Coordinator-General's evaluation report for an environmental impact statement

Northeast Business Park Project

October 2009

Under part 4 of the *State Development and Public Works Organisation Act 1971*

The Coordinator-General

Queensland Government

Northeast Business Park Project

Contents

Figures

Synopsis

This report has been prepared pursuant to s.35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and provides an evaluation of the environmental effects of the Northeast Business Park project (the project).

The proponent for the project, Northeast Business Park Pty Ltd, proposes to develop the site into an integrated mixed industry and business area (MIBA), and a marine and residential precinct. Significant marine works are proposed including construction of a major marina facility and dredging of the navigation channel in the lower reaches of the Caboolture River.

In undertaking my evaluation of the Environmental Impact Statement (EIS), I have considered the EIS, issues raised in submissions, the Supplementary EIS (SEIS), and the advice I have received on a range of key issues from state agencies and the Australian Government Department of the Environment, Heritage, Water and the Arts (DEWHA). I am satisfied that the requirements of the SDPWO Act have been satisfactorily fulfilled, and that sufficient information has been provided to enable me to finalise the required evaluation of the potential impacts, attributable to the project.

Economic and social Impacts on the surrounding region

I am satisfied that the development of new employment generating land on the site would provide considerable economic and social benefits for the region. I accept that the MIBA format in conjunction with other elements of the project is well formulated and has clear advantages over the alternative – a traditional industrial development of the land zoned as District industry. The proposal offers the opportunity to develop an attractive living and working environment and promotes a high degree of self-containment consistent with the objectives of the South East Queensland Regional Plan. Co-location of the MIBA with the marina close to existing urban areas and transport links is a rare opportunity to develop a new marine industry cluster in the region.

I recognise that there is significant demand for new marine facilities in the region with access to Moreton Bay and I am satisfied that the level of proposed commercial activity would not adversely impact on economic activity in nearby areas.

I am satisfied that the proposed retail and residential uses would have net positive economic and social impacts on the surrounding communities. The residential precincts would provide a useful contribution to forecast shortage of new houses in the area and could assist in encouraging further intensification of the adjacent areas. In addition, the dedication of large areas of open space for public use and the provision of associated facilities would become a significant asset to the community.

Infrastructure impacts

The ultimate development of the project would yield approximately 350 hectares of urban uses supporting an estimated 13 600 employees and 5 500 permanent residents. The scale and nature of the proposal will necessarily impact on the existing infrastructure including the existing local and regional road network. Infrastructure upgrades that are likely to be needed to accommodate the increased loads include capacity upgrades for a number of road sections and intersections including Buchanan Road and the Bruce Highway.

Given the difficulties in reaching firm conclusions at this point (i.e. the project is still in concept stage) about the ultimate extent of road impacts and the appropriate level of contributions required by the development, I accept that a staged approach to mitigation is necessary. Detailed traffic impact assessments would be required as part of development approvals for individual stages of the project in accordance with an overall strategy. Given this further traffic analysis and approval, I am therefore satisfied that the project will not lead to any significant adverse traffic impacts on the local and regional road network.

I note that a range of measures supporting active transport (pedestrian and cycling) and public passenger transport are proposed, including provision for: bus routes and bus stops; bicycle lanes within internal road corridors; dedicated walking/cycling paths within the marina

precinct and open spaces; and golf buggy paths for commuter travel between residential, marina, MIBA precincts and open spaces. I am therefore satisfied that suitable requirements for active transport (pedestrian and cycling) and public passenger transport can be provided.

Existing water supply and wastewater infrastructure exist to the west of the site, however I note that it is of insufficient size to service the proposed usage. I am satisfied that the proponent's proposed augmentation of this infrastructure and the utilisation of recycled water will ensure an adequate reticulation of water, recycled water and wastewater within the project site.

Impacts on the coastal environment

The project site has nine kilometres of tidal Caboolture River frontage and is approximately eight kilometres, by boat, from the river mouth and Moreton Bay. The entirety of its tidal sections is within the declared Deception Bay declared fish habitat area (management A area) and is also part of the Moreton Bay wetland aggregation that has been listed as a wetland of international importance in accordance with the Ramsar convention. The Moreton Bay Marine Park extends upstream almost to the eastern boundary of the site.

I note that the survey of the existing condition of the river banks shows many sections are currently suffering an erosion trend. I accept that increased vessel traffic and dredging may result in further impacts to the bed and banks in some sections of the river. The proponent has committed to develop and implement the Caboolture River Estuary Management Plan (CREMP) that would specify necessary actions to address the project related impacts on the bed and banks of the river. I am therefore satisfied that suitable requirements for protecting the river bed and banks can be provided.

I note the existing poor river water quality condition of the Caboolture River estuary. I accept the potential benefits of the project for improving water quality of the Caboolture River through the best practice management of stormwater inflows and the rehabilitation of riparian areas and wetlands on-site. The diversion of treated wastewater from the Caboolture South treatment plant and, in later stages, from the Burpengary East treatment plant for use on the site would yield further improvements by reducing nutrient inflows into the Caboolture River.

I note that some impacts to water quality are expected from the proposed channel dredging, construction activities and marina operations, however I accept that these would be manageable. Careful design of the project and management of construction and operational activities would be necessary to ensure risks of impacts are minimised. I am satisfied that the net impacts on water quality are likely to lead to an overall improvement in the longer term.

I note that, in an overall sense, the project would have generally positive impacts on coastal ecological values through improved water quality and the proposed rehabilitation and revegetation of coastal land on-site. However some activities, such as the direct loss of areas of aquatic habitat, disturbance of benthic fauna and shorebirds, and loss of riparian habitat (due to the potential exacerbation of the bank erosion), would have potential adverse impacts. The proponent has committed to addressing all project-related impacts through the funding of rehabilitation works in the affected sections of the estuary through the implementation of the CREMP. I am therefore satisfied that the project would not lead to significant adverse impacts on coastal ecological values.

I note that the development of the marina related components of the project would require several separate authorisations prior to an application for development approval under the *Integrated Planning Act 1997*. This includes the setting aside of a works area in the Moreton Bay Marine Park. I find that the proposed development would provide facilities for use by, or the benefit of, the public and that any adverse impacts in the Marine Park can be managed. Accordingly, I recommend that the Minister for Sustainability and Climate Change consider the setting aside of a works area in the lower Caboolture River and Deception Bay to enable the proposed channel deepening and realignment. In the event that a works area is declared in the Marine Park, I note that a requirement for an appropriate biodiversity offset would be determined at that time.

An amendment of the part of the Deception Bay declared fish habitat area in the Caboolture River affected by the project from a 'management A area' to a 'management B area'

designation would also be required to allow applications to be made for the construction of the proposed marina entrance, fishing platform and canoe landing structures. An amendment to the boundary of the declared fish habitat area would also be required to allow for dredging outside of the current channel marked by aids to navigation. Accordingly, I recommend that the Minister responsible for the *Fisheries Act 1994* considers the necessary amendments to the Deception Bay declared fish habitat area to enable the development of the project.

I note that over the last 30 years there have been extensive changes in the distribution of marine plants in Moreton Bay including the loss of seagrass cover in Deception Bay. I accept that there are opportunities for the design and management of the project to maintain and in some cases, restore and improve aquatic habitats in the Caboolture River. However, I note that some adverse impacts on fish habitat values are expected, including: direct loss of marine plants (although these have been assessed as having little aquatic value); additional boat traffic from the marina may exacerbate river bank erosion; and direct loss of shallow water habitat by capital and maintenance dredging. Nonetheless, I am satisfied that impacts to fish habitat values would be minor and localised and would be outweighed by the benefits to fisheries resources of the other aspects of the project including long term improvements in water quality, the rehabilitation of on-site riparian and wetland areas and the proponent's contribution to the development of the Caboolture River Plan. The new marina and other public facilities would also provide enhanced access to the river and Bay for recreational fishing.

Environmental management within the project site

Certified regional ecosystem mapping identifies 15.5 ha of 'endangered' and 2.7 ha of 'not of concern' remnant native vegetation located inside the south western boundary of the site fronting the Bruce Highway. The proposal includes clearing 12.4 ha of remnant vegetation, including 10.73 ha of 'endangered' remnant vegetation. To offset this clearing, the proponent has agreed to provide a vegetation offset consisting of 35.84 ha of 'endangered' and 4.4ha of 'of concern' remnant native vegetation at another location.

I am satisfied that the proposed vegetation clearing is necessary for the development of the project, particularly the portion on the Bruce Highway frontage for the MIBA precinct. I accept that the development would result in a vegetation offset with a replacement ratio of three to one (3:1), in addition to a substantial net gain of other vegetated habitat areas including the proponent's commitment to preserve and revegetate 86 ha of riparian vegetation and 64 ha of wetland vegetation.

A preliminary acid sulfate soils (ASS) investigation confirms the presence of ASS within the project site and in the area proposed for channel dredging in the lower reaches of the Caboolture River. Given the scale of proposed soil disturbance, proximity to the river, and likelihood of ASS occurrence, all earthworks and dredging would require careful monitoring and management of the potential impacts. A range of other matters will be addressed in a Construction Environmental Management Plan to ensure satisfactory environmental outcomes are achieved.

Conclusion

I have determined that on balance there is a significant positive net benefit to the community from the development of the project and that it can proceed, subject to a number of specific conditions (detailed in Appendix 1 of this report) to manage its design, construction and operation. Therefore, I recommend that the project can proceed, subject to the conditions contained in Appendix 1 of this report.

Colin Jensen

Coordinator-General

Date: Signed 31 October 2009

1. Introduction

This report has been prepared pursuant to s.35 of the SDPWO Act and provides an evaluation of the Northeast Business Park Project (the project). The EIS was conducted by the proponent, Northeast Business Park Pty Ltd and prepared on its behalf by Cardno Pty Ltd.

An initial advice statement (IAS) was lodged with the Coordinator-General in May 2006 and on 21 June 2006 the project was declared to be a 'significant project for which an environmental impact statement (EIS) is required' pursuant to s.26(1)(a) of the SDPWO Act.

On 12 July 2006, the project was determined to be a controlled action pursuant to s.75 of the *Environmental Protection and Biodiversity Conservation Act 1999* (reference number EPBC 2006/2912) under the controlling provisions of:

- sections 16 and 17B (Wetlands of international importance)
- sections 18 and 18A (Listed threatened species and communities)
- sections 20 and 20A (Listed migratory species)

Under a Bilateral Agreement with the Australian Government, this report will be used by the Australian Government Minister for the Environment, Heritage and the Arts to make an assessment of the controlled action for the purposes of the EPBC Act.

The objective of this report is to evaluate the key issues associated with the potential impacts of the project on the physical, social and economic environments at the local, regional, state and national levels. It is not intended to record all the matters which were identified and subsequently settled. Instead, it concentrates on the substantive issues identified during the EIS process.

This report represents the end of the State's impact assessment process and details my evaluation of the environmental effects of the project, based on information contained in the EIS, SEIS, subsequent technical reports, submissions made on the EIS and information and advice from advisory agencies and other parties.

I note that two applications for preliminary approval for material change of use overriding the planning scheme have been lodged with Moreton Bay Regional Council (MBRC), as assessment manager under the *Integrated Planning Act 1997* (IPA). My conclusions set out in this report relate to the approval of these applications by MBRC and state conditions under which the project may proceed. I have not considered details of the final form and composition of the proposed industrial and urban uses, which are not accurately known. These details will be dealt with by the MBRC Assessment Manager as part of subsequent development permits under the *Integrated Planning Act 1997* (IPA).

I have considered the operational works that would be associated with the proposed development and have specified conditions that include requirements relating to approvals of subsequent development permits.

For the purpose of this report, the EIS comprises the following documents:

1. Northeast Business Park, Environmental Impact Statement, 31 January 2008
2. Northeast Business Park, Supplementary Report to the Environmental Impact Statement, August 2008.
3. Revised report on siltation and coastal processes study Northeast Business Park (Cardno Lawson and Treloar, April 2009)

2. Project description

2.1 The proponent

The proponent for the project is Northeast Business Park Pty Ltd, which is a Queensland registered company with shares held by the shareholders of Port Binnli Pty Ltd, Laing O'Rourke Caboolture Developments Pty Ltd and a number of smaller shareholders.

2.2 The project

2.2.1 Site

The project site is a 769 hectare ex-pine plantation located approximately four kilometres east of the Caboolture town centre, bounded by the Bruce Highway to the west and by the Caboolture River to the north. The site has approximately nine kilometres of direct river frontage and is about eight kilometres, by boat, from the river mouth.

2.2.2 Proposal

The project scope was described in the EIS completed in January 2008 and released for public notification on 16 February 2008. The proposal is to develop the site into a major integrated mixed-use business park, marine and residential precinct. The development will comprise of a range of business and industry uses integrated with commercial, retail, residential, recreation and environmental areas. The project includes development of 169 hectares of industrial land and more than 100 hectares of mixed density residential development. Around 55 per cent of the site would be set aside as open space. Significant marine works are proposed including the construction of a major marina facility and dredging of the navigation channel in the lower reaches of the Caboolture River.

The SEIS presented further information regarding the project details, impacts and mitigation. There was no change to the layout and project features as described within the original EIS report, other than minor alterations to proposed uses within the industry and business precincts.

The project is predicted to yield a net benefit of $2.5 billion (in 2007 terms), with $2.3 billion dollars indirect net benefit to stakeholders other than the proponent. Through the 15-year development phase of the project, up to 1500 new jobs are expected to be provided, with a total of more than 13 600 direct full-time jobs provided in the operational phase. Direct construction costs are estimated to be approximately $628 million over the course of the development.

The marina component of the project is to be located on the eastern portion of the site and would accommodate 911 'wet' berths. A dry boat shipyard will provide further accommodation for 300-500 boats. These facilities would assist in meeting future boat storage/berthing demands for south-east Queensland.

The open space provided within the proposal totals 420 hectares, which is equivalent to 55 per cent of the total site area. Significant rehabilitation works and development of public recreation facilities are proposed.

Figure 1 - Overall project layout

Rev: Orig. Date: 14 August 2009

2.3 Project rationale

2.3.1 Need for industry land

The EIS and SEIS provide planning justification for the project. Planning reports, prepared by Conics Limited, describe the need for a continuing supply of industrial land within the Caboolture area. In alignment with this need, part of the site had already been designated as district industry under the current planning scheme administered by Moreton Bay Regional MBRC (formerly Caboolture Shire Council).

In addition to identifying the need for industrial land, Conics also state that a mixed industry business area (MIBA) as proposed in the project is a land-use that can successfully provide strong positive economic benefits and good environmental outcomes. The EIS states this as the justification for the proposed mix of retail and commercial uses interspersed with, and adjacent to, "traditional" industrial activities. The MIBA concept provides the opportunity for a relatively dense employment node, targeting high value industry and offering greater amenity, including on-site recreation facilities.

The EIS and SEIS argue that whilst there is a case for the district industry zoned land to be developed in a "traditional" format to support identified industrial land needs, the submitted proposal provides more economic, in particular employment, benefits in its current form. MBRC has advised its support for this approach.

2.3.2 Demand for marine industry and marina facilities

A marina demand study prepared by Pacific Southwest for the EIS indicates that current and proposed marina projects within south-east Queensland are not adequate to support growing recreational boating needs. Pacific Southwest found that in 2005 there were 21 marinas across South East Queensland (SEQ), with a combined estimated deficit of 1 500 marina berths. The study predicts that, based on mid-range modelling, 3 641 additional berths will be required in SEQ by 2010. The proposed Northeast Business Park marina would cater for approximately 25 per cent of the anticipated demand at that time.

The proposed marina and shipyard would be a key component of the MIBA development. The Caboolture Industry and Employment Lands Project report (2007) prepared for the former Caboolture Shire Council recommends that at least 15–25ha of suitable land should be provided for a marine industry cluster with deep-water access to the Caboolture River to cater for the burgeoning recreational boating manufacturing/servicing sector. The EIS contends that the subject site is an appropriate location for an all-tide access which is not available elsewhere in the region.

The EIS sets out the need for the associated dredging within the Caboolture River to support the marina and industry precinct. It has determined that whilst there is current river access to the site, this is limited during some tide conditions. The EIS finds that a reliable and safe access to the marina site would be critical for the financial and practical viability of the proposal.

2.3.3 Co-locating industrial uses with residential, commercial and recreational uses

The EIS maintains that the amalgamation of a range of commercial and retail uses with industrial activities provides opportunity for superior economic outcomes. Similarly, the residential component of the proposal supports the MIBA and marina functions by supplying a permanent residential population to utilise the development. In addition to this, there is a level of self-containment within the development that allows residents to work and/or recreate within the site.

The EIS contends that the development of part of the site zoned District Industry for residential allotments represents the most effective use of land not suited for industry. Using

this land for industrial purposes would be heavily constrained due to potential impacts of noise, lighting, emissions and heavy vehicle movement upon adjoining rural residential uses.

The proposed open space and recreational uses support the residential population, an increased level of amenity for local employees and encourage a range of opportunities for visitors to the site. The large river-side park is constrained by flood levels and other environmental constraints which would otherwise see it remain as undeveloped rural land for long into the future. The proposed combination of rehabilitation and active use of this area ensures that not only are environmental values protected, but the land also becomes a valuable resource for the local community.

2.3.4 Improved navigation of the Caboolture River

Correspondence from the Regional Harbourmaster (Brisbane) confirms that the proposed deepening of sections within the Caboolture River would improve safety for a range of marine craft. This includes marine emergency response and enforcement agencies, who currently find it difficult to respond to situations given the depth restrictions. The realignment of the navigation channel, additional lit beacons and the associated dredging, would enable safer and more efficient use of the Caboolture River for the wider public benefit and is proposed to be delivered at no cost to government.

3. Impact assessment process

3.1 Review and refinement of the EIS terms of reference

An initial advice statement (IAS) was released for public information and draft TOR were advertised for public comment on 16 October 2006. Comments were accepted until close of business on 13 November 2006. A final TOR was issued to the proponent on 22 December 2006.

Comments on the TOR were received from[1]:

- Department of Education, Training and the Arts
- Department of Emergency Services
- Department of Housing
- Department of Local Government, Planning, Sport and Recreation
- Department of Main Roads
- Department of Natural Resources and Water
- Department of Primary Industries and Fisheries
- Energex
- Environmental Protection Agency
- Office of Urban Management
- Queensland Transport
- Department of State Development
- Brisbane Regional Environment Council
- Sunfish North Moreton Inc.
- A member of the public

3.2 Public review of the EIS

The EIS was approved for release and advertised publicly on 16 February 2008 inviting submissions until close of business on 4 April 2008. A CD ROM copy of the EIS was available free of charge from the proponent.

The EIS was displayed at:

- Caboolture Shire Council library
- State Library of Queensland, Info Zone, South Bank, Brisbane

Information on the project was available via the proponent's and Coordinator-General's web site and general consultation was undertaken using methods such as agency briefings, distribution of community newsletters (February 2008) and newspaper articles.

The following advisory agencies[2] were approached formally to conduct an evaluation of the EIS:

- Department of Communities
- Department of Education, Training and the Arts
- Department of Emergency Services
- Department of Housing
- Department of Industrial Relations
- Department of Local Government, Planning, Sport and Recreation
- Department of Main Roads
- Department of Mines and Energy

[1] Names of organisations are as they were at the time of submission and may have subsequently changed

[2] Names of these organisations may have subsequently changed

- Department of Natural Resources and Water
- Department of Primary Industries and Fisheries
- Department of State Development
- Environmental Protection Agency
- Queensland Health
- Queensland Police Service
- Queensland Transport
- Queensland Treasury
- Caboolture Shire Council
- Australian Government Department of the Environment, Heritage, Water and the Arts

Following the six-week public review of the EIS, a total of 29 submissions were received with the following distribution.

Distribution		Number
Advisory agencies[3]	Department of Communities Department of Emergency Services Department of Housing Department of Infrastructure and Planning (DIP) Department of Main Roads Department of Natural Resources and Water Department of Primary Industries and Fisheries Department of Tourism Regional Development and Industry Environmental Protection Agency Queensland Health Queensland Transport Queensland Police Service Moreton Bay Regional Council (replacing the former Caboolture Shire Council) Australian Government Department of the Environment, Heritage, Water and the Arts	14
Industry	Trask Corporation Pty Ltd Marine Queensland Kangaroo Bus Lines	3
Interest groups	Caboolture Central Business District Retailers and Traders Association Wildlife Preservation Society of Queensland Bayside Branch	2
Individual	Various private submitters	10

[3] Names of Advisory Agencies may have subsequently changed

Submissions were forwarded to the proponent and, following discussions with the proponent's representatives and its technical consultants, it was determined that the preparation of a supplementary report to the EIS was necessary to address issues raised.

3.3 Review of supplementary report to the EIS

On 2 August 2008, the SEIS was forwarded to advisory agencies[4] and respondents to the EIS.

The following agencies advised that they were satisfied that all issues had been addressed:

- Department of Communities
- Department of Emergency Services
- Department of Mines and Energy
- Department of Tourism, Regional Development and Industry
- Queensland Police Service
- Queensland Treasury

The following agencies either provided advice or recommended conditions:

- Department of Housing
- Queensland Transport
- Department of Main Roads
- Department of Natural Resources and Water
- Environmental Protection Agency
- Department of Primary Industries and Fisheries
- Queensland Health
- Moreton Bay Regional Council
- Australian Government Department of Environment, Water, Heritage and the Arts

Substantive issues raised in submissions are discussed individually in the following section.

[4] Names of Advisory Agencies may have subsequently changed

4. Evaluation of environmental effects

4.1 Introduction

The *SDPWO Act* defines 'environment' to include:

(a) ecosystems and their constituent parts, including people and communities

(b) all natural and physical resources

(c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community

(d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

'Environmental effects' means "the effects of development on the environment, whether beneficial or detrimental". These effects can be direct or indirect, of short, medium or long-term duration and cause local or regional impacts.

This section outlines the major environmental effects identified during the EIS process, including those raised in the EIS, SEIS, in submissions on the EIS and in consultation with advisory agencies and other key stakeholders. I have provided comments on these matters and, where necessary, I have set conditions or made recommendations to mitigate adverse impacts.

The Moreton Bay Regional Council (MBRC) will be the assessment manager for development approvals pursuant to the IPA. Two applications for preliminary approval for material change of use overriding the planning scheme have been lodged with MBRC, as follows:

- in 2002, Lensworth Pty Ltd applied for preliminary approval for a mixed industry and business development over the western portion of the site
- in 2004, Noosa Events Pty Ltd lodged an application for a marina/residential development on the eastern portion.

In November 2007, the then Caboolture Shire accepted changes to both applications reflecting the additional information provided in the EIS.

The EIS provides only a level of detail consistent with the two applications for preliminary approval. Accordingly, my evaluation of the project has only considered that level of detail.

I note that the proponent has received advice from the Office of Urban Management (now incorporated within DIP) that the Regulatory Provisions of the *South East Queensland Regional Plan 2009-2031* (SEQRP) do not apply to the proposed development given that development permit applications were lodged before the provisions commenced. Additionally, the Regulatory Provisions don't apply to a project declared a significant project pursuant to s.26 1(a) of the SDPWO Act.

4.2 Economic and social impacts on the surrounding region

The EIS has investigated a range of matters related to the project's potential contribution to the economic development of the region and its complex interactions with the surrounding community.

MBRC has in turn made significant effort in assessing the project's impacts within the region; in some cases commissioning separate peer reviews of the EIS findings. I acknowledge the detailed advice from MBRC on these matters.

4.2.1 Context

The Caboolture sub-region has a diverse settlement pattern with the areas of highest urbanisation and commercial activity concentrated in the "urban spine" surrounding the major road and rail corridor. Large tracts of the hinterland to the east and west remain largely undeveloped or support rural or low density residential use.

The project site is located in a low density, semi-rural neighbourhood adjacent to the urban spine and strategically positioned with a one kilometre frontage to the Bruce Highway. The surrounding area is characterised by larger rural residential lots, bushland and open grassland areas with some (limited) agricultural and recreational land uses. The land on the opposite side of the Bruce Highway is fully developed for urban purposes.

The site has a significant exposure to the Caboolture River and a large proportion of the land lies within its floodplain. The northern boundary of the site is defined by the high water mark of the Caboolture River.

The Caboolture sub-region, along with many parts of the SEQ region, is undergoing a period of significant transition. The EIS Community Context Study (Appendix F of the EIS) has captured and summarised the key issues facing the local community, as follows:

- *Rapid urbanisation - which is changing the existing character of the study area, challenging the capacity of infrastructure and services and changing the composition and dynamic of the community. The emergence of new master planned communities on greenfield sites in particular is introducing a new resident mix.*
- *Housing affordability – recognising that whilst in relative terms, Caboolture still offers a relatively affordable lifestyle, house prices have doubled since 2003 and local wages have not kept pace. Local people are often priced out of the housing market and are forced to look further north and west to buy homes. Rising capital prices has reduced rental stocks and the availability of public housing has also declined significantly relative to demand.*
- *Economic development – the level of self containment is less than 50 per cent and commuting to Brisbane is a way of life for this community. There is a need for more jobs in absolute terms to keep pace with population growth and meet self containment targets, but there is also a need for further diversification of the labour market to meet the expectations of incoming residents and increase the capacity of the existing local community. Opportunities for youth are particularly significant in the context of regional growth and development. This community experiences significant pockets of structural unemployment and there is prevailing evidence of skills gaps and under-employment across the study area.*
- *Social issues and allied welfare needs – there has been an historical dependency on welfare prevalent across the study area and there are still pockets where considerable and multi factorial disadvantage are evident. There is increasing evidence of social polarisation by education, affluence and age across the study area as well as a trend towards increasing ethnicity – the introduction of new people with different needs has challenged the existing capacity of social, cultural, human services and infrastructure. There is a shire wide issue with respect to 'rowdy youth', young people who are not engaged or participating because they have no inclination, funds or transportation. More youth opportunity is an imperative.*
- *Movement – the road network is reliant on the Bruce Highway to facilitate car borne trips between settlements. There is evidence of congestion at a local level during peak periods exacerbated by heavy goods vehicles using key routes through neighbourhoods. There is a lack of east west connections between communities on either side of the Bruce Highway. Whilst the rail service is excellent, there is an*

inadequate bus service, with many parts of the study area lacking options out of key hours.

- *Image and identity – there is a lack of alignment between the identity of the shire as it is understood by residents and the image perceived by the rest of the region.*

The above findings provide a context for development of the project which would deliver improved economic/ employment opportunities for the local community as well as improved social and community amenities.

4.2.2 Northeast Business Park Area Plan

Regulation of the development of the site would be controlled by a site-specific variation to the local government planning scheme set out in the draft Northeast Business Park (NEBP) Area Plan. The NEBP Area Plan dated 12 October 2009 provides a statutory framework to ensure the orderly development of the project and includes:

- the proposed Structure Plan for the site describing the various precincts and their inter-connection
- provision for Sector Plans – these would address specific areas of the Structure Plan and anticipate preliminary approvals for material change of use at a more detailed level than the overall site
- assessment tables and development codes for various components of the project.

Conclusions

The draft Area Plan has been developed in conjunction with MBRC. Based on expert advice from MBRC staff, I am satisfied that the draft NEBP Area Plan would provide satisfactory planning and environmental outcomes for the project site and should be adopted.

In order to ensure the orderly development of the site in accordance with overarching planning principles for the region, I state conditions (Conditions 1 – 18, Schedule A, Appendix 1) that must be attached to a preliminary approval for the project relating to the NEBP Area Plan.

4.2.3 Proposed mixed industry and business area

The proposed MIBA use is located within part of the site which is currently zoned District Industry under the current local government planning scheme. The District Industry zoning envisages a range of uses including general industry, service industry, warehouse, utilities, hotel etc. The MIBA format is designed to expand the allowable uses to include related activities such as offices and retail. As described by the EIS, the intention is to create opportunities for greater diversity of businesses and more intense development and employment generation.

The proponent has also embraced the concept of industrial ecology in the design of the MIBA[5]. The goal is to create a governance model that promotes mutual cooperation between businesses and the local community. This is predicted to improve overall efficiencies by sharing information and resources, reducing waste and building economies of scale.

The proposed MIBA development, with a total area of 169 hectares, is predicted to support over 13 600 direct full time equivalent (FTE) positions during operation, with the potential to indirectly create another 13 400 positions. The proponent is also committed to enhancing employment opportunities for local indigenous groups through the preparation of an Indigenous employment strategy for the project[6].

The EIS reports significant positive support from local business operators for the proposed development and the MIBA concept. As discussed above, the findings of the community

[5] Refer to Commitment 8, Appendix 2
[6] Refer to Commitment 5, Appendix 2

context study indicates that the regional economy stands to benefit significantly from the creation of new employment and economic activity.

Despite the general support, a limited number of concerns were raised in EIS submissions that the composition of the proposed MIBA is contrary to the intent of the District Industry zoning and its composition would have potential to detract from the future viability of the nearby Caboolture Morayfield Principal Activity Centre (PAC).

The SEQRP sets out a hierarchy of activity centres to promote the orderly development of defined areas where business, services and high density residential uses should be concentrated. This is for a number of reasons including to ensure viability of existing centres, reducing private vehicle trip generation and maximising links with public transport. Within the project area, the intention is for residential and commercial development to be focused in the Caboolture Morayfield PAC to consolidate existing uses and economies and promote transit-oriented development.

The concerns raised in EIS submissions are primarily about the quantity of office and retail space to be offered in the development and its potential to compete with the PAC. This issue was investigated in detail by MBRC and as a result the relative mix of uses in the MIBA has changed since its initial presentation in the EIS report. The draft Area Plan no longer supports the stand-alone office use and has reduced the total allowable Retail Warehouse component from 45 000 m^2 gross floor area (GFA) to 25 000 m^2. In addition, land for Retail Warehouse use would be released in stages generally in accordance with demand.

The specialist investigation commissioned by MBRC on this matter advises that the amended format of the MIBA precinct would have no significant adverse impact on the commercial viability of the Caboolture Morayfield PAC. This was confirmed though MBRC's consultation with local business operators. MBRC has advised its support for the inclusion of this limited area of Retail Warehouse use on the project site.

Buffer zones

The proposed MIBA precinct would have a frontage along the Bruce Highway of approximately one kilometre. The majority of other boundaries of the MIBA are adjacent to open space areas and require little in the way of buffer treatments.

The portion of the MIBA precinct fronting the highway was initially envisaged in the EIS as having a visual prominence that 'will attract businesses that require ready highway access and some level of exposure'. Building heights up to 15 m are proposed.

In response to concerns raised by MBRC, the highway frontage is now intended to be screened by a vegetated buffer area. The proposed MIBA layout incorporates a service road adjacent to the highway frontage offset by ten metres. The MIBA code in the draft Area Plan includes specific requirements for vegetation screening within this buffer.

Conclusions

It is clear that development of employment supporting industry land is highly desirable in this location. I accept the EIS findings that the proposed MIBA format offers the potential for strong economic development and employment growth for the region.

I am satisfied that the proposed MIBA uses are appropriate and that, taking into account the development controls provided for in the draft NEBP Area Plan, the potential impacts on the future commercial activities of the surrounding region are minimal.

In order to ensure the orderly development of the MIBA, I state conditions (Conditions 1 - 18, Schedule A, Appendix 1) that must be attached to a preliminary approval for the project.

4.2.4 Proposed marine precinct

The proposal for the MIBA includes 17.8 hectares intended specifically for marine related industries. The project's stated intention is to promote the creation of a new marine industry cluster north of the Brisbane River to satisfy current and future demand. Based on economic forecasts in the EIS, continuing rapid growth in this sector is predicted to create additional domestic and export demand for the manufacture and servicing of recreational boats.

Supporting the MIBA marine industry precinct is the shipyard and marina with direct access to the Caboolture River and Moreton Bay. Along with these industrial components, the marine precinct also proposes:

- recreational boating facilities with an estimated 911 marina berths and storage of up to 500 additional boats in a multi-storey "stacker"
- approximately 17 000 square metres of retail space, envisaging restaurants, a supermarket, a tavern and general specialty retail
- residential towers of up to 12 storeys
- hotel facilities, up to 200 rooms
- public open space areas.

Location and need

The EIS includes specialist economic studies providing justification for the proposed marina and marine industry facilities. A (mid-range) projected demand of 3 641 marina berths for boats over eight metres in length is forecast by 2010. This is supported by advice from the former Department of Tourism, Regional Development and Industry that points to the shortage of publicly available boating facilities and the need to provide facilities to support Queensland's recreational boat-building industry. The department therefore strongly supports the development of the proposed marina facilities, particularly in terms of its potential to avoid constraints on future development of the recreational boat market. In addition to this, a number of EIS submissions gave in-principle support for the proposed marina and marine industry precinct.

The EIS finds that there are very limited locations suitable for development of a marina/marine industry facility between the Brisbane River and Noosa. The site provides opportunities for tall-mast and relatively deep-draft access to Moreton Bay, which are generally otherwise unavailable. The project site is also well placed in the northern Brisbane conurbation and is of a size and scale to facilitate the marine industry precinct. The inclusion of vessel maintenance facilities in the project is targeted to provide services to recreational boat owners throughout the northern part of Moreton Bay and Sunshine Coast, which are currently limited.

The EIS concludes that the marina is necessarily located outside the urban footprint, as defined by the SEQRP, to enable connection to the Caboolture River estuary. This finding is supported by advice from DIP.

Commercial impacts

Combined with other retail uses in the MIBA precinct, the project would create a level of commercial activity equivalent to a "district activity centre".

Several submissions to the EIS raised concerns about the quantity of retail space to be offered in the proposed marine precinct and its potential to detract from other commercial activities in Burpengary and the Caboolture Morayfield PAC. This issue was reviewed in a specialist investigation commissioned by the MBRC and I am advised that the proposed 17 000 m^2 gross floor area of retail space, with a limit of one supermarket of not more than 2 500 m^2, would not adversely impact on the centres hierarchy.

Conclusions

I recognise the demand for new marine facilities in the region with access to Moreton Bay. I accept the EIS findings that there are very limited opportunities for development of a marina/marine industry facility in the northern section of the SEQ region between the Brisbane River and Noosa. I am satisfied that the level of proposed commercial activity in the marine precinct would not adversely impact on economic activity in nearby areas.

The suitability of the proposal in terms of its impacts on the coastal environment is discussed in section 4.4.

In order to ensure the orderly development of the marina precinct, I state conditions (Conditions 1 – 18 of Schedule A and condition 1 of Schedule B , Appendix 1) that must be attached to a preliminary approval for the project.

4.2.5 Caboolture River navigation channel

EIS findings

The project includes a proposal to provide a dredged channel in the lower section of the Caboolture River to create an all tide access for vessels up to 18m in length. The EIS considers that the channel improvements are essential for the viability of the marina and marine industry precinct. This is based on both an economic consideration and also the need to provide a safe navigation access to the facility.

Maritime Safety Queensland (MSQ) maintains navigation beacons in sections of the existing channel in the Caboolture River. Recreational vessels regularly navigate the river and there are a number of existing facilities including boat ramps, permanent moorings and a commercial marina and shipyard (Monty's Marina) downstream from the project site.

At present, deep draft vessels can access the river however only during favourable tidal and weather conditions. The EIS notes potential safety concerns for existing users, particularly near the entrance during low tide conditions and periods of strong winds. These concerns have also been advised by the Regional Harbourmaster who has noted safety concerns for recreational vessels navigating the river and the limited access for emergency response vessels.

Similar to many other river entrances in Queensland, the navigation channel has never been dredged. Some sections of the channel have limited depths, in the order of 0.5 m below the lowest astronomical tide (LAT). Deepening the channel to 3m below LAT and straightening a section is proposed. New fixed navigation beacons would be installed and include standard navigation lighting to aid night visibility. The channel improvements, including the alignment, have been designed in consultation with the Regional Harbourmaster. It is noted that the proposed minimum navigable depth would be -2.5 m LAT; initial dredging to -3 m is proposed to allow for siltation between maintenance dredging works.

Responsibilities

The EIS recognises that the project will have to fund the full costs of the capital dredging and make at least a significant contribution to ongoing maintenance of the navigation channel. A separate commercial entity would be created to manage the marina and associated facilities and a levy for ongoing maintenance would be charged to all berth owners and tenants of the marine industry precinct[7]. This would cover costs for ongoing channel dredging, maintenance and operation of the lock facility and other works, including funding for environmental management.

It is the proponent's view that the state should contribute to maintenance costs of the improved channel because of the benefits it provides to other users. The proponent also notes the recent initiative of the state government to utilise revenue from increased boat registration fees directly for upgrade and maintenance of boating facilities such as boat ramps, harbours and channels. I am advised by the Department of Transport and Main Roads (DTMR) that limited funding for channel maintenance works may be available in-principle however this would depend on an assessment of priorities across all facilities in the state.

The project would fund the installation of the proposed new navigation beacons and the removal of the existing structures. Once installed, MSQ would assume responsibility for their ongoing maintenance.

The channel improvement works would require approximately 550 000 m^3 of capital dredging and an estimated average annual ongoing maintenance dredging of 21 000 m^3 per year. All dredged material would be pumped to the project site via a temporary pipeline, dewatered and treated for reuse or disposal. The EIS describes the establishment of a dredge material

[7] Refer to Commitment 10, Appendix 2

rehandling facility in the south eastern corner of the project site. This facility would need to be maintained on a permanent basis, or until an acceptable alternative is found.

Conclusions

I accept the need to provide a safe navigation access for the proposed marina to make the project commercially viable and to provide an acceptable level of safety for users. My conclusions regarding the environmental impacts of the marina and channel dredging are provided in section 4.4.

I acknowledge the benefits to other users in the Caboolture River that would derive from the proposed channel improvement works. It is noted that in future, DTMR may provide a contribution to the maintenance of the navigation channel however this would be based on a case by case decision and having regard to state-wide priorities.

It is critical that future berth owners are made aware of their responsibilities to contribute to funding of the ongoing maintenance of the navigation channel and other associated works. It is important to note that the cost of these requirements may vary in the future due to factors such as natural variability (eg river flooding) and changes in environmental management standards.

Conditions

In order to ensure the appropriate development and maintenance of the navigation channel in the Caboolture River, and to ensure that future berth owners are made aware of their financial responsibilities to ongoing maintenance and associated works of the navigation channel, I state conditions (Condition 2, Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

4.2.6 Proposed residential use

The proposal includes a mix of residential uses totalling approximately 2 200 dwellings, to be constructed in stages over 15 or more years. The marina precinct would include approximately 900 waterfront villas and apartments ranging from two to four bedrooms in buildings of up to 12 storeys. The residential precincts (a total of 110 hectares) would comprise approximately 1 300 mixed housing types including detached dwellings and a small number of medium density blocks up to 3 storeys. Lot sizes for detached dwellings would vary from 350 m^2 to 600 m^2. Overall the project would support approximately 5 500 residents.

The EIS identifies a number of benefits from the inclusion of residential uses in the project. The justification is primarily based on the economic support that it would provide to the recreational and community facilities and the open space precincts that are incorporated in the project. The permanent residents on-site would also contribute to the commercial activities in the marine precinct and the MIBA as customers and/or employees. The EIS also finds that the development of the residential precincts provides a high value alternative use of land that is not viable for industry or agriculture.

Concerns were raised in a limited number of EIS submissions that residential development in the project site is not appropriate, including for the following reasons:

- urban development (part of the residential precinct and the marina precinct) outside the urban footprint is contrary to the SEQRP
- the use of land zoned as district industry for residential use is questionable given the need for employment generating land in the region
- the proposed residential uses would adversely impact on the quiet, semi rural character of the adjoining area.

These concerns are discussed in the following sections.

New urban uses proposed outside the urban footprint

The EIS acknowledges that the proposed development creates a new residential area east of the Bruce Highway that is not contemplated in the SEQRP. Under normal circumstances such

a proposal would result in the regulatory provisions of the SEQRP being applied and the development would be unlikely to be approved. However, lodgement of planning applications for the project prior to the SEQRP coming into force and the project's declaration as a significant project, means that the regulatory provisions don't apply.

Notwithstanding the above, the policies of the SEQRP have been considered as part of my evaluation of the project. The EIS and the SEIS provide a justification for the proposed residential uses outside the urban footprint, including:

- the residential components are critical to the success of the project. The permanent population on-site would contribute significantly to the funding of recreation and community facilities and the open space areas
- the proposed residential housing provides a limited but valuable contribution to meeting future demand for new housing in the region. Recent population forecasting has estimated that 38 500 new dwellings in the Caboolture area will be needed by 2027 – the project would supply approximately 6 per cent of this projected demand
- the residential areas would be developed in a compact form (including medium and high density blocks) and are relatively well located close to employment, transport and service infrastructure
- the proposal would represent a natural extension to the urban footprint. Additionally, the new residential precincts are likely to encourage intensification of the adjoining large lot residential land to the immediate south of the project site, consistent with the objectives of the SEQRP
- the co-location of residential uses on the project site with the MIBA (within walking and cycling distance) enhances the functionality of the MIBA and promotes a high degree of self containment
- the proposal has negligible impact on regional landscape and rural production (RLRP) values. The parts of the site proposed for urban development within the RLRP have very low visibility from external viewpoints and have limited agricultural values.

Residential use on land zoned for District Industry

A substantial portion of the residential (west) precinct lies within the District Industry zoning. The EIS and SEIS examine the potential for this part of the site to be used for industrial use and conclude that only limited MIBA uses could be possible and that the proposed residential use is preferable. The reasoning, includes:

- given the flooding constraints, an industrial area in this location would be separated from the primary MIBA precinct and its highway access
- due to its location adjacent to existing residential areas the possible industrial uses would be constrained. Mitigation, such as the establishment of buffers to the boundary, would reduce the usable area and restrict certain activities
- it may be difficult to avoid heavy traffic on the adjacent road network
- the potential for the project to encourage intensification of the adjoining large lot residential land would be reduced.

Advice from MBRC on this matter indicates no concerns and that the proposed residential use in this area appears logical given the site constraints.

Impacts on adjacent residential areas

One submission to the EIS noted that proposed residential uses, including medium to high density apartments, would conflict with the quiet and semi-rural character and amenity of the adjacent area. Several other submissions raised concerns with the residential traffic generated by the development and its impact on the adjacent road network, particularly along Buckley Road. MBRC expressed concern in relation to the 12-storey residential buildings in the marina precinct and the visual impact on adjoining residential areas.

The development of the project would generate additional impacts compared to those expected from the district industry use anticipated in the planning scheme. The site would be transformed from its existing agricultural use into a highly urbanised setting, supporting an estimated 5 500 new residents and the associated traffic.

The EIS examined these issues and found that the positive benefits of the development would outweigh any adverse impacts. The EIS suggests that residents in the surrounding areas would benefit from the recreational and community facilities created by the project. The critical mass of new residents east of the Bruce Highway would generate opportunity for redevelopment, improved infrastructure, improved provision of public transport and positively influence property values.

Given the targets in the SEQRP for intensification of residential areas inside the urban footprint, it is likely that the quiet and semi-rural nature of the adjacent residential areas would be affected in the future irrespective of the project proceeding. The timing of the proposed development however may bring forward these changes. Similarly, the development of the site in accordance with the District Industry zoning would also result in increased traffic flows on Buckley Road. Traffic impacts are examined in section 4.3.2.

I accept that the development would be 'out of character' with its existing surroundings but it is questionable whether this would be an unexpected or inappropriate outcome. The impacts would be broadly consistent with the intent of the SEQRP. Additionally, I note the results of public consultation reported in the EIS and the finding that there is little community opposition to the proposed residential precincts. Rather, the community feedback indicates significant overall public support for the proposal.

The EIS examined the potential impacts of the high residential towers in the marina precinct. The analysis of scenic amenity in the EIS indicates that the 12 storey buildings would be noticeable from only a limited number of places in the adjoining residential areas and finds that buildings of that scale would be visually compatible with aesthetic and recreational values inherent with the proposed marina. The EIS also notes that 12 storeys would maximise the opportunity for the provision of higher density development, which is a key objective of the SEQRP (in appropriate locations) and that comparable development already exists within the MBRC area.

MBRC has expressed its preference for residential building heights to be limited to a maximum of six storeys, which would be broadly consistent with the Caboolture Shire Plan and the superseded planning scheme for an activity centre of this scale. MBRC also raised concern about the visibility of 12 storey buildings in the proposed location.

Affordable housing

The EIS community context study notes that demand for affordable housing in the region is high. In the recent past, housing stock in the Caboolture area has been seen to offer good value for money despite the relatively low availability.

Some lower cost housing options are included in the proposed development. The housing mix in the residential precincts includes a number of smaller allotments, smaller apartments and detached studio apartments. These products would help to meet some of the demand for lower cost housing types.

In addition, the proponent has committed to a voluntary contribution in the order of $2 000 from each residential lot sale to a housing trust for the provision of affordable housing in Caboolture[8]. The trust fund would be used by a non-profit agency to help leverage the provision of affordable housing in the area.

Community facilities

In response to the findings of the community context study, the draft Structure Plan includes provision for a range of community facilities on-site to cater for the proposed 5 500 new residents and the adjoining residential areas. The EIS finds that the additional permanent

[8] Refer to Commitment 4, Appendix 2

residents would have minor impact on demand for external social infrastructure such as schools, medical facilities and emergency services.

The community context study identified a potential need for a new primary school to service the development and the surrounding area. Although a site for a new primary school has been included in the draft Structure Plan, I am advised by the then Department of Education and Training that a new school in the area is not included within its 20 year forward planning.

Queensland Police Service has advised that a suitable site may be needed within the development to accommodate an appropriate policing presence when the development is fully established. The development will be monitored and, if deemed necessary, arrangements would be negotiated directly with the proponent.

Conclusions

The concept masterplan presented in the EIS has been strongly supported by a number of advisory agencies and private submitters. The project has received generally strong support in the local community.

I accept the arguments presented in the EIS supporting the proposed residential uses within the project site and that the project would make a positive contribution to the construction of new housing that will be needed in the region. I am satisfied with the planning requirements incorporated in the draft NEBP Area Plan in relation to residential areas and the provision for community and/or recreational facilities.

I conclude that social impacts on surrounding residential areas would be relatively minor and that benefits outweigh any adverse outcomes. The introduction of 2 200 new dwellings on the project site would positively assist in stimulating redevelopment and intensification of adjacent areas. I note the forecasts in the SEQRP for a demand of an additional 84 000 dwellings in the Moreton Bay Region by 2031.

I am conscious of MBRC's concerns in relation to building heights in the marina precinct and I have concluded that a maximum height of six storeys is not necessary. The proposed 12 storey buildings in this location, appropriately controlled through the planning process would enable the provision of appropriate development densities without significant adverse visual impacts in the surrounding area.

In order to ensure the development results in acceptable visual amenity from viewpoints external to the site, I state conditions (Conditions 5 and 6, Schedule A, Appendix 1) that must be attached to a preliminary approval for the project. This includes requirements for development density, massing and other architectural controls within the proposed marina residential precinct.

4.2.7 Riverine flood and storm tide risk

A substantial portion of the project site lies within the Caboolture River floodplain. The project proposal includes significant earthworks and other works to ensure acceptable mitigation of flood and storm tide risks.

Riverine flood risk

The extent of the developable area and the nature of the flood mitigation works are largely dictated by the requirements of the local government in relation to storm water drainage. These include:

- all development is to be located above the calculated 100 year average recurrence interval (ARI) ultimate flood level plus 0.3 m freeboard
- development is not to adversely affect flood storage or increase flood levels on adjoining properties for all floods up to the 100 year ARI event.

The proponent has commissioned detailed flood modelling as part of the EIS which in turn has influenced the design and layout of the proposal. The flood model includes:

- two dimensional non-steady flood simulation using best available topographical and hydrological data

- a downstream 'tailwater' boundary condition of 2.3 m above AHD - this corresponds to a level of 0.95m above the highest astronomical tide (HAT) at Beachmere
- calibration and verification against documented flood events
- sensitivity testing of sedimentation in the dredged channel in the Caboolture River.

Detailed review of the flood study has been undertaken by MBRC including the commissioning of an expert peer review of the modelling. Subsequent additional refinements to the flood study have been completed to demonstrate compliance with MBRC's requirements. I am advised by MBRC that the flood model study undertaken for the project is satisfactory for the purposes of assessing the applications for preliminary approval and further detailed information would be required for subsequent approvals.

The proposed building pad minimum levels of 4 m above AHD correspond to more than 0.5 m above the calculated 100 year ARI flood level. The extensive earthworks and flood diversion banks proposed within the site would avoid adverse material impacts on the adjoining properties and reduce overall water levels across the flood plain for the 100 year ARI case.

The EIS includes a draft stormwater management plan for the project site. Various water sensitive urban design measures are proposed including the use of vegetated treatment trains and buffer areas. These treatment areas would be designed to filter suspended sediments and pollutants from stormwater flows prior to ultimate discharge into the Caboolture River. The treatment trains would be located within the open space areas, covering approximately 11 per cent of the project site, and would include sufficient storage to manage smaller overland flood flows (up to 1 year ARI) such that peak flows are no greater than the undeveloped case.

Compliance with MBRC's stormwater drainage requirements would require construction of mitigation works within the project site including earthworks to improve overland flood conveyance and diversion banks at six locations within the site to avoid impacts on the neighbouring property. Ongoing maintenance of these works, including control of vegetation growth in floodways, are necessary to ensure overland flood impacts are managed. The allocation of the ongoing maintenance responsibilities of these works within open space areas is discussed in the following section.

The proposed flood mitigation measures presented in the EIS assume the channel in the Caboolture River is maintained at a minimum depth of 2.5 m below LAT. Prior to the development of the portions of the site that rely on the dredged channel for flood conveyance, it is critical that the requisite channel deepening works have been completed and necessary approvals and funding arrangements are in place to ensure its continued maintenance.

Storm tide risk

I note that storm tide risk has not been modelled for the proposed development. I accept that this is not necessary as it is sufficient to assume (conservatively) that storm tide levels affecting the site would be equivalent to maximum water levels at the river entrance.

The potential for rising sea levels associated with global climate change must be included when considering storm tide risk. MBRC has currently adopted a value of 0.3 metres (over a 50-year planning period) for sea level rise allowance. A report recently released by the DERM's (formerly the Environmental Protection Agency) Office of Climate Change entitled *Climate Change in Queensland: what the science is telling us* discusses the current scientific understanding of potential sea level rise. From this it can be concluded that a reliable estimate of predicted sea level rise is 0.8 metres by 2100.

The proposed minimum building pad level of 4 m AHD is more than 2.6 m above the HAT at Beachmere and is well above the 100-year storm tide level of:

- 2.8 m AHD adopted by MBRC (which includes a 0.3m sea level rise allowance)
- the corresponding level of 3.3m AHD when incorporating the predicted 0.8m sea level rise allowance by 2100

Conclusion

I note that the draft NEBP Area Plan requires that development of certain stages of the project can only proceed if flood mitigation works are completed. The sector plan code and reconfiguration of a lot code includes necessary requirements to ensure that flood immunity is considered prior to development of each project stage. Accordingly, I am satisfied that the risks of riverine flood can be appropriately managed for the site. I acknowledge the expert advice provided by MBRC on this matter.

Given that the minimum developed ground levels on the project site would be more than 2.6 m above HAT, I am satisfied that the risk of storm tide inundation affecting the site would be acceptably low and that the proposed development complies with requirements of coastal hazard policies established pursuant to the *Coastal Protection and Management Act 1995*.

In order to ensure the development minimises risks to people and property from flood and storm tide hazards, I state conditions (Conditions 19, 20, 21, 23, 25 of Schedule A) that must be attached to a preliminary approval for the project.

4.2.8 Open space

The project site is currently a degraded ex-pine plantation, largely cleared and used for cattle grazing. The proposal includes the creation of 419 hectares of open space precincts – the majority of which is flood constrained.

A draft landscape master plan provided in the EIS outlines the proposed open space areas. The intent of the various uses include habitat protection and enhancement[9], flood conveyance, a heritage park[10], river access and picnic areas, sports fields[11] and a golf course. The primary objectives are to manage flooding hazards and to enhance the value of the other elements of the project by providing attractive surroundings. Significant environmental benefits and benefits for the community in the surrounding areas are also intended.

A substantial component of the open space would be utilised for stormwater management. This includes sections of the proposed golf course which would incorporate Raff Creek and a series of vegetated treatment and retention areas.

In addition to the open space precincts there would be public open space areas within other precincts including local parks and pedestrian spaces in the vicinity of retail areas.

The current MBRC planning scheme sets out the requirements for open space contributions as a mandatory part of a development of this nature. The requirements include

- an area representing 10 per cent of the site must be dedicated to open space
- the dedicated area to be above the 20 ARI flood level
- 50 per cent of the dedicated area to be above the 100 year ARI flood level.

MBRC has advised that the proposal, in its preliminary form, would be able to satisfy the requirements, given the extent of revegetation, public facilities and other works to be provided across the site.

The EIS proposes that tenure of the open space precincts remain largely as private freehold, with appropriate arrangements in place for public access and management responsibilities. This was preferred to allow the site owners to actively manage the amenity and thereby control the attractiveness and overall value of the project. MBRC has advised a preference that all the public open space areas should be converted to public ownership to ensure that functions such as public access and flood mitigation are adequately maintained.

[9] Refer to Commitment 1, Appendix 2
[10] Refer to Commitment 6, Appendix 2
[11] Refer to Commitment 2, Appendix 2

The different forms of ownership would have implications for funding arrangements. Where a body corporate retains ownership of open space as common property, it would also have responsibility for the funding of ongoing maintenance and public liability insurance. Conversely, public ownership would require an ongoing allocation through the MBRC's general open space management program.

In subsequent discussions, a dual management arrangement has been proposed for the open space precincts of the project. Under this arrangement, ownership of a large proportion of the open space areas would be transferred to MBRC. The transfer would occur after completion of rehabilitation and other works and would be on the basis that the proponent is provided management access (e.g. in the form of a lease) over all or part of the area. This would enable the body corporate to undertake maintenance tasks (to an agreed standard) whilst guaranteeing ongoing public access.

The site owners (body corporate) would retain selected elements of the open space areas in the form of common property. Easements would be created to allow public access and for drainage purposes. Elements would include:

- water features and entry statements
- golf course
- public walkways and plazas within the marina and MIBA precincts
- areas required for access to the navigation lock.

Where these areas would be publicly accessible, the owners would need to ensure adequate public liability insurance cover is maintained.

Conclusions

I am satisfied that the proposed ownership and management arrangements for the open space are feasible and would provide both MBRC and the site owners an acceptable level of management control.

I note that the transfer of open space land to public ownership is in addition to that otherwise required by the planning scheme or by state legislation. Similarly, the proposed rehabilitation and revegetation works would also be considered as an addition to that normally required as part of a development of this type.

In order to ensure the development provides appropriate management of public open space within the project site, I state conditions (Condition 8, Schedule A, Appendix 1) must be attached to a preliminary approval for the project.

4.2.9 Alternative uses

As reported in the EIS, there are only two realistic alternative uses for the site other than the development proposed in the two current planning applications.

1. The land within the District Industry zoning (and the urban footprint) could be developed as a "traditional" industrial subdivision.

   The EIS compares the employment generation and the economic potential of this option against the fully developed proposal. Substantial benefits to the local economy would be generated, including more than 10 000 operational jobs, however these would be significantly less than those predicted for the current proposal (i.e. 13 000 operational jobs).

   It could be assumed that the balance land, outside the urban footprint and within a Rural zoning, would be retained for cattle grazing. Therefore the predicted environmental and social benefits of the proposed open space precincts would be unlikely to be realised.

2. Alternatively, the existing rural use could continue.

   The EIS includes an assessment of the value of the agricultural land on the project site. The site has historically been used for pine plantation, grazing and limited

cropping which has resulted in significant clearing and degradation. A total of 21.4 ha (2.8 per cent) of the site was assessed as Agricultural Land Class A and 116.7 ha (15.1 per cent) of the land was classed as Class A-B. These two classes are considered to be 'good quality agricultural land'. A further 12.2 per cent was Class B suitable for grazing, 51.4 per cent was Class C also suitable for grazing and 18.5 per cent is Class D which is non-agricultural land.

The Class A and A-B lands are located within the urban footprint, as designated in the SEQRP, and are constrained by topography. The EIS finds that the areas suitable for agricultural pursuits are relatively small and are unlikely to produce viable economic returns.

Advice from the DERM (formerly Department of Natural Resources and Water) confirms the EIS assessment that the land has negligible agricultural future.

4.2.10 Overall conclusions – economic and social

Having examined the project proposal and supporting information I am satisfied that the development of new employment generating land on the site would provide considerable economic and social benefits for the region.

I accept that the MIBA format in conjunction with other elements of the project is well formulated and has clear advantages over a traditional industrial development of the land zoned as District Industry. The proposal offers the opportunity to develop an attractive living and working environment and promotes a high degree of self-containment. Co-location of the MIBA with the marina close to existing urban areas and transport links is a rare opportunity to develop a new marine industry cluster in the region.

I am satisfied that the proposed retail and residential uses would have net positive economic and social impacts on the surrounding communities. The proposed development is generally in accordance with the strategic directions of the SEQRP. The residential precincts would provide a useful contribution to forecast shortage of new houses in the area and could assist in encouraging further intensification of the adjacent areas, as supported by the SEQRP.

4.3 Infrastructure impacts

4.3.1 Impacts on the existing road network

The project site is strategically located adjacent to the Bruce Highway, which is the primary northern route from Brisbane for commercial vehicles and trucks and also carries significant commuter and recreational vehicle loads. The rapid growth of the region has resulted in heavy use of the highway and other major road access routes often leading to congestion problems during peak periods. Current planning by DTMR suggests that at least eight lanes will be required on the Bruce Highway in the vicinity of the project site by 2020.

The ultimate development of the project would yield approximately 350 hectares of urban uses supporting an estimated 13 600 employees and 5 500 permanent residents. The scale and nature of the proposal will necessarily impact on the existing road network including the Bruce Highway.

The EIS reports on the results of a detailed assessment of traffic impacts on the road network. The studies list a number of works that are likely to be required to accommodate traffic flows generated by the project over and above background population/traffic growth.

The analysis undertaken for the EIS and supplementary EIS indicates that a majority of the traffic generated by the development is expected to pass through the Buchanan Rd interchange to access the Bruce Highway and broader road network. Similarly, the Uhlmann Road interchange and other nearby roads are expected to experience impacts from development traffic.

Figure 1 shows the principal transport routes for the project. Infrastructure upgrades that are likely to be needed to accommodate the increased loads include:

- upgrade of the Buchanan Road overpass to achieve sufficient capacity east and west of the highway. A high capacity signalised interchange will also be required
- the Buchanan Road link to Morayfield is expected to require a four-lane upgrade by 2030, both east and west of the highway. Significant intersection upgrades at the western end of Buchanan Road, including the rail crossing, are also required. The impacts of the project would bring forward the timing of these works
- increased traffic loads on the Bruce Highway are predicted and the timing of the likely upgrading of the Bruce Highway to eight lanes may need to be brought forward. An additional lane would be needed on the highway off ramp to Buchanan Road.

As shown in Figure 1, the internal road layout of the NEBP is based around a central east-west boulevard which extends from the Buchanan Road entry point. Connections will be made to the south primarily through Buckley Road. Limited access would be available via Nolan Drive in the short to medium term. Further east-west links between precincts would service local traffic.

The EIS discusses upgrade works expected for the local road network to the south of the project site. Buckley Road, the secondary access to the site, would need to be upgraded to sub-arterial standard. The planned upgrade of the Buckley Road/Uhlmann Road intersection would need to be brought forward, including a signalised intersection.

Works by 2020 on the Bruce Highway also include an upgrade of the existing Uhlmann Road overpass and roundabouts to a four lane cross-section, due to a general increase in local traffic. Additional traffic loads generated by the project may bring these works forward. A signalised intersection on the Uhlmann Road ramps west of the Bruce Highway is identified as already overdue.

Both DTMR and MBRC raised concerns that the extent of road network upgrades discussed in the EIS may not be adequate to mitigate all likely impacts. MBRC's concerns were based on an independent traffic modelling study that indicated that impacts may be expected over a larger area than anticipated by the model results in the EIS. In particular, significant traffic loads are anticipated on parts of the road network to the west of the project site.

Conclusions

Given the format of the MIBA development, the trip generation for this land-use is likely to be higher than that expected for a typical district industry development. Taken with the additional urban uses on the site (residential and marina), the associated network impacts on state and local roads are expected to be greater than originally envisaged within local and regional infrastructure planning. These impacts would need to be addressed as part of implementation of the project.

There is considerable uncertainty of the actual traffic generation of the project compared to the background growth over its 15-20 year staged development. Traffic loads in the project would be affected by the final configuration of the MIBA and other parts of the development. Similarly, continuing growth of the region including redevelopment and intensification of surrounding areas will affect background traffic loads and can't be accurately predicted over the timeframe.

It is therefore difficult to reach firm conclusions at this point about the ultimate extent of impacts and appropriate level of contributions required by the development. Accordingly, I accept that a staged approach to mitigation is necessary. Both DTMR and MBRC agree that the traffic and road impacts of the project be monitored and addressed at each stage of development on a cumulative basis. Detailed traffic impact assessments would need to be prepared as part of development approvals for individual stages.

In order to ensure that the impacts of the development on the adjacent road network are adequately mitigated, I state conditions (Conditions 26–31, 33 of Schedule A and Condition 3 of Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

4.3.2 Traffic impacts on existing residents

Public consultation undertaken as part of the EIS investigations indicates that a key concern of local residents is the worsening traffic loads and the delays experienced. Local access between communities in the Caboolture area can be difficult, particularly travelling east – west or during peak periods.

Several EIS submissions raised concerns about traffic impacts on local roads adjoining the project site. In particular, the northern section of Buckley Road is predicted to change from a quiet rural road which currently only serves a small number of local trips to a sub-arterial link. The SEIS notes that Buckley Road already has a sub-arterial classification in MBRC's road hierarchy with a 40m wide road reserve.

In addition to the road network upgrades that may be required, it is also proposed to close Nolan Drive at the southern end (immediately north of Coach Road East) in the longer term to stop through traffic from the development impacting upon local residents. This would avoid heavy trucks or commercial traffic from the MIBA precinct travelling on local roads.

Conclusions

The upgrade of Buckley Road and a subsequent increased traffic load is consistent with current planning for development of the site. I conclude that the anticipated future traffic loads on Buckley Road would not be unexpected or unacceptable given its proximity to the development site. The width of the existing corridor would enable appropriate treatment of traffic flows, parking and bicycle paths.

4.3.3 North-south arterial

Since 1994, DTMR planning has included an eastern alignment for a north-south arterial road. A corridor was identified and declared as a future state-controlled road (Deception Bay – Bribie Island Road) at that time. The function of this road would be to provide for alternatives to the use of the Bruce Highway for commuting traffic from Bribie Island and Sandstone Point and to allow for development of options for other links north and south of the current highway.

The north-south arterial corridor alignment includes a crossing of the Caboolture River approximately 3km downstream of the proposed marina. Unless a high bridge was constructed this would impact on the upstream access of high masted vessels. DTMR has advised that the viability of the north-south arterial corridor must be protected and that construction of a high bridge would incur significant additional costs.

DTMR has also acknowledged that the location of a bridge in the current corridor alignment would be expensive and difficult due to the need to traverse extensive areas of low lying land adjacent to the Caboolture River that has high conservation value.

DTMR has agreed that an acceptable alternative to the current alignment of the north-south arterial river crossing is to create an appropriate corridor through the project site. This corridor would connect to the central east-west boulevard from the south-eastern corner of the project site.

Provision of a corridor through the site will allow tall-masted vessel access to the proposed marina while ensuring an appropriate alternative route for the north-south arterial road is preserved and/or there is suitable connectivity through the area in the event that another viable equivalent route can be determined.

In order to ensure that adequate provision is made for the North-South arterial corridor, I state conditions (Condition 27 of Schedule A and Condition 3 of Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

4.3.4 Public transport, pedestrian and cycling facilities

The EIS reports that public transport services to the communities on the eastern side of the Bruce Highway in the vicinity of the project site are presently very limited. Also, it is reported that pedestrian linkages in the area are generally poor and dedicated bicycle paths appear to be limited.

The EIS outlines a range of proposed measures supporting public passenger transport, walking and cycling including:

- provision for bus routes and bus stops
- bicycle lanes within internal road corridors
- dedicated walking/cycling paths within the marina precinct and open space areas
- golf buggy paths for commuter travel between residential, marina, MIBA precincts and open space areas.

A bus route is proposed along the central boulevard and direct to Morayfield railway station. I note in the early stages of the project, the proponent has committed to providing a private bus service for commuter travel to the railway station. It is envisaged that in latter stages this will become part of the public bus network and extend into adjacent areas to the south of the site.

Conclusion

I am satisfied that suitable requirements for active transport (pedestrian and cycling) and public passenger transport can be provided by the project. In order to ensure appropriate facilities are provided, I state conditions (Conditions 4, 5, Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

4.3.5 Water and wastewater services

The EIS outlines the proposed provision of water (including recycled water) and wastewater services within the site and its external connections. Existing water supply and wastewater infrastructure has been provided to the west of the site however it is of insufficient size to service the proposed usage. Augmentation of this infrastructure and a recycled water supply would need to be provided.

Preliminary loading calculations and concept network designs have been discussed with the service provider, Moreton Bay Water. It is envisaged that wastewater from the MIBA precinct will be connected to the Caboolture South treatment plant, approximately 1 km west of the project site. Due to capacity constraints, the residential and marina precincts would not be able to be serviced by this treatment plant and would instead discharge to the Burpengary East treatment plant – located approximately 5 km south east from the site.

Potable water demand has been calculated assuming a range of water efficiency measures including water saving devices, rainwater tanks and dual reticulation. The EIS estimates an average demand of 77 litres per person per day for residential precincts and 118 litres per person per day for commercial and industrial uses. As reported in the EIS, Moreton Bay Water has indicated that sufficient supply can be provided.

Recycled water would be initially supplied from the Caboolture South treatment plant. Later stages of the project would source recycled water from the Burpengary East treatment plant, although this would require its upgrade to enable supply to Class A+ standard[12].

Conclusions

I am satisfied that the proposed development can be adequately serviced through the existing water and wastewater infrastructure, with appropriate augmentation works. Upgraded

[12] Refer to Commitment 11, Appendix 2

connection to these services will be the subject of commercial agreements. I am advised by MBRC that there are no concerns with this aspect of the project.

I am satisfied that the draft area plan (Sector Plan code) includes appropriate requirements to ensure an adequate reticulation of water, recycled water and wastewater within the project site.

In order to ensure the appropriate provision and management of water and wastewater infrastructure on the project site , I state conditions (Conditions 37 – 43, Schedule A, Appendix 1) that must be attached to a preliminary approval for the project.

4.4 Impacts on the coastal environment

The EIS, SEIS and subsequent reports have examined the potential impacts on the coastal environment in detail, considering the following coastal resources:

- water quality of Caboolture River
- ecological values
- marine plants and fish habitat
- physical condition of river bed and banks.

4.4.1 Context

The project site has a nine kilometre frontage along the southern bank of the Caboolture River and is approximately eight kilometres, by boat, from Moreton Bay at its closest point. The river is tidal up to the Caboolture weir, some 19 kilometres from the entrance. The entirety of its tidal sections is within the Deception Bay declared fish habitat area (management A area). The Moreton Bay Marine Park extends upstream almost to the eastern boundary of the site.

The tidal reaches of the river are also part of the Moreton Bay wetland aggregation that has been listed as a wetland of international importance in accordance with the Ramsar convention.

The key project actions that would affect coastal resources and values are:

- the construction and operation of a 28.4 hectare ‘dryland’ marina within the project site supporting 911 wet berths; a 300-500 boat dry-stacker facility is also proposed
- the deepening and straightening of the existing marked navigation channel in the lower Caboolture River and the adjacent Deception Bay. This navigation channel has not been dredged previously and would require regular ongoing maintenance dredging
- increased vessel traffic in the Caboolture River - principally downstream from the marina
- the management of storm water flows from, and through, the development site
- bulk earthworks in the floodplain, including flood mitigation bunds and excavation of the marina basin
- rehabilitation and revegetation of the riparian zone, wetlands and other open space area.

The marina basin will be separated from the river by a lock system at its entrance and would therefore not be tidally influenced. To ensure a continual circulation of water through the marina, a ‘rising main’ would be constructed to pump water from the river. Outflowing water would exit the marina via a weir system built into the entrance structure.

The project includes a proposal to upgrade the existing marked navigation channel in the lower reach of the river by straightening one section and deepening its overall length to 3m below LAT. The EIS estimates that approximately 550 000 m^3 of capital dredging would be required and in the order of 21 000 m^3 of maintenance dredging per year, on average. Sufficient depths are available in the river upstream of the marked channel and no dredging is proposed.

Dredging would be undertaken by a cutter suction dredge. Dredged material would be pumped ashore as a slurry through a temporary pipeline, collected and dewatered in a bunded area for later removal and disposal. The proponent has committed to setting aside an area within the project site for this purpose in perpetuity, or until an approved alternative is provided. The EIS envisages that a large proportion of the maintenance dredging material could be used for beneficial re-use such as river bank rehabilitation or beach nourishment.

4.4.2 Impacts on river bed and banks

An investigation of the physical processes in the estuary undertaken for the EIS indicates a number of changes are currently occurring. The survey of the existing condition of the river banks shows many sections are currently suffering an erosion trend. The EIS attributes this to a number of possible causes, including:

- natural variations such as those associated with floods and the meandering of channels
- clearing of riparian vegetation and continuing uncontrolled cattle grazing
- trapping of coarse grained sediments (sand and gravel) upstream of the weir
- local wind waves
- boat wash.

The EIS identified several reaches of the river where bank erosion is classified as severe. These severely affected banks typically occur in the mid to upper estuary reaches and often occur where riparian vegetation cover is poor. This includes the section of the northern bank of the river opposite the proposed marina entrance and extending downstream for approximately two kilometres.

A number of submissions to the EIS raised concerns that the proposed channel dredging and the increased boat traffic would accelerate the existing trend of bank erosion.

The EIS and SEIS include specialist reports investigating the condition of the river banks and potential changes to tidal hydrodynamics and geomorphology of the estuary as a result of the project proposed channel dredging. Detailed numerical modelling was employed for these studies, reported as:

- EIS appendix J: *Riverbank erosion assessment* (Cardno, October 2007)
- EIS appendix M1: *Caboolture River siltation study* (Cardno Lawson and Treloar, January 2008)
- SEIS appendix F: *Supplementary report on coastal processes* (Cardno Lawson and Treloar, July 2008)

Following the publication of the SEIS, reports were updated as follows:

- *Revised report on siltation and coastal processes study Northeast Business Park* (Cardno Lawson and Treloar, April 2009)

Effects on tidal flows

Hydrodynamic model studies in the EIS predict a very small change to tidal characteristics throughout the estuary. The model shows a very small increase in tidal penetration consistent with the slightly improved hydraulic efficiency of the dredged channel. This small increase in tidal penetration results in minimal changes to tidal velocities and the tide range further

upstream. The tidal prism (the total volume of water entering an estuary over an incoming tide) shows a small increase for spring tides in the order of 1.6 per cent .

I am satisfied with the findings of the hydrodynamic modelling that predicts the channel dredging would not have a noticeable effect on the tidal regime in the Caboolture River estuary. However I note that this is predicated on the continued use of the marina as a non-tidal waterway. It is therefore important to ensure that the lock system remains in place otherwise significant changes to tidal flows could result.

Effects of channel dredging

The existing marked navigation channel is generally well defined and over 1.5 m deep in many sections. The proposed dredging to 3m below LAT would require cut depths of more than 1.5 m over approximately one-third of its length. This is illustrated in figure 2 of Appendix G of the SEIS.

The majority of the dredging would occur in the upstream section of the marked channel where the estuary widens to its maximum extent. Additional shallow sections occur further downstream. These are typically edges of sand shoals that have encroached into the deeper main flow channel.

It is noted that sections where the channel is presently close to the bank are typically at, or close to, the proposed 3 m dredged depth. This includes the section at the river mouth that would not require deepening.

A morphological model was employed to estimate the potential rate of siltation in the dredged channel and to determine the likely changes to the nearby bed and banks of the river in response to the dredged channel. The model investigated changes in response to a major flood event and in response to normal tidal flows over a four year period. Both simulations were compared to a 'base-case' result that predict background changes that would occur without the dredging.

For verification purposes, the base-case simulation was compared to measured changes in the river bed based on hydrographic surveys in 1998 and 2007. The comparison of recorded survey data shows an overall shallowing trend throughout the estuary. This is consistent with anecdotal evidence from river users (reported in the EIS Community Consultation Study).

The result for the 100 year ARI flood shows only a minor shallowing over the majority of the dredged channel and indicates that minimal dredging would be required to restore the navigable depth after a flood event of that magnitude.

The model simulations of morphological changes in response to tidal flows predict an infill of the dredged channel in the order of 85 000 m^3 over the four year period. The model predicts significant changes occurring in the channel section immediately north of the Beachmere boat ramp. The predicted trend is to straighten and widen the primary channel and close off a secondary channel along the Beachmere shoreline. Similar changes are also shown in the base-case results; however these are not supported by survey and aerial photo data. Compared to recorded data, it may be concluded that the model tends to over-predict morphological changes.

On this basis, the study report concludes that the modelling is unable to determine rates of erosion and siltation with a high degree of accuracy and indicates that the estimate of channel siltation is very much a conservative upper limit.

Despite the limitations of the numerical modelling, the overall investigation enables a judgement of the pattern and scale of expected changes. There are several points of note in regard to the assessment:

- the tidal 'asymmetry' in the lower estuary indicates a net importation of bed material into the river from Deception Bay
- review of low level aerial photography indicates a relatively stable channel-shoal system with some additional evidence of a general, but relatively slow, shallowing trend

- apart from the aforementioned changes near the Beachmere boat ramp, the model predicts only minor changes to the channel-shoal system. Relatively little siltation of the dredged channel in the upper section is predicted
- some of the shallow banks adjacent to the dredged channel in that section are predicted to be eroded as the morphology adjusts to the deeper primary flow channel. Similar changes are also seen in the base-case simulation, which again suggests an over-prediction by the model
- assessment of modelled changes to river cross sections indicate that any changes to the river bed adjacent to the channel would be localised to the edge of the dredged area and would not impact on river banks.

Conclusions – effects of channel dredging

After considering the model results, taking into account the base-case simulation and the historical data, it can be concluded that large scale changes to the river bed and banks would not be anticipated.

As indicated by the morphological modelling investigations, the dredged channel is likely to become shallower over time, consistent with current trends. The material infilling the channel would partly come from Moreton Bay, deposited by tidal flows, and partly from the adjacent sand flats in the river. Accordingly, there is potential for the ongoing maintenance of the channel to cause some erosion of the adjacent river bed and, given the requirement to dispose of dredge material to land, a gradual long term deepening trend in the vicinity of the dredged area could occur if the rate of removal exceeds the rate of infill from Moreton Bay.

The actual response of the river bed and banks to the proposed channel dredging, although not expected to be significant, would need to be carefully monitored by regular hydrographic surveys. This would enable an accurate assessment of the system behaviour and provide a basis for appropriate corrective actions. In principle, these corrective actions could include the use of dredged material for restoration works in affected areas.

The EIS includes a commitment by the proponent to create a funding mechanism for ongoing monitoring and implementation of rehabilitation works in the river[13]. Any proposal for rehabilitation works would be based on advice from specialist consultants and prepared in consultation with MBRC and relevant state agencies. In addition, the EIS indicates that all material extracted from the river through ongoing maintenance dredging would be available for use in rehabilitation works.

Development approval conditions, including a requirement to prepare a Caboolture River Estuary Management Plan, are discussed in section 4.4.5.

Effects of boat wash

The EIS estimates that the number of boats expected to navigate the river as a direct result of the project would increase by an average of approximately 80 trips per day. Baseline data were recorded at a number of locations between the Beachmere boat ramp and the project site during non-peak times and observed 40 boat movements per day.

Given the increased number of boats, the amount of boat wash wave energy reaching the banks would increase as a consequence of the project. Detailed wave energy predictions have not been made due to a number of uncertainties such as the likely mix of vessel types, lengths and hull shape supported by the proposed marina. Compliance with speed limits would also be a major factor. The EIS notes the existing speed limit in the river of six knots or 'no wash' for boats of eight metres in length, or longer. This would limit the impacts of the majority of boats that are expected to occupy wet berths in the proposed marina.

Although the number of boats in the river, and related boat wash, would increase, the EIS finds that it is unlikely to cause a proportionate worsening of bank erosion. The bank erosion study shows that the sections of the river undergoing severe erosion are mainly in the mid to upper estuary, including upstream of the proposed marina entrance, where low levels of boat

[13] Refer to Commitment 10, Appendix 2

traffic occur presently. In addition, the largest concentration of vessels occur in the lower estuary, particularly near the Beachmere and Burpengary boat ramps and operating without the speed limit. Severe bank erosion is less evident in this section. Accordingly, the EIS finds that boat wash is not considered to be a major existing cause of bank erosion in the river.

The EIS demonstrates that wind-waves in the river could be a significant factor depending on the orientation of the reach in relation to predominant wind directions. Other natural and/or anthropogenic influences (such as removal of riparian vegetation) may also be significant in some sections.

The proponent has committed to addressing the overall problem through proposed monitoring and mitigation actions via the river rehabilitation plan, discussed above. The rehabilitation works would focus on the sections of the river showing severe erosion and include revegetation and other protection measures.

Conclusions – boat wash

The Caboolture River estuary is currently undergoing changes in the physical condition of its bed and banks. The underlying causes may be natural however some of these changes may be related to anthropogenic factors including the effects of the weir, clearing of riparian vegetation and boat wash. I accept the EIS findings that increased vessel traffic and dredging may result in further impacts to the bed and banks in some sections of the river. I note that it is often difficult to attribute actual causes of physical changes or identify anthropogenic impacts from the natural underlying changes.

The EIS bank erosion study identifies a section of river bank undergoing a severe erosion trend immediately downstream from the marina site. The channel in this section is relatively narrow and deep, with natural depths in the order of five metres, vertical bank profiles and a lack of riparian vegetation. The introduction of a large marina facility in this region, with consequent boat wash impacts, is likely to exacerbate the existing erosion trend - irrespective of the present underlying causes.

The proponent has committed to addressing the project related impacts on the bed and banks of the Caboolture River through the development and implementation of a Caboolture River Estuary Management Plan (CREMP). The CREMP would be informed by ongoing monitoring and expert advice. Recommended development approval conditions, including a requirement to prepare a Caboolture River Estuary Management Plan, are discussed in section 4.4.5.

In addition, the *Transport Operations (Marine Safety) Regulations 2004* sets out the general requirements for operation of boats in Queensland waters and a general six knot speed limit applies in the vicinity of a moored boat, jetty wharf, pontoon or boat ramp. Section 128 of the regulations requires that a person must not operate a ship at a speed at which the ship's wash can cause a marine incident or damage the shoreline. On this basis, I consider that it would be appropriate to impose a general six knots or 'no wash' speed limit in the section of the river between the marina and the marked navigation channel.

4.4.3 Impacts on water quality of the Caboolture River

The proposed urban development of the project site, with its frontage to the Caboolture River, the marina construction and channel dredging have the potential to impact on water quality of the river.

Extensive bulk earthworks, dredging and other operational works would be required for the project. These include over 4.5 million m^3 of cut and fill earthworks, excavation of the marina basin (323 000 m^3) and approximately 550 000 m^3 of capital dredging in the Caboolture River navigation channel. Without adequate controls, there would be considerable potential for these works to cause adverse impacts on surface and ground water quality.

The operational phase of the project would also require careful management to avoid adverse impacts. Various activities to be controlled would include stormwater and irrigation runoff, marina water quality and maintenance dredging.

Existing river water quality condition

For more than ten years a co-operative effort between state and local governments has been made through the Healthy Waterways Strategy to improve the ecological health of Moreton Bay and its catchments. A key part of the strategy is the Ecosystem Health Monitoring Program (EHMP)–an initiative to guide and assess the effectiveness of management actions. An output of the EHMP is an integrated assessment of a range of water quality parameters, reported annually by a scorecard system.

The Caboolture River estuary has been consistently graded poor to fair by the annual scorecard and has been recently downgraded to a score of F (fail).

The EHMP findings have been supported by water quality investigations undertaken for the EIS. Measurements of a range of indicators such as dissolved oxygen (DO) and turbidity, show poor conditions particularly in the upper estuary between the project site and the weir. These water quality parameters typically improve further downstream from the site as the tidal influence increases the exchange of water with Moreton Bay.

The EIS attributes the poor existing water quality in the Caboolture River to a range of factors including extraction of freshwater from above the weir and contamination of stormwater runoff from urban and agricultural uses within its catchment. The loss of riparian vegetation and river bank erosion are further aggravating contributors.

The poor condition of the river water quality is also attributed to the input of nutrients from the Caboolture South wastewater treatment plant that discharges into the river just downstream from the weir. In addition, the East Burpengary treatment plant discharges near the mouth of the estuary.

A tributary of the Caboolture River, Raff Creek, flows through the project site from adjoining rural residential areas. The EIS highlights the potential for this creek to contain diminished water quality due to influences in its upper catchment. This assessment was confirmed by water quality monitoring data presented in the EIS.

Potential project benefits

The EIS finds that the proposed development of the site would positively impact on water quality of the Caboolture River through the management of stormwater inflows and the rehabilitation of riparian areas and wetlands on-site. Stormwater quality from the site is predicted to improve through the removal of the current agricultural use and the treatment of inflows from the site and upper reaches of Raff Creek. The EIS provides a commitment by the proponent that water sensitive urban design (WSUD) principles would be used for all stages of the development. This would influence the design of the stormwater system and its integration within the overall layout of the project.

The EIS includes a preliminary stormwater management plan for the project site. Various best practice design measures are proposed including the use of vegetated treatment trains and buffer areas. These treatment areas would be designed to filter suspended sediments and pollutants from stormwater flows prior to ultimate discharge into the Caboolture River. The EIS estimates that approximately 11 per cent of the project site area would be required for stormwater treatment.

The EIS draft stormwater management plan describes water quality modelling for existing and post-development cases. The modelling assumes a conceptual stormwater treatment system based on best practice guidelines. Compared to the undeveloped case, the model results show significant reductions in pollutant loads from the site in the order of 80 per cent of suspended solids, 72 per cent of total phosphorus and 50 per cent of total nitrogen.

Accordingly, the EIS finds that the preliminary design of the stormwater treatment system would meet the adopted water quality objectives. These are based on the mean annual load reduction targets (nutrient and suspended sediment) set out in the current planning scheme. Further requirements, including management of high rainfall flow rates, would be incorporated in the detailed design of the system.

The EIS reports that the diversion of treated wastewater from the South Caboolture treatment plant for use on the site would yield further improvements by reducing nutrient inflows at the top of the estuary. Moreover, the residential stages of the project are predicted to create a demand for recycled water from the East Burpengary treatment plan and trigger its upgrading therefore reducing nutrient inflows into Moreton Bay near the mouth of the river[14].

Potential adverse impacts

Submissions to the EIS raised concerns about the management of water quality impacts of the proposed urban uses on-site and associated with the marina, including:

- increased suspended sediment concentrations from dredging activities and bank erosion caused by elevated boat traffic
- inflows to the river from marina flushing operations
- nutrient infiltration from use of recycled water for irrigation
- elevated sediment and nutrient inflows from construction and landscaping activities
- contamination of waterways from mobilisation of acid sulfate soils.

The EIS has investigated these matters and has acknowledged the potential for some impacts. Overall it found that, with implementation of best practice management[15], these impacts would be relatively minor and outweighed by the benefits from the on-site improvement actions. Further discussion is provided in the following section.

Marina

The proposed marina would be connected to the Caboolture River via a navigation lock and weir system and a pumped water exchange system. It is intended that water would be supplied at a rate to achieve an average turnover of marina waters within 24 days.

The EIS includes a draft marina water quality management plan (part of Appendix Y1 of the EIS). This outlines measures that would be taken to minimise pollutants from entering the marina basin including diversion and filtering of stormwater, restriction of boat maintenance activities and provision of ablution and waste reception facilities. The plan includes proposed measures to respond to incidents such as fuel/oil spills, algal blooms and fish kills. Where necessary the marina waters would be isolated from the river by closing the lock and weir and shutting down the water exchange system. The draft management plan also specifies regular monitoring of marina water quality.

Dredging

Dredging in the Caboolture River would be undertaken using a cutter suction dredge. Dredged material would be pumped to the project site via a temporary pipeline to be dewatered prior to disposal or reuse. Capital dredged material would be used within the project site for fill. Maintenance dredging material would be treated and re-used where possible or disposed to an appropriate reception facility.

A geotechnical investigation was undertaken consisting of 20 boreholes along the centreline of the proposed dredged channel at 300 m centres. Cores were taken to 2 m or deeper and samples tested for material properties, acid sulfate potential and contaminants. The results of the investigation indicates that the dredged material would be predominantly sand with variable silt content with a higher proportion of fines occurring in the upstream sections of the proposed dredging area. Analysis of selected samples indicated that effective treatment of tailwater for suspended sediment and acid generation is achievable. No sediment contamination by heavy metals or tributyl tin was detected.

The aquatic ecology assessment (Appendix L2 of the EIS) reports on an analysis of bed material samples from a number of sites in the river, including the area proposed for dredging. This analysis indicates that, whilst some samples in the river bed show high concentrations of metals and nutrients, the samples within the area proposed for dredging had low results.

[14] Refer to Commitment 11, Appendix 2
[15] Refer to Commitment 9, Appendix 2

It is expected that dredging in the river would result in temporary and localised increases in suspended sediments. The draft dredging site based management plan specifies a detailed monitoring program and includes measures to control fine sediments disturbed by the dredge including the use of silt curtains.

As discussed previously, the volumes of maintenance dredging material has been estimated to be approximately 21 000 m^3 per year on average. The composition of this material has not been predicted however the EIS considers that it is likely that it would be similar to the existing material on the adjacent river bed, although with a potentially higher silt content. No concerns with sediment contamination are expected.

Alteration of groundwater conditions

The EIS includes an investigation of the potential alteration of groundwater flows within the project site and adjacent areas. Some minor variations to the existing situation may be expected due to filling and changes to permeability and infiltration. Despite possible localised changes to flow and recharge, overall groundwater flow patterns are not expected to be affected.

An investigation was also undertaken to determine the risk of exporting nutrients to surface and ground waters from the golf course and other landscaped areas irrigated with recycled water. Based on the average nutrient concentration data supplied by the service provider, model results show that risks of exceeding guideline levels are low. The EIS provides recommendations for irrigation management to ensure that potential leaching concentrations are minimised.

Construction impacts

During the construction phase, water quality in the river could be affected by the disturbance of potential acid sulfate soils and sediment runoff from cleared areas during bulk earthworks. Large volumes of excavation and cut and fill in the order of 4.5 million m^3 are proposed. A significant extent of these works would disturb potential acid sulfate soils and require high levels of treatment.

Excavation of the marina basin is predicted to temporarily lower groundwater levels within the nearby vicinity. This has the potential to mobilise acid sulfate and other contaminants that could leach into the river through groundwater flows. The EIS provides a number of recommended measures to manage potential construction impacts. Further discussion of the management of acid sulfate soils is in section 4.5.5.

Conclusions

I note the findings of the EIS that the project would contribute to improved water quality in the Caboolture River.

I am satisfied that the net impacts on water quality are likely to lead to an overall improvement in the longer term. The proposed usage of waste water from the Caboolture South and Burpengary East treatment plants[16], rehabilitation of wetland and riparian areas[17] and the treatment of stormwater, including from the upper Raff Creek catchment, will provide positive assistance in reversing the declining trend of water quality in the Caboolture River estuary. I am advised by the proponent that the intention is to design the stormwater treatment system so that discharged water would meet the water quality objectives for the Caboolture River as defined in the *Environmental Protection (Water) Policy 2007*. This not only satisfies the requirements for the development of the site but also addresses stormwater pollution problems caused by existing rural and urban uses further upstream in the Raff Creek catchment. I note however that these activities are outside the control of the project proponent and may vary subsequent to the design of the stormwater treatment system.

Some impacts are expected from proposed activities such as channel dredging, construction activities and marina operations however these would be manageable. Careful design of the

[16] Refer to Commitment 11, Appendix 2
[17] Refer to Commitment 1, Appendix 2

project and management of construction and operational activities would be necessary to ensure risks of impacts are minimised.

It is important that specific actions as part of the project to manage the ecosystem health of the Caboolture River are complementary to, and coordinated with, a whole-of-catchment management approach. I note the establishment of a river recovery planning initiative by MBRC aimed at addressing the deterioration of waterway conditions. I endorse the implementation of this process and recommend its co-ordination with programs of relevant state agencies, particularly DERM. I have provided further discussion on developing a whole-of-government approach to addressing the range of factors currently contributing to the deterioration of the Caboolture river's ecosystem health (i.e. the proposed Caboolture River Management Plan) in section 4.4.4.

The EIS makes a number of commitments for the management of water quality, and has included several draft planning documents that outline the proposed management arrangements. It is critical that a full understanding of management responsibilities is finalised prior to commencement of works on site. Clearly, all construction works would need to be carefully controlled to avoid impacts on coastal water quality and ecosystems.

In order to ensure the appropriate management of surface and ground water within the project site, I state conditions (Conditions 19 - 25 of Schedule A and Condition 9 of Schedule B, Appendix 1) that must be attached to a preliminary approval for the project. This includes a requirement to contribute to MBRC's stormwater treatment infrastructure external to the site.

4.4.4 Impacts on coastal ecological values

The proposed development of the project site and the activities associated with channel dredging and marina development has the potential to affect coastal ecological values. In many instances, such as the proposed rehabilitation and revegetation works, positive outcomes would be expected.

Specialist studies in the EIS have investigated the ecological values in the Caboolture River and the project site that may be affected by the development. The EIS finds that, in general, ecological values are relatively degraded. The upper estuary is particularly affected by poor water quality and the impacts of the weir as a barrier to the movement of aquatic organisms within the river. Many river reaches show minimal riparian vegetation cover and sections of severe bank erosion. Land adjacent to the river is typically cleared and used for cattle grazing or urban uses with minimal buffering.

The EIS finds that the river's ecological health improves further downstream due to better water quality and less urban pressure. Large areas of mangrove and saltmarsh wetlands and extensive areas of productive tidal flats occur in the lower estuary. This area is also identified as important shorebird habitat and includes an area identified by mapping within the *South East Queensland Regional Coastal Management Plan 2006* as a critical high tide roost on the southern bank at the river mouth. Figure 2 shows the key coastal ecological attributes of the project area.

The southern part of Deception Bay has reportedly suffered a significant loss of seagrass cover since the mid 1990s and there has been little evidence of its subsequent recovery. The EIS investigations found no seagrasses in the Caboolture River and the adjacent parts of Deception Bay. The loss of seagrass is likely to be due to poor water quality conditions, partly associated with discharge of highly turbid water from the Caboolture River (particularly during flood events) and the poor tidal flushing of Deception Bay. Other factors include damage from trawling and smothering by blooms of nuisance algae.

The project site has been used for various agricultural uses since the 1860s and is currently largely cleared and used for cattle grazing. The EIS reports that no unique coastal habitat type exists on the project site although there are several areas of intact aquatic habitat, most notably in the lower section of Raff Creek and the south eastern corner of the property.

The EIS finds that, in an overall sense, the project would have generally positive impacts on coastal environmental values through improved water quality and the proposed rehabilitation

and revegetation of coastal land on-site. However some activities would have potential adverse impacts; including the following:

- the direct loss of areas of aquatic habitat on the site of the proposed marina
- the direct disturbance to benthic fauna during channel dredging and a minor loss of shallow water habitat on the tide flats in the lower estuary adjoining some sections of the dredged channel
- disturbance to shorebirds in the lower estuary by increased boating activity and dredging works
- exacerbation of the existing trend of bank erosion and the consequent loss of riparian habitat
- potential short term episodes of degraded water quality caused by construction activities, dredging, accidental or inadvertent failure of stormwater treatment systems, oil/chemical spills etc.

Loss of aquatic habitat on the marina site

The area of the proposed marina is partially subject to tidal influence and comprises areas of marine plants (mangrove and saltmarsh). These marine plants would be completely removed by the proposed marina construction works.

Based on field investigations, this area is assessed in the EIS as having little value as aquatic habitat. Similarly, the riparian zone in the vicinity of the marina entrance has poor vegetation cover and is also assessed as low ecological value. The EIS finds that the loss of these small areas of aquatic habitat is more than compensated by the extent of the proposed wetland rehabilitation works and the expected improved conditions for aquatic habitat in Raff Creek.

Impacts of dredging

Shallow tidal flats in estuarine areas are recognised as key aquatic habitat due to the relatively high abundance of benthic fauna compared to deeper areas. These areas are also important due to their accessibility as foraging habitat for shorebirds. Results of field investigations for the EIS aquatic ecology study demonstrate the value of the shallow sand flats in the lower estuary in terms of productivity of benthic fauna.

The proposed dredging in the navigation channel would remove all benthic fauna present in the sediments by direct mechanical action. The EIS finds that, due to the relatively small area within the extent of the lower estuary and its narrow linear footprint, the disturbed area is likely to be rapidly recolonised by benthic fauna from the adjacent river bed within six months.

Within sections of the channel where a relatively deep initial dredge ‘cut’ is required (1m or more), the permanent change in depth would then potentially affect its productivity and availability as foraging habitat. The extent of this area is relatively minor compared to the extent of the overall shallow water habitat of the lower estuary.

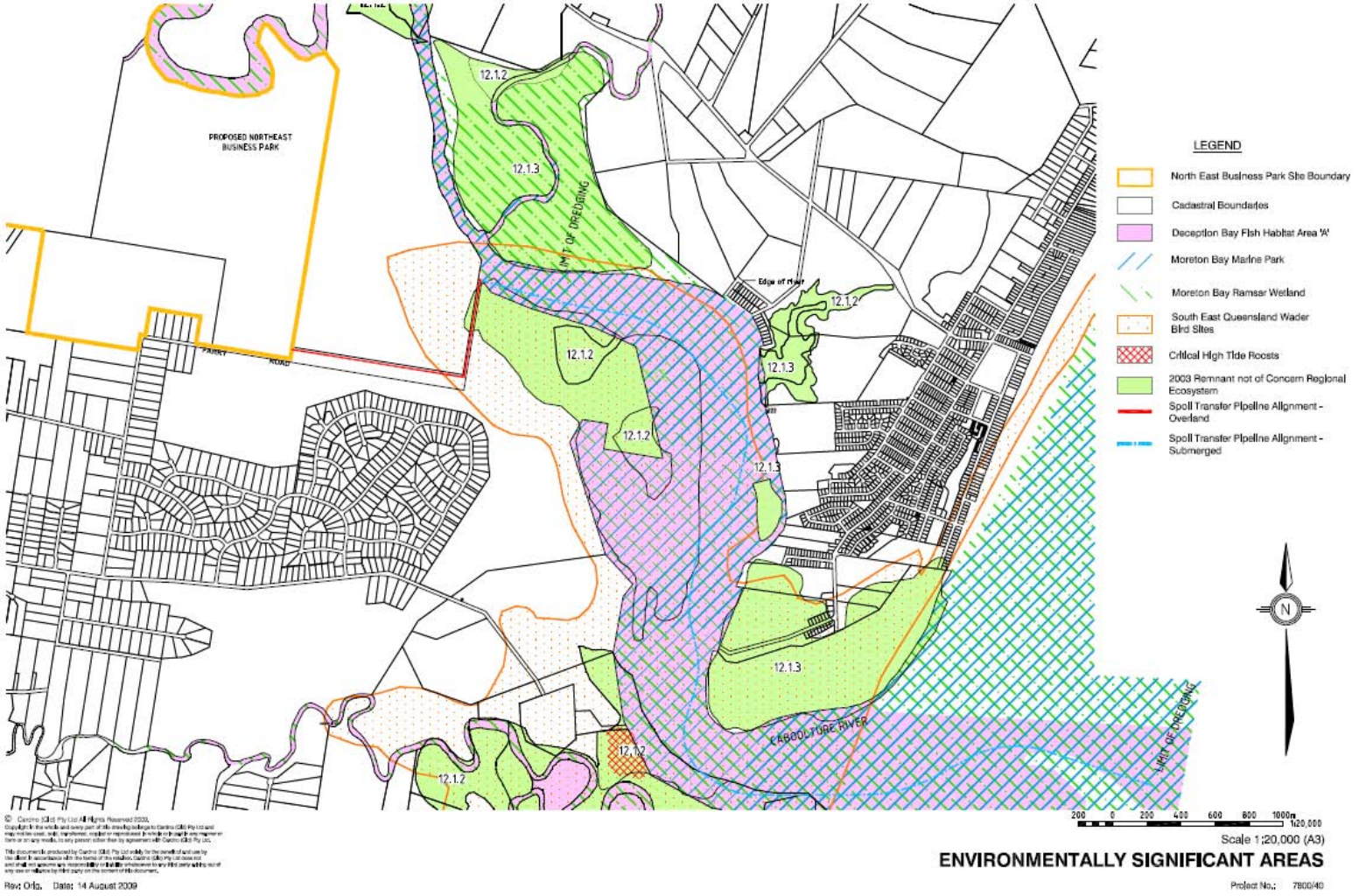
The proposed ongoing removal of bed material by maintenance dredging is predicted to lead to gradual erosion along the edges of the tide flats adjoining the channel and therefore potentially cause further loss of shallow water habitat in the lower estuary. Numerical modelling of these potential changes indicates that minor changes are predicted.

Clearly this matter would require careful monitoring of the physical response of the tidal flats and corresponding impacts on ecological values of the shallow water habitats in the estuary.

Bank erosion

As discussed in section 4.4.2, the development of the marina and marine industry precinct would significantly increase the level of boat traffic in the river and potentially exacerbate the existing trend of bank erosion in some locations. The EIS finds that many sections of the river are already in a poor condition including the two kilometre reach immediately downstream of the project site.

Figure 2 - Key coastal ecological attributes of the project area



Corresponding impacts on ecological values may result from bank erosion causing increased turbidity levels in the river and habitat loss. High rates of bank erosion affect the condition of riparian vegetation, particularly the marine plants in the intertidal zone such as mangroves. Severe erosion can cause undermining and eventual loss of vegetation and therefore impacts to the habitat value of the river.

The proponent has committed to ongoing funding of bank protection and rehabilitation works in the affected sections of the river. This would include revegetation of the banks and therefore provides an opportunity to address, and potentially reverse, the current declining condition of river bank vegetation in key locations. Stabilising vegetation would assist in reducing sediment loss with consequent benefits for water quality.

As discussed in section 4.4.2, I consider that it would be appropriate to impose greater regulation on boat speeds in the section of the river between the marina and the marked navigation channel to limit the impacts of boat wash on the banks.

Disturbance to shorebirds

Moreton Bay provides significant habitat for shorebirds and is important internationally for many species of migratory wader birds. It is a site in the East Asian-Australasian shorebird site network and comprises extensive intertidal areas providing shorebird feeding habitat.

The *South East Queensland Regional Coastal Management Plan 2006* identifies areas of shorebird habitat. The majority of the Deception Bay shoreline from Sandstone Point to Newport Waterways is identified as general habitat for shorebirds, including the lower estuary of the Caboolture River and the lower section of Burpengary Creek. A critical high tide roost is identified at the mouth of Caboolture River adjacent to the Uhlmann Road boat ramp (shown in Figure 2).

Migratory shorebird species need space, food and protection from predators and disturbances to recuperate from and prepare for long flights. Proximity of these roosting and staging areas to reliable food sources is also important. Several submissions to the EIS raised concerns of the project's potential impacts on shorebirds and their habitat arising from the proposed dredging works and the increased boating traffic.

A recent study was commissioned by Moreton Bay Regional Council to assess shorebird high tide roost sites in the northern Bay. In some cases, including the site at the mouth of the Caboolture River, the study found that pressures from human activities are leading to a degradation of the habitat value of these sites.

Impacts of dredging on the identified critical high tide roost

As described by the morphological modelling investigation reported in the EIS and supplementary reports, the proposed channel deepening and its ongoing maintenance is not expected to affect the river banks or cause shoreline erosion in the lower estuary. The physical condition of the critical high tide roost area would therefore not be affected.

Disturbance of shorebirds in the high tide roost area by dredging noise is not expected to be significant. Given the existing depths of the channel, minimal dredging works in the area would be required and would be scheduled to avoid effects on migratory species.

Impacts of boat traffic on shorebird habitat

Existing boat traffic is generally concentrated in the lower estuary in the vicinity of the boat ramps. A substantial proportion of this traffic would be small trailerable boats that are generally not subject to speed limits and often are only minimally limited by draft restrictions. A proportion of this existing boat traffic is to destinations within the river rather than out into the Bay. Accordingly, a level of disturbance of shorebirds already exists.

The development of the proposed marina would significantly increase the number of boats navigating the river and a large proportion would be expected to transit the channel to access Moreton Bay. Submissions to the EIS raised concerns of the potential for this increased boating traffic to cause disturbance to shorebirds foraging on the adjacent tidal flats and roosting on the nearby banks. Noise from dredging activities in the vicinity of shorebird habitats would also add to the level of disturbance.

The EIS estimates an increase in boat traffic in the order of 80 trips per day on average, compared to the existing situation which is estimated as 40 trips per day (based on week day observations). The majority of these trips would be recreational boats on weekends and public holidays and typically coincide with favourable weather conditions. At the peak, estimated trips could be up to 300 per day and are likely to be concentrated in the mornings and late afternoons as boats travel to and from destinations in Moreton Bay. These would be approximately the times when the highest levels of use of the boat ramps and general boating traffic would also be expected.

The additional impacts caused by boats from the proposed marina would cumulatively contribute to the noise disturbance at the critical high tide roost area, although not proportionately. The majority of boats from the proposed marina would be more than 8 m in length and therefore generally travelling at the six knot speed limit and constrained to the dredged channel - more than 150 m away from the roost site at its nearest point. Much of this traffic would also be at similar time periods to the existing times of peak disturbance.

Relatively greater effects would be expected on shorebird foraging activities in the upper sections of the marked channel because the expected increase in boating traffic would be more noticeable away from the vicinity of the boat ramps. However the disturbance would not be continuous and strongly focussed on peak periods. The greatest levels of disturbance would occur when these high traffic periods coincide with low tide.

The EIS finds that shorebirds are typically habituated to boat traffic and provides examples of similar sites in Moreton Bay where large numbers of birds co-exist with high levels of boat traffic. I conclude that it is unlikely that the birds have become completely habituated to the existing levels of disturbance and that they may have limited options of alternate, quieter places nearby. Nevertheless, I note the current level of disturbance is not sufficient for them to abandon the roost site and, after consideration of the nature and separation of the additional boat traffic compared to the existing situation, I have concluded that it is unlikely that the project would cause significant additional impacts.

I find that greater impacts would occur on foraging shorebirds in the vicinity of the upper section of the marked channel during peak periods of boating traffic. Although boat traffic in this area is not a new use, a relatively higher increase in numbers would be expected than the downstream sections. I accept the findings of the EIS that feeding shorebirds have some toleration of human-related activities and that adverse impacts would not be significant.

To detect impacts resulting from increased boating traffic and dredging activities associated with the project, the proponent has committed to undertaking a shorebird monitoring program. This combined with an appropriate strategy for corrective or compensatory action, where necessary, should minimise impacts.

Algal blooms

In the past, extensive blooms of nuisance algae *Lyngbya majuscul*a (Lyngbya) have occurred in Moreton Bay - with northern Deception Bay suffering severe cases. Less flow from the Caboolture River during recent dry summers has meant that reduced nutrient and sediment loads entered Deception Bay and consequent limited outbreaks of Lyngbya growth. The return of higher rainfall events in the future combined with poor water quality in the river and Bay may see future outbreaks.

Several submissions to the EIS raised concerns that the proposed development and dredging in the Caboolture River could lead to increased incidence of nuisance algal blooms in Moreton Bay.

The indicative nutrient export areas map included within the *South East Queensland Regional Coastal Management Plan 2006* shows the project site has been identified as having very high nutrient export potential. This classification is likely to be based on the existing grazing use and its previous use as a pine plantation. Analysis of water samples taken from within the project site and reported in the EIS confirms this potential, showing high levels of nutrients and bio-available iron within Raff Creek and other waterways.

The EIS finds that the development of the site would not be expected to cause higher potential for algal blooms and would significantly reduce the export of nutrients of concern into the marine environment, through the following:

- by removing the existing grazing activities
- utilising best practice stormwater management to treat runoff from the site and from adjacent urban areas
- a net improvement in the condition of coastal wetlands and riparian vegetation along the nine kilometre river frontage
- the net reduction of nutrient input to Moreton Bay through the commitment[18] to recycled water on-site for industrial and domestic purposes.

Construction works on the project site would have the potential to release contaminants into coastal waters. In particular, the disturbance of potential acid sulfate soils and the temporary lowering of groundwater levels in the vicinity of marina excavation works could increase the risk factors for harmful algae growth. Careful management of construction activities would be necessary to minimise risks to acceptable levels. The proposed management controls are discussed further in section 4.4.5 of this report.

The EIS included an analysis of bed sediments within the proposed dredge area and indicated the occurrence of low levels of nutrients. Disturbance of these sediments by capital dredging has low potential for significant increase in nutrient loads in the lower estuary and the Bay.

Conclusions

The project has potential to adversely impact coastal environmental values in the Caboolture River through proposed dredging works and increased boat traffic. The proponent has committed to addressing all project-related impacts through the funding of rehabilitation works in the affected sections of the estuary.

In order to ensure the development related impacts in the Caboolture River are appropriately mitigated, I state conditions (Conditions 14 and 17 of Schedule A and Conditions 6, 7, 8, 9 and 10 of Schedule B, Appendix 1) that must be attached to a preliminary approval for the project. This includes a requirement to develop and implement the project-specific Caboolture River Estuary Management Plan (CREMP) in conjunction with key agencies.

I note the suggestion by DEEDI for a whole-of-government approach to addressing the range of factors currently contributing to the deterioration of the Caboolture River's ecosystem health through the development of an overarching Caboolture River Management Plan

The proponent's commitment to develop the CREMP (as specified by Condition 8, Schedule B within Appendix 1 of this report), provides the opportunity to substantially contribute to this initiative within the key lower section of the river system.

However, as the CREMP would only address development-related impacts in the Caboolture River, further work would be needed to address the recovery of the ecosystem health for the entirety of the Caboolture River, particularly in the middle estuary that is currently in a poor condition. Accordingly, I recommend that the DERM lead a whole-of-government process to develop and implement a Caboolture River Management Plan.

I note that MBRC has already commenced the development of a Caboolture River recovery planning process that includes involvement from the Healthy Waterways Partnership and state agencies. A Caboolture River Management Plan is likely to be a continuation and extension of MBRC's recent initiatives.

[18] Refer to Commitment 11, Appendix 2

4.4.5 Legislative and policy considerations

The development of the marina related components of the project would require several separate authorisations prior to an application for development approval under the *Integrated Planning Act 1997*, as follows:

- the setting aside of a works area in the Moreton Bay Marine Park in accordance with section 62 of the *Marine Park (Moreton Bay) Zoning Plan 2008* to undertake the capital dredging of the navigation channel
- amendment of the Deception Bay declared fish habitat area (by amendment of the *Fisheries Regulation 2008)* and a resource allocation authority in accordance with part 5 of the *Fisheries Act 1994* for works in a declared fish habitat area
- allocation of quarry material in accordance with part 5 of the *Coastal Protection and Management Act 1995* (CPMA) for capital works and ongoing removal of dredged material from the navigation channel.

Marine Park - proposed works area

The Moreton Bay Marine Park zoning plan requires that a works area may be established if the works would "provide facilities for use by, or for the benefit of, the public". The SEIS (appendix G) has provided justification for the proposed works area in the Marine Park on the basis of it providing improved navigational safety and supporting the construction of new recreational boating facilities that provide improved public access to the Bay.

The EIS notes the critical nature of the channel works to the viability of the project and also the additional benefits for other users in the river.

I note advice from DERM that the information submitted with the EIS is not sufficiently convincing to demonstrate more than a minor public benefit associated with the proposed works in the Marine Park. The advice from DERM also notes that there is no clear guidance in the zoning plan as to the definition of public benefit, or the extent of benefit that should be proven. DERM has recommended, given the lack of definitive criteria, that I make an assessment based on the EIS and information provided by submitters.

I have considered this matter and am satisfied that the proposed channel improvement works are necessary for the public benefit, on the following basis:

- existing depths in the channel are relatively shallow - in the order of 0.5 to 1.0m below LAT in several locations. Due to these shallow water conditions, the river and the entrance is not safely accessible, except during higher tidal levels and relatively calm weather, other than by small trailerable boats.
- the safety improvements resulting from the works would benefit existing users of the river, not only the users of the proposed marina. The proposal to deepen and straighten the channel is supported by the Regional Harbourmaster and by local boaters and recreational fishers.
- the proposed marina meets a demand for recreational boating facilities in the northern part of Moreton Bay. Demand for 'wet' marina berths is mainly dependant on the number of boats of eight metres or more in length. In a submission to the EIS, the former Department of Tourism, Regional Development and Industry noted the strong demand for wet berths in Queensland and south east Queensland in particular. Boat registration data show the growth in registrations for vessels of eight metres or more in length has increased by an average of over 6 per cent per annum since 2000.
- results of public consultation reported in the EIS indicate strong local support for the provision of new marina facilities in the area.
- whilst the marina may not be perceived as a public facility in the traditional sense (such as a public boat ramp) it would be available for access by the boating public on a commercial basis. Recreational boating facilities of this type are highly unlikely to be provided by the public sector. The proponent has committed to establishing and maintaining these facilities at no cost to government and is highly unlikely to proceed

without the channel deepening and straightening works, for both financial and navigation safety reasons.

- the marina and the navigation channel improvements supports the proposed marine industry precinct that would generate wider social and economic benefits in the region.

The Minister for Climate Change and Sustainability, in deciding the proposed works area, must also consider impacts to the values of the Marine Park associated with the expected activities that would be authorised. Some short term environmental impacts of the proposed works would be expected including increased turbidity and noise from the dredge machinery, however I am confident that these temporary and localised impacts can be minimised through careful planning and management. Longer term changes to the morphology of the lower estuary are not expected to be significant and would be addressed by specific mitigation measures.

Alternatives to the proposed works have been investigated:

- the marina facility could potentially be established in the proposed location with a channel dredged to a shallower depth and would still cater for a significant majority of anticipated boat users. For example, taking into account localised channel sedimentation and the need for appropriate underkeel clearances, dredged depths could possibly be reduced by the order of 1m. This would reduce the extent and impacts of dredging however the need to declare a works area would remain. This alternative however would significantly detract from the potential social and economic benefits associated with the marine industry precinct.
- similarly, a recreational boating marina facility could arguably be established in other locations in northern Moreton Bay to cater for existing demand. However there are no practical locations that would not require major works in the Marine Park. Moreover, most other locations are more constrained as they would occur in a Habitat Protection zone or Conservation zone.

I accept that it is not possible to provide new recreational boating facilities of this nature (providing wet berths for vessels up to 18m in length) in the northern part of the Bay without the need for works in the Marine Park.

Accordingly, I recommend that the Minister of Sustainability and Climate Change consider the setting aside of a works area in the lower Caboolture River and Deception Bay to enable the proposed channel deepening. The proposed works area is set out in Figure 3.

Potential offset

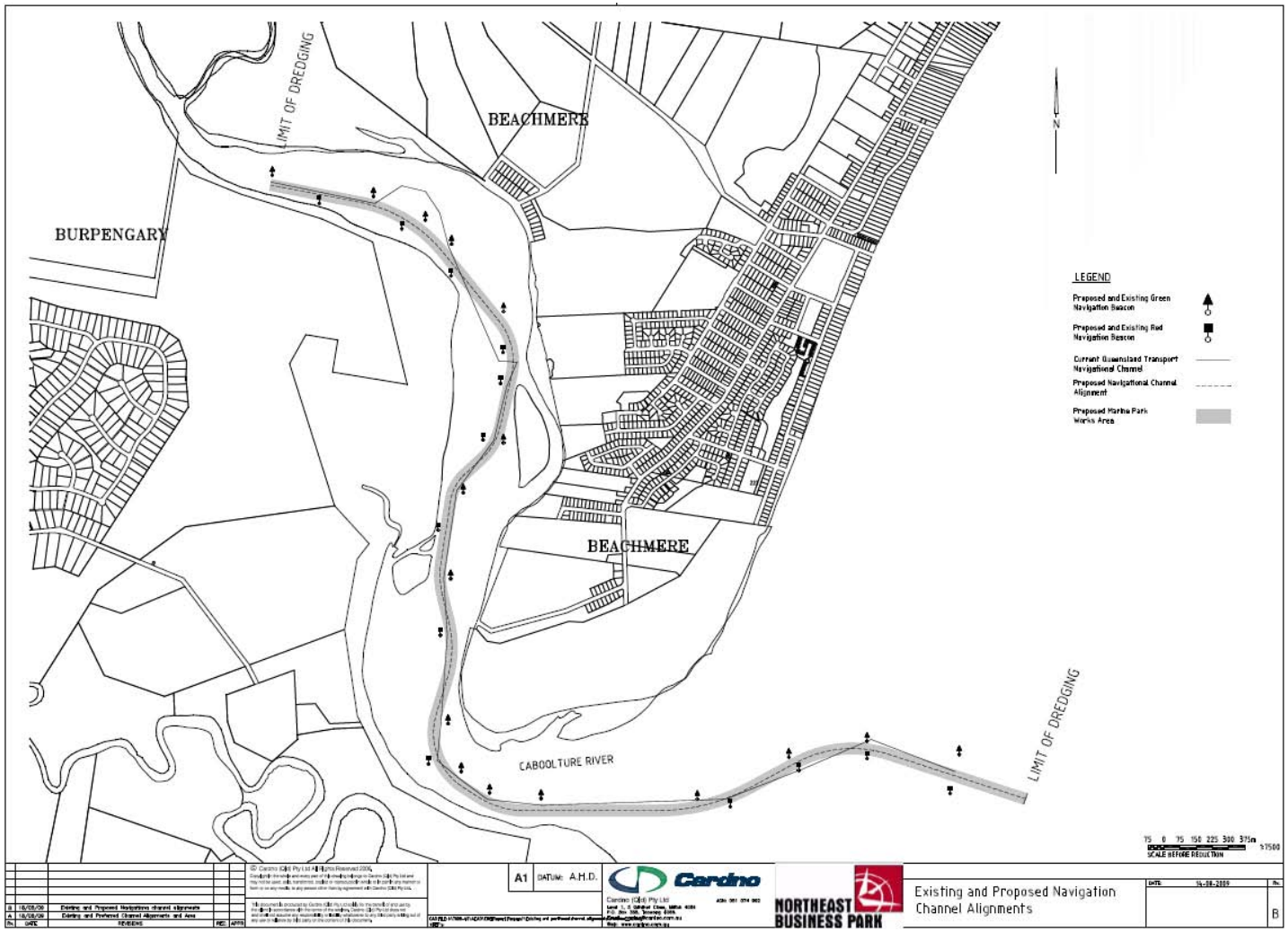
The relevant values of the Moreton Bay Marine Park that may be impacted by the project are:

a) setting aside a works area. The value of interest is the Marine Park zoning protection that would be altered by the declaration of a works area covering the area of proposed channel dredging. Through this 'downzoning', local Marine Park attributes would be affected by authorising dredging works. This would result in permanent changes to the benthic habitat and the short-term impacts on water quality and benthic fauna in the channel area.

   The total area of the proposed works area (shown in Figure 3) is in the order of 35 hectares however, due to the variable depths in the river, only a proportion of this area would require significant deepening to achieve the proposed -3m navigation depth.

b) endangered, vulnerable and rare species. The increased levels of boating traffic and the occasional presence of dredging machinery may impact on marine fauna and bird species that utilise the affected sections of the Caboolture River estuary. Notably, the lower estuary is extensively utilised by shorebirds.

Figure 3 - Proposed works area



It is noted that the proposal cannot proceed in its current form unless a decision is made to declare a works area in the Marine Park. If this occurs and if the works are to proceed, a requirement for an appropriate offset would be determined at detailed design stage. This should consider all of the project's actions to determine the net impact on the natural and cultural resources of the Marine Park. The beneficial effects of the project include:

- long-term improvements to the water quality of the Caboolture River estuary and nearby parts of Deception Bay, including utilisation of recycled water supply from the Burpengary East wastewater treatment plant
- establishment and implementation of the CREMP providing baseline studies, ongoing monitoring and a positive contribution to rehabilitation programs

If an offset is considered necessary it should be included in the CREMP that would be finalised as part of approvals for operational works and Marine Park permits for the proposed marina and channel dredging. A potential offset may include a contribution towards improved management of the critical high tide shorebird roost at the mouth of the river that is currently experiencing pressures from human activities.

To ensure the appropriate management of the Marine Park, I state conditions (Conditions 13 of Schedule B, Appendix 1) that must be attached to a preliminary approval for the project including a requirement that the impacts of the development that may adversely affect the natural and cultural resources of the Marine Park must be appropriately mitigated and offset in accordance with the relevant policies.

Marine fish habitat

The distribution and conservation value of aquatic habitats in Moreton Bay, particularly mangroves, saltmarshes and potentially seagrasses, has significant implications for the proposed project. These habitats are important for a variety of fauna, including fish and invertebrates of commercial and recreational value, turtles, dugongs and shorebirds. The EIS reports that over the last 30 years there have been extensive changes in the distribution of marine plants in Moreton Bay including the significant loss of seagrass cover, particularly in the northern sections including Deception Bay.

A large fish habitat area (management A area) has been declared in Deception Bay and extending into Burpengary Creek and upstream into the Caboolture River to the weir. The fish habitat area extends along the project site's river frontage and a short way into Raff Creek. This creek is included in the buffer set aside in the design of the development.

It is noted that declared fish habitat areas do not include the area of a channel marked by aids to navigation. The existing marked channel in the Caboolture River is therefore excluded from the Deception Bay declared fish habitat area and its statutory management.

The EIS finds that there are opportunities for the design and management of the project to maintain and in some cases, restore and improve aquatic habitats in the Caboolture River. These include the rehabilitation of riparian zones (86 hectares) and wetland areas (57 hectares) on-site and the expected overall improvement to water quality in Raff Creek and the Caboolture River.

Some adverse impacts on fish habitat values are expected, including:

- direct loss of marine plants (mangrove and saltmarsh) on the marina site and within the riparian zone in the vicinity of the marina entrance. Based on field investigations, these areas are assessed in the EIS as having little value as aquatic habitat.
- additional boat traffic from the marina may exacerbate bank erosion in the river, particularly in the section immediately downstream from the project site, with consequential impacts on water quality and marine plants. This would be addressed through the implementation of the CREMP developed as part of the project.
- direct loss of shallow water habitat by capital dredging and further potential indirect losses caused by extraction of bed material by continued maintenance dredging. No

seagrass beds occur in the channel although some minor disturbance of marine plants may be caused by the installation and operation of the dredge pipeline.

Amendments to the declared fish habitat area management and boundary would be needed to authorise some of the construction works. Based on advice from DEEDI, this would consist of the amendment of the part of the declared fish habitat area in the Caboolture River from a 'management A area' to a 'management B area' designation. This amendment would allow applications for fisheries development approvals to be made for the construction of the marina entrance and other marine related components of the development (i.e. the proposed fishing platform and canoe landing structures).

In addition, the declared fish habitat boundary would have to be amended to exclude the part of the proposed realigned navigation channel that is outside the current marked channel to allow for the channel realignment and the associated capital dredging. Future works for rehabilitation of the river bed and banks could also be considered if necessary and developed as part of the CREMP.

I am satisfied that impacts to fish habitat values would be minor and localised and would be outweighed by the benefits to fisheries resources of the other aspects of the project including long term improvements in water quality, the rehabilitation of on-site riparian and wetland areas and contribution to the development and implementation of the Caboolture River Management Plan. Also, the new marina and other public facilities would provide enhanced access to the river and the Bay for recreational fishers. Accordingly, I recommend that the Minister responsible for the *Fisheries Act 1994* considers the necessary amendments to the Deception Bay fish habitat area to enable the development of the project.

To ensure the appropriate management of marine fish habitat, I state conditions (Condition 12 of Schedule B, Appendix 1) that must be attached to a preliminary approval for the project including a requirement that the impacts of the development that may affect marine fish habitats must be fully mitigated and offset in accordance with the relevant policies.

Potential offset

If a decision is made to amend the declared fish habitat area, a fisheries offset may be required. Any offset requirement would be in accordance with the Queensland Government Environmental Offsets Policy. Although the requirement for an offset can not be determined until detailed design stage , the following discussion provides the basis for the calculation of the losses of fish habitats.

The proposal requires the Deception Bay declared FHA to be amended from a management A to a management B area, which will lessen the protection provided to the area's fish habitats. The development proposal includes the following impacts relevant to the consideration of a resource allocation authority (RAA) and a development permit for operational works affecting marine plants:

- removal of approximately 2.0 ha of disturbed saltwater couch grassland associated with a drainage line along the north eastern boundary of the site for the purposes of constructing the marina
- removal of a small number of marine plants on the river bank in the construction of the marina entrance channel
- disturbance or removal of marine plants in the establishment of a dredge material pipeline. The extent of this area is not accurately known however it would be expected to be less than 1000 m^2. Overall, the area of direct marine plant disturbance would be less than 3 hectares
- disturbance of benthic habitat in the river bed (bare substrate) caused by dredging including:
    - permanent loss of shallow sand bank areas in the lower estuary by capital works and ongoing maintenance dredging. The total area potentially impacted is defined by the proposed works area (Figure 3) although not all of this area would be dredged and a large proportion is within the existing marked channel and therefore excluded from the FHA

- intermittent removal of benthic fauna by maintenance dredging (entirely within the marked channel)
- long term erosion of adjacent sand bank areas caused by maintenance dredging although this would be limited by mitigation works utilising (treated) dredged material

Overall, the extent of the area affected by the proposed capital dredging currently within the existing FHA is estimated to be less than 10 hectares and is comprised of bare substrate (river bed) only. Future maintenance dredging would be confined to the extent of the marked channel and would therefore not directly affect the FHA.

Additional indirect impacts may occur due to the increased boating traffic in the river causing accelerated bank erosion and consequent adverse effects on riparian vegetation (including marine plants). The actions of the CREMP, as specified in conditions stated in this report, to monitor and mitigate these effects would ensure a no net worsening of the current trend of bank erosion in the river.

The need for an offset should consider the project's beneficial actions to determine the net impact on marine fish habitat. These include

- revegetation and protection of 150 hectares of wetlands and riparian area, including a residual area of marine plants on the project site significantly in excess of the estimated 3 hectares directly impacted by the project. Figure 9, Appendix L2 of the EIS indicates that the site currently supports more than 25 hectares of saltmarsh and mangroves. The implementation of the project (including replacement of current rural uses with public open space) would facilitate the expansion of these areas and ensures its ongoing viability. Additionally, it is likely that a large proportion of these areas would be transferred to public ownership
- provision of public access to the river for recreational fishers including fishing platforms and other facilities
- a number of actions to improve the long-term management of the Caboolture River estuary including:
    - the establishment of the CREMP providing baseline studies, ongoing monitoring and a positive contribution to rehabilitation programs
    - utilisation of recycled water supply from nearby wastewater treatment plants for residential and industrial use leading to a reduction in nutrient inputs
    - actions required to offset adverse impacts on the Marine Park
    - a requirement to contribute to MBRC's stormwater treatment infrastructure external to the site

It is generally accepted that areas of seagrass and other marine plants and saltmarsh areas have greater value as fish habitat than bare substrate (approximately in the factor of 2.5, or more for saltmarsh). Accordingly, I am confident that the rehabilitation and protection of 150 hectares of marine wetlands and riparian vegetation on the project site would offset the impacts of the proposed development including the dredging of the area of river bed (comprised mainly of bare substrate) currently in the FHA.

If additional offsets are considered necessary, the EIS describes a number of potential options including fish stocking in the marina basin and the creation of artificial 'snags' in the river. These additional offsets would be implemented via the CREMP that would be finalised as part of operational works approvals for the proposed marina and channel dredging and aligned to the whole-of-government Caboolture River Management Plan.

Quarry material allocation

The proposed dredging of the navigation channel requires the removal of bed material from tidal waters and therefore requires an allocation of quarry material in accordance with part 5 of the *Coastal Protection and Management Act 1995*. Section 75 of the Act sets out the assessment criteria for deciding an application. These criteria include:

- relevant policies of the state and regional coastal management plans
- impacts on the physical integrity of river bed and banks
- impacts on water quality and ecological values
- impacts associated with placement of the dredged material
- economic and social implications
- views of the local government and the regional harbourmaster.

An application for a quarry material allocation would be made by the proponent and include detailed information against the assessment criteria. However, given information provided in the EIS and my evaluation of the proposal, I am confident that a quarry material allocation may be granted. I note the following:

- potential impacts of the proposed dredging on physical and ecological values of the Caboolture River estuary would be manageable and conditions set out in this report would ensure that the proposal can proceed in a sustainable manner.
- the proposal includes a dedicated dredge material handling area within the project site to facilitate its appropriate treatment and disposal (or re-use).
- the EIS finds no adverse economic or social implications of the proposed dredging. Rather, the community context study reported significant support for improved navigability of the river and entrance. No adverse commercial implications are likely to be associated with the proposal when compared to typical sand extraction operations - the silt content of the dredge material suggests a limited commercial value. The EIS finds that the channel deepening is a critical element of the marina and marine industry precinct in terms of financial considerations and navigation safety.

Requirements of the state and regional coastal management plans

The current state and regional coastal management plans set out the principles and policies for achieving ecologically sustainable coastal development. A significant number of the policies relate to the matters discussed in previous sections of this report, including avoiding adverse impacts on physical processes, water quality and ecological values of the coastal zone. Specific requirements warranting further discussion are:

- a proposal for development of a 'dryland marina' must demonstrate a net benefit for the state and a net gain in coastal resources
- dredging in an area mapped as an area of state significance (natural resources) must demonstrate a net benefit for the state.

The EIS provides an assessment of net benefit, prepared in accordance with draft guidelines developed by EPA. I am advised by DERM that this assessment has been satisfactorily completed and a substantial net benefit is demonstrated.

Material submitted as part of the EIS process addressed the net gain of coastal resources. Although no guidelines are available to assist in the evaluation of these criteria, I note that DERM has advised that the submitted material is insufficient to demonstrate compliance. My assessment is that the detailed design and implementation of the proposal, in accordance with recommendation and conditions specified in this report, is capable of resulting in a net gain of coastal resources. Tables 1 and 2 summarise my findings of an overall net gain in coastal resources.

Table 1: *Coastal natural resources*

Coastal native vegetation and riparian habitat: • rehabilitation of 86 hectares of riparian zone with native plant species on site • funding for river bank rehabilitation.	positive

Water quality: • reduced nutrient and contaminant inputs in the estuary due to improved management of stormwater on-site and the use of recycled water • transient adverse impacts from dredging causing localised increase in suspended sediments.	positive
Coastal wetlands and marine plants: • rehabilitation and protection of the majority of existing (degraded) wetlands on site, although loss over a small area on the marina site • accelerated bank erosion, to be mitigated by proposed river rehabilitation program.	positive
Aquatic/benthic fauna: • benefits from improved water quality • direct, temporary disturbance by dredging • permanent loss of some shallow water habitat due to capital and maintenance dredging • corrective or compensatory actions would be implemented through a Caboolture River Estuary Management Plan.	negative
Shorebirds: • disturbance from increased boat traffic and dredging works • minor loss of shallow water foraging habitat in lower estuary • corrective or compensatory actions would be implemented through a Caboolture River Estuary Management Plan.	negative
Overall: natural resources	**no net loss**

Table 2: *Coastal cultural resources*

Historical significance or value: • protection of original homestead and grave site within the open space precinct (Heritage Park[19]).	positive
Visual significance or value: • provision of landscaped open space areas on coastal land • revegetation and rehabilitation of degraded ex-pine plantation • development of marina precinct in the coastal zone (up to 12 storeys), although largely out of sight from external viewpoints.	neutral
Sociological significance or value: • significant gain of public access to Caboolture River and community recreational opportunities provided in open space areas • provision of publicly available marina facilities • improved navigation safety in the Caboolture River channel • potential benefits for foreshore protection at Beachmere from re-use of dredge material for beach nourishment • accelerated bank erosion partly mitigated by funding of estuary rehabilitation scheme • minor loss of 'quiet enjoyment' in the river from increased vessel traffic.	positive
Overall: cultural resources	**net gain**

[19] Refer to Commitment 6, Appendix 1

4.5 Environmental management within the project site

4.5.1 Native vegetation

Remnant native vegetation

A relatively small fragment of remnant native vegetation remains on the project site; located inside the south western boundary and fronting the Bruce Highway. The certified regional ecosystem mapping (reproduced in figure 7 of the EIS) identifies the following remnant native vegetation:

- 15.5 hectares of 'endangered' regional ecosystem (RE) 12.5.3 *Euculyptus tindaliae and/or Euculyptus racemosa* open forest
- 2.7 hectares of 'not of concern' RE 12.3.5 *Melaleuca quinquenervia* open forest on coastal alluvium.

Site investigations for the terrestrial ecology component of the EIS (appendix L1) indicate additional areas of paperbark forest (*Melaleuca quinquenervia*) on the site although these are identified as non-remnant.

The proposal includes clearing of 12.4 hectares of the remnant vegetation for development of the MIBA precinct, including 10.73 ha of endangered RE 12.5.3. Approximately five hectares would be retained in the south western corner of the site as a buffer to adjoining residential land and to preserve the existing drainage regime.

In respect of the proposed clearing of the RE 12.5.3, a vegetation offset has been secured consisting of 35.84 hectares of 'endangered' RE 12.9-10.11/12.3.3c and 4.4 hectares of 'of concern' RE 12.9-10.7. Details of the offset proposal are provided in appendix K of the SEIS.

The proponent has consulted with DERM (formerly DNRW) concerning the proposed purpose and extent of remnant vegetation clearing and an application for development approval for Operational Works for the clearing of vegetation was lodged in 2006. DERM has advised that the proposed clearing and offset meets the relevant statutory requirements under the *Vegetation Management Act 1999*.

The certified regional ecosystem mapping shows the remnant vegetation as 'essential habitat' for Koala (*Phascolarctos cinereus)* – listed as vulnerable under the *Nature Conservation Act 1992*. This matter is discussed further in section 4.5.2.

To the immediate north of the RE 12.5.3 fragment is a 12.6 hectare portion of 'regenerating paperbark forest'. Although this is not identified as remnant native vegetation, taken together the proposal constitutes the clearing of 25 hectares of vegetated land (the majority of Lot 2 / RP902075) along the Bruce Highway frontage.

I note that, in its most recent advice to me, DERM does not accept the need for clearing of the 25 hectare vegetated portion. In its advice, it considered that this vegetated fragment could be viably maintained and the 'regenerating paperbark' area could be rehabilitated to regional ecosystem status. Further, the habitat value of the portion could be improved by providing connectivity northwards to the rehabilitated riparian zone via fauna underpasses and overpasses. Additionally, retaining the vegetated area would serve as a noise and visual buffer between the highway and the MIBA precinct.

The EIS investigated the condition of vegetation proposed to be cleared inside the southwestern boundary and determined some degradation including altered drainage patterns due to the highway works and weed infestation. If retained, the portion would be affected by urban uses with frontages to the highway and the MIBA precinct and is likely to suffer continued degradation.

The 25 hectares to be cleared along the Bruce Highway frontage represents 15 per cent of the total unconstrained district industry zoned land that has been identified as suitable for the

MIBA. The EIS contends that the proposed clearing and pattern of land use in this sector of the site is critical to the commercial success of the development. Additionally, the EIS points to the large extent of revegetation of riparian and wetland areas proposed elsewhere on the site.

Planning scheme requirements

The current planning scheme includes Nature Conservation overlay mapping that identifies a number of areas of "significant vegetation" on the project site. These include the areas of remnant vegetation along the south western boundary and additional fragments of non remnant vegetation that occur in that vicinity and in wetlands along the Caboolture River and drainage lines that traverse the site.

The field investigations undertaken for the EIS has refined the mapping of vegetation communities on the site. These are presented as figure 16 of the EIS.

The overall outcomes sought for the Nature Conservation overlay include the requirement that development is appropriately sited to retain significant vegetation and wetlands.

The superseded planning scheme (Caboolture Shire, 1988) has less stringent requirements in respect to nature conservation areas and did not include a specific overlay with detailed requirements for significant vegetation.

In addition to the areas of remnant native vegetation mentioned in the previous section, the development proposal includes the removal of the following significant vegetation.

- 1.7 ha (or 15 per cent) of the non remnant paperbark forest in the south-eastern portion of the site
- 2.0 ha of disturbed saltwater couch grassland associated with a drainage line along the north eastern boundary of the site for the purposes of constructing the marina.

As proposed, development of the site cannot achieve compliance with the specific outcomes of the overlay code in the current planning scheme. The EIS contends that the development satisfies the overall outcomes for the Nature Conservation overlay through protection and enhancement of native vegetation and wetlands through alternative measures.

Conclusions

I am satisfied that the proposed vegetation clearing is necessary for the development of the project, particularly the portion on the Bruce Highway frontage for the MIBA precinct. I note that the majority of other vegetated areas will be retained and protected in open space precincts and that the proposal includes extensive revegetation of the riparian zone and wetland areas. Fragments of paperbark open forest (*Melaleuca quinquenervia*) would also be retained and included in open space areas. Overall the development of the project would result in a substantial net gain of vegetated habitat areas (more than 100 ha on-site) in addition to the 40.2 ha offset area. A significant proportion of these vegetated areas would provide potential habitat for koalas.

To ensure appropriate management of native vegetation on the project site, I state conditions (Condition 14, Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

4.5.2 Terrestrial ecology

The majority of the site is highly modified and has been continuously occupied for agricultural purposes for more than 100 years. Nevertheless, the relatively large areas of open grassland and the fragments of vegetated areas have ongoing ecological value.

The EIS and SEIS provide an investigation of the terrestrial ecology that may be affected by the proposed development. Section 6 of this report provides my assessment of the project's impacts on Matters of National Environmental Significance including effects on listed threatened species. The following discussion provides my assessment of terrestrial ecological values of the site in general and with respect to the specific requirements of state legislation.

Flora

The project proposal includes the protection and rehabilitation of extensive areas of open space. Apart from the proposed clearing of vegetation along the south western boundary for the MIBA precinct, the development would largely retain existing vegetated areas. The majority of the development footprint would impact areas that have been cleared for agricultural purposes. Accordingly, the potential for impact on threatened flora species and communities is assessed to be low.

A review of flora records indicated 11 species of conservation significance that may potentially occur in the site locality. None of these or any other threatened flora species were recorded on the site during field surveys carried out as part of the EIS investigations. The investigation also considered that no species would have a high probability of occurrence at the site due to the lack of suitable habitat for some species and/or the degradation of potential habitat by anthropogenic disturbance.

Fauna

The EIS finds that the project site and adjacent reaches of the Caboolture River provide habitat resources that are exploited by a diversity of terrestrial fauna. Database searches and field observations indicate a significant number of species have potential to occur within the site or within a ten kilometre radius.

With some exceptions, the EIS finds that the proposed development would provide benefits for the majority of terrestrial species due to the rehabilitation and protection of open space areas. The development would also result in the removal of the existing cattle grazing use and significantly improve the control of weeds and feral animals. The revegetation and rehabilitation of watercourses and riparian areas would provide particular benefits to birds and frog species.

The proposed clearing of 25 hectares of vegetation along the south western boundary would impact some species. In particular, the area of remnant vegetation is identified as 'essential habitat' for the Koala (*Phascolarctos cinereus)* – listed as vulnerable under the *Nature Conservation Act 1992*. The site has not been mapped as koala habitat by the *Nature Conservation (Koala) Conservation Plan 2006* (Koala Plan).

The EIS and SEIS discuss a number of compensatory measures in the draft construction environmental management plan and the project's design to minimise impacts on native fauna during construction and operational phases of the project, particularly koalas.

The EIS notes that koalas have been observed on-site and recommends the adoption of koala sensitive urban design features throughout the development and the inclusion of koala habitat species in the revegetated riparian areas.

The proponent has also committed to a $100 000 'in kind' contribution to a local rehabilitation proposal in Burpengary that is aimed specifically at koala habitat[20].

Planning scheme requirements

The current planning scheme Nature Conservation overlay mapping identifies a broad "ecological corridor" through the northern section of the site parallel with the course of the river. The overall outcomes sought for the overlay include the strengthening of the ecological corridors and improvement of links to adjoining nature conservation areas.

The proposed development largely meets these requirements by revegetating and protecting a core ecological corridor of 100 metres in width, or more, along the Caboolture River frontage. The EIS acknowledges that there is a break in the continuity of the buffer by the marina entrance, however the ecological implications are considered to be low given that:

- the corridor is most likely to be utilised by highly mobile species (i.e. birds, bats, macropods and koala)

[20] Refer to Commitment 3, Appendix 2

- an additional movement corridor to the south of the marina will be provided through the golf course.

The superseded planning scheme (Caboolture Shire,1988) under which the development application was lodged has less stringent requirements in respect to nature conservation areas on the site.

Conclusions

I am satisfied that the proposed project design and management of construction and operations would achieve acceptable overall conservation of the environmental values of the site and adjacent areas.

To ensure appropriate mitigation of potential impacts on wildlife on the project site, I state conditions (Condition 15, Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

4.5.3 Environmental offset requirements

As defined by the Queensland Government Environmental Offsets Policy (QGEOP), an environmental offset is an action taken to counterbalance unavoidable, negative environmental impacts that result from an activity or a development. An offset may be located within or outside the geographic site of the impact. Environmental offsets are only applicable when the impacts cannot be avoided or minimised, and if all other environmental standards have been met.

The QGEOP provides an overarching framework for deciding and implementing environmental offsets. Specific-issue offsets policies provide detailed direction for offsets that address specific environmental matters. These policies are developed from requirements of the various pieces of controlling legislation.

The following discussion summarises the project's requirements against specific-issue offsets policies.

Vegetation management

As discussed in section 4.5.1 a vegetation offset has been identified for the proposed clearing of endangered remnant vegetation. DERM (formerly NRW) has assessed the proposal and advised that the proposed clearing and offset meets the relevant statutory requirements under the *Vegetation Management Act 1999*.

Conditions to be attached to development approvals shall require that a suitable offset is to be provided prior to the clearing of any endangered regional ecosystems on the project site.

Koala habitat

The project site has not been mapped as koala habitat by the *Nature Conservation (Koala) Conservation Plan 2006* and no offset requirements apply. Nevertheless, the project would provide actions to promote the sustainability of koala populations in the area, as discussed in section 4.5.2.

Marine fish habitat

This is discussed in section 4.3.4.

Biodiversity

The potential for a biodiversity offset associated with the proposed dredging in Caboolture River is discussed in section 4.3.4.

No net adverse impacts on endangered, vulnerable or rare species are expected on the project site therefore no additional biodiversity offset is considered necessary.

4.5.4 Sustainable buildings

The state government has recently announced that by 2010, all new and renovated homes will be required to achieve a five star energy equivalent rating, and therefore, all residential dwellings on the project site must be constructed to this standard. In addition to this requirement, the project incorporates a range of environmental design, energy and water efficiency principles to promote a high degree of sustainability. The EIS includes commitments[21] to incorporate specific measures including:

- water efficient fittings and provision of recycled water supply
- minimising the use of mains power through the use of alternative power generation such as solar, wind and co-generation
- energy efficient equipment, appliances, lighting and hot water systems
- buildings to include passive thermal design principles to optimise energy efficiency.

These measures apply to the entirety of the project site including industrial buildings in the MIBA precinct. The MIBA precinct is intended to operate within the principles of industrial ecology, which involves the examination of waste streams and coordination of resource use and recycling/re-use where possible.

The project's master planned layout provides for public transport and active transport throughout the site with internal pedestrian and cycling tracks and a bus link to the nearby Caboolture Morayfield Principal Activity Centre.

Conclusions

I am satisfied that the proposal has adopted a wide range of practical measures that would promote the implementation of a high degree of sustainable development outcomes. I state conditions (Condition 7, Schedule A, Appendix 1) that must be attached to a preliminary approval for the project to ensure that sustainable building measures are incorporated into its detailed design.

4.5.5 Management of acid sulfate soils

Acid sulfate soils (ASS) are a characteristic feature of low lying coastal environments in Queensland, particularly where landform elevations are below 5 m AHD. ASS are comprised of iron sulfides generally in the form of pyritic material that is a product of the natural interaction between iron rich organic matter and sulfate rich seawater present in anaerobic low energy estuarine environments. Undisturbed, these soils are generally present in an anaerobic state within the subsurface profile (below the water table) of marine muds and sands in the form of potential acid sulfate soil (PASS). Actual acid sulfate soils (AASS) are the oxidised (disturbed) form, which may occur as the result of natural or anthropogenic disturbance from changes in groundwater levels and/or exposure to oxygen (source: Powell, B. & Ahern, C.R. Nature, Origin and Distribution of Acid Sulphate Soils: Issues for Queensland 1999).

ASS in an undisturbed environment may have a pH of neutral or slightly alkaline and no visual appearances indicating its acidic potential. However, when exposed to air either by direct excavation or by indirect changes to the surrounding water table, pyritic material inherent in the soil is oxidised by sulfur oxidising bacteria leading to the formation of sulfuric acid. Following rainfall, sulfuric acid associated with soil oxidation can then be released into surface runoff and receiving waters and mobilised in groundwater, potentially causing significant impacts on ecosystem health.

A preliminary ASS investigation was completed as part of the EIS. The limited sampling undertaken to date confirms the presence of ASS within the marina area, and at other

[21] Refer to Commitment 7, Appendix 2

locations on low lying land throughout the site. Potential acid sulfate soils are also present in the area proposed for channel dredging in the lower reaches of the Caboolture River.

The preliminary ASS management plan presented in the SEIS recommends that additional sampling and testing is required, particularly in the marina area. Indicative treatment levels for ASS have been identified and show that very high to extra high levels would be required.

Conclusion

Advice from DERM specifies that further assessment will be required including more boreholes in the marina and channel sediments. The sampling guidelines recommend a minimum borehole intensity of two per hectare for sites greater than four hectares. Given the large area of the site, it is acknowledged that it is impractical to apply this intensity to the whole site, and a staged approach to sampling would be appropriate.

Over 3.7 million cubic metres of fill is proposed to be placed within the site and possible impacts on ASS must be considered. Filling activities may disturb in situ ASS by:

- bringing actual ASS (AASS) into contact with the groundwater (and thus potentially mobilising and transporting existing acidity out of the AASS into the groundwater)
- displacing or extruding previously saturated potential acid sulfate soil (PASS) above the watertable and aerating these soils or sediments.

Further detailed investigations of ASS would be required prior to any excavations or filling works commence. The borehole intensity and frequency of field and laboratory analysis are to be consistent with the current state sampling guidelines although sampling density may be relaxed where significant excavations are not proposed.

Given the scale of proposed disturbance, proximity to the river, and likelihood of ASS occurrence, all earthworks and dredging will require careful monitoring and management of the potential impacts. Groundwater drawdown in ASS adjacent to marina excavation works is identified as a risk.

In order to ensure the appropriate management of potential acid sulfate soils on the project site, I state conditions (Condition 15 of Schedule A and Condition 16 of Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

5. Environmental management plans

Project design and operational management plans

The development conditions specified in Appendix 1 include requirements to develop a number of separate management plans to guide the design and continuing operation of the project. These are complementary to the NEBP Area Plan which provides the statutory framework to guide the approval and implementation of the development proposal. The plans will become reference documents because they will convert the undertakings and recommendations of the environmental studies into a set of actions and commitments to be followed by the designers, constructors and future operators of the proposed project.

The required management plans include:

1. Water Quality Monitoring Plan (Condition 9, Schedule B, Appendix 1)
2. Navigation Channel Maintenance Plan (Condition 2, Schedule B, Appendix 1)
3. Dredging Site Based Management Plan (Condition 6, Schedule B, Appendix 1)
4. Marina Site Based Management Plan (Condition 1, Schedule B, Appendix 1)
5. Caboolture River Estuary Management Plan (Condition 8, Schedule B, Appendix 1)
6. Transport Management Plan (Condition 4, Schedule B, Appendix 1)
7. Waste Management Plan (Condition 19, Schedule B, Appendix 1)
8. Emergency Response and Evacuation Plan (Condition 20, Schedule B, Appendix 1)

I note that a preliminary contamination investigation of the project site identified a confined area of soil contamination associated with the former use of the site for above and underground diesel and/or oil storage. In order to ensure the appropriate management of contaminated land on the project site, I state conditions (Condition 17, Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

I note that a Cultural Heritage Management Plan has been completed for the project site and approved by DERM (formerly Department of Natural Resources and Water) in accordance with the *Aboriginal Cultural Heritage Act 2003*.

A number of additional draft management plans were supplied with the EIS. These will be valuable by informing the responsible design and construction of the project however are not required to be formalised prior to development approval. This includes the Non-Indigenous Cultural Heritage Management Plan.

The effective implementation of the management plans will serve to implement the commitments made by the proponent and ensure the effective management of environmental impacts of the project.

Construction environmental management plan

Construction of the proposed development would take place in stages over 15 or more years. Careful management of all construction stages would be needed to ensure satisfactory environmental outcomes are achieved.

The aim of the construction environmental management plan (CEMP) is to detail the actions, procedures and responsibilities to be carried out during the implementation phase of the project so that the project's potential construction impacts are addressed. These impacts were identified during the environmental studies and consultation conducted as part of the EIS process.

A draft CEMP was prepared by the proponent for the construction of the project and provided in the EIS. The draft CEMP outlines commitments to protect the environmental values potentially affected by construction within the project site and the dredging of the navigation

channel. These commitments include environmental protection objectives, standards, measurable indicators and control strategies (to demonstrate how the objectives will be achieved).

The CEMP will be further refined and expanded as part of final approvals for the construction phase of the project based on the detailed design of the works and through consultation with regulators.

The CEMP will also serve as the benchmark for measuring the effectiveness of environmental protection and management. This can be achieved by specifying the monitoring, reporting and auditing requirements, with nominated responsibilities and timing, to ensure the necessary mitigation measures are met. The CEMP also provides, as appropriate, for unforseen events by outlining corrective actions that may be implemented in these situations.

The effective implementation of the CEMP will serve to implement the commitments made by the proponent and ensure the effective management of environmental impacts of the project. In order to ensure the appropriate management of construction activities on the project site, I state conditions (Condition 18, Schedule B, Appendix 1) that must be attached to a preliminary approval for the project.

6. Matters of National Environmental Significance

6.1 Project assessment and approvals

If a project involves an action which will or is likely to have an impact on matters of National Environment Significance (MNES) as defined by the EPBC Act, then it may be declared a 'controlled action'. A project involving a controlled action requires the approval of the Australian Government Minister for Environment, Heritage and the Arts or a delegate of that Minister.

An EPBC Referral for the project was submitted to the Australian Government on 28 October 2005. The project was declared a controlled action on 12 July 2006 pursuant to section 75 of the EPBC Act. The controlling provisions for the decision are:

- sections 16 and 17B (Wetlands of international importance)
- sections 18 and 18A (Listed threatened species and communities)
- sections 20 and 20A (Listed migratory species).

In accordance with the Bilateral Agreement between the Australian and Queensland Governments, a project involving a controlled action may be considered for approval under section 133 of the EPBC Act once the Minister or delegate has received the Coordinator-General's EIS evaluation report prepared in accordance with section 35 of the SDPWO Act.

This report fulfils that requirement for the NEBP. This section of the report provides an evaluation of the potential impacts of the project on the 'controlling provisions' being the matters of National Environmental Significance (MNES).

6.2 Potential impacts and mitigation measures

6.2.1 Wetlands of international importance

Context

The Moreton Bay wetland aggregation has been listed as a wetland of international importance and is subject to a protection agreement to which Australia is a party (the Ramsar Convention). The Ramsar listing covers a total area of more than 113 000 hectares extending from Caloundra on the Sunshine Coast to Southport on the Gold Coast. It extends into the tidal reaches of the Caboolture River upstream to the weir but not onto the project site.

The basis for the Ramsar designation is that Moreton Bay is important internationally for migratory wading birds. It is a site in the East Asian-Australasian shorebird site network and comprises extensive intertidal areas providing shorebird feeding habitat. It is estimated that more than 50 000 migratory waders depend on the Bay during their non-breeding season and at least 34 species of migratory shorebirds visit Moreton Bay each September to April. Most of these shorebirds migrate from Arctic or sub-Arctic regions at the end of the breeding season.

The *South East Queensland Regional Coastal Management Plan 2006*, along with a recent study commissioned by Moreton Bay Regional (MBRC), identifies areas of shorebird habitat in Moreton Bay. The majority of the Deception Bay shoreline from Sandstone Point to Newport Waterways is identified as general habitat for shorebirds. This includes the lower estuary of the Caboolture River and the lower section of Burpengary Creek. A number of critical high tide roost sites in Moreton Bay are identified and one is located at the mouth of the Caboolture River.

Potential impacts

The EIS identifies several aspects of the proposed development that may impact (positively and negatively) on the integrity of the Ramsar listed wetlands. In general, these include:

- dredging of the navigation channel in the lower estuary. The navigation channel has not been dredged previously and would require extraction of more than 550 000 m^3 of river bed material.
- establishing a major marina facility in the Caboolture River supporting up to 1400 recreational boats. This would introduce a significant number of additional recreational vessels in the river, primarily travelling downstream to Moreton Bay.
- works on-site that may temporarily affect aquatic habitat areas and the water quality of the river.

The EIS has addressed the potential impacts on the physical and ecological state of the wetlands. Findings of the EIS and my evaluation of these matters are summarised as follows.

Impacts of dredging on the bed and banks of the Caboolture River

Hydrodynamic modelling has demonstrated that channel dredging would not have a noticeable effect on the tidal regime in the Caboolture River estuary. The model shows a very small increase in tidal penetration consistent with the slightly improved hydraulic efficiency of the dredged channel. The tidal prism (the total volume of water entering an estuary over an incoming tide) shows a small increase for spring tides in the order of 1.6 per cent . This small increase in tidal penetration results in minimal changes to tidal velocities and the tide range further upstream.

As described by a morphological modelling investigation, the proposed channel deepening and its ongoing maintenance is likely to cause some redistribution of sediments within the adjacent river bed. These impacts would primarily consist of erosion of edges of river shoals and deposition in the dredged channel in the upstream part of the dredged area. However, given the requirement to dispose of dredge material to land, a long term deepening trend in the vicinity of the dredged area is expected if the rate of removal exceeds the rate of sedimentation from external sources (either upstream or from Deception Bay). The proponent has committed to the ongoing funding of a monitoring program and implementation of a river rehabilitation plan. Any concerns about erosion of these shallow water habitat areas would be addressed by the rehabilitation plan. This would include beneficial re-use of suitably treated dredged material to restore eroded sections of river bed.

The effects on river morphology associated with the proposed channel deepening and ongoing maintenance dredging would be confined to the vicinity of the channel and is not expected to cause bank erosion.

Impacts of boat traffic on wetland areas

The EIS included a specialist study on the current state of river banks in the Caboolture River estuary. Many river bank sections are currently severely affected, particularly in the upper estuary. A number of potential causes were identified, both natural and anthropogenic, including wave action from boat wash.

High rates of bank erosion can affect the condition of riparian vegetation, particularly the marine plants in the intertidal zone such as mangroves. Severe erosion can cause undermining and eventual loss of vegetation and therefore impacts to the habitat value of the river.

The development of the marina and marine industry precinct would significantly increase the level of boat traffic in the river and potentially cause an acceleration of the existing trend of bank erosion in some locations. The two kilometre reach immediately downstream of the project site is identified as the most likely to be affected.

Existing regulations set out the general requirements for operation of boats in waterways and includes the restriction that ‘a person must not operate a ship at a speed at which the ship's wash can cause a marine incident or damage the shoreline’. A recommendation arising from

my evaluation of the project is that the Regional Harbourmaster should consider imposing a general six knots or 'no wash' speed limit in the section of the river between the marina and the marked navigation channel. This would significantly limit the potential impacts of boat wash on the physical condition of the river banks.

The proponent has committed to ongoing funding[22] of bank protection and rehabilitation works in the affected sections of the river therefore minimising impacts on inter-tidal areas. This would include revegetation of the banks and, potentially, restoration of banks via the re-use of (suitably treated) dredge material. These works would provide an opportunity to address, and potentially reverse, the current declining condition of river bank vegetation in key locations.

Development conditions specified in Appendix 1 of this report require the preparation and implementation of a Caboolture River Estuary Management Plan (CREMP) as a necessary requirement for any works in the river. This would include actions to mitigate all project-related impacts from the proposed marina and dredging activities including:

- bed and bank stability adjacent to dredged areas or potentially affected by such works
- potential damage to the shoreline by boat wash caused by vessels in the marina facility
- anticipated changes to marine fauna/flora habitats (e.g. mangroves, salt-marshes and sand banks/shorebird roost sites)

The plan would be developed in consultation with key agencies, including the Australian Government Department of Environment, Water, Heritage and Arts, and DERM.

It is noted that the DERM is to lead a process with MBRC and state agencies to develop and implement a catchment-wide Caboolture River Management Plan. This will seek to address the current poor ecosystem health of the river and would provide an overarching management framework for individual initiative such as the CREMP.

Development of wetland areas on the project site

The area of the proposed marina is partially subject to tidal influence and comprises areas of marine plants (mangrove and saltmarsh). Based on field investigations, this area is assessed in the EIS as little value as aquatic habitat. Similarly, the riparian zone in the vicinity of the marina entrance has poor vegetation cover and is also assessed as low ecological value.

The EIS finds that the loss of these small areas of aquatic habitat is more than compensated by the extent of the proposed wetland rehabilitation works on site (comprising the revegetation of 86 hectares of riparian area and the rehabilitation of 64 hectares of wetland areas) and the consequent improved conditions expected in Raff Creek.

Water quality in the Caboolture River

The net impacts of the project on water quality are likely to be an overall improvement in the longer term. The proposed rehabilitation of wetland and riparian areas and the treatment of stormwater will provide positive assistance in reversing the declining trend of water quality in the Caboolture River estuary.

Various best practice design measures are proposed including the use of vegetated treatment trains and buffer areas. These treatment areas would be designed to filter suspended sediments and pollutants from stormwater flows prior to ultimate discharge into the Caboolture River. The EIS estimates that approximately 11 per cent of the project site area would be required for stormwater treatment.

The stormwater treatment system would be designed to meet stringent pollutant/nutrient reduction targets. These are set out in development conditions stated in Appendix 1 of this report.

[22] Refer to Commitment 10, Appendix 2

In addition to the on-site treatment of stormwater, the EIS reports that the diversion of treated wastewater from the South Caboolture treatment plant for use on the site would yield further improvements by reducing nutrient inflows at the top of the estuary. Moreover, the residential stages of the project are predicted to create a demand for recycled water from the East Burpengary treatment plan and trigger its upgrading therefore reducing nutrient inflows into Moreton Bay near the mouth of the river.

Dredging in the Caboolture River would be undertaken using a cutter suction dredge. Dredged material would be pumped to the project site via a temporary pipeline to be dewatered prior to disposal or reuse. Capital dredged material would be used within the project site for fill. Maintenance dredging material would be treated and re-used where possible or disposed to an appropriate reception facility.

A geotechnical investigation was undertaken consisting of 20 boreholes along the centreline of the proposed dredged channel at 300 m centres. Cores were taken to 2 m or deeper and samples tested for material properties, acid sulfate potential and contaminants. The results of the investigation indicates that the dredged material would be predominantly sand with variable silt content with a higher proportion of fines occurring in the upstream sections of the proposed dredging area. Analysis of selected samples indicated that effective treatment of tailwater for suspended sediment and acid generation is achievable. No sediment contamination by heavy metals or tributyl tin was detected.

The aquatic ecology assessment (Appendix L2 of the EIS) reports on an analysis of bed material samples from a number of sites in the river, including the area proposed for dredging. This analysis indicates that, whilst some samples in the river bed show high concentrations of metals and nutrients, the samples within the area proposed for dredging had low results.

It is expected that dredging in the river would result in temporary and localised increases in suspended sediments. The draft dredging site based management plan specifies a detailed monitoring program and includes measures to control fine sediments disturbed by the dredge including the use of silt curtains.

The volumes of maintenance dredging material has been estimated to be approximately 21 000 m^3 per year on average. The composition of this material has not been predicted however the EIS considers that it is likely that it would be similar to the existing material on the adjacent river bed, although with a potentially higher silt content. No concerns with sediment contamination are expected.

Conclusions

My assessment of the project on the coastal ecological values in the Caboolture River estuary has determined that, on balance, there is likely to be negligible overall impacts from the project. I have made this determination having regard to the following:

- generally positive impacts on marine and freshwater wetlands, coastal native vegetation and riparian habitat would occur within the project site
- the treatment of stormwater and use of recycled water would contribute to long term improvements of estuarine water quality
- some negative direct and indirect impacts on aquatic/benthic fauna would be caused by the introduction of dredging in the river
- the implementation of the proposed on-site rehabilitation/revegetation works and the CREMP (as required by development conditions) would address project-related impacts in the estuary and provides the opportunity to contribute positively to the overall management of the river system.

In addition, I have included conditions in this report that requires an offset be provided for any residual impacts to the natural and cultural resources of the Moreton Bay Marine Park (that extends to a point in the estuary close to the project site). The requirements for an offset would be determined at detailed design stage and is likely to be implemented through the CREMP as additional actions over and above those required to mitigate project related impacts.

6.2.2 Listed threatened species and communities

Context

The project site is a 769 hectare parcel within an urban setting directly adjacent to the Bruce Highway. The majority of the site is highly modified and has been used for agricultural purposes for many decades; parts of the site have been occupied for cultivation for more than 100 years. Accordingly, the potential for impact on listed threatened species and communities is assessed to be very low within the cleared areas.

Some vegetated areas remain on the site. Notably, a 25 hectare area of vegetation inside the south western boundary of the property is proposed to be cleared for development of the industry precinct. This comprises a stand of remnant native vegetation and an adjoining area of regenerating paperbark forest.

Other vegetated areas will be retained and protected in open space precincts. In addition, the development proposal also includes the revegetation of 86 hectares of riparian area and the rehabilitation of 64 hectares of wetland areas. This includes the rehabilitation and protection of a small, partially tidal waterway within the site (Raff Creek) and other watercourses.

Overall the development of the project would result in a substantial net gain (over 100 ha) of vegetated habitat areas on-site.

EIS findings

The EIS provides an investigation of the threatened flora and fauna that may be affected by the proposed development. Based on database searches for a radius of 10km and field observations, the species that may be affected include 25 terrestrial species and eight aquatic species. The EIS provides a species profile and a discussion of potential impacts for each (EIS Appendix L3 and SEIS Appendix C).

The overall findings conclude a low likelihood of significant impacts on listed threatened species and communities. A large number (16) of species are considered to have a low probability of occurrence within the project area because of the absence of specific habitat requirements. Additionally, many species that may have a moderate to high probability of occurrence are assessed as being unlikely to be affected by the development because of the current degraded condition of the site. Several species are predicted to have potential benefits from the proposed revegetation and protection of open space areas on-site.

Proposed dredging in the lower estuary and the anticipated increase in boat traffic may directly impact threatened marine species such as turtles and shark. These impacts are assessed as minimal on the basis that:

- the construction environmental management plan will include measures such as turtle exclusion devices to minimise potential impacts
- the Caboolture River has an existing speed limit regime and therefore a relatively low risk of collision (to be reinforced by proponent commitments[23] and recommendations made in this report).

The dredging would be confined to the navigation channel that follows the natural areas of deep water and would have minor direct impact on foraging habitat for turtle and shark species.

Species profiles and discussion of impacts are provided in Appendix L3 of the EIS and summarised in the following sections.

[23] Refer to Commitment 9, Appendix 2

Threatened flora species

Acacia attenuata
EPBC Act – Vulnerable
The EIS identifies a moderate probability of occurrence for this species on the site given that:

- the species was not observed on the site and the EPA database records did not include this species
- the site does contain areas of potential habitat in the form of low lying eucalypt and paperbark open forest associated with Raff Creek
- the current certified RE map for the site does not identify remnant vegetation within the site as supporting essential habitat for this species
- the DERM does not specifically recognise the remnant vegetation types (i.e. RE 12.3.5 and RE 12.5.3) occurring within the site as providing valuable habitat for *Acacia attenuata*.

Low likelihood of significant impacts: the EIS concludes that the development would retain and enhance the majority of potential on-site habitat for the *Acacia attenuata* through the inclusion of the species in the landscaping and rehabilitation of open space areas.

Hairy Joint Grass (*Arthraxon hispidus*)
EPBC Act – Vulnerable
The EIS identifies a moderate probability of occurrence for this species on the site given:

- EPA database records did not include this species
- low-lying areas of the site subject to temporary inundation and saturation are in a disturbed state owing to a history of altered land uses
- the current certified RE map for the site does not identify remnant vegetation within the site as supporting essential habitat for this species
- EPA does not specifically recognise the remnant vegetation types (i.e. RE 12.3.5 and RE 12.5.3) occurring within the site as providing valuable habitat for Hairy Joint Grass.

Low likelihood of significant impacts: the EIS identifies that the site has been subject to disturbance pressures associated with vegetation clearance, agricultural pursuits, plantation forestry and livestock grazing for over 100 years. As such, the potential impacts associated with the development on Hairy Joint Grass are expected to be relatively low given that the majority of the site is already in a state that would not facilitate the long-term survival of this species.

Heart-leaved Bosistoa (*Bosistoa selwynii*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Three-leaved Bosistoa (*Bosistoa transversa*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Leafless Tongue Orchid (*Cryptostylis hunteriana*)
EPBC Act – Vulnerable
The EIS identifies a moderate probability of occurrence for this species on the site.

Low likelihood of significant impacts: the EIS conclusdes that the development is not likely to have an adverse impact on the viability of any local populations of this species. While the site supports some habitat (i.e. swampy heath) that may provide suitable habitat for *Cryptostylis hunteriana*, it is unlikely that this species occurs within the site owing to:

- an extensive history of disturbance associated with various altered land uses that have occurred across the site
- heavy infestations of weed species within the swampy heathland
- trampling and grazing by livestock

As such, the development is unlikely to have an impact on *Cryptostylis hunteriana* or critical habitat resources for this species.

Glass House Mountains Hop Bush (*Dodonaea rupicola*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Bush Nut (*Macadamia integrifolia*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Bopple Nut (*Macadamia ternifolia)*
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Lesser Swamp Orchid (*Phaius australis*)
EPBC Act – Endangered
The EIS identifies a moderate probability of occurrence for this species given that the site supports *Melaleuca quinquenervia* open forests and wetlands that are known to provide habitat resources for *Phaius australis*. The site currently supports approximately 19.9 ha of paperbark open forest and wetlands along the southern and western boundaries. The development will necessitate the removal of approximately 2.7 ha of paperbark forest along the western boundary of the site.

Low likelihood of significant impacts: the EIS concludes that the development is not likely to have an adverse impact on the viability of local populations of this species. While there will be some removal of vegetation that constitutes favourable habitat for the Lesser Swamp Orchid, the Structure Plan will have a net positive outcome on vegetation suitable for the Lesser Swamp Orchid through the following:

- the retention of 86.6 per cent of paperbark vegetation existing on the site
- the removal of degrading forces such as livestock, feral pigs and source populations for weed invasion
- the implementation of best practice stormwater management techniques

Threatened mammals

Grey-headed Flying-fox (*Pteropus poliocephalus*)
EPBC Act – Vulnerable
The EIS identifies a high probability of occurrence for this species given its habitat requirements. The Grey-headed Flying-fox would be an occasional visitor to the site, utilizing available resources provided by the paperbark and eucalypt open forests. This species may also establish temporary camps in some of the more densely vegetated sectors of the site.

Low likelihood of significant impacts: the EIS concludes that the development is unlikely to have any significant impacts on this species. Existing habitat will be retained and enhanced and this species is known to be able to adapt to urban environments. Given there are no roosts present within the site, it is likely that the species will continue to occur intermittently across the site.

Large-eared Pied Bat (*Chalinolobus dwyeri)*
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Water Mouse (*Xeromys myoides*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence for this species. A targeted trapping program failed to capture any Water Mouse and no indicators of habitat have been identified on the site during the course of field surveys.

Threatened birds

Red Goshawk (*Erythrotriorchis radiatus*)
EPBC Act – Vulnerable
The EIS identifies a moderate probability of occurrence at this site given the habitat preferences of the species. The Casuarina species, Melaleuca species and mangrove areas may provide suitable habitat for the species.

Low likelihood of significant impacts: the EIS concludes that the NEBP is not likely to have any long term significant impacts upon this species. Whilst there is habitat present and there have been records of sightings within the area, it is considered that adequate rehabilitation and conservation of areas of ecological value within the project site would protect any populations of this species resident in the area.

Australian Painted Snipe (*Rostratula australis*)
EPBC Act – Vulnerable
The EIS identifies a moderate probability of occurrence given the habitat and foraging site requirements of the species. The subject site supports areas of disturbed salt couch grasslands and heathland which include brackish and freshwater streams. This species may occur intermittently within these areas.

Low likelihood of significant impacts: the EIS identifies that the existing habitat is considered to be marginal and disturbed with only a moderate probability of the species occurring on the site. The disturbed salt couch grassland and heathland does support some brackish and fresh water streams however no characteristics present can be considered to be critical habitat resources.

Swift Parrot (*Lathamus discolor*)
EPBC Act – Endangered
The EIS identifies a moderate probability of occurrence at this site given the habitat requirements of the species. The species had records from EPA database indicating that it has been observed previously within the immediate region of the site and there is known habitat supporting the characteristics required by this species. The EPBC database shows that the species or species habitat is known to occur within the area.

Low likelihood of significant impacts: this species often moves in flocks and is gregarious in nature, associating with different lorikeet and parrot species and moving as individuals within a larger flock. The EIS concludes that the development will retain potential habitat for the species.

Regent Honeyeater (*Xanthomyza phrygia*)
EPBC Act – Endangered, Migratory
According to the habitat requirements of the species, the EIS identifies a moderate probability that the species will occur at this site, given the criteria. This species is cryptic in nature and prefers heavily wooded areas with dense canopies and a large number of trees supporting hollows. The subject site demonstrates some characteristics required for this species however these characteristics are spread across a large distance and do not conform in total.

Low likelihood of significant impacts: habitat and potential nesting areas would be retained and enhanced within the proposed development.

Squatter Pigeon - southern sub-species (*Geophaps scripta scripta*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Coxen's Fig-Parrot (*Cyclopsitta diophthalma coxenii*)
EPBC Act – Critically Endangered, Migratory
The EIS identifies a moderate probability of occurrence at this site given the habitat and forage preferences of the species, which includes riparian woodland and fruiting trees (eg. Fig, Camphor laurel, Lantana).

Low likelihood of significant impacts: The EIS concludes that the development will not have any adverse impacts upon this species, as the majority of on-site habitat for this species will be retained or enhanced.

Black-breasted Button-quail (*Turnix melanogaster*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Southern Giant-petrel (*Macronectes giganteus*)
EPBC Act – Endangered
The EIS identifies a low probability of occurrence.

Northern Giant-Petrel (*Macronectes hallii*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Campbell Albatross (*Thalassarche impavida*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Threatened reptiles

Three-toed Snake-tooth Skink (*Coeranoscincus reticulatus*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Threatened amphibians

Giant Barred Frog (*Mixophyes iteratus*)
EPBC Act – endangered
The EIS identifies a low probability of occurrence.

Threatened insects

Australian Fritillary (*Argyreus hyperbius inconstans*)
EPBC Act – Endangered
The EIS identifies a moderate possibility of occurrence given the habitat requirements of the species. The larvae have a specific host plant, Native Violet (*Viola betonicifolia*), which restricts the distribution of the species to areas of *Melaleuca* wetlands. The site supports numerous examples of *Lomandra* species and Blady Grass making it likely that some occurrences of Native Violet also are present.

Low likelihood of significant impacts: the EIS concludes that the development is not likely to have an adverse impact on the viability of local populations of this species and has the potential to provide positive impact upon the conservation status of this species.

Threatened marine reptiles

Loggerhead Turtle (*Caretta caretta*)
EPBC Act – Endangered, Migratory
The EIS identifies a moderate probability of occurrence at this site given the habitat preference of this species. The lower section of the Caboolture River and adjacent area of Moreton Bay may be suitable foraging habitat.

Low likelihood of significant impacts: Given that there would be no direct impact on marine turtle foraging or nesting habitat, potentially an improvement in water quality and controls on the speed of vessels associated with the proposed marina, the EIS identifies that there are unlikely to be any significant impacts to loggerhead turtles.

Green Turtle (Chelonia mydas)
EPBC Act – Vulnerable, Migratory
The EIS identifies a moderate probability of occurrence at this site given the habitat preference of this species. The lower section of the Caboolture River and adjacent area of Moreton Bay may be suitable resting habitat.

Low likelihood of significant impacts: Given that there would be no direct impact on marine turtle foraging habitat, potentially an improvement in water quality and controls on the speed of recreational vessels, the EIS identifies that there are unlikely to be any significant impacts to green turtles.

Leatherback Turtle (Dermochelys coriacea)
EPBC Act – Vulnerable, Migratory
The EIS identifies a low probability of occurrence at this site given the habitat preference of this species. The lower section of the Caboolture River and adjacent area of Moreton Bay may be suitable resting habitat only.

Low likelihood of significant impacts: potentially, Leatherback Turtles may rest in the lower section of the Caboolture River and forage in the adjacent areas of Moreton Bay. Given that there would be no direct impact on marine turtle foraging habitat, potentially an improvement in water quality and controls on the speed of recreational vessels, the EIS identifies that there are unlikely to be any significant impacts to Leatherback Turtles.

Pacific Ridley (*Lepidochelys olivacea*)
EPBC Act – Endangered, Migratory
The EIS identifies a moderate probability of occurrence at this site given the habitat preference of this species. The lower section of the Caboolture River and adjacent area of Moreton Bay may be suitable foraging habitat.

Low likelihood of significant impacts: given that there would be no direct impact on marine turtle foraging habitat, potentially an improvement in water quality and controls on the speed of recreational vessels, the EIS identifies that there are unlikely to be any significant impacts to Pacific Ridley.

Hawksbill Turtle (*Eretmochelys imbricata*)
EPBC Act – Vulnerable, Migratory
The EIS identifies a moderate probability of occurrence at this site given the habitat preference of this species. The lower section of the Caboolture River and adjacent area of Moreton Bay may be suitable foraging habitat.

Low likelihood of significant impacts: given that there would be no direct impact on marine turtle foraging habitat, potentially an improvement in water quality and existing controls on the

speed of recreational vessels, the EIS identifies that there are unlikely to be any significant impacts to Hawksbill Turtles.

Threatened fish

Honey Blue-eye (*Pseudomugil mellis*)
EPBC Act – Vulnerable
The EIS identifies a moderate probability of occurrence at this site given the habitat preference of this species. The tidal section of the Caboolture River and associated creeks may be suitable habitat.

Low likelihood of significant impacts: given that there would be no direct impact on honey blue-eye habitat above the weir and in Raff Creek, potentially an improvement in water quality, the EIS identifies that there are unlikely to be any significant impacts. An EMP would contain procedures for controlling mosquito fish and reduce the potential for increased turbidity to waterways potentially associated with construction.

Great White Shark (*Carcharodon carcharias*)
EPBC Act – Vulnerable
The EIS identifies a low probability of occurrence.

Grey Nurse Shark - East Coast population (*Carcharias taurus*)
EPBC Act – Critically endangered
The EIS identifies a low probability of occurrence.

Conclusions

Potential impacts on listed threatened species and communities within the project site are assessed within the EIS to be minimal. Development of the project would result in a substantial net gain of vegetated areas (over 100 ha on-site) and is likely to result in positive overall impacts for terrestrial species.

The proposed clearing of 25 hectares inside the south western boundary of the site includes a 12.7 hectare stand of remnant regional ecosystem. The EIS investigated the condition of this vegetation and found some degradation including altered drainage patterns due to the highway works and weed infestation. If retained, the portion would be affected by urban uses with frontages to the highway and the industrial precinct and is likely to suffer continued degradation.

In respect of the proposed clearing of the remnant regional ecosystem, the proponent has secured a 40 hectare site that is acceptable to DERM for the purposes of an offset in accordance with the *Vegetation Management Act 1999*.

The proposed revegetation of 86 hectares of riparian area and the rehabilitation of 64 hectares of wetland areas on the site would re-introduce significant areas of native vegetation within the coastal riparian zone. This provides an enhancement to the ecological corridor along the Caboolture River with strong linkages further downstream to the lower estuary and represents an opportunity to improve habitat for threatened species and communities in the region.

The implementation of the CREMP and the management of construction activities (as required by development conditions) would address project-related impacts in the estuary and ensure minimal adverse effects on marine species. As noted above, additional contributions to the CREMP may be specified as an offset for any residual impacts in the Moreton Bay Marine Park that may be determined at the detailed design stage of the project.

6.2.3 Listed migratory species

EIS findings

The EIS provides an investigation of the listed migratory species that may be affected by the proposed development. Based on database searches for a radius of 10 km and field observations the species that may be affected include 24 terrestrial species and three aquatic species. The EIS provides a species profile and a discussion of potential impacts for each (EIS Appendix L3 and SEIS Appendix C).

The overall findings in the EIS conclude a low likelihood of significant impacts on listed migratory species within the project site, primarily due to the condition of the land and its previous uses.

Species profiles and discussion of impacts are provided in Appendix L3 of the EIS and summarised in the following sections.

Migratory birds

Little Tern (Sterna albifrons)

According to the habitat requirements of the Little Tern, there is a moderate probability that this species will occur at the site, given the criteria. The development occurs in close proximity to Moreton Bay. It is possible this species flies over the subject site or occurs as a short term vagrant.

Low likelihood of significant impacts: the EIS identifies a low likelihood of significant impacts as the areas where this species may occur within the site are intended to be retained as conservation areas.

Eastern Curlew (Numenis madagascariensis)

The EIS identifies a moderate probability of occurrence of the Eastern Curlew at this site given the species habitat requirements. The site is located within the Moreton Bay region and this species is likely to travel some distance inland and would intermittently occur on the subject site.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina may create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Cotton Pygmy-goose (Nettapus coromandelianus)

The EIS identifies a moderate probability that this species will occur at this site, given the habitat requirements. The species had records from the EPA database indicating that it has been observed previously within the immediate region of the site and there is known habitat supporting the characteristics required by this species. The EPBC database shows that the species or species habitat is known to occur within the area

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Great Egret (Ardea alba)

The EIS identifies a very high probability of occurrence of this species on the site given its habitat requirements. The site supports a variety of habitats consistent with that utilised by the species and the Great Egret was observed during field assessments.

Low likelihood of significant impacts: the EIS concludes that the project is unlikely to have any long term adverse impacts on this species. The habitat values that are present are intended

to be retained within open space and conservation areas and best practice stormwater management is intended (Conditions 19 – 22, Schedule A, Appendix 1).

Cattle Egret (Ardea ibis)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats within the region that may be influenced upon by the NEBP including grasslands grazed by stock, freshwater streams and brackish water areas.

Low likelihood of significant impacts: the EIS concludes that the project is unlikely to have any long term adverse impacts on this species. The habitat values that are present are intended to be retained, although with the removal of livestock these values may change, however wetlands and grasslands will be maintained within open space and conservation areas and best practice stormwater management is intended (Conditions 19 – 22, Schedule A, Appendix 1).

Ruddy turnstone (Arenaria interpres)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats within the region that may be influenced upon by the NEBP.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Curlew Sandpiper (Calidris ferruginea)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats both within and adjacent to the NEBP which support characteristics consistent with this species' requirements.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Mongolian Plover (Charadrius mongolus)

The EIS identifies a moderate probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats both within and adjacent to the NEBP which support characteristics consistent with this species' requirements.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Latham's Snipe (Gallinago hardwickii)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats both within and adjacent to the NEBP which support characteristics consistent with this species' requirements.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Grey-tailed Tattler (Heteroscelus brevipes)

The EIS identifies a very high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats both within and adjacent to the NEBP which support characteristics consistent with this species requirements and there were observations made during field assessment.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Bar-tailed Godwit (Limosa lapponica)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats both within and adjacent to the NEBP which support characteristics consistent with this species' requirements.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Whimbrel (Numenis phaeopus)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats both within and adjacent to the NEBP which support characteristics consistent with this species' requirements.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Pacific Golden Plover (Pluvialis fulva)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats both within and adjacent to the NEBP which support characteristics consistent with this species' requirements.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

Terek sandpiper (Xenus cinereus)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. There are numerous habitats both within and adjacent to the NEBP which support characteristics consistent with this species' requirements.

Low likelihood of significant impacts: the dredging of the channel to the Caboolture River would be managed to minimise noise impacts on migratory birds. Additional vessel movements associated with the marina might create some issues in regards to levels of disturbance to species utilising Moreton Bay however this is not a commencement of a new activity and currently does not create any significant impacts.

White-bellied Sea-Eagle (Haliaeetus leucogaster)

The EIS identifies a very high probability of occurrence of this species on the site given its habitat requirements. The species was observed on site and habitat resources that are required for this species are present throughout and adjacent to the site.

Low likelihood of significant impacts: the project will retain habitat for this species within open space and conservation areas. Nests or roosting trees will be protected and the proximity to Moreton Bay and the Caboolture River will ensure that food resources are kept available.

White-throated Needletail (Hirundapus caudacutus)

The EIS identifies a low probability of occurrence.

Black-faced Monarch (Monarcha melanopsis)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. The species is listed in both the EPA and the EPBC databases and is likely to occur within vegetated habitats within the site.

Low likelihood of significant impacts: The EIS concludes that the project will not have any significant impact on this species. Habitat will be retained within conservation and open space areas and other management strategies will be employed to remove feral animals and minimise harm from domestic animals.

Spectacled Monarch (Monarcha trivirgatus)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements. Whilst no observations were made, there were numerous records in the EPA database and habitat was observed to be present at the site.

Low likelihood of significant impacts: The EIS concludes that the project will not have any significant impact on this species. Habitat will be retained within conservation and open space areas and other management strategies will be employed to remove feral animals and minimise harm from domestic animals.

Rainbow Bee-eater (Merops ornatus)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements.

Low likelihood of significant impacts: The EIS concludes that the project will not have any significant impact on this species. Habitat will be retained within conservation and open space areas and other management strategies will be employed to remove feral animals and minimise harm from domestic animals.

Rufous Fantail (Rhipidura rufifrons)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements.

Low likelihood of significant impacts: the EIS concludes that the project will not have any significant impact on this species. Habitat will be retained within conservation and open space areas and other management strategies will be employed to remove feral animals and minimize harm from domestic animals.

Satin Flycatcher (Myiagra cyanoleuca)

The EIS identifies a high probability of occurrence of this species on the site given its habitat requirements.

Low likelihood of significant impacts: the EIS concludes that the project will not have any significant impact on this species. Habitat will be retained within conservation and open space areas and other management strategies will be employed to remove feral animals and minimize harm from domestic animals.

Migratory marine mammals

Dugong (Dugong dugon)

The EIS identifies a moderate probability of occurrence at this site given the habitat preference of this species. The tidal section of the Caboolture River and adjacent area of Moreton Bay may be a suitable habitat.

Low likelihood of significant impacts: the EIS concludes that there are unlikely to be any significant impacts on this species given that there would be no direct impact on dugong foraging or breeding habitat, potentially an improvement in water quality as a result of the project and controls on the speed of recreational vessels

Indo-Pacific Humpback Dolphin (Sousa chinensis)

The EIS identifies a moderate probability of occurrence at this site given the habitat preference of this species. The tidal section of the Caboolture River and adjacent area of Moreton Bay may be a suitable foraging habitat.

Low likelihood of significant impacts: the EIS concludes that there are unlikely to be any significant impacts on this species given that the direct impact on Indo-Pacific Humpback Dolphins would be minimal, potentially an improvement in water quality and controls on the speed of recreational vessels, there are unlikely to be any significant impacts to Indo-Pacific Humpback Dolphins.

Irrawaddy dolphin (Orcaella brevirostris)

The EIS identifies a moderate probability of occurrence at this site given the habitat preference of this species. The tidal section of the Caboolture River and adjacent area of Moreton Bay may be a suitable foraging habitat.

Low likelihood of significant impacts: the EIS concludes that there are unlikely to be any significant impacts on this species given that there would be no direct impact on Irrawaddy Dolphin foraging or nesting habitat, potentially an improvement in water quality, controls on the speed of recreational vessels, and their rarity in areas south of Gladstone there are unlikely to be any significant impacts on Irrawaddy Dolphins.

Conclusions

The EIS has addressed the potential impacts of the project on migratory species in the lower estuary. Key findings of the EIS and my evaluation of these matters are summarised in the following.

Shorebird habitat

The EIS identifies potential impacts on migratory shorebirds that utilise the lower estuary of the Caboolture River. The *South East Queensland Regional Coastal Management Plan 2006* identifies areas of shorebird habitat throughout the majority of the Deception Bay shoreline from Sandstone Point to Newport Waterways. This includes the lower estuary of the Caboolture River and the lower section of Burpengary Creek. A number of critical high tide roost sites in Moreton Bay are identified - one located at the mouth of the Caboolture River.

No loss or changes to the condition of the critical high tide roost areas would be expected or associated with the project. Some minor impacts on the extent and condition of intertidal foraging habitat areas are predicted as a result of long term maintenance dredging. These impacts are expected to be localised to the edge of banks and are proposed to be mitigated by placement of (suitably treated) dredged material where appropriate.

The predicted water quality improvement in the river would also provide benefits to the ecological health of these areas.

Disturbance to shorebirds and other migratory species

In some cases disturbance sources located within 200 metres or more can affect migratory birds. Migratory bird species must have space, food and protection from predators and disturbances, to recuperate from and prepare for long flights. Proximity of these roosting and staging areas to reliable food sources is also critical.

A recent study was commissioned by MBRC to assess shorebird high tide roost sites in the northern Bay. In some cases, including the site at the mouth of the Caboolture River, the study found that pressures from human activities are leading to a degradation of the habitat value of these sites.

Existing boat traffic is generally concentrated in the lower estuary in the vicinity of the boat ramps. A substantial proportion of this traffic would be small trailerable boats that are

generally not subject to speed limits and often are only minimally limited by draft restrictions. A proportion of this existing boat traffic is to destinations within the river rather than out into the Bay. Accordingly, a level of disturbance of shorebirds already exists.

The development of the proposed marina would significantly increase the number of boats navigating the river and a large proportion would be expected to transit the channel to access Moreton Bay. Submissions to the EIS raised concerns of the potential for this increased boating traffic to cause disturbance to shorebirds foraging on the adjacent tidal flats and roosting on the nearby banks. Noise from dredging activities in the vicinity of shorebird habitats would also add to the level of disturbance.

The EIS estimated an increase in boat traffic in the order of 80 trips per day on average, compared to the existing situation which is estimated as 40 trips per day (based on week day observations). The majority of these trips would be recreational boats on weekends and public holidays and typically coincide with favourable weather conditions. At the peak, estimated trips could be up to 300 per day and are likely to be concentrated in the mornings and late afternoons as boats travel to and from destinations in Moreton Bay. These would be approximately the times when the highest levels of use of the boat ramps and general boating traffic would also be expected.

The additional impacts caused by boats from the proposed marina would cumulatively contribute to the noise disturbance at the critical high tide roost area, although not proportionately. The majority of boats from the proposed marina would be more than eight metres in length and therefore generally travelling at the six knot speed limit and constrained to the dredged channel - more than 150 m away from the roost site at its nearest point. Much of this traffic would also be at similar time periods to the existing times of peak disturbance.

Relatively greater effects would be expected on shorebird foraging activities in the upper sections of the marked channel because the expected increase in boating traffic would be more noticeable away from the vicinity of the boat ramps. However the disturbance would not be continuous and strongly focussed on peak periods. The greatest levels of disturbance would occur when these high traffic periods coincide with lower stages of the tide.

The EIS found that shorebirds are typically habituated to boat traffic and provides examples of similar sites in Moreton Bay where large numbers of birds co-exist with high levels of boat traffic. I conclude that it is unlikely that the birds have become completely habituated to the existing levels of disturbance; and that they may have limited options of alternate, quieter places nearby. Nevertheless, I also note that the current level of disturbance is not sufficient for them to abandon the roost site and, given the nature and separation of the additional boat traffic compared to the existing situation, I have concluded that it is unlikely that the project would cause significant additional impacts.

Relatively greater impacts would occur on foraging shorebirds in the vicinity of the upper section of the marked channel during peak periods of boating traffic. Although boat traffic in this area is not a new use, a relatively higher increase in numbers would be expected than the downstream sections. Given that feeding shorebirds have some toleration of human-related activities and the estuary is relatively wide in this section, significant adverse impacts are not expected.

To detect impacts resulting from increased boating traffic and dredging activities associated with the project, the proponent has committed to undertaking a shorebird monitoring program. This combined with an appropriate strategy for corrective or compensatory action, where necessary, should minimise any impacts.

The implementation of the CREMP and the management of construction activities (as required by development conditions) would address project-related impacts in the estuary and ensure minimal adverse effects on shorebirds and marine species. The plan would be structured to include measures that specify management controls or other actions needed to minimise impacts on migratory species. These actions would be informed by results of an ongoing monitoring. The development and implementation of the whole-of-government Caboolture River Plan by DERM is likely to include complementary actions to ensure an overall positive outcome.

7. Conclusions

Having regard to the documentation provided during the EIS/ SEIS process for the project and the input of advisory agency and public submissions, I am satisfied that the requirements of the Queensland Government for impact assessment in accordance with the SDPWO Act have been met. The EIS process has provided sufficient information to government and to the community to allow an informed evaluation of potential environmental impacts which could be attributed to the project. I am satisfied that careful management of the key construction and operational activities should ensure that any potential environmental impacts will be minimised or avoided.

I note that development of the project would proceed in accordance with a suite of design, construction and operational management plans. The proponent has committed to finalising these plans in consultation with MBRC and other regulatory agencies.

Thus, on the basis of the information provided, including advice from advisory agencies, I am satisfied that the adverse environmental impacts associated with the project are able to be addressed through:

- implementation of the project generally in accordance with the arrangements described in the EIS, SEIS and the proposed NEBP Area Plan
- finalisation and implementation of the suite of design, construction and operational management plans (described in section 5 of this report)
- attachment of conditions listed in Appendix 1 of this report (pursuant to s.39 of the SDPWO Act).

I consider that on balance there is a need for the proposed development as it would enhance the future of industrial development within the SEQ region and the Caboolture area in particular. The form of the MIBA proposal optimally meets the strong demand for employment generating land in a region that has a demonstrated need to generate industry and employment. It also would contribute to the housing stock needed in the future to meet the anticipated demand for housing in the region.

I am satisfied that the proposal represents an effective use of the development site, taking into account its constraints and its strategic location on the Caboolture River. The proposed marina development would provide a major new recreational boating facility, available for use by the public and forming the basis of a new marine industry cluster. Additionally, the dedication of large areas of open space for public use and the provision of associated community facilities would become a significant asset to the community.

Overall, the project has the potential to create an attractive living and working environment and would promote improvement of self-containment of employment in the region.

Therefore, I recommend that the project, as described in detail in the EIS and summarised in Section 2 of this report, can proceed subject to the conditions contained in Appendix 1 of this report.

I note that the project, as described in the EIS, has been formulated in a preliminary sense only and does not contemplate the detail of all likely uses within the site. This reflects the two current applications for preliminary approval for material change of use that apply to the project site. Detailed plans will be formulated for approval by the MBRC assessment manager as the project is implemented. Accordingly, I state for the assessment manager that approvals must be a preliminary approval only.

In the event of any inconsistencies between the EIS documents and the recommended requirements in this report, the recommended requirements in this report shall prevail.

Copies of this report will be issued to:

- the proponent, pursuant to section 35(5)(a) of the SDPWO Act.

- the MBRC as assessment manager for development approvals pursuant to the *Integrated Planning Act 1997*.
- the Australian Government Minister for the Environment, Heritage and the Arts to make an assessment of the controlled action for the purposes of the EPBC Act.

A copy of this report will also be made available on the DIP web site at: www.dip.qld.gov.au

8. Recommendations

I note that regulatory amendments would be necessary to enable the proposal to be fully implemented. In conjunction with my conclusion that the project can proceed, subject to conditions, I recommend the following:

1. the Minister responsible for administering the *Marine Parks Act 2004* should consider the proposed amendment to the Marine Park (Moreton Bay) zoning plan to include a works area, as shown in Figure 3
2. the Minister responsible for administering the *Fisheries Act 1994* should consider an amendment to the Deception Bay fish habitat area that alters the management designation from type A to type B in key sections of the Caboolture River estuary.

In addition, I recommend the following initiatives to improve the overall management of the Caboolture River

3. the DERM lead a whole-of-government process to develop and implement a Caboolture River Management Plan
4. Maritime Safety Queensland consider the introduction of a six knots or 'no wash' speed limit in the Caboolture River between the marina entrance and the marked channel in the lower estuary

9. Abbreviations and definitions

The following acronyms have been used in this report:

AADT	Average annual daily traffic
ACH Act	Aboriginal Cultural Heritage Act 2003
Active transport	defined by the *Transport Planning and Coordination Act 1994*
AHD	Australian Height Datum
Artificial waterway	defined by the *Coastal Protection and Management Act 1995*
AS	Australian Standard
ASS	Acid sulfate soils (under SPP 2/02)
ARI	Average recurrence interval
Caboolture River Management Plan	A non statutory management plan for the Caboolture River currently in preparation by DERM
CAMBA	China Australia Migratory Bird Agreement
CEMP	Construction environmental management plan
CG	The Coordinator-General of the State of Queensland
CHMP	Cultural heritage management plan (under the ACH Act)
Clear navigable channel	A channel constructed in the Caboolture River and intended for safe navigation of boats between the marina facility and Moreton Bay
CLR	Contaminated Land Register
Coastal management district	Defined by the *Coastal Protection and Management Act 1995*
Community management statement	Defined by the *Body Corporate and Community Management Act 1997*
CPI	Consumer price index
CPMA	Coastal Protection and Management Act 1997
CREMP	Caboolture River Estuary Management Plan
DEEDI	QLD Department of Employment, Economic Development and Innovation
DERM	QLD Department of Environment and Resource Management
DEWHA	(Australian Government) Department of Environment, Water, Heritage and the Arts
DIP	QLD Department of Infrastructure and Planning
DO	Dissolved oxygen
DTMR	QLD Department of Transport and Main Roads
EHMP	Ecosystem Health Monitoring Program – monitoring program of the South East Queensland Healthy Waterways Partnership, refer http://healthywaterways.org
EIS	Environmental impact statement for the Northeast Business

	Park project
EMP	Environmental management plan
EMR	Environmental management register
EPA	Former QLD Environmental Protection Agency
EP Act	Environmental Protection Act 1994
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
EPP	*Environmental protection policy* (water, air, waste, noise)
FHA	Fish habitat area
FireComm	Fire Communications Centre
FTE	Full-time equivalent
HAT	Highest astronomical tide
IAS	Initial advice statement
IMP	Integrated movement plan
IPA	*Integrated Planning Act 1997*
JAMBA	Japan Australia Migratory Bird Agreement
LAT	Lowest Astronomical Tide
Marina facility	The marina basin and shipyard dedicated in the NEBP Area Plan as precincts 2(1) and 2(2)
MBRC	Moreton Bay Regional Council
MIBA	Mixed industry business area
MNES	Matters of National Environmental Significance
MSQ	Maritime Safety Queensland
NEBP	Northeast Business Park
NSA	North south arterial
PAC	Principal Activity Centre
PPT	Public passenger transport
Principal Cycle Network	Defined by the *South East Queensland Principal Cycle Network Plan 2007*
The project	The Northeast Business Park project as described by the environmental impact statement of January 2008
Project site	Land described by Lot 2 on RP902075, Lot 7 on RP845326, Lot 10 on RP902079, Lot 12 on RP145197, Lot 15 on RP902073, Lot 17 on RP902072 and Lot 24 on SP158298
QGEOP	Queensland Government Environmental Offsets Policy
QPIF	Queensland Primary Industries and Fisheries
RAA	Resource allocation approval
RE	Regional ecosystem
RIA	Road impact assessment
RLRP	Regional landscape and rural production
SBSMP	Site based storm water management plan

SCMP	State Coastal Management Plan (under the CPMA)
SDPWO Act	State Development and Public Works Organisation Act 1971
SEIS	Supplementary environmental impact statement
SEQ	South East Queensland
SEQRP	South East Queensland Regional Plan 2009 - 2031
SQMP	Stormwater quality management plan
The proponent	Northeast Business Park Pty Ltd
TIA	Traffic impact assessment
TOR	Terms of reference
VM Act	Vegetation Management Act 1999
WSUD	Water sensitive urban design

Notes: As a result of machinery of government changes from 26 March 2009 (see *Public Service Department Arrangements Notice (No.2) 2009*), the following changes to Queensland Government departments referred to in this report occurred (in summary):

New department (as of 26 March 2009)	Previous department/s
Department of Employment, Economic Development and Innovation – DEEDI	Department of Tourism, Regional Development and Industry - DTRDI Department of Mines and Energy – DME Department of Primary Industries and Fisheries – DPI&F
Department of Environment and Resource Management – DERM	Environmental Protection Agency – EPA (including QPWS) Department of Natural Resources and Water – NRW
Department of Transport and Main Roads – DTMR	Department of Main Roads – DMR Queensland Transport – QT
Department of Community Safety	Department of Emergency Services – DES

Appendix 1: Schedule of conditions

Conditions stated by the Coordinator-General pursuant to s.39 of SDPWO Act that the Assessment Manager must attach to a Preliminary Approval

Schedule A - Conditions that the Chief Executive of the MBRC is the responsible entity

CONDITION		TIMING
MATERIAL CHANGE OF USE – PRELIMINARY APPROVAL		
1.	MBRC Approved Plans and Documents Carry out the development in accordance with the approved plans and documents, including: (i) Northeast Business Park Area Plan, prepared by Conics Pty Ltd dated 12 October 2009 (ii) Northeast Business Park Structure Plan (20430-10/J), prepared by Conics Pty Ltd dated 17 April 2009 (iii) Landscape Master Plan, prepared by PLACE Planning and Design dated 27 September 2007.	At all times.
2.	MBRC Currency Period The currency period for this approval is limited to twenty (20) years. Note: This condition is imposed in accordance with the provisions of Section 3.5.21(2) of the Integrated Planning Act.	As indicated.
3.	MBRC Level of Assessment and Codes The level of assessment for the respective uses and the relevant assessable requirements are to accord with the Northeast Business Park Area Plan, unless otherwise stated in these conditions of development. Any future request for a minor variation to the approved Northeast Business Park Area Plan is to include justification for such departure. Such request is to be submitted to Council for approval.	As indicated.
4.	MBRC Staging of the Development Carry out the sequencing of the development in accordance with a	Prior to a

	staging plan. Such plan is to be submitted to the Council for approval and to be generally in accordance with Table 11 of the EIS documents. The staging plan is to ensure that the MIBA component of the development (Council reference: MCU-2002-1079) occurs first. Note: any future request for a minor variation to the approved staging plan and/or sequencing of the development is to include justification for such departure. Variation to the staging plan is also to include amendments as required to all infrastructure provisions and is not to adversely impact on Council's ability to provide such infrastructure. Such request is to be submitted to Council for approval.	Reconfiguring a Lot application being lodged for Stage 1.
5.	MBRC Sector Plan and Reconfiguring a Lot Requirements The sector plan and Reconfiguring a Lot proposals are to comply with the following requirements: (i) construct screen fencing along the interface to all adjoining properties for this development. The details of the fence height and construction material are to be provided as part of subsequent Development Permits. (ii) the interface to all adjoining properties for this development is to include a minimum 10.0 metre wide landscaped buffer, where non residential uses are proposed and otherwise for the width of any batter. (iii) where proposed filling at the boundaries of the site is in excess of 1.0 metre to those levels of adjoining properties, the fill is to be offset at least the same distance it reaches in height, or battered at no steeper than 1 in 4. (iv) the interface of the development to the Bruce Highway is to include a minimum 10.0 metre wide landscaped buffer, this area is to be landscaped to ultimately screen the proposed buildings from view from the Highway. (v) provide a signage strategy that addresses the size, location and nature of signage permitted for each lot. The signage strategy is to be submitted for approval by the Council's Delegate and to be included in any community management statement. (vi) the development is to be subdivided predominantly by community title, as outlined in Section 3 of the Northeast Business Park Area Plan.	Prior to release of the survey plan for each stage.
6.	MBRC Development Requirements The development of the respective allotments are to comply with the following requirements: (i) building heights, massing, setbacks and other amenity and design issues must be addressed in a Sector Plan for Precinct 2(4). An application for a sector plan approval must be accompanied by a detailed visual amenity analysis of the impact of proposed building(s) above eight storeys upon areas external to the development. (ii) within Precinct 2(4) no more than 10 buildings may be higher than eight storeys (to a maximum height of 12 storeys and 39.5m) and the heights of buildings must be	Prior to the commencement of use and to be maintained.

	varied to maximise visual interest. Basement levels will be permitted to protrude above the finished ground level (endorsed as part of the survey plan release) by 1.5m and not be included as a storey. (iii) apartment buildings above 3 storeys within Precinct 2(4) must have a maximum plot ratio of 1.5 (defined as total Gross Floor Area / total site area). (iv) the separation between any parts of buildings above 8 storeys must be more than 30m. (v) the maximum gross floor area for commercial and retail uses in Precincts 2(3), 2(4) and 2(6) is 17,000m^2. Within these areas only one (1) supermarket tenant is permitted and it is to have a maximum gross floor area of 2 500m^2. (vi) Notwithstanding the staging plan (Condition 4), the timing of construction of building(s) greater than eight storeys in Precinct 2(4) must ensure no significant adverse market impacts on the establishment of similar residential products within the Caboolture/Morayfield Principal Activity Centre. (vii) the maximum gross floor area for retail warehouse uses in precinct 1(3) is 25 000m^2. The overall staging plan is to ensure that the retail warehouse uses are not constructed all at once. The first stage for such uses is to contain a maximum gross floor area of 15,000m^2. (viii) any industrial buildings that face residential properties are to have no windows or openings on that elevation, with the exception of emergency access, that is to be kept closed at all times.	
7.	MBRC Sustainability Measures. Incorporate sustainability measures as outlined in the main Northeast Business Park EIS and the supplementary Northeast Business Park EIS in buildings and structures proposed to be erected on site. Such measures are to be included in the proposed Design Guidelines for the development (as identified in Section 3 of the Northeast Business Park Area Plan) and/or the relevant Community Management Statements.	At all times.
8.	MBRC Open Space Requirements. (a) provide revised calculations for the contribution of public open space providing for a minimum 10% contribution of the developable land, in accordance with the provisions of the Open space contributions Planning Scheme Policy (17). Such calculations are not to include any land proposed for the golf course, or the proposed north/south arterial. Calculations are to be submitted for approval by the Council's Delegate. (b) dedicate the areas of land, calculated for the contribution of public open space by Planning Scheme Policy (17), free of cost and compensation to the Council. Such areas are to include required local parks for the residential precincts (minimum area of 4 000m^2 and maximum 400.0 metres walking distance to any residential Lot). (c) unrestricted public access, apart from any restrictions necessary for public safety, must be provided in perpetuity to:	(a) Prior to a Reconfiguring a Lot application being lodged for Stage 1. (b) As indicated in an approved agreement.

	(i) all remaining land not dedicated to the Council and shown as open space on the approved structure plan (ii) a public boulevard accessing at least 50% of the perimeter of the marina basin (d) the owner of any land allowing unrestricted public access within the project site must at all times maintain public liability insurance cover in respect of the death of or injury to any person, or the loss of or damage to any property. The minimum level of public liability cover required is $20 000 000 for any single event.	
9.	MBRC Open Space Agreement Enter into an agreement with Council that ensures the timely delivery of all public open space and associated improvements, as outlined in the EIS documents and section 9.1 of the Northeast Business Park Area Plan. Such agreement is to be prepared by the developer (at no cost to Council) and submitted for approval/endorsement by Council and is to contain, at least the following: (i) timing for delivery of the various components of open space; (ii) timing for delivery of the improvements to open space as listed in Section 9 of the Northeast Business Park Area Plan, including indicative building floor areas; (iii) level of maintenance requirements for the various components of open space and who is responsible for carrying out these maintenance requirements; (iv) establishment of a per lot monetary contribution towards the (additional) cost of maintenance, with at least an annual review (Note 1); (v) on maintenance and off maintenance periods; and (vi) access arrangements necessary for the developer to meet its environmental obligations. Note1: Council will contribute towards the maintenance of the dedicated public open space areas, at levels commensurate with its landscape maintenance standards manual (or equivalent document). The difference in cost to delivering a higher standard of maintenance will need to be funded by this development, through measures such as an additional rates charge.	Prior to a Reconfiguring a Lot application being lodged for Stage 1.
10	MBRC Community Purpose Lot Dedicate an 8,000m^2 lot for community purposes, to be located at the Community Node in precinct 3(1) (Residential West), free of cost and compensation to the Council. The allotment shape and frontage is to be suitable for Council's intended use of the site.	Prior to release of the survey plan for the stage of development affected by this condition.
11	MBRC Design Guidelines Provide Council with a copy of the Design Guidelines for the	Prior to release of

	development, as identified in Section 3 of the Northeast Business Park Area Plan.	the survey plan for Stage 1.
12.	MBRC Local Plan Contribution Pay a monetary contribution of $100 000.00 to Council towards the preparation of a Local Plan, to be carried out over adjacent and adjoining land, to investigate preferred land use patterns, having regard to the land uses approved as part of this development.	Prior to release of the survey plan for any residential allotment.
13.	MBRC Noise Impacts (a) demonstrate via an acoustic report, prepared by an appropriately qualified acoustic consultant how the noise impacts are to be mitigated, where the proposed development or use of a specific site is subject to unacceptable levels of noise. (b) obtain approval from Council's delegated officer for the acoustic report and carry out the works required by the recommendations of the report. Provide certification from an appropriately qualified acoustical consultant, which confirms that the required treatments have been provided, designed and located in accordance with the relevant requirements.	Prior to release of the survey plan for each stage.
14.	MBRC Buffers to Riparian Areas (a) provide and maintain a vegetated buffer to either side of Raff Creek, as required by Probable Solution 14.2 of the Reconfiguring a Lot Code in the Northeast Business Park Area Plan. The works are to maximise the usage of local indigenous species and to enhance the habitat values of the environmental corridor. The works may be staged, as approved by the Council's delegated officer. (b) provide and maintain a vegetated buffer of at least 100 metres to the Caboolture River and all wetland protection areas, generally as provided on the approved plans. The works are to maximise the usage of local indigenous species and to enhance the habitat values of the environmental corridor. (c) before commencing the works obtain approval for detailed design plans, details and technical specifications of any planting or landscape work from the Council's delegated officer.	(a)&(b) Prior to release of the survey plan for each stage of development affected by this condition. (c) Prior to the works commencing.
15.	MBRC Acid Sulfate Soils All potential Acid Sulfate Soil disturbance is to be addressed through Section 11 of the Northeast Business Park Area Plan, and/or the relevant referral agency requirements.	Prior to earthworks being carried out on the site.
16.	MBRC Bushfire Hazard All areas of the site identified as having a medium risk, or higher are to provide a detailed bushfire hazard report that provides an	Prior to release of the survey plan for

	assessment of risk and proposed mitigation measures. Such report is to be prepared having consideration to the Bushfire assessment report, as contained in appendix Z of the EIS.	each stage.
17.	MBRC Bank Stability As part of the Caboolture River Estuary Management Plan provide Council with appropriately certified Hydrological/Hydraulic Engineering reports and/or management plans that demonstrate that impacts on bank stability of the Caboolture River affected by this development (being the frontage of this development, through to the mouth of the river) will be mitigated to the satisfaction of the relevant State Agencies. Such factors are to include, but not be limited to: (i) all proposed works within 100 metres of the river; and (ii) boat wash generated by this development. Note: All works are to be designed to withstand predicted long term sea level rise and increased frequency of storm events and are to be carried out at no cost to the Council.	Prior to any tidal works – development permit being issued and to be maintained at all times.
18.	MBRC Copy of all Approvals Relating to the Development Provide Council with a copy (both electronic and hard copy) of all approvals, management plans and monitoring data, as required by other authorities, relating to this development. Such requirement is to ensure that Council is kept up to date with all matters relating to this development.	To be maintained at all times.
DEVELOPMENT ENGINEERING		
STORMWATER		
19.	MBRC Adverse Drainage Impact – General (a) stormwater drainage discharge from the development shall not adversely impact adjoining lots. Where an adverse impact is identified during the assessment of any stage, including operational works, the developer is required to submit details of adequate measures to offset such. (b) demonstrate that stormwater can be lawfully discharged from the subject land in accordance with Council's standards without causing nuisance and annoyance to any person.	(a) At all times. Implement approved mitigation measures prior to release of the survey plan for each stage or prior to the commencement of each use. (b) Downstream Drainage Discharge reports to be approved prior to approval of operational works or building works (whichever occurs first). Implement approved mitigation

		measures prior to release of the survey plan for each stage or prior to the commencement of use.
20.	MBRC Stormwater Draining to Land (a) adequately cater for all stormwater draining to the land, or stormwater flow paths which are interfered with by the development or the filling of the subject land. (b) provide drainage easements, free of cost and compensation in Council's favour, over any drainage paths and drainage infrastructure within all new residential lots including all inter-allotment drainage works. (c) the major and minor drainage systems are to be designed to cater for a fully developed upstream catchment. (d) the roads, drainage pathways, drainage features and waterways safely convey the stormwater flows for the major storm event without allowing flows to encroach upon residential lots. (e) overland flow paths and pipe drainage (for any storm event) from roads and public open space do not pass through residential lots. Drainage pathways are provided to accommodate overland flows from roads and public open space areas. (f) stormwater drainage infrastructure through or within private land is protected by easements in favour of Council (at no cost to Council) with easement areas and dimensions conforming to Council's standards.	Prior to release of the survey plan for each stage, or prior to the commencement of each use.
21.	MBRC Stormwater Drainage – Design Criteria Design and construct at no cost to Council, stormwater management and drainage works in accordance with Council's design standards current at the time of development.	Prior to release of the survey plan for each stage, or prior to the commencement of each use.
22.	MBRC Stormwater Quality Management Plan – Master Plan/Catchment Level (a) submit for approval a revised stormwater quality management plan (SQMP) that considers the fully developed project and demonstrates compliance with specific outcomes S01 to S03 of the Caboolture ShirePlan Stormwater Code and the following criteria: The total effect of permanent water quality control measures achieve reductions in the mean annual load generated by the development site at a minimum of: (i) 80% for Total Suspended Sediment (TSS); (ii) 45% for Total Nitrogen (TN); (iii) 60% for Total Phosphorous (TP); and	(a) SQMP prior to a Reconfiguring a Lot application being lodged for Stage 1.

	(iv) 90% reduction in litter (sized 5mm or greater). Note: should the overall effectiveness of the optimal treatment train for the development catchment not meet mean annual load reduction targets, specific concentrations as defined by local water quality objectives set out in schedule 1 of *Environmental Protection (Water) Policy 1997* should be used as the water quality objective for stormwater discharging from development sites. All stormwater treatment areas are to be separated from ecologically sensitive areas and dredge material rehandling facilities. Stormwater treatment measures for industrial areas are to be structurally separated from other stormwater runoff pathways and generally in accordance with the Healthy Waterways' Partnership fact sheets and guidelines on Water Sensitive Urban Design for Industrial Sites and Precincts. Stormwater treatment systems are to be designed to function effectively during and immediately after flood events up to the 100 year ARI event in the Caboolture River. Stormwater discharges from the site are to comply with the frequent flow management and waterway stability objectives listed in table 4-2 of the draft Stormwater Management Plan provided with the EIS (Appendix H1).	
	(b) a Site Based Stormwater Management Plan (SBSMP), as a minimum, shall be undertaken in accordance with the Planning Scheme Policy 4 Design and Development Manual, Part A, Section 8, No. 19 – Stormwater and the "Healthy Waterways Water Sensitive Urban Design Technical Design Guidelines for South East Queensland". The revised stormwater quality management plan and supporting electronic model files for each reconfiguration application must include the following recommendations: (i) stormwater quality modelling is to be undertaken in accordance with the most current version of the MUSIC Modelling Guidelines for South East Queensland (South East Queensland Healthy Waterways Partnership); (ii) prepare and implement as part of the stormwater management plan, or as part of a broader environmental management plan for the development a water quality monitoring program for pre; during and post construction. If undertaken specifically as part of the stormwater management plan, Council requires that it would be most appropriately incorporated at the master plan level; (iii) review the results of the MUSIC modelling once water quality monitoring data for the site is available to: a) Confirm or otherwise, the nutrient/sediment export characteristics of the site in the existing	(b) SBSMP prior to release of the survey plan for each stage or prior to the commencement of use.

	situation, b) Assess the anticipated performance of the proposed development in accordance with the adopted water quality objectives (reduction targets for pollutant exports as per Healthy Waterways Guidelines), and c) Assess the impact of the proposed development on the Caboolture Estuary in absolute terms by comparing the pre and (anticipated) post development Sediment and nutrient loadings; and (iv) bio-retention basins and Wetlands are to be sized for minor runoff events and must not be designed for attenuation of Q1 to Q100 ARI flood events. (c) implement the approved Stormwater Quality Management Plans.	(c) Prior to release of the survey plan for each stage or prior to the commencement of use.
23.	MBRC Flood Free Land Requirements Apply the minimum requirements for flood free land in accordance with Table 7.20 of the Caboolture ShirePlan, including the minimum flood immunity levels as stated in Section 8.9 of Planning Scheme Policy 4 – Design and Development Manual. The finished ground levels (including allowance for freeboard) are to include an additional clearance of 800mm to accommodate sea level rise, resulting from predicted climate change impacts to the year 2100.	Prior to release of the survey plan for each stage, or prior to the commencement of each use.
24.	MBRC Trunk Stormwater Infrastructure Contributions Pay stormwater network monetary contributions towards additional stormwater infrastructure (external to the site) necessary to ameliorate the impact of the development downstream of the site in order to protect the Environmental Values and satisfy the Water Quality Objectives for the Caboolture River as specified under the *Environmental Protection (Water) Policy 1997*. Contributions are to be determined commensurate with the load that the development will place on existing and planned future infrastructure (where impacts would cause an exceedence of Water Quality Objectives) and taking into account relevant contributions specified under other conditions of this approval (such as implementation of the Caboolture River Estuary Management Plan). Note: Notwithstanding that the development is required to achieve certain on site water quality objectives specified under other conditions of this approval, further catchment works (outside the subject land) may be required to protect the Environmental Values and achieve the Water Quality Objectives specified under the *Environmental Protection (Water) Policy 1997*. Consequently, a contribution towards additional external catchment works may be necessary.	Prior to the commencement of each use.

25.	MBRC Stormwater Detention and Flood Plain Management	
	(a) control the discharge of stormwater from the developed site so as to restrict peak flow discharge to pre-development flows at any location where the discharge is into an adjoining property. Any discharge onto downstream properties must also not result in an increase of concentration of the Stormwater. Note: On-site stormwater detention facilities are to comply with the relevant design standard current at the time of development (currently Section 8.18 of Planning Scheme Policy 4 of the Caboolture ShirePlan).	(a) Prior to release of the survey plan for each stage.
	(b) submit for approval a Flood Management Plan prepared by a suitably qualified and experienced Stormwater Engineer demonstrating non-worsening and/or any necessary detention/attenuation for storm events corresponding to 2, 5, 10, 50 and 100 year ARI storm event and a possible 100 year ARI Caboolture River flood event coinciding with a 20 year ARI storm tide. In addition demonstrate that any discharge towards downstream properties does not result in an increase of peak flow discharge or concentration of the stormwater to downstream properties. Council's requirements in relation to sizing and configuration of detention basins at the development permit application stage are outlined in Council's Planning Scheme Policy 4 - Design & Development Manual – Section 8.18 "Stormwater Detention. The Flood Management Plan is to address the following issues: (i) revise the Mike 21 Hydraulic flood model to reflect the adopted Caboolture River flood levels (1994) where higher, particularly in the middle to upper reaches of the development site. Alternatively the higher adopted 1994 levels are to be applied to the North East Business Park; (ii) provide revised reporting demonstrating no net loss of flood plain storage volume for storm events Q10, Q50 and the Q100 ARI flood event based on the above item. Volumetric details are to be provided at each development stage to demonstrate preservation of the existing flood plain storage. (iii) incorporate an appropriate allowance for Caboolture River siltation dependent upon the dredging maintenance regime proposed and the timing (i.e. after significant storm events); monitoring of, and the frequency of such maintenance works; (iv) any proposed excavation, alterations to site contours or reshaping of areas are to be free draining and volumes to be occupied by permanent water levels will not to be credited towards compensatory earthworks calculations; (v) all works (filling and/or mitigation) within the existing flood plain must not create adverse	(b) Prior to a Reconfiguring a Lot application being lodged for Stage 1.

	impacts on adjoining, upstream or downstream properties, cause affluxes in flood conditions, redirect water away from existing flow paths where they cross adjoining boundaries or concentrate flows upon adjoining properties; Note: Any modification to internal flow paths must consider the environmental impacts of such changes. (vi) hydraulic remodelling must be accurately based on finished surface coverage's (i.e. grasses in diversion banks and overflow bypass channels, river bank revegetation works, tree density and plantings in open spaces, etc.) and their associated Mannings 'n' roughness coefficient within the floodplain. Where adopted friction values require ongoing maintenance of the surface, the report must also include a maintenance management plan acceptable to Council; (vii) discharge from the individual stages and the overall site as a whole does not cause nuisance to any person, property or premises; and (viii) use of advance methodology by electronic modelling techniques is to be undertaken in determining and estimating detention volumes. Council does not support the Queensland Urban Drainage Manual methods in this instance, as these methods are only suitable for low volume estimations. (c) implement the approved stormwater detention and Flood Management Plan.	(c) Prior to release of the survey plan for each stage or prior to the commencement of use.
ACCESS & ROADS		
26.	MBRC Mitigating Traffic and Transport Impacts on Council Controlled Roads (a) Provide a detailed traffic and transport impact report to assess the cumulative impact of the development on Council-controlled (trunk and non-trunk) roads on which traffic generated by the development equals or exceeds 5% of the existing Average Annual Daily Traffic (AADT) predictions for any road section, intersection movement or turn movement to the year 2026 or 10 years after opening of the final stage of development whichever is the greater. The report is to be prepared in accordance with Council's guidelines and determine appropriate measures required to mitigate the impacts of the development to achieve the Levels of Service specified in Council's Planning Scheme Policy PSP21B. The report shall include, but not necessarily be limited to, the following: 1. a program of works to minimise the traffic impacts	(a) Initial report required prior to lodging any further development applications for the first stage of the development.

	to residents on Nolan Drive and Coach Road East 2. an integrated movement plan that demonstrates a system of connected and continuous pathways, bike lanes and bus stop infrastructure. The integrate movement plan will generally be in accordance with Figure 9.2 in the NEBP Traffic Impact Assessment by Cardno Eppell Olsen dated January 2008 except that: a. pathway and bike lane widths are to be designed in accordance with Councils typical cross sections that exist at the time of lodgement; b. bus stops and shelters are designed in accordance with Council's standards that exist at the time of lodgement; c. road and streets not currently shown in the plan will be included at the time the relevant sectors are planned by the Applicant.	
	(b) the approved traffic and transport impact assessment is to account for revisions of Council's road system planning and traffic growth in the region. The revised assessment reports are to take into account the impact of the development on Council-controlled roads to the end of Council's trunk roads planning horizon at that time or 10 years hence, whichever is the greater. The revised reports are to be prepared in accordance with Council's guidelines current at the time and determine appropriate measures required to mitigate the impacts of the development to achieve the Levels of Service specified in Council's Planning Scheme Policy PSP21B.	(b) Revised reports to be lodged every 4 years from commencement (first stage) of the development.
	(c) the initial and revised traffic and transport impact assessment reports are to identify when the various mitigation works will be required in line with the development sequence in the approved Staging Plan and provide preliminary cost estimates for any mitigation works and necessary road resumptions associated with the mitigation works. (d) the developer is to pay a monetary contribution amounting to the approved value of the development's portion of the cost of the mitigation works and necessary road resumptions associated with the mitigation works. The monetary contribution may be paid in stages as approved by the Council providing the total contribution for any individual mitigation measure and any associated road resumption is paid to Council not less than 12 months prior to the particular measures being required to meet the specified Level of Service in the road system. The monetary contribution is to be adjusted to reflect movements in the building costs and land values between the dated of the approved estimates and the time of payment. The Rawlinsons Building Index (Brisbane) is to be used to	(c)&(d) The total (indexed) monetary contribution towards identified mitigation works and land resumptions to be paid within 12 months of the approval of each relevant report unless approved otherwise by the Council.

	adjust the value of the works and Council's published Land Value Index relevant to the area of the development is to be used to adjust the value of the land component of the estimated costs. Notes: 1. this development's portion of any mitigation works is determined by deducting the proportion of the value of the works attributable to existing deficiencies and future / planned demand (excluding this development) from the total approved value of the mitigation works determined with this development's impact. 2. the proponent's traffic report and its amendments provided in support of the EIS are not considered to adequately address the impacts of the development over the duration of the project. The report will require amendment to adequately address impacts for an initial planning horizon in line with Council's trunk planning horizon of 2026. Because the project duration is likely to exceed the current planning horizon of 2026 it will be necessary for the traffic and transport impacts to be re-considered periodically throughout the life of the project. 3. Council is prepared to accept the modelling for the report to be based on the most relevant version (approved by Council) of the Brisbane Strategic Transport Model incorporating industrial traffic generation rates equivalent to those being experienced at the "Metroplex on Gateway" development at Murarrie in Brisbane, or within agreed representative sectors of NEBP (when fully developed).	
27.	MBRC Updated Road Hierarchy Map (a) Submit to Council for approval an updated road hierarchy map that: (i) shows a connection between the proposed Main Boulevard road and the future North South Arterial (NSA) on an alignment approved by Department of Transport and Main Roads; (ii) shows a Collector road connection between the two residential precincts (west and east) located in the vicinity adjacent to the southern boundary of the site across the waterway; (iii) does not provide direct property access to residential streets likely to carry 3,000vpd or more; (iv) limits traffic volumes on residential collector streets to 8,000vpd or less; (v) provides on-road bike lanes including 2.5m shared pathways along both sides of the proposed Main Boulevard and Buckley Road; (v) provides appropriate connectivity between the proposed internal collector streets and trunk road network, to improve flexibility for future bus services; (vi) provides a connection between Trafalgar Drive and	Prior to a Reconfiguring a Lot application being lodged for Stage 1.

	the proposed western signalised intersection on Main Boulevard (east of the existing Trafalgar Drive alignment). Restrict Trafalgar Drive to left in only from Buchanan Road at the existing intersection; (vii) cul-de-sac Nolan Drive at its intersection with Buchanan Road and Main Boulevard. All access to the northern section of Nolan Drive would be via the connection linking with the western signalised intersection on Main Boulevard (east of the existing Nolan Drive alignment). (b) implement the updated road hierarchy plan. Such plan will be incorporated with and become part of the approved plans of development. Notes: 1. Council acknowledges that the State is requiring dedication of a future road corridor through the project and that intersection spacing along this future corridor will be determined by the relevant State department.	
28.	MBRC Council Roads – Design Criteria Design and construct at no cost to Council, all new roads and frontage roads (and associated works) in accordance with Council's design standards current at the time of development.	Prior to release of the survey plan for each stage, or prior to the commencement of each use.
29.	MBRC Road Network Plan (Sector Planning) (a) Submit to Council for approval a road network plan for each sector generally in accordance with the NEBP TIA prepared by Cardno Eppell Olsen (dated January 2008) and Council's standards current at the time of development to incorporate the following amendments: (i) more than one street access is to be provided to all areas with the equivalent of seventy six (76) or more residential lots; (ii) network legibility is to be maximised with drivers required to turn at no more then three intersections between their home and the collector street network; (iii) Multiple Dwelling unit precincts are to have wider road reserves and parking lanes to cater for the greater potential for over-flow parking. Total parking demand for Multiple Dwelling unit precincts needs to be accommodated through a combination of onsite parking as well as on-street overflow parking, in accordance with Queensland Streets; and (iv) all industrial access and industrial collector roads are to comply with Council's standards current at the time of development. (v) industrial collector roads are to incorporate on-road bike lanes.	Prior to an approval being issued for each sector plan.

	(b) Implement the approved road network plan.	
30.	MBRC Heavy Vehicle Management (a) Submit to Council for approval the proposed heavy vehicle management strategy to be implemented by the owner/developer to encourage heavy vehicle movements directly to the Buchanan Road interchange from the MIBA precincts and not via Coach Road East and/or Buckley Road. (b) Implement the approved heavy vehicle management strategy.	Prior to a Reconfiguring a Lot application being lodged for Stage 1.
31.	MBRC Integrated Movement Plan (a) Submit to Council for approval an integrated movement plan (IMP) for each sector that shows connected and continuous pedestrian pathways, off road cycle ways, on road bike lanes and bus stop infrastructure generally in accordance with any Transport Management Plan approved by the State, Council's standards current at the time of development and including: (i) pathway and bike lane widths are to be designed in accordance with Councils typical cross sections that exist at the time of lodgement of each sector plan; (ii) bus stops and shelters to Council controlled roads are designed in accordance with Council's standards that exist at the time of lodgement of each sector plan. (b) Implement the approved Integrated Movement Plan.	Prior to the approval being issued for each sector plan.
32.	MBRC Flood Immune Access Provide trafficable flood immune access during a 100 year ARI storm event by providing all necessary cross drainage culverts or other cross bridging structures over waterways and drainage channels. All cross drainage and bridging structures are to be designed and built in accordance with the relevant standards current at the time of the development.	Prior to release of the survey plan for each stage, or prior to the commencement of each use.
33.	MBRC Traffic Control Devices	

	Construct necessary traffic control devices at suitable locations in the residential areas to reduce speed and improve traffic safety in accordance with Council's standards and requirements current at the time of development. Note: at the time of this approval the relevant standard is Queensland Streets. Council's preference is that traffic speed is controlled principally by variation in street alignment and that traffic control devices are only used where it is considered by Council, due to topographical or drainage constraints as impractical to use variation in street alignment as the only mechanism to control speed.	Prior to release of the survey plan for each stage.
OTHER – DEVELOPMENT ENGINEERING		
34.	MBRC Start of Works Work shall not commence on the construction (or upgrading) of any proposed (or existing) road, park or other facility under (or proposed to be transferred to) the control, trusteeship or ownership of Council until: (a) all engineering plans, drawings, specifications and drainage calculations for the work has been lodged for Council approval; (b) council's written approval for (a) has been issued; (c) any appeal, which has been lodged against Council's decision to approve (with or without conditions) the development application, has been decided, resolved or withdrawn; and (d) the Principal Contractor has accepted the contract in writing and has been appointed as such within the provisions of the Workplace Health and Safety Act 1995, by Council and/or the Owner/Applicant at the Applicant's expense.	Prior to the commencement of site works for each stage.
35.	MBRC Works – Applicant's Expense All works, services, facilities and/or public utility alterations required by this approval or stated condition/s, whether carried out by the Council or otherwise, shall be at the developer's expense unless otherwise specified in subsequent development approvals.	Prior to release of the survey plan for each stage.
36.	MBRC Replace Existing Council Infrastructure Replace existing Council infrastructure (including but not limited to street trees and footpaths) to a standard acceptable to Council's Delegated Engineering Officer should this infrastructure be damaged as part of construction works.	Prior to the release of the survey plans for each stage.
MORETON BAY WATER		

WATER & SEWERAGE		
37.	MBRC Mitigating Impacts on Water Supply, Recycled Water and Sewerage Networks	
	(a) provide a detailed water supply, recycled water and sewerage analysis report to assess the cumulative impact of the development on these infrastructure networks to the year 2021. The report is to be prepared in accordance with Council's guidelines and determine appropriate measures required to mitigate the impacts of the development to achieve the Levels of Service specified in Council's Planning Scheme Policy PSP21D and Planning Scheme Policy PSP21F	(a) Prior to lodging any further development applications for the development.
	(b) the approved initial water supply, recycled water and sewerage impact assessments (to 2021) will need to be revised periodically to account for revisions of the infrastructure system planning and other growth in the region. The revised assessment reports are to take into account the impact of the development on the networks to the end of the current planning horizon at that time. The revised reports are to be prepared in accordance with relevant guidelines current at the time and determine appropriate measures required to mitigate the impacts of the development to achieve the Levels of Service specified in Council's Planning Scheme Policy PSP21D and Planning Scheme Policy PSP21F	(b) Revised reports to be lodged every 4 years from commencement (first stage) of the development.
	(c) the initial and revised impact assessment reports are to identify when the various mitigation/upgrading works will be required in line with the development sequence in the approved Staging Plan and provide preliminary cost estimates for any mitigation/upgrading works and necessary land resumptions associated with the works	(c)&(d) The total (indexed) monetary contribution towards identified mitigation works and land resumptions to be paid within 12 months of the approval of each relevant report unless approved otherwise by the Council.
	(d) the developer is to pay a monetary contribution amounting to the approved value of the mitigation/upgrading works and necessary land resumptions associated with the works. The monetary contribution may be paid in stages as approved by the Council providing the total contribution for any individual mitigation/upgrading measure and any associated land resumption is paid to Council not less than 12 months prior to the particular measures being required to meet the specified Level of Service in the particular network. The monetary contribution is to be adjusted to reflect movements in the building costs and land values between the date of the approved estimates and the time of payment. The Rawlinsons Building Index (Brisbane) is to be used to adjust the value of the works and Council's published Land Value Index relevant to the area of the development is to be used to adjust the value of the land component of the estimated costs	
	Notes:	

	1. The water supply and sewerage reports provided in support of the EIS are not considered to adequately address the impacts of the development over the duration of the project. The reports will require amendment to adequately address impacts for an initial planning horizon in line with Council's trunk planning horizon of 2021. Because the project duration exceeds the current planning horizon of 2021 it will be necessary for the infrastructure impacts to be re-considered periodically throughout the life of the project. 2. This development's portion of any mitigation works is determined by deducting the proportion of the value of the works attributable to existing deficiencies and future / planned demand (excluding this development) from the total approved value of the mitigation works determined with this development's impact.	
38.	MBRC Infrastructure Agreements Prepare and enter into an Infrastructure Agreement (IA) with Council for any water supply, recycled water or sewerage works approved by the Council to be provided by the developer.	To be executed by all parties not less than 12 months prior to the particular infrastructure item being required for the development.
39.	MBRC Connect Development to Services Connect the development to the Council's water supply, recycled water and sewerage network in accordance with Council's Design and Development Manual, the recommendations of the approved water supply and sewerage network analyses and in accordance with any infrastructure agreement relating to these networks.	Prior to release of the survey plan for each stage, or prior to the commencement of each use.
40.	MBRC Sewer Easements Unless approved otherwise by Council's delegated officer, provide 4.0m wide easements over: • gravity sewers constructed greater than 3.0m depth; • gravity sewers not constructed on Council's standard sewer alignments; • rising mains located on private properties; and • lots with areas less than 600 square metres.	Prior to release of the survey plan for each stage, or prior to the commencement of each use.
41.	MBRC Permit to Enter Provide Council a written "Permit to Enter" letter from all owners of property through which external sewer will traverse. The "Permit to Enter" is to include consent to construct the works on their property(ies).	Prior to issue of the Operational Works approval.
42.	MBRC Sewer to Upstream Property Provide sewerage within the subject land to the upstream boundary(ies) to enable future mains extensions.	Prior to release of the survey plan for each

		stage, or prior to the commencement of each use.
43.	MBRC Adequate Water Supply and Sewerage Services Ensure that an adequate water supply and sewerage service is available for each and every lot into which the land is proposed to be developed without impacting on the existing services, by supplying all necessary material and works (internal and external to the land), including structures and equipment and performing all necessary works at the expense of the developer.	At all times.

ADVICES	
1.	Water Supply and Sewerage Connection to Development Council is only prepared to provide a water supply and sewerage connection to the development on the basis that the developer accepts all of the Water and Sewerage conditions imposed by Moreton Bay Water, as detailed in this approval.
2.	MBRC Infrastructure Agreements Council recommends that the developer enter into infrastructure agreements regarding the major infrastructure items and contributions to obtain Council agreement for it to use its best endeavours to provide the mitigation/upgrading works in a timely manner, to suit the development sequence in the approved Staging Plan.
3.	MBRC Stormwater Quality Management Plan The preliminary Stormwater Quality Management report submitted is satisfactory for Preliminary Approval only, however does not contain suitable detail for further Development Permits.
4.	MBRC Stormwater Detention and Flood Management The preliminary Hydraulic Flood Study and Stormwater Management plan submitted is satisfactory for Preliminary Approval only, however does not contain suitable detail for further Development Permits.

Schedule B - Conditions that a state agency is the responsible entity

1. Marina facility

a) Prior to an application being lodged for a development permit for the marina facility, submit to DERM for review a Marina Site Based Management Plan. The plan should be generally based on the draft Marina Site Based Management Plan provided with the EIS (Appendix Y1) and must take into account the performance criteria a) to g) for the design of new non-tidal artificial waterways specified in policy 2.1.15 of the *South-east Queensland Regional Coastal Management Plan 2006*.

b) The design, construction, operation and decommissioning of the marina facility must ensure that the artificial waterway is never directly connected to the flow of tidal waters.

c) From the commencement of its operation, the marina facility must allow continuous access (24 hours per day, seven days per week) through the lock system for all vessels and at least two (2) visitor berths must be available for short-term use by the general public.

d) From the commencement of its operation, the marina facility must make available berthing and/or boat storage facilities for at least one (1) vessel operated by emergency services, Queensland Police Service or the Boating and Fisheries Patrol.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

2. Navigation Channel Maintenance Plan

a) Prior to lodging an application for a development permit for the marina facility, submit to the Coordinator-General for approval a Navigation Channel Maintenance Plan. The plan must:

i. define the objective of providing a clear navigable channel from the marina entrance to Moreton Bay and specify performance targets including the minimum accepted channel configuration that would trigger maintenance dredging

ii. describe the navigation channel maintenance works, including dredge material disposal

iii. describe the proposed funding arrangements necessary to establish, monitor and maintain a clear navigable channel. Acknowledge that the proponent is responsible for meeting all costs associated with the establishment, monitoring and maintenance of a clear navigable channel between the proposed marina and the mouth of the Caboolture River

iv. clearly state that the Moreton Bay Regional Council and the State have no responsibilities for the initial establishment, nor the ongoing maintenance of the navigation channel

v. acknowledge that the proponent will meet all costs associated with the withdrawal of existing aids to navigation and the establishment of any new permanent aids to navigation related to the project, as undertaken by Maritime Safety Queensland

vi. acknowledge that Maritime Safety Queensland will undertake all ongoing maintenance of the aids to navigation, at no cost to the proponent

vii. acknowledge that, upon physical completion and commissioning, ownership of all aids to navigation will be transferred to Maritime Safety Queensland, at no

cost to the State

viii. specify a program for monitoring the depths in the navigation channel, including requirements for the timely publication of monitoring data

ix. specify the annual reporting of navigation channel maintenance works including details of funding contributions and expenditure

b) Any amendment to an approved Navigation Channel Maintenance Plan must be approved by DTMR.

c) The use of the marina facility must not commence, apart from the construction of up to ten (10) display berths, unless all necessary works have been completed to establish a clear navigable channel to Moreton Bay.

e) The owner of the marina facility must ensure that all owners and/or lessees of a marina berth, mooring or dry-stack place are:

i. provided with a copy of the Navigation Channel Maintenance Plan as an attached schedule to the contract of sale or lease documentation

ii. provided with a copy of any amended Navigation Channel Maintenance Plan as soon as reasonably practicable

iii. provided with a copy of reports of navigation channel maintenance works including details of funding contributions and expenditure.

The Chief Executive of DTMR is the entity with jurisdiction for this condition.

ADVICE: The state may, at the discretion of DTMR, contribute to the cost of the ongoing maintenance of the navigation channel.

3. External traffic network – state controlled roads

a) An application for a development permit for material change of use that would increase the numbers of vehicle movements to and from the project site must include a certification from the Department of Transport and Main Roads (DTMR) that impacts on state-controlled roads have been adequately assessed and appropriate mitigation measures have been agreed. The agreement may be in the form of an infrastructure agreement for the overall project or, alternatively may be a separate infrastructure agreement for the part of the project in respect of which the development permit is sought.

b) An infrastructure agreement mentioned in a) must:

i. encompass one or more project stages as described by the Development Staging Plan

ii. be informed by an assessment of impacts on state-controlled roads in the form of a detailed traffic/road impact assessment (RIA) report

iii. demonstrate consideration of impact assessment and mitigation to the following state-controlled roads:

- Bruce Highway, King St and Lower King St, Morayfield Rd, Bribie Island Rd and Burpengary Service Rd
- identification of specific upgrades to key intersections along the above roads where necessary
- identification of specific upgrades for the Buchanan Road and Uhlmann Road interchanges on the Bruce Highway where necessary. Mitigation works on these interchanges would only be required to be constructed to a standard necessary to accommodate project related traffic and provide safe and efficient access to the site in accordance with DTMR design requirements

- specify that the proponent will be responsible for mitigating the project related impacts on the above-mentioned state-controlled roads through some combination of works and/or contributions. Any contribution will be in line with the assessed level of impact identified in the detailed assessment.

c) An assessment of project related impacts on state-controlled roads (RIA) mentioned in b) must:

i. be prepared in accordance with the most recent version of DTMR's Guidelines for Assessment of Road Impacts of Development

ii. undertake an assessment of the impacts (including cumulative impacts of all previously approved development or stages and construction traffic) on the state-controlled road network for the stage(s) of development in respect of which the development approval is sought

iii. provide mitigation strategies or 'measures' proposed to mitigate the impacts of the project traffic on the state-controlled road network including concept layout plans to give effect to the measures and proposed triggers or timing for the applicant to contribute to or undertake the measures

iv. include any road network improvement or upgrading which it has been assumed will be provided by DTMR and/or Council for, or during, that particular stage of development.

d) In preparing a RIA, the applicant should note the following:

i. the Brisbane Strategic Transport Model or a derivative thereof is likely to be considered acceptable to DTMR. The model should only be used to determine trip distribution assumptions and to indicate potential development traffic on the network if underpinning road network improvements and regional development assumptions occurred at the modelled time frames.

ii. scenarios that should be modelled include:

- present day or earlier (pre-development) so that traffic forecasts can be compared to actual counts to demonstrate suitability of the model
- 2011 or 2016 with and without development traffic to demonstrate the potential implications of the early Sector Plan development areas
- 2026-2036 or some alternative long term time frame representing expected completion of the project, with and without development.

iii. The likely scope of measures required to mitigate the impacts of all project traffic over the life of the entire project should be revised and agreed with DTMR prior to approval of the first phase, stage or sector of the development.

iv. Mitigation strategies or measures to address the impacts associated with initial and subsequent development applications should be consistent with "likely scope of measures for the entire project" as required above.

e) All mitigation works on state-controlled roads are to be designed and constructed in accordance with current DTMR manuals, standards and specifications.

f) As part of an application for Reconfiguration of a Lot relating to open space precincts 4(2) and 4(3), the applicant is to provide for and dedicate, at no cost to the state, a road corridor through the subject site from the south-east corner to a potential crossing of the Caboolture River near the north-west of the site, including a link to the Buchanan Road interchange on the Bruce Highway. The corridor must be a 56.5m road reserve of a similar standard to the North-South Urban Arterial proposed to be constructed within the North Lakes development to enable:

i. a future divided four lane roadway and auxiliary turn lanes at key intersections and with all intersections at agreed intervals

ii. a minimum 90 km per hour design speed posted to 80 km per hour through the project site

iii. provision for a quality public transport facility including interim indented bus bays and shelters at stops along the road within the 56.5 metre road reservation

iv. safe travel for bicycles and pedestrians including on-road cycle provision and shared pedestrian and cycle facilities within the verge.

The Chief Executive of DTMR is the entity with jurisdiction for this condition.

4. Transport Management Plan

Prior to lodging an application for Reconfiguring a Lot for Stage 1 of the project, submit for review to DTMR a Transport Management Plan based generally on the draft Transport Management Plan provided with the EIS (Appendix K1). The plan must:

a) address the objectives of section 8A(2) of the *Transport Planning and Coordination Act 1994*

b) nominate one or more routes on the subject site which aims to locate 90% of the residential development within 400m of a bus route

c) demonstrate an efficient school bus route to access the maximum number of school students on the site via the shortest and most direct bus route servicing adjoining residential areas to local state and secondary schools

d) identify public passenger transport (PPT) infrastructure required on the site and ensure that road designs and layout will be able to accommodate PPT where required, generally in accordance with development standards specified in Part 2 of the *Transport Planning and Coordination Regulation 2005*

e) identify active transport infrastructure within the project site to:

i. support PPT

ii. include connections to the surrounding Principal Cycle Network

iii. demonstrate safe and direct connections between residential precincts and key activity generators and points of attraction both internal and external to the project site

f) identify active transport infrastructure required and describe the funding arrangements necessary for its implementation

g) be prepared in consultation with Moreton Bay Regional Council

The Chief Executive of DTMR is the entity with jurisdiction for this condition.

5. Public passenger transport

At the commencement of construction of the Mixed Industry and Business precinct, a bus service must be provided between the site and Morayfield railway station until such time as TransLink (or the relevant public passenger transport provider) agrees to establish an equivalent service. The bus service must:

a) include the provision of appropriate infrastructure such as bus shelters[24]. Bus shelters and bus indent bays are to be constructed in accordance with TransLink's Public Transport Infrastructure Manual. The road widths for the routes are to be constructed in accordance with the *Transport Planning and Coordination Regulations 2005*

b) service all developed precincts of the site

[24] NOTE: TransLink signage is not to be used.

c) have appropriate capacity to meet expected demand

d) provide a frequency of service for the construction work force that is at least: ½ hourly between 7 to 9am and between 4 to 6pm inclusive or alternatively in accordance with the construction work hours.

e) be made available at a cost equivalent to nearby bus routes

f) once the first stage of the development is completed and a permanent workforce is established within the Mixed Industry and Business precinct the frequency of the service will be at least ½ hourly between 7 to 9am and between 4 to 6pm inclusive and hourly between 9am and 4pm.

The Chief Executive of DTMR is the entity with jurisdiction for this condition.

6. Channel dredging

a) Prior to an application being lodged for a development permit for dredging works in the Caboolture River, submit to DERM for review a Dredging Site Based Management Plan. The plan should be generally based on the draft Dredging Site Based Management Plan provided with the EIS (Appendix R3) and must:

i. specify that, during the months of September to April, dredging activities must avoid works within 200 metres of the critical high tide shorebird roost area at the mouth of the Caboolture River

ii. specify the measures to avoid the generation of conditions that could lead to the occurrence of nuisance algal blooms, such as *Lyngbya majuscula*, in coastal waters in accordance with policy 2.4.7 (Algal blooms) of the *South-east Queensland Regional Coastal Management Plan 2006.* Notwithstanding such measures, specify remedial action that would be taken to correct any occurrence of such conditions and redress any impacts caused as a consequence of such failure.

iii. be prepared in consultation with Moreton Bay Regional Council and DEEDI (QPIF)

iv. be prepared in accordance with the National Assessment Guideline for Dredging 2009

b) An application for a development permit for dredging works in the Caboolture River must include details of the ongoing management arrangements for disposal of dredge material and must demonstrate that the proposed arrangements would comply with policy 2.1.8 (Dredging) of the *South-east Queensland Regional Coastal Management Plan 2006*.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

ADVICE: An application for an allocation of quarry material in accordance with Part 5 of the *Coastal Protection and Management Act 1995* must:

a) include a plan drawn to a suitable scale to show:

- the boundaries of the land to be dredged, adjacent river banks, sand banks and the foreshores, showing the line of high water mark, the limit of vegetation and any other details to permit the identification of the tidal land on the ground
- a hydrographic survey of that land on lines not more than 20 metres apart
- the proposed areas where the quarry material will be taken ashore or transported over and the proposed location of any stockpile, reclamation, disposal or fill areas
- the proposed area/s of disturbance (temporary and permanent) of marine

plants protected under the *Fisheries Act 1994* required for transport, stockpile or disposal of quarry materials

- the proposed area outside of the existing navigation channel (being part of the Deception Bay declared Fish Habitat Area) and the area to be removed from this channel (to be added to the declared FHA)
- the proposed areas of disturbance for placement of temporary structures for transport of quarry materials (e.g. pipelines, pumping stations) within the Deception Bay declared Fish Habitat Area
- adjacent real property boundaries, roads and any esplanade
- navigation channels, navigation aids, pipelines, cables, wharves and any other structures or harbour works located in or adjacent to the marine land

b) include plans showing the depth of dredging and the anticipated final alignment and slope of batters, together with an indication as to whether this work will result in a stable alignment or if recurrent maintenance dredging will be required

c) describe characteristics of, and quantify, quarry materials to be removed

d) describe the purpose/use of quarry material

e) describe methods of extraction of quarry material and disposal of dredge spoil (including equipment to be used)

f) quantify the maximum extraction rate of quarry material in cubic metres per year

g) demonstrate agreement from:

- owner(s) of land on which the material is to be deposited or stockpiled
- owner(s) of land over which the material will be transported either by pipeline or truck.

h) address all relevant policies of the state and regional coastal management plans

7. Dredge material rehandling

A dredge material rehandling facility established on-site:

a) should be located generally in accordance with plan Cardno 7900/33/05-700A dated 21 July 2008.

b) must have sufficient capacity to accept anticipated maintenance dredging volumes, including a contingency for flood related channel siltation

c) must be designed to facilitate regular removal of dredge material

d) to the greatest extent practicable, must be designed and operated to avoid risk of environmental harm to waterways, including ground waters and where there are any unavoidable risks, they should be minimised

e) must be designed to minimise impacts on visual amenity

f) must be designed and operated to ensure that the release of noxious offensive odours or any other noxious or offensive airborne contaminants resulting from the activities do not cause an environmental nuisance at a nuisance sensitive place

g) must be designed and operated to ensure that emissions of dust and/or particulate matter resulting from the activities do not cause an environmental nuisance at a nuisance sensitive place

h) must be designed and operated to ensure public safety

i) must include measures to minimise trapping hazards for wildlife

The Chief Executive of DERM is the entity with jurisdiction for this condition.

8. Caboolture River Estuary Management Plan

a) Prior to an application being lodged for a development permit for dredging works in the Caboolture River, submit to DERM for review a Caboolture River Estuary Management Plan that specifies actions and responsibilities for environmental monitoring, impact mitigation and other rehabilitation works within the estuary. The plan must:

i. provide a summary of the underlying physical processes of the Caboolture River estuary downstream from the project site that describes the condition, trend and pressures on the bed and banks. This summary should be based on the EIS findings and other available information and may require additional specialist studies as necessary

ii. describe the environmental values of the sections of the Caboolture River estuary potentially affected by the project in terms of its habitat for marine and shorebird species. This summary should be based on the EIS findings and other available information and may require additional specialist studies as necessary

iii. describe all potential adverse impacts of the project, together with their extent and duration particularly with reference to:

- bed and bank stability adjacent to dredged areas or potentially affected by such works
- potential damage to the shoreline by boat wash caused by vessels in the marina facility
- anticipated changes to marine fauna/flora habitats (e.g. mangroves, salt-marshes and sand banks/shorebird roost sites)

iv. identify corrective or compensatory actions that would be implemented to mitigate development related impacts on the river bed and banks including a description of priority works and agreed performance criteria. The strategy should avoid the use of bank protection structures

v. identify corrective actions or alternative options that would be implemented if adverse impacts on marine and shorebird species are detected and are attributed to the construction and operation of the project. This must include specification of measurable threshold criteria

vi. specify a schedule of works and/or compensatory actions required to address all potential development related impacts and clearly state the responsible entities for their implementation

vii. include a schedule of additional works and/or actions contributing to the management of the Caboolture River estuary or nearby coastal areas that may be undertaken and are not related to addressing development related impacts. Clearly state the responsible entities for the implementation of the works and/or actions

viii. specify a monitoring program, including requirements for further baseline data that must be collected prior to capital dredging works. Monitoring must include:

- wave energy recorded at the river bank in a minimum of three key locations and in conjunction with observations of boat traffic and wind velocity
- water level recordings in the mid estuary to determine any changes to tidal hydrodynamics that may be attributed to the capital dredging
- annual bank erosion monitoring in fixed locations generally in accordance with Figure 5 of EIS Appendix J, with the addition of at

least four monitoring points on the northern river bank evenly spaced within one kilometre downstream of the marina entrance

- hydrographic survey of the river bed and banks in the vicinity of the upper one-third of the marked channel between three and six months of completion of dredging works. Surveys must be undertaken by a qualified hydrographic surveyor and consist of soundings at no more than 10m apart and with a vertical accuracy of 0.1m or better
- shorebird monitoring at a minimum of ten key locations in the lower estuary, including the critical high tide roost area near the river mouth
- sampling of benthic invertebrates on shallow banks adjacent to the dredged channel at a minimum of three key locations

ix. specify annual reporting against performance criteria including monitoring data and analysis, works undertaken and expenditure of funds. All reports must be made publicly available.

x. describe linkages to the Caboolture River Management Plan

xi. be prepared by a suitably qualified person and in consultation with Moreton Bay Regional Council, DEEDI and DEWHA

xii. specify regular review in conjunction with key agencies and stakeholder groups

b) Prior to an application being lodged for a development permit for dredging works in the Caboolture River, submit to the Coordinator-General for approval a funding schedule for the implementation of the Caboolture River Estuary Management Plan. This must:

i. specify the funding necessary to implement rehabilitation works or compensatory actions in the Caboolture River estuary. As a minimum, the level of funding must be $100 000 per annum[25], indexed to CPI

ii. identify the funding component for any environmental offset required under another condition of this approval (such as impacts on the natural and cultural resources of the Moreton Bay Marine Park)

iii. clearly state, if any, the extent of funding contributions from parties other than the entity undertaking dredging works in the Caboolture River.

c) Any amendment to an approved funding schedule for the Caboolture River Estuary Management Plan must be approved by DERM.

d) Implement the monitoring program and the schedule of rehabilitation works and/or compensatory actions specified by the Caboolture River Estuary Management Plan prior to any dredging works in the Caboolture River and continuing for the duration of the operation of the marina facility.

e) Where monitoring indicates that development related impacts are occurring or are likely to occur, the specific remedial or compensatory actions in the Caboolture River Estuary Management Plan must be implemented.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

9. Monitoring of water quality and adaptive management

Prior to an application being lodged for Reconfiguring a Lot for Stage 1, submit to DERM for review a Water Quality Monitoring Plan that specifies the post-construction monitoring program. The plan must comply with or be better than measures contained in the draft

[25] NOTE: it is understood that this would be generated by a levy imposed on occupants of the marina facility

Environmental Monitoring Plan provided with the SEIS (Appendix I); and include the following requirements:

a) Monitoring of surface water

   i. monitoring is to include at least three key locations in the Caboolture River upstream, downstream and adjacent to the project site

   ii. sampling sites within sub-catchments are to be suitable for the reliable gauging of flows, have well mixed flow, are to be secure from damage by flood or vandalism, and must have easy access to power supply (if necessary)

   iii. monitoring at key locations to be conducted at least monthly with additional monitoring after rainfall events corresponding to the 1 year ARI, or higher

   iv. provide sufficient detail to demonstrate that stormwater quality is being effectively controlled during the land and building construction phase in accordance with the relevant statutory provisions and requirements

   v. water quality parameters to be monitored are to be compatible with the Ecosystem Health Monitoring Program, including monitoring of chlorophyll a to enable detection of algal blooms. Additional analysis is to include chemicals of concern, particularly those associated with Environmentally Relevant Activities

   vi. monitoring of marina water quality must include appropriate water quality parameters to detect pollutants associated with marina activities and industry.

   vii. include any other measures necessary to ensure reliable data is obtained within an acceptable level of statistical confidence

b) Monitoring of groundwater

   i. monitoring is to include at least three key locations and is to be conducted at least quarterly

   ii. monitoring of groundwater parameters associated with operational activities including nutrients, hydrocarbons, organic compounds and heavy metals

c) specify procedures for reporting and corrective action following exceedence of water quality target conditions, particularly in the event of:

   i. detection of low pH in ground or surface waters

   ii. contamination of waters in the marina basin ie oil or chemical spill, high chlorophyll a

   iii. repeated occurrences of water quality target exceedence events of contaminants in groundwater and/or at the discharge point of the stormwater treatment systems

d) specify the collation and review of monitoring data and a description of the decision process to implement corrective action. Reporting is to be provided to MBRC and DERM at least twice per year.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

10. Irrigation of golf course and landscaped areas

a) Irrigation systems using recycled water must not operate during wet weather and must ensure sufficient grass cover is maintained over irrigated areas to minimise infiltration of nutrients into groundwater

b) At all times, run-off from high nutrient areas must be directed away from natural waterways

ADVICE: See 'Improving the Eco-Efficiency of Golf Courses in Queensland' available via: http://www.agcsa.com.au/guests/bookshop/index.xsp?book_type_code=13000

11. Water resources

a) All activities within the bed and banks of a watercourse, lake or spring must comply with the provisions of the *Water Act 2000* and the *Water Resource (Moreton) Plan 2007*.

b) Any activities relating to the take of overland flow water must comply with the provisions of the *Water Act 2000* and the *Water Resource (Moreton) Plan 2007*.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

12. Marine fish habitat

a) An application for the material change of use or reconfiguration of a lot for any portion of the project site that includes marine fish habitats must also apply for the associated operational works for the removal, damage or destruction of marine plants and/or construction of a waterway barrier.

b) Any operational and/or building works within the Deception Bay declared Fish Habitat Area must be undertaken in accordance with a resource allocation authority under the *Fisheries Act 1994* and a development permit under the *Integrated Planning Act 1997*.

c) Any residual impacts of the development that may affect marine fish habitats must be appropriately mitigated and offset as determined by the Coordinator-General and generally in accordance with the Queensland Government Environmental Offsets Policy.

d) Where practicable, the final design of the marina facility and public recreation facilities in the Caboolture River should incorporate fish-friendly structures using QPIF's "Fisheries Guidelines for Fish Friendly Structures".

The Chief Executive of DEEDI is the entity with jurisdiction for this condition.

13. Marine Park

a) Any works in the Moreton Bay Marine Park must be undertaken in accordance with a permit granted under the *Marine Parks Regulation 2006*.

b) The residual impacts of the development that would adversely affect the natural and cultural resources of the Marine Park must be appropriately mitigated and offset as determined by the Coordinator-General and generally in accordance with the Queensland Government Environmental Offsets Policy. Preferably, the offset should be in the form of an additional contribution to the Caboolture River Estuary Management Plan.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

14. Clearing remnant vegetation

a) Prior to the clearing of any regional ecosystems on the project site, a development permit for operational works that is the clearing of native vegetation must be obtained.

b) An offset that is in accordance with the applicable codes and policies for assessment of the development application for operational works for the clearing of native vegetation must be provided for any and all areas of regional ecosystem that are cleared as part of the project. All offsets are to accord with the Queensland Environmental Offsets Policy 2008.

c) Any vegetation clearing is to accord with procedures of Policy 6: vegetation clearing practices of the *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016*. Clearing of koala habitat trees must be performed sequentially and in the presence of a qualified koala spotter.

d) The clearing of koala habitat trees must not occur unless an appropriate equivalent habitat area is available on site or in a nearby location to enable the relocation of individual animals.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

15. Wildlife habitat

a) Wildlife habitat and movement corridors must be incorporated in the design, construction and operation of the project. This must include:

i. the design and management of the golf course and stormwater treatment areas to retain and enhance vegetated areas and maximise fauna movement corridors, to the greatest extent practical to connect to open space adjacent to the Caboolture River and particularly around the southern boundary of the marina precinct and the Raff Creek riparian corridor

ii. adequate vegetated buffers to protect sensitive environments from run-off, nutrient leaching and chemical pollutants - a distance of at least 60m is recommended

iii. an environmental management plan for the Wallum Froglet (*Crinia tinula*) and Tusked Frog (*Adelotus brevis*) that are recorded in the Raff Creek area associated with wetland vegetation regional ecosystem RE 12.3.5. These species are particularly susceptible to changes in nutrient levels and measures should be included to avoid potential impacts associated with the construction and operation of the golf course.

iv. koala sensitive design measures including:

- the use of koala friendly fencing within areas of open space
- koala exclusion fencing where appropriate particularly along the western boundary of the site adjacent to the Bruce Highway
- landscaping with native vegetation, including locally-occurring koala habitat trees
- retention and rehabilitation of koala habitat in the biodiversity corridor, Raff Creek riparian corridor, road verges, district, local and pocket parks and residential lots
- road design, alignment and construction that aims to, where appropriate, reduce speed, increase visibility and provide for safe road crossings
- installation of fauna-friendly over or under-passes to ensure connectivity, particularly where the Raff Creek riparian corridor is bisected by Nolan Drive
- a maintenance and monitoring program

b) Measures must be included in a Community Management Statement for the regulation of domestic animals in residential precincts to avoid the disturbance of native fauna in open space areas.

c) All site rehabilitation work is to be undertaken and/or managed by appropriately qualified personnel.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

16. Acid Sulfate Soils Management Plan

a) Prior to an application being lodged for a development permit for operational works involving disturbance of potential and actual acid sulfate soils, submit to the Coordinator General for approval subject to technical advice from DERM, a site-specific Acid Sulfate Soil Management Plan. Additional ASS investigations and management plan preparation must be conducted in accordance with:

   i. State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils

   ii. the SPP 2/02 Guideline: Acid Sulfate Soils, and with reference to the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland (Ahern et al. 1998)

   iii. the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines (Dear et al 2002).

b) The proponent must conduct all works to ensure that no environmental harm as defined under the Environmental Protection Act 1994 is caused.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

17. Contaminated land

Prior to the commencement of bulk earthworks, the area of contaminated land within Lot 10 on RP902079 identified in the EIS must be de-contaminated and a report must be submitted to DERM in accordance with the *Environmental Protection Act 1994*.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

18. Construction Environmental Management Plan

Prior to an application being lodged for a development permit for operational works within the project site, submit to DERM for review a Construction Environmental Management Plan. The plan must be based on the preliminary Construction Environmental Management Plan (provided as Appendix X2 of the EIS). Specific requirements must include:

a) bulk earthworks and associated sediment control measures designed and staged to minimise the area of soil disturbance and minimise the release of sediment to surface waters and generally in accordance with DERM's guideline for "Best practice urban stormwater management: erosion and sediment control "

b) surface water quality monitoring to include key locations in the Caboolture River upstream, downstream and adjacent to the project site. Water quality parameters to be monitored are to be compatible with the Ecosystem Health Monitoring Program, including monitoring of chlorophyll a to enable detection of algal blooms

c) monthly monitoring of groundwater and weekly monitoring of groundwater for pH during operational works that disturb acid sulfate soils

d) daily monitoring of ponded water for pH during operational works that disturb acid sulfate soils

e) specify procedures for corrective action following exceedence of water quality target conditions particularly in the event of:

   i. detection of low pH in ground or surface waters

   ii. unacceptable levels of contaminants in groundwater or surface waters discharging to the Caboolture River

   iii. unacceptable levels of suspended sediments in surface waters discharging to the Caboolture River.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

19. Waste Management Plan

a) Prior to lodging an application for Reconfiguring a Lot for Stage 1 of the project, submit to DERM for review a Waste Management Plan prepared in accordance with the Environmental Protection (Waste Management) Policy (2000) that covers all anticipated construction and operational activities for the project.

b) The element addressing operational waste management for the marina should accord with the ANZECC (1997) Best Practice Guidelines for the Provision of Waste Reception Facilities at Ports, Marinas, and Boat Harbours in Australia and New Zealand.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

20. Emergency Response and Management

a) Prior to lodging an application for Reconfiguring a Lot for Stage 1 of the project, submit for approval by the Department of Community Safety an Emergency Response and Evacuation Plan. The plan must:

i. specify temporary firewater containment and diversion structures that serve the industrial park and/or the marina as a whole to prevent contaminated discharges to the Caboolture River and associated watercourses

ii. specify the circumstances (activities and/or thresholds) where fire alarms must be connected to the Fire Communications Centre (Firecomm) to minimise the risk of fire propagation between adjoining land uses

iii. ensure the permanent and temporary internal road network provides accessibility for emergency services vehicles to all parts of the site, including construction areas. In addition, large isolated buildings must ensure complete access around the whole of the building by road sufficient for fire service purposes

iv. ensure traffic management plans cater for required responses into and out of these developments along the main thoroughfares

v. ensure that the dimensions of lifts in high-rise buildings conform to the operation of stretchers utlised by the Queensland Ambulance Service

vi. provide appropriate and functional location identifiers (street and site numbers) to facilitate ease of identification for responding to emergency vehicles

vii. specify that the Queensland Fire and Rescue Service (QFRS) should be involved in the testing of the plan.

b) Implement the Emergency Response and Evacuation Plan

The Chief Executive of the Department of Community Safety is the entity with jurisdiction for this condition.

ADVICE:

1. Under section 23 of the *Aboriginal Cultural Heritage Act 2003* a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage (the "cultural heritage duty of care"). Maximum penalties for breaching the duty of care are $750 000 for a corporation and $75 000 for an individual.
2. Applicants will comply with the duty of care in relation to Aboriginal cultural heritage if they are acting in accordance with cultural heritage duty of care guidelines gazetted under the *Aboriginal Cultural Heritage Act 2003*, available on the DERM website, or in

accordance with an agreement with the Aboriginal party for the area or a cultural heritage management plan approved under part 7 of the *Aboriginal Cultural Heritage Act 2003*.

END OF CONDITIONS

Appendix 2: List of key proponent commitments

1. Open space revegetation on-site

Rehabilitation and continued management of approximately 300 hectares of open space in accordance with the Landscape Master Plan including:

a) revegetation and rehabilitation of the riparian zone buffer to the Caboolture River and the river stream bank to restore water quality and improve amenity. The buffer is approximately 9km in length and will be approximately 100m wide

b) revegetation and rehabilitation other areas of riparian zone buffer to Gympie Creek and the creek stream bank. Gympie Creek traverses the NEBP site for approximately two kilometres and the riparian zone buffer will be approximately 80m wide

c) conservation of remnant vegetation and rehabilitate disturbances to that vegetation, including managing two significant areas of remnant mangrove and melaleuca habitat as conservation zones

d) creation of fauna habitat vegetation planting and management strategies to ensure all of the above works are undertaken for multiple benefit.

The proponent will facilitate the participation of community and environment groups in the site rehabilitation works (such as Caboolture Regional Environmental Education Centre).

It is further proposed that a Community Environment Centre demonstrating sustainability principles and encouraging such strategies in the private development domain will be constructed and operated as part of the project. The form and configuration of the environment centre is yet to be determined.

The proponent is committed to ensuring ongoing community input into the design and management of public open space areas throughout the development. A community reference group containing a minimum of six local community representatives will be supported by the proponent until all land designated as public open space is handed over to the Moreton Bay Regional Council.

2. Open space sports fields

The proponent has committed to undertake the landscape construction of sports fields within the open space area as per the landscape management plan concepts described by the EIS (Appendix P). These sportsfields once constructed will be handed over to the Moreton Bay Regional Council as part of the 'Open Space Infrastructure Agreement'. The Moreton Bay Regional Council will ultimately own and manage these facilities.

3. Contribution to local rehabilitation project

In addition to the offset for clearing of native vegetation on the project site, the proponent has committed to a $100 000 'in-kind' contribution to a local rehabilitation proposal in Burpengary that is aimed specifically at koala habitat. This would be undertaken in conjunction with the revegetation works on the project site. If that project doesn't proceed, the proponent would make a $100 000 contribution directly to EcoFundQ.

4. Affordable housing levy

Voluntary provision of an affordable housing levy to be directed to a trust fund used by a non-profit agency to help leverage the provision of affordable housing in the area. The proponent has committed to the contribution of $2 000 (2010 dollars, indexed by CPI) per residential land parcel sold within the project site.

5. Indigenous employment strategy

The proponent has prepared an Indigenous employment strategy for the project aimed at providing enhanced employment opportunities for local Indigenous groups and has committed to facilitating its implementation.

6. Queensland Heritage Register

The proponent is committed to supporting registration of the former Raff Homestead site on the Queensland Heritage register.

7. Sustainable buildings

The proponent has committed to promote best practice sustainable buildings throughout the project via specifications in design guidelines and implemented by the bodies corporate. The guidelines will address detailed aspects of design such as architectural style, orientation, siting, shading, ventilation, colours, materials and landscaping, as well as energy and water efficiency measures.

8. Industrial ecology

Eco-industrial initiatives will be managed through the body corporate and its Community Title Schemes and Community Management Statements. The proponent will facilitate the coordination of a range of industrial ecology initiatives during design, construction, and operation of the development including:

a) providing a whole system analysis of flows of wasted energy, water, and materials to achieve optimal level of waste minimization and resource recovery

b) identifying the highest and best use of waste resources that can be recovered

c) sharing training and new technologies for waste management

9. Marina operations

The proponent has committed to operation of the marina with regard to the Marina Industries Association of Australia (MIAA) 'Clean Marinas' accreditation programme.

The proponent will investigate, with the co-operation of the Queensland Primary Industries and Fisheries, the potential of fish stocking of the marina basin with local indigenous fish species.

In addition, the marina operator will develop and implement an education program with co-operation from the Maritime Safety Queensland, Queensland Primary Industries and Fisheries and the Department of Environment and Resource Management (Marine Parks) for boat users to encourage compliance with speed limits and minimise environmental impacts in the Caboolture River. The proponent has committed to the construction of a public fishing platform and kayak launching pontoon in the Caboolture River. This will

occur should the decision be made to amend the Fish Habitat Area to allow the construction and placement.

10. Northeast Business Park marina "green levy" for riverbank restoration and maintenance dredging contribution

The proponent has committed to the full costs of the initial capital dredging program and has committed to the establishment of a contributions scheme that will be made by the purchasers and lessees of the marina product (berths and dry stack places) for riverbank restoration and maintenance dredging.

These contributions are in addition to the ongoing monitoring regime proposed to be established in the Caboolture River by the proponent as outlined in the EIS (Appendix L2) and conditions stated in Appendix 1.

Funds would be managed by a Trust, likely to comprise representatives of MBRC, QPIF, DERM, DTMR and NEBP.

11. Treated effluent reuse

The proponent has committed to maximise the use of treated effluent throughout the development site to reduce significantly the amount of effluent (currently 9MGL per day) disposed of by Cab Water into the Caboolture River each day.