Shute Harbour Marina: Net Benefit Assessment

FINAL REPORT
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Shute Harbour Marina Development Pty Ltd

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Executive Summary

Background

Shute Harbour has been identified by the Queensland Government as being a strategically located safe haven in the event of a cyclone and as a gateway to the Whitsunday Islands (Shute Harbour Marina Development, 2006). Given its strategic location to the nearby island resorts and the existing transit terminal, Shute Harbour is a major marine transport hub for the Whitsunday Island Tourist resorts.

The development of a marina facility at Shute Harbour has been proposed for some time, through a range of proponents and proposals. Port Binnli Pty Ltd, a specialist marina development organisation, purchased a 50% share in Shute Harbour Marina Development Pty Ltd in March 2006 and has subsequently redesigned the proposed marina facility in response to identified community concerns and environmental requirements.

Purpose of the Report

The purpose of this report is to provide an analysis of the proposed Shute Harbour Marina in terms of its net benefit to the State of Queensland.

On 24th July 2006, the Coordinator General declared the Shute Harbour Marina project a significant project under Section 26 of the Queensland *State Development and Public Works Organisation Act 1971 (SDPWOA)*. As such, an Environmental Impact Statement (EIS) is required in accordance with Part 4 of the *SDPWOA*.

Additionally, as the proposed Shute Harbour Marina triggers assessable development under the *Coastal Protection and Management Act 1995 (CPM Act)*, policies within the *State Coastal Management Plan (SCMP)* and the *Draft Mackay Whitsunday Regional Coastal Management Plan (RCMP)* apply which require the proposed development to demonstrate it provides a net benefit for the State of Queensland.

The definition under the *RCMP* of a net benefit for the State is as follows:

"there is a net benefit (taking into account all financial, social and environmental impacts) to the State as a whole, as distinct from sectorial, commercial, private or regional gain, and the proposal delivers the greatest net benefit of all viable alternatives".

Policies within the *SCMP* and *RCMP* identified, in consultation with Queensland EPA, as triggering the net benefit assessment in relation to the proposed Shute Harbour Marina Development include:

- 2.1.5: Maritime infrastructure;
- 2.1.9: Reclamation;
- 2.8.1: Areas of state significance (natural resources);
- 2.8.2: Coastal wetlands; and
- 2.9.4: Private use of state land on the coast.

This report assesses the suitability of the proposed development according to the requirements of the *SCMP* and *RCMP* for the development of the Shute Harbour Marina in relation to net State benefit. This requires assessing the net benefit of the development compared to the current site usage across the triple bottom line (economic, social and environmental). Where the positive (beneficial) impacts of development outweigh the negative impacts (costs) across the triple bottom line, the development will be deemed to deliver a net benefit to the State.

Net Benefit Assessment Criteria and Methodology

A cost benefit analysis (CBA) is utilised in this analysis to identify if the benefits delivered by the proposed development are anticipated to outweigh the costs of the development

across the triple bottom line. CBA assesses the impact of a development by comparing the "with" and "without" scenarios.

The key decision criteria that are investigated in the CBA are:

- **Net present value (NPV)**: represents the present value of all benefits minus the present value of all costs. If the net present value is positive, (i.e. present value of benefits is greater than the present value of costs) then the option or project is considered economically desirable and will provide net benefit; and
- **Benefit cost ratio (BCR)**: is the present value of benefits divided by the present value of the costs. If the resulting BCR is greater than one (1) then the option or project is considered economically desirable and will provide net benefit. The higher the BCR the greater the quantified economic benefits compared to the quantified economic losses.

Where the analysis undertaken meets these decision criteria, the development of the proposed Shute Harbour Marina Development is considered to result in a net benefit to the State of Queensland.

Project Overview

The proposed Shute Harbour Marina includes the following key features:

- A world class marina facility will be developed including:
  - A Marina providing 669 berths (including just under 200 multi hull berths) in a "good" wave climate constructed in accordance with Australian Design Standard AS3962-2001;
  - Excavation and dredging of the marina basin to achieve navigation depths to suit the types and sizes of vessels to be accommodated;
  - A fixed breakwater located at the eastern and southern edges of the site to control and dampen wave action and induce calm conditions within the marina basin;
  - Fixed breakwall for marina berths accommodating vessels of various sizes ranging from 11 metres to 35 metres in length and including berths for large catamarans in accordance with Australian Design Standard AS3962-2001;
  - Charter boat base for a range of charter boats directly connected to the onshore facilities; and
  - All required navigation aids, lights and signage to comply with Queensland Maritime Safety requirements.
- Onshore Commercial and Tourism Precincts, including:
  - A 4½ star tourist resort up to 5 storeys comprising 109 family suites in a format designed to suit the site and the location with underground car parking;
  - Managed Resort Accommodation, with the architectural design controlled though design covenants and guidelines to achieve a high quality, consistent and coordinated built form appropriate to the region and the marina setting;
  - Marina office and amenities and car parking;
  - Charter boat base comprising a range of charter boat tenancies, administration and amenities;
  - Retail space; and
  - Landscaped approach road, entry statement open space and gardens.

The proponents intend to import a proportion of sand which, when blended with excavated material from the marina basin, will form the platform for the onshore development. The water edge will be retained with sheet piling or similar structure.

The onshore development will be set at levels that can accommodate the tidal range and predicted increases in sea levels due to storm conditions and greenhouse effects. The full range of site services such as power, water, sewer, stormwater drainage and telecommunications will be provided. A new intersection will be developed at Shute Harbour Road and the approaches landscaped in accordance with the Deed of Agreement with the Department of Main Roads.

Alternative Sites

An analysis of marina demand in the Whitsunday region undertaken by Brown and Root (2001) identified Airlie/Muddy Bay and Shute Harbour as the most appropriate locations for marinas in between and including Bowen and Mackay. The identification of the most appropriate locations was based on analysis of site selection issues (including environmental, engineering, locational and planning considerations) and constraints, as well as a sieve mapping process.

The Shute Harbour locality used in the ranking process included potential sites east and west (current proposal) of the existing Shute Harbour Transit Terminal while the Airlie/Muddy Bay locality included the sites of the Abel Point marina expansion and Port of Airlie.

The report concluded that Shute Harbour scored well for access to the marina from populated areas and favoured destinations from the marina, as well as on environmental matters and proximity to services. The scoring shows that Shute Harbour is well protected from cyclonic activity. The assessment also highlights that both Airlie/Muddy Bay and Shute Harbour require extensive dredging and may have difficulties with the disposal of dredge material, and subsequently both scored poorly on this criteria. However, investigations carried out as part of the EIS have quantified capital and maintenance dredge volumes for this project as being very acceptable.

The appeal of the SHMD site to boat owners and operators is already evidenced by the large number of craft on swing moorings in the Bay and the popularity of the adjacent Shute Harbour Transit Terminal, often referred to as Australia's leading gateway to the Whitsundays. In addition, with the Queensland Government actively encouraging the growth of marine industry, and with the unparalleled conditions provided by the 74 Whitsunday Islands and enticing waters of the Great Barrier Reef, it would appear inevitable that the Whitsundays will continue to attract increasing numbers of visiting and resident boats.

Impact Quantification

The CBA identified that both the direct (those accruing to the proponent) and indirect (those accruing to external stakeholders) benefits of the proposed development outweigh the direct and indirect costs.

Direct benefits of the development, including income from the sale of land, land based facilities and marina berth leases, as well as income from operation of the marina, are estimated to total approximately $536.1 million over the 30 years of the analysis, which has a present value of approximately $295.8 million (discount rate 10%). By comparison, the cost to the proponent of constructing the SHMD is expected to total approximately $254.4 million, with a present value of $202.2 million.

Indirect benefits of the SHMD including revenues to secondary developers from the sale of Managed Resort Accommodation, increased business activity as a result of the SHMD, and social and environmental benefits from maintenance of the coral reef as a result of a Reef Conservation Fund, are estimated to total approximately $1.31 billion over the 30 years of analysis, which has a present value of $688.7 million (discount rate 6%). By comparison, indirect costs, which includes the cost of developing the Managed Resort Accommodation, purchasing marina berth leases, the loss of business elsewhere in

Queensland, as well as environmental impacts from the removal of seagrass and mangrove communities in the marina footprint, are estimated to total approximately $805.6 million, which has a present value of $483.1 million.

Net Benefit Assessment Findings

The CBA assessment found that development of the Shute Harbour Marina is expected to deliver a total net benefit of $299.2 million in present value terms (NPV) at a discount rate of 10% for direct impacts (i.e. incurred by the proponent) and 6% for indirect impacts (i.e. to stakeholders other then the proponent), with present value of benefits of $984.5 million and a present value of costs of $685.3 million. Overall, the development provides a benefit cost ratio (BCR) of 1.44 (i.e. returns $1.44 for every dollar spent in delivery of the project).

The project provides a positive direct net benefit (i.e. to the proponent) in present value terms of $93.6 million with a BCR of 1.46. The project delivers a positive indirect net benefit (i.e. to stakeholders other then the proponent) in present value terms of $205.7 million with a BCR of 1.43.

All aspects across the triple bottom line (economic, social and environmental) are anticipated to record a net benefit as a result of the project.

It is anticipated that the overall net benefit is understated by these results as where possible a conservative approach has been applied. A number of economic and social benefits were unable to be quantified, with these benefits expected to outweigh the economic and social costs identified from the SHMD project that have not been able to be quantified, which further supports this assessment potentially understating the benefits delivered by the SHMD development.

From the outcomes of the net benefit assessment, it is clear that the direct, indirect and overall impacts of the project result in a clear benefit to the community.

Table E.1. Quantitative CBA Summary

Impact	PV of Benefits ($M)	PV of Costs ($M)	Net Present Value ($M)	BCR
Economic				
Direct Impacts	$295.8	$202.2	$93.6	1.46
Indirect Impacts	$570.6	$461.4	$109.2	1.24
Total Impacts	**$866.5**	**$663.6**	**$202.8**	**1.31**
Social				
Direct Impacts	N/a	N/a	N/a	N/a
Indirect Impacts	$94.0	$0.0	$94.0	N/a
Total Impacts	**$94.0**	**$0.0**	**$94.0**	**N/a**
Environmental				
Direct Impacts	N/a	N/a	N/a	N/a
Indirect Impacts	$24.0	$21.6	$2.4	1.11
Total Impacts	**$24.0**	**$21.6**	**$2.4**	**1.11**
Total				
Direct Impacts	$295.8	$202.2	$93.6	1.46
Indirect Impacts	$688.7	$483.1	$205.6	1.43
Total Impacts	**$984.5**	**$685.3**	**$299.3**	**1.44**

Source: AEC*group*

Conclusion

The proposed SHMD development provides a positive net benefit to the State of Queensland with any costs associated with the project being outweighed by the total benefits provided. That is, the SHMD returns a positive net present value and a benefit cost ratio of above one. Indeed, the proposal provides a net benefit to the State in each of the categories of economic, social and environmental impacts.

The proposed SHMD is identified to provide a range of community, economic and environmental benefits including increased access and recreational space, employment and additional business activity across a range of industries. The proposed SHMD also contributes to a net, or overall improvement in the environmental conditions throughout the Whitsunday's, valued through the increase of ecosystem services values and recreational value of the natural attributes of the Great Barrier Reef maintained as a result of the development.

The proposed SHMD will assist Gia and Ngaro peoples through the opportunity to:

- Participate in and share economic prosperity and cultural tourism opportunities;
- Support the intrinsic benefits of governance and culture in community capacity building;
- Maintain generational celebration and learning of cultural heritage traditions, language and expression;
- Contribute to functional and resilient families and communities; and
- Provide generational 'care for country', while showcasing Indigenous pride and knowledge to local, regional and international tourists.

It is therefore strongly asserted that the Cultural Heritage Management Plan, now approved and registered by the Department of Natural Resources and Water, will contribute to positive long term outcomes for at least two Indigenous peoples – the Gia and Ngaro communities – at a local community level.

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1. Introduction

1.1 Background

Shute Harbour has been identified by the Queensland Government as being a strategically located safe haven for vessels in the event of a cyclone and as a gateway to the Whitsunday Islands (Shute Harbour Marina Development, 2006). Given its strategic location to the nearby island resorts and the existing transit terminal, Shute Harbour is a major marine transport hub for the Whitsunday Island Tourist resorts.

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1.2 Purpose of the Report

The purpose of this report is to provide an analysis of the development of the proposed Shute Harbour Marina in terms of its net benefit to the State of Queensland.

On 24th July 2006, the Coordinator General declared the Shute Harbour Marina project a significant project under Section 26 of the Queensland *State Development and Public Works Organisation Act 1971 (SDPWOA)*. As such, an Environmental Impact Statement (EIS) is required in accordance with Part 4 of the *SDPWOA*.

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The definition under the *RCMP* of a net benefit for the State is as follows:

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Policies within the *SCMP* and *RCMP* identified, in consultation with Queensland EPA, as triggering the net benefit assessment in relation to the proposed Shute Harbour Marina Development include:

- 2.1.5: Maritime infrastructure;
- 2.1.9: Reclamation;
- 2.8.1: Areas of state significance (natural resources);
- 2.8.2: Coastal wetlands; and
- 2.9.4: Private use of state land on the coast.

This report will assess the suitability of the proposed development according to the requirements of the *SCMP* and *RCMP* for the development of the Shute Harbour Marina in relation to net State benefit. This requires assessing the net benefit of the development compared to the current site usage across the triple bottom line (economic, social and environmental). Where the positive (beneficial) impacts of development outweigh the negative impacts (costs) across the triple bottom line, the development will be deemed to deliver a net benefit to the State.

Much of the analysis presented in this report is referenced from the volume of technical documents have been prepared in support of the Shute Harbour Marina, these documents are referenced as appropriate and should be referred to where additional technical information is required.

1.3 Scope and Policy Context of the Assessment

The following table outlines the policies triggering the requirement for a net benefit assessment in relation to the Shute Harbour Marina Development, their definition as appearing in the *CPM Act*, *SCMP* or *RCMP*, their policy application, and the aspect of the proposed Shute Harbour Marina Development relating to that policy.

Table 1.1. Coastal Management Plan Policies & Net Benefit Assessment Triggers

State & Mackay Whitsunday Regional Coastal Management Plan Policy	Definition	Policy Direction	Aspect of Shute Harbour Marina Development Relating to Policy
2.1.5: Maritime infrastructure	Includes ports, harbours, marinas, jetties, pontoons, ramps, and marine transport facilities of a public, commercial or private nature.	Policy 2.1.5 acknowledges that existing maritime infrastructure plays an integral role in public and private marine activities. However, undeveloped tidal waterways in the region provide an undisturbed scenic landscape and have high environmental, biodiversity, cultural, recreational and tourism values, and construction and use of maritime infrastructure in these undeveloped tidal waterways can result in significant adverse impacts on coastal resources. While the preference is for new maritime infrastructure to be located in developed tidal waterways in locations which recognise public access requirements and protection of natural, cultural and landscape values of the waterway, new maritime infrastructure in undeveloped tidal waterways is acceptable provided there is a net benefit for the State.	Marina facility and associated infrastructure.
2.1.9: Reclamation	Loss of one environment (tidal waters) and the creation of another (land above tidal waters).	Policy 2.1.9 identifies that reclamation can result in the degradation and loss of coastal resources including foreshores, wetlands and wader bird habitats as well as adversely affecting coastal processes and scenic landscape values, and requires the demonstration of a net benefit to the state or region.	Effectively all land based aspects of the development will be on reclaimed land.
2.8.1: Areas of state significance (natural resources)	The following areas, where they are located on the coast, or within the coastal zone and linked to the coast through their contribution to protecting coastal resources and their values, are defined as 'areas of state significance (natural resources)' for the purposes of coastal management: • Significant coastal wetlands; • Significant coastal dunes; • Endangered regional ecosystems; and • Protected areas (State land), land declared as critical habitat, and areas of major interest as defined under the *Nature Conservation Act 1992*.	Land identified to be developed in the future for urban, maritime and rural land uses in regional plans, planning schemes and port land use plans is to be located outside of areas of state significance (natural resources). Existing urban, maritime and rural land uses within 'areas of state significance (natural resources)' will not expand in these areas unless: • It can be demonstrated that there will be no adverse impacts on coastal resources and their values; or • The development has a demonstrated net benefit for the State as a whole.	The marina site lies within the Great Barrier Reef World Heritage Area and abuts Conway National Park.

State & Mackay Whitsunday Regional Coastal Management Plan Policy	Definition	Policy Direction	Aspect of Shute Harbour Marina Development Relating to Policy
2.8.2: Coastal wetlands	Coastal wetlands in the Mackay Whitsunday region include marine and freshwater grasslands and mixed Melaleuca wetlands, forblands and sedgelands, rivers and coastal streams, seagrass beds, coral reefs and mangrove forests.	Policy 2.8.2 identifies that coastal wetlands in the region play a key role in the maintenance of water quality entering the Great Barrier Reef World Heritage Area and protection of the coast from destructive natural events such as erosion, storm surges and flooding. New infrastructure to service development and other land uses is to be located outside, and provide an adequate buffer to, coastal wetlands unless: • It is of net benefit for the region; • There are no viable alternatives; and • Potential adverse impacts are minimised and managed.	The entire marina footprint is within coastal wetland areas.
2.9.4: Private use of state land on the coast	Includes all State-owned land on the coast, including land leased for private uses.	Private use of State land on the coast is not supported on land with significant ecological, biodiversity or cultural heritage values unless it is of net benefit for the region and mechanisms are in place to protect and manage coastal resources and their values. Significant areas include foreshores, coastal dunes and wetlands, coastal habitats and erosion prone areas.	The entire marina footprint is located on State-owned coastal land with significant ecological and biodiversity values.

Source: AEC*group*, Cardno

Policies within the *SCMP* and *RCMP* triggered by the development require the development to demonstrate that it provides a net benefit for the State of Queensland with the exception of policy 2.8.2, which requires the demonstration of the benefit to the region. No impacts appropriate for assessment under policy 2.8.2 occur outside of the region, subsequently a regional assessment will be identical to a State based assessment.

In consultation with the EPA, a State focus was identified as being most appropriate for this analysis and is applied throughout the analysis for all policies.

1.4 Report Structure

The structure of this report is as follows:

Chapter 1: Introduction. Provides the purpose and background of this report.

Chapter 2: Project Overview & Context. Provides an overview of the project's objectives, location background and description and alignment with government (State and Local) policies and planning frameworks. This chapter also provides an overview of the Queensland marina market.

Chapter 3: Net Benefit Assessment Methodology. Outlines the cost benefit analysis (CBA) methodology used to measure the costs and benefits of the Shute Harbour Marina development.

Chapter 4: Identification of Impacts. This chapter identifies all the costs and benefits of the project, outlining whether the impact has been quantified for inclusion in the CBA.

Chapter 5: Net Benefit Assessment. Discusses the benefits and costs of the Shute Harbour Marina development, providing quantitative measures for these impacts where possible in dollar terms. Results of the CBA are also provided in this section.

Chapter 6: Summary of Findings. Summarises the findings of the Shute Harbour Marina Net Benefit Assessment.

2. Project Overview and Context

2.1 Project Description

2.1.1 Location

The project site is located in Shute Bay in the Whitsunday Shire Council Local Government Area (LGA), off Shute Harbour Road. The proposed Shute Harbour Marina Development site is described as Lot 2 on Plan SP 117389, Lot 273 on Plan HR1757.

The site lies outside the boundary of the Great Barrier Reef Marine Park (GBRMP), Dugong Protection Areas and Fish Habitat Areas (FHA). Part of the site is within the outer margin of the World Heritage Area, and the proposed site abuts Conway National Park on the northern boundary.

2.1.2 Key Features

Components

The key features of the Shute Harbour Marina development include:

- A world class marina facility will be developed including:
  - A Marina providing 669 berths (including just under 200 multi hull berths) in a "good" wave climate constructed in accordance with Australian Design Standard AS3962-2001;
  - Excavation and dredging of the marina basin to achieve navigation depths to suit the types and sizes of vessels to be accommodated;
  - A fixed breakwater located at the eastern and southern edges of the site to control and dampen wave action and induce calm conditions within the marina basin;
  - Fixed breakwall for marina berths accommodating vessels of various sizes ranging from 11 metres to 35 metres in length and including berths for large catamarans in accordance with Australian Design Standard AS3962-2001;
  - Charter boat base for a range of charter boats directly connected to the onshore facilities; and
  - All required navigation aids, lights and signage to comply with Queensland Maritime Safety requirements.
- Onshore Commercial and Tourism Precincts, including:
  - A 4½ star tourist resort up to 5 storeys comprising 109 family suites in a format designed to suit the site and the location with underground car parking;
  - Managed Resort Accommodation, with the architectural design controlled though design covenants and guidelines to achieve a high quality, consistent and coordinated built form appropriate to the region and the marina setting;
  - Marina office and amenities and car parking;
  - Charter boat base comprising a range of charter boat tenancies, administration and amenities;
  - Retail space; and
  - Landscaped approach road, entry statement open space and gardens.

The proponents intend to import some sand which, when blended with excavated material from the marina basin, will form the platform for the onshore development. The water edge will be retained with sheet piling or similar structure.

The onshore development will be set at levels that can accommodate the tidal range and predicted increases in sea levels due to storm conditions and greenhouse effects.

The full range of site services such as power, water, sewer, stormwater drainage and telecommunications will be provided.

A new intersection will be developed at Shute Harbour Road and the approaches landscaped in accordance with the Deed of Agreement with the Department of Main Roads.

Expected Outcomes of the Development

The Shute Harbour Marina development will provide marina facilities at a strategic transport hub in a fast growing and internationally recognised tourism destination – the Whitsundays. The development will also result in:

- The development of a new four lane public access boat ramp with parking for approximately 100 vehicles with trailers (this is to be developed separately to the marina with the proponent providing partial funding); and
- The redevelopment of the existing Shute Harbour road under the terms of an existing deed of agreement with the Department of Main Roads. The road will follow the current alignment and no development will take place north of Shute Harbour road thereby minimising any potential impacts on the adjoining Conway National Park.

The project will result in increased public access to the waterfront at Shute Harbour. The proponents of the development will contribute to the provision of recreational boat launching and trailer parking facilities at Shute Harbour.

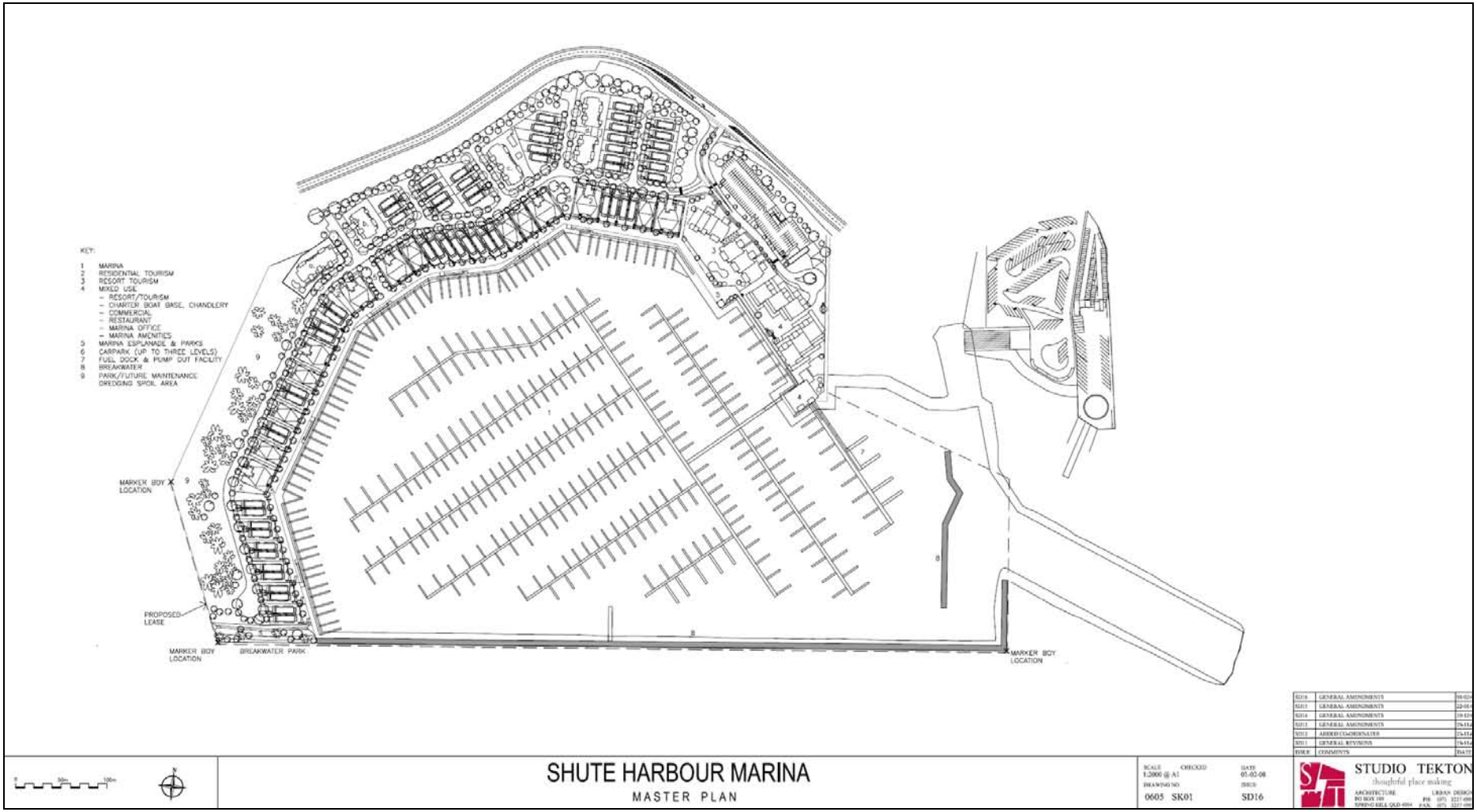
In terms of long term sustainable benefits the Shute Harbour Marina facility aims to deliver:

- Increased local employment opportunities;
- Increased opportunities to “value add” to the local tourism industry;
- Provision of a mainland tourism destination experience at Shute Harbour;
- Provision of an effective recreational vessel management opportunity that will decrease the need for destructive single moorings and provide environmentally controlled effluent disposal facilities; and
- Provision of increased controlled access to the waters of Shute Harbour and the Whitsundays.

Master Plan

The concept master plan for the proposed Shute Harbour Marina development described above is shown in the following site Master Plan.

Figure 2.1. Shute Harbour Master Plan



Source: Studio Tekton (2008)

2.1.3 Site Selection and Alternative Locations for Project Development

With the greater part of the population of Queensland located in the south-east corner, it is to be expected that the majority of vessels in Queensland are owned by residents of south-eastern Queensland and are moored in the south-east. However, the attractiveness of the Whitsunday area for boating activities is drawing the attention of retirees, baby boomers with disposable income, and younger people to relocate to the Whitsunday area for lifestyle reasons or to own a second home and marina berth in the area, in addition to the advent of cheaper airfares increasing the opportunities for southern residents to base their boats in the Whitsundays.

Given the trend in demand for marina berths a Whitsunday Region Marina Demand Analysis was undertaken (Brown and Root, 2001) to identify the most appropriate locations for marinas in the Whitsunday region between and including Bowen and Mackay. The identification of the most appropriate locations was based on analysis of site selection issues (including environmental, engineering, locational and planning considerations) and constraints, as well as a sieve mapping process. This methodology was developed for strategic planning purposes as a means of comparing and ranking a number of possible marina sites.

The ranking of localities revealed Airlie/Muddy Bay and Shute Harbour leading the order of preference for development of marina facilities in the region. The Shute Harbour locality used in the ranking process included potential sites east and west (current proposal) of the existing Shute Harbour Transit Terminal while the Airlie/Muddy Bay locality included the sites of the Abel Point marina expansion and Port of Airlie.

The report concluded that the Airlie/Muddy Bay and Shute Harbour group score well for access to the marina from populated areas and favoured destinations from the marina. Both score well on environmental matters and proximity to services. This is particularly so for the Airlie/Muddy Bay locality, where in most cases facilities and services are available and considerable alteration to the natural environment has already occurred. Shute Harbour is better protected from cyclonic activity than Airlie/Muddy Bay and this is reflected in the scoring. However, both localities require extensive dredging and have potential difficulties with the disposal of dredge material and as a result each scored poorly in this criterion. However, investigations carried out as part of the EIS have quantified capital and maintenance dredge volumes for this project and have found them to be very acceptable.

The appeal of the SHMD site to boat owners and operators is already evidenced by the large number of craft on swing moorings in the Bay and the popularity of the adjacent Shute Harbour Transit Terminal, often referred to as Australia's leading gateway to the Whitsundays. In addition, with the Queensland Government actively encouraging the growth of marine industry, and with the unparalleled conditions provided by the 74 Whitsunday Islands and enticing waters of the Great Barrier Reef, it would appear inevitable that the Whitsundays will continue to attract increasing numbers of visiting and resident boats.

2.2 Alignment With Regional Planning

The Shute Harbour Marina Development project's objectives align with a number of State and Local government planning and policy documents for the delivery of sustainable economic development that provides environmental, social and community benefits producing prosperous communities, including:

- Queensland Government Priorities;
- Whitsunday Growth Management Initiative;
- Draft Mackay-Whitsunday Regional Coastal Management Plan;
- Mackay Whitsunday Regional Tourism Investment and Infrastructure Plan (RTIIP);
- WHAM Regional Plan;
- Whitsunday 2015: A Whitsunday Shire Economic Development Strategy; and
- Whitsunday Destination Management Plan.

Identification of the key priorities for each strategy and the relevant outcome delivered by the Shute Harbour Marina project is provided in Appendix A.

2.3 Demand for the Shute Harbour Marina Development

2.3.1 Queensland Marine Industry

The Boating Industry Association of Queensland (2007) estimate that the Queensland marine industry, including manufacture, servicing, retail, distribution, brokerage and marinas, has an annual turnover of $2.6 billion and employs approximately 11,000 people. Further, it is estimated that the Queensland marine industry contributed $1.4 billion to State's economy in 2002-03, or approximately 1.2% of total Queensland Gross State Product (GSP) for the year (Pacific Southwest Strategy Group, 2006a).

The marine industry and boatbuilding sector is one of the largest manufacturing and value added sectors in Queensland, and has a significant presence in the Mackay Statistical Division (SD).

2.3.2 Boat Registrations

Queensland boat registrations exceeded 200,000 in January 2006 (Collins PRD, 2007), and have continued to grow since, with 223,425 boats registered as of July 2007. Over the past decade, boat registrations have recorded an average annual growth of 5.3% (Boating Industry Association of Queensland, 2007), which is approximately double the Queensland population growth rate.

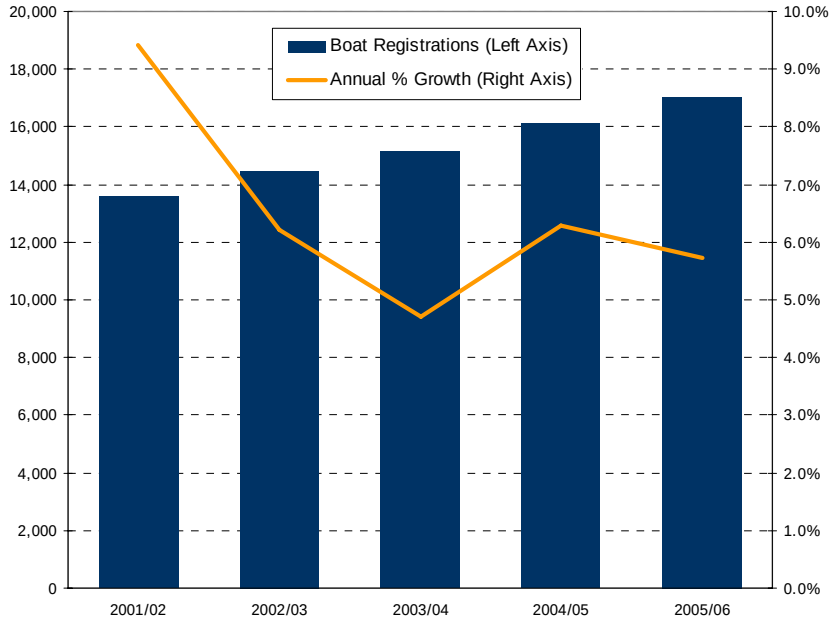
Of the 223,425 boats registered in Queensland, 11,602 (or 5.2%) of these are greater than 8 metres in length (Pacific Southwest Strategy Group, 2007). Boats larger than 8 metres typically require a mooring or berth for storage for a variety of reasons, including (URS, 2005):

- Larger boats are difficult to handle on a trailer as towing and launching larger boats can be difficult;
- Larger boats tend to be more valuable, with owners who tend to prefer and can afford alternate storage options; and
- With trends toward medium and higher density living, there are fewer suburban storage options.

Since 2002, registrations for boats greater than 8 metres in length have been growing at a faster rate than smaller boats (7.1% per annum on average compared to 6.0%), reflecting the current trend towards larger and more luxurious watercraft (Pacific Southwest Strategy Group, 2007; Collins PRD, 2007).

In the Mackay SD there were over 17,000 recreational boats registered as at April 2006, accounting for approximately 8.5% of total Queensland recreational boat registrations. Since 2000-01, recreational boat registrations have averaged annual growth of 6.7% in the region, above the Queensland growth rate of 5.1% over the same period.

Figure 2.2. Recreational Boat Registrations, Mackay SD



Note: Registrations for 2005/06 are for the 10 months to the end of April 2006.
Source: Pacific Southwest Strategy Group (2006a) (data originally from Queensland Transport)

2.3.3 Existing Marina Capacity in Mackay SD

There were six marinas operating in the Mackay SD in 2006, with a total capacity of 1,384 wet berths. Whitsunday Shire has three marinas currently operating, Abel Point Marina, Hamilton Island Marina and Hayman Island Marina. Mackay City has two operating marinas (Mackay Marina Village and Laguna Quays Marina) and Bowen Shire has one marina (Bowen Marina).

Occupancy rates for these marinas are high, with the majority recording over 80% of berths occupied. Existing wet berth capacity at the six marinas is outlined in the table below.

Table 2.1. Wet Berth Capacity at Mackay SD Marinas, 2006

Marina	Location	Wet Berths
Abel Point Marina	Whitsunday Shire	500
Hamilton Island Marina	Whitsunday Shire	220
Hayman Island Marina	Whitsunday Shire	26
Mackay Marina Village	Mackay City	328
Laguna Quays	Mackay City	110
Bowen Marina	Bowen Shire	200
Total		1,384

Source: Pacific Southwest Strategy Group (2006a)

In addition to these wet berths there are a number of moorings available (413 moorings identified in 2001) and dry berths (75 identified in 2006).

2.3.4 Proposed Additional Marina Capacity in Mackay SD

There are currently a number of developments in the planning stage in the Mackay SD that will result in an increase in wet berth capacity if developed. The proposed Shute Harbour development will result in an increase in capacity in the region of 669 wet berths upon completion.

A complete list of proposed marina development (including expansion and the new facilities identified above) in the region is outlined in the table below.

Table 2.2. Proposed Additional Wet Berth Capacity at Mackay SD Marinas

Marina	Location	Current Wet Berths	Proposed Additional Wet Berths	Total Wet Berths
Abel Point Marina	Whitsunday Shire	500	-	500
Hamilton Island Marina	Whitsunday Shire	220	200	420
Hayman Island Marina	Whitsunday Shire	26	-	26
Port of Airlie Marina	Whitsunday Shire	-	300	300
Shute Harbour Marina	Whitsunday Shire	-	669	669
Mackay Marina Village	Mackay City	328	156	484
Laguna Quays	Mackay City	110	500	610
Bowen Marina	Bowen Shire	200	600	800
Total		1,384	2,425	3,809

Source: Pacific Southwest Strategy Group (2006a)

2.3.5 Marina Demand in Mackay SD

There was a total waiting list of 1,480 for marina berths in Queensland in 2005 (Pacific Southwest Strategy Group, 2006a), consisting of 795 waiting to purchase and 685 wanting to lease. Assuming that the waiting list for berths in the Mackay SD constitutes a similar proportion of the Queensland total as boat registrations (8.5%), this equates to a waiting list of approximately 121 marina berths in the Mackay SD. In addition, there are an estimated 75 dry berths and 413 moorings in the region (Pacific Southwest Strategy Group, 2006a).

In total, Pacific Southwest Strategy Group (2006a) estimate that current demand for berths in the Mackay SD (including current wet berth capacity, moorings, dry berths and waiting list) is 1,993, or 11.7% of current boat registrations in the region.

Alternatively, using a conservative occupancy rate of 80% for existing marina wet berths, this equates to total current demand base of 1,716 berths, or 10.1% of current boat registrations in the region.

2.3.6 Anticipated Additional Berthing Demand in Mackay SD

Based on current growth in boat registrations (6.7% per annum), Pacific Southwest Strategy Group (2006a) estimate that demand for berths in the Mackay SD will increase to 2,730 by 2010, and 5,122 by 2020. This is above the total existing and proposed additional wet berth capacity for the region (3,809), including the Shute Harbour Marina development, which implies that the current planned developments are insufficient to meet anticipated demand.

Even at a conservative existing demand estimate of 1,716 berths, and assuming that the current ratio between boat registrations and berth demand remains the same (10.1%, which is a conservative estimate as registration of boats requiring a mooring or berth is growing faster than for boats small enough to be stored on a trailer (Pacific Southwest Strategy Group, 2007; Collins PRD, 2007), it is expected that demand for berths in the Mackay SD will increase to 2,220 by 2010, and 4,226 by 2020. This is still above the total existing and proposed additional wet berth capacity for the region, including the Shute Harbour Marina development.

3. Assessment Methodology

This section outlines the quantitative cost benefit assessment (CBA) framework and how it is applied to the triple bottom line net benefit assessment of the Shute Harbour Marina Project.

3.1 Cost Benefit Analysis Approach and Methodology

A cost benefit analysis (CBA) is utilised in this analysis to identify if the benefits delivered by the proposed development are anticipated to outweigh the costs of the development, which in this case is applied across the triple bottom line.

CBA is an analytical tool that identifies and attempts to quantify the relative costs and benefits of a project and converts available data into manageable and comparable information units. The strength of the method is that it provides a framework for analysing complex and sometimes confusing data in a logical and consistent way.

CBA assesses the impact of a development by comparing the "with" and "without" scenarios, and helps decision makers answer questions such as:

- Does the proposed project provide a net benefit to the community, region or State as a whole?
- Should the proposed project, be undertaken?

CBA is a methodology for assessing the net benefits accruing to society as a whole as a result of a project. The CBA method considers the effect of real resource costs and benefits, and excludes, for example, taxes and subsidies, which are regarded as transfer payments from one part of the economy to another.

A detailed overview of the steps undertaken in the CBA process is included in Appendix B.

3.2 Decision Criteria and Interpretation

The key decision criteria that are investigated in the CBA are:

- **Net present value (NPV)**: represents the present value of all benefits minus the present value of all costs. If the net present value is positive, (i.e. present value of benefits is greater than the present value of costs) then the option or project is considered economically desirable and will provide net benefit; and
- **Benefit cost ratio (BCR)**: is the present value of benefits divided by the present value of the costs. If the resulting BCR is greater than one (1) then the option or project is considered economically desirable and will provide net benefit. The higher the BCR the greater the quantified economic benefits compared to the quantified economic losses.

Where the analysis undertaken meets these decision criteria, the development of the proposed Shute Harbour Marina Development is considered to result in a net benefit to the State of Queensland.

3.3 Key Assumptions

- The economic planning period is 30 years due the impact of discounting beyond this time scale;
- It is assumed that no alterations or additional features to the proposed development will occur over the next 30 years; and
- All values are expressed in 2007 dollars.

4. Identification of Impacts

4.1 Introduction

The following sections outline the potential environmental, economic and social costs and benefits associated with the proposed Shute Harbour Marina development identified in the relevant technical documents, including their causal activity and description. The impacts are also characterised as either direct (i.e. experienced by the proponent) or indirect (experienced by external stakeholders) impacts. For full details of the impacts associated with the Shute Harbour Marina Development refer to the relevant sections of the EIS and the associated technical documents.

The impacts identified in the tables below are those that are expected to occur as a result of the development and are included in the net benefit assessment as relevant. Potential impacts that are considered unlikely to occur (for instance, due to appropriate strategies to be applied to mitigate or prevent an impact) are not included in the tables below as they are not deemed relevant to the assessment of the net benefit to the State.

4.2 Costs

Impact	Activity and Description	Impact Type (Direct / Indirect)	Impact Quantified (Yes / No)	Phase	
				Construction	Operation
Economic					
Cost of approvals	Includes the cost of obtaining development approval for all aspects of the development.	Direct	Yes	Yes	
Construction cost of the marina and related amenities	Includes the capital cost of the marina, car park and marina related amenities borne by the proponent.	Direct	Yes	Yes	
Construction cost of the land based aspects of the development	Includes the capital cost of the land based aspects (e.g. tourism resort, commercial and retail precincts) of the development borne by the proponent including the cost of site preparation and development, infrastructure and utility services, park areas and boardwalk. [(a)]	Direct & Indirect	Yes	Yes	
Ancillary costs including contributions to the community	Includes contributions from the proponent for the development of a boat ramp (separate to this project) and other ancillary costs.	Direct	Yes	Yes	Yes
Reef Conservation Fund	As part of the development the proponent will develop a "Reef Conservation Fund" to be operated as a charitable fund with the funds administered by the Great Barrier Reef Marina Park Authority. The fund will be funded from the sale of the marina berths, with an initial contribution, to be provided by the proponent upon the settlement of each marina berth, totalling approximately $1.0 million, and an ongoing contribution of approximately $150,000 per annum as part of the lease agreement (the benefits of the Reef Conservation Fund are examined as recreational and ecosystems services values in the section 4.3).	Direct & Indirect	Yes	Yes	Yes
Cost of Managed Resort Accommodation development	Includes the capital cost of purchasing the land and developing the Managed Resort Accommodation borne by secondary developers.	Indirect	Yes	Yes	
Cost of purchasing a lease on a marina berth	Includes the cost to third parties for the purchase of a lease on a marina berth. These are expected to be long term leases.	Indirect	Yes		Yes
Additional social, community and recreational infrastructure and services	Costs associated with providing additional social, community and recreational infrastructure and services to facilitate the needs of the increased residential and workforce population of the Shute Harbour Marina Development.	Indirect	No		Yes
Transfer of business activity from elsewhere in Queensland	The SHMD is expected to result in the transfer of some business activity from elsewhere in Queensland.	Indirect	Yes		Yes

Impact	Activity and Description	Impact Type (Direct / Indirect)	Impact Quantified (Yes / No)	Phase	
				Construction	Operation
Social					
Increased road traffic (Shute Harbour Road)	The activity surrounding the marine precinct and associated facilities will increase local traffic including larger numbers of vehicles, boats and trailers on Shute Harbour Road.	Indirect	No	Yes	Yes
Decreased water safety from increased water traffic	The marina will increase the number of vessels using and located in Shute Bay, potentially increasing the risk of accident incidence.	Indirect	No		Yes
Loss of cultural heritage	Development of the SHMD has the potential to result in a loss of cultural heritage values associated with the site to traditional owners.	Indirect	No	Yes	Yes
Increased demand for accommodation and housing	The influx of construction and operational workers to the region may place additional pressure on an already limited housing supply in the Whitsunday Shire and surrounding regions.	Indirect	No	Yes	Yes
Increased demand for community and recreational services and facilities	Growth in employment and population during both construction and operation will increase the demand for community and recreational service and facilities in Whitsunday Shire and the broader service centre.	Indirect	No	Yes	Yes
Noise impacts	Noise impacts include those generated through the use of machinery and equipment during the construction phase. Noise impacts during the operational phase of the development are not assessed as individual businesses will be required to operate within the requirements of the governing agency so as not to have external affects.	Indirect	No	Yes	
Changing community values and lifestyle	The development has the potential to impact on the accessibility to and enjoyment of recreational boating activities in the area, which is a key characteristic of the local community's lifestyle. Additionally, the attraction of up to 548 people in the marina, tourism precinct and related facilities has the potential to change the level of community cohesiveness and the identity of the Shute Harbour community.	Indirect	No		Yes
Environmental					
Removal of seagrass/ macroalgae	Dredging of the marina basin is expected to result in the removal of approximately 14.68 hectares of seagrass and 34.0 hectares of macroalgae beds that exist within the marina footprint (FRC Environmental, 2007). These communities play an important role in the overall ecosystem function of Shute Bay, providing habitat for a number of aquatic species and a source of organic matter for nutrient cycling. Water depths in the marina basin are likely to be too great to support significant communities of seagrass and macroalgae following dredging.	Indirect	Yes	Yes	Yes

Impact	Activity and Description	Impact Type (Direct / Indirect)	Impact Quantified (Yes / No)	Phase	
				Construction	Operation
Removal of mangroves	Reclamation and alteration of the shoreline is expected to result in the removal of approximately 1.84 hectares of mangroves along the Shute Harbour coast (FRC Environmental, 2007). Mangroves play an important role in the overall ecosystem function of Shute Bay in terms of habitat, nutrient cycling, and erosion prevention. An increase in erosion and sedimentation may have an adverse effect on coastal water quality and associated seabed flora and fauna through a smothering effect within the marina basin and a decrease in flushing and intermixing from fresh water with marine waters in the project area.	Indirect	Yes	Yes	Yes
Removal of coral communities	There are 10 coral communities identified within the marina basin that are expected to be permanently removed as a result of dredging (FRC Environmental, 2007).	Indirect	Yes	Yes	Yes

Notes: (a) Assumes infrastructure and utility services provided by Whitsunday Shire Council or other stakeholders are operated on a full cost recovery basis, which are therefore considered transfer payments.

4.3 Benefits

Impact	Activity and Description	Impact Type (Direct / Indirect)	Impact Quantified (Yes / No)	Phase	
				Construction	Operation
Economic					
Land sales income to proponent	The proponent is anticipated to make a return from the development and sale of land for the Managed Resort Accommodation precinct.	Direct	Yes		Yes
Revenue to proponent from lease of marina berths	The proponent is anticipated to make a return from developing and selling marina berth leases to third parties.	Direct	Yes		Yes
Revenue to proponent from sale of land based facilities	The proponent is anticipated to make a return from the development and sale of the land based aspects of the development, including the hotel accommodation and commercial and retail space.	Direct	Yes		Yes
Revenue to secondary developers from sale of Managed Resort Accommodation	Return on investment to secondary developers from the sale of the Managed Resort Accommodation to third parties.	Indirect	Yes		Yes
Increased business activity at SHMD	The Shute Harbour Marina Development is expected to result in increased business and economic activity at the SHMD site through operation of the marina, hotel, managed resort accommodation, retail and commercial areas.	Direct & Indirect	Yes		Yes
Increased business activity outside of SHMD	In addition to expenditure undertaken at SHMD, visitors to and users of SHMD are expected to undertake expenditure on goods and services in the wider region, in particular in the surrounding service area of Airlie Beach, Cannonvale, Flametree and Jubilee Pocket.	Indirect	Yes		Yes
Appreciation of property values	An increase in the availability of services and leisure facilities from SHMD has the potential to increase property values in the immediate area of Shute Harbour and Shutehaven (e.g. having the ability to purchase basic supplies such as bread and milk, or pursue activities such as going to cafes/ restaurants).	Indirect	No		Yes
Enhanced networking and linkages in the marine sector	The development of SHMD in close proximity to the existing transit terminal and salvage operation will provide opportunities for enhanced networking and linkages within the local and regional marine sector and local marine businesses.	Indirect	No		Yes
Increased business confidence (investment attraction)	The development is anticipated to contribute to increased business confidence, which has well established links to local investment and re-investment of business and residents in the local economy.	Indirect	No		Yes
Tourism support	The project primarily targets the expanding tourism market on the Whitsunday Coast and provides much needed linkages between water and land based tourism activities supporting the regional tourism sector.	Indirect	No		Yes

Impact	Activity and Description	Impact Type (Direct / Indirect)	Impact Quantified (Yes / No)	Phase	
				Construction	Operation
Social					
Increased amenity from lease of marina berths	Third parties leasing the marina berths are expected to derive some recreational and amenity benefits from the access to and use of the marina and land-based aspects of the development, as well as the knowledge of a 'safe' berth in rough weather.	Indirect	Yes		Yes
Maintenance of the recreational value of the Great Barrier Reef World Heritage Area	As part of the development the proponent will develop a "Reef Conservation Fund" to be operated as a charitable fund with the funds administered by the Great Barrier Reef Marina Park Authority. The fund will be funded from the sale of the marina berths, with an initial contribution, to be provided by the proponent upon the settlement of each marina berth, totalling approximately $1.0 million, and an ongoing contribution of approximately $150,000 per annum as part of the lease agreement. This fund will contribute to the ongoing sustainability of the reef by providing environmentally friendly moorings on the reef that minimise disruption to benthic communities and provide space for boaters to safely moor their boat away from environmentally sensitive sites without damaging the reef. Preservation of the reef will provide some benefit in terms of maintained recreational value into the future.	Indirect	Yes		Yes
Increased mangrove habitat along western fringe	The Shute Harbour Marina Development will include reclamation of land under water for development of the Managed Resort Accommodation and parkland along the western side of the development site. Consultation with FRC Environmental (authors of the Aquatic Ecology Report for the SHMD) suggests that mangrove communities may colonise along approximately 0.93 hectares of the western fringe (the non-marina side) of this parkland area. This mangrove habitat will be accessible for viewing by the public via the parkland area and will provide some recreational value.	Indirect	Yes		Yes
Improved access to areas for recreational and leisure activity	The proximity of the marina and associated facilities, retail, café and restaurant precincts, open space and recreational infrastructure (boardwalk, etc.), as well as provision of a new four lane boat ramp (separate to this development) contribute to the development of lifestyle, recreation and leisure activities in the region. This will contribute significantly to the wellbeing of local residents and visitors to the development.	Indirect	No		Yes
Enhancement of community interaction and cohesion	SHMD will provide additional facilities in Shute Harbour and the surrounding service centre for community interaction and meeting places. The collective community use and benefit of the marina and land based aspects of the development has the potential to enhance community cohesion, interaction, vitality, wellbeing and prosperity.	Indirect	No		Yes
Additional employment opportunities	The development is expected to directly provide 78 FTE additional employment positions during construction on average, and 142 employment positions during operation. Additional employment positions are also expected to be generated as a result of additional expenditure and business activity outside of SHMD itself.	Indirect	No	Yes	Yes

Impact	Activity and Description	Impact Type (Direct / Indirect)	Impact Quantified (Yes / No)	Phase	
				Construction	Operation
Environmental					
Increased habitat from development of breakwater	The fixed breakwater will provide 1.8 km of habitat capable of accommodating different aquatic species, for example mangrove jack, a common sport fish species in the region (FRC Environmental, 2007).	Indirect	Yes		Yes
Reestablishment of seagrass from removal of swing moorings	The proposed marina and access channel will necessitate the removal of approximately 57 swing-moorings. These moorings currently impact on the seabed through chronic physical disturbance as the vessel responds to changing winds and tides. The removal of swing moorings will enable approximately 950 m^2 of seagrass to re-establish and a more stable benthic community to develop (FRC Environmental, 2007).	Indirect	Yes		Yes
Increased mangrove habitat along western fringe	The Shute Harbour Marina Development will include reclamation of land under water for development of the Managed Resort Accommodation and parkland along the western side of the development site. Consultation with FRC Environmental (authors of the Aquatic Ecology Report for the SHMD) suggests that mangrove communities may colonise along approximately 0.93 hectares of the western fringe (the non-marina side) of this parkland area. This mangrove habitat will provide some value in terms of increased habitat for aquatic species, nutrient cycling and erosion prevention.	Indirect	Yes		Yes
Maintenance of the environmental and ecosystem services value of the Great Barrier Reef World Heritage Area	As part of the development the proponent will develop a "Reef Conservation Fund" to be operated as a charitable fund with the funds administered by the Great Barrier Reef Marina Park Authority. The fund will be funded from the sale of the marina berths, with an initial contribution, to be provided by the proponent upon the settlement of each marina berth, totalling approximately $1.0 million, and an ongoing contribution of approximately $150,000 per annum as part of the lease agreement. This fund will contribute to the ongoing sustainability of the reef by providing environmentally friendly moorings on the reef that minimise disruption to benthic communities and provide space for boaters to safely moor their boat away from environmentally sensitive sites without damaging the reef that provide key ecosystem functions such as habitat for aquatic species, nutrient cycling, etc.	Indirect	Yes		Yes

5. Cost Benefit Assessment

This section uses a cost benefit analysis (CBA) framework, as outlined in Chapter 3, to assess the quantifiable impacts of the proposed Shute Harbour Marina Development. Each impact is quantified, valued in monetary terms and is assessed individually before being combined in the CBA model to calculate the net impact of the proposed development. All values are presented in 2007-dollar terms.

The assessment has been conducted in accordance with the Queensland Department of Treasury's Cost Benefit Analysis Guidelines (2006), the Environmental Protection Agency's guidelines for Environmental Economic Valuation (2003a) and the Environmental Protection Agency's Information Sheet on techniques for environmental economic valuation (2003b).

To clearly identify impacts by stakeholder two forms of impacts are examined throughout the analysis:

- **Direct impacts**: Those borne by the proponent, have been discounted at 10.0%, which is the indicative risk adjusted rate; and
- **Indirect impacts**: Those externalities or impacts borne by those other than the proponent, are discounted at 6.0% (Queensland Treasury, 2006).

These impacts should not be confused with the terminology frequently used to describe the flow-on impacts of an input-output style multiplier analysis, which in accordance with Cost Benefit Analysis Guidelines (Queensland Treasury, 2006), has NOT been used in this analysis.

As with any *ex ante* assessment assumptions must be made regarding the future flow of costs and benefits. For confidentially reasons, the following assessment is undertaken utilising existing industry benchmarks, which have been clarified with the proponent regarding their relative accuracy.

Not all impacts can be readily quantified in dollar terms. To ensure all project impacts are adequately considered, those impacts, not readily attributed a monetary value are discussed qualitatively. These impacts are predominantly social amenity and lifestyle impacts, which are inherently difficult to quantify in monetary terms.

5.1 Direct Development Impacts

Direct impacts refer to the economic, social and environmental costs and benefits that apply directly to the project proponent. Direct development costs and benefits of the SHMD are outlined in the following sections.

5.1.1 Direct Development Costs

This section pertains to those costs identified as being incurred by the proponent in the development of the proposed SHMD.

Economic

Quantified Economic Costs:

Cost of Approvals
The proponent is expected to incur a cost of approximately $4.0 million in obtaining development approval for SHMD. This cost is assumed to occur in the first year of the analysis (2008).

Construction Cost of the Marina and Related Amenities
The proponent will incur costs in developing the marina and associated marina amenities. Construction of the marina and related amenities will be undertaken during the 30 month construction period. Marina construction costs include all expenditure incurred in constructing the sea wall, breakwater, marina berths, marina office and associated car parking and amenities, as well as dredging of the marina site.

Development of the marina and related amenities is anticipated to have a total cost of approximately $72.5 million.

Construction Cost of the Land Based Aspects of the Development
The proponent will also incur costs related to constructing the land based aspects of the development. Construction of the land based aspects of the Shute Harbour Marina Development will be undertaken during the 30 month construction period. Costs associated with the land based aspects of the development include reclamation of the site and site development, as well as construction of the tourist resort, retail and commercial areas, open space, roads and pathways and includes a provision for appropriate headworks charges (for example for additional infrastructure such as electricity, water, and sewerage). A discussion of additional infrastructure requirements is included in Appendix C. It is anticipated that is with other major developments the costs associated with the provision of additional infrastructure will be split between the infrastructure provider and the proponent. This exact split has not yet been identified.

Development of the land based aspects of SHMD is anticipated to have a total cost of approximately $171.9 million, distributed over the 30 month construction period.

Ancillary Costs Including Contributions to the Community
Additional ancillary costs will be incurred by the proponent during the course of the development, including a $2.5 million contribution to Whitsunday Shire Council for the development of a boat ramp (separate to this project).

Initial expenditure of approximately $2.5 million is assumed to occur in the second year of development (2009). Consultation with the proponent indicates that the boat ramp is likely to be developed in 2010, with the contribution for its development expended in this period.

Reef Conservation Fund
As part of the development the proponent will develop a "Reef Conservation Fund" to be operated as a charitable fund with the funds administered by the Great Barrier Reef Marina Park Authority, and will be funded from the sale of leases for marina berths. The initial contribution, to be provided by the proponent upon settlement of each marina berth (see Table 5.1 in Section 5.1.2 below), is identified to total approximately $1.0 million. Ongoing contributions are also expected from marina berth lessees and are included in the indirect economic costs section as these contributions are from leaseholders once they have purchased the lease from the proponent.

This fund will contribute to the ongoing sustainability of the reef by providing environmentally friendly moorings on the reef that minimise disruption to benthic communities and provide space for boaters to safely moor their boat away from environmentally sensitive sites[1].

Unquantified Economic Costs:

No direct (i.e. incurred by the proponent) unquantified economic costs have been identified for inclusion in the analysis.

Social

No direct (i.e. incurred by the proponent) social costs have been identified for inclusion in the analysis.

[1] The proponent has indicated that a portion of the trust will be utilised to facilitate marine best practice and indigenous education programs through the interpretative centre to be co-located with the charter boat transit centre. However, whilst anticipated to be predominately focussed on the implementation of EzyRider moorings, this disaggregation has not been identified. For the purposes of this assessment the analysis assumes that 100% is allocated to the development of EzyRider moorings.

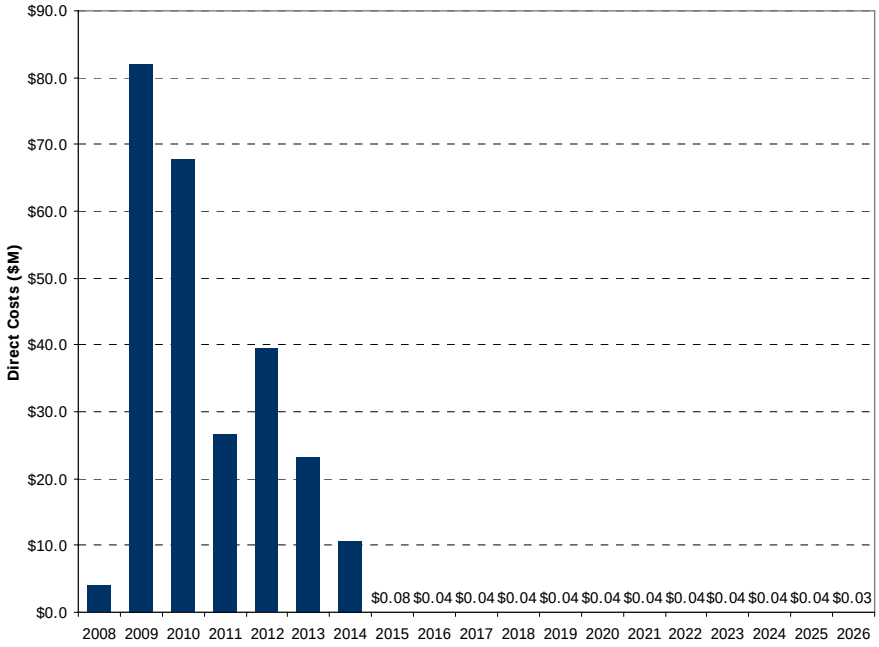
Environmental

No direct (i.e. incurred by the proponent) environmental costs have been identified for inclusion in the analysis.

Total Direct Development Costs

Direct costs are estimated to total approximately $254.4 million over the course of the development, with a maximum annual spend of approximately $82.0 million in 2009 and the last direct cost expenditure undertaken in 2026 (between 2015 and 2026 direct costs are assessed to accrue through contributions to the Reef Conservation Fund as marina berth leases are released and sold). The following figure summarises the distribution of direct costs associated with the proposed Shute Harbour Marina Development.

Figure 5.1. Direct Costs of the Shute Harbour Marina Development ($M2007)



Source: Shute Harbour Marina Development Pty Ltd (2007)

The construction of the Shute Harbour Marina Development is expected to cost approximately $254.4 million to 2037, which has a present value of $202.2 million (discount rate 10%).

5.1.2 Direct Development Benefits

Economic

Quantified Economic Benefits:

Land Sales Income to Proponent

As the site preparation for land in the Managed Resort Accommodation precinct is completed, the 67 waterfront and 50 dry lots will be released and sold to secondary developers with the cash flows accruing to the proponent. In this analysis, it is assumed that the release of lots commences in 2010, with the last cash revenue received by the proponent in 2013.

Waterfront land is estimated to sell for an estimated $2.5 million per lot on average (Malcolm Hall-Brown, 2007), with a total value of $167.5 million, while the land based lots are estimated to sell for approximately $700,000 per lot on average, with a total value of $30 million. The overall revenue from the sale of land to secondary developers in the Managed Resort Accommodation precinct is estimated to be $202.5 million.

Revenue to Proponent from Sale of Marina Berth Leases

The proponent will sell long term (assumed 35 years) leases to third parties for the 669 marina berths, charged on a linear metre basis. The development will result in approximately 11,859 lineal metres of marina berths, with an estimated lease cost of approximately $12,000 per lineal metre.

It is estimated that marina berths will be leased according to the following schedule (Malcolm Hall-Brown, 2007). The overall revenue to the proponent is estimated to be approximately $142.3 million over the 30 years of the analysis.

Table 5.1. Marina Berth Leasing Schedule

Year	Lineal Metres/Year	Value ($M/Year)
2010 - 2013	1,000	$12.00
2014	1,500	$18.00
2015	1,000	$12.00
2016 - 2025	500	$6.00
2026	359	$4.31
Total	**11,859**	**$142.31**

Source: Malcolm Hall-Brown (2007)

Revenue to Proponent from Sale of Land Based Facilities

The proponent will make a return from the construction and sale of the land based aspects of the development to secondary investors to own and operate, including the hotel accommodation and the commercial and retail space.

The hotel will include 109 serviced apartments that are anticipated to be sold to secondary investors and managed by either these secondary investors or a third party. The apartments are expected to sell for approximately $795,000 each on average, and are estimated to be sold over a three year period according to the schedule in the table below (Malcolm Hall-Brown, 2007).

Table 5.2. Serviced Apartment Sales Schedule

Year	Number of Apartments	Value ($M)
2013	48	$38.16
2014	48	$38.16
2015	13	$10.34
Total	**109**	**$86.66**

Source: Malcolm Hall-Brown (2007)

Overall, the sale of the hotel accommodation to secondary investors is expected to result in approximately $86.7 million in revenue for the proponent.

The 2,000 m^2 of commercial and retail space is also expected to be sold to secondary investors over a three year period for $4,000/$m^2$, generating revenues for the proponent of $3.2 million in 2013 and 2014 and $1.6 million in 2015 (overall revenue of $8.0 million) (Malcolm Hall-Brown, 2007).

Increased Business Activity at Marina and Charter Boat Base

It is anticipated that the marina and charter boat base will begin trading on completion of the primary construction phase. It is recognised the facility will not be fully operational on day one of operation and will take some time to reach full operational capacity. This assessment assumes that SHMD will ramp up to full operational capacity over a six-year period following the completion of the facilities.

The annual operating output from marina and charter boat base once in steady state is outlined in the table below. In total, the marina and charter boat base is expected to generate approximately $7.6 million in turnover per annum. However, for the purposes of this analysis, only the value added component of this output has been used to take into consideration the operating costs associated with the operation of the marina and charter boat base to ensure the economic contribution of the additional business activity is not overstated. In the analysis, the additional business activity generated by the marina and charter boat base is estimated to be approximately $3.8 million per annum once in steady state operation.

Table 5.3. Operating Output of Charter Boat Base and Marina ($M 2007)

SHMD Element	Annual Output ($M)	Value Add ($M)
Marina	$3.8	$1.9
Charter Boat Base	$3.8	$1.9
Total	**$7.6**	**$3.8**

Source: AEC*group* (2008a).

Unquantified Economic Benefits:

No direct (i.e. received by the proponent) unquantified economic benefits have been identified for inclusion in the analysis.

Social

No direct (i.e. received by the proponent) social benefits have been identified for inclusion in the analysis.

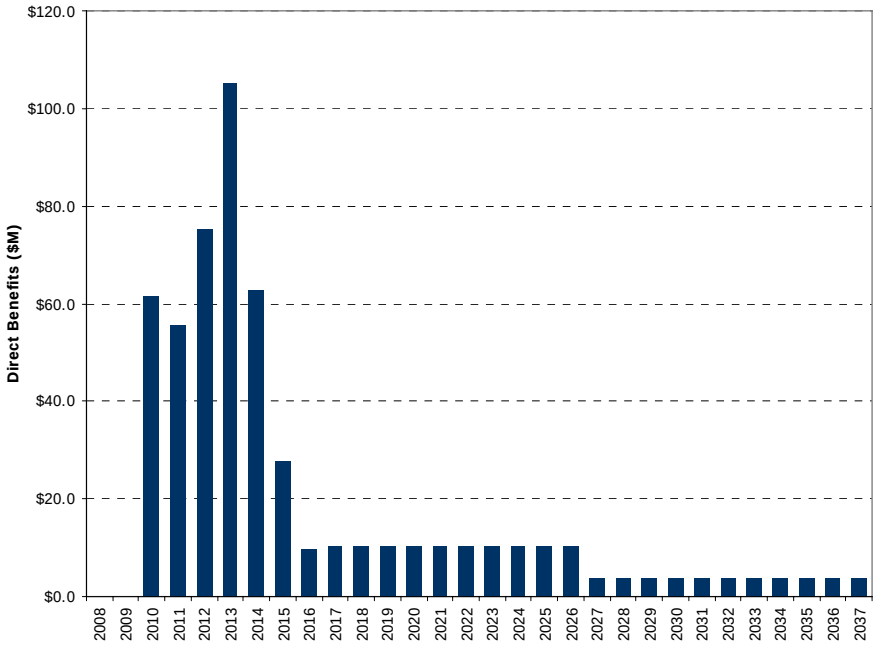
Environmental

No direct (i.e. received by the proponent) environmental benefits have been identified for inclusion in the analysis.

Total Direct Development Benefits

Over the lifetime of the project, direct benefits are expected to total approximately $536.1 million. The largest estimated annual benefit of approximately $105.2 million is due to be received in 2013. The following figure summarises the flow of direct benefits associated with the proposed Shute Harbour Marina Development.

Figure 5.2. Direct Benefits of the Shute Harbour Marina Development ($M2007)



Source: Shute Harbour Marina Development Pty Ltd (2007)

The total benefit from site development revenues is forecast to be approximately $536.1 million, which has a present value of approximately $295.8 million (discount rate 10%).

5.1.3 NPV of Direct Impacts

The net present value (NPV) of the direct impacts of the Shute Harbour Marina is calculated by subtracting the present value of the direct costs from the present value of the direct benefits as outlined in the following table. All direct impacts are economic impacts, with no direct social or environmental impacts identified as resulting from the development of SHMD.

Table 5.4. Direct NPV & BCR of the Shute Harbour Marina Development ($2007)

Real Discount Rate	PV of Direct Benefits ($M)	PV of Direct Costs ($M)	Direct Net Present Value ($M)	BCR
6%	$363.7	$220.5	$143.2	1.65
8%	$326.7	$211.0	$115.8	1.55
10%	$295.8	$202.2	$93.6	1.46
12%	$269.5	$194.1	$75.5	1.39

Source: AEC*group*

The net present value of the direct impacts of the Shute Harbour Marina, assuming a discount rate of 10.0% is estimated to be $93.6 million, and has a benefit to cost ratio (BCR) of 1.46, which implies a return in present value terms of $1.46 for each dollar invested.

5.2 Indirect Development Impacts

The following section outlines the indirect economic, social and environmental impacts associated with the development of the Shute Harbour Marina. Indirect impacts are those that accrue beyond those experienced by the project proponent.

5.2.1 Indirect Development Costs

Economic

Quantified Economic Costs:

Cost of Managed Resort Accommodation Development
When the site preparation works have been completed, the 117 lots in the Managed Resort Accommodation precinct will be sold to secondary parties who will then undertake secondary development work in accordance with the site master plan (i.e. construction of buildings on the divided lots). The total cost to secondary investors of purchasing the lots is estimated to be approximately $202.5 million.

When fully operational, the Managed Resort Accommodation precinct is anticipated to include approximately:

- 146 one, two or three bedroom units/ suites, comprising 91 water front units and 55 non-water front units; and
- 61 single lots, comprising 32 water front single lots and 29 non-water front single lots (it is assumed that separate dwelling managed resort accommodation will be developed on these single lots).

Using construction cost estimates from Rawlinsons (2007) for prestige quality house and unit accommodation in the Mackay and Rockhampton regions, it is estimated that the total building costs in the Managed Resort Accommodation precinct will be approximately $104.5 million.

The first land release is anticipated to occur in 2010, with lots released over a four year period, with the last lot sold in 2013. For the purposes of the CBA it is assumed that building construction expenditure by secondary developers occurs one year after the release and purchase of the land, with the final building expenditure costs forecast to be incurred in 2014. The total development cost of the Managed Resort Accommodation, including the capital cost of purchasing land and developing the accommodation, is estimated to be $307.0 million.

Cost of Purchasing a Lease on a Marina Berth

The proponent will sell long term (assumed 35 years) leases to third parties for the 669 marina berths, charged on a linear metre basis. The development will result in approximately 11,859 lineal metres of marina berths, with an estimated lease cost of approximately $12,000 per lineal metre.

The expected schedule for release of marina berths is provided in the table below (Malcolm Hall-Brown, 2007). The overall cost to third parties is estimated to be approximately $142.3 million over the 30 years of the analysis, which is paid to the proponent as identified in the direct impacts section.

Table 5.5. Marina Berth Leasing Schedule

Year	Lineal Metres/Year	Value ($M/Year)
2010 - 2013	1,000	$12.00
2014	1,500	$18.00
2015	1,000	$12.00
2016 - 2025	500	$6.00
2026	359	$4.31
Total	**11,859**	**$142.31**

Source: Malcolm Hall-Brown (2007)

Reef Conservation Fund

As part of the development the proponent will develop a "Reef Conservation Fund" to be operated as a charitable fund with the funds administered by the Great Barrier Reef Marina Park Authority, and will be funded from the sale of leases for marina berths. An initial contribution, to be provided by the proponent upon settlement of each marina berth, has been included in the direct economic costs ($1.0 million). The terms of the lease will also require ongoing contributions from marina berth lessees, with a total value of $150,000 per annum to be contributed from lessees starting from 2011.

This fund will contribute to the ongoing sustainability of the reef by providing environmentally friendly moorings on the reef that minimise disruption to benthic communities and provide space for boaters to safely moor their boat away from environmentally sensitive sites.

Transfer of Business Activity from Elsewhere in Queensland

The SHMD is expected to result in the transfer of some business activity flowing from the attraction of visitors and their expenditure from elsewhere in Queensland to the marina, charter boat base, tourism precincts, retail and commercial precincts, and other businesses in the surrounding service centre of Shute Harbour.

For the purposes of assessing the net benefit to the State of Queensland, the analysis needs to consider the transfer of business from other areas of the State to the SHMD associated with the attraction of visitors (and their expenditure) from these areas due to the development of the SHMD. For the purposes of assessing the impact of SHMD, it is assumed that approximately 40% of expenditure at the various elements of the SHMD would have otherwise occurred within other areas of Queensland, with the exception of the marina itself where it is anticipated that only 10% of visitors would have gone elsewhere in the State. This is considered to be a highly conservative assumption with the actual transfer likely to be much lower.

For the purposes of this analysis, only the value added component of this output has been used to reflect the economic value of this loss. In the analysis, the business activity transferred from elsewhere in Queensland as a result of the SHMD is estimated to be approximately $12.16 million per annum once in steady state operation.

Table 5.6. SHMD Operating Phase Output ($M 2007)

SHMD Element	% Attracted from Elsewhere in Qld	Value Add ($M)
Hotel Accommodation	40%	$2.22
Managed Resort Accommodation	40%	$4.96
Marina	10%	$0.19
Charter Boat Base	40%	$0.76
Commercial	40%	$0.96
Retail	40%	$0.55
Outside of SHMD [(a)]	33%	$2.51
Total		**$12.16**

Note: This figure is a weighted average of the six SHMD elements.
Source: AEC*group* (2008a).

Unquantified Economic Costs:

Additional Social, Cultural and Recreational Infrastructure and Services
An analysis of population-based benchmarks (AEC*group*, 2008a) indicates that the current level of social, community and recreational infrastructure and services should generally have capacity to cater to the increase in population expected as a result of the SHMD. However, health care service levels and the provision of sports fields and tennis courts appear to be currently under stress.

It is not possible to quantify the cost of these facilities, as the exact nature of the demand will not be known until the market develops.

The provision of health services and sports fields is generally provided by the public sector, while tennis courts are commonly provided by both the private and public sectors. It is assumed the provision of private sporting (tennis) facilities would not occur unless demand was sufficient for them to be commercially viable. In the case of additional publicly provided facilities and services, developer contributions are assumed to be set at the level where there is no upward pressure on rates or utilities charges, which implies no marginal cost to external stakeholders and no impact on this analysis (for example, rates charges are a transfer payment between external stakeholders).

Additionally, SHMD Pty Ltd has committed a contribution of $2.5 million to the Whitsunday Shire Council to upgrade the existing boat ramp and associated facilities at Shute Harbour should the proposed marina proceed. As well as adding to the local amenity, this would reduce the current overcrowding at the existing facility and provide some capacity to accommodate predicted growth in community demand for this facility. This funding support would also save Whitsunday Shire Council from having to fund this expenditure from their capital budget.

Social

Quantified Social Costs:

No indirect quantifiable social costs have been identified for inclusion in the analysis.

Unquantified Social Costs:

Increased Road Traffic (Shute Harbour Road)
The activity surrounding the development and operation of SHMD will increase local traffic including greater numbers of vehicles, boats and trailers on Shute Harbour Road. Cardno (2007a) estimate the total additional traffic in peak hour to be 168 vehicles during construction, which is equivalent to an increase of approximately 50% from the current peak load. During operation, an additional 338 vehicles are expected to travel along Shute Harbour Road in peak hour, equivalent to a doubling in traffic in this period. This increase in traffic has the potential to reduce access and mobility through increased congestion, travel times and safety risks on Shute Harbour Road.

Traffic management and mitigation measures have been developed to minimise the potential impacts on road access and safety, in particular for users of the transit terminal

and residents of Shutehaven, and are outlined in the Transport section of the EIS (Cardno, 2007a).

Decreased Water Safety from Increased Water Traffic

The increase in marina berths available is anticipated to result in an increase in the number of recreational boats and marine traffic in the marina and local area. This will have some impact on traffic movement within and around the waters of Shute Harbour, increasing the risk of accident incidence. Of particular concern is the potential conflict between the commercial vessels that serve the Whitsunday islands, and the charter and recreational vessels crewed by people with limited experience (Thompson Clarke Shipping, 2007). Appropriate traffic management provisions have been designed and will be implemented to monitor and mitigate this potential impact (Thompson Clarke Shipping, 2007).

Loss of Cultural Heritage

Consultation with traditional owners for the site (the Gia and Ngaro/Gia people) indicated that there were initially concerns regarding the impact of the development on the region's cultural heritage. These concerns primarily related to the potential impact of the proposed development on culturally significant flora and fauna, the potential to uncover archaeological findings and the involvement of cultural representatives in the construction phase of the development. Through a consultative process a Cultural Heritage Management Plan (CHMP) was developed that addresses these issues and demonstrates the high level of support for the project by the respondent parties.

The CHMP (Shute Harbour Marina Development, 2008) and the associated report that details the process by which it was achieved is a component of the EIS and has used the guiding principles and rationale of Council of Australian Government's Overcoming Indigenous Disadvantage, Key Indicators Report 2007 (Council of Australian Government, 2007) to explore the determinants of net social benefit, which are aligned to the proposed Shute Harbour Marina Development and the Aspirations initiatives agreed to in the CHMP.

The Overcoming Indigenous Disadvantage, Key Indicators Report 2007 (Council of Australian Government, 2007) provides a robust 'roadmap' for actioning change to address disadvantage and contribute to 'closing the social, economic, environmental and wellbeing gap' between Indigenous and non-Indigenous Australians.

While the SHMD does not address all indicators of disadvantage for Gia and Ngaro/Gia communities, it is closely aligned to three of the four headline indicators. This alignment is demonstrated through the potential positive impact on Gia and Ngaro peoples through the opportunity to:

- Participate in and share economic prosperity and cultural tourism opportunities;
- Support the intrinsic benefits of governance and culture in community capacity building;
- Maintain generational celebration and learning of cultural heritage traditions, language and expression;
- Contribute to functional and resilient families and communities; and
- Provide generational 'care for country', while showcasing Indigenous pride and knowledge to local, regional and international tourists.

It is therefore strongly asserted that the CHMP will contribute to positive long term outcomes for at least two Indigenous peoples – the Gia and Ngaro communities – at a local community level.

The Cultural Heritage Management Plan (CHMP) has been signed by the Gia and Ngaro/Gia people and the proponents. The CHMP has been approved and registered by the Department of Natural Resources and Water in April 2008.

Increased Demand for Accommodation and Housing

The influx of construction and operational workers to the region may place additional pressure on an already limited housing supply in Shute Harbour and the surrounding service centre.

Based on observed trends, the majority of the construction workforce that are not currently residing in the region (39 on average, 96 peak[2]) are anticipated to seek rental accommodation where available, with relatively less expensive short stay accommodation such as caravan parks and motels a secondary option. The supply of rental properties in the surrounding service centre has increased in recent years, however, rental prices have also increased significantly and rental properties do not stay available for long due to the current high demand from other construction work crews in the area and tourists (AEC*group*, 2008a). Rapid growth in accommodation affordability places increasing financial burden on low income families in the region. However, there is a strong likelihood of employment continuity for construction workers within the region between projects, which would reduce this potential impact.

During operation, it is expected that some of the operational workforce will need to be sourced from outside the surrounding service centre. These workers are expected to relocate and seek a residence within an appropriate travel time to their place of work, placing increased demand on the property and rental markets. However, given the relatively low number of workers (some with family members) anticipated to move to the region (36), the highly mobile nature of the surrounding service centre population (i.e. low proportion of residents in the same address as the previous year) and the considerable amount of property development currently being undertaken in the region, it is not expected that the attraction of workers to the region will have any significant impact on the property market during operation (AEC*group*, 2008a).

Increased Demand for Community and Recreational Services and Facilities

Growth in employment and population during both construction and operation will increase the demand for community and recreational services and facilities in Shute Harbour and the surrounding service centre, as well as potentially in the broader service centres of Proserpine and Mackay. During construction, there is anticipated to be an increase in population of approximately 46 persons, peaking at 112 in the 22nd month of construction. During operation, the increase in population is expected to average 596 people, with a peak of 746 during peak tourism periods (AEC*group*, 2008a).

An analysis of population-based benchmarks (AEC*group*, 2008a) indicates that the current level of social, community and recreational infrastructure and services should generally have capacity to cater to the increase in population expected as a result of the Shute Harbour Marina Development, with the exception of health and child care service levels and the provision of sports fields and tennis courts which appear to be currently under stress.

Noise Impacts

Noise impacts include those generated through the use of machinery and equipment during the construction phase. The Initial Advice Statement (IAS) prepared by SHMD (2006) outlines the likely impact of noise and dust on the local community through the construction phase of the proposed development. The report outlines that the noise generated through the piling stage of development will be between 85dBA and 110dBA at a distance of 7 metres, falling to 50dBA at a distance of 300 metres (SHMD, 2006). The work onsite will be limited to 12 hours per day, with works to be carried out 6 days per week (excluding dredging which at times will be carried out around the clock). This schedule for works meets the standards specified in the *Environmental Protection (Noise) Policy 1997* (SHMD, 2006).

Further noise monitoring was undertaken by Cardno (2007b) to assess the potential noise impacts of the development in its construction and operational phases. The monitoring indicates that the primary impact of noise will be on the existing residence,

[2] Labour force and associated population impacts of the SHMD are examined in the *Shute Harbour Marina: Socio-Economic Impact Assessment* (AEC*group*, 2008a). The relevant population or labour force pressure may differ based on the impact and catchment area examined. A full explanation of population or labour force pressures is included in the *Shute Harbour Marina: Socio-Economic Impact Assessment* (AEC*group*, 2008a).

located 50 metres from the proposed development, and the Shute Harbour Motel, located 100 metres from the proposed development (Cardno, 2007b). The report states that control measures will be implemented to minimise construction noise to these sites, however, the noise levels indicated during particular stages of construction are likely to reduce the acoustic amenity of the residence and the motel during the day, with the noise levels of some activities expected to potentially generate difficulties in hearing normal conversations (Cardno, 2007b). The motel may potentially experience some noise at night as a result of round the clock dredging (Cardno, 2007b). The report suggests several mitigation strategies to address these issues and to minimise the potential impacts on sensitive areas.

Noise impacts during the operational phase of the development are not assessed as individual businesses will be required to operate within the requirements of the governing agency so as not to have external affects. Further details regarding noise management can be found in section 4.8 of the EIS.

Changing Community Values and Lifestyle
The proposed development has the potential to impact on elements of the community values and lifestyle of the immediate area through the attraction of an additional 548 people to Shute Harbour. Potential impacts on the values and lifestyle of residents in the area are (AEC*group*, 2008a):

- Potential impacts (both negative and positive) on accessibility to and enjoyment of recreational boating activities in the area; and
- Potential for changes to the level of community cohesiveness and the identity of the Shute Harbour community.

Environmental

Quantified Environmental Costs:

Removal of Seagrass / Macroalgae
Dredging of the marina basin is expected to result in the removal of approximately 14.68 hectares of seagrass and 34.0 hectares of macroalgae beds that exist within the marina footprint (FRC Environmental, 2007). These communities play an important role in the overall ecosystem function of Shute Bay, in particular by providing:

- Habitat and nursery for a number of aquatic species; and
- A source of organic matter for nutrient cycling within the estuary habitat.

Nutrient cycling occurs when mineral bearing rocks or organic matter (i.e. from decomposing plants or animals) is broken down and absorbed by the soil. These nutrients are then made available to growing plants and subsequently animals, thus continuing the cycle. The removal of seagrass and macroalgae is likely to reduce the level of nutrient cycling, which could result in degraded water and soil quality in and around the marina footprint (CRC Reef Research Centre, 2004).

Seagrass and macroalgae communities are estimated to provide a total ecosystem value, adjusted to 2007 dollar terms (refer Appendix D), of approximately $35,000 per hectare per year (Costanza, 1997).

Following dredging, water depths in the marina basin are expected to be too great to support significant communities of seagrasses and macroalgae (FRC Environmental, 2007), meaning this habitat will be lost permanently.

Removal of Mangroves
Reclamation and alteration of the shoreline is expected to result in the removal of approximately 1.84 hectares of mangroves located along the southern side of Shute Harbour road fronting the development site. Mangroves play an important role in the overall ecosystem function of Shute Bay in terms of:

- Habitat and nursery for a number of aquatic species;

- Nutrient cycling; and
- Erosion prevention.

The removal of mangroves and topsoil is likely to increase the risk of erosion and sedimentation from rainfall, overland flow and wind action/wave action. An increase in erosion and sedimentation may have an adverse effect on coastal water quality and associated seabed flora and fauna through a smothering effect within the marina basin and a decrease in flushing and intermixing from fresh water with marine waters in the project area.

Mangrove communities are estimated to provide a total ecosystem value of approximately $17,190 per hectare per year (Costanza, 1997 – refer Appendix D). These mangrove communities will be lost permanently following development of the land based aspects of SHMD.

Removal of Coral Communities

There are 10 coral communities identified within the marina basin that are expected to be permanently removed as a result of dredging. The removal of these communities will impact on the overall ecosystem function of Shute Bay. Coral communities are estimated to provide a total ecosystem value of approximately $5,650 per hectare per year (Costanza, 1997 – refer Appendix D). These coral communities are expected to be lost permanently following development of the marina.

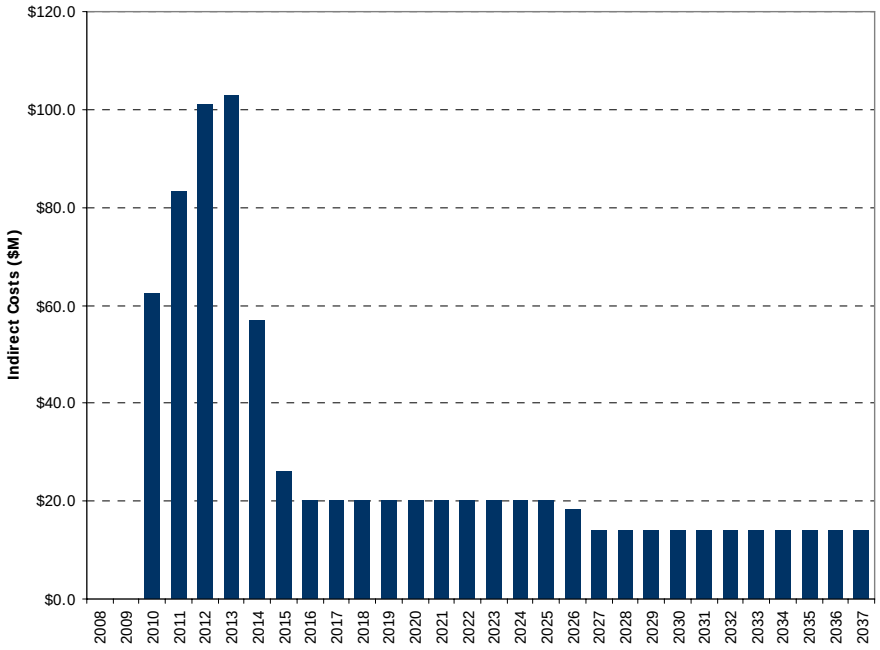
Unquantified Environmental Costs:

No indirect unquantified environmental costs have been identified for inclusion in the analysis.

Total Indirect Development Costs

Over the 30 years of analysis, indirect costs of the Shute Harbour Marina Development are expected to total approximately $805.6 million. The largest estimated annual cost of approximately $103.0 million is anticipated to occur in 2013. The following figure summarises the flow of indirect costs associated with the proposed Shute Harbour Marina Development.

Figure 5.3. Indirect Costs of the Shute Harbour Marina Development ($M2007)



Sources: AEC*group*.

The majority of indirect costs are incurred in the early stages of the project and are due to secondary stage development expenditure.

Over the period of the analysis, total indirect costs are estimated to be $805.6 million, which has a present value of $483.1 million (discount rate 6%).

5.2.2 Indirect Development Benefits

Economic

Quantified Economic Benefits:

Revenue to Secondary Developers from Sale of Managed Resort Accommodation
Secondary developers are expected to sell the Managed Resort Accommodation to third parties following the completion of construction. Based on market rates it is assumed that an average margin of between 12.0% and 17.5% would be achieved by secondary developers through the sale of Managed Resort Accommodation (an average of 15.0% is used in the analysis).

With a cost to secondary developers of purchasing the land $202.5 million) and construction ($104.5 million), the total gross revenue received by secondary developers from the sale of Managed Resort Accommodation is estimated to be $353.0 million. Sales are assumed to occur in the same year as completion of construction of the Managed Resort Accommodation.

Increased Business Activity at SHMD
It is anticipated that the operating aspects of the development that will be managed by secondary parties (which includes all of the land based developments) would begin trading on completion of the primary construction phase. It is recognised the land based aspects of the development will not be fully operational on day one of operation and will take some time to reach full operational capacity. This assessment assumes that the land based aspects of the SHMD will ramp up to full operational capacity over a five year period following the completion of the development.

The annual operating output from the land based aspects once in steady state is outlined in the table below. In total, the land based aspects are expected to generate approximately $46.6 million in turnover per annum for secondary investors. However, for the purposes of this analysis, only the value added component of this output has been used to take into consideration the operating costs associated with the operation of the facilities. In the analysis, the additional business activity generated by the land based aspects of the development is estimated to be approximately $21.7 million per annum once in steady state operation.

Table 5.7. Operating Output of Charter Boat Base and Marina ($M 2007)

SHMD Element	Annual Output ($M)	Value Add ($M)
Hotel Accommodation	$11.7	$5.6
Managed Resort Accommodation	$26.2	$12.4
Commercial	$5.9	$2.4
Retail	$2.8	$1.4
Total	**$46.6**	**$21.7**

Source: AEC*group* (2008a).

Increased Business Activity Outside of SHMD
In addition to expenditure undertaken at SHMD, visitors to and users of SHMD are expected to undertake expenditure on goods and services in the wider region, in particular in the surrounding service area of Airlie Beach, Cannonvale, Flametree and Jubilee Pocket.

In addition to expenditure undertaken at SHMD (above), visitors would also be expected to undertake expenditure on goods and services in the wider region, in particular in the surrounding service centre. It is estimated that the average expenditure per visitor per day will be approximately $175 (AEC*group*, 2008a). This level of expenditure is estimated to result in additional output of $15.1 million per annum for businesses located in the

surrounding service centre, with a value add component of $7.6 million (the value added component is incorporated into the analysis to ensure impacts are not overstated).

Unquantified Economic Benefits:

Appreciation of Property Values

The Shute Harbour Marina Development includes the development of recreational and leisure based services and facilities including marina berths, a charter boat base, a sailing club, retail space, restaurants, a tourist resort and parkland areas. The availability of these services and facilities in Shute Harbour (e.g., having the ability to purchase basic supplies such as bread and milk, or pursue activities such as going to cafés/ restaurants) has the potential to increase property values in the immediate area of Shute Harbour and Shutehaven.

Enhanced Networking and Linkages in the Marine Sector

The marine sector is a high value industry with the potential to sustain a substantial support services network including businesses with direct marine connections such as marine transport operators, marine engineering, boat manufacture and repair services, a service sector including clothing and equipment sales and administrative, financial and management functions (Queensland Department of State Development, 2007).

The development of SHMD in close proximity to the existing transit terminal and salvage operation will provide opportunities for enhanced networking and linkages within the local and regional marine sector. Potential benefits from enhanced networks and linkages include (Berk & Associates, 2007):

- Facilitating the creation of business to business networks and co-operation;
- Enhanced business and industry productivity through increased access to specialised suppliers, skills, and information;
- Improved targeting and impact of marketing activities;
- Increased industry efficiency through improved industry coordination and collaboration; and
- Other supply chain synergies between companies (for example between boat repair and marine transport operators).

Increased Business Confidence (Investment Attraction)

The development of the SHMD is expected to provide a significant boost to regional business confidence and increase the attractiveness of the area to new business investment. The development is expected to result in an increase in economic activity within the local area and surrounding service centre, which provides an incentive for business investors to invest in the regional economy. As the number of businesses expending or locating to the region increases additional opportunities to leverage business to business transactions and networking would become apparent, further increasing economic activity within the region.

Tourism Support

The SHMD is primarily targeted towards the tourism market, and is focused on providing visitors access to water and aquatic based activities in the region. A recently conducted Economic Baseline Audit of the Mackay region (AEC*group*, 2007) identified transport and infrastructure linkages between water and land based tourism activities often constrain the expansion of the tourism sector.

SHMD will provide a first class facility that enables easy linkages between land and water based activities, which is in line with the state government priorities outlined in the Living the Queensland Lifestyle (Queensland Government, 2006) document for encouraging and facilitating participation in boating leisure activities. There are significant opportunities to create high value tourism services around the development with significant flow on benefits for other tourist attractions in the region.

There is also a significant shortage of appropriate berthing facilities in the Mackay SD (Pacific Southwest Strategy Group, 2006a), with a total capacity of 1,384 wet berths

available at six marina / marine precincts. Registration of boats requiring mooring or berths for storage (typically those greater than 8 metres in length) in Queensland has been growing at approximately 7.1% per annum since 2002 and this rapid growth is expected to continue in coming years. Boat registration has been growing at a faster rate in the Mackay SD than in Queensland, and is anticipated to result in a lack of capacity of approximately 1,313 berths by 2020 (Pacific Southwest Strategy Group, 2006a). This increases the risks of boat owners mooring their vessels inappropriately with associated environmental and health and safety risks.

The marina, tourist resort and managed resort accommodation are expected to be popular with local residents and visitors from outside of the region given the rapidly expanding Whitsunday Coast tourism market and high demand for water based activities in the Whitsundays. The proposed 4½ star hotel and managed resort accommodation is expected to attract high value customers given the high quality of the accommodation and ancillary facilities such as the marina, boardwalk and parkland area.

Social

Quantified Social Benefits:

Increased Amenity from Lease of Marina Berths

Third parties leasing the marina berths are expected to derive some recreational and amenity benefits from the access to and use of the marina and land-based aspects of the development, as well as the knowledge of a 'safe' berth in rough weather. At a minimum, this social amenity value is expected to be equivalent to the cost associated with leasing a marina berth ($12,000 per lineal metre, with a total value of approximately $142.3 million).

Increased Mangrove Habitat Along Western Fringe (Recreational Value)

Currently, mangrove communities are established along the coast line of the development site and adjacent areas. Mangroves spread rapidly in unvegetated, wetland areas, and at the tree line have been found to progress at a rate of up to approximately 50 metres per annum (Panapitukkula *et al*, 1998).

The Shute Harbour Marina Development will include reclamation of land currently under water for development of the Managed Resort Accommodation and parkland along the western side of the development site. Consultation with FRC Environmental (authors of the Aquatic Ecology Report for the SHMD) suggests that mangrove communities may colonise along approximately 0.93 hectares of the western fringe (the non-marina side) of the parkland area, spreading at a rate of approximately 50 metres per annum.

This mangrove habitat will be accessible to the public via the parkland area and will provide some recreational value. Costanza (1997) estimates that mangrove communities provide recreational value of approximately $1,210 per hectare per year (refer Appendix D).

Maintenance of Great Barrier Reef World Heritage Area

As part of the development the proponent will develop a "Reef Conservation Fund" to be operated as a charitable fund with the funds administered by the Great Barrier Reef Marina Park Authority, and will be funded from the sale of the marina berths. An initial contribution will be provided by the proponent following the settlement of each marina berth totalling approximately $1 million, with an ongoing contribution of approximately $150,000 per annum from leaseholders.

The Great Barrier Reef Marina Park Authority is expected to use this fund to develop environmentally friendly "EzyRider" swing moorings[3] that would provide easy access to the Great Barrier Reef World Heritage Area while allowing boaters to safely moor their boat away from environmentally sensitive sites. The EzyRider swing mooring system is a low-impact, strong swing mooring that minimises the environmental impact to soft bottom and benthic communities by lifting the chain off the seabed, thereby stopping

[3] As outlined previously, part of this funding is expected to be allocated to developing and interpretative centre to be co-located with the charter boat transit centre. However, this disaggregation has not been identified, and for the purposes of this assessment the analysis assumes that 100% is allocated to the development of EzyRider moorings.

damage caused by chain dragging as occurs from traditional swing moorings or from anchoring boats. The estimated cost of developing EzyRider swing moorings is approximately $15,000 per mooring. Based on an initial investment of $1 million dollars and an ongoing investment of $150,000, this equates to approximately 66 swing moorings from the initial investment (assumed to be developed in line with the release of marina berths between 2010 and 2026) with additional swing moorings developed on an annual basis from ongoing contributions, ramping up to 6 additional moorings per year once all berths are leased.

Currently, a large number of boat users visiting the Great Barrier Reef drop anchor overnight in the marine park. This is partly due to a limited number of moorings available within easy access of the reefs. Anchoring within the reef area can cause damage to soft bottom and benthic communities over the extent of the anchor and chain drag area, including coral, seagrass and macroalgae (Francour *et. al.*, 1999). The area potentially damaged by anchoring is conservatively estimated to be equivalent to the area a traditional swing mooring chain would disturb (approximately $30m^2$).

The development of swing moorings will enable these boats that currently drop anchor overnight to safely moor their boat without damaging the environmentally sensitive areas and assist in preserving soft bottom and benthic communities in these areas within the Great Barrier Reef World Heritage Area. It is estimated that these moorings would be approximately 90% utilised throughout the year. This equates to an overall area preserved by the use of an EzyRider swing mooring of approximately 0.49 hectares per mooring ($30m^2$ x 365 days x 90% occupancy).

The preservation of coral communities within the Great Barrier Reef will assist in maintaining the recreational value of the reef for visitors. Coral reefs are estimated to provide recreational value of approximately $5,540 per hectare per year (Costanza, 1997 – refer Appendix D).

Unquantified Social Benefits:

Improved Access to Areas for Recreational and Leisure Activity

The SHMD incorporates the development of a number of recreational and leisure based activities and facilities, including marina berths, a charter boat base, retail, café and restaurant precincts, open space and recreational infrastructure (boardwalk, parkland, etc.), as well as provision of a new four lane boat ramp (separate to this development).

The current government election promise outlined in the Living the Queensland Lifestyle (Queensland Government, 2006) document highlights a policy to encourage…

"…Queenslanders to live a more relaxed, more healthy and less stressful outdoors lifestyle, to reconnect with family and nature."

The Living the Queensland Lifestyle (Queensland Government, 2006) document goes on to highlight the key components encouraged by the current government to include:

- Greater participation in recreational fishing and boating;
- Develop, upgrade and maintain boat ramps;
- Coordination of regional outdoor recreation; and
- Increased numbers of walking trails for locals and visitors;

The proposed SHMD facilitates each of the above factors, highlighting the SHMD's alignment with the broader lifestyle priorities of the State Government. With respect to encouraging boating, the Living the Queensland Lifestyle (Queensland Government, 2006) document outlines upgraded recreational boating facilities and infrastructure as being required, particularly in response to the anticipated increase in boat registrations in Queensland (approximately 5.0% annually). With boat registrations increasing at an even faster rate in the Mackay SD, this highlights the importance of delivering additional places to berth and/ or moor a boat in the region to maintain and enhance access to water based recreational and leisure activities.

Enhancement of Community Interaction and Cohesion

SHMD will provide additional facilities and meeting places in Shute Harbour and the surrounding service centre that may enhance community interaction, including retail, café and restaurant precincts and open space such as a boardwalk and parkland area. Use of these facilities by the community has the potential to enhance community cohesion, interaction, vitality, wellbeing and prosperity.

SHMD is also expected to enhance community interaction and cohesion in local Indigenous communities. The *Overcoming Indigenous Disadvantage: Key Indicators Report 2007* (Council of Australian Governments, 2007) focuses on the disadvantage experienced by many Indigenous people, arising from historical, social and economic causes. The vision outlined in this report is that Indigenous people will one day enjoy the same opportunities as other Australians, together with a strong cultural identity. The information presented in the report provides policy makers with a broad view of the current state of Indigenous disadvantage and where things need to change if the report's vision is to be achieved.

The *Overcoming Indigenous Disadvantage: Key Indicators Report 2007* (Council of Australian Governments, 2007) identifies the intrinsic role developers, extraction companies and the corporate sector can play in contributing to these objectives.

The CHMP and associated report conducted as part of the EIS detailing the process by which it was achieved (Shute Harbour Marina Development, 2008) has used the guiding principles and rationale of the *Overcoming Indigenous Disadvantage: Key Indicators Report 2007* (Council of Australian Governments, 2007) to explore the determinants of net social benefit, which are aligned to the proposed Shute Harbour Marina Development and the Aspirations initiatives agreed to in the Cultural Heritage Management Agreement (CHMA).

While the SHMD does not address all indicators of disadvantage for Gia and Ngaro/Gia communities, it is closely aligned to three of the four headline indicators. This alignment is demonstrated through the potential positive impact on Gia and Ngaro peoples through the opportunity to:

- Participate in and share economic prosperity and cultural tourism opportunities;
- Support the intrinsic benefits of governance and culture in community capacity building;
- Maintain generational celebration and learning of cultural heritage traditions, language and expression;
- Contribute to functional and resilient families and communities; and
- Provide generational 'care for country', while showcasing Indigenous pride and knowledge to local, regional and international tourists.

It is therefore strongly asserted that the CHMA will contribute to positive long term outcomes for at least two Indigenous peoples – the Gia and Ngaro communities – at a local community level.

Additional Employment Opportunities

The primary construction phase of the SHMD is anticipated to result in additional labour demand of approximately 78 FTE workers on average, with a peak of 192 positions. Current skill availability in the surrounding and broader service areas and the implementation of education, training and skills development programs is expected to enable approximately 50% (39 average, 96 peak) of the labour requirement to be sourced from within the surrounding service centre, with the remainder needing to be attracted to meet labour requirements.

The majority of the labour requirement for the secondary construction phase (total of 358 FTE over a four year period) is expected to be sourced from existing local residential and accommodation construction companies and represent a continuation of work for these companies and employees.

During operation, a total of 142 FTE positions are anticipated to be created, with 75% (106) of these anticipated to be filled using local labour. The remaining 36 employment positions are anticipated to need to be filled from outside the surrounding service centre. These are anticipated to be filled from within Queensland.

Additional employment positions are also expected to be generated as a result of additional expenditure and business activity outside of SHMD itself.

Environmental

Quantified Environmental Benefits:

Increased Habitat from Development of Breakwater

The fixed breakwater component of the marina development will provide 1.8 kilometres of habitat capable of accommodating different aquatic species, such as mangrove jack, a common sport fish species in the region (FRC Environmental, 2007). The breakwater is expected to be completed and providing additional habitat in the 41st week of construction. The value of this habitat is assumed to be equivalent to the existing habitat in the marina basin (primarily mangroves, seagrass and macroalgae), which is estimated to have a habitat value of approximately $240 per hectare per year (Costanza, 1997 – refer Appendix D).

Reestablishment of Seagrass from the Removal of Existing Swing Moorings

The proposed marina and access channel will necessitate the removal of approximately 57 swing-moorings. These moorings currently impact on the seabed through chronic physical disturbance caused by chain dragging as the vessel responds to changing winds and tides. The removal of swing moorings will enable approximately 950m^2 of seagrass to re-establish following the completion of the marina development in 2011 (FRC Environmental, 2007), allowing a more stable and productive benthic community to develop.

Seagrass is estimated to have a total ecosystem value of approximately $35,000 per hectare per year (Costanza, 1997 – refer Appendix D).

Increased Mangrove Habitat Along Western Fringe (Ecosystem Services Value)

As outlined in the indirect social benefits above, the Shute Harbour Marina Development will include reclamation of approximately 0.93 hectares of land along the western side of the development site that is expected to be colonised by mangrove communities.

This mangrove habitat will provide some ecosystem value, in particular in terms of increased habitat for aquatic species, increased organic matter for nutrient cycling and erosion prevention. Costanza (1997) estimates that the total ecosystem value of mangrove communities is approximately $17,190 per hectare per year (refer Appendix D).

Maintenance of Great Barrier Reef World Heritage Area

As outlined in the indirect social benefits above, the proponent will develop a “Reef Conservation Fund” to be operated as a charitable fund with funds administered by the Great Barrier Reef Marina Park Authority, which will be used for the development of environmentally friendly swing moorings away from environmentally sensitive sites. These swing moorings are expected to be used by boaters that would otherwise drop anchor overnight, potentially causing significant damage to soft bottom and benthic communities, such as seagrass and coral reefs (Francour *et. al.*, 1999).

The preservation of these areas will assist in maintaining key ecosystem functions such as habitat for aquatic species, food production and providing organic matter for nutrient cycling (CRC Reef Research Centre, 2004).

Given the dispersal patterns of seagrass, coral reefs and other benthic communities in the Great Barrier Reef, it is unlikely that every anchor drop would damage each community. As such, it is assumed that an average ecosystem value per hectare for seagrass and coral would be more applicable in the analysis. Based on per hectare ecosystem values of seagrass ($35,000) and coral ($5,650) from Costanza (1997 – refer

Appendix D), the average ecosystem value per hectare of the Great Barrier Reef is estimated to be approximately $20,320 per hectare per year.

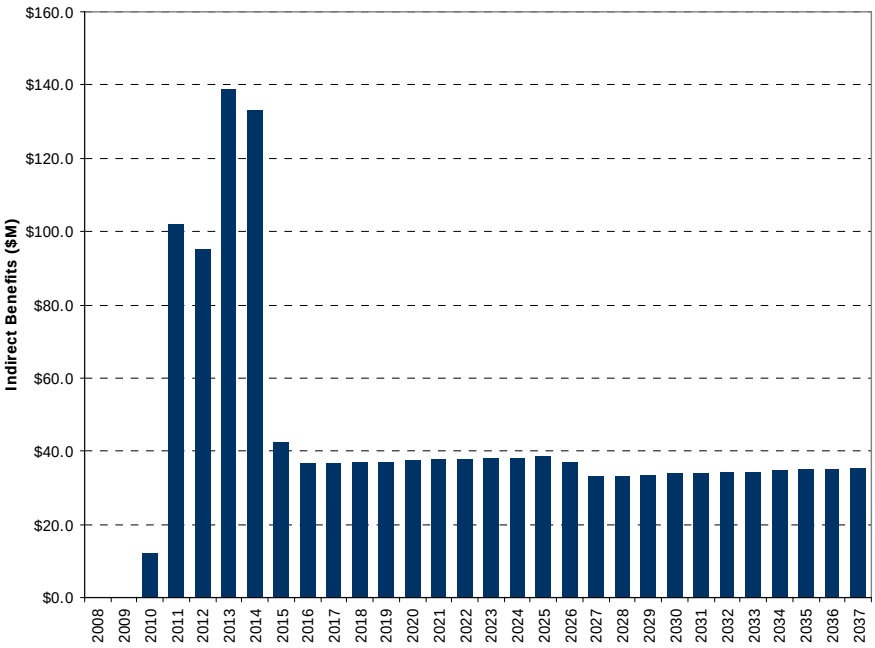
Unquantified Environmental Benefits:

No indirect unquantifiable environmental benefits have been identified for inclusion in the analysis.

Total Indirect Development Benefits

Indirect benefits of $1.31 billion are anticipated to be delivered by the Shute Harbour Marina Development over the 30 year horizon of the analysis, with a maximum annual benefit of $139.2 million in year 2013. The following figure summarises the flow of indirect benefits associated with the proposed development.

Figure 5.4. Indirect Benefits of the Shute Harbour Marina Development ($M2007)



Sources: AEC*group*.

Over the period of the analysis, total indirect benefits are estimated to be $1.31 billion, which has a present value of $688.7 million (discount rate 6%) over the period of the analysis.

5.2.3 NPV of Indirect Impacts

The net present value of the indirect impacts of the Shute Harbour Marina is calculated by subtracting the present value of the indirect costs from the present value of the indirect benefits.

Table 5.8. Indirect NPV & BCR of the Shute Harbour Marina Development ($2007)

Real Discount Rate	PV of Indirect Benefits ($M)	PV of Indirect Costs ($M)	Indirect Net Present Value ($M)	BCR
Economic				
5%	$625.5	$494.9	$130.6	1.26
6%	$570.6	$461.4	$109.2	1.24
7%	$523.3	$431.9	$91.4	1.21
10%	$414.3	$361.0	$53.2	1.15
Social				
5%	$101.1	$0.0	$101.1	N/a
6%	$94.0	$0.0	$94.0	N/a
7%	$87.7	$0.0	$87.7	N/a
10%	$72.3	$0.0	$72.3	N/a
Environmental				
5%	$28.5	$24.3	$4.2	1.17
6%	$24.0	$21.6	$2.4	1.11
7%	$20.4	$19.4	$1.0	1.05
10%	$12.9	$14.4	-$1.5	0.89
Total				
5%	$755.0	$519.3	$235.8	1.45
6%	$688.7	$483.1	$205.6	1.43
7%	$631.4	$451.3	$180.1	1.40
10%	$499.4	$375.4	$124.0	1.33

Source: AEC*group*

The net present value of the indirect impacts of the Shute Harbour Marina is estimated to be $205.6 million over the next 30 years (discount rate of 6.0%), and has a benefit to cost ratio of 1.43. The project is anticipated to provide a net indirect benefit across all aspects across the triple bottom line (economic, social and environmental).

5.3 CBA Results

The CBA assessment found that development of the Shute Harbour Marina is expected to deliver a total **positive net state benefit** (the sum of all benefits and costs incurred by both the proponent and external stakeholders) of $299.4 million in present value terms (NPV), with present value of benefits of $984.5 million and a present value of costs of $685.3 million. Overall, the development provides a benefit cost ratio (BCR) of 1.44 (i.e. returns $1.44 for every dollar spent in delivery of the project).

The project provides a positive:

- **Direct net benefit** (i.e. to the proponent) in present value terms of $93.6 million with a BCR of 1.46 and
- **Indirect net benefit** (i.e. to stakeholders other then the proponent) in present value terms of $205.6 million with a BCR of 1.43.

Table 5.9. Quantitative CBA Summary

Impact	PV of Benefits ($M)	PV of Costs ($M)	Net Present Value ($M)	BCR
Direct Impacts	$295.8	$202.2	$93.6	1.46
Indirect Impacts	$688.7	$483.1	$205.6	1.43
Total Impacts	**$984.5**	**$685.3**	**$299.2**	**1.44**

Source: AEC*group*

The following table outlines the impact that an increase or decrease in the discount rates used would have on overall project NPV. In the base scenario (shaded grey in the table below) the NPV of the project, including both the direct and indirect components, is estimated to be $299.2 million and a BCR of 1.44. The table shows that for discount rates for direct impacts between 8% and 12% and for indirect impacts between 5% and 7% the NPV of the project varies between $255.6 million and $351.6 million.

Table 5.10. NPV & BCR of the Shute Harbour Marina Development ($2007)

Real Discount Rate	PV of Benefits ($M)	PV of Costs ($M)	Net Present Value ($M)	BCR
Economic				
Direct @ 8% & Indirect @ 5%	$952.3	$705.9	$246.3	1.35
Direct @ 10% & Indirect @ 6%	$866.5	$663.6	$202.8	1.31
Direct @ 12% & Indirect @ 7%	$792.8	$626.0	$166.9	1.27
Social				
Direct @ 8% & Indirect @ 5%	$101.1	$0.0	$101.1	N/a
Direct @ 10% & Indirect @ 6%	$94.0	$0.0	$94.0	N/a
Direct @ 12% & Indirect @ 7%	$87.7	$0.0	$87.7	N/a
Environmental				
Direct @ 8% & Indirect @ 5%	$28.5	$24.3	$4.2	1.17
Direct @ 10% & Indirect @ 6%	$24.0	$21.6	$2.4	1.11
Direct @ 12% & Indirect @ 7%	$20.4	$19.4	$1.0	1.05
Total				
Direct @ 8% & Indirect @ 5%	$1,081.8	$730.2	$351.6	1.48
Direct @ 10% & Indirect @ 6%	$984.5	$685.3	$299.2	1.44
Direct @ 12% & Indirect @ 7%	$900.9	$645.3	$255.6	1.40

Source: AEC*group*

5.4 Sensitivity Analysis

In conducting this sensitivity analysis, a range of magnitudes for key inputs have been modelled to determine the sensitivity of the project outcomes to the inputs driving these results. The key inputs that have been tested are outlined in the table below, as well as the value(s) used in the base scenario examined above.

To ensure a conservative approach, the assessment as focussed on the 'down-side' rather than the 'up-side' when testing the variables in the sensitivity analysis.

Table 5.11. Inputs Tested Using Sensitivity Analysis

Input	Value in Base Scenario
Construction Cost of SHMD	$253.4 million
Sale Price of Marina Berth Leases	$12,000 per lineal metre
Sale Price of Land to Secondary Developers (per lot)	$2.5 million for waterfront $700,000 for land based
Value Added Business Activity from Operation of SHMD [(a)]	$33.15 million
Total Sale Revenue of Serviced Apartments in the Hotel and Retail and Commercial Space	$86.7 million
Margin Received by Secondary Developers from Sale of MRA	15%
Contribution to the Reef Conservation Fund	$1.0 million initial $150,000 ongoing
Area of Seagrass and Coral Reef Preserved per EzyRider Swing Mooring installed	0.49 hectares
Increased Mangrove Habitat Along Western Fringe	0.93 hectares
Contribution to the Boat Ramp	$2.5 million

Note: (a) This includes operation of the marina, charter boat base, hotel, managed resort accommodation, commercial and retail space, as well as additional business activity elsewhere in the region.
Source: AEC*group*.

Sensitivity assessment of key inputs has been conducted at discount rates of 10.0% for direct impacts and 6.0% for indirect impacts. Findings from the sensitivity assessment are provided in the sub-sections below.

Construction Cost of SHMD

The total cost of constructing the SHMD is estimated to be $253.4 million, comprising:

- $4.0 million in approvals;
- $171.9 million in land-based developments;

- $72.5 million in marina and related facility development; and
- $5.0 million in ancillary costs.

Sensitivity analysis was conducted for construction costs of the SHMD ranging from 75% ($190.0 million) and 200% ($506.7 million) of total estimated development costs. The table below outlines the findings of the sensitivity analysis. As can be seen, even where the costs of constructing the SHMD are double the anticipated construction costs, the project is expected to result in a considerable net benefit to the State, with an NPV of $101.51 million and a BCR of 1.11. All aspects of the triple bottom line achieve a positive net result across all ranges of construction costs, although at a cost of $506.7 million (200%) the net economic benefit is only marginally positive.

Given that the project returns a positive net benefit even at double the anticipated construction costs, any discrepancies between the actual construction costs of the SHMD and the estimates used in the assessment are not considered to significantly alter the findings of the analysis.

Table 5.12. Sensitivity Analysis of Construction Costs of SHMD

% Change from Base Scenario	Total Development Cost ($M)	PV of Benefits ($M)	PV of Costs ($M)	NPV ($M)	BCR	*NPV ($M) Economic*	*NPV ($M) Social*	*NPV ($M) Environmental*
75%	$190.0	$984.50	$635.86	$348.64	1.55	*$252.25*	*$94.03*	*$2.37*
90%	$228.0	$984.50	$665.52	$318.99	1.48	*$222.59*	*$94.03*	*$2.37*
100%	$253.4	$984.50	$685.29	$299.22	1.44	*$202.82*	*$94.03*	*$2.37*
110%	$278.7	$984.50	$705.06	$279.45	1.40	*$183.05*	*$94.03*	*$2.37*
125%	$316.7	$984.50	$734.71	$249.79	1.34	*$153.39*	*$94.03*	*$2.37*
150%	$380.0	$984.50	$784.14	$200.37	1.26	*$103.97*	*$94.03*	*$2.37*
200%	$506.7	$984.50	$882.99	$101.51	1.11	*$5.12*	*$94.03*	*$2.37*

Source: AEC*group*.

Sale Price of Marina Berth Leases

The proponent will sell long term leases to third parties for the 669 marina berths, charged on a linear metre basis. Approximately 11,859 lineal metres of marina berths will be leased at an estimated lease cost of approximately $12,000 per lineal metre.

Sensitivity analysis was conducted for the sale price of marina berths per lineal metre, with prices ranging from $6,000 per metre (50%) to $15,000 per metre (125%). Sensitivity analysis shows that even where the sales price per lineal metre is half that assumed in the base scenario, the project is expected to result in a considerable net benefit to the State, with an NPV of $263.92 million and a BCR of 1.41, with all aspects of the triple bottom line achieving a positive net result across all ranges of sales prices.

Given that the project returns a positive net benefit even at half of the anticipated marina berth sale price, any discrepancies between the actual sale price and the estimates used in the assessment are not considered to significantly alter the findings of the analysis.

Table 5.13. Sensitivity Analysis of Sale Price of Marina Berth Leases

% Change from Base Scenario	Sale Price per Lineal Metre ($)	PV of Benefits ($M)	PV of Costs ($M)	NPV ($M)	BCR	*NPV ($M) Economic*	*NPV ($M) Social*	*NPV ($M) Environmental*
50%	$6,000	$903.82	$639.90	$263.92	1.41	*$212.91*	*$48.64*	*$2.37*
75%	$9,000	$944.16	$662.59	$281.57	1.42	*$207.87*	*$71.34*	*$2.37*
90%	$10,800	$968.37	$676.21	$292.16	1.43	*$204.84*	*$84.95*	*$2.37*
100%	$12,000	$984.50	$685.29	$299.22	1.44	*$202.82*	*$94.03*	*$2.37*
110%	$13,200	$1,000.64	$694.36	$306.28	1.44	*$200.80*	*$103.11*	*$2.37*
125%	$15,000	$1,024.85	$707.98	$316.87	1.45	*$197.77*	*$116.72*	*$2.37*

Source: AEC*group*.

Sale Price of Land to Secondary Developers

The proponent will develop and sell land to secondary developers to construct the Managed Resort Accommodation Precinct. There will be 67 water front lots sold at an

estimated average price of $2.5 million and 50 land based lots sold at an estimated average price of $700,000.

Sensitivity analysis on land sales prices was conducted over ranges between 50% of expected sales price ($1.25 million waterfront and $350,000 land based) and 150% of estimated prices ($3.75 million waterfront and $1.05 million land based). Even where land sales prices are just 50% of the anticipated sales price used in the base assessment, the project is expected to result in a considerable net benefit to the State, with an NPV of $219.64 million and a BCR of 1.36. All aspects of the triple bottom line achieve a positive net result across all ranges of sales prices.

Given that the project returns a positive net benefit even at half of the anticipated land sales prices, any discrepancies between the actual sales prices and the estimates used in the assessment are not considered to significantly alter the findings of the analysis.

Table 5.14. Sensitivity Analysis of Sale Price of Land to Secondary Developers

% Change from Base Scenario	Sale Price (Water Front) ($)	Sale Price (Land Based) ($)	PV of Benefits ($M)	PV of Costs ($M)	NPV ($M)	BCR	*NPV ($M) Economic*	*NPV ($M) Social*	*NPV ($M) Environmental*
50%	$1,250,000	$350,000	$822.44	$602.79	$219.64	1.36	*$123.24*	*$94.03*	*$2.37*
75%	$1,875,000	$525,000	$903.47	$644.04	$259.43	1.40	*$163.03*	*$94.03*	*$2.37*
90%	$2,250,000	$630,000	$952.09	$668.79	$283.30	1.42	*$186.90*	*$94.03*	*$2.37*
100%	$2,500,000	$700,000	$984.50	$685.29	$299.22	1.44	*$202.82*	*$94.03*	*$2.37*
110%	$2,750,000	$770,000	$1,016.92	$701.78	$315.13	1.45	*$218.73*	*$94.03*	*$2.37*
125%	$3,125,000	$875,000	$1,065.54	$726.53	$339.01	1.47	*$242.61*	*$94.03*	*$2.37*
150%	$3,750,000	$1,050,000	$1,146.57	$767.78	$378.79	1.49	*$282.40*	*$94.03*	*$2.37*

Source: AEC*group*.

Value Added Business Activity from Operation of the SHMD

Once operational, the marina, charter boat base, hotel, managed resort accommodation, and commercial and retail areas will begin trading. Once in steady state, the SHMD is expected to generate approximately $69.3 million in additional turnover in the region (Shute Harbour and the surrounding service centre) per annum, with a value add of approximately $33.2 million per annum. The table below provides a breakdown of value add generated by each aspect of the SHMD, as well as additional business activity generated elsewhere in the region.

Table 5.15. Operating Output of Charter Boat Base and Marina ($M 2007)

SHMD Element	Value Add ($M)
Marina	$1.9
Charter Boat Base	$1.9
Hotel Accommodation	$5.6
Managed Resort Accommodation	$12.4
Commercial	$2.4
Retail	$1.4
Activity Elsewhere in the Region	$7.6
Total	**$33.2**

Source: AEC*group* (2008a).

Sensitivity analysis has been conducted on the additional business activity generated by the SHMD over ranges between 50% of expected total value add ($16.6 million) and 150% of estimated total value add ($49.7 million)[4].

Sensitivity analysis shows that even where the level of economic activity (measured as value added product) to the Queensland economy is just 50% of that estimated to occur, the project would still be expected to result in a net benefit to the State, with an NPV of $137.09 million and a BCR of 1.20.

[4] In assessing the net benefit to the State, a lower than expected level of value add could result due to a number of factors, such as lower business activity at the SHMD than anticipated, or the attraction of higher than anticipated business activity from elsewhere in Queensland.

As outlined in the table below, at a value add of additional business activity of $16.6 million (50%) the NPV of economic impacts is reduced to $40.69 million from $202.82 million in the base scenario. It is important to note, however, that the estimates for additional value added business activity used in the base scenario are conservative estimates and it is considered more likely that the actual value add business activity generated by the SHMD will be higher than that used in the base scenario rather than lower. If additional business activity were to be 50% higher than the estimated level used in the base scenario, the project could be expected to result in an NPV of economic impacts of $364.95 million (with total project NPV of $461.34 million), which is approximately 80% more than the net economic benefit of the project in the base scenario.

Given that the project returns a positive net benefit to the State even at half of the anticipated value added business activity, and combined with the expectation that the values used in the base scenario for each component of the SHMD are conservative estimates, any discrepancies between the actual additional business activity generated by the SHMD and the estimates used in the assessment are not considered to significantly alter the findings of the analysis.

Table 5.16. Sensitivity Analysis of Value Added Business Activity from Operation of the SHMD

% Change from Base Scenario	Value Add Business Activity ($M)	PV of Benefits ($M)	PV of Costs ($M)	NPV ($M)	BCR	*NPV ($M) Economic*	*NPV ($M) Social*	*NPV ($M) Environmental*
50%	$16.6	$822.38	$685.29	$137.09	1.20	*$40.69*	*$94.03*	*$2.37*
75%	$24.9	$903.44	$685.29	$218.15	1.32	*$121.76*	*$94.03*	*$2.37*
90%	$29.8	$952.08	$685.29	$266.79	1.39	*$170.39*	*$94.03*	*$2.37*
100%	$33.2	$984.50	$685.29	$299.22	1.44	*$202.82*	*$94.03*	*$2.37*
110%	$36.5	$1,016.93	$685.29	$331.64	1.48	*$235.24*	*$94.03*	*$2.37*
125%	$41.4	$1,065.57	$685.29	$380.28	1.55	*$283.88*	*$94.03*	*$2.37*
150%	$49.7	$1,146.63	$685.29	$461.34	1.67	*$364.95*	*$94.03*	*$2.37*

Source: AEC*group*.

Sale Price of Serviced Apartments in the Hotel and Retail and Commercial Space

The proponent will develop and sell 109 serviced apartments in the hotel as well as 2,000m^2 of retail and commercial space. The serviced apartments are estimated to be sold at an average price of $795,000, while retail and commercial space is estimated to be sold at a price of approximately $4,000 per square metre.

Sensitivity analysis on serviced apartment and retail/ commercial space sales prices was conducted over ranges between 50% of expected sales price ($397,500 per serviced apartment on average and $2,000/m^2 retail and commercial space) and 150% of estimated prices ($1.19 million per serviced apartment on average and $6,000/m^2 retail and commercial space). Even where sales prices are just 50% of the anticipated sales price used in the base assessment, the project is expected to result in a considerable net benefit to the State, with an NPV of $271.64 million and a BCR of 1.40. All aspects of the triple bottom line achieve a positive net result across all ranges of sales prices.

Given that the project returns a positive net benefit even at half of the anticipated sales prices for serviced apartments and retail/ commercial space, any discrepancies between the actual sales prices and the estimates used in the assessment are not considered to significantly alter the findings of the analysis.

Table 5.17. Sensitivity Analysis of Sale Price of Serviced Apartments and Retail/ Commercial Space

% Change From Base Scenario	Sale Price (Serviced Apartments) ($)	Sale Price (Retail/ Commercial Space) ($ / sqm)	PV of Benefits ($M)	PV of Costs ($M)	NPV ($M)	BCR	*NPV ($M) Economic*	*NPV ($M) Social*	*NPV ($M) Environmental*
50%	$397,500	$2,000	$956.93	$685.29	$271.64	1.40	*$175.24*	*$94.03*	*$2.37*
75%	$596,250	$3,000	$970.72	$685.29	$285.43	1.42	*$189.03*	*$94.03*	*$2.37*
90%	$715,500	$3,600	$978.99	$685.29	$293.70	1.43	*$197.30*	*$94.03*	*$2.37*
100%	$795,000	$4,000	$984.50	$685.29	$299.22	1.44	*$202.82*	*$94.03*	*$2.37*
110%	$874,500	$4,400	$990.02	$685.29	$304.73	1.44	*$208.33*	*$94.03*	*$2.37*
125%	$993,750	$5,000	$998.29	$685.29	$313.01	1.46	*$216.61*	*$94.03*	*$2.37*
150%	$1,192,500	$6,000	$1,012.08	$685.29	$326.79	1.48	*$230.40*	*$94.03*	*$2.37*

Source: AEC*group*.

Margin Received by Secondary Developers from Sale of Managed Resort Accommodation

Secondary developers are expected to sell the Managed Resort Accommodation to third parties following the completion of construction with an average margin of between 12.0% and 17.5% (average of 15.0% used in the base scenario).

Sensitivity analysis on the margin received was conducted over ranges between 5.0% and 20.0%. Even where the margin received is just 5.0%, the project is expected to result in a considerable net benefit to the State, with an NPV of $275.62 million and a BCR of 1.40. However, the margin received is expected to be between 12.0% and 17.5%, which corresponds to an expected NPV of between $292.14 million and $305.12 million. All aspects of the triple bottom line achieve a positive net result across all ranges of margins.

Given that the project returns a positive net benefit even at half of the anticipated margin received by secondary developers from the sale of Managed Resort Accommodation, any discrepancies between the actual margin and the estimates used in the assessment are not considered to significantly alter the findings of the analysis.

Table 5.18. Sensitivity Analysis of Margin Received by Secondary Developers from Sale of MRA

Margin Received (%)	PV of Benefits ($M)	PV of Costs ($M)	NPV ($M)	BCR	*NPV ($M) Economic*	*NPV ($M) Social*	*NPV ($M) Environmental*
5.0%	$960.91	$685.29	$275.62	1.40	*$179.23*	*$94.03*	*$2.37*
10.0%	$972.71	$685.29	$287.42	1.42	*$191.02*	*$94.03*	*$2.37*
12.0%	$977.43	$685.29	$292.14	1.43	*$195.74*	*$94.03*	*$2.37*
13.5%	$980.96	$685.29	$295.68	1.43	*$199.28*	*$94.03*	*$2.37*
15.0%	$984.50	$685.29	$299.22	1.44	*$202.82*	*$94.03*	*$2.37*
17.5%	$990.40	$685.29	$305.12	1.45	*$208.72*	*$94.03*	*$2.37*
20.0%	$996.30	$685.29	$311.01	1.45	*$214.62*	*$94.03*	*$2.37*

Source: AEC*group*.

Contribution to the Reef Conservation Fund

As part of the development the proponent will develop a "Reef Conservation Fund" to be operated as a charitable fund with the funds administered by the Great Barrier Reef Marina Park Authority. The Reef Conservation Fund will be funded from the sale of leases for marina berths, with an initial contribution to be provided by the proponent upon the settlement of each marina berth totalling approximately $1 million and ongoing contributions from marina berth lessees of approximately $150,000 per annum.

This fund will contribute to the ongoing sustainability of the reef by providing environmentally friendly moorings on the reef that minimise disruption to benthic communities and provide space for boaters to safely moor their boat without damaging environmentally sensitive sites.

The table below outlines the sensitivity of the net benefit assessment to the contribution of the Reef Conservation Fund (in terms of overall project NPV) in with and without scenarios, as well as over a range of initial and ongoing contribution levels. The NPV of

any resultant combination of initial investment (rows) and ongoing payment (columns) can be read from the table below. For example, the scenario of no Reef Conservation Fund is identified by the combination of $0 initial payment in row one and $0 ongoing payment in column one. The base case of $1.0 million initial contribution and $150,000 ongoing contribution is shaded and in bold (NPV of $299.22 million).

As can be seen, even without the contribution from the Reef Conservation Fund, the project returns a highly positive NPV of $273.81 million.

Table 5.19. NPV ($M) of SHMD for Different Levels of Investment in the Reef Conservation Fund

Initial Payment \ Ongoing Payment	$0	$25,000	$50,000	$75,000	$100,000	$125,000	$150,000	$200,000
$0	$273.81	$274.95	$277.34	$279.90	$282.32	$284.64	$287.20	$292.33
$200,000	$275.16	$277.10	$279.45	$282.21	$284.47	$287.00	$289.52	$294.59
$400,000	$277.98	$279.74	$282.08	$284.77	$286.82	$289.52	$291.88	$296.71
$600,000	$279.61	$281.68	$284.27	$286.93	$289.27	$291.92	$294.66	$299.07
$800,000	$282.23	$284.20	$286.97	$289.13	$291.69	$294.03	$297.10	$301.43
$1,000,000	$283.86	$286.40	$289.10	$291.68	$293.93	$296.78	**$299.22**	$303.53
$1,250,000	$287.89	$289.75	$292.19	$294.94	$297.21	$299.74	$301.87	$307.33
$1,500,000	$290.77	$292.67	$295.07	$297.60	$299.76	$302.57	$305.33	$309.90

Note: The cell shaded grey with bold text represents the level of investment in the Reef Conservation Fund used in the base scenario.
Source: AEC*group*.

The table below outlines the present value of environmental benefits provided by the Reef Conservation Fund over the same range of initial and ongoing contributions. The table shows that in order for the SHMD to provide a net environmental benefit, contributions to the Reef Conservation Fund are required, and that an initial contribution of $1.0 million and ongoing contribution of $150,000 provides a net environmental benefit of over $2 million. Even where the initial contribution is reduced to $800,000, with ongoing contributions of $150,000 the project would return a net environmental benefit to the State. Similarly, where the ongoing contribution is reduced to $125,000 per annum, at an initial contribution of $1.0 million the project would still return a net environmental benefit to the State.

Table 5.20. PV ($M) of Environmental Benefits for Different Levels of Investment in the Reef Conservation Fund

Initial Payment \ Ongoing Payment	$0	$25,000	$50,000	$75,000	$100,000	$125,000	$150,000	$200,000
$0	$0.00	$1.17	$3.44	$5.86	$8.15	$10.36	$12.78	$17.63
$200,000	$1.27	$3.15	$5.39	$7.97	$10.13	$12.53	$14.91	$19.71
$400,000	$3.85	$5.56	$7.78	$10.32	$12.29	$14.83	$17.07	**$21.66**
$600,000	$5.37	$7.35	$9.80	$12.31	$14.53	$17.03	$19.61	**$23.82**
$800,000	$7.76	$9.66	$12.27	$14.33	$16.75	$18.97	**$21.84**	**$25.98**
$1,000,000	$9.28	$11.68	$14.23	$16.66	$18.81	*$21.48*	**$23.79**	**$27.92**
$1,250,000	$12.94	$14.74	$17.05	$19.64	**$21.80**	**$24.20**	**$26.23**	**$31.37**
$1,500,000	$15.58	$17.42	$19.69	**$22.09**	**$24.16**	**$26.79**	**$29.40**	**$33.74**

Note: Cells in red text represent levels of investment in the Reef Conservation Fund that result in a negative NPV of environmental impacts. Cells in blue italic text represent levels of investment in the Reef Conservation Fund that result in a positive NPV of environmental impacts when other environmental benefits of the SHMD are included in the assessment but in isolation do not result in a net benefit. Cells in green text represent levels of investment in the Reef Conservation Fund that provide a level of environmental benefits greater than the total environmental costs of SHMD independent of other environmental benefits of SHMD.
Source: AEC*group*.

Area of Seagrass and Coral Reef Preserved by an EzyRider Swing Mooring

The Reef Conservation Fund will be used to develop EzyRider swing moorings to reduce the level of impact on coral reefs and other benthic communities from boats dropping anchor. The area potentially preserved is estimated to be approximately 30m^2 per EzyRider mooring. It is estimated that these moorings would be approximately 90% utilised throughout the year, which equates to an overall area preserved by the use of an EzyRider swing mooring of approximately 0.49 hectares per mooring.

Sensitivity analysis on the area of seagrass and coral reef preserved by an EzyRider swing mooring was conducted over ranges between 50% of expected area (0.25 hectares) and 150% of estimated area (0.74 hectares). Where the area preserved is only

50% of the anticipated area used in the base assessment, the project still provides a considerable net benefit to the State, with an NPV of $285.70 million and a BCR of 1.42. However, sensitivity analysis shows that at an estimated preservation of 0.25 hectares per swing mooring, the present value of environmental benefits from using the EzyRider swing moorings would not be sufficient to offset the present value of environmental costs associated with the SHMD, with an NPV of environmental impacts of -$9.5 million.

Whilst this variable influences the net environmental position, given that the project returns a positive net benefit to the State even at half of the anticipated area of seagrass and coral reefs preserved by an EzyRider swing mooring, any discrepancies between the actual preserved area and the estimates used in the assessment are not considered to significantly alter the findings of the analysis.

Table 5.21. Sensitivity Analysis of Area of Seagrass/ Reef Preserved by an EzyRider Swing Mooring

% Change from Base Scenario	Area Preserved (Ha)	PV of Benefits ($M)	PV of Costs ($M)	NPV ($M)	BCR	*NPV ($M) Economic*	*NPV ($M) Social*	*NPV ($M) Environmental*
50%	0.25	$970.99	$685.29	$285.70	1.42	*$202.82*	*$92.41*	*-$9.53*
75%	0.37	$977.74	$685.29	$292.46	1.43	*$202.82*	*$93.22*	*-$3.58*
90%	0.44	$981.80	$685.29	$296.51	1.43	*$202.82*	*$93.71*	*-$0.01*
100%	0.49	$984.50	$685.29	$299.22	1.44	*$202.82*	*$94.03*	*$2.37*
110%	0.54	$987.21	$685.29	$301.92	1.44	*$202.82*	*$94.36*	*$4.75*
125%	0.62	$991.26	$685.29	$305.98	1.45	*$202.82*	*$94.84*	*$8.32*
150%	0.74	$998.02	$685.29	$312.74	1.46	*$202.82*	*$95.65*	*$14.26*

Source: AEC*group*.

Increased Mangrove Habitat Along Western Fringe

The SHMD will include reclamation of land under water for the development of land based aspects of the SHMD. Approximately 0.93 hectares of this reclaimed land along the western side of the development site is expected to be colonised by mangrove communities.

Sensitivity analysis has been conducted on the area along the western fringe that will be colonised by mangroves, with areas ranging from no colonisation (0% of area used in base scenario) to 0.93 hectares (100% of estimated area colonised in base scenario). Analysis shows that even where no colonisation of mangrove habitat occurs along the western fringe, the project NPV is reduced by approximately $180,000, which is relatively insignificant compared to the estimated total NPV of almost $300 million (i.e. less than 0.1% of total project NPV). As such, any discrepancies between the actual area colonised by mangroves and the estimates used in the assessment do not significantly alter the findings of the analysis.

Table 5.22. Sensitivity Analysis of Increased Mangrove Habitat Along the Western Fringe

% Change from Base Scenario	Area of Mangrove Habitat (Ha)	PV of Benefits ($M)	PV of Costs ($M)	NPV ($M)	BCR	*NPV ($M) Economic*	*NPV ($M) Social*	*NPV ($M) Environmental*
0%	0.00	$984.32	$685.29	$299.04	1.44	*$202.82*	*$94.02*	*$2.20*
50%	0.47	$984.42	$685.29	$299.13	1.44	*$202.82*	*$94.03*	*$2.29*
75%	0.70	$984.46	$685.29	$299.18	1.44	*$202.82*	*$94.03*	*$2.33*
90%	0.84	$984.49	$685.29	$299.20	1.44	*$202.82*	*$94.03*	*$2.35*
100%	0.93	$984.50	$685.29	$299.22	1.44	*$202.82*	*$94.03*	*$2.37*

Source: AEC*group*.

Contribution to the Boat Ramp

The proponent will contribute $2.5 million to the Whitsunday Shire Council as part of the SHMD for the development of a four lane boat ramp (separate to this project), the development of which will enhance access to water based recreational and leisure activities.

The contribution of $2.5 million by the proponent for the development of the boat ramp has been included in the base scenario, however, as the development of the boat ramp

will occur outside the marina footprint, a sensitivity analysis should be conducted to determine the sensitivity of the net benefit assessment to exclusion of the impacts of the boat ramp.

In the base scenario, the costs to Council for developing the boat ramp and the benefits received from enhanced access to water based recreational and leisure activities were not quantified, and as such have not been included in the CBA. These impacts would be excluded from the assessment of the net State benefit if the boat ramp is not included. The only impact quantified pertaining to the boat ramp is the $2.5 million contribution by the proponent.

As the costs to Council and benefits received by the community have not been quantified, assessment of the net benefit of the SHMD excluding the impacts of the boat ramp results in a reduction in expenditure by SHMD of $2.5 million, which provides an increase in the NPV of the SHMD from $299.2 million to $301.3 million.

6. Summary of Findings

6.1 Findings

The CBA assessment found that development of the Shute Harbour Marina is expected to deliver a total net benefit of $299.2 million in present value terms (NPV) at a discount rate of 10% for direct impacts (i.e. incurred by the proponent) and 6% for indirect impacts (i.e. to stakeholders other then the proponent), with present value of benefits of $984.5 million and a present value of costs of $685.3 million. Overall, the development provides a benefit cost ratio (BCR) of 1.44 (i.e. returns $1.44 for every dollar spent in delivery of the project).

The project provides a positive direct net benefit (i.e. to the proponent) in present value terms of $93.6 million with a BCR of 1.46. The project delivers a positive indirect net benefit (i.e. to stakeholders other then the proponent) in present value terms of $205.7 million with a BCR of 1.43.

All aspects across the triple bottom line (economic, social and environmental) are anticipated to record a net benefit as a result of the project.

It is anticipated that the overall net benefit is understated by these results as where possible a conservative approach has been applied. A number of economic and social benefits were unable to be quantified, with these benefits expected to outweigh the economic and social costs identified from the SHMD project that have not been able to be quantified, which further supports this assessment potentially understating the benefits delivered by the SHMD development.

Table 6.1. Quantitative CBA Summary

Impact	PV of Benefits ($M)	PV of Costs ($M)	Net Present Value ($M)	BCR
Economic				
Direct Impacts	$295.8	$202.2	$93.6	1.46
Indirect Impacts	$570.6	$461.4	$109.2	1.24
Total Impacts	**$866.5**	**$663.6**	**$202.8**	**1.31**
Social				
Direct Impacts	N/a	N/a	N/a	N/a
Indirect Impacts	$94.0	$0.0	$94.0	N/a
Total Impacts	**$94.0**	**$0.0**	**$94.0**	**N/a**
Environmental				
Direct Impacts	N/a	N/a	N/a	N/a
Indirect Impacts	$24.0	$21.6	$2.4	1.11
Total Impacts	**$24.0**	**$21.6**	**$2.4**	**1.11**
Total				
Direct Impacts	$295.8	$202.2	$93.6	1.46
Indirect Impacts	$688.7	$483.1	$205.6	1.43
Total Impacts	**$984.5**	**$685.3**	**$299.3**	**1.44**

Source: AEC*group*

From the outcomes of the net benefit assessment, it is clear that the direct, indirect and overall impacts of the project result in a clear benefit to the community.

6.2 Conclusion

The proposed SHMD development provides a positive net benefit to the State of Queensland with any costs associated with the project being outweighed by the total benefits provided. That is, the SHMD returns a positive net present value and a benefit cost ratio of above one. Indeed, the proposal provides a net benefit to the State in each of the categories of economic, social and environmental impacts.

The proposed SHMD is identified to provide a range of community, economic and environmental benefits including increased access and recreational space, employment and additional business activity across a range of industries. The proposed SHMD also contributes to a net, or overall improvement in the environmental conditions throughout the Whitsunday's, valued through the increase of ecosystem services values and recreational value of the natural attributes of the Great Barrier Reef maintained as a result of the development.

The proposed SHMD will assist Gia and Ngaro peoples through the opportunity to:

- Participate in and share economic prosperity and cultural tourism opportunities;
- Support the intrinsic benefits of governance and culture in community capacity building;
- Maintain generational celebration and learning of cultural heritage traditions, language and expression;
- Contribute to functional and resilient families and communities; and
- Provide generational 'care for country', while showcasing Indigenous pride and knowledge to local, regional and international tourists.

It is therefore strongly asserted that the Cultural Heritage Management Plan, now approved and registered by the Department of Natural Resources and Water, will contribute to positive long term outcomes for at least two Indigenous peoples – the Gia and Ngaro communities – at a local community level.

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Appendix A: Alignment With Regional Planning

The Shute Harbour Marina Development project's objectives align with a number of State and Local government planning and policy documents that provide key areas for action and focus to ensure the delivery of sustainable economic development that provides environmental, social and community benefits producing prosperous communities. The following section identifies the key priorities for each strategy and the relevant outcome delivered by the Shute Harbour Marina project for each.

Queensland Government Priorities

The Queensland Government Priorities have been identified by the Queensland Government to provide a directional approach to the development of policy and are outlined in the following table along with the synergies delivered by the Shute Harbour Marina development.

Table A.1. Alignment of Shute Harbour Marina with Queensland Government Priorities

Queensland Government Key Priorities	Delivered by Shute Harbour Development
Realising the *Smart State* (education, skills and innovation)	• **Increase employment opportunities in *Smart State* priority industries (marine & tourism sector):** Provision of a marina and tourism precinct will provide both mid term construction employment and long term marina and tourism employment opportunities in identified priority *Smart State* industries.
Protecting children and enhancing community safety	• **Emergency services and facilities:** Provision for a cyclone shelter (car-park) and water-based emergency service access (marina) to increase the safety standards for the community. • **The interpretative centre:** Will include operating and safety guidelines particularly relevant to sometimes relatively inexperienced charter boat users.
Managing urban growth and building Queensland's Regions	• **Regional job creation:** The site will cater to targeted increase in local and regional workforce. • **Marine industry:** Marine industry facilities and maintenance services in the surrounding service centre will support the marina and marine tourism operators.
Protecting the environment for a sustainable future	• **Sustainability:** Regulation of marine and industry practices with a 'clean and green' philosophy, including provision of a trust fund to assist in the management and maintenance of marine ecology. • **Improved management and education of recreational boaters:** The management and education of recreational boaters facilitated by the interpretative centre and education extension programs run by the marina is anticipated to assist in reducing potential detrimental impacts of recreational boaters on the reef by assisting locals, visitors and the recreational and commercial boating community to understand coastal processes and the marine environment and appropriate boating best practice. • **Rehabilitation and environmental management:** The proponent has developed a "Reef Conservation Fund" to be operated as a charitable fund and administered by the Great Barrier Reef Marine Park Authority. The Reef Conservation Fund will be funded from the sale of the marina berths, with an initial contribution, to be provided by the proponent upon the settlement of each marina berth, of approximately $1.0 million in total, and an ongoing contribution of approximately $150,000 per annum. This fund will contribute to the ongoing sustainability of the coral providing environmentally friendly moorings on the reef. Part of this funding is expected to be used for ongoing public education and awareness campaigns as part of cultural and marine interpretive centres. • **Sustainable construction and operation practices:** The marina resort buildings and facilities are to incorporate best practice sustainable construction techniques and the resort is to be run according to industry best practice.
Growing a diverse economy and creating jobs	• **Job creation and employment opportunity:** Direct and indirect flow on effects on employment with education and training opportunities to expand the skilled workforce base. • **Diversification, productivity and growth:** The development of retail, commercial and managed tourism accommodation, 4½ star hotel, and a large marina facility including charter boat hub has the ability to create a diverse community in Shute Harbour Bay with a high standard of productivity and economic growth. • **Increasing capacity of the marina market**: Increased supply of marina berths to the market that is currently undersupplied will help continue to meet the growing Queensland marine industry; • **Supporting Shute Harbour precinct:** Enhancement of the Shute Harbour Precinct's pivotal role in the Whitsundays will help support the long term growth of tourism in the region.

Source: Queensland Government Key Priorities (2006) & AEC*group*

Whitsunday Growth Management Initiative

The Whitsunday Growth Management Initiative was established to ensure a proactive response to rapid growth and development within the Whitsunday Shire (Department of Infrastructure and Planning, 2007). The Initiative was the product of a collaborative effort between the Queensland Government and the Whitsunday Shire Council, in the formation of the Whitsunday Growth Management Group.

This group is led by the Department of Infrastructure and Planning, and has maintained that a key aim of the Initiative is the development of an integrated, strategic and collaborative approach to service and infrastructure planning.

The project is closely linked to Whitsunday Hinterland and Mackay Regional Plan (WHAM). While it is particularly focused on the high growth areas of Cannonvale and Airlie Beach, the strategy is relevant for the surrounding localities as well.

The Growth Management Initiative is currently still under review, however the Growth Management Group has released its Strategic Infrastructure and Services Plan for the Whitsundays, of which key aims are outlined in the following table, along with deliverables of the SHMD project.

Table A.2. Alignment of Shute Harbour Marina with the Whitsunday Growth Management Initiative

Whitsunday Growth Management Key Objectives	Description	Delivered by Shute Harbour Development
Skilled Development Opportunities	Whitsunday Shire has very low levels of unemployment however, issues such as skills development and training are key needs for Whitsunday. Seasonal tourism and the attraction of nearby coal mines mean that many skilled employees leave the region.	• **Increased employment:** The proposed SHMD will provide diversification of employment and skills development opportunities, including year-round options in the marine, tourism, recreation, and service industries.
Electricity and water supply	It is recommended that electricity and water supply expand to meet expected future population and industry growth for the region.	• **Infrastructure services:** Power, water, sewer, stormwater drainage and telecommunications will be provided, but do not require infrastructure upgrades apart from power, a component of which will be provided by the proponent.
Support of the Marine Industry	The growing marine industry is a major economic driver and needs to be supported through infrastructure provision and a skilled employee base.	• **Marine industry:** Marine industry facilities and maintenance services in the surrounding service centre will support the marina and marine tourism operators. • **Employee training opportunities:** The expansion of employment opportunities and the marine industry will provide a basis for developing a complementary, skilled labour supply.
Traffic Management	Preservation of amenity and economic value of the area through traffic management.	• **Transport infrastructure and transit centre**: The development of a marina will provide key marine-based transport infrastructure, increasing access to the area by sea and providing transport which is focused on the key amenity in the region, the coastline. • **Road infrastructure**: New road alignment will be designed to accommodate increasing amounts of visitors and labourers in the region. Reports indicate the current condition of Shute Harbour Road is appropriate for additional traffic impact from the proposed development. • **Public transport:** A regular bus service already exists from Airlie Beach to Shute Harbour. The development includes a bus set down area, and increased demand for access to Shute Harbour can be expected to provide a commensurate increase in patronage on the bus route. SHMD will provide a shuttle bus to facilitate connectivity where the market is initially insufficient to justify provision by a commercial operator.

Source: Queensland Department of Local Government and Planning (2007)

Draft Mackay-Whitsunday Regional Coastal Management Plan

The Draft Mackay-Whitsunday Regional Coastal Management Plan provides direction for development management with the aim of protecting the unique ecosystem of the Mackay-Whitsunday Region within the framework of the State Coastal Management Plan.

It is a response to the growing demand for coastal residential and commercial development, and the challenge to protect local wetlands, flora, fauna, and erosion prone areas. Apart from providing environmental value, these resources contribute significantly to the social and economic well being of the region (Environmental Protection Agency, 2006).

The Mackay Whitsunday Coastal Plan addresses the following key coastal management issues for the region:

- Maintaining diversity of recreational opportunities to accommodate the diverse range of visitors;
- Planning and managing for natural coastal erosion processes;
- Maintaining biodiversity within the region;
- Balancing the need for urban expansion due to population growth with protection of environmental resources in the region;
- Improving quality of water entering the Great Barrier Reef Marine Park and World Heritage Area;
- Recognition of the social and economic importance of the ports, airports and identified marine transport facilities; and
- Identification and protection of significant scenic coastal areas and species habitats in the region.

Specific key principles of the Management Plan are outlined below, along with aspects of the SHDM which support these legislative principles.

Table A.3. Alignment of Shute Harbour Marina with the Draft Mackay Whitsunday Regional Coastal Management Plan

Coastal Management Key Principles	Delivered by Shute Harbour Development
Recognition of coastal resources in development and planning.	• **Recognition**: The proposed SHMD development is directly reliant on coastal resources such as recreation and boating opportunities. The value of these resources is recognised in the design of the marina and resort facilities, initiation of education programs and the establishment of an environmental management trust fund.
Coastal use, infrastructure, and development is planned and managed to ensure that significant adverse effects of activities on the natural environment are avoided, mitigated or remedied.	• **Sustainability**: Regulation of marine and industry practices with a 'clean and green' philosophy, including provision of a trust fund to assist in the management and maintenance of marine habitat including provision of sea grass friendly moorings. • **Improved management and education of boat owners and operators**: Improved management and education of boat owners and operators will be facilitated by the initiation of education programs at the proposed marina, which is anticipated to assist in reducing potential detrimental impacts of boaters on the environment.
Development and use of the coast should enhance and maintain quality of life for residents and visitors.	• **Transport**: Increased transportation networks will provide more options for tourists, visitors and residents. • **Industry**: The development of the marine industry will provide skills training and employment for residents, and enhanced social infrastructure options for both visitors and inhabitants. • **Tourism**: The enhanced infrastructure will provide more destination options and accommodation for tourists staying in the region and visiting the neighbouring islands. • **Diversification of opportunities**: The development of retail, commercial and managed tourism accommodation will create a diverse community in the region with the potential for high levels of productivity, growth, and expanding social opportunities and infrastructure.

Coastal Management Key Principles	Delivered by Shute Harbour Development
Maintenance of functionality in areas of state significance (social and economic) and protection from incompatible land uses and activities that may adversely affect the continued use of those areas.	• **Areas of state significance:** Includes those which provide coastal dependent recreational and marine transport facilities. The Shute Harbour Transit Facility is listed as one of those key significant sites. The proposed SHMD will act as a key catalyst in the overall upgrade and enhancement of the Shute Harbour precinct, allowing the Transit terminal to better fulfil it's pivotal role in the tourism fabric of the Whitsunday region. • **Marine safety:** The development itself is designed to be compatible with the operations of the terminal and barge facilities, and the construction of the public boat ramp facilitated by the proponent's monetary contribution will lead to increased capacity and safety for all users of the precinct. • **Enhanced opportunities**: Development of the Shute Harbour Marina will enhance the accessibility and functionality of coastal dependent transport services offered in the region. Infrastructure investment will provide the framework for expanded social and economic opportunities.

Source: Queensland Government Environmental Protection Agency (2006).

Mackay Whitsunday Regional Tourism Investment and Infrastructure Plan (RTIIP)

The Mackay Whitsunday Regional Tourism Investment and Infrastructure Plan 2006-2016 (MWRTIIP) was developed to determine real opportunities for sustainable growth within the region, with the aim of creating collaborative opportunities for private and public sectors (Tourism Queensland and the Department of Tourism, Fair Trading and Wine Industry Development, 2006). Key aims and SHMD deliverables are outlined in the table below.

Table A.4. Alignment of Shute Harbour Marina with the Mackay Whitsunday Regional Tourism Investment and Infrastructure Plan

RTIIP Key Points	Delivered by Shute Harbour Development
Create a sense of uniqueness especially in built environments.	• **Integration with existing environment**: The proposed development will be a unique stand-alone development that will build upon the unique characteristics of the region, Shute Harbour and the marine and tourism industry. The SHMD is to be designed as a World Class Facility acting as an icon for the region. • **Precinct enhancement:** The SHMR will add to and facilitate the enhancement of the Shute Harbour precinct to better fulfil its pivotal role in the tourism industry of the Whitsundays.
Invest in new and enhanced infrastructure.	• **Marine transport infrastructure:** Provision for marina berths in the region's most appropriate marina location to cater to current and expected future regional demand. • **Marina and supporting social and commercial infrastructure:** Appropriate planning and coordination of marina infrastructure with tourism, recreational, commercial, and transport infrastructure as an integrated project. • **Road infrastructure**: Road alignment will be developed on Shute Harbour Road in line with the deed of agreement between the Department of Main Roads and Shute Harbour Marina Development Pty Ltd. • **Boat ramp**: The proponent's contribution towards a new public boat ramp will facilitate the construction of a key piece of community infrastructure rationalising and adding to the capacity, functionality and marine safety of the precinct. • **Pedestrian linkages and foreshore access**: The development will provide approximately 1km of boardwalk along the marina esplanade and isthmus parkland, creating new and unique vantage points to view the marina, Shute Harbour, Conway National Park and the Islands to the east.
Ensure an appropriate mix of products are available to visitors.	• **Diversification of opportunities**: The development of retail, commercial and managed tourism accommodation will create a diverse community in the region with the potential for high levels of productivity, growth, and expanding social opportunities and infrastructure. • **Managed resort accommodation**: The ability to provide waterfront tourism accommodation of an appropriate character within the Managed Resort Accommodation precinct caters to a market which is largely absent from the current tourism accommodation mix.

RTIIP Key Points	Delivered by Shute Harbour Development
Develop Shute Harbour including the Shute Harbour Foreshore and Waterways Management Plan.	• **Boat ramp**: The proponent's contribution towards a new public boat ramp will facilitate the construction of a key piece of community infrastructure rationalising and adding to the capacity, functionality and marine safety of the precinct. • **Pedestrian linkages and foreshore access**: The development will provide approximately 1km of boardwalk along the marina esplanade and isthmus parkland, creating new and unique vantage points to view the marina, Shute Harbour, Conway National Park and the Islands to the east.
Improve electricity and water supply and service, and telecommunications to the region.	• **Infrastructure services**: Power, water, sewer, stormwater drainage and telecommunications will be provided, but do not require infrastructure upgrades apart from power, a component of which will be provided by the proponent.
Expand accommodation facilities catering to leisure and business visitor markets.	• **Key industry investment**: The project will provide accommodation and supporting infrastructure for approximately one years growth in the regional tourism sector (tourism, accommodation, cafes and restaurants, transport and storage and marine support). This will assist in enhancing tourism opportunities and experiences in the region and promote sustainable economic growth. The standard of the accommodation lends itself well to strengthening the options for general leisure and particularly business markets. • **Tourism precinct:** Precinct facilities will include a 4½ star, 109 suite hotel; managed resort accommodation, marina office, amenities, carparking, charter boat cruise base, retail space and landscaped gardens entry and open space as well as managed resort accommodation.

Source: Tourism Queensland and the Department of Tourism, Fair Trading and Wine Industry Development (2006).

WHAM Regional Plan

The Whitsunday Hinterland and Mackay (WHAM) region is centrally located on the Queensland coastline and has experienced strong population and economic growth, increasing the region's contribution to the Queensland economy in recent times through its major industries of mining, agriculture, marine and tourism. The WHAM Regional Plan (Queensland Department of Local Government and Planning, 2006a) provides the strategic framework for guiding development of the WHAM region over the next 20 years.

The WHAM Regional Plan was established to provide a holistic and integrated approach to recognising and addressing the economic, social and environmental elements, issues and opportunities of the region. Key priorities and goals of the WHAM Regional Plan are centred around the following themes:

- Regional identity, leadership and management;
- Environment and natural resources;
- Economic development;
- Social infrastructure;
- Settlement pattern;
- Infrastructure; and
- Transport.

The priorities and goals delivered by the Shute Harbour Development are identified in the table below.

Table A.5. Alignment of Shute Harbour Marina with the WHAM Regional Plan

Key Priorities and Goals of WHAM	Description	Delivered by Shute Harbour Development
Regional identity, leadership and management	• **Regional Identity:** Establish region as a distinct economic, cultural, social and administrative entity. • **Collaborative Planning and Management:** Integration, coordination and streamlining of planning and management to improve quality and effectiveness of outcomes. • **Investment and resourcing:** Secure investment and resource avenues to support major growth, productivity and prosperity.	• Development of **regional identity** towards a marine and tourism hub and enhancement of the overall Shute Harbour precinct. • **Integration** of individual and stakeholder collaboration between the marine, tourism and transport sectors into a key development and strengthened Shute Harbour precinct. • **Secure investment** in the Shute Harbour development with the capacity to support growth with provision of marina, tourism and commercial infrastructure. The construction of the development is a major investment and vote of confidence for the region.

Key Priorities and Goals of WHAM	Description	Delivered by Shute Harbour Development
Environment and natural resources	• **Natural disaster management:** Manage and minimize potential impacts of social, economic and natural disaster of the region.	• **Safe harbour**: Provision of a marina in Shute Harbour in conjunction with the Harbour's natural weather protection provides exceptional marine safety in extreme cyclonic events. • Assist in the **management and education of recreational boaters** to reduce the risk of potentially detrimental environmental impacts. • **Cyclone shelter:** Provision for a community cyclone shelter within the carpark equipped to respond to cyclone disaster.
Economic development	• **Economic climate:** Establishment of a stable, cost-competitive and sustainable environment for business and investment that facilitates economic growth and employment. • **Sustainable industries:** Maximise investment in sustainable industries. • **Tourism:** Establish region as a distinctive tourist destination that offers a diverse range of tourism opportunities and unique experiences. • **Management and workforce skills:** Attract and retain skilled workforce to strengthen economic opportunities and social infrastructure. • **Land infrastructure and transport:** Provide infrastructure and adequate services that are suitably located to meet the needs of the region.	• **Tourism precinct:** Precinct facilities will include a 4½ star, 109 suite hotel; managed resort accommodation, marina office, amenities, carparking, charter boat cruise base, retail space and landscaped gardens entry and open space as well as managed resort accommodation. • **Key industry investment:** The project will provide accommodation and supporting infrastructure for approximately one year's growth in the regional tourism sector (tourism, accommodation, cafés and restaurants, transport and storage and marine support). This will assist in enhancing tourism opportunities and experiences in the region and promote sustainable economic growth. • **World class facility:** The provision of a world class facility will promote the identity of Shute Harbour and the Whitsundays to the international tourism market, capitalising on the unique attributes of the region. • **Attraction and retention of skilled workers:** Establishment of a marina and tourism precinct will increase demand for skilled labour and employment opportunities in key sectors of the marine, tourism and hospitality industries. • **Transport infrastructure and transit centre:** The development of a marina will provide key marine-based transport infrastructure, increasing access to the area by sea. • **Precinct improvement:** The development's contribution towards the upgrading of the Shute Harbour precinct is likely to help protect the precinct's pivotal role for some decades, aiding the region's long term competiveness with other tourism areas.
Social infrastructure	• **Services and facilities:** Provision for current and future needs of communities through timely and appropriate planning.	• **Transport infrastructure:** Provision for marina berths to cater to current and expected future regional demand. • **Improvement of transport links** to the Shute Harbour region (courtesy bus, improved road infrastructure through the deed of agreement with Main Roads and increased patronage on the existing bus route). • **Provision of leisure infrastructure:** The development will include the provision of retail, cafe and restaurant areas in the Marina Plaza precinct. This will increase leisure opportunities in Shute Harbour and the surrounding service centre, and provide a meeting place for residents and visitors. • **Provision of recreational infrastructure:** The development includes a $2.5 million contribution to a new public boat ramp and car parking facility. • **Pedestrian linkages and foreshore access**: The development will provide approximately 1km of boardwalk along the marina esplanade and isthmus parkland, creating new and unique vantage points to view the marina, Shute Harbour, Conway National Park and the Islands to the east.

Key Priorities and Goals of WHAM	Description	Delivered by Shute Harbour Development
Infrastructure	• **Infrastructure planning and coordination:** Provision for the appropriate physical and social infrastructure to allow for economic development. • **Energy and telecommunications:** Appropriate and timely infrastructure development to meet demands. • **Sewerage:** Provision for appropriate environmentally friendly, safe and effective sewerage disposal. • **Water infrastructure:** Provision for water demands in timely, cost effective, safe and environmentally responsible manner.	• **Infrastructure services:** Power, water, sewer, stormwater drainage and telecommunications will be provided, but do not require infrastructure upgrades apart from power, a component of which will be provided by the developer. • **Marina and supporting social and commercial infrastructure:** Appropriate planning and coordination of marina infrastructure with tourism, recreational, commercial, and transport infrastructure of the project. Provision of pump out facilities to maintain high water quality and reduce instances of illegal or inappropriate effluent disposal • **Road infrastructure:** A new intersection & road alignment will be developed on Shute Harbour Road in line with the deed of agreement between the Department of Main Roads and Shute Harbour Marina Development Pty Ltd;
Transport	• **Seaports:** Provide competitive, cost effective, efficient and safe transport facilities to meet the needs of regional industry. • **Aquatic facilities:** Provide and maintain quality, environmentally sustainable aquatic infrastructure to meet commercial and recreational needs.	• **Marina and aquatic facilities:** The establishment of 669 berths and supporting marina structure will provide significant facilities to the marine industry and increase the availability of aquatic activities in the region. • **Marine transport:** The improvement of the seaport, facilities and capacity of marine vessel accommodation in the area will meet increasing demand for such services in the region. The new boat ramp and the plan for separating recreational and commercial traffic will greatly improve access and safety. • **Improved operation and capacity:** The provision of the public boat ramp facilitated by the proponent's monetary contribution will increase marine safety for all users and remove a current impediment for growth in capacity for the transit terminal.

Source: Queensland Department of Local Government and Planning (2006a)

Whitsunday 2015: A Whitsunday Shire Economic Development Strategy

Whitsunday 2015: A Whitsunday Shire Economic Development Strategy (Pacific Southwest Strategy Group, 2006b) is an economic planning document that has been developed by the Whitsunday Shire Council and Whitsunday Development Corporation (WDC). Whitsunday 2015 aims to produce economic and social outcomes in the Whitsunday Shire by building on the region's competitive advantages whilst balancing the management of the environment and national parks and fostering community cohesion.

The main focus of the vision is to build on the thriving tourism industry whilst achieving infrastructure targets that provide safe, clean communities and a high standard of living, built in harmony with the social, natural and environmental features of the region.

Key goals and objectives of the strategy were identified to include:

- Facilitation of business growth and development;
- Creation of job training and local needs;
- Marketing and promotion;
- Cooperative asset development and optimisation; and
- Increased networking and coordination.

The Strategy is considered to be broadly consistent with both the MWRTIIP and the WHAM and hence is supported by the measures outlined in the responses provided to those sections above. In particular, however, the proposed SHMD development aligns with the strategy by assisting in and improving the delivery of:

- **Transport and transport servicing**: *Development of a marina and transit centre will augment the water transport services and facilities and encourage linkages between water and land based tourism in the region.*

- **Tourism and travel**: *The construction of the 4½ star resort/ managed tourism accommodation tourism precinct and retail facilities in conjunction with the marina will promote the tourism and water transport services in and around Shute Harbour and the broader service centre.*
- **Marketing and promotion**: *The provision of a world class marina resort facility in Shute Harbour, coupled with the leveraged enhancement of the precinct will aid the image and identity of the region, increasing marketing and promotion reach, whilst aiding in providing a more completely satisfying tourism experience for visitors travelling to and from the Whitsunday Islands and Great Barrier Reef.*
- **Cooperative asset development**: *There are clear synergies between the development and the enhancement of the overall Precinct. The contribution towards the public boat ramp by the proponents is considered to be an excellent example of a cooperative approach to asset development. The overall investment in the precinct which is of State Economic and Social significance in line with State, Regional and Local priorities represents successful integration of public and private interests and investments. The development also proposed to establish an environmental trust that will facilitate the development of environmentally friendly 'EzyRider' type moorings for public use on the reef to help prevent anchor damage.*
- **Education and training**: *The proponent has a commitment to training and development of the local labour force and has partnered with the Barrier Reef Institute of TAFE to deliver identified training needs.*

Whitsunday Destination Management Plan

The Whitsunday Destination Management Plan (Tourism Queensland, 2004a) has been developed to ensure the future of the tourism industry in the Whitsundays and Great Barrier Reef. This plan supports the development of a sustainable and ecologically 'friendly' tourism industry and promotes industry growth whilst aligning with the environmental and sustainable obligation guidelines set out by the Government. The goals and strategies of the Whitsundays Destination Management Plan and how they align with the proposed development include:

- **Promoting the Whitsunday's as a desirable holiday experience in domestic and international markets**: *The proposed development will have a range of accommodation and tourism facilities to meet the demand of both domestic and international tourists. The proposed development provides accommodation and associated infrastructure for approximately one year's growth in the regional tourism market. The development and it's leveraged effect on the Shute Harbour Precinct will help Shute Harbour to better perform it's pivotal role in the overall image and tourism experience of the Whitsundays.*
- **Ensure more effective distribution of travel information, products and services to the trade and consumers:** *The 4½ star hotel and managed tourism accommodation and associated facilities of the proposed development will allow for and facilitate linkages with other destinations, particularly in relation to land and water based activities.*
- **Identify and facilitate the development of infrastructure and services that are appropriate to the needs of visitors and residents:** *Infrastructure and services of the development include marina services and facilities, transport facilities, a 4½ star hotel and managed tourism accommodation precinct, with commercial and retail infrastructure provision and associated leisure facilities such as cafes restaurants in the marina plaza precinct, linked to an extensive marina esplanade and Isthmus parkland.. The Charter boat base including transit lounge and interpretive centre will provide a clear strengthening and improvement of the boating experience for charter boat and other marina users.*
- **Promote the value and importance of sustainable tourism practices**: *The project upholds the values of environmental sustainability and 'clean and green' tourism and marine based activity, including the design, construction and operation of the marina and resort and a commitment to fund a trust to assist in the management and maintenance of marine habitat in the region, including provision of sea grass friendly moorings and a marine interpretive centre.*

Appendix B: CBA Methodology

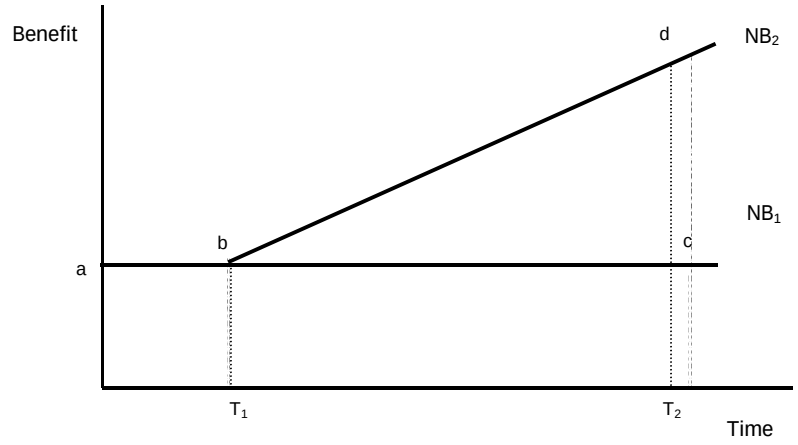
A Cost Benefit Analysis (CBA) model has been applied to the quantifiable components of the Shute Harbour Marina Development to identify whether the project will provide a net benefit to the State. The process used in undertaking the CBA is discussed below.

Step 1: Define the Scope and Boundary

To enable a robust determination of the net benefits of undertaking a given project, it is necessary to specify base case and alternative case scenarios. The base case scenario represents the "without project" scenario and the alternative or "with project" scenario examines the impact with the program in place.

The base case (without) scenario is represented by line NB_1 (bc) over time T_1 to T_2 (Figure 9.2). The investment at time T_1 is likely to generate a benefit, which is represented by line NB_2 (bd). Therefore the net benefit flowing from investment in the SHMD is identified by calculating the area (bcd) between NB_1 and NB_2.

Figure B.1. With and Without Scenarios



Source: AEC*group*

In this assessment the CBA is conducted from the point of view of the State and is considered over a 30 year time frame. 30 years has been selected as the generally acceptable point at which future flows of benefits and costs approximate zero due to discounting.

Step 2: Identify Costs and Benefits

A comprehensive quantitative specification of the benefits and costs included in the evaluation and their various timings is required and includes a clear outline of all major underlying assumptions. These impacts both positive and negative are then tabulated and where possible valued in dollar terms.

Some impacts, such as environmental and social impacts may not be quantifiable. Where this occurs the impacts and their respective magnitudes will be examined qualitatively for consideration in the overall analysis.

Step 3: Quantify and Value Costs and Benefits

CBA attempts to measure the value of all costs and benefits that are expected to result from the activity in economic terms. It includes estimating costs and benefits that are 'unpriced' and not the subject of normal market transactions but which nevertheless entail the use of real resources. These attributes are referred to as 'non-market' goods or impacts. In each of these cases, quantification of the effects in money terms is an important part of the evaluation.

However, projects frequently offer non-market benefits and costs that can be difficult to quantify. Where the impact does not have a readily identifiable dollar value, proxies and other measures should be developed as these issues represent real costs and benefits.

Some commonly utilised techniques for valuing non-market impacts are outlined in the table below.

Table B.1: Valuation Techniques

Type of Valuation	Valuation Technique	Description
Stated Preference Valuation	Contingent Valuation (CVM)	This technique uses a simulated or hypothetical market to directly assess the willingness to pay (WTP) or the willingness to accept compensation (WTAC) for a particular environmental outcome. The survey-based approach can be used to measure both use and non-use values, and is generally applied in assessing a dollar value to a change in or preservation of environmental quality.
	Choice Modelling (CM)	Similar to CVM, choice modelling (CM) utilises stated preferences of respondents to rank or rate different scenarios. Respondents must choose between specific options presented to them. CM can produce independent values for the specific attributes of an environmental program.
Revealed Preference Valuation (surrogate market based)	Hedonic Pricing	Hedonic pricing employs the use of surrogate markets to value environmental quality. Property and labour markets are widely used for this technique.
	Travel Cost	This valuation technique is based on the assumption that demand for an asset is revealed by a willingness to spend money and time travelling to the particular site. It is also assumed that expenditure is higher for travel to more valuable sites. This methodology is best used in assessing amenity or recreational value.
Revealed Preference Valuation (market based)	Factor of Production	The factor of production technique is limited to assets that are used in the production process of goods and services within the market, as it uses the direct value in production as an indicator of the environmental worth.
	Producer/ Consumer surplus	This technique is a calculation of both producer and consumer surplus.
	Defensive Expenditure	This valuation technique is based on expenditure that is made on behalf of the public or specific industry in prevention or counteraction of environmental damage (such as pollution).

One commonly used method of approximating values for non-market impacts is 'benefit transfer'. Benefit transfer (BT) means taking already calculated values from previously conducted studies and applying them to different study sites and situations. In light of the significant costs and technical skills needed in using the methodologies outlined in the table above, for many policy makers utilising BT techniques can provide an adequate solution.

Context is extremely important when deciding which values to transfer and from where. Factors such as population, number of households, and regional characteristics should be considered when undertaking benefit transfer. For example, as population density increases over time, individual households may value nearby open space and parks more highly. Other factors to be considered include, depending on the location of the original study, utilising foreign exchange rates, demographic data, and respective inflation rates.

Benefit transfer should only be regarded as an approximation. Transferring values from similar regions with similar markets is important, and results can be misleading if values are transferred between countries that have starkly different economies (for example a benefit transfer from the Solomon Islands to Vancouver would likely provide limited accuracy of results). However, sometimes only an indicative value for environmental assets is all that is required.

Step 4: Tabulate Annual Costs and Benefits

All identified and quantified benefits and costs are tabulated to identify where and how often they occur. Tabulation provides an easy method for checking that all the issues and outcomes identified have been addressed and provides a picture of the flow of costs, benefits and their sources.

Step 5: Calculate the Net Benefit in Dollar Terms

Because costs and benefits are specified over time it is necessary to reduce the stream of benefits and costs to present values. The present value concept is based on the time value of money – the idea that a dollar received today is worth more than a dollar to be received in the future. The present value of a cash flow is the value today that is equivalent to a cash flow in the future. The time value of money is determined by the given discount rate to enable the comparison of options by a common measure.

The selection of appropriate discount rates is of particular importance because they apply too much of the decision criteria and consequently the interpretation of results. The higher the discount rate, the less weight or importance is placed on future cash flows.

The choice of discount rates should reflect the weighted average cost of capital. For this analysis, direct impacts and indirect impacts have been discounted at different rates. Four sets of discount rates have been used for direct and indirect impacts, as outlined below.

Table B.2. Discount Rates Used

Direct Impacts	Indirect Impacts
6%	5%
8%	6%
10%	7%
12%	10%

Note: The cells shaded grey represent the base scenario used for the CBA.

The formula for determining the present value is:

$$PV = \frac{FV_n}{(1+r)^n}$$

Where:

PV = present value today
FV = future value n periods from now
r = discount rate per period
n = number of periods

Extending this to a series of cash flows the present value is calculated as:

$$PV = \frac{FV_1}{(1+r)^1} + \frac{FV_2}{(1+r)^2} + \cdots + \frac{FV_n}{(1+r)^n}$$

Once the stream of costs and benefits have been reduced to their present values the Net Present Value (NPV) can be calculated as the difference between the present value of benefits and present value of costs.

Step 6: Scenario and Risk Analysis

Scenario and risk analysis allows for the testing of the key assumptions and the identification of the critical variables within the analysis to gain greater insight into the drivers to the case being examined. Variables such as the adoption rate or percentage of uptake may have a significant impact on the outcome of the analysis.

Appendix C: Additional Infrastructure

Additional and upgraded infrastructure, such as electricity, telecommunications, water, wastewater and roads, may be required to meet the needs of business, tourists and visitors of the SHMD. The requirements for additional infrastructure costs are currently under discussion with the Whitsunday Shire Council and the level of developer contribution and subsequently the contribution from Whitsunday Shire Council has not been identified. It is assumed that developer contributions will be made as negotiated with Whitsunday Shire Council, with costs being shared between the proponent and other stakeholders. The proponent costing for the development includes some provision for these facilities. The facilities are anticipated to be operated on a cost recovery basis and as such, excluding the developer contribution, are not required to be included in the analysis as they constitute a transfer payment within the community (indirect).

Electricity

As the development is to be under a community title, Ergon will only provide underground high voltage reticulation and ground mounted substations. Low voltage reticulation to individual residential lots and to the hotel and commercial developments will be private reticulation (Lectel, 2007). It is estimated that the total electrical demand of the development, including marina and associated facilities, hotel, managed resort accommodation and commercial and retail areas, will be approximately 1.9MVA (Megavolt Amperes).

Ergon may be required to upgrade or duplicate its current 66kV Mount Rooper zone substation to meet the electricity requirements of the SHMD. Should a zone substation be required, Ergon would most likely require a financial contribution by the developer toward its cost (Lectel, 2007). Upgrading of an existing zone substation or construction of a new zone substation would take approximately 2 years from agreement of a site and for it to proceed to energisation.

Where development of a new zone substation is not undertaken, upgrading of the existing 66kV network may be necessary and could require heavier grade poles and/or overhead conductors (Lectel, 2007). Further, connection of the development to the existing 11kV route will most likely require an easement between Proserpine Shute Harbour Road and the existing Ergon 11kV route along the north side of Proserpine Shute Harbour Road (Lectel, 2007).

The SHMD is expected to require 11kV/240V padmount transformer substations (PMTs) to be located within the marina. It is expected these PMTs will be pontoon mounted, and will be privately owned and provided by the proponent (Lectel, 2007).

The internal electricity reticulation and street-lighting will require underground high voltage (HV) and low voltage (LV) cables to be installed. A number of 125mm conduits and PMTs will be required at intervals throughout the development.

Depending on customer loads a single PMT can supply up to 90 residential customers and is located on an easement of 3m by 2.8m. On sloping ground a slightly larger area would be required to accommodate retaining walls outside the easement. Each PMT may require an earth grid. Should an earth grid be required for an Ergon PMT, the padmount easement would be 12m by 7.2m (Lectel, 2007).

The HV reticulation to pontoon mounted PMTs would be privately owned and would be connected to an HV metering point on land. It is considered that HV reticulation cabling within the marina should be run underground to below each PMT and should rise to accommodate tidal variation and pontoon motion. An LV switchboard to control circuits to power outlets on bollards would be installed adjacent to each PMT. LV circuits could be installed below pontoon decking.

Telecommunications

Telstra are currently mandated to provide a copper cable telephone network, or PSTN, in all new freehold developments free of charge to the developer except for the cost of trenching and any possible civil headworks (Lectel, 2007). Although the PSTN will be fully owned by Telstra, other service providers would be able to resell their services across it.

Adequate existing conduits and optic fibre cable is available in the vicinity of the development. Telstra's adjacent existing assets include a fibre optic cable in conduit along the north side of Shute Harbour Road and a copper cable in conduit along the south side of Shute Harbour Road connecting to a pillar at the boundary with the property east of the development site. The existing network is broadband data transmission enabled via ADSL technology. No additional conduits should be required but Telstra may need to upgrade mains cabling (Lectel, 2007).

The area should receive adequate mobile phone coverage from Telstra and Optus repeater stations as well as wireless data coverage from existing base stations. The area is also located within the Austar satellite digital pay TV footprint for pay TV services (Lectel, 2007).

Water and Sewerage

Water and sewerage costs will be shared between the developer and Whitsunday Shire Council. The actual contributions are yet to be identified.

Roads

A condition to provide provision for a three lane cross section has been identified as part of the SHMD. Land has been dedicated to meet this requirement, with the Department of Main Roads to construct the additional lane in the future as and when required as follows (Cardno, 2007a):

- 3 x 3.5 metre lanes for two through lanes plus one overtaking lane;
- 2 x 2.0 metre shoulders; and
- 2.0 metre central median.

Car Parks

Car parking in Shute Harbour is already over subscribed and Queensland Transport have informed the Whitsunday Shire Council that they will only contribute to the a new boat ramp when an additional 90 car and boat trailer spaces are provided for users (AEC*group*, 2008a). Council has prepared preliminary plans to create some additional parking at Shute Harbour although no decision will be taken before the SHMD is considered.

Appendix D: Valuation of Environmental Impacts

Original environmental and recreational values for marine communities in US 1994 dollar terms have been taken from Costanza (1997) and inflated to Australian 2007 dollar terms using an exchange rate of AUD 0.73/ USD, and an inflation multiplier for 1994 to 2007 of 1.42 (Reserve Bank of Australia, 2008a and 2008b).

Table D.1. Environmental/ Social Value of Marine Communities in $/Ha

Aspect	US$1994 Value/ Ha	AU$2007 Value / Ha
Total Ecosystem Values		
Seagrass/ macroalgae	$19,004.00	$34,999.10
Mangroves	$9,332.00	$17,186.46
Coral reefs	$3,067.00	$5,648.40
Habitat Value		
Breakwater [(a)]	$130.57	$240.47
Recreational Values		
Coral reefs	$3,008.00	$5,539.74
Mangroves	$658.00	$1,211.82

Note: (a) The habitat value for breakwater is estimated as the replacement value for the existing seagrass communities.

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