Shute Harbour Marina Project

Initial Advice Statement

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EXECUTIVE SUMMARY

Shute Harbour is the central hub of marine traffic in the Whitsundays and will remain so given its proximity to the major resort islands and safe anchorage. As the population of Australia grows and tourism numbers increase it will be extremely important to ensure facilities in this strategic location are in place to manage the increasing boating population in the Whitsundays and visitors to the region.

As indicated in the 2001 Brown and Root Whitsunday Region Marina Demand Analysis – 2001 *"with the exception of the Abel Point marina expansion, the other potential marina sites in the area will be difficult to develop unless they have a mix of land based facilities such as residential Tourism or commercial outlets".* This marina project is an investment in sustaining the capacity of the region to cope with increasing visitation pressures. The project involves the significant expenditure of time, financial and human resources ensuring that the best viable outcome from an ecological, social and economic standpoint is achieved for the long term.

A new corporate entity has been created to deliver the Shute Harbour Marina project. The recent introduction of renowned marina specialists Port Binnli Pty Ltd as partners in the project brings certainty to the development outcome in terms of quality and long term sustainability. Port Binnli's latest project the Mackay Marina was voted the 2006 Australian Marina of the year. The design concepts represented in this Initial Advice Statement represent the benefits of that award winning knowledge and are the result of considered appreciation of the feedback from the initial EIS conducted by the former proponents and the experience of Port Binnli in design and construction.

The focus of the new design is a world class marina facility. The new design delivers a much needed marina at the strategic transport hub in one of Australia's fastest growing and most scenic tourism destination of the Whitsundays. The revised concepts will see the existing Shute Harbour Ferry Terminal redeveloped in its current location as part of a separate project to the Marina. The existing Shute Harbour road will be redeveloped 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 minimizing fully any potential impacts on the adjoining Conway National Park.

The project will deliver 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, and the creation of a mainland tourism destination at Shute Harbour.

In terms of long term sustainable benefits the Shute Harbour Marina facility will deliver;

- Increased local employment opportunities
- Increased opportunities to "Value Add" to the local Tourism Industry
- Provide a mainland tourism destination experience at Shute Harbour
- Provide an effective recreational vessel management opportunity that will decrease the need for destructive single moorings and provide environmentally controlled effluent disposal facilities.
- Provide increased controlled access to the waters of Shute Harbour and the Whitsundays

The Shute Harbour Marina Development will deliver sustainable facilities for the long term.

1. INTRODUCTION

1.1 Project Background

The development site was initially identified by government as being strategically located as a safe haven marina in the event of a cyclone and as a gateway to the Whitsunday Islands. Given its strategic location to the nearby island resorts Shute Harbour is a transport hub for the Whitsunday Island Tourist resorts.

In order to assess the feasibility of the site for a marina development, Shutehaven Marina Pty. Ltd. (Scotex) was granted a Special Lease and associated Permit to Occupy in 1994 by the Department of Natural Resources and Mines (DNRM). Following "prove up" of the validity of the project, Special Lease Number 200573 and Permit to Occupy No. 200056 were issued to allow the proponent to proceed with a detailed EIS.

The Special Lease and the new Permit to Occupy No. 210191, was transferred to the current development company, Shute Harbour Marina Development Pty Ltd (SHMD), in April 1998.

Following investigation by Commercial Advisory Services, Shute Harbour Marina Development Pty Ltd was granted approval to proceed with the development and DNR approved a 7 year Term Lease commencing 25th August 1999.

Shute Harbour Marina Development Pty Ltd undertook an EIS in 2005 and substantial feedback was provided to the proponents with regard to the proposed design elements. It became apparent from the EIS feedback that significant components of the project needed to be reviewed.

The Co-ordinator General advised SHMD on 30 August 2005 (Appendix A) that a supplementary EIS was to be undertaken to further refine aspects of the project. On going negotiations between SHMD and a number of statutory agencies and submitters in the EIS process indicated that elements of the project would require modification. Following further discussions with the proponents in light of this modification, the Co-ordinator General subsequently advised SHMD on 27 March 2006 (Appendix B) that given the nature of the changes proposed a new EIS process should be initiated.

Since the preparation of the Initial Advice Statement and subsequent EIS, the Shareholders and Directors of Shute Harbour Marina Development Pty Ltd have changed. In March 2006, Port Binnli Pty Ltd purchased an interest in SHMD and the project. Port Binnli Shute Harbour Pty Ltd has now taken over sole responsibility for project management and delivery of. the project and hold a 50% interest in Shute Harbour Marina Development Pty Ltd. Port Binnli Pty Ltd the developers of the multi award winning Mackay Marina, bring much needed valuable experience to the project.

The other shareholders are represented by Mark Daniels and Gregory Phillips, William Kelly, Geoffrey Inglis, David Wade, John Robinson, Howard Young, Fergus Simpson, and David Inglis. This group now holds a 50% interest in the company along with Port Binnli Shute Harbour Pty Ltd (PBSH) (Appendix C).

PBSH shareholders and Directors have common interests in the Mackay Marina, the existing Shute Harbour Ferry terminal and the Raby Bay Marina.

All members of the Development Company have sound reputations in the successful completion of projects and bring a range of skills to the project. This diverse group of shareholders has been, and continues to be, involved in the investment and delivery of a broad spectrum of projects, ranging from small to medium land subdivision and urban infill developments, to major urban development projects creating new communities, including major projects of state significance involving large scale mixed use developments.

Considerable additional work has been undertaken encompassing engineering and geotechnical audits, floating breakwater studies and analysis, design and feasibility studies, which have contributed to the redesigned concept.

Following advertising of the original EIS, substantial feedback was provided to the proponents with regard to the proposed design elements. It became apparent from the EIS feedback that significant components of the project needed to be reviewed.

The project has now been reviewed and changes have now been incorporated into the current master plan design concept. The changes in summary include:

- Removal of the Transit Terminal and Ship repair facility from the project
- A significant reduction in land based development with only a 5000square metre increase in reclamation
- No development of the land areas abutting National Park
- The inclusion of a Public Esplanade along the entire frontage of the development
- Contribution to construction of public boat ramp facilities
- An increased development footprint in terms of additional marina berths

1.2 Project Proponent

Shute Harbour Marina Development Pty. Ltd. is a private company, which owns a "term lease under the Land Act 1994" over the proposed development site. SHMD is owned jointly by Port Binnli Shute Harbour Pty Ltd (Port Binnli) (500 Shares) and other individual and company shareholders (500shares) as per the attached Shellco search attached as (Appendix C).

Port Binnli, a Queensland registered company, have only recently (March 2006) acquired a 50% stake in SHMD. Port Binnli have an excellent track record in project management and dealings under the Land Act 1994 having developed the Mackay Marina facility (2006 Australian Marina of the Year). Other Port Binnli developments include the Raby Bay Marina in Redland Bay and the recently proposed Northeast Business Park, a 760 hectare integrated Business Park, Marina precinct and residential development at Caboolture.

1.3 Purpose of Document

SHMD proposes to construct a marina with associated residential and commercial components on Lot 2 also comprising Lot 273 on Plan SP117389 and incorporating proposed additions to Lot 2 depending on the result of further site investigations.

This IAS seeks to provide for and accommodates the requirements Section 27 (a) of the *State Development and Public Works Organisation Act 1971* (SDPWOA). That is, it presents and provides the relevant information for the project to the public and advising agencies at the local, state and federal

levels. This will allow such stakeholders to determine the nature and level of their interest in the proposal and accordingly:

- Is prepared to assist the Coordinator General to make a determination regarding the significant project declaration;
- Is to facilitate the preparation of Terms of Reference for an Environmental Impact Statement (EIS) for the proposal;
- Also addresses relevant statutory approvals that may be necessary for the proposal to proceed (e.g. environmentally relevant activities and *Environmental Protection and Biodiversity Conservation Act 1999*).

Copies of the Plans are provided in Appendix D, outlining the location of the proposed development site.

1.4 Scope of Document

This IAS has been prepared to provide information to government to provide sufficient detail to enable advisory agencies to have effective input into a Terms of Reference (TOR) for an Environmental Impact Statement (EIS). The information provided in the IAS is supplemental to that already provided to agencies as part of the original Shute Harbour Marina Development project the subject of an Initial Advice Statement lodged 24 September 2003 by Shute Harbour Marina Development Pty Ltd.

2. THE PROPOSAL

2.1 Location

The site is located in Shute Bay within the Whitsunday Shire Council local government area. The site is located at Shute Harbour Road, Shute Harbour and is described as Lot 2 on Plan SP 117389, Lot 273 on Plan HR1757 and portion of Shute Harbour Road abutting the north west corner of Lot 2 north of Shute Harbour Road (Appendix D).

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

2.2 Elements

The concept master plan for the proposed Shute Harbour Marina development incorporates water and land based components, which are summarised below and are shown in the Master Plan drawing contained in (Appendix D).

2.2.1 Marina

- A Marina providing 733 berths (including 193 multi hull berths) in a “good” wave climate constructed in accordance with Australian Design Standard AS3962-2001 (Table 4.2).
- Excavation and dredging of the marina basin to achieve navigation depths to suit the types and sizes of vessels to be accommodated.
- A floating 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.

- Floating pontoons supported by driven piles 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 basin for a range of charter boats directly connected to the onshore facilities.
- All required navigation aids, lights and signage to comply with Queensland Maritime Safety requirements.

2.2.2 Onshore Development

The revised development concept no longer proposes excavation of the northern part of the site, north of Shute Harbour Road to win sufficient fill material. Instead the proponents intend to import sand from the Don River at Bowen 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.

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

A summary of the commercial and residential precincts and proposed infrastructure services is provided below.

2.2.3 Commercial and Tourism Precinct

- A four star tourist resort up to 5 storeys comprising 96 family suites in a format designed to suit the site and the location with underground car parking.
- Marina Office and amenities and car parking.
- Charter boat base comprising a range of charter boat tenancies, administration and amenities
- Retail
- Landscaped approach road, entry statement open space and gardens

2.2.4 Residential Precinct: Foreshore

- High quality residential environment comprising 115 lots. These allotments will accommodate up to three storey dwellings. The architectural design will be controlled though design covenants and guidelines to achieve a high quality, consistent and co-ordinated built form appropriate to the region and the marina setting.
- Landscaped entry statements with security gates for controlled access high quality urban setting and street scaping incorporating street lighting, signage, seating, letterbox structures and dense plantings.

2.2.5 Infrastructure Services

- 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.

2.3 Approval Process

The project will be subject to a highly complex and multi government approval process. These approvals will include:

2.3.1 Environment Protection and Biodiversity Act 1999 (EPBC Act)

The EPBC Act provides that any action (ie a project, development, undertaking, activity or series of activities) which has, will have or is likely to have a significant impact on a matter of National Environmental Significance, or other matter protected under the Act, requires approval from the Commonwealth Environment Minister (the Minister). If the Minister decides that approval is required, the proposed action is termed a "controlled action". The proposal will then pass through a formal assessment and approval process before it can proceed.
The matters of National Environmental Significance identified in the EPBC Act as triggers for the Commonwealth assessment and approval regime are:

- National Heritage places;
- World Heritage properties;
- Ramsar wetlands of international importance;
- Listed migratory species;
- Listed threatened species and ecological communities;
- Commonwealth marine areas (and Commonwealth land); and
- Nuclear actions.

2.3.2 Relevance to the Project

Shute Harbour Marina Development Pty Ltd has previously submitted an EPBC Referral Form to the Commonwealth Department of Environment and Heritage (DEH) in December 2003. The Minister declared the project to be a “controlled action” on 24 December 2003 (Appendix E).

Further discussion with the Commonwealth Department of Environment and Heritage has been undertaken in light of the project modification. A new EPBC referral will be made and the revised project will still be considered a “controlled action” by the proponent.

The EIS process under the *State Development and Public Works Organisation Act 1971* (SDPWO Act) has been accredited by DEH for the purpose of environmental assessment under the EPBC Act.

The Part 3, Division 1, controlling provisions are:

- Sections 12 and 15A (World Heritage);
- Sections 18 and 18A (Listed threatened species and communities);
- Sections 20 and 20A (listed migratory species); and
- Section 23 and 24A (Marine Environment).

2.3.4 State Development and Public Works Organisation Act 1971 (SDPWO Act)

Under Section 26 of the SDPWO Act the Coordinator General may declare a project to be a “significant project” for which an EIS is required.

The EIS process for significant projects is described in Division 3, Part 4 of the Act. The Coordinator General is the authority responsible for coordinating the EIS process for significant projects.

The proposed Shute Harbour Marina Development has previously been declared a "significant project" by the Coordinator General pursuant to Section 26 of the SDPWO Act and the Coordinator General has required Shute Harbour Marina Development Pty Ltd to prepare an EIS under the Act.

The Co-ordinator General has advised by letter dated 27 March 2006 that a new application must be made for consideration of this project under the *State Development and Public Works Organisation Act* (Appendix B).

2.3.5 Integrated Planning Act 1997 (IPA)

The SDPWO Act contains provisions which outline the relationship with the IPA if an application is required for a development approval under IPA and Integrated Development Approval System (IDAS) linked legislation.

If a decision is made to declare this project as significant under the *State Development and Public Works Organisation Act, t*he decision stage of IDAS for a development application does not start until the Coordinator General gives the assessment manager a copy of the Coordinator General's report.

The proposed Shute Harbour Marina Development requires development approval under IPA for the following:

- Approval to override the Whitsunday Shire Planning Scheme;
- Material Change of Use under the Whitsunday Shire Planning Scheme and for Environmentally Relevant Activities (ERA) as required under the *Environmental Protection Act 1994*;
- Operational Work that is tidal works in, or above land under tidal water as required under the *Coastal Protection and Management Act 1995;*
- Operational Work that is clearing of native vegetation on land subject to a lease issued under the *Land Act 1994* as required under the *Vegetation Management Act 1999*;
- Operational Work that is the removal, destruction or damage of marine plants defined under the *Fisheries Act 1994*;
- Operational Work involving excavation, filling and landscaping;
- Reconfiguring a Lot; and
- Building Works.

Prior to construction commencing on the Shute Harbour Marina Development other development approvals may be required under IPA as other State legislation is incorporated into IDAS.

2.3.6 Environmental Protection Act 1994

A range of ERAs as defined in the *Environmental Protection Act 1994* will be carried out during both the construction and operational phases of the proposed Shute Harbour Marina

Development. As part of this EIS, a Preliminary Approval for these ERAs will be sought by Shute Harbour Marina Development Pty Ltd. Construction contractors will be responsible for the application for Registration Certificates from the Environmental Protection Agency under the *Environmental Protection Act 1994* for their planned activities. In addition, operators carrying out an ERA during the operational phase of the proposed Shute Harbour Marina Development will also be required to seek Registration Certificates from the EPA Environmental Protection Agency under the *Environmental Protection Act 1994* for their planned activities. These are outlined in section 5 of the IAS.

2.4 Project Justification

2.4.1 Marina

One of the tasks undertaken by the Whitsunday Region Marina Demand Analysis (2001) was the identification of 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, location 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. The Shute Harbour locality used in the ranking process included potential sites east and west of the existing Shute Harbour ferry 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 and to 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 occurred. Shute Harbour is better protected from cyclonic activity then 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 they scored low in these criteria.*

The assessment process has a preference for the development of marina facilities in the Airlie/Muddy Bay and Shute Harbour localities. This is particularly important as the greatest demand for marina facilities is in these locations." (Page 3-13, Whitsunday Region Marina Demand Analysis – 2001).

The Marine Industries Taskforce of the DSDI has prepared a booklet titled Queensland Marine Industry Regional Strengths which is available on that Department's website. In claiming that "Queensland is the national leader in a range of marine related industries particularly, boat building" (page 4) the booklet then provides details of the strengths of the regions along the Queensland coast, including the Mackay/Whitsundays region which is described as "a major tourism destination attracting Australian and international mono and multi-hulled sailing vessels, as well as motor cruisers and super yachts" (page 22). The booklet also claims that the "Whitsundays region has Australia's largest grouping of charter boat operations catering to

domestic and international visitors and contributing approximately $70 million in economic output and 770 direct jobs to the regional economy." (page 22).

The Marine Industry Profile posted on the DSDI website on 23 July 2004 indicates a concentration of the Australian boat building industry in Queensland with 35 boatbuilding establishments not only on the Gold Coast but also located in Brisbane, Caboolture, Sunshine Coast, Fraser Coast, Bundaberg, Townsville and Cairns. These manufacturers account for 41% of the national output, with most of the manufacturers catering for the leisure and recreation industries. With the Queensland Government actively encouraging the growth of marine industry, and with the unparalleled conditions provided by the 74 islands and enticing waters of the Whitsundays, it would appear inevitable that the Whitsundays will continue to attract increasing numbers of visiting and resident boats.

The attractiveness of the Whitsunday area for boating activities is drawing the attention of the world wide boating population. The additional marina berths on Hamilton Island have proved extremely popular with visitors. On the mainland, the expanded Abel Point marina and the recently approved Port of Airlie marina will not be able to meet the full demand in the medium to long term.

The advent of Virgin and Jetstar flights to Proserpine and Mackay and Jetstar flights to Hamilton Island have brought cheaper airfares and increased opportunities for southern residents to base their boats in the Whitsundays and take advantage of competitive airfares to enjoy short and longer breaks in the Whitsundays.

There has been no marina development undertaken or approved in the Shute Harbour area. The appeal of the area in terms of a sheltered mooring location is evidenced by the large number of craft (350) on swing moorings in the inlet. In addition, the shorter distance between Shute Harbour and the islands and waters out to the east and south-east is also of considerable appeal to boat owners and operators.

With significant increases over the past four years in size and consequently purchase price of boats, there has been an increased focus on safeguarding investments in boats, with accompanying greater emphasis on safe berths and marinas offering not only a complete range of services and facilities but also embracing high environmental standards. The concept of a safe harbour facility has driven the planning and design of all components of the marina, including floating breakwater, marina berths, pump-out facilities and the Sea Rescue and Emergency Services Centre

As early as 1996, the Whitsunday Tourism Strategy (1996) commented that: "*Inadequate facilities exist at present to service existing and growing boating needs. A new passenger terminal at Shute Harbour is necessary to provide improved service to islands and Reef".* The Strategy went on to identify the provision of a vessel berthing facility to improve marine services and improvement of the quality of passenger terminal facilities at Shute Harbour as two strategic directions of the Strategy.

Pacific Southwest consultants have been contracted to review the existing demand analysis and provide further evidence to support the demand for marina berths in the Whitsundays.

2.4.2 Residential and Tourist Accommodation, Commercial and Retail Facilities

Information available on the Whitsunday Shire website (Population & Housing Fact Sheet March 2006 and Total Residential Activity Fact Sheet September quarter 2005) show Whitsunday Shire to have a population size of 17,512 residents and an average population growth of 3.41% over the previous decade. This population growth was considerably greater than the Queensland average of 2.1%. Whitsunday Shire recorded a 76.4% increase in new residential dwelling approvals over the previous year. A total of 358 approvals, 36.9% of which were separate houses, compares to 203 approvals in 2004.

2.4.3 Tourism Outlook

The spectacular beauty of the Whitsunday waters, the diversity of islands scattered through the area, the scenic indented coastline, the accessibility to the Great Barrier Reef and the enjoyable climate have all contributed to the growth of this region and continue to influence the strong growth potential of the region. In offering outstanding locations and environments for leisure activities, the natural resources of the area have also fostered the growth of the tourism industry and the development and growth of a wide range of related business activities.

With the objective of identifying and prioritising public and private sector needs, opportunities and responsibilities to stimulate and facilitate growth, development, management, operation and marketability of tourism in the area, the Whitsunday Tourism Strategy (1996) was prepared and implemented to increase economic benefits from tourism at the same time as making sure that the conservation values and visual integrity, a range of nature-based experiences, and the local community's social and economic benefits were addressed.

In encouraging the development of a diversity of experiences on the mainland, islands and water, the Whitsunday Tourism Strategy (1996) recognised the need to provide a broader range of experiences or visitors which would complement the dominant island/reef marine image. The Strategy identified the need to emphasise the land/sea interface. The proposed Shute Harbour Marina Development project aims to broaden the range of choices for visitors with its waterfront location and its provision of accommodation and various activities in a mainland waterfront setting, while providing the infrastructure for visitors to set out and explore the marine attractions of the region.

The Strategy identified the need for further growth and development of accommodation on the mainland – since 1996, the market has responded and this perceived deficiency has been addressed at Airlie Beach. However, there continues to be limited accommodation at Shute Harbour.

Almost a decade later, through its Strategy for Growing Tourism, the Queensland Government is actively working to develop tourism in a sustainable manner, with the main objectives relating to infrastructure, the environment, market trends and government leadership and coordination. Tourism Queensland's destination management planning has been developed to enable Tourism Queensland to "best meet its market, industry and Government obligations" (page 6).

As part of its destination management planning, Tourism Queensland has released its Whitsundays Destination Management Plan 2004, which has been prepared in the context of

Queensland Government priorities for delivery of government services, the Queensland Government Strategy for Growing Tourism and the Tourism Queensland Corporate Plan. The proposed Shute Harbour Marina Development project is in line with Queensland Government priorities, in particular:

Managing Urban Growth and Building Queensland's regions.

Protecting the environment for a sustainable future.

Growing a diverse economy and creating jobs.

The safe harbour provided by the floating breakwater, will increase public safety, while the project will contribute to the economic development of the Whitsunday region. The sustainable future of the area is being fostered through the environmentally conscious planning of the project in relation to the adjacent National Park and Marine Park, in addition to the responsible management of all potential impacts of the project.

The Whitsundays Destination Management Plan guides Tourism Queensland's efforts by focussing on:

"the issues identified within this plan. Specifically these issues are:

- *Position and promote the Whitsundays as a unique and desirable holiday experience in domestic and international markets;*
- *Develop and implement marketing strategies to convert consumer interest and desire into holiday travel;*
- *Ensure more effective distribution of tourism information, products and services to the trade and consumers;*
- *Develop products and packages to enhance length of stay, address seasonality and attract emerging niche markets;*
- *Identify and facilitate investment in infrastructure and services appropriate to the needs of visitors and residents;*
- *Promote the value and importance of sustainable tourism development practices;*
- *Undertake appropriate research to monitor destination performance, visitor profiles and general tourism trends; and*
- *Forge and facilitate effective partnerships and alliances with all stakeholders who have an interest in the sustainable development of the Whitsundays" (page 2).*

The Tourism Queensland Whitsundays Regional Update for the year ending June 2005 indicates that over 648,000 visitors per annum were attracted to the Whitsundays in 2004 - 2005, with domestic visitors comprising 67% and international visitors 33%. While the average length of stay for international visitors were 5.7 nights in 2004 - 2005, and that of domestic visitors is 4.6.

With 79% of all visitors coming to the Whitsundays for the purpose of a holiday, the profile of the region is significantly that of a holiday destination. Attractions of a Whitsundays holiday include the Great Barrier Reef, the eight (8) resort islands, the 74 islands of the area, and the many water-based activities.

In relation to international tourist visitation, the latest Tourism Forecasting Committee forecasts indicate a strong recovery from the major world events that have influenced the industry (prior to the Asian tsunami) and predict the strong growth in international tourist arrivals in Australia to continue in the coming years.

The tourism industry in Queensland is undergoing significant growth, while Tropical North Queensland, Brisbane and the Gold Coast continue to be the primary focus of growth in visitor numbers, the Whitsunday region is also attracting increased numbers of visitors, assisted by the increase in air services, the introduction of cheaper airfares by Virgin Blue and Jetstar, and the increasing range of accommodation and tourism infrastructure.

Based on feedback from visitor surveys, the Whitsundays Tourism and Market Development Monitor (2004 - 2005) has identified suggested improvements with shopping, entertainment, accommodation and public facilities. The highest standards of design, fit-out, and service will be features of the proposed Shute Harbour Marina Development project and are likely to assist in changing some of the satisfaction levels with accommodation and restaurants.

Source: PRDnationwide Whitsundays – real estate review – Tourism Whitsundays website

In examining tourism market requirements, room occupancy rates of Whitsunday Mainland and Islands of hotels, motels and serviced apartments, as collected by the Tourism Queensland RTAM Report, provide an indication of demand. This information accounts for 79.3% of total rooms available in Whitsunday Mainland and Island establishments in August 2004. Room occupancy rates for hotels, motels and serviced apartments in the Whitsunday Mainland were 71.5% in July 2004 and 73.9% in August 2004, as compared with 62.5% in July 2004 and 62.9% for August 2004 for Whitsunday Islands. Domestic visitors accounted for 75.6% of the total room nights occupied in hotels, motels and serviced apartments in August 2004 on the Mainland and 81.5% on the Islands.

Besides the accommodation choices offered by hotels, motels and serviced apartments, visitors also have the option of chartering a bare boat, with the boat providing a means of transport to various destinations throughout the Whitsunday waters as well as providing accommodation. The use of bare boats peaked in October 2002 at 68% and October 2003 at 70% occupancy (Whitsundays Regional Summary 2004). While the majority of international visitors (48%) stay in backpacker accommodation, 35% of international visitors utilise boats, houseboats or cabin cruisers. It can be anticipated that the growth in visitor numbers, both domestic and international, will also lead to an increase in the use of bare boats and of skippered craft.

For visitors with little or no experience in handling a bare boat, the waters within Shute Harbour offer a valuable training ground before venturing out into more open waters. The proposed Marina is therefore of interest to the bare boat charter companies.

2.5 Construction and Operational Processes

2.5.1 Construction Phase

Seven phases will be required to construct the Shute Harbour Marina marine works, these include:

- Preparation works for the reclamation;

- Installation of sheet piling wall and associated tension & compression piles & tie backs. (this work to be completed prior to the major dredging of the marina basin)
- Importation of sand fill
- Dredging of the marina basin & access channels and filling of the reclamation area behind the sheet pile wall
- Installation of roads and services including upgrading of Shute Harbour Road
- Installation of the marina structures:
    - Piles;
    - Floating breakwater;
    - Marina pontoon; and
    - Ancillary marine equipment (eg navigation aids).
- Construction of mixed use facilities, car parks and tourist resort.

Construction operations will commence with the building of a work area by the importation of the sand fill along the existing shoreline immediately to the seaward side of Shute Harbour Road and at the northern end of the on-shore development. This will allow access for the land based piling rig to commence sheet piling from the land at the north western edge of the reclamation area out to approximate RL 1.0 to 1.5. A barge-mounted sheet piling rig will then take over and continue the sheet piling for the balance of the reclamation area. The sheet piling barge will have its own dedicated spud legs. These allow the barge to be positioned using temporary pile mechanisms which is far less damaging to the environment than using numerous anchors.

A floating silt curtain will be installed around the sheet piling barge encompassing its operations. This will be moved as necessary so as to contain any plume which will occur as a result of the sheet piling barge operations. These operations include, a deck mounted excavator which will dig a trench in front of the barge so as to facilitate the barge floating at all tides. This excavated spoil will be placed on the landward side of the proposed sheet piling wall and the floating silk curtain will enclose the entire work area.

A separate piling rig will commence installation of the floating breakwater and this work will proceed concurrently with the barge mounted sheet piling operation. A third piling rig will be utilised on the inside of the sheet piling wall to install the necessary tension and compression piles and tie-backs for the sheet piling.

The reclamation will be constructed with fill mixed from material dredged from the Marina basin and imported sand in accordance with engineer's recommendations.

The reclamation and construction of the roads and services will be carried out in three (3) stages so as to allow for the land fill to be brought up to the required compaction (Please refer to drawing no. 0605 SK05 Appendix D).

The marina basin will be dredged using a 16 inch cutter suction barge (s) surrounded by adequate silt curtains. Consulting Engineers Cardnos estimate 644720m3 of material will be dredged in order to achieve the design depth in the marina of -3.0 LAT. The access channel will range from -3.0m LAT to -4.0m LAT. The dredging would be undertaken over a 7 to ten month period depending on weather conditions, reclamation fill performance and equipment used. The floating breakwater and marina equipment would be installed as soon as the dredging program permits.

At the completion of dredging operations, a piling barge will install the piles for the marina.

2.5.2 Initial Capital Reclamation and Dredging

To facilitate dredging of the marina area it will firstly be necessary to reclaim an area approximating 2/3rds of the fill area using imported sand. The majority of this sand will be brought in by barge, with a smaller quantity being brought in by road. The reclamation will be within the confines of the sheet pile retaining wall to allow for dewatering of the fill area.

Hydraulic dredging operations of the cut materials, utilising a 16" cutter suction dredge, will then be carried and placed on top of the initially reclaimed area. Spreading, drying and compacting of the dredged materials will then be carried out to complete the reclamation to the design levels.

The tailings or 'sluiced' materials from the dredging operation will be initially contained within the final 1/3rd of the fill area, with the treated tail water, that satisfies the project's water quality objectives, returned to the marina area. The tailings will be treated so that the volume that remains within this final filling stage is maximised. The volume of tailings that are unable to be reasonably treated will be deposited into an area of the marina specifically deepened to cater for these materials. This deepened or borrow area will also cater for the earthworks volume losses experienced.

The fill necessary to complete this last 1/3rd will then be brought forward from preloads placed on the initial fill areas.

It must be noted that an error was discovered in the reclamation figure of 7.4 hectares quoted in the original EIS for the project. The original figure excluding dredge disposal area should have been calculated as 10.9576 hectares. The proposed reclamation figure in the revised design is now 11.44 hectares of reclamation excluding road works with a dredge spoil area of 1.9 hectares.

The construction of the floating breakwater will be one of the initial activities. To capture sediment plumes from the reclamation, sheet piling and dredging operations, specific silt curtains will be installed around the dredging and sheet piling operations and as a back up a floating curtain will be attached to the floating breakwater and encompass the entire work site.

Outside the works area, suspended sedimentation will be monitored visually from the surface during construction. The sedimentation levels will be controlled by the use of a daily routine Secchi Disk monitoring along the site boundaries bench marked to performance criteria.

2.5.3 Floating Breakwater and Marina Pontoon Installation

The floating marina will require piling and the supply and installation of pontoons and associated catwalks, power, potable and fire water services. Installation of the piles will be from a barge mounted piling rig. Piling of mooring piles has the potential to generate noise, although the noise impact would be less than for sheet piling. The floating pontoons will be brought in via trucks and unloaded into the water via site cranes and pushed by small work boats into position and connected to the piles.

2.5.4 Noise, Hours of Operation and Visual Impact

Sheet piling, marina pontoon piling and floating breakwater piling works have the potential to generate noise. Noise levels are estimated at 85 to 110dBA at 7m from the piling equipment. It is anticipated that within 300m of the piling rig, the noise level will be reduced to 50dBA or less, which is the noise level of normal speech. The noise level will also be very variable with time.

Calm periods of pile handling and clutching will separate noisy periods of pile driving. The piling time will be kept to a minimum. Inconvenience caused by the piling rig to Shutehaven is likely to be minimal, as dominant winds would tend to push the sound away from this area.

Work onsite will be limited to 12 hours a day during daylight, and 6 days a week with the exception of the dredging work which will at times be necessary to carry out on a 24/7 basis.

2.6 Operational Phase

2.6.1 Shute Harbour Marina Sedimentation Processes

A mixture of gravelly clay covers Shute Harbour Bay. About 60 to 70% of the surface sediments are smaller than 63µm, making the finer fraction a cohesive material. The typical sedimentation processes are:

- Suspension, re-suspension and erosion;
- Transport through various medium, including dilute suspension and fluid mud; and
- Settlement and consolidation.

The maintenance dredging rate for the proposed Shute Harbour Marina will be primarily influenced by:

- Cyclonic event frequency;
- Dredge batter stability;
- Floating breakwater design (eg draft, under keel clearance);
- Circulation of fluid mud or concentrated benthic suspension within the bay; and
- Land based inputs from upstream sources.

2.6.2 Estimated Quantity of Maintenance Dredging

For the purpose of the EIS a preliminary estimate has been made of the maintenance dredging requirements during the operational stage of the Shute Harbour Marina.

Based upon the following assumptions, cohesive transport within the dredging area has been quantified to give an order of magnitude to the sedimentation rate and various estimates:

- The suspended sediments entering the marina basin settle in the marina;
- Krone equation for transport used to calculate the erosion potential (using the last 35 years of combined waves and currents calculated for several water depths);
- Typical sedimentation rates in similar environment (ie Nelly Bay, Magnetic Island, from Scotex 1991); and
- Dredged sediment investigation findings for Shute Harbour Redevelopment (Golder 1999).

Considering a range of likely dry mass for the deposited matter, the following findings are made:

- Sedimentation is primarily driven by wave shear stress, while tidal currents define the transport location;
- Sedimentation is seasonal and three times higher during the March to August period (as the dominant winds are orientated in the direction of the larger fetch);
- Potential erosion at 0.0m LAT is a maximum of 0.40m/year, excluding cyclone events;
- Potential erosion at –3.0m LAT is of about 0.01m/year, excluding cyclone events;
- Erosion outside the dredge basin can be considered to be negligible, even during cyclone events ("Investigation of Long-term Re-suspension" Lawson and Treloar 1999);
- Erosion in the dredge basin can be considered to be negligible, even during cyclone events; and
- Accretion of sediment within the marina basin is estimated at a rate of 1,750m3 per annum excluding Cyclonic events.

2.6.3 Estimated Frequency of Maintenance Dredging

The basin will be over dredged during construction to minimise the requirement for maintenance dredging during the first ten years. With an initial over dredging of over 0.2m, it is likely that maintenance dredging would not occur until 10 years of operation, unless it is necessary after a severe cyclone event or when monitoring indicates that it is required.

After initial dredging, the maintenance dredging rate should stabilise to approximately 1500 - 2000 cubic meters per year due to the:

- Stabilisation of dredge batter slopes;
- Stabilisation of the sea bed below the floating breakwaters; and
- Decrease of fine sediments available within the bay.

It should be noted that a specific cyclonic event can bring large quantities of sediment into the proposed harbour basin (in the order of 10,000m3 to 50,000m3). A number of options in design are being considered. It is expected that further investigations and ultimate final construction will be of a design that minimises sedimentation. One option being investigated is a series of floating sheet walls with limited porosity.

2.6.4 Disposal of Maintenance Dredging Material

A maintenance dredging disposal area is located at the western sector of the site adjacent to the access road to the waterfront residential allotments and is denoted as Area 4 (Drawing No 0605 SK02 Appendix D). The area comprises approximately 19000m2. The disposal area is retained on the western and northern edges by sheet piling and will have an average depth of approximately 4 m providing a storage capacity of approximately 76000m3.

2.7 Waste Management

The Shute Harbour area is serviced by a waste contractor for collection of domestic and commercial wastes on behalf of the WSC. Commercial waste collection agreements will need to be negotiated with WSC and the waste contractor.

2.7.1 Oil and Waste

Best practice oil and fuel handling and use aboard the barges will be enforced in order to reduce the risk of accidental spillage. The Construction EMP will describe the fuel handling and storage procedures. Oil spill kits of sufficient capacity will be available at all times aboard the tugs and barges. Operators and crews will be trained to use these kits.

Used oil will be placed in the appropriate waste container for recycling. All wastes, including solid waste and sanitary waste, will be collected and treated or recycled, as appropriate.

2.8. Hazard and Risk

The construction and operation of the proposed marina development has the potential to introduce hazards and risks to the surrounding environment which require appropriate management. These hazards and risks have the potential to impact upon the environment, property and individuals. Although there are general hazards and risks applicable to most major projects, there are also some impacts that could arise specifically as a result of a project such as the proposed Shute Harbour Marina Development. Such hazards and risks need to be identified and addressed adequately.

This section identifies the potential hazards and risks that could emerge with the construction and operation of the proposed marina development, analyses the likelihood of their occurrence, and identifies appropriate management measures that would be implemented to reduce such hazards and risks.

This hazard and risk assessment does not deal with occupational health and safety hazards which may be present during the construction and operational phases of the proposed marina development, but rather only those that affect the environment, property or the public. Occupational hazards present during both construction and operation will be similar to those of any construction or workplace site and will need to be managed by sound workplace health and safety procedures, and compliance with the *Workplace Health and Safety Act 1995*, regulations and codes.

The framework for risk assessment is shown in Figure 22.1.(Sourced from Connell Wagner EIS May 2005)

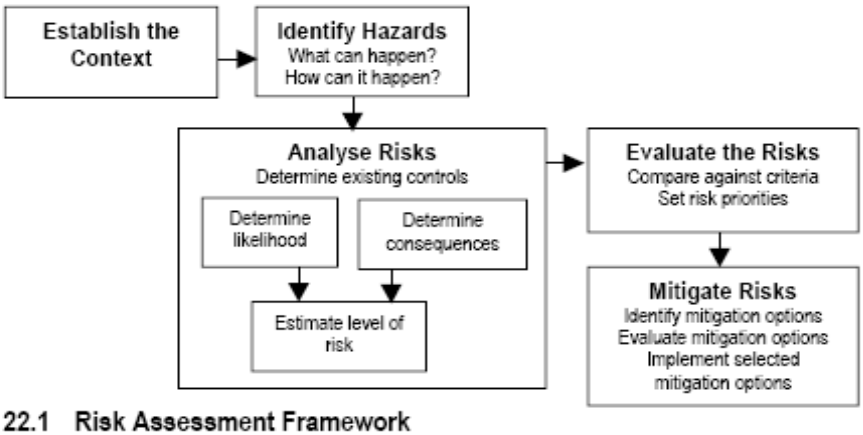

Figure 22.1 Risk Assessment Framework

2.8.1 Hazard Identification

A list of possible hazards was developed on the basis of an understanding of the proposed infrastructure, operational arrangements, location of operations and the receiving environment.

The risks could be grouped within one of ten environmental hazard areas, being:

- Plant or equipment failure (construction);
- Fire (construction);
- Cyclone (construction);
- Plant or equipment failure (operation);
- Vessel collision (operation);
- Vessel contact (operation);
- Vessel grounding (operation);
- Fire (operation);
- Dangerous goods storage and handling facilities failure (operation); and
- Cyclone (operation).

These hazard areas are based on identifiable hazard which may impact on the construction or operational phases of the proposed marina development.

2.8.2 Risk Analysis

Consistent with AS/NZS 4360, qualitative matrices (refer tables below) were developed to differentiate between the different levels of likelihood and consequence specific to each hazard. Likelihood is defined in HB203 as a qualitative description of probability or frequency (ie it relates to how likely it is something will occur). Similarly consequence is the outcome of an event expressed qualitatively or quantitatively, being a loss, injury, an expressed concern, disadvantage or gain.

Table 2.8.2 Summary of Hazard and Risk Assessment

Low Risks	Plant or equipment failure during construction Fire during construction Plant or equipment failure (operation) Vessel Collision (operation) Vessel Contact (operation) Vessel Grounding (operation)
Medium Risks	Dangerous goods storage failure
High Risks	Cyclone during construction Cyclone during operation

Of the hazards identified, most were considered to be of low risk, with only three hazards being identified as medium or high.

Regardless, however, of the final level of risk for each of the hazard, a range of risk treatment measures have been identified for each hazard. Risks associated with the proposed marina development during both the construction and operational phases of the project are considered to be manageable through the implementation of the strategies and risk treatment measures identified.

In addition, existing emergency services are considered to be within an appropriate distance and of an appropriate standard (both local services and regional support services) to support (if required) the proposed marina development. It is unlikely that the proposed Shute Harbour Marina Development will require or necessitate additional emergency services during either the construction or operational phases.

2.9 External Infrastructure Requirements

2.9.1 Road Access

The site is dissected by the existing Proserpine – Shute Harbour Road, which is a state controlled road under the jurisdiction of the Queensland Department of Main Roads (QDMR). The road through the site is currently a 2-lane bitumen sealed pavement carriageway with unsealed shoulders. QDMR has progressively been upgrading the road from Proserpine/Cannonvale/Airlie Beach towards Shute Harbour to a wider formation with sealed shoulders. The section of road through the site is yet to be upgraded and is the final section into Shute Harbour to be reconstructed. A recent scheme finished just to the west of the site boundary.

Therefore access to the site from Proserpine/Airlie Beach is to a satisfactory level and there is not expected to be any substantial traffic increases affecting road carriageway or intersection standards external to the site, on the adjoining road network.

A new access intersection will be constructed within the site to access developed areas below the current formation. No individual lot access is required off Shute Harbour Road as new internal site roads off a new intersection are proposed. The site location and expected intersection location will allow an appropriate standard intersection to be constructed without substantial change to existing road line and level. Road access to the project will be constructed in accordance with the Deed of Agreement with the Department of Main Roads as attached Appendix G.

2.9.2 Drainage

The existing site above high water mark currently drains into Shute Bay and the proposed development will not change this general drainage path. Onsite collection will include elements of recycling of roof stormwater and will include gross and fine sediment removal systems prior to discharge to Shute Bay. The proposed development will conform to best practice water sensitive design guidelines.

2.9.3 Water Supply

Whitsunday Shire Council (WSC) currently supplies reticulated potable water to Shute Harbour from its Whitsunday Coast trunk system. Recent discussions with Council's water and sewerage engineer indicate that the trunk main from the Cannonvale/Airlie Beach reservoirs has been upgraded to a 225mm diameter DICL pipe to the western boundary of the site. From this point on through the site (in the Shute Harbour Road reserve) to Shute Harbour, the main is a 150mm diameter. Top water level on the existing reservoir system is 90m and sufficient head is therefore currently available to service the site and proposed development.

2.9.4 Sewerage

Shute Harbour is not currently served by a WSC sewerage scheme. However Council advised in discussions that a scheme for Shutehaven had been planned and is expected to be implemented and operational within 12-18 months from August 2003. Construction of this scheme recently began in March 2006.

WSC has constructed, in conjunction with the Shute Harbour Road upgrades, a 150mm diameter sewer rising main from their Jubilee Pocket main pump station/treatment plant to the western boundary of the development site. The rising main is not currently active but will be brought into service when the Shutehaven scheme is completed. Council has identified a main pump station site at Shute Harbour on Council's mid level car park area behind the Shute Harbour Ferry Terminal complex. This pump station will connect to the 150mm diameter rising main through the development site providing an appropriate manifold connection point for an internal rising main from a pump station located within the development.

This will enable the entire development to be serviced by WSC's sewerage scheme and preclude any site discharge of effluent.

2.9.5 Power

Ergon Energy currently supplies high voltage (66Kv) trunk services to the Shute Harbour area via aerial service cables close to the site. It is expected a high voltage service of 3 phase 11Kv would be provided to the site via an underground conduit service from this existing HV line. An onsite substation/transformer for low voltage reticulation would be established.
Commercial supply agreements will be required to be negotiated with Ergon Energy on the above basis.

2.9.6 Telecommunications/Data Services

Telstra currently reticulates telephone/data services to Shutehaven/Shute Harbour via an underground fibre optic cable located in the Shute Harbour Road reserve. It is expected that sufficient capacity exists or can be augmented by Telstra to provide capacity to service the proposed development from this trunk service.

2.11 Employment

It is estimated that the construction work force will average 78 persons per month over the proposed 32 month timeline for construction of the marina and other early phase works. The workforce activity at the site will be greatest from the sixth to the twenty eighth month peaking in month 22 with an estimated monthly workforce of 192 people. This equates to approximately 247 full time equivalents (FTE) in the first 12 months and 367 in the second 12 months. The construction phase of the project will require specialist skills in relation to the sheet piling and reclamation construction methods. The quality of the architectural design will also require high standards of structural construction, fit out and finish.

Following completion of construction, the development will generate approximately 148 operational jobs. What is significant about this number of operational jobs is the potential for new businesses, new skills, and job opportunities for the local community.

The estimated daily employment requirements during the operational stages of development are summarised below.

Tourist Resort	66
Charter Boat Base	16
Marina	16
Commercial	32
Retail	12
Maintenance	6
Total	148

2.12 Proposed Timeframes

Proposed timeframes for development are attached at Appendix H.

2.13 Additional Studies Required

A substantial amount of research has already been compiled as part of the previous Environmental Impact Statement process dealing with the original project concepts. Recognising the feedback from that process, Shute Harbour Marina Development Pty Ltd has modified the project and undertaken significant further geological research to confirm construction options.

Given the feedback from the previous EIS the project proponents propose undertaking a range of subsequent studies to meet the requirements of agencies and other submitters. A list of those studies has been compiled and is attached as Appendix F.

3. EXISTING ENVIRONMENT

3.1 Natural Environment

3.1.1 Climate

Shute Harbour has a tropical climate and experiences an annual average rainfall of about l,650mm. The majority of the rain falls in Summer and Autumn.
Airlie Beach has experienced numerous cyclones over the last 30 years. A few of these have been considered large scale and have caused serious damage to infrastructure, marine vessels and human lives. Cyclones typically occur during Summer or early Autumn. The proposed marina is well placed to afford protection from cyclones.

3.1.2 Geology and Soils

The proposed development site is located within the Whitsunday Volcanics of Lower Cretaceous age. Bedrock typically comprises rhyolite, andesite and a sequence of very similar lava flows which, in places, have been intruded by steeply dipping dykes.

A number of geotechnical investigations have been undertaken by Ullman & Nolan, geotechnical consulting engineers, and others at this and nearby sites. Reports prepared by Cardno Ullman & Nolan (2006) present a geotechnical summary of the site. Some investigation work is still in hand. The findings of the current work will be reported in the EIS.

A QASSIT compliant acid sulphate soils investigation in the marine sediments of the site has been undertaken by Ullman & Nolan 2004. The findings confirm the presence of PASS but note that natural carbonates in the sediments make them effectively self buffering. There is hence little opportunity of acid leachate being released during site development works.

3.1.3 Terrestrial Flora and Fauna

The proposed site area above HAT south of Shute Harbour Road covers an area less than 1 ha. The majority of the vegetation is regrowth and is affected by wave erosion adjacent to the intertidal zone. This area does not provide a quality habitat for terrestrial fauna; however the proposed development would be near by to the Conway National Park. Existing land on the northern side of Shute Harbour Road that directly adjoins the National Park would be surrendered to the Crown for addition to the National Park.
Conway National Park is 22,500 ha and encompasses the largest area of lowland tropical rainforest in Queensland south of the wet tropics. There is a diverse range of vegetation within the Park including mangroves, open forest and lowland rainforest.

As previously indicated no development is proposed on the site north of Shute Harbour Road. That area is primarily dry sclerophyll forest with *Eucalyptus tessalaris* being the dominant species. There are small areas of rainforest located in the gullies. There may be some minimal impact to these areas North of Shute Harbour road during reconstruction of Shute Harbour road.
An analysis of the Regional Ecosystem (RE) Map for the area indicates that the following REs maybe present on the northern side of Shute Harbour Road:

- RE 8.12.5 - *Eucalyptus acmenoides, E resinifera, Corymbia* spp. open forest on granite. This ecosystem has the potential to provide habitat for rare and threatened flora species including *Personia amalieae* (Sattler and Williams 1999);

- RE 8.12.14 - Acacia shrubland of rock pavements on granite; and

- RE 8.12.18 – Notophyll/microphyll vine forest with species often including *Argyrodendron polyandrum, Carallia brachiata. Elaecarpus grandis, Macropteranthes fitzalanii, Backhousia citriodora* and *Dissilaria indistincta* on coastal ranges and islands. Intermediate and acid volcanics. This ecosystem has the potential to provide habitat for rare and threatened flora species,including *Macropteranthes fitzalanii.*

3.1.4 Aquatic Ecology

A narrow fringe of mangroves lines the upper shore, with *Avicennia eucalyptifolia* dominating. The shore here is not sufficiently wide to enable the zonation characterising the mangrove communities of the western bay. Foreshore rocks are likely to support a moderately diverse flora and fauna, able to tolerate the commonly turbid waters of Shute Bay. Rock oysters (*Saccostrea* sp.) are reported as being common (Marine Rio Logic 1991).

The 1991 study encountered only a small area of seagrass (approximately 10m²) at the eastern margin of the site.

Beyond the development footprint, Shute Bay supports extensive seagrass meadows.

The distribution, community composition and density of these seagrass meadows fluctuate seasonally, and in response to a range of environmental influences (FRC Environmental 2002). These seagrass meadows are of high regional significance.

The western and southern shores of the Bay support dense and diverse mangrove forests. Dense macro algal beds have been recorded within the south-eastern Bay (FRC Environmental 1999).

A fringing reef runs across the southern extent of the mouth of the bay. This reef supports diverse hard and soft corals, and a range of other invertebrate taxa (sponges, ascidians, hydroids, etc.) and macro algae (FRC Environmental 1999). The numerous small islands seaward of Shute Harbour, all have extensive fringing reefs dominated by hard and soft corals, and support seagrass meadows over adjoining intertidal and shallow subtidal flats. Mangroves fringe the island's upper intertidal zone.

It is likely that the floral and faunal communities of the intertidal and shallow subtidal, both within and adjoining the development footprint are characteristic of the Whitsunday coast.

It is unlikely there are any endangered ecological communities exisingt either within or adjacent to the footprint of the proposed development. Marine plants, including macro algae, seagrasses and mangroves are protected under the *Fisheries Act 1994*. A permit for their disturbance will be sought under Section 55 of the *Fisheries Regu1aton 1995* if marine plants need to be removed for the proposed development.

The green turtle *(Chelonia mydas)* is commonly observed in Shute Bay. Additionally, the loggerhead turtle *(Caretta caretta),* leathery turtle *(Dermochelys coriacea),* flatback turtle *(Natator depressa)* and the hawksbill turtle *(Eretmochelys imbricata)* are known from the Whitsunday region. Under Schedule 3 of the *Nature Conservation Act 1992* NCA), *Nature Conservation (Wildlife) Regulation 1994*, loggerhead and leathery turtles are listed as 'endangered', and the hawksbill and flatback turtles are listed as 'vulnerable'. Under the EPBC Act the hawksbill and leathery turtles are listed as 'vulnerable', and the loggerhead turtle is listed as 'endangered'. All sea turtles are protected under the 'marine' and 'migratory' provisions of the EPBC Act.

The dominant seagrasses of Shute Bay, Halophila and Halodule species are the preferred foraging species for green turtle. Green turtles also feed on the propagules of the mangrove Avicennia marina, which are likely to be seasonally common in the Bay. Given the range of reef and intertidal habitats, Shute Bay also provides suitable feeding areas for flatback, hawksbill, leathery and loggerhead turtles. Shute Bay is not known to support turtle nesting.

On the basis of available information, Shute Bay is likely to have moderate conservation value for sea turtles at regional and national scales.

Saltwater crocodiles *(Crocodylus porosus)* are known to occur within the region and may occasionally visit Shute Bay. Saltwater crocodiles are declared 'vulnerable' under the *Nature Conservation Act 1992*, and protected under the 'marine' and 'migratory' provisions of the EPBC Act.

Australian coastal waters, particularly in Queensland, are considered to have the highest dugong population densities in the world. Dugongs are listed as 'vulnerable' under Schedule 3 of the *Queensland Nature Conservation Act 1992, Nature Conservation (Wildlife) Regulation 1994*.

Dugongs are also protected under the EPBC Act, under the 'migratory' and 'marine' provisions. Dugong populations in the southern Great Barrier Reef (GBR) region are listed as 'critically endangered' by the International Union for the Conservation of Nature (IUCN).

Dugong feed almost exclusively on the seagrass species *Halophila ovalis, Halophila spinulosa* and *Halodule uninervis* (Lanyon & Morris 1997). Dugong feeding trails have been observed within Shute Bay (J Thorogood pers. obs). Dugong numbers in the Whitsunday region are generally low and numbers have dramatically declined in the past 2 to 3 decades.

Common dolphins *(Delphinus delphis),* bottlenose dolphin *(Tursiops truncatus)* and the Indo-Pacific hump-backed dolphin *(Sousa chinensis),* classified as 'rare' under the *Nature Conservation Act 1992* may use Shute Bay from time to time. Hump-back dolphins are coastal and are rarely seen more than 20km out to sea, preferring areas in which there are lagoons, estuaries or mangrove swamps (Bryden et al. 1998). Hump-back dolphins eat fish, particularly those associated with estuarine habitats.

Several other species of dolphin have a range that potentially includes Shute Bay (Bryden et. at 1998). These include the Irrawaddy River dolphin *(Orcaella brevirostris,* listed as 'rare' under the *Nature Conservation Act 1992*), Risso's dolphin *(Grampus griseus,)* the pantropical spotted dolphin *(Stenella attenuata)* and the spinner dolphin *(Stenella longirostris,).* It is unlikely that Shute Bay would provide significant habitat for any of these species. All delphinids are protected under the 'cetacean' provisions of the EPBC Act.

A number of syngnathid (sea horse, sea dragon and pipefish) species, and solenostomid (ghost pipefish) species are likely to inhabit the area. Species in these families are protected marine species under the EPBC Act. Many syngnathid (and solenostomid) species such as the double-ended pipefish and the flat-faced seahorse are associated with bays and estuaries, and are often found in seagrass beds (Grant 1987).

Cast-netting for bait fish is conducted in the shallow waters of Shute Harbour, adjacent to boat ramps and the jetty complex. Fish are also caught off the Shute Harbour Wharf Complex and by boats in nearby waters. Inshore reef habitat such as that found within Shute Bay may act as a nursery for the juveniles of a number of species including *Lutjanus carponotatus, L. fulvus* and *L. fu1viflamma.* Commercial netting is prohibited thin Shute Bay.

3.1.5 Great Barrier Reef Marine Park

The tidal waters that form part of the proposed development site, while not included in the boundary of the Great Barrier Reef Marine Park, are currently zoned General Use A under the Great Barrier Reef Marine Park Zoning Plan (Central Section). The Shute Bay area is located with the Whitsunday Management Area.

Under the Great Barrier Reef Marine Park Zoning Plan 2004 the tidal waters adjacent to the site have been included in the Habitat Protection Zone.

The EIS will discuss the proposal's compliance with the existing Zoning Plans and management objectives. The EIS will also assess the potential impacts of the proposed development on the World Heritage values of the areas.

3.2 Social Environment

Shute Harbour and the adjacent residential area of Shutehaven are located within the Whitsunday Shire. Together with nearby settlements of Cannonvale and Airlie Beach, these areas represent the main tourism centres for the Shire. The Shire contains some 72 islands set in the Great Barrier Reef with boat access to the islands centred on Shute Harbour.

In 2001, the estimated resident population of Whitsunday Shire was 15,495 persons. The population has increased at an annual average rate of 2.1 percent since 1996, which is above the State average of 1.7 percent. This higher than average growth rate is expected to continue into the future with the population of the Shire expected to reach 23,661 by 2021, being an increase of 7,894 persons over the 20-year period.

In November 2005 the Planning Information and Forecasting Unit of the Department of Local Government and Planning stated the population of Whitsunday Shire was estimated to be 16,874. Whitsunday Shire being only one of three shires in the Whitsunday Hinterland and Mackay region averaging population growth in excess of 100 people annually.

The growth in population in the Shire has been reflected in a high rate of residential building approvals between the period 1997 to 2001, which was more than double the average rate of Queensland as a whole. The value of non-residential building approvals over this period was also higher than the state average. This trend has continued with 379 dwellings approved in the year to June 2005. Of all dwellings approved in the Whitsunday Hinterland and Mackay region 24.8% were in the Whitsunday Shire. The Shire has a higher employment participation rate (69.4%) and a lower unemployment rate (6.6%) than the Queensland average. Tourism growth in the region is also strong with over 640,000 tourists visiting the Shire annually.

One of the key issues identified in the Statement of Proposals for the new planning scheme for Whitsunday Shire (July 2001) was the need to protect marina facilities within the Shire and to provide for future marina requirements.

3.2.1 Cultural Heritage

Northern Archaeology Consultancies (NAC) was engaged to prepare the cultural heritage assessment for the proposed Shute Harbour Marina Development.

The Shute Harbour Marina Development site lies within the traditional homelands of the Gia and Ngaro peoples. Three indigenous interest groups have been included in the consultation process as all have indicated that they represent the Gia and/or Ngaro Traditional Owners and Native Title applicants. Consultation has been undertaken with spokespersons representing the Gia Native Title claimants (claim QC99/24), the Gudjuda Reference Group Aboriginal Corporation (Ayr) and the Giru Dala Council of Elders Aboriginal Corporation (Bowen). Consultation with these groups has been ongoing over the duration of the assessment process between October 2003 and February 2004. The main contact persons have included Vicky Toffetti and Patricia Brimble (Gia claimants), Joe Henaway (Cultural Officer, Gudjuda Reference Group) and Jim Gaston (Cultural Officer, Giru Dala Council of Elders).

3.2.2 Traditional Owner Consultation

As noted, the Shute Harbour Marina Development area is located in the traditional homelands of the Ngaro and Gia peoples. The precise location of traditional territorial boundaries between these two distinct indigenous groups is the subject of extended anthropological and Native Title research, well beyond the scope of the current study. For the purposes of this cultural heritage project representatives from both groups have been included in the cultural heritage assessment, as both have indicated strong interests in land development and land management issues in the wider Shute Harbour region. There is currently one Native Title claim relevant to the wider Bowen-Proserpine coastal area, claim QC99/24 lodged by the Gia people.
A field survey of the proposed Shute Harbour Marina Development area did not locate any definite archaeological evidence for significant Aboriginal or European (historical) cultural heritage sites. The Ngaro and Gia Traditional Owner field officers did not identify any significant non-tangible cultural sites or values in the project area.

The results of the current investigation generally confirm the results of the earlier archaeological assessment by Barker (1991a). No definite archaeological evidence for Aboriginal occupation was discovered on the steep and sloping terrain on the northern side of Shute Harbour Road. While Barker located a possible Aboriginal shell midden on the south side of Shute Harbour Road in 1991, he suggested that this site was highly disturbed as a result of cutting and filling operations for the construction of Shute Harbour Road (Barker 1991a). The recent (2003) field surveys have found no evidence of intact Aboriginal shell middens along the coastal margins of the study area. Shell deposits and scatters along the foreshore were identified as naturally accumulated coastal deposits (with a significant proportion of non-cultural materials such as shell grit, juvenile shellfish, coral, beach pumice, beach pebbles, etc) (cf. Attenbrow 1992; Bowdler 1983; Hughes and Sullivan 1974).

3.2.5 Native Title Issues

On 25 August 1994, a special lease (for development purposes) under the *Land Act* 1962 (Qld) was granted over the development land which required the lessee (developer) to “use the leased land for reclamation, marina, business (commercial development), residential (multi-residential units), and tourist facility purposes and for the purposes incidental thereto”

Pursuant to section 23B of the *Native Title Act* 1993 (Cth) – the issuing of the special lease is classed as an exclusive possession act which extinguishes Native Title pursuant to section 20 of the *Native Title Act* (Qld) 1993 due to the following reasons:

- It is valid pursuant to section 8A of the *Native Title Act* (QLD), as it is a Category A intermediate period act;
- It was issued prior to 23 December 1996; and
- It consists of the granting of a scheduled interest.

The *Native Title Act* 1993 and the *Native Title Act* (QLD) however, is not to be confused with the *Aboriginal Cultural Heritage Act* 2003. The Native Title applicants for the area, the Gia people, still must be included while constructing the Aboriginal Cultural Heritage Management Plan and during the construction phase of the development. It is also important to ensure that all construction staff adhere to the *Aboriginal Cultural Heritage Act* 2003 Duty of Care Guidelines during their time onsite. This means that all activities carried out onsite must take all reasonable

and practicable measures to ensure the activity does not harm Aboriginal Cultural Heritage be it in the form of artefacts, areas or other evidence.

3.2.6 Shipwrecks

Under the *Historic Shipwrecks Act 1976* it is necessary to conserve, protect and preserve Australia's shipwrecks and relics. Australia has rich maritime history which can be traced back 60,000 or more years to the arrival of the aboriginal people. They were later followed by the Macassans and then in the seventeenth century by the Dutch, English and French (DEH 2004). Australia's coastline was the focus for many ships and some of these ships never made their destination. These shipwrecks are a part of Australia's history and are important to protect. To protect these shipwrecks the Commonwealth Department of the Environment and Heritage (DEH) administers the *Historic Shipwrecks Act 1976* and the Australian National Shipwreck Database.

The database includes all known shipwrecks in Australian waters and allows users to search for those historic shipwrecks protected by Commonwealth or State/Territory legislation.
A search was undertaken on the database and no shipwrecks were found in Shute Bay or nearby areas.

3.3 Land Tenure

The proposed development site for the Shute Harbour Marina (i.e. land, intertidal and waters) is owned by the Queensland Government. The Governor in Council has granted a Term Lease over the site (Lot 2 on Plan SP 117389) to Shute Harbour Marina Development Pty Ltd. Upon completion of the development the land above the HWM will be freehold to SHMD and SHMD will be granted 99 year lease for the area below the HWM.

The existing lease is due to expire in August 2006. Application has been made (2006) by the proponents to the Minister administering the Land Act 1994 to renew the lease. The Department of Natural Resources, Mines and Water have advised that the lease is capable of renewal however modified terms and conditions will apply consistent with recent additions to policy.

3.4 Planning

3.4.1 The Whitsunday Shire Council Strategic Plan

The Whitsunday Shire Council Strategic Plan dated 27 April 2000 designates the subject site as Marina and Road Reserve. There is also a small amount of land included in the Regional Open Space designation. Land to the north of Shute Harbour Road is included in Scenic Management Zone B. The site is adjacent to lands classified as Regional Open Space (Conway National Park).

The Strategic Plan designation obviously gives a general indication that the site is considered suitable for a Marina. However whilst this designation gives a broad indication of the acceptability in principle of a marina development, the vision statement also indicates that environmental performance needs to be of the highest standard. The overall vision statement includes strong concerns for pristine environmental areas. It also refers to the need for improved boating and outdoor recreational opportunities and the need to support economic development in the Shire. The framework for environmental performance is already provided through the approval mechanisms of the Great Barrier Reef Marine Park Authority (GBRMPA) and the EPA (through the administration of the State Coastal Management Plans and ERAs).

The proposed development will require a development approval for a Material Change of Use, among other approvals, from Council under the *Integrated Planning Act 1997.*

3.4.2 The Mackay Whitsunday Coastal Management Plan

State Government issues relating to the development of Shute Harbour are articulated in the State Coastal Management Plan and Draft Mackay Whitsunday Coastal Management Plan, which are deemed as a State Planning Policy for the purposes of the *Integrated Planning Act 1997* (IPA). The draft Mackay Whitsunday Regional Coastal Management Plan has been prepared to provide a more detailed regional planning framework.

The provision for 'Tourism and Recreational Activities' within the State Coastal Management Plan states:

"When planning for tourism and recreation, facilities and services such as waste treatment and access need to be designed to be capable of meeting projected peak demand. New tourist or recreational developments must be compatible with the coastal landscape values of the area and be of a scale that does not result in a significant impact on coastal resources and their values. Consideration also needs to be given to allow for a diversity and balance of tourism and recreational opportunities."

The development has been prepared to cater for projected demands. It is concluded that the proposed development is generally in compliance with the Strategic Plan vision, principles and objectives.

3.5 Approvals Required

At the Local Government level, the proposed project will require development approval for a Material Change of Use, among other approvals, from Whitsunday Shire Council, under the *Integrated Planning Act 1997.*

A range of approvals would be needed from State Government agencies for removal of marine and terrestrial plants; works and structures within the marine environment, including dredging; activities requiring a Marine Park permit; activities within an erosion prone area; provision for a number of environmentally relevant activities.

The potential application of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is foreshadowed with the location of the project adjacent to the Great Barrier Reef World Heritage area.

The project will not involve broad scale clearing for agricultural purposes.

Given the significance of the Shute Harbour Marina development and the nature of the environmental elements within the project area, there are a number of Commonwealth and State environmental legislative requirements which need to be addressed prior to construction commencing. The key interactions between the environmental legislative requirements and the associated environmental studies are summarised in Table 3.5.

Table 3.5 Summary of Key Environmental Legislative Requirements for the Project

Legislation	Legislative Trigger	Project Requirement
Environment Protection and Biodiversity Conservation Act 1999 (Cth)	Significant impact on matters of national environmental significance	EPBC Act Referral
Fisheries Act 1994	Removal, destroy or damage marine plants (Section 51)	A fisheries development approval will be obtained for any disturbance, removal or damage of marine plants associated with the construction of the project.
Coastal Protection and Management Act 1995	Works within tidal waters	A permit will be obtained for any works within tidal waters.
	Works in an erosion prone area	A permit will be obtained for any works within an erosion prone area.
Environmental Protection Act 1994	Undertaking ERAs	Environmental Authorities will be obtained for all ERAs carried out on the Shute Harbour Marina construction site
Vegetation Management Act 1999	DNRM	Development permit for operational works to be obtained for clearing native vegetation.

3.5.1 State Permits, Licences and Environmental Authorities

An assessment of the relevant Queensland legislation and associated approvals has been undertaken to provide an understanding of the likely permits and licenses required for the proposed Shute Harbour Marina Development. Table .3.5.1 provides a summary of the likely approvals required for the proposed marina.

Table 3.5.1 Summary of Likely State Approvals

Legislation	Administering Authority	Trigger	Project Response	Responsibility (Project Phase)
Coastal Protection and Management Act 1995 and *Integrated Planning Act 1997*	EPA	Operational work that is tidal works in, on or above land under tidal water. "Land" is defined to include any estate under land and also the subsoil Works within Erosion Prone areas	Development Permit for Operational Works to be obtained Approval for works within Erosion Prone Area	Detail Designer (Detail Design) Detail Designer (prior to construction)
Dangerous Goods Safety Management Act 2001	DES	Dangerous goods location established	Notify the Chief Executive (DES). Emergency Plans to be prepared	Construction Contractor (Construction)
Environmental Protection Act 1994 and *Integrated Planning Act 1997*	EPA	ERAs listed	Environmental Authority to be obtained	Detail Designer to obtain Development Permit and construction contractors to obtain

		Removal of contaminated soil from sites listed on CLR or EMR	Disposal Permit to be obtained (if required)	registration certificates (Prior to Construction) Individual operators to obtain Registration Certificates (prior to Operation) Construction Contractor (Prior to Construction)
Fisheries Act 1994	DPIF	Work in areas causing removal, destruction or damage to marine plants	Permit to be obtained	Detail Designer (Detailed Design)
Nature Conservation Act 1992	EPA	Taking, using, keeping or interfering with a protected animal or plant	Fauna to be relocated in accordance with Fauna Relocation Plan Permit to be obtained if protected plants are affected by project	Construction Contractor (Construction) Construction Contractor (Prior to clearing)
Water Act 2000	DNRM	Destroying vegetation, excavating and placing fill within the watercourses. Stream diversion Permit	Permit to be obtained for works within the watercourse Permit to be obtained for diversion of watercourse	Detail Design (prior to construction) Detail Designer (prior to construction)
Vegetation Management Act 1999	DNRM	Clearing native vegetation	Development permit for Operational Works to be obtained	Detail Designer (Detail Design)

Table 3.5.2 Other Key Legislative Requirements

Legislation	Administering Authority	Trigger	Project Response	Responsibility (Project Phase)
Animal Care and Protection Act 2001	DPIF	Encounter animals in the course of works/activities	Must not be cruel to an animal (eg cause pain, abuse, confine or transport inappropriately) Fauna Relocation	Construction Contractor (Construction) Construction

			Plan to be implemented	Contractor (Construction)
Environmental Protection (Waste Management) Regulation 2000	EPA	Various triggers relating to waste trackings	Waste management to comply with relevant provision	Construction Contractor (Construction)
Land Protection (Pest and Stock Route Management) Act 2002	DNRM	Pests (ie animals or plants) must be controlled	EMP to be implemented during construction and maintenance	Construction Contractor (Construction) Operator (Operation)

ERAs which will be carried out during the construction and operational phases of the proposed Shute Harbour Marina Development are outlined in Table 3.5.3.

Table3.5.3 Environmentally Relevant Activity Licences required

ERA Number	ERA Details
19	Dredging material – dredging material from the bed of any waters (other than dredging by a port authority of material for which a royalty or similar charge is not payable) using plant or equipment having a design capacity of – (a) not more than 5,000t per year; or (b) 5,000t or more, but less than 100,000t per year; or (c) 100,000t or more per year.
11	Crude oil or petroleum product storage – storing crude oil or a petroleum product in tanks or containers having a combined total storage of 10,000L or more
73	Marina or seaplane mooring - operating a commercial marina or facility for mooring seaplanes, including any land based buildings or works used in association with the marina or mooring – for 100 or more berths.

4. POTENTIAL IMPACTS

It is impossible to undertake any development without a combination of both positive and negative impacts in terms of sustainable development. Ultimately in keeping with sustainable development principles the project should deliver a net benefit across the broad spectrum of environmental, social and economic factors. It is important to note that potential adverse impacts that might have arisen due to the original project design have been minimised and in some cases removed.

- The revised construction of the marina and associated land uses will result in the clearing of approximately 2ha of terrestrial vegetation. No rare and threatened flora species were found on the project site. One Regional Ecosystem RE 8.12.14 was present on the project site. This RE is listed as “not of concern” under the current regulations of the *Vegetation Management Act 1999* and is well represented in reserves, including the Conway National Park. In any event this will not be affected under the new proposal.
- The revised design will minimise the removal of vegetation from the site and the potential impact on local fauna. The area to be cleared is minimal when compared with the size of the adjacent Conway National Park and management measures will be implemented to ensure that there is no direct impact to fauna;

- Although the project will have both direct and indirect impacts on the aquatic environment, the implementation of mitigation measures and "best practice" will ensure that these impacts are minimised. Consultation will occur with DPIF and EPA to ensure that adequate compensatory habitats are developed so that there will be no net loss of habitat or productivity in the region;

4.1 Potential Environmental Impacts

Shute Bay contains a broad range of habitats including mangroves, seagrass, salt marsh and soft bottom communities. A wide variety of fish, invertebrates, reptiles and mammals utilise the area and are dependent upon the mangrove and seagrass communities within the bay.

Stormwater flows into Shute Bay are not significant even during the wet season compared with tidal action. Although runoff is likely to contain sediment, rocks and leaf litter, the stormwater flows will have little effect on sedimentation within the bay. Shute Bay is one of the lowest energy areas within several kilometres of mainline coastline, and consequently acts as a sediment trap. The origins of sediment deposits within the bay are from erosion, estuary deposits and organic matter.

To ensure that the ecological processes, communities, and species are protected and ecosystem function is maintained, management and mitigation measures will be developed for all stages of the project. Although the proposed development will have a direct impact to the habitats within the footprint, appropriate management and mitigation techniques will be developed to minimise potential impacts to areas outside the footprint.

4.1.2 Aquatic Ecology

Potential impacts of the proposed development may be associated with the development of the site, or with the consequent use of the developed facilities. Impacts may be direct (e.g. removal of habitat) or indirect (e.g. through influences on water quality). The potential impacts of development are clearly related to the sensitivities of floral and faunal communities within the area influenced by the proposed development.

Development of the proposed marina-complex and access channel is likely to result in the direct loss of fringing mangrove forest; and minimal impact on intertidal and shallow sub tidal seagrass meadows and unvegetated soft sediments.

Construction of the proposed development will potentially result in the creation of other habitats associated with the rock breakwaters, piles and other intertidal and subtidal structures. These hard surfaces will provide substrate for many species of algae, hard and soft corals, and a variety of other invertebrate fauna. SHMD do intend to institute a no net loss in terms of mangrove habitat, incorporating mangrove regeneration as part of the dredge maintenance management regime.

Indirect impacts of construction activities likely to impact the marine environment include dredging, spoil handling and disposal, pile driving and similar activities. These construction activities may result in:

- increased suspended sediment levels and consequent sediment;
- deposition within the bay and adjoining waters;

- a release of nutrients or contaminants from the disturbed sediments;
- spills of hydrocarbons and other contaminants;
- disturbance of acid sulphate or potential acid sulphate sediments (PASS); and
- increased human activity, including changes in light and noise levels.

In particular increased suspended solids and sediment deposition may disturb the seagrasses and corals of the Bay. Impacts potentially associated with the operation of the marina-complex are likely to be principally linked to human activity. Use of the marina will result in an increase in human activity and specifically in boat traffic within Shute Bay, and an increase in, for example, refuelling operations. There is likely to be an increase in recreational fishing in the Bay, and any 'charismatic megafauna' (e.g. turtles and dugong) are likely to attract increased attention.

Impacts associated with both construction and operation of the proposed development can be significantly mitigated through a range of strategies relating to design, development planning and operational controls and best practice management techniques.

There are positive impacts that will occur as a result of the development and these will include a decrease in potential sullage and waste disposal by visiting boats given provision for state of the art facilities in Shute Harbour Marina, opportunity to decrease the number of indiscriminate moorings across Shute Bay, overall better management of recreational traffic within Shute Bay. Marinas such as Mackay Marina when managed effectively provide an effective management tool to manage the impact of vessels on the marine environment.

4.1.3 Terrestrial Flora and Fauna

Impacts on terrestrial flora and fauna south of Shute Harbour Road will be minimal due to the highly disturbed nature of the area. Construction that occurs north of Shute Harbour Road will be minimal as no development is proposed north of Shute Harbour Road. Potential minor direct impacts may include the removal of vegetation through road realignment work. Potential indirect impacts include removal of habitat, edge effects and the potential introduction of pest species. The introduction of pest species may occur due to construction machinery being used onsite. This potential can be discounted with the application of effective machinery hygiene measures.

The proposal for no development north of Shute Harbour road will provide a buffer zone between the development and the National Park. This will reduce the impact of noise on the fauna utilising the surrounding areas as well as the impact on surrounding commercial and residential properties.

Management and mitigation measures will need to be implemented during construction and operation to ensure minimal impact occurs.

4.1.4 Air Quality

Based on the location of the proposed marina and the general land use of the area, the air quality issues associated with the project include:

- Dust;
- Vehicle emissions;
- Odours; and
- Other particulates (salt spray).

There is limited existing information available on the current air quality within and surrounding the project site. Ambient monitoring was undertaken for this IAS to provide a "snap shot" of the background dust levels in the area. To gain an understanding of the current air quality at the proposed site, dust monitoring was carried out over eight (8) days, commencing at 00:01am on Friday 20 August 2004. A TSI Dustrak data logging aerosol monitor was used, with a PM_{10} attachment. Dust is considered the major air quality issue during the construction phase of the project.

4.1.5 Tidal Level

The proposed Shute Harbour Marina reclamation will not significantly change the tidal prism of Shute Bay approximately 225ha and the proposed marina will not impact ocean water level variations. Due to its limited size and nature, the floating breakwater will not modify storm surge magnitude or frequency (ie barometric and wind set-up).

The wave climate within the bay will be not be modified appreciably by the proposed floating breakwater. Within the marina basin the "good" wave climate will need to comply with the objectives in the Australian Standard AS3962-2001 (Table.4.2). A floating breakwater or wave attenuator, will be located at the eastern and southern edges of the site to control and dampen wave action and induce calm conditions within the marina basin. Consequently, the flooding height will be somewhat smaller than existing.

Detailed design will define development levels to ensure no overtopping of the reclamation area.

4.1.6 Tidal Flow Patterns

The proposed marina will not significantly modify existing current patterns in Rooper Inlet, Shute Bay and along the existing jetties. As the floating breakwater will not create a physical barrier to flow the overall bay circulation and flow mass balance will not be modified. It is expected that differences in current magnitude and direction will be small and insignificant. The current directions will stay tidal and wind driven. Potential, local impacts from the proposed works include:

- The current will increase at the tip of the western reclamation area of the development. Peak flow could be as fast as the existing peak flows offshore of the helipad area (cross shore currents of about 0.20m/s during spring tides);
- The depth-averaged current will be smaller within the proposed marina basin, reduced approximately by a factor of two; and
- During the lowest tides, the current magnitude will be slightly larger below the floating breakwater as this structure will partially obstruct the flow.

4.1.7 Suspended Sediment and Turbidity

The proposed marina dredging basin will cause small disturbances to the bay morphology, as it will act as a sediment trap for the bay's fine sediments.

Some of the finer bay sediment will be deposited inside the proposed marina basin. This sediment will be dredged and disposed at the maintenance dredging disposal area. It is anticipated that the average turbidity in the bay would stabilise to a slightly lower level than existing after a few years of operations. The water within Rooper Inlet and in the vicinity of the

existing jetties may become clearer and less turbid. This has the potential to impact on species living in the turbid environment and any burrowing organisms, while it might be beneficial for pelagic and other species. The aquatic environment will be monitored before and after construction.

4.1.8 Geomorphology

Because of slight changes in wave climate and hydrodynamic conditions locally, sedimentation is likely to increase:

- In the vicinity of the Repair Estuary; and
- In the vicinity of the floating breakwater, siltation will vary with tide and wave conditions.

The Shute Harbour Bay soils change in nature from soft mud to coral reefs. It should be noted that overall changes in seabed structure and sedimentation are speculative and subject to a range of interpretations.

The impact of the project on soft soil substrate within the seagrass areas will be minimal, as the bed shear within the stress zones will not be modified. On the other hand, colonisation to new areas might become slower as the top substrate might contain less soft sediment than was previously existing. As the seagrass is growing seasonally, this might become noticeable over several years.

The soft sediment within the bay could become mobilised inside the basin harbour, which acts as a sedimentation trap for the Shute Bay. Therefore another consequence could be that the harder surface horizon, described above as a “crust”, might become slightly harder with time.

4.2 Potential Social Impacts

The proposed Shute Harbour Marina Project will provide marina berths and associated facilities to meet local, regional and international demand. The residential component of the project will provide high quality accommodation in a region of strong growth and high demand. The resort will provide four and a half-star family accommodation for national and international visitors

The construction workforce is unlikely to be of a size that would create unreasonable demand for temporary accommodation in the region and it is expected that the majority of the construction workforce would be sourced from within the Shire or adjacent Mackay or Bowen Shires.

The operational workforce will provide additional jobs that will benefit the local economy.
The new population will create local demand for shopping, educational and community facilities. It is anticipated that the new demand will not generate sufficient need for new facilities and services; rather a need for the augmentation of existing facilities and services. These demands will need to be quantified in the EIS.

Social impacts on the Shutehaven/Cannonvale/Airlie Beach communities during construction are likely to be minor and acceptable with minor disruption to traffic on the Shute Harbour Road and small increases in traffic generation, noise and dust associated with construction activities.

Overall, the project is expected to have social benefits for the region through the increased supply of housing, the provision of a resort as well as commercial and boating facilities and the economic

benefits to the region through increased employment and expenditure. The international standard facilities will increase tourism of national and international visitors.

4.2.1 Potential Impacts to Cultural Heritage

The cultural heritage survey of the development area for the proposed Shute Harbour Marina Development project has not found any definite archaeological evidence for significant Aboriginal or non-indigenous (historical) cultural heritage sites or materials.

The overall cultural heritage potential of the development area is assessed as low, given the high degree of previous landscape disturbance and the steep, rugged nature of the coastline. The results of this cultural heritage investigation indicate that the potential impact of the proposed development on the Aboriginal and/or European (historical) cultural heritage record is likely to be low to negligible.

Having said this, the Traditional Owners have noted several points of concern regarding the potential impacts of the proposed project on the natural and cultural values of the study area and the wider Shute Harbour region.

The Traditional Owners are generally concerned about the large scale coastal development currently being undertaken in the wider Whitsunday area. They are particularly concerned at the rate of coastal clearing being undertaken for development projects. To the Traditional Owners the Shute Harbour coastline and surrounds is part of a broad cultural landscape which retains a high level of significance as part of their traditional homelands. The consultation process has revealed that the Traditional Owners are particularly concerned about long term impacts to the cultural landscape and the natural environment.

In the case of the Shute Harbour Marina Development project, the Traditional Owners have noted their concerns regarding the potential impacts on water quality in Shute Bay (from reclamation works, dredging, increased boat traffic, pollution from boats and other vessels, etc). Their concerns extend to the long-term potential impacts on marine habitats (mangroves, reefs and seagrass beds) and marine fauna (fish, shellfish, turtles and dugong). On this basis, the Traditional Owners have requested that they receive feedback from the proponent on environmental studies being undertaken as part of the broader EIS process. Traditional Owners would like the opportunity to review and provide comment on the completed EIS (not just this cultural heritage component). Again, the point is reiterated that the Traditional Owners view the land and sea as an important and integral component of the cultural landscape of their traditional homelands.

As noted, the Traditional Owners have noted their concern regarding the potential impacts to culturally sensitive vegetation in the project area, specifically grass trees and old growth trees. According to the Shute Harbour Marina Development plan impacts to the grass trees which grow along the slopes of the study area will be negligible given the redesign of the project. The Traditional Owners have requested that the proponent investigate the possibility of incorporating (replanting) any of the grass trees disturbed in the proposed landscaping for the development project.

The Traditional Owners have identified five large trees (Eucalypts) in the western sector of the study area as being culturally sensitive. Given that these trees are located on the extremity of the

development area it will be possible to avoid and protect them from all developmental impacts. Avoidance of these trees is strongly recommended.

The cultural heritage survey for the proposed project has included a *surface* survey of the study site. The potential for locating intact sub-surface cultural heritage sites or materials in the study area must be considered.

The project archaeologist suggests that the potential for *in situ* subsurface cultural deposits to exist in the study area (in either coastal or hillside deposits) is likely to be low, given the extent of previous cutting, filling and other earthworks. Observations of stratigraphic profiles in hillside cuttings indicate that there is very little soil deposition on the hill slopes in the study area. Soil profiles indicate that the bedrock is very close to the surface and capped by only a very shallow layer of residual soil. As noted by Barker (1991a) coastal deposits adjacent to Shute Harbour Road have been completely altered by road construction works. The results of previous cultural heritage investigations, both within and adjacent to the project area (cf. Barker 1991a, Bird 2002a and 2002b), indicate that it is highly unlikely that intact subsurface cultural deposits will exist in the project area.

The Traditional Owners feel that there is some potential for cultural sites such as shell middens and/or stone artefacts to occur along the coastal margins of the development area (including the shoreline and lower hill slopes). On this basis, the Traditional Owners are requesting that the proponent appoint Traditional Owner representatives to monitor development works (that is, clear and grade operations and subsurface earthworks along the coastal margins).

4.2.2 Cultural Heritage Recommendations

The following recommendations are made as a result of the cultural heritage assessment of the Shute Harbour Marina Development area:

4.2.3 Archaeological Recommendations

- It is recommended that the five old growth trees identified in the report be avoided and protected from all developmental impacts. In particular, the Traditional Owners have noted that all attempts be made by the proponent to retain and preserve Tree 3 which has an old scar that may be of cultural origin.
- The Traditional Owners request that the proponent make concerted efforts to minimise impacts to grass trees within the study area by investigating the viability of retaining and replanting this vegetation as part of the development project.
- The Traditional Owners request that the proponent appoints Traditional Owner representatives to monitor development works within the study area. Specifically, the Traditional Owners request that there be monitoring of initial clear and grade operations, as well as subsurface earthworks.
- In the event that unrecorded cultural heritage sites or materials are discovered in surface or sub-surface deposits during development operations, the following recommendation should apply. All development work at the find spot should cease, pending a thorough inspection of the area by Traditional Owner representatives and an archaeologist (either the project archaeologist or the Regional Manager, Cultural Heritage Branch, Environmental Protection Agency). Depending on the cultural significance of the finds, appropriate management and mitigation strategies should be implemented before the re-commencement of development operations in that area.

- It is recommended that the Traditional Owners be provided with information compiled from environmental and other studies as part of the broader EIS process. The Traditional Owners would like the opportunity to review and comment on other components of the EIS (not just this cultural heritage investigation.

4.2.4 Other Recommendations

The Traditional Owners have raised several issues regarding the proposed project which are outside the brief for this cultural heritage investigation. Recommendations regarding these issues are outlined below.

- The Traditional Owners request the opportunity to enter into discussions with the proponent regarding prospects for future employment and training opportunities for indigenous people in the developmental and operational phases of the Shute Harbour Marina project.
- The Traditional Owners request the opportunity to enter into discussions with the proponent regarding the possibility of incorporating a cultural centre/cultural display area as part of the proposed development project.

4.3 Potential Economic Impacts

The potential economic development impacts of the $240 million dollar Shute Harbour Marina project are significant. They include:

- Increased Employment: Following completion of construction, the development will generate approximately 148 operational jobs. What is significant about this number of operational jobs is the potential for new businesses, new skills, and job opportunities for the local community. It is estimated that these jobs will inject approximately $10million per year into the local economy post construction.
- The estimated construction work force will average 95 persons per month over the proposed 22 month timeline for construction of the marina and other early phase works. The workforce activity at the site will be greatest from the sixth to the eighteenth month peaking in month 16 with an estimated monthly workforce of 189 people. This equates to approximately 243 full time equivalents (FTE) in the first 12 months and 365 in the second 12 months that is in excess of 600 ftes over the life of the project. This equates to an injection approximately $400 million during construction into the local economy.
- An Industry Participation Plan increasing local business opportunities: The development off an Industry Participation Plan will maximise local employment opportunities afforded by Shute Harbour Marina during construction. The $240 million dollar construction program will boost regional development and assist local industry to become more competitive.
- Increased Mainland Tourism: A significant issue in the Whitsunday Tourism experience is a lack of mainland tourism accommodation. The resort will complement the island resorts through special arrangements such as linked mainland and island resort packages. Located in close proximity to the Conway National Park and soon to be upgraded Shute Harbour Tourist terminal the $30 million dollar proposed resort will broaden the Whitsunday Tourism accommodation options for tourists and potentially deliver up to $15 million in increased tourism expenditure per year into the region.
- Increased Investment in Public Recreational boat launching facilities: Shute Harbour Marina Development Pty Ltd have had initial discussions with the Whitsunday

Shire Council with a view to providing a $2.5million dollar investment in Public recreational boating and car and trailer park facilities at Shute Harbour.

Shute Harbour is the major port facility from which a range of commercial and marine vessels access the Whitsunday Islands and waterways. Prominent types of cruising and marine recreation activities include outer reef tours, bareboat charters, diving and snorkelling, fishing charters and water taxi's/ferries between the mainland and island resorts. The Whitsunday region has a very high incidence of local and private ownership of vessels and similarly is a popular transit destination for vessels visiting the region.

Tourists to the Whitsunday region in 2001, numbered approximately 555,000 staying an average of 5.2 nights and spending approximately $389 million (or $232 per person). The Whitsunday region experienced average annual growth of 15% in tourist expenditure between 1989 and 1999. By comparison in 2005, the Whitsunday's hosted 3% of all visitors to Queensland. Of these 648,049 visitors 436,000 were domestic visitors (67%) and 212,049 were international visitors (33%) staying an average of 4.6 nights and spending $ 425 million (or $655 per person).

It is in keeping with the continuing growth and interest in the Whitsundays as a tourist destination that the project is being proposed. Tourism Queensland, in the year ending June 2005 report on the Whitsundays identified that 38% of visitors saw the lack of tourism destinations on the mainland Whitsunday region as a real weakness in the tourism experience. The Shute Harbour Marina project will create a unique mainland tourism experience in the Whitsundays at Shute Harbour.

Consisting of a water based development (marina basin accommodating up to 733 boat berths, floating breakwater and pontoons, charter boat base) and an onshore development comprising commercial precinct (Tourist resort, marina retail, car parking) and residential precinct (foreshore), this $240 million project will complement and enhance the water-based and land-based facilities to further endorse the Whitsundays as a destination of world renown.

The economic impacts of constructing the $240 million project and the ongoing economic benefits, which will accrue to the regional and state economies from the planned commercial activities, will be substantial. The development will compliment existing commercial operations and also improve their viability.

On the mainland, the expanded Abel Point marina and the recently approved Port of Airlie marina will prove popular, however, with the growth in boat ownership and boating activities, these marinas will not be able to meet the full demand.

The advent of Virgin and Jetstar flights to Proserpine and Mackay and Jetstar flights to Hamilton Island have brought cheaper airfares and increased opportunities for southern residents to base their boats in the Whitsundays and take advantage of competitive airfares to enjoy short and longer breaks in the Whitsundays.

The appeal of the Shute Harbour area in terms of a sheltered mooring location is evidenced by the large number of craft on swing moorings in the inlet. In addition, the shorter distance between Shute Harbour and the islands and waters out to the east and south-east is also of considerable appeal to boat owners and operators.

The construction phase will have direct and indirect effects on employment, output, value added and household income at the state and regional levels. The operation phase will have a number of recurrent outputs because of the mix of activities, which comprise the project. This will increase employment, value add to the region's services and increase household income over the 20 year assessment timeframe.

Major synergistic industry and/or commercial opportunities will arise in the Whitsunday region during the construction and operation phases with regional firms participating in the supply of goods and services, namely capital investment, plant and equipment, materials and labour.

The proposed development will strengthen the local economy by increasing accommodation, tourism, and retail opportunities, by providing provisioning and storage facilities, and by allowing this area to develop as a major tourist transport node. In addition to complementing and enhancing the economic development of this region, the project will encourage further economic development with the opportunities for new businesses and commercial activities associated with various components of the project. New business and commercial activity will provide a critical mass to ensure the ongoing viability of Shute Harbour as a key commercial hub and service centre for mainland/island transfers.

From the perspective of state and national economic benefits, the addition of a master planned and environmentally responsible project including high quality residential accommodation, a four star resort, marina and associated boating services, to existing development in the Whitsundays will compliment and enhance the economic development of this region.

4.4 Potential Built Environment Impacts

The proposal has been significantly modified from the original project concept. The majority of the site will only be included within the Local Authority boundary once reclamation occurs. Buildings heights will vary between two and five stories and the taller structures will be located and have colour schemes that blend with the natural environment so as to minimise interference with view lines from both Shute Harbour Road and from the waters of Shute Harbour.
These modifications will lessen the impact of the built environment.

With the Shute Harbour road upgraded in accordance with the existing Deed of Agreement, road infrastructure impacts will be minimal beyond the road reserve.

In terms of the marine environment surface currents following the main wind direction may transport floating debris, such as freshwater plume, floating pieces of wood or plastic and hydrocarbon shine. Most likely, these would be pushed by the south east and east dominant winds, and have the potential to accumulate against the southern sheet pile wall.

The sheet pile wall edge will need to be inspected regularly and cleaned from floating debris that might stagnate around the marina pontoons. The Shute Harbour Marina waste facilities will comply with International Maritime Organisation Port Reception Facilities Manual, ANZECC best practice guideline for waste reception facilities at marinas and the *Environmental Protection (Water) Policy 1997*.

Sanitary waste will be collected, pumped in the municipal sewage system and treated by the Whitsunday Shire Council Water Treatment Facility. The marina amenities will be well maintained

and will be designed to accommodate boating and visitor numbers. Boats entering the marina without holding tanks will need to have their head sealed by the Marina Superintendent on entry to the marina. The Operational EMP will prohibit boats from discharging sewage within 1km of land.

During operations small oil spills are possible within the proposed marina basin. The proposed Shute Harbour Marina will be equipped with oversized waste oil containers and multiple oil spill kits, which will be maintained regularly. Marina personnel will be trained and will practice use regularly.

The proposed small vessel maintenance facility included in the previous design of the project has been removed. No vessel maintenance activities involving antifouling will occur in the Shute Harbour Marina development.

4.4.1 Floating Breakwater

The proposed floating breakwater will be tested in a wave flume for cyclonic wave. Cyclonic conditions will be investigated through further studies. The breakwater piling will be sized using numerical and physical modelling as part of the detailed design process. The objectives of the design are to:

- Ensure a "Good" wave climate as per Table 4.2 AS3962-2001 for boats moored inside the marina.
- Material will be chosen carefully in order to minimise corrosion and facilitate maintenance.

5. Environmental Management

An important requirement of a project of this scale is to ensure that best practice environmental safeguards proposed as a result of the planning and environmental assessments associated with the project are enacted in an appropriate and timely fashion. This will be achieved by the preparation of a draft Environmental Management Plan (EMP) as part of the EIS. This will be incorporated and refined as part of the construction contract and operational Environmental Management System (EMS).

The potential exists during the construction and operation phases of this project for degradation of the natural values of the site and its surrounds. Planning is therefore necessary to ensure that all reasonable measures are taken to protect the environmental values which may be impacted upon by construction and operation activities and related infrastructure.

The purpose of an EMP is to detail the actions and procedures to be carried out during the implementation phase of the project in order to mitigate adverse effects and enhance beneficial environmental and social impacts. The EIS will identify the potential construction and operation effects of proceeding with the proposed project and recommend a range of impact mitigation measures to be implemented during the design, construction and operational stages of the project.

The EMP will address proposed environmental safeguards and control measures and will establish the framework to ensure they are implemented. In effect, the EMP will become the key

reference document in that it converts the undertakings and recommendations in the EIS into a set of actions and commitments to be followed by designers, constructors and operators.

The EMP will serve as the framework for measuring the effectiveness of environmental protection and management. This is achieved by specifying the monitoring, reporting and auditing requirements, including responsibilities, timing and format in order to meet the necessary performance criteria. The EMP also makes provision, as appropriate, for unforeseen events by outlining corrective actions which may be implemented in these situations.

5.1 Construction and Operational Air Quality

Potential impacts on air quality during construction include:

- Dust;
- Construction vehicle emissions; and
- Burning of cleared vegetation.

Dust from earthmoving, stockpiles and from vehicular traffic on unsealed surfaces will be the main air quality impact during construction. The significance of the impact is dependent on the prevailing weather conditions, including wind direction and speed and rainfall. The predominant south to south-easterly wind direction means the most significant impact would be on the single residence to the east of the site.

Standard management procedures during construction (eg wetting of dust generating areas) will minimise the potential for air quality impacts and they are not expected to be significant. Exhaust emissions from construction equipment and vehicles can also produce minor impacts on the local air quality. However the coastal location, and relatively strong prevailing winds, suggests the potential for impact from construction equipment emissions is not significant

Vegetation waste is to be chipped, composted or spread over cleared areas as a ground cover/mulch to protect soils from erosion and facilitate rehabilitation. No burning of vegetation waste material is to occur.

There will be no significant reduction in the air quality of the area from the normal operations of the proposed Shute Harbour Marina Development.

Potential impacts on air quality during operation include:

- Odour emissions from food preparation;
- Odours from pump out of wastewater from marine vessels;
- Marine and terrestrial vehicle emissions; and
- Volatile hydrocarbons from fuel storage and handling/refuelling.

Boat and vehicle emissions are not expected to have a significant impact on the air quality of the area. The associated fuel storage and handling facilities must be appropriately managed under Australian Standards (eg AS1940) and are not expected to significantly impact the local air quality. Odours from food preparation are likely to be localised and are not considered significant.

Mitigation measures to be implemented during the design, construction and operational phases of the project are provided below.

Design management strategies for minimising the potential impacts on the local air quality include:

- Stacks from kitchens and commercial areas to include scrubbers;
- Suitable waste management facilities for kitchens and commercial areas;
- Marine vessel sewage pump-out facilities to be sealed and designed to current guidelines; and
- Petroleum hydrocarbons to be stored and handled according to AS1940.

Management strategies to minimise potential impacts on the local air quality during construction include:

- Watering of unpaved roads during construction;
- All complaints to be recorded on the Complaint Reporting Form and kept for a period of 5 years;
- Minimisation of areas of soil exposed as a result of construction activities;
- Planning of earthmoving activities to minimise stockpile sizes and cover stockpiles if possible; and
- Revegetation of exposed soils as soon as possible following construction.

Management strategies to minimise potential impacts on the local air quality during marina operation include:

- Appropriate waste facilities to be used for all commercial and kitchen wastes;
- Marine vessel pump-out facilities to be used for removal of wastewater from boats;
- Prompt removal of rubbish and wastes from the marina complex;
- Limiting boat and vehicle speeds within the marina precincts and discouraging prolonged idling of boat engines; and

There is the potential for dust generation due to the stockpiling, handling and transporting of excavated and/or dredged material and earthworks during construction of the proposed marina and associated infrastructure. Dust impacts are unlikely to cause detrimental effects to native flora and fauna or visitors to the area.

Dust control measures will be implemented during construction to mitigate any adverse effects. Operational air quality will include vapours and gases from the units, apartments and houses, tavern, refuelling areas; however these impacts are expected to be minimal given the low volumes and frequency of use.

5.1.3 Noise Construction Phase

The proposed Shute Harbour Marina site contains coastal bushland within an enclosed bay (Shute Bay). There are no residences within the project site however there is one residence and a small motel directly adjacent to the site and moored boats within the bay that can potentially be impacted by an increase or change in the noise and vibration in the area. A detailed Noise and Vibration analysis has been undertaken.

Potential noise and vibration sources during the construction phase will include:

- Dredging and excavation of marine mud;
- Importation and spreading of fill material and land reclamation;
- Building construction;

- Pile driving;
- Vehicle movements; and
- Plant noise.

Adverse noise impacts are expected to be variable throughout the staged construction period and localised to the project site, with the exception of the dredging which will occur in the marine development area and channel and there will some loss of amenity. Estimated noise levels from construction activities based on the existing environment, the EPP (Noise) and AS 2436 –1981: *Guide to Noise Control on Construction, Maintenance and Demolition Sites* are shown in Table 5.1.3.

Table 5.1.3 Typical Construction Equipment and Activity Noise Levels

Type of Equipment	Sound Pressure Level in dB (A)
Unsilenced pile driver	136
Unsilenced truck scraper, grader	114
Unsilenced pneumatic drill	114
Unsilenced compressor	107
Silenced pile driver	100
Silenced truck scraper, grader	95
Silenced pneumatic drill	108
Silenced compressor	90-100
Concrete mixer	109
Crane	106
Crane	115
Excavators	110
Rock Breakers (Pneumatic)	109
Saws	115
Winches (Pneumatic)	105
Oxy-acetylene Welders	<96

The sound level (dB(A)) at a sensitive receptor can be derived from the following equation (AS2436-1981, *Guide to Noise Control on Construction, Maintenance and Demolition Sites*):

$$L_{w(A)} = L_{p(A)} + 20\log_{10}R + 8$$

Where: $L_{w(A)}$ = A - weighted sound power level of the source, in dB ref. 10^{-12} W
$L_{p(A)}$ = A - weighted sound pressure level at the distance R from the source, in dB(A)
R= Distance from the source in metres.

Based on this data noise from the construction site has the potential to adversely impact the residential property approximately 50m from the construction site and the Shute Harbour Motel approximately 100m from the site. For example, the residence may experience contributed noise levels up to 68 dB(A) during excavation depending on the type and number of machines operating and the prevailing meteorological conditions.

Minor noise impacts may also be experienced at the Katchor's Cover (1.1km) and Coral Point (1.6km) residential areas and the Mount Rooper National Park camping ground approximately 1.6km west of the project site. The camping ground may experience greater adverse noise impacts from construction vehicles transporting materials along Shute Harbour Road.

The marine component of the site is zoned under the GBRMPA Mackay Management Area Zoning Maps as being surrounded by habitat protection zones, which contains state and nationally recognised vulnerable fauna (such as *Chelonia mydas*), which is sensitive to excessive long term noise, such as that which will be experienced during dredging (refer Section 14 for further details). Marine fauna such as dugong and turtles are likely to avoid the area during periods of significant noise generation such as piling and dredging.

Minor noise impacts may be experienced on the Shute Harbour Road through Cannonvale and Airlie Beach due to increased traffic from construction vehicles, however this is not considered significant given the already large volumes of traffic in these areas.

Piling will likely cause a significant noise impact, with a series of repeated and loud impacts whilst the pile is being driven. The indicative maximum noise level at the nearest residence will be around 88dB(A) which is 40dB(A) higher than measured L_{A90} background noise levels at the locations between 50 and 100m of the works. These works are expected to take several months but will not occur every day. Control measures will be implemented during the construction phase to minimise noise levels experienced at sensitive receptors within the area.

There are no specific Queensland guidelines for vibration assessment from developments of this type. Guidance on assessment criteria can be provided from the Queensland EPA guidelines for *"Noise and vibration from blasting"* (June 2004) and from the British Standards 7385-Part 2-1993 *Evaluation and measurement of vibration in buildings Part 2* and 6472-1992 *Evaluation of human exposure to vibration in buildings*.

Suggested criteria for two buildings most likely to be impacted by any significant vibration during construction are 15mm/s @ 4Hz, 20mm/s @15Hz and 50mm/s @ 40Hz (from BS7385-Part 2-1993).

Vibration is expected from construction equipment at the site, however, based on the geological profile of the site and the limited number and reasonable distance of sensitive receptors from the site, this is not expected to cause significant impact.

A more detailed assessment of potential vibration levels will be undertaken as part of further studies to confirm management and mitigation measures during construction. It is envisaged that mitigation measures will be put in place to ensure;

- Noise from construction activities must not cause an environmental nuisance at any "noise sensitive place";
- Vibration emitted from activities must not cause an environmental nuisance at any "vibration sensitive place";
- All plant and machinery to be in good working order with operational mufflers where required;
- Noise during construction must be consistent with operational requirements in the *Environmental Protection Regulation 1998* and specifically Division 4, Subdivision 1, Section 6W;
- A builder or building contractor must not carry out building work on a building site in a way that makes or causes audible noise to be made from the building work:
    - On a Sunday or public holiday, at any time; or
    - On a Saturday or business day, before 6.30am or after 6.30pm.
- Compliance with conditions of approvals;

- Undertake building condition surveys for the Shute Harbour Motel and MacInerney Residence prior to construction;
- Vehicles and equipment will be turned off when not in use;
- Undertake a detailed vibration assessment of the proposed works and affected buildings; and
- Carry out vibration monitoring during piling and significant excavations if required.

Adverse noise and vibration impacts are expected to be variable throughout the staged construction period and localised to the project site, with the exception of the dredging which will occur in the marine development area and channel. Noise during the operational phase of the proposed development has the potential to adversely impact the residential property and the Shute Harbour Motel. Minor noise impacts may be experienced at nearby residential areas and the Mount Rooper National Park camping ground however this is expected to be minimal.

Mitigation measures will be implemented for the construction phase of the development to ensure that any potential noise and vibration impacts are managed accordingly especially in situations where noise criteria are expected to be exceeded. Potential noise and vibration impacts during the operational phase of the development can be adequately controlled, and in relation to the sensitive receptors adjacent to the development site, through appropriate mitigation (physical or management) measures.

5.1.4 Noise Operational Phase

Potential noise and/or vibration sources during operation of the proposed development will include:

- Motor boats;
- Boat rigging (generally on windy days);
- Entertainment venues (tavern, sailing club, restaurants);
- Refrigeration units;
- Air conditioners and ventilation fans;
- Boat maintenance; and
- Motor vehicles along Shute Harbour Road.

The EPP Noise provides the framework for assessing and managing noise from developments such as the Shute Harbour Marina under the *Environmental Protection Act 1994*. Noise level guidelines are provided under the Queensland Nuisance Laws, which define audible noise limits and time restrictions for a range of activities and equipment that may impact on sensitive receptors. There are no specific guidelines for boats and rigging, which are likely the most significant noise sources for the new residences/accommodation at the proposed marina apart from air conditioners. Noise from entertainment venues is controlled under the *Liquor Regulation 2002*.

As Shute Harbour Road is a state controlled road the noise level to be complied with is 68dB(A) as the L_{10} (18 hour) level.

Noise from the proposed development has the potential to adversely impact the residential property approximately 50m from the site and the Shute Harbour Motel approximately 100m from the site. Minor noise impacts may be experienced at the Katchor's Cover (1.1km) and Coral Point

(1.6km) residential areas and the Mount Rooper National Park camping ground approximately 1.6km west of the development site. The camping ground may experience greater adverse noise impacts from an increase in traffic along Shute Harbour Road, however this is expected to be minimal.

The site is zoned under the GBRMPA Mackay Management Area Zoning Maps as being surrounded by habitat protection zones, which contains state and nationally recognised vulnerable fauna (such as *Chelonia mydas*), which is sensitive to excessive long term noise, such as that which will be experienced during maintenance dredging.

Vibration is not considered a significant issue for the operation of the proposed marina.
Mitigation measures will be implemented during the operational phase of the project to minimise potential noise and vibration impacts.

Mitigation measures to be implemented to address potential noise and vibration impacts include:

- Suitable design of entertainment venues to minimise external noise;
- Noise mitigating design and materials in construction of the residential and resort accommodation; and
- Suitable design of entertainment venues to minimise vibration from noise.
- Boat speed limits within the marina precinct;
- Road traffic speed limits within the precinct;
- Limiting operational hours of commercial and business facilities;

The most significant existing noise and vibration at the site is from vehicles utilising Shute Harbour Road that runs adjacent to the proposed site. The remainder of the site is largely undeveloped and contains no significant noise sources.

6. Costs and Benefits Summary

Any statement of Costs and Benefits for this development must recognise that the 2001 Brown and Root Whitsunday Region Marina Demand Analysis stated *"with the exception of the Abel Point marina expansion, the other potential marina sites in the area will be difficult to develop unless they have a mix of land based facilities such as residential Tourism or commercial outlets".* In addition one of the key issues identified in the Statement of Proposals for the new planning scheme for Whitsunday Shire (July 2001) was the need to protect marina facilities within the Shire and to provide for future marina requirements.

Ultimately in keeping with sustainable development principles the project should deliver a net benefit across the broad spectrum of environmental, social and economic factors. It is important to note that potential adverse impacts that might have arisen due to the original project design have been minimised and in some cases removed with the new project concept.

The provision of a marina at Shute harbour completes the delivery of marina berths in the Whitsunday shire. Already there are 350 swing moorings in Shute Harbour, this represents approximately half the estimated capacity of the Shute Harbour Marina. Swing moorings are inefficient in terms of area and can be destructive in terms of seabed habitat. These moorings spread vessels and the associated impacts of those vessels across a wide area. With the Shute Harbour Marina a greater number of vessels can be accommodated over a smaller area in a

controlled environment removing potential adverse impacts from approximately 60 hectares of Shute Bay.

The Shute Harbour Marina is in effect a management tool to effectively manage the pressures of tourism and recreational boating demands in the Whitsundays. There will be environmental impacts in developing the project however these will be offset by the provision of controlled vessel harbour facilities that will ensure environmental impacts of increased vessel visitation in the area are managed effectively. Other positive impacts that will occur as a result of the development will include a decrease in potential sullage and waste disposal by visiting boats given provision for state of the art facilities in Shute Harbour Marina, opportunity to decrease the number of indiscriminate moorings across Shute Bay and overall better management of recreational traffic within Shute Bay

The Shute Harbour Marina development unlocks extensive frontages to Shute Harbour, previously inaccessible to residents. It creates a recreational and leisure precinct centred around the marina and open spaces providing a desirable addition to the social fabric, leisure choices and identity of the region. The board walk linking the Resort with the balance of the project provides the opportunity for the local community and for visitors to be alongside the water.

The residential development areas proposed for the project provides an increased range of housing and accommodation choice for the region providing the local population necessary to underpin the viability and vitality of the precinct, such that the development can provide a business and social heart for Shute Harbour and add to the social choices for the region.

The provision of a master planned four and a half star resort with 96 suites on the mainland of the Whitsunday area compliments the other mainland tourist accommodation that has been recently constructed or is being constructed on the mainland and broadens the range of tourism product in the region. The $45 million proposed resort will broaden the Whitsunday Tourism accommodation options for tourists and potentially deliver up to $15 million in increased tourism expenditure per year into the region.

The construction phase will have direct and indirect effects on employment (600 jobs on site during construction), output, value added and household income at the state and regional levels. The operation phase will have a number of recurrent outputs because of the mix of activities, which comprise the project. This will increase employment (148 direct jobs post construction) and value-add to the region's services and increase household income over the 20 year assessment timeframe. The project is estimated to inject over $400 million into the local economy during construction. Major synergistic industry and/or commercial opportunities will arise in the Whitsunday region during the construction and operation phases with regional firms participating in the supply of goods and services, namely capital investment, plant and equipment, materials and labour.

Shute Harbour Marina Development Pty Ltd have had initial discussions with the Whitsunday Shire Council with a view to providing $2.5million dollar investment in Public recreational boating and car and trailer park facilities at Shute Harbour.

The establishment of a Body Corporate for the Residential, Commercial and Marina Precincts under the *Body Corporate and Community Management Act 1997* will not result in the imposition of additional costs on the Whitsunday Shire Council, State Government or the public. The *Body Corporate and Community Management Act 1997* is designed so that

expenses and costs that arise from the Body Corporate are paid by the individual lot owners. A Maintenance Fund will be established and controlled by the Management/Marina Operation Company. The fund levied on land and berth owners in the development will ensure that there is no impost on Local/State Government for operation or maintenance of the marina.
There will be little loss of existing recreational activities undertaken in the area. This section of coastline is generally difficult to access from onshore and although it may potentially be accessed during high tides for boat fishing, its regular use is unlikely.

The proposal for no development north of Shute Harbour road will provide a buffer zone between the development and the National Park. This will reduce the impact of noise on the fauna utilising the surrounding areas as well as the impact on surrounding commercial and residential properties.

Development of the proposed marina-complex and access channel is likely to result in the direct loss of small areas of fringing mangrove forest; and minimal impact on intertidal and shallow sub tidal seagrass meadows and unvegetated soft sediments.

Because of slight changes in wave climate and hydrodynamic conditions locally, sedimentation is likely to increase:

- In the vicinity of the Repair Estuary; and
- In the vicinity of the floating breakwater siltation will vary with tide and wave conditions.

The proposed marina dredging basin will cause small disturbances to the bay morphology, as it will act as a sediment trap for the bay's fine sediments. Some of the finer bay sediment will be deposited inside the proposed marina basin. This sediment will be dredged and disposed at the maintenance dredging disposal area. It is anticipated that the average turbidity in the bay would stabilise to a slightly lower level than existing after a few years of operations. The water within Rooper Inlet and in the vicinity of the existing jetties may become clearer and less turbid. This has the potential to impact on species living in turbid environment and any burrowing organisms, while it might be beneficial for pelagic and other species. The aquatic environment will be monitored before and after construction.

The project will have an impact on the existing visual presentation from Shute Harbour Road as the site changes from an undeveloped area to a developed area. The existing views will be replaced with developed views comprising landscaping and built form. From Shute Bay the visual impact of the project is assessed as low and modifications to the original concepts will now mean that the buildings will not adversely affect the predominance of the Conway National Park and the harbour.

Although the project will have both direct and indirect impacts on the aquatic environment, the implementation of mitigation measures and "best practice" will ensure that these impacts are minimised. Consultation will occur with DPIF and EPA to ensure that adequate compensatory habitats are developed so that there will be no net loss of habitat or productivity in the region.

Ultimately the Shute Harbour Marina Development will provide benefits to the Whitsunday region that will far outweigh the costs of the development in terms of the principles of sustainable development.

7. SHUTE HARBOUR MARINA REFERENCES AND DATA SOURCES

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