and residents.	
Car parking (associated with ferry terminals)	• Free public car parks (currently 667 car parking spaces located across the PDA and surrounding streets), the majority of which have no time limit • The facility also has a long-term parking facility owned corporately by SeaLink and not part of the redevelopment proposal, however this is currently at capacity • Facilitates utility derived by tourist visitors to Minjerribah and recreational (and non-recreational) ferry travellers. • Important commuter and transport service for 2,000+ island residents. • Important for freight with all goods and construction materials transported by barge.	• The development is to include 1,010 ferry public car parks, with provision for a further 500 to be provided by Council in a multi-deck car park subject to demand.
Swing basin	• Swing basin located in Fison Channel to provide access to ferries and water taxis • Facilitates utility derived by tourist visitors to Minjerribah and recreational (and non-recreational) ferry travellers. • Facilitates commuter and transport services and freight access for 2,000+ island residents.	• Development to include dredging to provide a larger swing basin to accommodate larger ferries. • Construction materials to be transported via barge, facilitated by swing basin.
Dredge material spoil pond	• Disused spoil pond containing dredge material – no economic value derived under the base case.	• Development will require removal of spoil pond from the PDA. A new dredge spoil pond for ongoing marina maintenance dredging will be provided in the PDA.
Toondah Harbour public boat ramp	• Public boat ramp providing access to recreational (and potentially smaller commercial) boat users.	• Development to include: – New marina including approximately 200 new berths for recreational and commercial vessels. – New launching facility for non-motorised recreational vessels located in the eastern foreshore park, including 16 boat trailer parks, 52 car parks and a boat shed – Public deep-water pontoon located in the marina adjacent to the marina plaza – Proponent contribution to the upgrade of the nearby William Street public boat ramp facility to offset closure of the existing Emmett Drive facility.
Council-owned office facilities	• General council-owned office facilities located within the PDA. • Activities include ferry terminal operations and a trade college. The trade college occupies approximately 2,500 sqm of office space within the PDA.	• Ferry terminal operators will be relocated into the new ferry terminal building including visitor information and ticketing facilities • Retail floor space provided as part of mixed use development will be utilised for food and beverage, an information office, small convenience retail, boutique artisans, and tour bookings. • Similarly, 2500sq m of commercial office space will be provided as part of mixed use development.

Land use	Economic value derived under the base case	Implications under project scenario
		• It is expected the trade college will find new premises once the existing lease expires, likely nearby in Cleveland.
Moreton Bay Marine Park	• The PDA overlaps with 42 hectares of the Moreton Bay Ramsar Site • The area provides feeding habitat for species listed as threatened and migratory • It is important to note that this area is already highly disturbed by activities in developed areas along the foreshore and there are existing impacts on MNES, both direct and indirect from the operating port and existing public boat ramp.	• The dredging activities and reclamation of land under the project scenario has potential impacts on impact on feeding habitat for threatened and migratory species and indirect impacts on roosting sites adjacent to the PDA for threatened and migratory shorebird species. • Adverse impacts attributable to the development must be assessed against a baseline that incorporates existing disturbance from development along the foreshore, marine transport and recreational boating activities, and continuing decline in water quality levels due to continued increases in population and nutrient loads in SEQ.

Source: Land use information provided by Walker Group Holdings.

As there are no viable or agreed alternative plans for the development of land within the PDA, for the purpose of the cost-benefit analysis, it has been assumed that the existing land uses are to continue under the base case. That is:

- the continued operation of vehicle and passenger ferry services between the Toondah Harbour Ferry Terminal and Minjerribah, with associated use of the swing basin and car parking facilities;
- continued provision of the parkland facilities located in GJ Walter Park;
- continued use of the Toondah Harbour public boat ramp by recreational and small commercial boat users;
- the continuation of current activities within the Council-owned office facilities located within the PDA (the trade college); and
- the continued provision of foraging habitat for the migratory and threatened species in the Moreton Bay Ramsar Site that lies within the PDA (noting that this area is materially impacted by development and activities occurring in the surrounding areas).

There is no evidence the development will adversely impact on the economic value derived from land uses outside the PDA.

4.3.2 Operating, maintenance and refurbishment costs under the base case

As noted above, the PDA contains the current common use facilities that will be either redeveloped or removed under the project scenario:

- Toondah Harbour Ferry Terminals
- car parking facilities associated with the ferry terminals
- Emmett Drive public boat ramp
- disused dredge spoil pond south of the boat ramp
- Council-owned office facilities temporarily occupied by the Australian Industry Trade College.

While the above table details the economic value derived from the use of these facilities under the base case and how this value will be affected under the project scenario, it is also necessary to note the costs associated with the operation of these facilities.

While it has not been possible to secure accurate estimates of the operating, maintenance and refurbishment costs attributable to these facilities, it is important to note that under the base case, the Council and service providers will continue to incur costs associated with the continued operation of these facilities. These costs must be considered in the assessment of the incremental operating, maintenance, and refurbishment costs under the project scenario.

In addition to these costs, there are also costs to be considered under the base case in relation to the dredging of Toondah Harbour to maintain access for ferries, water taxis and other boats. Maintenance dredging is undertaken on an ad hoc basis due to constraints on availability of funding. The last two maintenance dredging campaigns were undertaken in 2019 and 2014, with these campaigns resulting in the removal of approximately 50,000m^3 and 85,000m^3 respectively.[3] Given the previous dredging campaign was undertaken in 2006, this translates to a rate of approximately 10,000m^3 per annum. Based on an estimated cost of $78 per m^3,[4] this translates to an annual cost for maintenance dredging of $780,000 under the base case.

4.3.3 Tourism visitations and expenditure

Minjerribah is the world's second-largest sand island and is a popular tourist destination for families and day trippers. Since the cessation of sand mining in 2019, tourism has become the largest industry on Minjerribah and is the primary proposed driver of future economic growth and employment. The diversification and expansion of the tourism sector is a key priority for the Queensland Government's Minjerribah Economic

[3] Based on information provided by Walker Group Holdings.

[4] Estimate provided by Walker Group Holdings based on maintenance cost estimates sourced from Redlands City Council.

Transition Strategy (see box below). As one of the key drivers of the Toondah Harbour Development Project is to create a gateway linking the mainland to Minjerribah, the project is closely aligned with this strategy.

Box 3 Queensland Government's Minjerribah Economic Transition Strategy

As part of its commitment to phasing out sand mining on Minjerribah by 2019, the Queensland Government implemented the Minjerribah Economic Transition Strategy (ETS) to expand the island's existing industries to ensure a strong, sustainable economy for the island's residents. The ETS consists of 23 initiatives aimed at stimulating business development, increasing economic activity and creating sustainable jobs.

The Queensland Government has identified three key areas to be addressed through the ETS:

- Diversify and expand the current tourism industry
- Expand the education and training sector
- Stimulate local business development and growth.

The ETS aims to achieve this through initiatives that will:

- Help stimulate economic activity and generate local employment opportunities
- Help leverage private sector and stakeholder co-investment
- Stimulate growth in domestic and international tourism markets
- Encourage the establishment of new cultural, ecological and adventure tourism opportunities
- Support new training and education facilities for both island residents and externally based students
- Help growth local business services.

The ETS identifies the facilitation of the Toondah Harbour development project as a key component of the broader plan to increase economic development and provide greater opportunities to Minjerribah and the wider region.

Source: Department of State Development, Manufacturing, Infrastructure and Planning (2018). North Stradbroke Island Economic Transition Strategy Annual Update 2017-18.

As discussed in section 3.1, a key component of the Toondah Harbour Development Project is the development of a port and ferry terminal facility to accommodate larger ferry services between Toondah Harbour and Minjerribah, in addition to the significant expansion of car park facilities at the ferry terminal to alleviate capacity constraints during peak periods.

There are currently three ferry services operating between Cleveland and Dunwich on Minjerribah:

- Stradbroke Flyer Gold Cats water taxi which operates 15 services to and from One Mile Jetty at Dunwich on Monday to Friday and 14 services on Saturdays, Sundays, and public holidays. The water taxi service has a trip time of around 25 minutes;
- SeaLink's Stradbroke passenger ferry service, which operates 14 services to and from the Stradbroke Ferry Terminal at Junner Street, Dunwich Monday to Friday and 12 services each way on Saturdays, Sundays, and public holidays. The passenger service has a total trip time of around 25 minutes; and

- SeaLink's vehicle ferry service, which operates 11 services to and from the Stradbroke Ferry Terminal at Dunwich from Monday to Thursday with an additional service operating on Sundays and two additional services on Friday. Total trip time is 45 to 50 minutes one way.[5]

A detailed analysis has been undertaken of tourist visitations and expenditure to Minjerribah as part of the North Stradbroke Island (Minjerribah) Visitor Research Program.[6] The key outcomes from the most recent update to this study (based on 2018 data) in relation to tourist visitations and expenditure are set out in Table 3.

Table 3 Key metrics from analysis of tourist visitations and expenditure on Minjerribah

Metric	Estimates (annual)
Annual tourism visitations	345,000-405,000
Number of day trippers	~125,000
Number of overnight visitors	~250,000
Average length of stay for overnight visitors	3.7 nights
Total expenditure by day trippers	$15.0 million[a]
Total expenditure by overnight visitors	$159.1 million[b]
Total expenditure by visitors or NSI	$174.1 million
Breakdown of visitor origin	95.5% domestic; 4.5% international

a Noting that of this total, $6.25 million was spent getting to and from Minjerribah.

b Noting that of this total, $37.0 million was spent getting to and from Minjerribah.

Note: Total expenditure estimates have been derived based on an estimate for annual tourist visitations of 375,000.

Source: Queensland Government (2019). Minjerribah Futures – Minjerribah Visitor Research Program. Round 2 Report.

As shown in the above table, total annual expenditure by tourists on Minjerribah is estimated at $174.1 million. Based on an average value add proportion of 20.61 per cent,[7] this equates to a total economic benefit to the Minjerribah community of $35.9 million per annum.[8]

As shown in Figure 2, tourist visitations and expenditure to NSI have been increasing since 2009.

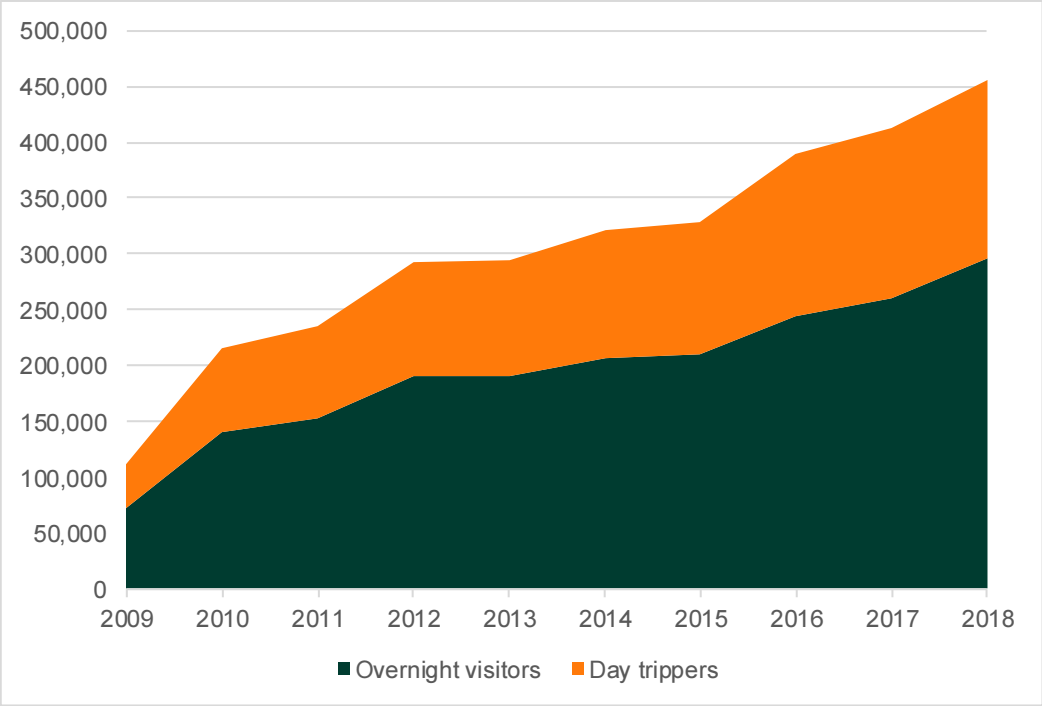
5 Walk-on passengers are still permitted on the vehicle ferry service.

6 Queensland Government (2018). North Stradbroke Island Visitor Research Program. Round 1 Report.

7 Calculated based on current ABS value added estimates, using the breakdown of expenditure data by tourists on NSI (Minjerribah). This estimate represents the weighted average of the value-add for day trippers and overnight tourists, weighted based on the proportion of total tourism expenditure attributable to the two visitor categories.

8 To determine the economic benefit associated with a given level of tourist expenditure on goods and services on NSI (Minjerribah), it is necessary to apply a percentage estimate for the margin derived from this additional expenditure to account for the costs incurred in providing the related gods and services.

Figure 2 Ferry and water taxi trips to Minjerribah from tourist visitors (2009-2018)



Data source: Queensland Government (2019). Minjerribah Futures – Minjerribah Visitor Research Program. Round 2 Report.

In comparison, based on 2019 tourist visitation data from the TRA, the Redlands City Council region recorded a total of 378,000 overnight visitors in 2019, of which 28,000 were international. The region also recorded a total of 743,000 day-tripper visits in 2019.[9]

The above chart shows that for the 2011 to 2018 period, average annual growth in tourist visitations (day trippers and overnight) to Minjerribah averaged around 10 per cent per annum. Over this time, Minjerribah has become increasingly dominant in terms of its role in the tourism sector for the Redlands region. Based on 2018 and 2019 visitation data, Minjerribah accounts for almost 80 per cent of overnight visitors to the region. Furthermore, Minjerribah has accounted for almost all of the growth in overnight visitations to the region since 2014.

Noting the strong growth exhibited in the chart above, it is not expected that such significant year-on-year growth in tourist visitations to Minjerribah will continue over the medium to long term. This is attributable to two factors:

[9] TRA data.

- constraints on the capacity and frequency of ferry services operating between Toondah Harbour and Minjerribah, particularly during peak periods (see box below); and
- the capacity of infrastructure on Minjerribah to accommodate significant growth in tourist visitations.[10]

Box 4 Constraints on tourist visitations to Minjerribah

The survey conducted as part of the NSI Visitor Research Program in 2019 revealed several factors that may constrain growth in tourist visitations. Two of the key factors identified were cost and accessibility. Furthermore, during peak season, island events and holiday periods operations are nearing capacity (services are already generally fully booked during peak holiday seasons) and are unlikely to be able to service even moderate growth in tourist visitations beyond the short term.

In response to this capacity, it is likely that larger or wider vessels will be required to accommodate the future increase in patronage, of both island residents and visitors. However, the shallow channel and harbour basin risks larger vessels 'bottoming out', striking submerged objects or dragging on the harbour floor. The frequency of services that can operate between Toondah Harbour and NSI is also constrained by the existing one-way entrance channel. It is also understood that the capacity of the existing ferry terminal and car parking facilities further constrains ferry utilisation, particularly during busy periods.

Essentially, Toondah Harbour's physical infrastructure, facilities and amenities have reached a practical threshold that will restrict future growth in patronage, capacity, and services, impacting island residents, prospective visitors and tourism related businesses.

Based on the information in the box above, it is assumed that under the base case, while it may be possible to accommodate modest growth in tourist visitations (and hence expenditure) to Minjerribah over the short term, the issues with access to the island and community opposition to significant growth in tourist visitations over the long term are likely to eventually constrain future growth in tourist visitations to Minjerribah.

There is also unlikely to be material growth in tourist visitations to the mainland area within the Redlands City Council under the base case. As noted above, Minjerribah is currently the sole source of growth in overnight tourist visitations to the region and given the constraints on future growth in visitations to Minjerribah and lack of alternative tourist developments under the base case, it is not anticipated that tourist visitations to the region will exhibit material growth over the duration of the study period (above the annual growth of five per cent assumed for Minjerribah over the short term).

[10] Noting there is also some community opposition to continued growth in tourist visitations to NSI (Minjerribah).

As discussed further in section 4.5.3, the development will significantly enhance the mainland tourist offering, through the establishment of a hotel and complementary retail and commercial services, in addition to significantly enhancing the aesthetic offering of the surrounding area. The development of the marina and associated infrastructure will also significantly enhance the capacity for tourism service providers to operate out of Toondah Harbour, including day tripping tours to Minjerribah and throughout the southern Moreton Bay.

As such, one of the beneficial economic impacts attributable to the project will be the facilitation of increased tourist visitations and expenditure to the region, including Minjerribah and the rest of the Redlands region. This benefit is assessed in detail in section 4.5.3.

4.3.4 Environmental assets within the PDA

Moreton Bay is one of the largest estuarine bays in Australia. The formation of large, vegetated sand dunes on the eastern side of the Bay and river and creek flows entering the Bay to the west from the mainland have created a major wetland complex.

To assess the impact of the development on environmental economic values, it is first necessary to assess the economic value of the habitats that are located within, and will thus be affected by, the PDA. This enables a comparative assessment of the economic impact associated with the loss of habitat within the PDA under the project case.

A range of environmental professionals have undertaken a detailed assessment of the ecological values within the PDA. Impacts were assessed for the development footprint and adjacent areas such as the high tide roost sites.

Based on the environmental assessment conducted as part of the EIS process, the development has been identified as having the potential to impact on the following environmental attributes:

- permanent impact on approximately 35 hectares of intertidal habitats as a result of reclamation works and temporary impact on approximately 6.2 hectares as a result of dredging works on the Moreton Bay Ramsar Site;
- the reclamation area contains a range of intertidal habitat types including mudflat, seagrass and mangroves. Habitats likely to be impacted by the development include:
  - approximately 35 hectares of seagrass and mudflat representing less than 0.7 per cent of this type of habitat in central western Moreton Bay;

  - approximately 4 hectares of mangroves representing less than 0.1 per cent of this type of habitat in central western Moreton Bay;
  - approximately 0.15 hectares of saltmarsh representing less than 0.03 per cent of this type of habitat in central western Moreton Bay;

- the PDA contains intertidal feeding habitat for several migratory shorebird species including the critically endangered Eastern Curlew and Vulnerable Bar-tailed Godwit. The site provides less than 0.1 per cent of the total available feeding habitat for these species in the Moreton Bay Ramsar site. Two high tide roost sites are located adjacent to the PDA and provide high value habitat for migratory shorebirds. Neither of the roost sites will be significantly impacted by the development; and
- while potential habitat for 21 migratory marine species has been identified within five kilometres of the PDA, similar or better habitat is present throughout Moreton Bay.[11]

The impact of the development project on these ecological values/characteristics will be assessed in the economic assessment of the project options.

In noting the ecological value of the wetland area within the PDA, it is important to note that the habitat within the PDA, in particular the saltmarsh and mangrove forests along the foreshore, is highly disturbed by activities in developed areas along the foreshore.[12]

Furthermore, water quality monitoring undertaken in Moreton Bay has identified significant increases in nutrient (phosphorus and nitrogen) loads over the past 20 years, due to the increased population of the region and changes in land use in the catchments of Moreton Bay. The increase in mud and sediment loads in Moreton Bay as a result of this population growth and land use change represents a significant threat to the health of natural habitat within the Bay. As the population of SEQ is expected to continue to grow in the future, in the absence of significant changes in land use practices within Moreton Bay catchments, it is expected that water quality will continue to deteriorate, adversely affecting the ecological value of habitat within Moreton Bay (particularly in coastal areas). This expected deterioration in water quality and habitat health under the base case must also be considered in assessing the economic impacts of the project.[13]

[11] Saunders Havill Group (2020).

[12] Saunders Havill Group (2020).

[13] Saeck, E., et al (2019). Water quality in Moreton Bay and its major estuaries: Change over two decades (2000-2018).

4.4 Project case

The project case to be assessed in the cost-benefit analysis involves the completion of the Toondah Harbour Development Project. The key characteristics of the project are detailed in section 3. As per the approach detailed in section 4.1, the cost-benefit analysis involves the assessment of the economic benefits and costs under the project case relative to the base case, as described in section 4.3.

4.5 Economic benefits

The comparison of the project case against the base case resulted in the identification of the following economic benefits:

- value of reclaimed land for retail, commercial, and residential use;
- value of marina berths;
- economic benefit derived from increased tourism expenditure on Minjerribah;
- avoided maintenance dredging costs incurred under the base case;
- catalytic benefits for the region attributable to the development; and
- economic benefit derived from enhanced common-use facilities to be provided as part of the development (e.g. plaza and parklands).

4.5.1 Value of retail, commercial, and residential development

As discussed in section 3.1, the Toondah Harbour Development Project involves the reclamation of 49.5 hectares of land, the majority of which is to be developed for retail, commercial, and residential use. The value derived from the development of this land represents an economic benefit attributable to the development project.

As noted in section 4.3.1, there is currently no planned development on land currently within the PDA (noting that the majority of the land for commercial development is reclaimed). As the cost incurred in purchasing the current land that falls within the PDA has been included in the capital cost for the project (see section 1.1.1), the full value of land developed for retail, commercial, and residential use by the development project has been included as an incremental economic benefit.

Table 4 sets out the profile of the retail, commercial, and residential developments over the 30-year study period, noting that the first year of development is 2024.

Table 4 Profile of development of retail, commercial, and residential land uses (square metres)

Year	Retail (Square metres)	Commercial (Square metres)	Residential	
			Square metres	Dwellings
2024	-	-	8,020	25
2025	500	-	27,240	245
2026	-	-	8,030	45
2027	-	-	39,780	390
2028	-	-	17,643	180
2029	1,000	500	32,054	300
2030	1,000	1,000	23,086	230
2031	1,000	-	23,298	395
2032	1,500	1,000	30,324	315
2033	-	-	-	-
2034	-	-	38,724	365
2035	-	-	24,552	205
2036	-	-	-	-
2037	-	-	-	-
2038	-	-	53,364	470
2039	-	-	-	-
2040	-	-	42,072	435
Totals	**5,000**	**2,500**	**368,188**	**3,600**

Note: Excludes hotel development (to be developed by 2031).
Source: Development profile provided by Walker Group Holdings.

The following sections set out the estimation of the land value up-lift, and hence economic benefit, derived from these developments.

Retail and commercial

As shown in the table above, the development includes 5,000 sqm and 2,500 sqm of mixed-use retail and commercial development respectively. The majority of this space is to be developed between 2029 and 2032. An estimate of $3,000 per sqm has been applied to estimate the economic benefit associated with the retail and commercial area within the development.[14]

This approach to valuing the economic benefit of the creation of new space for retail and commercial activities means it is not necessary to consider, in the quantification of economic benefits generated by the development project, future revenues or costs incurred in relation to the retail and commercial activities that occur within the

[14] Estimate based on an analysis of recent sales of commercial and retail properties in the Cleveland area.

development, as the value that is realised from the sale of the space is commensurate with the Present Value of future expected revenues (benefits) and costs.

Hotel development

The development includes a 3,322 sqm hotel to be constructed by 2031. The development plan for the hotel is comprised of the following:

- two function and event spaces, with capacities of 100 and 150
- one business centre
- 200 sqm of meeting spaces
- a 180-room hotel and bar.

It is yet to be determined whether the hotel will be sold once development is completed or is to be constructed and managed by the developer. For consistency with the quantification of other economic benefits, the benefits derived from the development of the hotel facility have been estimated on the basis that the hotel will be sold once construction has been completed. The Proponent has advised an indicative value for the hotel facility of $100 million. The economic benefit to be derived from the hotel development has therefore been estimated based on the sale of the hotel for $100 million ($2020) in 2031.

As with the retail and commercial space within the development, by quantifying the economic benefit to be derived from the hotel based on the expected value to be realised from the sale/lease of the hotel, it is not necessary for the cost-benefit analysis to have regard to future hotel revenues or operating, maintenance, and refurbishment costs required to operate the hotel over the study period.

Residential

The value up-lift from the residential development has been quantified on a per dwelling basis. As the project developer will be constructing and selling the dwellings,[15] the cost of constructing the apartments has been included in the capital cost estimate for the project (see section 1.1.1), the economic benefits attributable to the residential developments have been quantified based on the expected value of the apartments. The Proponent has advised that the anticipated average sale price of the apartments is $720,000.

[15] Comprised of detached houses, townhouses and apartments.

As shown in the table above, there are 3,600 apartments planned for the development. At an average price of $720,000 per apartment, this translates to a total value of $2,592 million. In PV terms, the estimated economic benefit attributable to residential development is $1,185.4 million.

4.5.2 Economic value of marina berths

The development includes the construction of 210 marina berths for use by commercial and recreational vessels between 2026 and 2038. These berths are to be sold upon completion of construction. The benefits to be derived from the marina berths have been quantified based on a market value of $100,000 per berth.[16] Based on the profile of development of marina berths provided by the Proponent, the total economic benefit derived from the construction and sale of marina berths is estimated at $10.65 million in PV terms.

4.5.3 Economic value of increased tourism activity

As discussed in section 4.3, the development will result in increased tourist visitations and expenditure in the Redland City Council region through:

- facilitating growth in tourist visitations to Minjerribah through:
  - alleviating constraints on the capacity and frequency of ferry services operating between Toondah Harbour and Minjerribah, particularly during peak periods;
  - creating a gateway between the mainland and tourist destinations in southern Moreton Bay, including Minjerribah; and
- creating a mainland tourist offering at Toondah Harbour and surrounding areas, through the creation of a focal point for tourism operations, in addition to the establishment of a luxury hotel and complementary retail and commercial services.[17]

Growth in tourist visitations to Minjerribah

As discussed in section 4.3.3, with the cessation of sand mining on Minjerribah in 2019, there is an increased focus on tourism as a driver of economic activity. It has previously been estimated that around 70 per cent of the businesses on Minjerribah are in the

[16] Based on estimated market value provided by Walker Group Holdings.

[17] In addition to additional mainland accommodation offerings established as a result of the flow-on impacts from the establishment of a mainland tourism hub.

accommodation, food and beverage, and services sectors.[18] With the reduction in economic activity attributable to the cessation of sand mining, the continued viability of these businesses is likely to be contingent upon continued growth in tourist visitations to Minjerribah.

The extent to which the economic benefit derived from increased tourist visitations and expenditure on Minjerribah can be attributed to the Toondah Harbour Development Project is contingent upon whether:

1) The future growth of tourist visitations to Minjerribah is constrained due to issues with transport access from the mainland (e.g. lack of capacity of ferry services to accommodate growth, low service quality, trip times); and

2) These constraints will be alleviated by the Toondah Harbour Development Project; and

3) The extent to which the establishment of a mainland tourism gateway at Toondah Harbour will lead to growth in tourist visitations to Minjerribah and the rest of the southern Moreton Bay.

While the current ferry services have the capacity to accommodate moderate growth (five per cent per annum) in tourist visitations to Minjerribah over the next five years (i.e. to 2025), the inability of the landside facilities, swing basin, and channel to accommodate larger and more frequent ferry services will constrain further growth over the medium to long term (i.e. from 2026 onwards). This is despite visitation data for the past ten years indicating strong growth in visitation is likely to be achievable.

In addition, in the survey conducted as part of Round 2 of the Queensland Government's Minjerribah Visitor Research Program, potential tourist visitors to Minjerribah noted the heavy reliance on private vehicles to access ferry terminals, placing strain on road access and parking facilities during peak periods. Public transport facilities connecting major population centres to the ferry terminals are poorly utilised. Improving accessibility was one of the three major improvements identified by potential visitors, while the provision of more frequent ferry services and improvements to the ferry terminal were identified as potential transport improvements by current tourist visitors to Minjerribah.

Taking into account these survey responses and that current ferry services are unlikely to be able to accommodate growth in tourist passengers from 2026 onwards, it is concluded that the development will, through the construction of a larger ferry terminal and expansion of the capacity of the Fison Channel and swing basin, alleviate the

[18] Public Hearing – Inquiry into the Stradbroke Island Protection and Sustainability and Other Acts Amendment Bill.

constraint on the capacity of ferry services between Toondah Harbour and Minjerribah from 2026 onwards.

However, in noting the potential for the development to alleviate the constraint on access to Minjerribah and increase public awareness of the island as a tourist destination, there is still a limit to the extent to which Minjerribah can accommodate significant growth in tourist visitations above the current level of visitations (noting community concerns regarding the impact of growth in tourist visitations and issues with the capacity of infrastructure and facilities on the island).

On this basis, the additional tourist visitations and expenditure on Minjerribah attributable to the development have been modelled based on the following assumptions:

- the creation of a mainland tourism hub and alleviation of the constraint on the capacity and frequency of ferry services between Toondah Harbour and Minjerribah will result in additional growth in tourist visitations of five per cent per annum from 2026 to 2030; and
- from 2031 onwards, no growth rate has been applied to tourist visitations and expenditure, noting the constraints on the capacity of Minjerribah to accommodate further growth in tourist visitations over the long term and community concerns in relation to a significant increase in tourist visitations.

Quantifying the economic benefit attributable to this increase in tourist activity on Minjerribah requires an analysis of the additional expenditure that will result from the increase in visitations.

Data collected as part of Round 2 of the NSI Visitor Research Program identified the following estimates for expenditure by tourist visitors to NSI:

- $160 per day for day trippers
- $224 per day for overnight visitors.

These estimates have been applied to the number of additional tourist visitations to Minjerribah under the project case to calculate the economic benefit attributable to the development. Table 5 summarises additional visitations and expenditure on Minjerribah attributable to the development from 2026 to 2030, based on an annual growth of five per cent and the expenditure estimates detailed above.

Table 5 Additional tourist visitations and expenditure on Minjerribah under the project case

Metric	2026	2027	2028	2029	2030+
Additional day tripper days	8,794	18,028	27,724	37,905	48,594

Metric	2026	2027	2028	2029	2030+
Additional overnight visitors	17,589	36,057	55,449	75,810	97,189
Additional overnight days	65,078	133,411	205,160	280,496	359,599
Additional day tripper expenditure	$1,407,100	$2,884,556	$4,435,884	$6,064,779	$7,775,118
Additional overnight expenditure	$14,577,560	$29,883,999	$45,955,759	$62,831,107	$80,550,223
Additional total expenditure	**$15,984,661**	**$32,768,555**	**$50,391,643**	**$68,895,886**	**$88,325,341**

Note: Based on a long-term average annual growth rate in visitations of five per cent per annum with constant per day expenditure. Also based on the assumption that ferry services will be unable to accommodate any growth in tourist visitor numbers beyond 2025.
Source: Synergies modelling.

The Present Value of future expenditure by 'growth' tourist visitors to Minjerribah under the project case totals $784.2 million.[19] To calculate the economic benefit attributable to this expenditure, it is necessary to identify the value-add component of the total expenditure (i.e. total expenditure less the costs incurred in providing the associated goods and services).[20] Based on ABS data, the weighted average value add for tourist goods and services is estimated at 20.61 per cent.[21] Applying the proportion to the total expenditure estimate for 'growth' tourist visitations result in a total economic benefit estimate of $161.6 million (in PV terms).

While this estimate relates to the economic benefit to Minjerribah as a result of increased tourist visitations accommodated by the development, it is not appropriate to include this estimate in the cost-benefit analysis, as the analysis is being conducted at the national level. On this basis, it is likely that were the development not to proceed, and the ferry services unable to accommodate the growth in tourist visitations to Minjerribah, these visitors would incur similar expenditure elsewhere in the economy (e.g. alternative domestic tourism or entertainment activities). That is, this expenditure does not provide an incremental economic benefit for the economy as a whole, relative to the base case.

The treatment of international visitors is different. As these visitors are tourists that spend a finite amount of time in Australia, it is reasonable to assume that if visitors are unable to visit Minjerribah due to transport constraints, they will incur less expenditure during their visit. Hence, accommodating additional tourists from international jurisdictions does represent an incremental economic benefit.

[19] Noting that this includes 'additional' tourist expenditure under the project case for the years 2031 to 2050.

[20] This is necessary as in calculating the economic benefit derived from increased tourist-related expenditure, it is necessary to account for the costs incurred in providing the tourist-related goods and services. That is, the economic benefit derived is the value of these goods and services (being revenue derived) less the costs of providing the goods and services.

[21] This value added percentage was calculated by applying the ABS industry-specific value-added estimates to the breakdown of tourist-related expenditure obtained from the NSI Visitor Survey (2019). The value-added is weighted based on this expenditure breakdown.

The Round 2 report for the NSI Visitor Research Program states that 4.5 per cent of tourist visitors to NSI were from international origins. This compares to 6.8 per cent from the Round 1 report. The proportion of 'growth' tourist expenditure attributable to visitors of international origins has been estimated using the average of these proportions – 5.65 per cent.

Applying this proportion to the total economic benefit attributable to all additional tourist expenditure on Minjerribah under the project case results in an economic benefit estimate of $9.1 million in PV terms.

In addition to this value, it is also noted that existing tourist visitors to Minjerribah will also derive benefit from the improved ferry and ferry terminal service offerings to be provided by the development. Estimating this benefit would require detailed information regarding the utility derived (i.e. willingness to pay) by tourists from these improvements. This would require a contingent valuation study to be undertaken, the cost of which is disproportionate to the magnitude of the benefit.

Growth in tourist visitations to the rest of the Redlands region

As discussed above, Minjerribah is the primary driver of tourist visitations (particularly overnight visitations) and hence expenditure by tourists in the Redlands region. This is evidenced by the relatively small number of overnight and international visitors to the region (excluding visitors to Minjerribah). With no major tourism development proposed for the mainland in the absence of the development, material growth in visitations (outside of Minjerribah) is unlikely.

The development addresses this current gap both through the provision of a tourism gateway to the southern Moreton Bay and the establishment of a tourism precinct on the mainland at Toondah Harbour. The key characteristics of the development that are expected to attract visitors to the region are:

- a comprehensive, well-connected tourism offering with high amenity, that offers good access to Brisbane and South East Queensland. The tourism-based harbour, coastal open space, hotel facilities, and marina dining precinct represents an attractive proposition to a range of tourist types, including holiday makers, people visiting friends and relatives, ecotourists, and organisers of corporate events and private functions;
- the provision of a mainland base for ecotourism operators providing services throughout southern Moreton Bay (including Minjerribah and Peel Island). This will create a new market for day-trippers seeking to access ecotourism services throughout southern Moreton Bay from the mainland; and

- the development will complement the other major tourism projects throughout the region, including the Queen's Wharf Development, the Brisbane Airport Parallel Runway, and International Cruise Terminals. These developments are focused on increasing Brisbane's profile as an international tourist destination, in particular targeting high-growth Asian markets.[22]

The box below provides an example of a comparable tourism service offering to Toondah Harbour and Minjerribah in Fremantle and Rottnest Island. The success of the Fremantle-Rottnest Island tourist offering provides an example as to how an island destination and complementary mainland tourist hub can generate significant regional economic benefits.

Box 5 Case study: Fremantle and Rottnest Island

Rottnest Island (Wadjemup) is located approximately 18 kilometres west of Fremantle in southwest Western Australia. The island is 11 kilometres in length and 4.5 kilometres wide at its widest point, with a total land area of around 19 square kilometres. Rottnest Island (Wadjemup) is a popular destination for interstate and international tourists and is identified as one of the major tourist attractions in the Perth region, with annual tourist visitations to the island estimated at between 500,000 and 1,000,000. The island is renowned for its picturesque scenery, beaches, and bays.

The primary access to Rottnest Island (Wadjemup) is by ferry from Fremantle's Victoria Quay. The trip duration between Fremantle and Rottnest Island (Wadjemup) is approximately 25 minutes (not dissimilar to the duration of the ferry service between Toondah Harbour and Minjerribah). In addition to providing the gateway for tourists to access Rottnest Island (Wadjemup), Fremantle is a major tourist destination itself. The Fremantle markets are frequented by over two million tourist visitors annually, with the area also containing other popular tourist destinations such as the Fremantle Prison.

The increased popularity of Fremantle and Rottnest Island (Wajemup) as a destination for day-tripper and overnight tourists has resulted in several positive flow-on impacts for tourism businesses in the region, including:

- The establishment of direct flights to and from cities in major Asian tourist markets (e.g. Tokyo)
- Flow-on accommodation benefits from cruise ship visitors
- Increased number of conferences and corporate events being held at hotels in Fremantle.

Sources: Tourism Council Western Australia (2019). New Attractions for Perth; 'Top Ten Attractions', Visit Fremantle; DOA: 26 November 2020; See: https://www.visitfremantle.com.au/play/top-ten#:~:text=Fremantle%20is%20the%20gateway%20to,world's%20finest%20beaches%20and%20bays; 'High hopes for a big tourism season for port city'; Fremantle Gazette; DOA: 1 December 2020; See: https://www.perthnow.com.au/community-news/fremantle-gazette/high-hopes-for-a-big-tourism-season-for-port-city-c-896463

While the tourist services and experiences on Minjerribah will continue to be a key driver of the region's tourism sector, the establishment of a mainland tourism hub at Toondah Harbour is also expected to attract additional tourist visitors to the region.

Initially, growth in day-tripper visitations are expected to occur, following the completion of the initial stages of the development by 2026, with growth in overnight

[22] 'Unlocking Brisbane's Tourism Potential'. Choose Brisbane. DOA: 24 November 2020; See: https://www.choosebrisbane.com.au/corporate/news-centre/news/brisbane-tourism-investment-guide?sc_lang=en-au

tourist visitations to the mainland expected to commence from 2032, following the development of the hotel and complementary commercial and retail services.

However, the lack of a mainland tourism offering in the region under the base case and limited data on tourist visitations (outside of visitation to Minjerribah makes it difficult to robustly assess the market potential in terms of the growth in tourist visitations to the mainland that could be achievable, and the likely timing of this growth, under the project case.

Given this uncertainty, this benefit has not been quantified in the cost-benefit analysis. The regional economic impacts of increased tourist expenditure at Toondah Harbour and other locations throughout southern Moreton Bay has been modelled in the regional economic impact analysis, based on an indicative growth scenario (see section 5.3.2).

4.5.4 Catalytic benefits from the development

The economic benefits discussed in the above sections are direct benefits attributable to the Toondah Harbour development. In addition to these direct benefits, there are also catalytic, or 'spill over', benefits associated with the development. Two key types of catalytic impacts are:

1) Demand-side catalytic impacts – the effects the economic activity has on the net demand for goods and services produced in a region; and

2) Supply-side catalytic impacts – situations in which the economic activity boosts the productivity potential of the economy.

Significant waterfront developments have the potential to attract investment to the area, improve local reputation, attract and retain a skilled workforce, and stimulate additional investment by establishing a hub or cluster of complementary activities. These developments also trigger positive flow-on effects on a place's reputation, appeal, and confidence.

These catalytic impacts are often particularly observable in waterfront developments outside of Central Business District areas. These developments have the potential to stimulate or rejuvenate the immediate location and facilitate the further development of the wider region. The catalytic impacts likely to be provided by the Toondah Harbour development include:

- source of amenity and opportunity for residents whose suburban lifestyles have potentially detached them from the amenity and opportunities typically provided by a city centre;

- diversification of the visitor economy beyond narrow segments, to open a different and more sustainable visitor and user mix. Further, it also provides a focus for industries that have distinctive waterfront or co-location needs;
- act as a brand builder for the region's competitive advantages (e.g. tourism), a perception changer for visitors and customers, and a confidence raiser about the local area's capacity and appetite to adjust to changing circumstances;
- facilitate the shift from a single-centre focus and development model to a more efficient multi-centre region providing wider economic and social benefits;
- accommodate renewed demand for waterfront living, while protecting access for existing residents and fostering reattachment of communities to the water – thereby enhancing the awareness of the local environment by integrating it into the community and local economic activity;
- drive talent attraction and retention as early career workforce becomes more amenity- and place-sensitive in their location decisions; and
- provide flexibility to adjust to economic and environmental shocks which alter patterns of human and business behaviour (e.g. adapting to the impact of COVID-19).

Examples of international waterfront developments and their positive flow-on impacts are presented in the box below.

Box 6 International examples of successful waterfront developments

Harbour City, Hamburg

Harbour City is an example of a long-term multi-phase project with integrated ownership that has set international benchmarks in urban design, physical quality, and low carbon precinct development. It illustrates the potential to raise a city region's status as a destination, gateway and pioneer, and the importance of highly mixed uses and incomes in destination building.

Chula Vista, San Diego

The revitalisation of the Chula Vista waterfront south of San Diego is providing a boost to recreation, commerce and hospitality in a region transformed by the innovation economy. The project public parks, protect natural coastal resources, provide conference and visitor-serving amenities, building a new hub for the San Diego region. The project aligns its aims with the wider regional development plan and is recognised for the level of buy-in it has achieved among public and private stakeholders during the planning process.

Dundee Waterfront, Dundee

70 kilometres from Edinburgh, Dundee has successfully transformed its former harbour into waterside apartments, cultural institutions, workspaces for innovative firms, hotels, and shops. The project shows the range of impacts that can be achieved for the whole city – including the psychological reconnection with the water, raising civic pride, uplifting local jobs prospects, and raising external perceptions.

India Basin, San Francisco

The India Basin is San Francisco's recent attempt at a medium-density, amenity rich neighbourhood in one of the last undeveloped areas of its south-east. Its public park emphasises the preservation of the rich ecology of the Bay Area's shore. The project points to the need to establish new ways for residents and visitors to experience the waterfront, and the importance of intensive remediation of environmental habitats, and aligning with local communities.

Aspern, Vienna

Aspern is an innovative waterfront district to the north east of Vienna. It shows how a fairly remote location can become a node for faster growth through a lively mix of housing, workspaces, local services, amenities, leisure and education facilities. It offers lessons about the value of social infrastructure and building complete neighbourhoods.

Sea City District, Gdynia, Poland

In one of Poland's more ambitious small cities, Gdynia, leaders are transforming a former shipyard outside of the city centre into a residential, recreational and employment precinct with a new marina. Sea City District illustrates a committed approach to absorb the next cycle of population growth while maintaining its high quality of life. It points to successful communication of advantages to attract investment, residents, visitors, and business.

Source: The Business of Cities (2020) Toondah Harbour: A review of international experience and local opportunity.

As observed from international experience, signature harbourside and waterfront projects require a common set of approaches and tools. The success factors observed from the highest impact projects are:

1) Recognise the long-term benefit from the outset, seek critical mass to add genuine capacity, enable a substantial quantum of new jobs, and be able to become a gateway, a destination, and a hub.

2) Substantially increase community amenity, familiarity, and attachment while the development evolves into a real destination.

3) Commit to high standards of environmental quality and stewardship, investing in preservation, education, and wellbeing.

4) Communicate boldly and authentically, pitching and co-creating the development effectively both with the public and with all levels of government.

5) Build in agility to adapt to changing space needs and mixes, so that the development remains relevant and resilient.

6) Continuously make and re-make great places between buildings, land and water through careful tactics, design, investment, and management.

7) Create a logical and legible 'whole day' and 'whole place' journey for residents and visitors alike, with a strong underpinning mobility proposition.

8) Use arts, culture, and heritage to link the past, present and future.

9) Create a socially and economically inclusive and inviting environment.

10) Drive new collaborative ventures among public and private stakeholders, from shared services, to investment partnerships and multilevel co-ordination.

Table 6 presents international experience of high impact projects' demonstration of these success factors and Toondah Harbour's observed potential in achieving catalytic benefits.

Table 6 Assessment of the Toondah Harbour Development Project against key success factors for catalytic waterfront developments

Success factor	International examples	Toondah Harbour project alignment
1 – Long term benefit	• Harbour City, Hamburg – Emphasis on scope for development to produce strong public goods – Focus on innovation, sustainability, and providing access to a mix of incomes – Significant weighting on wider benefits from developments (public use value, cultural values) • Dundee Waterfront, Dundee – Demonstrates significance of up-front planning and broad stakeholder engagement.	• Infrastructure to provide long-term benefit and opportunity for residents and recreational users, including improved transport for residents and visitors and public spaces and recreational facilities • Provision of a gateway for the region and Minjerribah, in addition to a hub of local activity • Attributes of the development to support social and economic growth in local economy.
2 – Community amenity	• Greenwich Peninsula – Prioritised community interventions – identified opportunity to create standalone neighbourhood building at the centre of the residential development – Includes nursery, prayer room, community gym, food and beverage retailers, rooms for hire, etc. • Harbour City, Hamburg – Deliberate sequencing of retail and commercial developments with focus on provision of core services to residents and community.	• Strong focus on provision of community amenity and infrastructure to support the use of that amenity (e.g. ferry terminal, marina) • The development is centred around a network of open spaces and community facilities, providing a link between both built (e.g. cultural centre, retail) and natural attractions (bird hides, wetland, walking trails) and highlighting the destination's natural attractions.
3 – Environmental protections	• Dundee Waterfront, Dundee	• Development involves reclamation of wetland habitat, however no material

Success factor	International examples	Toondah Harbour project alignment
	– Redevelopment in internationally significant protected area, regularly visited by dolphins and marine bird species – Strong focus on mitigating risks to local wildlife, including a harbourside wildlife corridor for biodiversity preservation – Riverside Nature park maintained and programmed by community association working in partnership with local council.	adverse impacts on marine fauna or migratory bird species are expected • Several mitigation measures to be implemented, including strict buffer zones to ensure protection of nearby roost sites for migratory shorebird species • Development to include community wetland education centre.
4 – Communication & storytelling	• Harbour City, Hamburg – Production of 2100 statement on the future of Hamburg – Forward-looking calendar of public exhibitions and talks – Observation deck with view of whole development – Architectural models, show rooms, and exhibitions.	• The Moreton Bay area and Minjerribah are rich in cultural value. The development aims to showcase this local culture by providing public spaces that are designed with local culture in mind and facilities to hold cultural events and displays. Further, it provides greater access to Minjerribah for both locals and visitors.
5 – Flexible development for a changing economy	• Harbour City, Hamburg – Adaptable framework to enable the development to remain relevant and resilient to changing land uses • Lisbon South Bay – Waterfront revitalisation plan • Dundee Waterfront, Dundee – Conversion of key harbourside building into co-working and office space for innovators, entrepreneurs, and freelancers.	• Local demand for more mixed use spaces that enlarges the scope for positive multipliers and the emergency of talent-friendly 'live-work-play' environments • Creating spaces and facilities to meet this demand has been a key focus of the design process for the Toondah Harbour development.
6 – Continuous placemaking	• Harbour City, Hamburg – Seamless integration between neighbourhoods, improving connectivity – Strong investment in public systems and infrastructure – key access roads, bridges, promenades, parks, cultural facilities.	• The Toondah Harbour development sets the scene for continuous development and enhancement to the area, as it increasingly becomes a liveable space providing opportunity for businesses and institutions to establish within the hub.
7 – Whole city & neighbourhood journey	• Greenwich Peninsula – Improved physical and emotional linkages to popular visitor attractions – Establishment of a single brand platform, walkways between sites, public transport access, including newly established ferry service.	• The development will provide a range of connecting transport infrastructure to support linkages within the destination. As the area grows and develops over time, it will become more and more of a 'whole place' journey for its attractions, accommodation, retail, and entertainment.
8 – Arts, culture, and heritage	• Dundee Waterfront, Dundee – High-calibre cultural anchor – Established relationship with V&A Museum, increasing profile and tourist appeal.	• The area benefits from the connection to the culturally significant Minjerribah and the development further enhances the natural and cultural heritage by providing spaces and facilities for both locals and visitors to access the local culture. • The wetland education and cultural centre, convention centres and public open spaces will provide a platform for local arts, culture, and heritage.
9 – Affordability & inclusiveness	• Sea City District, Portland – Planning scheme focused on creation of balanced and year-round neighbourhood, noting concerns of local residents – District planned as an integrated residential and employment hub.	• The small 'village style' precincts of three to four buildings will provide diversity in residential dwelling options, ensuring affordability and inclusiveness. The 'village style' will also ensure that year-around residents do not lose a sense of community and home to residential developments only geared toward leisure living and rentals.

Success factor	International examples	Toondah Harbour project alignment
10 – Coordination across government with business	• Greenwich Peninsula – Public-private coalition between local government and Knight Dragon, the private developer – 'Visit Greenwich' set up as 20% public, 80% private Community Interest Company to encourage an attractive, integrated visitor experience across the whole 2-3km of waterfront.	• The development will be undertaken by private company Walker Group Holdings, however the location of the development within a PDA means that close coordination will exist between the private developer and both state and local government.

Source: The Business of Cities (2020) Toondah Harbour: A review of international experience and local opportunity; Synergies analysis.

4.5.5 Economic value derived from enhanced common use facilities and improved amenity

The development will provide improved and additional common use facilities from which economic benefits will also be derived from residents and users of the development facilities. Key enhancements that will generate economic benefits attributable to the development are:

- improvements to the GJ Walter Park, including addition of new recreational facilities (informal play spaces, BBQ shelters and amenities), a new fenced dog park, and shared pedestrian and cycle path;
- upgraded ferry terminal, which will generate additional economic benefits to existing ferry passengers and service providers;
- boat ramp for recreational, non-motorised vessels; and
- expanded car park facility, accommodating additional visitors (including tourist visitors to Minjerribah), particularly during busy periods.

In addition to the above, the development will provide benefits to residents both within the development and in the surrounding areas through improved amenity. There is a significant body of literature supporting these benefits.[23]

As with the benefits derived from improvements to the ferry services and ferry terminal, the magnitude of the economic benefit derived from these enhanced common-use facilities will be determined by users' willingness to pay for the enhancements. This would require a contingent valuation study, the cost of which is disproportionate to the magnitude of this benefit.

[23] For example, see: SGS Economics & Planning (2017). Valuing Good Urban Design on the Gold Coast.

4.5.6 Summary of economic benefits

Table 7 summarises the economic benefits assessed under the project case.

Table 7 Summary of economic benefits under the project case

Benefit	Description	Estimate ($PV)
Value of retail, commercial, and residential development	• Economic benefit derived from the retail, commercial, and residential space to be created by the development • Quantified based on expected market value of these facilities	$1,241.1 million
Value of marina berths	• Economic benefit derived from use of marina berths by vessel (commercial and recreational) owners • Quantified based on expected market value of marina berths	$10.7 million
Value of increased tourism expenditure on Minjerribah	• Value add on additional expenditure by tourist visitors to Minjerribah under the project case • Quantification of the benefit limited to 'incremental' international tourist visitors to Minjerribah under the project case	$9.1 million
Value of increased tourism expenditure on mainland and other locations	• Value add on additional expenditure by tourist visitors to the mainland development and other locations throughout southern Moreton Bay (in addition to Minjerribah • Not quantified due to high level of uncertainty regarding magnitude and timing of additional tourist visitors under the project case	Not quantified
Avoided maintenance dredging costs	• Under the base case, maintenance dredging will be required to maintain the existing channel and swing basin • These costs will be avoided under the project case (noting the full cost of maintenance dredging has been included in the estimation of economic costs under the project case)	$11.1 million
Catalytic benefits	• Flow-on benefits for the Toondah Harbour and surrounding area attributable to demand and supply-side catalytic impacts	Not quantified
Value of enhanced common use facilities and improved amenity	• Economic benefit derived from users of common-use facilities within the development	Not quantified
Total economic benefits		**$1,272.0 million**

Source: Synergies modelling.

4.6 Economic costs

The following economic costs have been identified in relation to the development project:

- capital costs associated with the development project;
- the cost of up-front and ongoing dredging works;
- operational costs to be incurred in operating and maintaining common use facilities to be developed as part of the project; and
- adverse environmental impacts associated with the loss of RAMSAR wetland as a result of the development project.

4.6.1 Capital costs

The capital costs associated with the development have been modelled based on cost estimates and development profiles provided by the Proponent. Table 8 details the capital expenditure profile by key cost category.

Table 8 Profile of capital expenditure under the project case ($ million, $2020)

Cost category	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2034	2035	2038	2040	Totals
Dredging	43.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**43.6**
Land reclamation	6.563	7.875	7.875	7.875	7.875	3.938	-	-	-	-	-	-	-	-	-	-	**42.0**
Building construction	-	-	-	8.75	85.75	15.75	136.5	63.0	105.0	80.5	218.25	110.25	127.75	71.75	164.5	152.25	**1,340.0**
Ferry terminal[a]	18.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**18.0**
Marina development	-	-	-	-	-	0.2	0.7	0.625	0.4	-	2.625	0.15	0.375	-	0.175		**5.25**
Boardwalks, plaza and parklands	-	-	-	38.6	-	-	-	-	-	-	-	-	-	-	-	-	**38.6**
Road improvements	71.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**71.0**
Total capital costs	**139.163**	**7.875**	**7.875**	**55.225**	**93.625**	**19.888**	**137.2**	**63.625**	**105.4**	**80.5**	**220.88**	**110.4**	**128.13**	**71.75**	**164.68**	**152.25**	**1,558.5**

a Includes car parking and bus interchange facilities.

Note: Totals may not add due to rounding.

Source: Walker Group Holdings.

As shown in the table above, in nominal terms, total capital expenditure associated with the development project is estimated at $1,558.5 million, with over 85 per cent attributable to building construction costs. The Present Value (PV) of these capital costs is estimated at $803.9 million, based on a real discount rate of 7 per cent. The reason for the PV estimate being significantly less than the total cost of the development project in nominal terms is the discounting effect associated with the significant capital expenditure incurred from 2027 to 2040.

4.6.2 Maintenance dredging costs

While the initial cost of the dredging works required to expand the capacity of the Fison Channel and swing basin has been included in the estimate for capital costs ($43.6 million to be incurred in 2021), the development will also require increased maintenance dredging. The Proponent has advised that the maintenance dredging requirement has been estimated at 12,000 cubic metres per annum (compared to the base case estimate of 10,000 cubic metres).

Based on a cost estimate for maintenance dredging of $78 per cubic metre (see section 4.3.2),[24] the annual cost of maintenance dredging under the project case is estimated at $936,000. This cost will commence from 2024 and totals $12.96 million in PV terms over the duration of the study period.[25]

4.6.3 Maintenance costs

As noted in the preceding sections, where the economic benefits attributable to components of the development (e.g. retail and commercial, hotel development, residential) have been quantified based on the value to be realised from the sale of the development, it is not necessary to include the cost of operating and maintaining with these facilities in the cost-benefit analysis.[26]

Hence, the maintenance costs to be included in the cost-benefit analysis are to be limited to the costs related to:

- ferry terminal
- boardwalks, plaza, and parklands
- bus interchange and car parking facilities.

The maintenance costs to be incurred over the lifetime of the study period in relation to these common-use facilities has been estimated based on a high-level industry benchmark assumption that annual maintenance costs will equate to around two per cent of the capital cost of the facilities. Table 9 details the maintenance cost estimates for

[24] This estimate aligns with recent maintenance dredging cost estimates sourced from Redlands City Council.

[25] It has been assumed that the maintenance dredging requirement for 2021 to 2023 will be the same as under the base case (i.e. annual cost of $780,000).

[26] Noting that the value realised from the sale of the facilities reflects the expected value of future revenues (benefits) and costs over the lifetime of the facilities.

the common-use facilities to be included in the development, including the annual and PV cost estimates.

Table 9 Maintenance costs for common-use facilities

Common-use infrastructure	Capital cost	Annual maintenance costs	Total maintenance costs (PV terms)
Ferry terminal	$18.0 million	$360,000	$5.1 million
Boardwalks, plaza, and parklands	$38.6 million	$772,000	$9.0 million
Bus interchange and car parking	$71.0 million	$1,420,000	$20.3 million
Total costs	**$127.6 million**	**$2,552,000**	**$34.4 million**

Note: Based on assumption of annual maintenance costs equalling two per cent of capital costs.
Source: Synergies modelling.

4.6.4 Relocation of trade college

As noted in Table 2, the PDA currently contains Council-owned office facilities that accommodate a trade college. The trade college occupies 2,500 sqm of office space. Under the project case, the trade college will be required to relocate to alternative premises upon expiry of its current lease.

As the project case requires the relocation of this activity, it is appropriate to allow for this cost in the cost-benefit analysis of the development. This cost is quantified based on the opportunity cost associated with the accommodation of the trade college in alternative premises. While the current rental arrangements are unknown, it is assumed that the rent levied by council on the trade college is below the commercial rental rate.

In quantifying the cost of relocating the trade college, it has been assumed that the college would relocate to premises elsewhere in the Cleveland region. The cost has been estimated based on the value of these alternative premises (noting this is the opportunity cost of the use of these premises by the trade college under the project case). As the location and value of these premises is not currently known, the assumption has been applied that these premises would be valued at 50 per cent of the market value of commercial and retail space to be made available within the development under the project case (i.e. $1,500 per sqm).[27] That is, a total cost of $3.75 million, to be incurred in 2021.

[27] This is appropriate given the value of the commercial space to be created by the development is expected to be of higher quality and in a more desirable location that the premises likely to be sought by the trade college under the project case.

4.6.5 Environmental costs

As noted in section 4.3.4, the economic cost associated with the adverse impact of the development project on ecological values are to be assessed for the following key values:

- estuaries and intertidal habitats, including seagrass, mangroves and mudflats, impacted by the development;
- intertidal feeding habitat, for several threatened migratory shorebird species; and
- potential habitat for 21 migratory marine species.

These are the ecological values that the environmental assessment identifies as being potentially impacted by the Toondah Harbour Development Project.

Ecological value of seagrass, mangroves, and mudflats

The PDA contains estuaries and intertidal habitats (seagrass, mangroves, and mud flats) that will be lost under the project case. It is not uncommon for development projects to result in the loss of wetland assets.[28] Where this occurs, an economic value should be attributed to the loss of wetland assets, as the community places a value on these assets for their use and non-use values.

The steps required to estimate the loss of economic value from the loss of wetland assets under the project case are as follows:

- undertake a comprehensive review of past studies estimating the economic value of wetland assets;
- identify the appropriate value to be applied to the Moreton Bay wetlands, having regard to the size and international significance of the wetlands and magnitude of the impact;[29] and
- assess the proportion of the total economic value to be applied to the area of wetlands to be lost under the project case.

It is important to note that this impact is limited to the direct loss of wetland habitat. Indirect impacts of the development on threatened species and marine fauna have been assessed separately.

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[28] Amenu, B.T. & Shanko Mamo, G. (2018). Review on Wetland Ecosystem Destruction. *International Journal of Scientific Research in Civil Engineering*, 2(2).

[29] Moreton Bay was listed as an internationally important wetland under the Ramsar Convention in 1993. The Ramsar Convention on Wetlands of International Importance is an international treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Studies estimating the economic value of wetland assets

A detailed literature review was conducted to identify studies that have estimated the economic value of wetlands. A summary of those studies as most relevant to the Moreton Bay Ramsar Wetlands is provided in Attachment A. These studies were identified based on the scope (i.e. assessing willingness to pay for protecting/avoiding loss of wetlands) and the nature of the wetlands valued in the studies (i.e. environmentally significant wetland systems).

Table 10 presents the key findings from these studies in terms of the willingness to pay (WTP) for wetland protection/avoiding wetland destruction, and the calculation of the estimated WTP per household per hectare in AUD2020.

Table 10 Summary of results from key WTP studies on the economic value of wetlands

Study	Hectares	WTP estimate	WTP per household	WTP per household per hectare (AUD2020)
Ndebele, T. & Forgie, V. (2017).	91.55	NZD$47.88 per household (over 5 years)	NZD$9.58 per annum	$0.102 per household per hectare per annum
He, T., Dupras, J. & Poder, T. (2016).	~400,000	CAD$447-$465 per household (annual)	CAD$456 per annum	$0.0013 per household per hectare per annum
Petrolia, D. R., Interis, M.G. & Hwang, J. (2014).	94,700	USD$909 per household (one-off payment)	USD$909 (one-off payment)	$0.0149 per household per hectare (one-off)
Clouston, E.M. (2002).	41,491	AUD$22.27 per person (one-off payment)	AUD$57.90 (one-off payment)	$0.0021 per household per hectare (one-off)
Gerrans, P. (1994).	20,579	AUD$32.73 per household (annual)	AUD$32.73 per annum	$0.0029 per household per hectare per annum
Hammit, et al (2001)	153	USD$21-$65 per household (annual)	USD$65 per annum	$0.880 per household per hectare per annum
Kwak, et al (2007)	854	USD$2.10 per household (annual)	USD$2.10 per annum	$0.0044 per household per hectare per annum

Source: Various.

Valuing Moreton Bay wetland habitat

Estimating the WTP for the protection of wetlands (i.e. economic value of wetlands) typically requires a judgement to be made in terms of the population on which the valuation of the wetland is to be based.[30] Typically, studies produce total value estimates based on residents within relatively close proximity to the wetlands being valued. For example, the Clouston (2002) study that estimated the economic value of Moreton Bay

[30] For example, if a value of $50 per household per hectare is applied to estimate the economic value of wetlands, the total value attributed to the wetland assets will be dependent upon the number of households to which this estimate is applied.

wetlands, included all residents in Commonwealth electoral districts that bordered Moreton Bay. In Gerrans (1994), which assessed the value of wetlands in south Perth, the study included all residents in the Perth metropolitan region.[31]

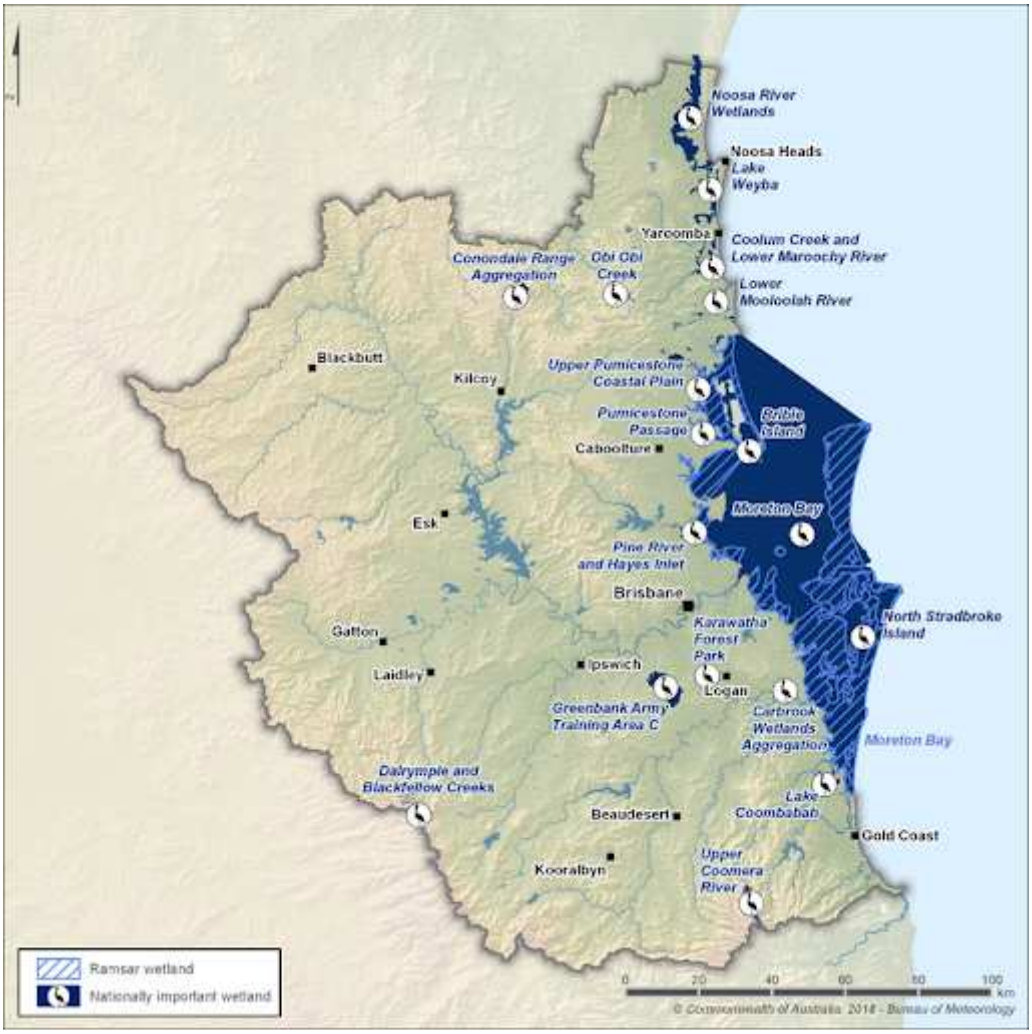
In determining the geographic extent of the population that is to underpin the valuation of wetlands, regard should be had for the significance of the wetlands being valued. That is, if wetlands hold significance only or overwhelmingly to a local community (e.g. south Perth), it is appropriate for the total economic value to be estimated based on the population of the local area (e.g. Perth metropolitan region). As discussed in section 3.3, the wetlands in Moreton Bay have been registered under the Ramsar convention, meaning they are wetlands that are representative, rare, or unique wetlands, or are important for conserving biological diversity.

Given the significance of the Moreton Bay wetlands, it is considered appropriate to estimate the economic value based on the population of South East Queensland. The current population of South East Queensland is approximately 3.6 million people.[32] As shown in the map below, this region fully encompasses the Moreton Bay Ramsar site. This is also consistent with the approach adopted in previous studies estimating the total economic value of significant wetlands (see Table 10).

[31] Gerrans, P. (1994). An economic valuation of the Jandakot wetlands. Perth, Australia: Edith Cowan University.

[32] This translates to 1,384,614 households, based on an estimate of 2.6 persons per household.

Figure 3 Map of Moreton Bay Ramsar wetlands and South East Queensland



Data source: 'South East Queensland: Geographic Information'. National Water Account 2017. Bureau of Meteorology; DOA: 21 October 2020. See: http://www.bom.gov.au/water/nwa/2017/seq/regiondescription/geographicinformation.shtml

Having identified the appropriate population on which the economic value of the Moreton Bay wetlands is to be based, the next step is to identify an appropriate per hectare value, or range of values, to be applied to the population and size of the wetlands.

The study by Clouston (2002) represents the starting point for estimating the economic value of the Moreton Bay wetlands, given the purpose of the study was to estimate the community's willingness to pay for the protection of wetlands in Moreton Bay, being the environmental assets relevant to this EIA.[33]

[33] Clouston, E. (2002). Linking the Ecological and Economic Values of Wetlands: A Case Study of the Wetlands of Moreton Bay.

The study sought to estimate the following ecological values of the Moreton Bay Ramsar site:

- primary functions of mangroves, seagrass, and microalgae in the wetlands, including in providing food and habitat for marine species;
- provision of dependent habitat for several species, including dugongs and turtles; and
- biological diversity of the wetlands and the role this plays in supporting population of marine species.

These ecological values are closely aligned with those identified as relevant to this cost-benefit analysis. The scope of the study also included use and non-use values associated with the wetlands (e.g. commercial fishing, boating and recreational use).

The purpose of the study was to identify how much respondents would be WTP, as a one-off payment, to protect the Moreton Bay wetlands through improving water quality.[34] Analysis of the survey responses revealed a mean willingness to pay of $22.74 per respondent (with protest bids removed).[35] This translates to an estimate of $33.97 per respondent in AUD2020. Given the geographic scope of the study was 41,491 hectares of wetlands, this equates to a per hectare estimate of $0.00082 per person per hectare. Applying this estimate to the population of South East Queensland results in a one-off per hectare estimate of approximately $2,950.

Table 11 sets out the estimated economic value of the Moreton Bay wetlands based on the key studies summarised in the preceding section, including Clouston (2002). The estimates have been derived based on the registered site of the Moreton Bay Ramsar wetland site of 120,654 hectares and a population of 3.6 million (or 1,384,614 households), being the current population of South East Queensland.

Table 11 Estimated economic value of Moreton Bay wetlands

Study	Hectares	WTP per household per hectare (AUD2020)	Value of Moreton Bay wetlands (PV terms)[a]
Ndebele, T. & Forgie, V. (2017).	91.55	$0.102 per household per hectare per annum	$243.4 billion
He, T., Dupras, J. & Poder, T. (2016).	~400,000	$0.0013 per household per hectare per annum	$3.1 billion
Petrolia, D. R., Interis, M.G. & Hwang, J. (2014).	94,700	$0.15 per household per hectare (one-off)	$25.1 billion

[34] It is noted that community willingness to pay is likely to differ for the protection of wetlands through improving water quality and protecting wetlands from destruction, as is being assessed in this study.

[35] A protest bid is defined as not stating the true WTP value for the good or value in question for whatever reason.

Study	Hectares	WTP per household per hectare (AUD2020)	Value of Moreton Bay wetlands (PV terms)[a]
Clouston, E.M. (2002).	41,491	$0.0021 per household per hectare (one-off)	$350.8 million
Gerrans, P. (1994).	20,579	$0.003 per household per hectare per annum	$7.2 billion
Hammit, et al (2001)	153	$0.880 per household per hectare per annum	$2.1 trillion
Kwak, et al (2007)	854	$0.0044 per household per hectare per annum	$10.5 billion

a PV estimates calculated based on real discount rate of 7 per cent.
Source: Various.

These results demonstrate the significant variability in terms of the potential economic values that can be attributed to the Moreton Bay Ramsar site. The Clouston (2002) study, while the most directly applicable in terms of the geographic scope of the study, produces a significantly lower estimate relative to the other studies. As such, this study has been excluded from the analysis.

Two other studies produce estimates that are significantly higher than the estimates derived using the other studies – the Ndebele and Forgie (2017) and Hammit, et al (2001) studies. Both studies assessed the community's WTP for the protection of wetlands that are significantly smaller than the Moreton Bay Ramsar Site (MBRS) – 91.55 hectares and 153 hectares respectively (0.08 per cent and 0.13 per cent). These studies are therefore not reasonable comparators and are excluded.

This leaves four studies in the sample. Applying the per household per hectare estimates derived using the willingness to pay estimates contained within these studies produces a range for the total economic value of wetlands in the MBRS of $3.1 billion to $25.1 billion. The mid-point of this range is $14.1 billion. Based on the total area of the MBRS, this equates to $116,863 per hectare. This estimate has been applied to estimate the economic cost of the loss of part of the MBRS under the project case (see below). Sensitivity analysis has also been performed on estimates of $3.1 billion ($25,693 per hectare) and $25.1 billion ($208,033 per hectare) (see section 4.7.2).

Economic cost of loss of wetlands under the project case

To estimate the economic cost attributable to the loss of wetlands, the estimated per hectare willingness to pay to protect/avoid the loss of wetlands is applied to the number of hectares to be lost under the project case. Arguably, this is conservative on the basis that the area affected is relatively modest, so that, at the margin, the impact will be less than an average impact as assumed under this approach.

The development project overlaps with 42 hectares of the MBRS. While direct impacts on habitat will be less than 42 hectares, this value will be used as a conservative estimate of habitat loss. Applying the per hectare estimate of $116,863 results in a total estimate

for the economic cost of the loss of wetland area of $4.9 million. This estimate has been applied as a one-off cost incurred in the same year as the land is reclaimed under the project case. As noted above, given the uncertainty associated with the economic value of the MBRS, sensitivity analysis has been performed on the economic cost of the loss of wetlands under the project case (see section 4.7.2).

Loss of habitat for shorebird species

As detailed in section 4.3.4, the PDA contains intertidal feeding habitat for several migratory shorebird species, including the critically endangered Eastern Curlew and the vulnerable Bar-tailed Godwit. Two high tide roost sites are located adjacent to the PDA and provide high value habitat for migratory shorebirds.

There is a significant body of studies and literature demonstrating that the community places a significant economic value on the protection of feeding habitat for threatened and endangered species. The extent to which it is appropriate for an economic cost to be attributed to the loss of feeding habitat for migratory shorebirds under the project case depends on the extent to which the loss of habitat will adversely impact the population of these species.

The environmental assessment conducted as part of the EIS process noted the following regarding the impact of the development on the habitat for shorebird species:

- there are over 7,500 hectares[36] of intertidal mudflats throughout Moreton Bay that can accommodate the threatened shorebird species observed within the PDA;[37]
- the PDA provides less than 0.1 per cent of the total available feeding habitat for shorebird species in the Moreton Bay Ramsar site; and
- neither of the two high tide roost sites directly adjacent to the PDA will be significantly impacted by the development.

Furthermore, the assessment noted there has also been a significant decline in the population of migratory shorebird species in Moreton Bay in recent years, driven by factors unrelated to the Toondah Harbour development project. The assessment noted that the carrying capacity of the Moreton Bay wetlands for migratory shorebirds is

[36] Noting that recent studies (Fuller, 2019) have estimated there is over 10,000 hectares of this habitat type throughout Moreton Bay.

[37] Saunders Havill Group (2020). Assessment of Potential Impacts on the Ecological Character of the Moreton Bay Ramsar Wetland from the Toondah Harbour Project. Attachment 3.

significantly underutilised, meaning that migratory shorebird species are unlikely to be subject to density-dependent population regulation in Moreton Bay.[38]

The implication of these findings is that the loss of less than 0.1 per cent of the total area of habitat throughout the Moreton Bay Ramsar site for the shorebirds observed within the PDA is unlikely to lead to a reduction in the number of migratory shorebirds using Moreton Bay.

The more likely outcome, having regard to the findings from the environmental assessment, is a relocation of these species away from the PDA and surrounding areas to other regions of the Moreton Bay wetlands. In addition, the environmental assessment has found that neither roost site will be significantly impacted by the development.

It is also noted that site design and management measures have been targeted at avoiding direct, indirect or facilitated impacts to these areas and their ongoing use as roost sites both during construction and operational phases. These measures include:

- a buffer for urban, tourism and retail use of at least 250 metres to the Cassim Island roost site;[39]
- construction of appropriate barriers, such as fences to restrict public access to areas identified as important to migratory shorebirds;
- timing of construction activities, particularly dredging and piling near sensitive areas, to avoid impacts on migratory shorebirds. These activities will be undertaken over the May to August period when most migratory shorebirds are absent from Moreton Bay;
- landscape, architecture, and urban design to include sympathetic lighting strategies, vegetation screening, and sound attenuation; and
- increased community education, including community awareness campaigns, educational signage, and the development of a wetland education and cultural centre, and management of the local area through a community ranger program.[40]

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38 Saunders Havill Group (2020). Assessment of Potential Impacts on EPBC Act Threatened and Migratory Species. Attachment 4.

39 Noting that this buffer distance exceeds those identified through review of several studies on flight initiation distances for a range of migratory shorebird species.

40 Saunders Havill Group (2020). Assessment of Potential Impacts on EPBC Act Threatened and Migratory Species. Attachment 4.

Based on the above, it is concluded that it would not be appropriate to attribute an economic cost to the impact of the development on threatened and migratory shorebird species, as the environmental assessment indicates the development is not expected to materially impact the population of the shorebird species identified within the PDA.

Adverse impacts on marine fauna habitat

The environmental assessment identified 21 migratory marine species within five kilometres of the PDA. Noting this, the environmental assessment has also identified that similar or better habitat is extensively distributed throughout the Moreton Bay Ramsar site and throughout western Moreton Bay.

Based on the findings from the environmental assessment, no economic cost has been included in the analysis to account for the impact of the development of marine fauna habitat in the PDA and in surrounding areas.

4.6.6 Summary of economic costs

Table 12 summarises the economic costs assessed under the project case.

Table 12 Summary of economic costs under the project case

Cost	Description	Estimate ($PV)
Capital costs	• Costs incurred in construction of development, including buildings, marina, ferry terminal, and other common-use facilities	$803.9 million
Relocation of trade college	• Relocation of trade college to alternative premises • Quantified assuming 50 per cent of the market value of commercial space to be created by the development	$3.51 million
Maintenance dredging costs	• Maintenance dredging costs to be incurred as a result of the dredging of the Fison Channel and swing basin	$12.96 million
Maintenance of common-use infrastructure	• Incremental costs to be incurred in maintaining the common-use infrastructure, including the bus interchange and car parking facilities, parklands, etc.	$34.43 million
Environmental costs	• Economic cost attributable to destruction of wetlands and adverse impacts on threatened and migratory shorebird species and other marine flora and fauna	$4.59 million
Total economic costs		**$859.4 million**

Note: Totals may not add due to rounding.

Source: Synergies modelling.

4.7 Results of the cost-benefit analysis

4.7.1 Net economic impact

The net economic impact of a project is assessed through two key metrics:

- Net Present Value (NPV) – calculated by subtracting total economic costs from total economic benefits; and
- Benefit Cost Ratio (BCR) – calculated by dividing total economic benefits by total economic costs.

The NPV is calculated by applying a discount rate to the cashflows over the entire study period. The discount rate accounts for the social opportunity cost of capital. A real social discount rate of 7 per cent is typically applied by government assessment entities (e.g. Infrastructure Australia, Building Queensland, Queensland Treasury), with sensitivity analysis performed at discount rates at 4 and 10 per cent.[41]

Table 13 summarises the NPV and BCR estimates for the project case under three discount rates – 4 per cent, 7 per cent, and 10 per cent.

Table 13 Results from cost-benefit analysis ($'000 2020 $s)

Economic impact	Discount rate		
	4 per cent	7 per cent	10 per cent
Economic benefits			
Value of retail, commercial, and residential development	$1,705,337	$1,241,076	$924,479
Value of marina berths	$14,118	$10,646	$8,126
Value of increased tourism expenditure on Minjerribah	$19,495	$9,132	$5,277
Avoided maintenance dredging costs	$19,500	$11,143	$7,800
Catalytic benefits		Not quantified	
Value of enhanced common use facilities		Not quantified	
Total economic benefits	**$1,758,450**	**$1,271,996**	**$945,682**
Economic costs			
Capital costs	$1,044,189	$803,941	$637,595
Maintenance dredging costs	$22,967	$12,962	$8,972
Maintenance of common-use infrastructure	$61,658	$34,431	$23,600
Trade college relocation Costs	$3,606	$3,505	$3,409
Environmental costs	$4,719	$4,587	$4,462
Total economic costs	**$1,137,139**	**$859,426**	**$678,039**

[41] It is important to note that 10 per cent is a particularly high discount rate and is highly unlikely to represent an appropriate measure of the social opportunity cost of capital.

Economic impact	Discount rate		
	4 per cent	7 per cent	10 per cent
NET PRESENT VALUE	$621,311	$412,570	$267,643
BENEFIT COST RATIO	1.55	1.48	1.39

Source: Synergies modelling.

These results show that under the central discount rate of 7 per cent, the project results in a positive NPV of $412.6 million, which is a BCR of 1.48. The results improve to $621.3 million and 1.55 under a lower discount rate of 4 per cent, while at a discount rate of 10 per cent, the development is still economically feasible, with an NPV of $267.6 million and a BCR of 1.39.

The economic feasibility of the project is driven by the value realised from the retail, commercial, and residential space to be created by the development. This benefit accounts for 98 per cent of total quantified benefits at a discount rate of 7 per cent. Similarly, the economic costs are dominated by the capital costs of the development. These account for nearly 94 per cent of total economic costs.

Alternatively, the economic cost attributable to the adverse environmental impacts of the development are $4.6 million, less than 1 per cent of total economic costs. While this is commensurate with the significance of these impacts having regard to the results of the assessment of the development's environmental impacts and efficacy of proposed mitigation measures, it is important this is acknowledged in assessing the results of the cost-benefit analysis. That is, the economic feasibility of the development is contingent upon the efficacy of the proposed measures in terms of mitigating the environmental impacts of the development, particularly in relation to the impacts on threatened and endangered migratory shorebird species.

4.7.2 Sensitivity analysis

The purpose of sensitivity analysis is to assess the sensitivity of the results of the cost-benefit analysis of a project to changes to key assumptions or parameters. Sensitivity analysis is typically undertaken on those assumptions or parameters that have a significant impact on the results of the cost-benefit analysis and having regard to the level of uncertainty associated with the parameter estimates applied in the analysis. Sensitivity analysis has been undertaken on the following parameters:

- discount rate (see above)
- capital costs
- market value of residential dwellings
- economic value of MBRS.

Table 14 sets out the results from the sensitivity analysis.

Table 14 Results of sensitivity analysis ($'000S, 2020)

Impact	NPV (% change)	BCR
Base results	$412,570	1.48
Capital costs		
High (+20%)	$251,782 (-39.0%)	1.25
Low (-20%)	$573,359 (+39.0%)	1.82
Market value of residential dwellings		
High (+20%)	$649,641 (+57.5%)	1.76
Low (-20%)	$175,500 (-57.5%)	1.20
Economic value of Moreton Bay wetlands		
High ($208,033 per hectare)	$408,992 (-0.9%)	1.47
Low ($25,693 per hectare)	$416,149 (+0.9%)	1.49

Source: Synergies modelling.

The results from the sensitivity analysis demonstrate the significance of the capital costs and market value of residential dwellings to the economic feasibility of the development. In the case of residential dwellings, the feasibility of the project, at a real discount rate of 7 per cent, falls by nearly 60%when the market value falls by 20 per cent (from $720,000 per dwelling to $576,000 per dwelling). Similarly, the development's viable suffers significantly when capital costs are assumed to be 20 per cent higher than the estimates provided.

In terms of the economic value of the wetlands to be lost under the project case, the sensitivity analysis shows that, due to the small area of the wetlands that are lost as a result of the development, even applying a per hectare estimate of $208,033, being the top of the range identified through the review of relevant studies, this cost has a small impact on the economic feasibility of the development.

As noted in section 4.6.5, the economic cost of the loss of part of the MBRS has been estimated by applying the per household per hectare estimate to the number of households in South East Queensland. While this is consistent with the approach adopted in other studies that have assessed the economic value of wetlands, it is noted that the MBRS is a large, internationally significant wetland system. Applying the per hectare per household estimates in the relevant studies to the whole population of Queensland,[42] the economic value of the MBRS per hectare increases from $116,863 to $169,130. As shown in the sensitivity analysis, this does not materially impact on the economic feasibility of the development.

[42] Estimated number of households of 2,003,893.

In summary, the project delivers a positive NPV and BCR of well above 1 under all discount rates and sensitivities tested.

5 Economic impact analysis

This section details the economic impact analysis undertaken for the Toondah Harbour Development Project.

5.1 Methodology overview

Synergies estimated the economic contribution of the development project by:

1. Developing nonlinear Input-Output (I-O) models for the economies of Queensland, Redland local government area (LGA) and Minjerribah;
2. Estimating economic activity in terms of capital costs and additional tourist expenditure to determine the incremental economic stimulus of the project during the construction and operational periods respectively; and
3. Introducing the economic stimulus amounts into respective I-O models to assess the direct and flow-on economic impacts of the project.

5.2 Input-Output model development

This study uses I-O models, which capture the manner in which an initial "shock" – such as a new expenditure on goods or services – flows out through the various sectors of the economy, generating further economic activity.

Generally, I-O models can be understood as a summary of all supply chains in a region. At the heart of the model is a static representation of the regional economy called an I-O table, which reflects industry interdependencies.

Synergies' I-O model has been developed 'in-house' using best practice standards for nonlinear I-O modelling. The model has been peer reviewed by John Mangan, Professor of Economics within the UQ Business School at the University of Queensland.[43]

Nonlinear I-O models (the type used by Synergies) largely overcomes potential weaknesses of the conventional, linear form. It does this by relaxing the constraining assumption that all factors of production shift in proportion to each other. The nonlinear version also accounts for inter-regional trade more accurately and includes economic supply constraints.

[43] Professor Mangan is one of Australia's leading authorities on economic impact assessment and has published widely in the academic literature.

5.2.1 Mainland input-output models

Synergies generated mainland I-O tables (for Queensland and the Redland LGA) following the method of regionalisation (see Appendix B). We derive these tables by starting with the latest (2016-17) national I-O table published by the Australian Bureau of Statistics (ABS)[44] and adjusting it using other more granular data to mechanically and appropriately inspect and scale the host (i.e. national) I-O table to ensure state and sub-state tables derived reflect the economic structure of each region as accurately as possible. Our approach is consistent with other well-accepted and widely used hybrid[45] regional I-O approaches, such as the Distributive Commodity Balance (DCB)[46] and the Generation of Regional Input-Output Tables (GRIT) [47].

The mainland I-O tables were used to model economic impacts of two different types of economic stimulus:

- construction stimulus
  - to account for the large scale of the project, the Queensland nonlinear I-O table was used to assess the economic impacts attributable to the construction activity associated with the development. The construction activity occurs from 2021 to 2040;
  - majority of the capital expenditure is incurred from 2024 to 2032, exhibiting a lumpy profile which means no one year is representative of all years. Due to this lumpiness, and the inherent limitations of modelling impacts into the

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[44] Australian Bureau of Statistics (2019). Australian National Accounts: Input-Output Tables, 2016-17. Cat. No. 5209.0.55.001, Commonwealth of Australia, Canberra.

[45] The hybrid approach combines the use of non-survey techniques with superior data (i.e. statistical information obtained through surveys, experts or other reliable sources).

[46] Christie, J. and Varua, E., M. (2010). Application of the Distributive Commodity Balance Method Approach to Regional Disaggregation: the Case of Penrith LGA. University of Western Sydney.

Johnson, P. (2001). An Input-Output Table for the Kimberly Region of Western Australia. Economic Research Centre, University of Western Australia.

[47] Jensen, R., C., Mandeville, T., D. and Karunarante, N., D. (1977). Generation of Regional Input-Output Tables for Queensland. Report to Coordinator General's Department and Department of Commercial and Industrial Development, Department of Economics, University of Queensland.

Jensen, R., C., Mandeville, T., D. and Karunarante, N., D. (1979). Regional Economic Planning: Generation of Regional Input-Output Analysis. Croom Helm, London.

Murphy, T., Brooks, M. and Mazzotti, L. (2003). The Barwon Darling Alliance. The Western Research Institute, Charles Sturt University.

West, G., R. (1980). Generation of Regional Input-Output Tables (GRIT): An Introspection. Economic Analysis and Policy, 10, pp. 71-86.

West, G., R., Morison J., B. and Jensen, R., C. (1984). A Method for the Estimation of Hybrid Interregional Input-Output Tables. Regional Studies, 18(5), pp. 413–422.

future in a changing economy, we discount the investment stimulus at a rate of seven per cent per annum, noting that this is consistent with the discount rate applied in the cost-benefit analysis and the preferred discount rate for State and Commonwealth Government departments;[48]

- ongoing operating stimulus
  - the project will have ongoing impacts through additional tourist visitations and expenditure, both to Minjerribah and the mainland and other locations throughout the southern Moreton Bay (as discussed in section 4.5.3); and
  - estimating the regional economic impacts from this expenditure involves applying the estimates for the additional tourist expenditure to the nonlinear I-O models for both Minjerribah and the Redland LGA mainland. The value of the increase in visitor spending was allocated to the various industries producing the goods and services purchased by visitors.

5.2.2 Minjerribah input-output model

The shifting structure of the Minjerribah economy following the cessation of sand mining in 2019 has increased the significance of tourism and tourist-related activities to the local economy. However, quantifying the potential impact of tourism expenditure in a small, open regional economy presents difficulties. At a national level, Tourism Satellite accounts create a synthetic 'tourist' industry and assign value added, income and employment characteristics to that industry.[49] At a sub-regional level, the impact of tourist spending can be modelled within the confines of a specifically constructed I-O table with tourism spending being assigned to the respective tourist-related sectors as exogenous inputs to final demand. Alternatively, a set of weighted 'tourism' multipliers can be estimated based on the identified tourism-related sectors within the regional economy. The latter has been applied in this study.

Producing sub-regional I-O tables creates some challenges because of:

- lack of sub-regional data, particularly value of production data, per industry sector;
- incomplete information on leakages from the economy;

[48] Noting that there is a reasonable basis for adopting a lower discount rate, having regard to the current cost of debt for government. See Terrill, M. and Batrouney, H. (2018) Unfreezing discount rates: transport infrastructure for tomorrow, Grattan Institute.

[49] Even here, assumptions are made concerning the likely sectoral distribution of spending with Accommodation; Air, water and other transport; Cafes, restaurants and takeaway food services and Other retail trade continuing to be the most important tourism industries, see, https://www.ausstats.abs.gov.au

- the need to estimate patterns of tourism spending in the absence of location-specific data; and
- insufficient data to successfully regionalise larger 'host' tables.

These limitations may be addressed using reasonable assumptions; however, caveats must always attest to sub-regional and small area I-O tables and results obtained from them should be regarded as indicative rather than proscriptive.

Standard regionalisation procedures[50] were used to create a Minjerribah I-O table from a Queensland 19 sector table as the host and employing the cross-industry location quotient method contained within the IO8 software developed by Professor Guy West for the Centre of Policy Modelling at the University of Queensland.[51] The 'Mining' sector was omitted from the model due to a cessation of sand mining on Minjerribah in 2019.[52] After the completion of the regionalisation process, the table was balanced and diagnosed to test for the feasibility of results. The table yielded 1A and 2A (SAM) multipliers within the expected range and produced the following description of Minjerribah Regional Accounts (2019):

- Gross Regional Product – $2.1 billion
- Gross Regional Expenditure – $780 million
- Compensation – $1.14 billion
- Gross Operating Surplus – $770 million
- Exports – $270 million
- Employment – 693 FTEs.

These results again are within the feasible range for a sub-regionally produced I-O table. As a final check, the following sectoral input distributions were obtained from the constructed table.

[50] For a good overview of various methods, see Holt. J (2017) "Approaches to estimating regional input output tables, *New Zealand Transport, Research* paper 619

[51] This method requires knowledge of both employment and value of production data. The letter is unavailable and had to be proxied by regional income and employment data

[52] This required, as an initial step, that the Mining sector was also deleted from the host table with subsequent re-balancing

Table 15 Minjerribah sector distributions by input value

Sector	Percentage of total regional inputs by value
Agriculture, forestry, and fishing	6.46
Manufacturing	1.97
Electricity, gas, water, and waste services	0.55
Construction	7.65
Wholesale trade	1.56
Retail trade	5.65
Accommodation and food services	13.26
Transport, storage, and warehouse services	4.11
Information and media services	0.47
Finance and insurance services	2.49
Rental and hiring services	9.50
Professional, scientific, and technical services	3.05
Administration and support services	10.34
Public administration and defence	7.06
Education and training services	7.68
Health and social assistance	6.92
Arts and recreation services	7.30
Other services	3.98
Total	**100**

Source: Estimated using Synergies Minjerribah I-O table.

On inspection, these sectoral input distributions (within caveats) appear to be in the feasible range, although it might have been expected that the Construction sector would have been more prominent.[53] Overall, the constructed Minjerribah I-O table appears to be acting in an appropriate manner and the descriptive results are feasible. It can therefore be used to provide valid estimates of the total economic impact of injecting additional tourist-related expenditure into the regional economy.

5.2.3 How the I-O model works

Economic models are driven by what is called 'shifts in final demand'. This means that additional expenditure on finished products (final demand) represents a stimulus to economic activity. If this additional expenditure is exogenous (i.e. originates from outside the host economy), it is particularly valuable to the local economy because it represents additional new investment rather than displacement from other areas of past spending within that economy (endogenous spending).

[53] This might suggest a re-ordering of the table to reflect a greater Construction sector, however as this sector is not considered a primary tourist-related sector and as the other diagnostic appear feasible, the model was not adjusted.

Overall, the main factors that govern how influential an industry will be terms of economic impact are:

- *Endogenous vs Exogenous:* the extent to which the activity brings in new spending to the economy rather than simply displacing existing activity;
- *Leakage:* the extent of leakage from the host economy, for example, through the need for imports in the production process, or the repatriation of profits and dividends. The more leakage the less impact the activity has on the domestic economy; and
- *Linkage:* The extent to which the production of the product is linked to other sectors in the economy. The more integrated a sector is to the domestic economy, the greater the impact of exogenous expenditure.

5.2.4 How we report economic impacts

There are typically three components of economic impacts that are measured in economic impact studies:

- *Final demand* – being the direct impacts attributable to the project expenditure;
- *Industry effects* – being the indirect impacts of the project expenditure. These relate to production activities downstream of the project by industries that supply into the sector directly supplying the final product or service;
- *Consumption effects* – also referred to as induced impacts, which relate to activities generated by the spending of additional income directly or indirectly related to the activity for which impacts are being assessed;
- *Total impacts* – being the sum of all three types of impacts; and
- *Flow on impacts* – the sum of industry and consumption impacts.

Economic impacts are typically assessed across four key measures: gross output, gross state/regional product, income (wages paid) and employment. These are defined in box 7 below.

Box 7 Economic impacts assessed in Input Output modelling

Gross Output (turnover) measures the gross value of transactions generated or facilitated by the stimulus. Within this gross value is included the value of raw materials that, in most cases, have already been counted as part of gross output from earlier production. As a result, there is a tendency for gross output figures to include some double counting. Nevertheless, it is a useful measure of the total level of economic activity in gross terms (before netting off input costs).

Gross State/Regional Product measures the money value of final goods and services generated or facilitated by the stimulus. When assessed at state level, the measure becomes Gross State Product (GSP). Similarly, at the regional level, the measure is referred to as Gross Regional Product (GRP).

GRP differs from Gross Output because only the value added at each step of the production chain is considered (as opposed to the entire transactional value of each step as is the case for turnover). That is, GRP is the sum of value

added across all industries, not the value of industry output or sales. Accordingly, the economic contribution of an industry, as measured by GRP, is distinguished from its gross value of output and total exports, which do not discount inputs supplied by other industries or economies.

Income (wages paid) relates to the share of value added (and gross output) which is directly paid to individuals in the form of salaries or wages. It is a percentage of GRP and therefore cannot exceed it.

Employment measures the total number of full-time equivalent (FTE) jobs generated or facilitated by the stimulus.

5.3 Modelling results for Queensland and Redland LGA

5.3.1 Construction phase impacts

Table 16 presents the economic impacts attributable to the construction activity to be undertaken as part of the development. The construction period impacts have been modelled for the Queensland economy, having regard to the scale of the development.

The construction activity occurs from 2021 to 2040. Final demand shocks were obtained by summing all construction expenditure over this period and discounting back to a Present Value estimate (at a rate of 7 per cent). The rationale for adopting this approach was described in section 5.2.1.

The results highlight substantial positive direct impacts, with the sum of the flow-on impacts (indirect and induced impacts) being commensurate in magnitude. The results demonstrate that the direct impacts would:

- increase overall gross output by $1,560 million
- increase overall GSP by $550 million
- increase overall labour income by $270 million.

Employment represents the peak annual construction jobs impact over the period. The results suggest that at peak construction, the proposed project would support 390 annual jobs in the initial/direct impact stage, 200 jobs through indirect industrial support effects and 180 jobs from induced consumption effects. This gives a total possible annual employment impact of 770 jobs at peak in supplying industries and in other sectors supplying consumers. When combined with the estimated employment impacts on Minjerribah (see section 5.3.2), this equates to peak employment of well over 1,000 FTEs.

While noting the modelling of the construction impacts has been undertaken based on the entire Queensland economy, the development is likely to provide significant employment opportunities for residents in the Redland LGA. This is significant given the lack of alternative drivers of employment throughout the region.

Table 16 Construction period – Queensland economic impacts

	Indicator	Unit	Final demand	Industry effects	Consumption effects	Total impacts	Flow-on impacts
	Gross output (turnover)	$ million	790	480	290	**1,560**	**770**
	GSP	$ million	220	210	120	**550**	**330**
	Income (wages paid)	$ million	100	110	60	**270**	**170**
	Employment	Annual FTEs (Peak)	390	200	180	**770**	**380**

Notes: Expenditures discounted to 2020 dollars at 7 per cent per annum. Numbers may not sum due to rounding.
Source: Synergies analysis.

5.3.2 Operational phase impacts

As discussed in section 4.5.3, in addition to facilitating increased tourist visitations and expenditure on Minjerribah, the development will also stimulate increased tourist visitations and expenditure at Toondah Harbour and throughout other locations in southern Moreton Bay, through the creation of a mainland tourism hub.

While the timing and magnitude of the additional tourist visitations to Toondah Harbour and other locations in the southern Moreton Bay is less certain than the impacts for Minjerribah, it is important to acknowledge the beneficial impacts that this increased tourism activity will have on the regional economy.

To provide an indication of the potential impacts from the increased tourism activity at Toondah Harbour and other locations in southern Moreton Bay, the following assumptions have been applied to estimate the increase in tourist expenditure attributable to the development:

- annual increase in day-tripper tourist visitations to the Redland LGA of five per cent per annum from 2026;[54]
- annual increase in overnight visitations to the Redland LGA of five per cent per annum from 2032;[55]
- average of 3.7 nights per overnight visitation;[56]

[54] Noting that by 2026, the dredging works, land reclamation, road improvements, and ferry terminal will have been completed and the building construction works will have commenced.

[55] Noting the construction of the hotel is expected to be completed by the end of 2031.

[56] Consistent with average duration of overnight visitation to NSI (Minjerribah) as reported in the Round 2 Report.

- estimates for average expenditure of $160 per day for day-tripper visitors and $224 per day for overnight visitors;[57] and
- growth in tourist visitations attributable to the development is assumed to occur for a 10-year period (i.e. 2026 to 2035 for day-tripper visitors and 2032 to 2041 for overnight visitors).[58]

The growth in tourist visitations to Toondah Harbour and other locations in southern Moreton Bay has been calculated based on TRA data on tourist visitations to the Redland LGA less the tourist visitations attributable to Minjerribah, based on the visitation estimates contained in the Round 2 Report for the Visitor Research Program. On this basis, the following estimates were adopted for tourist visitations to the Redland LGA (excluding Minjerribah) in 2018:

- 536,000 day-tripper visitations
- 78,000 overnight visitations.

Table 17 sets out the additional tourist visitations (for selected years) to Toondah Harbour and other locations in southern Moreton Bay as a result of the development.

Table 17 Additional tourist visitations and expenditure at Toondah Harbour and other locations in southern Moreton Bay as a result of the development

Metric	2026	2029	2032	2035	2038	2041+
Additional visitors						
Day-trippers	26,800	115,511	218,206	337,088	337,088	337,088
Overnight	-	-	3,900	16,809	31,754	49,054
Additional visitor days						
Day-trippers	26,800	115,511	218,206	337,088	337,088	337,088
Overnight	-	-	14,430	62,195	117,489	181,499
Additional visitor expenditure						
Day-trippers	$4,228,000	$18,481,816	$34,912,932	$53,934,003	$53,934,003	$53,934,003
Overnight	-	-	$3,232,320	$13,931,703	$26,317,577	$40,655,774
Total expenditure	**$4,228,000**	**$18,481,816**	**$38,145,252**	**$67,865,706**	**$80,251,580**	**$94,589,777**

Source: Synergies estimates.

Error! Reference source not found. presents the projected additional tourism expenditure impacts in the Redland LGA for the period between 2026 and 2041. To

[57] Based on the assumption that the expenditure profile of tourist visitors to Toondah Harbour and other locations in southern Moreton Bay will resemble the expenditure incurred by visitors to NSI (Minjerribah). This is based on the expectation that these tourist visitors will engage in similar activities as current visitors to NSI (Minjerribah).

[58] At the conclusion of this 10-year period, the 'additional' tourist visitations and associated expenditure are retained, however there is no further growth factor applied for the tourist visitors attributable to the development.

maintain consistency with the construction impacts, which have been modelled over the same timeframe, final demand shocks were obtained by summing all future additional expenditure over this period and discounting back to a Present Value estimate (at a discount rate of 7 per cent).

Error! Reference source not found. shows positive impacts on the Redland LGA economy. The results demonstrate that the direct tourism expenditure impacts would:

- increase overall gross output by $440 million
- increase overall GRP by $140 million
- increase overall labour income by $90 million.

The results further reveal that the additional expenditure is expected to generate up to 135 additional FTEs within the Redland LGA. This is significant, given the limited alternative employment growth drivers for employment in the Redland LGA, as discussed above.

Table 18 Operating period – Redland LGA economic impacts

	Indicator	Unit	Final demand	Industry effects	Consumption effects	Total impacts	Flow-on impacts
	**Gross output (turnover)**	$ million	280	70	90	**440**	**160**
	**GSP**	$ million	100	20	20	**140**	**40**
	**Income (wages paid)**	$ million	70	10	10	**90**	**20**
	**Employment**	Annual FTEs (Peak)	107	14	14	**135**	**28**

Notes: Expenditures discounted to 2020 dollars at 7 per cent per annum. Numbers may not sum due to rounding.
Source: Synergies analysis.

5.4 Modelling results for Minjerribah

As discussed in section 4.5.3, through the expansion of the capacity of the Fison Channel and swing basin and construction of a new ferry terminal, the development will enable ferry services to expand their capacity to meet future growth in demand for tourist visitation from 2026. As such, the increased expenditure by tourist visitors to Minjerribah under the project case can be attributed to the development project.

In addition to the economic benefit derived from this increased tourism expenditure, this additional expenditure will also generate additional economic activity that will stimulate the Minjerribah economy. Based on the assumptions detailed in the cost-benefit analysis, it is estimated that alleviating these constraints will result in five per

cent growth in tourist visitations and expenditure on Minjerribah annually, resulting in an additional $88.3 million of tourist-related expenditure from 2030 onwards.

As noted in the preceding section, the preferred method of estimating tourism expenditure impacts is through the Tourist Satellite accounts; however, due to the sub-regional nature of the Minjerribah economy and other data constraints, this method cannot be used here. Rather, multipliers within the tourism-related sectors were combined in a weighted average to form a 'tourism multiplier' for gross output (turnover), value added, factor income, and employment (FTEs) for each year for the 2026-2030 period.[59] The reason for estimating different multipliers for each year of this period is due to the nature of tourist-related impacts and the likelihood that nonlinearities will enter into the estimation process.[60]

As Gamage and West (2006) argued in their analysis of tourism impacts in Victoria:[61]

> In the classical input-output model, the inputs purchased by each sector are a function only of the level of output of that sector. The input function is assumed linear and homogeneous of degree 1, which implies constant returns to scale and no substitution between inputs.

The authors go on to argue that:[62]

> A more reasonable approach is to allow substitution between primary factors. So, for example, where there is an expansion in, tourist services due to increased visitor numbers, employers will attempt to increase output without corresponding proportional increases in employment numbers on therefore labour costs.

Therefore, a more reasonable approach to modelling tourism impacts is to replace the average expenditure propensities for labour income by employers with marginal input propensities.

To achieve this, non-elasticities were progressively introduced into the modelling of the steadily increasing flow of tourism expenditure into Minjerribah over the 2026-2030 period under the following pattern:

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[59] Data sourced from the NSI Visitor Survey (2019) were used to categorise average tourist visitor expenditure into four key categories – transport (26 per cent), retail trade (25 per cent), accommodation (35 per cent), and arts and recreation (14 per cent).

[60] Giarratani, F., and Garhart, R (1991). "Simulation Techniques in the Evaluation of Regional Input-Output Models: A Survey." In *Regional Input-Output Modelling: New Developments and Interpretations*, edited by J.H.L. Dewhurst, R. C. Jensen, and G.J.D. Hewing's. Aldershot: Avebury, pp. 14-50.

[61] West, G., and Gamage, A. (2006). "Macro Economic Effects of Tourism in Victoria: A Nonlinear Approach, *Journal of Travel Research*, p 102.

[62] Et al, p 102.

- in 2026, increased tourism expenditure leads to a standard fixed factor response (marginal coefficient setting 1) as the tourism industry adapts to increased demand; and
- however, in the second and subsequent years, the adjustment to increased tourism expenditure, especially in terms of additional employment and wages paid, will be less than proportional (marginal coefficients set to less than 1) to allow for improved efficiencies in labour demand

The speed of the nonlinear adjustment (annual reductions in marginal coefficient settings) is not known with any degree of certainty and as a result a conservative schedule was introduced as shown in the table below.

Table 19 Nonlinear adjustment path for modelling tourism impacts on Minjerribah (2026-2030)

Year	Marginal coefficient adjustment factor	Explanation
2026	1.0	Tourist operators expand proportionally; impacts modelled at original setting.
2027	0.9	Minor non-proportionality still in asset building stage and employment and factor income adjust roughly proportionally.
2028	0.8	Non-proportionality grows but still a small departure from linear model; tourism operators coping with increased demand.
2029	0.7	Non proportionality grows; marginal impact increases in employment and wages is less than proportional increase with spending as economies of scale are found.
2030	0.6	Most impacts of new tourism are now in value added and profits rather than employment and wage increases; both increase but not proportionally. Minjerribah tourism industry reaching steady state under present infrastructure.

Source: Synergies NSI Input-Output model.

Using these nonlinearity injections, a set of tourism multipliers for Minjerribah (for each year) were produced and applied to derive estimates of the total economic impacts from each year of increasing tourism expenditure.[63] These multipliers are shown in the table below.

Table 20 Annual tourism multipliers for Minjerribah with increasing nonlinearities

Year	Marginal coefficient parameter	Output	Value-added/GRP	Factor income	Employment
2026	1.0	1.73	1.70	1.65	1.69
2027	0.9	1.73	1.59	1.54	1.49
2028	0.8	1.73	1.49	1.40	1.46
2029	0.7	1.73	1.38	1.27	1.31
2030	0.6	1.73	1.31	1.20	1.19

Source: Synergies Minjerribah Input-Output model.

[63] See, Appendix 1.

Annual impacts from projected additional tourism expenditure between 2026 and 2030 are shown in Table 21.

Table 21 Operational period – Minjerribah economic impacts

Indicator	Unit	2026	2027	2028	2029	2030
Additional expenditure	$ million	15.98	32.77	50.40	68.90	88.32
Gross output (turnover)	$ million	26.65	56.69	86.69	118.51	151.91
GRP	$ million	15.20	31.00	47.68	65.18	83.53
Income (wages paid)	$ million	7.85	16.10	24.62	33.66	43.14
Employment	FTEs	65	133	204	279	357

Source: Synergies Minjerribah Input-Output model.

The above table shows that the increase in tourism expenditure has positive impacts on the Minjerribah economy in each year of the five-year period, however as the tourism industry grows, it accommodates the increased expenditure more efficiently, resulting in a less than proportional increase in employment and total compensation to employees.

Noting this, the projected increase in tourist-related expenditure attributable to the development is estimated to result in a total increase in the output of the Minjerribah economy of $151.91 million in 2030, translating to an increase in Gross Regional product of $83.53 million, and supporting an additional 357 FTEs.

6 Summary

The cost-benefit analysis of the Toondah Harbour Development Project demonstrates that the development is economically feasible. At a real social discount rate of 7 per cent, the development has a Net Present Value of $412.6 million, with a Benefit Cost Ratio of 1.48. This means that for every dollar invested in the project, an economic return of $1.48 is derived. These results improve significantly at a discount rate of 4 per cent, to $621.3 million and 1.55 respectively.

The vast majority of the economic benefits derived from the development are accounted for by the economic value of the land created by the development to be used for residential, commercial and retail purposes. Likewise, the capital costs account for the majority of the economic cost under the project case.

In interpreting the results of the cost-benefit analysis, it is important to note the significance of the findings from the environmental assessment, particularly regarding the impact on migratory shorebird species. Based on the findings that the area of lost habitat will not be significant and that the two high tide roost sites will not be impacted by the development, it was not considered appropriate to apply an economic cost to the impact on shorebird species.

The regional economic impact analysis demonstrates the development will make a significant contribution to regional economic activity, both through construction activity, and through the increased tourism expenditure on both Minjerribah and at Toondah Harbour and other locations throughout southern Moreton Bay. In terms of the construction impacts, the analysis shows the project will contribute up to $1,560 million to regional output and support annual employment of up to 770 FTEs during the peak construction period.

Meanwhile, in terms of the ongoing impacts on Minjerribah and the rest of the Redlands regional economy, the additional tourism expenditure to be facilitated by the development is estimated to result in the following beneficial impacts:

- for Minjerribah, the following increases by 2030:
  - $152 million in additional gross output
  - $83 million in added Gross Regional Product
  - additional employment of 357 FTEs

- for the rest of the Redland LGA (i.e. Toondah Harbour and other locations), the following total impacts, based on projected increased in tourist visitations and expenditure from 2026 to 2041:[64]
  - $440 million in additional gross output
  - $140 million in added Gross Regional Product
  - additional employment of up to 135 FTEs.

These beneficial impacts are particularly significant given the importance of facilitating the growth of the Minjerribah tourism industry following the cessation of sand mining, and subsequent loss of economic activity and employment, in 2019 and the limited alternative drivers of employment growth throughout the Redland LGA.

[64] Noting that these impacts were modelled based on the Present Value of projected additional expenditure, based on a discount rate of 7 per cent.

A. Literature review

Table A.1 Summary of key studies estimating the economic value of wetlands

Study details	Country	Scope	Study description	Results and findings
Ndebele, T. & Forgie, V. (2017). Estimating the economic benefits of a wetland restoration programme in New Zealand: A contingent valuation approach.	New Zealand	Direct, indirect and non-use values attributable to wetland system	Valued the economic benefits of the restoration and preservation of Pekapeka Swamp using mean willingness to pay via the contingent valuation approach. The study was conducted for households in the Hawke's Bay region. Study area of 91.55 hectares	Mean WTP over a five-year period estimated at NZ$47.88 per household. This translates to $46.82 for a five-year period in AUD2020. This can be translated to an annual estimate of $9.36 per household, or $0.102 per household per hectare.
He, T., Dupras, J. & Poder, T. (2016). The value of wetlands in Quebec: A comparison between contingent valuation and choice experiment.	Canada	Indirect use values attributable to wetland system	Valuation of the ecosystem services provided by wetlands in southern Quebec using mean willingness to pay via the contingent valuation approach (dichotomous choice) and the choice experiment approach. Study area of 400,000 hectares of wetlands.	Study produced a range for the willingness to pay for improving wetlands in Quebec of $447 to $465 per household per annum. This equates to a range of $513 to $534 per household in AUD. This equates to an annual value of 0.128 to 0.134 cents per household per hectare.
Petrolia, D. R., Interis, M.G. & Hwang, J. (2014). America's Wetland? A National Survey of Willingness to Pay for Restoration of Louisiana's Coastal Wetlands.	United States	Direct and indirect use values attributable to coastal wetlands	Nation-wide survey to estimate economic welfare associated with large-scale wetland restoration in coastal Louisiana. The study was conducted using choice survey instruments. The wetlands cover an area of around 94,700 hectares.	Mean household (one-off) willingness to pay of $909. This translates to $1,411, or $0.15 per household per hectare, in AUD2020.
Clouston, E.M. (2002). Linking the Ecological and Economic Value of Wetlands: A Case Study of the Wetlands of Moreton Bay.	Australia	Direct, indirect and non-use values attributable to wetland system	Contingent valuation study to estimate the ecological value of Moreton Bay wetlands, including use and non-use values. Surveys were administered to residents within the Commonwealth electoral districts that border Moreton Bay. The area of wetlands covered by the study was 41,491 hectares.	Estimated willingness to pay (one-off) for preservation of the wetlands through improved water quality of $33.97 per respondent ($2020). This equates to 0.082 cents per respondent per hectare.
Gerrans, P. (1994). An economic valuation of the Jandakot wetlands.	Australia	Direct, indirect and non-use values attributable to wetland system	Economic valuation of the Jandakot wetlands (willingness to pay for wetland preservation) using a contingent valuation method survey administered to households in metropolitan Perth.	Median willingness to pay ($2020) of $57.55 to $60.47 per household per annum, equating to a total annual economic value of $25.62 to $26.94 million. This translates to an annual value of 0.280 to 0.294 cents per household per hectare.

Study details	Country	Scope	Study description	Results and findings
Hammit, et al (2001). Contingent valuation of a Taiwanese wetland	Taiwan	Direct and indirect use values attributable to wetland system	Contingent valuation study to estimate value to local residents of protecting the Kuantu wetland. Estimates were made based on both dichotomous-choice and open-ended study formats. The Kuantu wetlands comprise an area of 153 hectares.	Mean household willingness to pay of USD$21 to $65 per household per annum. This translates to AUD$43.49 to $134.62 per household per annum and equates to $0.284 to $0.880 per hectare per household annually.
Kwak, et al (2007). Valuation of the Woopo Wetland in Korea: a contingent valuation study	South Korea	Predominantly non-use values and, to some extent, use values.	Utilised contingent valuation method to determine willingness to pay to conserve Woopo wetland. Face-to-face interviews through a dichotomous choice format were used to determine willingness to pay. Wetlands cover an area of 854 hectares.	Mean household willingness to pay of USD$2.10 annually, which equates to AUD$3.718 ($2020). This translates to an annual willingness to pay of 0.437 cents per household per hectare ($2020). Found truncated mean willingness to pay of USD$3.05 annually per household, which equates to AUD$4.718 ($2020). This translates to an annual willingness to pay of 0.552 cents per household per hectare ($2020).
Siew et al (2015)	Malaysia	Direct and indirect use values attributable to wetland system	Determined willingness to pay for conservation of Paya Indah Wetlands by estimating the entrance fee visitors are willing to pay. Study respondents were randomly selected and data collected through face-to-face interviews. Paya Indah Wetland area is 450.76 hectares.	Mean willingness to pay per visit was found to be RM7.12 per person, which equates to AUD$2.63 ($2020) per person. This translates to a willingness to pay of 0.583 cents per visit per person.

Source: Various.

B. Preparation of I-O tables

I-O tables are constructed following the method of regionalisation. The regionalisation method developed by Synergies to derive state, and thereby sub-state as well as regional level, I-O tables is consistent with other well-accepted and widely used hybrid[65] regional I-O approaches, such as the Distributive Commodity Balance (DCB)[66] and the Generation of Regional Input-Output Tables (GRIT)[67]. Synergies' regionalisation method of I-O tables generally involves three main phases as set out in the box below.

Box B.1 I-O model development

Phase 1 Adjustment to the base (national) I-O table

Step 1: Selection of base table

The latest (2016-17) national I-O table published by the Australian Bureau of Statistics (ABS) is used as the base table.[68] In this table, there are 114 industries represented with direct allocation of all imports and valuation of transactions at basic prices. The direct allocation table is selected for the regionalisation process because it excludes imports from national intermediate transactions, expressing the proportion of intermediate inputs in domestic flows only.

Step 2: Update the base table

The base table is updated using 'temporal quotients' or industry specific factor levels in terms of weighted average industry earnings data[69] between the compilation year (financial year 2017) and the year to be analysed (financial

[65] The hybrid approach combines the use of non-survey techniques with superior data (i.e. statistical information obtained through surveys, experts or other reliable sources).

[66] Christie, J. and Varua, E., M. (2010). Application of the Distributive Commodity Balance Method Approach to Regional Disaggregation: the Case of Penrith LGA. University of Western Sydney.

Johnson, P. (2001). An Input-Output Table for the Kimberly Region of Western Australia. Economic Research Centre, University of Western Australia.

[67] Jensen, R., C., Mandeville, T., D. and Karunarante, N., D. (1977). Generation of Regional Input-Output Tables for Queensland. Report to Coordinator General's Department and Department of Commercial and Industrial Development, Department of Economics, University of Queensland.

Jensen, R., C., Mandeville, T., D. and Karunarante, N., D. (1979). Regional Economic Planning: Generation of Regional Input-Output Analysis. Croom Helm, London.

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West, G., R., Morison J., B. and Jensen, R., C. (1984). A Method for the Estimation of Hybrid Interregional Input-Output Tables. Regional Studies, 18(5), pp. 413–422.

[68] Australian Bureau of Statistics (2019). Australian National Accounts: Input-Output Tables, 2016-17. Cat. No. 5209.0.55.001, Commonwealth of Australia, Canberra.

[69] Average industry earnings data were updated using statistical information classified according to the one-digit or narrow levels of the Australian and New Zealand Standard Industrial Classification structure.

year 2019). Statistical information from across Australian Bureau of Statistics (ABS) databases were relied upon for estimation of the temporal quotients.[70]

It is important to note that updates to the temporal quotients are based on aggregate input data at the one-digit Australian and New Zealand Standard Industrial Classification (ANZSIC) level. This means that the extent of changes in the economic structure between the compilation year and the year to be analysed is restricted.

Step 3: Insertion of superior data and balancing

To better capture the latest possible structure of the national economy, and mitigate the problem associated with the application of outdated ratios for intermediate inputs to and outputs from production, we incorporate superior survey-based data into the table. This data is incorporated in the I-O table via the following two rounds of adjustment.

Round one adjustment

We initially adjust vectors of primary inputs and column totals using statistical information sourced from the *ABS National Accounts' data-cubes*,[71] while holding flows between industries and vectors of final demand constant. Industry flows and vectors of final demand are then adjusted following a manual bi-proportional (or RAS)[72] procedure to reflect changes attributable to the transposition of the production vector.

Round two adjustment

Whilst holding everything else constant, we adjust vectors of final demand and row totals using statistical information sourced from the *ABS National Accounts' data-cubes*, *Household Expenditure Survey and International Merchandise Exports*.[73] This is then followed by adjusting industry flow elements following a manual RAS procedure. The updated and balanced base (or national) I-O table is subsequently checked for accuracy against the ABS derived gross domestic product (GDP).

Phase 2 Regional I-O table formulation

Note that the remaining steps (Steps 4 to 7) are repeated at the sub-state (or regional) level for which I-O tables are required, though, using the state (or sub-state) I-O table as the base table.

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[70] Australian Bureau of Statistics (2018). Census of Population and Housing, 2016. Commonwealth of Australia, Canberra.

Australian Bureau of Statistics (2019). Labour Force, Australia, Detailed, Quarterly, Aug 2019. Cat. No. 6291.0.55.003, Commonwealth of Australia, Canberra.

Australian Bureau of Statistics (2019). Wage Price Index, Australia, Jun 2019. Cat. No. 6345.0, Commonwealth of Australia, Canberra.

[71] Australian Bureau of Statistics (2019). Australian System of National Accounts, 2018-19. Cat. No. 5204.0, Commonwealth of Australia, Canberra.

[72] The bi-proportional (or RAS) procedure is a well-recognised and widely applied technique in re-balancing I-O tables. It is an iterative adjustment procedure for optimisation in which rows and columns, excluding those that have been accurately pre-estimated using superior data, are harmonised with given margins until consistency is achieved.

[73] Australian Bureau of Statistics (2019). Australian System of National Accounts, 2018-19. Cat. No. 5204.0, Commonwealth of Australia, Canberra.

Australian Bureau of Statistics (2017). Household Expenditure Survey, Australia: Summary of Results, 2015–16. Cat. No. 65300DO013_201516, Commonwealth of Australia, Canberra.

Queensland Government Statistician's Office (2020). International Trade – Exports – Overseas exports by industry (4-digit ANZSIC 2006 edition) and country of destination, Queensland and other states and territories, 2008–09 to 2018–19. The State of Queensland (Queensland Treasury), Queensland.

Step 4: Application of location quotients

Extensive use has been made of methods of location quotients (LQ) in constructing regional I-O tables, since obtaining ad-hoc regional data through a full-scale survey is inevitably expensive and time-consuming.

Synergies operates both conventional (linear) and nonlinear methods of LQ, capable of assessing how economic, social and fiscal outputs can contribute to regional, state and national economies. Both types of the model are essentially based on the Social Accounting Matrices (SAM) framework, which is an extension of the classical input-output framework and includes all flow of resources between economic agents through transactions at a specific period of time.

The conventional approach to I-O modelling essentially assumes a constant return to scale economy. Under this formulation, we initially verify the existence of a sector at the regional level by collating detailed (at the four-digit ANZSIC level) weighted average earnings data from the 2016 Census.[74] After updating this data to the year to be analysed,[75] we apply conventional LQs to regionalise the base (national) I-O table.

Although the relative simplicity of the conventional I-O model lends itself to rapid computation, it disregards constraints on economic activity, such as supply imbalances and lack of interregional trade for the product or nonlinearities in economic production. Consequently, the conventional I-O model tends to underestimate imports and overestimate local intermediate transactions as well as economic impacts. This has led policy makers to doubt the accuracy of using conventional techniques for impact assessment.

Hence, in contrast to conventional tables, that only consider the supplying sector, nonlinear I-O tables also consider the size of the purchasing sector in the context of the region. They can therefore account for interregional trade (i.e. estimate leakage to other regions) more accurately, which is likely to be prevalent in smaller regions as they are apt to engage in interregional trade and be more import-intensive.

In other words, the nonlinear table relaxes the assumption that all locally available intermediate products are sourced locally and thus reduces the tendency of overestimating local intermediate transactions (by increasing cross-hauling) as the region in question becomes smaller and less self-contained.

Multipliers based on nonlinear I-O tables can consequently help overcome the critique of being overly optimistic that tends to limit the credibility of analyses based on conventional I-O tables. Economic impacts calculated using nonlinear I-O tables tend to be more conservative than those of conventional ones.

Step 5: Computation of regionalised indices

Regional input and import (competitive) coefficients are derived from base (e.g. national, state or sub-state) technical coefficients through the application of LQs.

Phase 3 Computation of the complete regional I-O table

Step 6: Derivation of the prototype regional I-O table

[74] Australian Bureau of Statistics (2018). Census of Population and Housing, 2016. Commonwealth of Australia, Canberra.

[75] Australian Bureau of Statistics (2019). Labour Force, Australia, Detailed, Quarterly, Aug 2019. Cat. No. 6291.0.55.003, Commonwealth of Australia, Canberra.

Australian Bureau of Statistics (2019). Wage Price Index, Australia, Jun 2019. Cat. No. 6345.0, Commonwealth of Australia, Canberra.

The approach to obtain regional I-O tables is similar under both conventional and nonlinear methods, with the only difference being the application of different regionalised indices. Taking this into consideration, the prototype regional I-O table is developed by:

- transforming the regional direct requirements (industry flows) matrix and import coefficients into monetary flows;
- calculating the sectoral primary inputs' categories; and
- calculating the sectoral final demand categories.

Step 7: Insertion of superior data and balancing

The approach to inserting superior survey-based data and then re-balancing the regional I-O table is identical to the approach discussed in Step 3, with the only difference being the application of distinct or region-specific data.[76] The updated and balanced regional I-O table is then checked for accuracy against the ABS or state government derived gross state/regional product.

In the case of smaller regions, however, distinct or region-specific data becomes generally unobtainable or unavailable. In turn, this limits our ability to produce more accurate results through the insertion of superior survey-based data.

Data sources

The following sources have informed our I-O model:

- ABS (2018). Census of Population and Housing, 2016. Commonwealth of Australia, Canberra.
- ABS (2019). Australian National Accounts: Input-Output Tables, 2016-17. Cat. No. 5209.0.55.001, Commonwealth of Australia, Canberra.
- ABS (2019). Australian System of National Accounts, 2018-19. Cat. No. 5204.0, Commonwealth of Australia, Canberra.
- ABS (2019). Australian System of National Accounts: State Accounts, 2018-19. Cat. No. 5220.0, Commonwealth of Australia, Canberra.
- ABS (2017). Household Expenditure Survey, Australia: Summary of Results, 2015–16. Cat. No. 65300DO013_201516, Commonwealth of Australia, Canberra.
- ABS (2019). Labour Force, Australia, Detailed, Quarterly, Aug 2019. Cat. No. 6291.0.55.003, Commonwealth of Australia, Canberra.
- ABS (2019). Wage Price Index, Australia, Jun 2019. Cat. No. 6345.0, Commonwealth of Australia, Canberra.
- Queensland Government Statistician's Office (2020). International Trade – Exports – Overseas exports by industry (4-digit ANZSIC 2006 edition) and country of destination, Queensland and other states and territories, 2008–09 to 2018–19. The State of Queensland (Queensland Treasury), Queensland.

[76] Australian Bureau of Statistics (2019). Australian System of National Accounts: State Accounts, 2018-19. Cat. No. 5220.0, Commonwealth of Australia, Canberra.

Australian Bureau of Statistics (2017). Household Expenditure Survey, Australia: Summary of Results, 2015–16. Cat. No. 65300DO013_201516, Commonwealth of Australia, Canberra

Queensland Government Statistician's Office (2020). International Trade – Exports – Overseas exports by industry (4-digit ANZSIC 2006 edition) and country of destination, Queensland and other states and territories, 2008–09 to 2018–19. The State of Queensland (Queensland Treasury), Queensland.