



ENVIRONMENTAL IMPACT STATEMENT

Northeast Business Park

Northeast Business Park Pty Ltd



Cardno (Qld) Pty Ltd

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NORTHEAST BUSINESS PARK

ENVIRONMENTAL IMPACT STATEMENT

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7900/33/01-317	Caboolture River Dredging Cross Sections – CH 5200.000 – CH 6348.983 Sheet 4 of 4		

PHOTOGRAPHS

- Plate 1: Aerial photographs of key features of the Caboolture River
- Plate 2: Aerial photographs of key features of the NEBP and surrounds
- Plate 3: Photographs of key features of the aquatic habitats of the NEBP property
- Plate 4: Photographs of Caboolture Weir (upstream of NEBP property)
- Plate 5: Photographs of existing infrastructure, Caboolture River
- Plate 6: Erosion issues, Caboolture River

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- Appendix X1 Construction Staging Plans
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- Appendix Y2 Waste Management Technical Report (includes a Waste Management Plan)
- Appendix Z Bushfire Assessment Report



GLOSSARY OF TERMS

AASS	Actual Acid Sulfate Soils			
ABN	Australian Business Number			
ACN	Australian Company Number			
ADG Code	Australian Code for the Transport of Dangerous Goods			
	by Road and Rail — Sixth Edition' (ADG Code			
ADWE	Average Dry Weather Flow			
ADWG	Australian Drinking Water Guidelines			
AGO	Australian Greenbouse Office			
	Australian Height Datum			
	Australian Reight Datum Australia and New Zaaland Environment and			
ANZECC	Australia and New Zealand Environment and			
	Conservation Council			
Area Plan	Northeast Business Park Area Plan			
ARI	Average Recurrence Interval			
AS	Australian Standard			
ASS	Acid Sulfate Soils			
ASSMP	Acid Sulfate Soil Management Plan			
BAU	Business As Usual			
BCC	Brisbane City Council			
BCR	Benefit Cost Ratio			
BIAQ	Boating Industry Association of Queensland			
BoM	Bureau of Meteorology			
BTEX	Benzene, Toluene, Ethylbenzene and Toluene			
CaCo ₃	Agricultural lime			
CAMBA	China Australia Migratory Birds Agreement			
CBA	Cost Benefit Analysis			
CBR	California Bearing Ratio			
CEMP	Construction Environmental Management Plan			
	Cultural Heritage Management Plan			
	Contaminated Land Register			
	Containinated Land Register			
	Cudstal Management District			
CPTED	Chine Prevention Through Environmental Design			
CREEC	Caboolture Regional Environmental Education Centre			
DA				
DEO	Desired Environmental Outcome			
DG	Dangerous Goods			
DGL	Dangerous Goods Location			
DRO	Desired Regional Outcome			
EDIP	Economic Development Issues Plan			
EHI	Environmental Health Index			
EHMP	Ecosystem Health Monitoring Program			
EIL	Environmental Investigation Level			
EIS	Environmental Impact Statement			
EP	Equivalent Person			
EMP	Environmental Management Plan			
EMR	Environmental Management Register			
ERA	Environmentally Relevant Activity			
FSC	Erosion and Sediment Control			
FSD	Erosion and Sediment Control Ecological Sustainable Development			
FHA	Ecological Sustainable Development Fish Hahitat Area			
FTF	Full Time Equivalent			



GFA	Gross Floor Area			
GQAL	Good Quality Agricultural Land			
ha	Hectare			
НАТ	Highest Astronomical Tide			
HBIL	Health-Based Investigation Level			
IAS	Initial Advice Statement			
IDAS	Integrated Development Assessment System			
IE	Industrial Ecology			
JAMBA	Japan Australia Migratory Birds Agreement			
kV	kiloVolt			
LAT	Lowest Astronomical Tide			
LDGL	Large Dangerous Goods Location			
LMPR	Landscape Master Plan Report			
MCU	Material Change of Use			
MHF	Major Hazard Facility			
MHWS	Mean High Water Spring			
MIAA	Marina Industries Association of Australia			
MIBA	Mixed Industry Business Area			
MIKE21	Flood modelling program			
MVA	Mega Volt Amperes			
NEBP	Northeast Business Park			
NEPM	National Environment Protection Measure			
NEPC	National Environment Protection Council			
NES	National Environmental Significance			
NHMRC	National Health and Medical Research Council			
NSA	North South Arterial			
NPV	Net Present Value			
NSESD	National Strategy for Ecological Sustainable			
	Development			
OC	Organochlorine (pesticide)			
OP	Organophosphrous (pesticide)			
ou	odour unit			
PASS	Potential Acid Sulfate Soils			
Planning Scheme	Caboolture Shire Council Planning Scheme 2005			
PM ₁₀	Particulate matter with an aerodynamic diameter less			
	than 10µm			
PMT	Pad-Mount Transformer			
PNL	Planned Noise Level			
Project Area	Lot 2 RP902075, Lot 7 RP845326, Lot 10 RP902079,			
	Lot 12 on RP145197, Lot 15 on RP902073, Lot 24			
	SP158298 and Lot 17 RP902092			
Proponent	Northeast Business Park Pty Ltd			
PSP	Planning Scheme Policy			
PSTN	Public Switched Telephone Network			
PWWF	Peak Wet Weather Flow			
Qa	Quaternary Alluvium			
Qe	Quaternary Estuarine Deposits			
Qha	Quaternary Holocene Recent Alluvial Deposits			
QASSIT	Queensland Acid Sulfate Soil Investigation Team			
QWQG	Queensland Water Quality Guideline (2006)			
RAP	Remediation Action Plan			
RCMP	Regional Coastal Management Plan			
RCU	Referral Regional Outcome			



RE	Regional Ecosystem
RJI	Triassic-Jurassic Landsborough Sandstone
RL	Relative Level
PG	Packing Group
ROL	Reconfiguration of a Lot
SBMP	Site Based Management Plan
SCMP	State Coastal Management Plan
SEO	South East Oueensland
SEQ SEO Dogional Dian	South East Queensland Perional Plan
Site	Lot 2 RP902075, Lot 7 RP845326, Lot 10 RP902079, Lot 12 on RP145197, Lot 15 on RP902073, Lot 24 SP158298 and Lot 17 RP902092
SMP	Site Management Plan
SMS	Safety Management System
SO	Specific Outcome
	Sound Proceure Level
	Sound Flessure Level
	Stewage Treatment Plant
	Stormwater Management Plan
IOR	Terms of Reference
TIA	Traffic Impact Assessment
TMP	Transport Management Plan
TPH	Total Petroleum Hydrocarbon
TSP	Total Suspended Particles
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
VKT	Vehicle Kilometres Travelled
WMP	Waste Management Plan
WQG	Water Quality Guideline
WQO	Water Quality Objective
WRP	Water Reclamation Plant
WSUD	Water Sensitive Urban Design
Local State and Commo	nucelth Agencies and Authorities
Local, State and Common	nwealth Agencies and Authorities
CG	Coordinator-General (Qld)
CHEM Services	Specialised Chemical Hazards and Emergency
	Services
000	Selvices
	Cabooliule Shile Council
	Department of the Environment and Water Descurres
DEWR	(Cwth)
DIP	Department of Infrastructure and Planning (Qld)
DMR	Department of Main Roads (Old)
DNRW	Department of Natural Resources and Water (Old)
DPIE	Department of Primary Industries and Fisheries (Old)
	Department of Tourism Regional Development and
	Industry (Old)
FPΔ	Environmental Protection Agency (Old)
	Environment Protection Authority (Victoria)
	Maritime Safety Oueensland (nart of Oueensland
	Transport)



OESR OUM QFRA QPWS QT	Office of Economic and Statistical Research Office of Urban Management Queensland Fire and Rescue Authority Queensland Fire and Rescue Service Queensland Transport (Qld)
Legislative Instruments	
ACHA	Aboriginal Cultural Heritage Act 2003
BCCMA	Body Corporate and Community Management Act 1997 (Qld)
CPM Act EPBC Act	Coastal Protection and Management Act 1995 (Qld) Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
EP Act	Environmental Protection Act 1994
EPP Air	Environmental Protection (Air) Policy 1997
EPP Noise	Environmental Protection (Noise) Policy 1997
EPP Water	Environmental Protection (Water) Policy 1997
EPP Waste	Environmental Protection (Waste Management) Policy 2000
Fisheries Act	Fisheries Act 1994
DGSM	Dangerous Goods Safety Management Act 2001
IP Act	Integrated Planning Act 1997 (Qld)
LP Act	Land Protection (Pest and Stock Route Management) Act 2002 (Qld)
NC Act	Nature Conservation Act 1992
SDPWO Act	State Development and Public Works Organisation Act 1971
SPP	State Planning Policy
SPP1/03	Mitigating the Adverse Impacts of Flood, Fire and Landslide
SPP 1/07	Housing and Residential Development
SPP 1/92	Development and the Conservation of Agricultural Land
SPP 2/02	Planning and Management involving Acid Sulfate Soils
VM Act	Vegetation Management Act 1999 (Qld)
WA	Water Act 2000 (Qld)
Consultants	
AEC	AEC Group
Cardno	Cardno (Qld) Pty Ltd
Cardno Environment	Environment unit within Cardno (Qld) Pty Ltd
CEO	Cardno Eppell Olsen
CLT	Cardno Lawson and Treloar
Coffey	Coffey Geotechnics Pty Ltd
Davies	Davies Heritage Consultants Pty Ltd
Katestone	Katestone Environmental Pty Ltd
Lectel	Lectel Pty Ltd
MVV&A	Max Winders and Associates
RR Black	Parsons Brinkernom
	Place Environmental & PLACE Planning and Design
	FIVINI DIISDAILE FLY LLU Dacific Southwest Strategy Croup
1000	r aono oounwesi onalegy Gloup



EXECUTIVE SUMMARY

The Proposal

The Northeast Business Park (NEBP) is a proposed master planned mixed industry and business park, featuring an associated marina, marine industry precinct and complementary residential, commercial and community uses.

NEBP is located on a strategically significant 769 hectare landholding on the southern banks of the Caboolture River at Morayfield, close to the heart of Caboolture. The site has a unique set of strategic attributes, making it an ideal location for an integrated development.

The key features of NEBP are:

- Mixed Industry Business Area (MIBA) 169 hectares of industry and businesses provided local and regional employment and training opportunities.
- 911 Berth Marina, 300-500 dry boat stacker, and associated Shipyard and Marine Industry Infrastructure, building on Queensland's growing national and international marine industry.
- A Marina Village, accommodating public spaces, cafés, restaurants, public promenades and a mix of villas and apartments.
- Community Facilities, including nodes in the MIBA, residential area, Marina and business facilities.
- Residential Housing areas incorporating a range of housing styles to meet community needs.
- Regional Open/Green Space; approximately 420 hectares of open space, heritage parks, walking tracks, golf course, clubhouse and environment centre.
- Flexibility to respond as demands change over time, with the potential inclusion of retirement living and a primary School.

Other points of note are:

- NEBP is intended to be a key catalyst for the strengthening of the Caboolture region as a regional destination.
- NEBP will generate local employment and economic prosperity and will deliver on the region's goals of building self contained communities.
- NEBP will provide a complementary relationship with Caboolture and Morayfield's role as the Principal Activity Centre for the region.
- Public transport between NEBP, Caboolture and Morayfield will provide positive benefits to all three areas.
- NEBP will accommodate uses not able to be accommodated within Caboolture or Morayfield.



Introduction

This Environmental Impact Statement (EIS) has been prepared for Northeast Business Park Pty Ltd by Cardno (Qld) Pty Ltd (Cardno), in accordance with the Terms of Reference (ToR) which was prepared by the Queensland Department of Infrastructure and Planning ('DIP') on behalf of the Coordinator General (CG), in December 2006.

The proponent is Northeast Business Park Pty Ltd (NEBP Pty Ltd). NEBP Pty Ltd is a Queensland registered company with shares held by Port Binnli Pty Ltd (50%), Laing O'Rourke Caboolture Developments Pty Ltd (25%) and a number of smaller shareholders (25%). Port Binnli Pty Ltd and Laing O'Rourke Pty Ltd have joined forces to undertake the development of the Northeast Business Park.

Background to the Application

Two planning applications for Preliminary Approval have previously been lodged over the NEBP site. The original application was lodged by Lensworth Ltd in 2002, and sought a Preliminary Approval for a mixed-use Business Park over the western portion of the site. In 2004, Noosa Events Pty Ltd (now Northeast Business Park Pty Ltd) purchased the neighbouring parcels to the east and proceeded to lodge an application for Preliminary Approval over that land for a marina precinct. The locality of the site is shown on Figure 1.

The proponent realised that substantial synergies were possible between the two developments. Consequently, it was believed that the full potential could only be achieved if development of the two sites was planned as an integrated mixed use precinct. Accordingly, the proponent commenced negotiations and subsequently purchased the Lensworth properties in 2005, and an integrated development concept was formulated which incorporates business, industry, commercial uses, marina facilities, residential development, heritage and recreational open space. The proposal is known as the Northeast Business Park and will provide a high quality master planned riverside precinct in which to live, work and play.

In view of the size and strategic significance of the site, the needs of the Caboolture region, the particular nature of the development proposal, and the natural attributes of parts of the site and surrounding areas, the NEBP proposal was nominated to the DIP as a project of significance under the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

NEBP was declared to be a "significant project" pursuant to the SDPWO Act by the CG on 21 June 2006, and the proponent was required to prepare an EIS for the project. Cardno has been appointed to co-ordinate and prepare the EIS, which will form the basis of local, State and Commonwealth approvals for the project.

Proposal Masterplan

Master planning for the NEBP aligns with the Queensland Government's key priorities and is consistent with all of the relevant strategic directions of the Southeast Queensland Regional Plan, including:

• creating a more sustainable future;



- identifying land to accommodate future growth;
- promoting land use efficiency;
- enhancing the identity of regional communities;
- providing infrastructure and services; and
- integrating land use, transport and economic activity.

The NEBP is also consistent with the key state priorities including:

- growing a diverse economy and creating jobs;
- realising a Smart State through eduction, skills and innovation;
- managing urban growth and building Queensland's regions, with protection of the environment for a sustainable future;
- tourism; and
- total water cycle management.

A Structure Plan has been formulated for the site, and this is presented as Figure 2. The Structure Plan incorporates the retention of over half of the site as open space, including public open space, golf course, rehabilitated riparian zones, playing fields and wetlands. It is proposed to develop the NEBP site into a quality mixed use development, creating a hub for business and employment in Caboolture and addressing the growing demand for marina berths and associated marina industries and facilities. Development of NEBP is therefore expected to enhance the social and economic status of Caboolture Shire.

A computer visualisation of the developed NEBP site has been prepared by V2i, and this presentation is attached to this EIS in CD format.

An assessment of the proposed development against relevant provisions of local, and State planning policies has been undertaken by PMM and is presented in the Planning Report appended to the EIS.

The Northeast Business Park Area Plan (NEBP Area Plan) has been created to provide detailed land use intents and controls for the site. Its purpose is to ensure that NEBP is planned and developed in an orderly fashion and has the necessary infrastructure and services. When approved by the Local Government the NEBP Area Plan will override the Planning Scheme and will become the framework for future development of NEBP. The NEBP Area Plan ensures that adequate assessment processes and standards are established to guide future development of the site and preserve environmental assets. The NEBP Area Plan's objective is also to ensure that development is of an intensity that is appropriate to the local development constraints, and is consistent with the aims of regional and local planning instruments.

Site Description

NEBP is located in Caboolture Shire, South East Queensland. NEBP is a strategically important site covering 769 hectares at Morayfield. The site is situated on the southern banks of the Caboolture River, with 9km of river frontage.



The site has direct access to the Bruce Highway and is about 4km radially south east of the Caboolture town centre and about 3km east of Morayfield rail station. The NEBP site is 45 kilometres from the Brisbane CBD and 35 minutes drive from Brisbane Airport.

Presently a largely cleared, ecologically degraded site, the NEBP site provides substantial opportunities for rehabilitation, sustainable development and enhanced community accessibility to the Caboolture River. With the majority of the site is designated for urban purposes, the scale of the site is sufficient to accommodate a wide range of activities, taking advantage of the site's limited physical and visual relationships with existing communities.

The 769ha site is a former pine plantation that is currently privately owned and used for cattle grazing. An aerial photograph of the existing site is presented as Figure 3, and further aerial photography of the site its environs is attached to the EIS.

The site comprises 7 lots, which are described below. The existing cadastral boundaries of the land parcels are presented in Figure 4.

The land comprises seven freehold titles, including one freehold lot owned by the State of Queensland, as described in the Table below.

Real Property Description	Frontage	Area (ha)	Registered Owners
L2 RP902072	Nolan Drive	28.83	Northeast Business Park Pty Ltd
L7 RP845326	Farry Road	55.90	Northeast Business Park Pty Ltd
L10 RP902079	Nolan Drive	515.24	Northeast Business Park Pty Ltd
L12 RP145197	Trafalgar Drive	4.86	Northeast Business Park Pty Ltd
L15 RP902073	Nolan Drive	1.91	Northeast Business Park Pty Ltd
L17 RP902072	Interchange	1.88	State of Queensland (Queensland Transport)
L24 SP158298	Farry Road	160.38	Northeast Business Park Pty Ltd
	Total	769.00	

 Table E1
 Summary of Site Details

The lands surrounding NEBP are predominantly freehold in nature. A small number of parcels near to the site are held by the State, predominantly as reserves for open space, generally administered by Caboolture Shire. Two lots are held by the State as freehold land adjacent to the Buchanan Road interchange.



The NEBP site is relatively flat ranging in elevation from 3m AHD to 17.5m AHD. Tidal levels of the Caboolture River adjacent to the NEBP site are approximately 1.34m AHD for Highest Astronomical Tide (HAT) and 0.81m AHD for Mean High Water Springs (MHWS). Existing site elevations are presented in Figure 8. Raff Creek traverses the NEBP site and flows from the southwest to the northeast boundary.

The NEBP site previously supported exotic pine plantations and was utilised for forestry purposes. As such, with the exception of a 1.3ha area of remnant vegetation located at the south west corner of the NEBP site, the majority of the NEBP site is devoid of native vegetation. Some areas of marine vegetation fringe the Caboolture River and associated waterways and tidally influenced drainage channels.

The EIS

An Initial Advice Statement (IAS) was submitted to the CG in May 2006 to support the nomination of NEBP as a "significant project" pursuant to the SDPWO Act.

NEBP was declared to be a "significant project" under section 26(1) (a) of the SDPWO Act by the CG on 21 June 2006. The declaration initiates the statutory environmental impact assessment procedure of Part 4 of this Act, which requires the proponent to prepare an EIS for the project.

The EIS process, managed by the DIP on behalf of the CG, required the preparation of a Draft Terms of Reference (ToR) which was finalised in December 2006. A copy of the ToR is provided in Appendix A.

In addition to the CG's involvement in the EIS process, the statutory impact assessment process is the subject of a Bilateral Agreement between the Queensland and Commonwealth Governments under the SDPWO Act. This agreement relates to environmental assessment under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* ('EPBC Act') which requires the proponent to refer the proposal to the Australian Minister for the Environment and Water Resources. On 12 July 2005, the Australian Minister stated the proposal constituted a controlled action pursuant to Section 75 of the EPBC Act under the following controlling provisions.

- Sections 16 and 17B (wetlands of international importance).
- Sections 18 and 18A (listed threatened species and communities).
- Sections 20 and 20A (listed migratory species).

The objective of the EIS is to provide information to community and decision makers on the concepts, aspects and impacts of the development proposal, through comprehensively identifying, evaluating, and providing mitigation for issues associated with the development.

The EIS also serves the purpose of identifying all necessary planning and environmental approvals including requirements pursuant to State and Commonwealth legislation, and appropriately addresses these requirements.



All potential environmental impacts of the proposal have been identified, and mitigation measures have been proposed, where appropriate, to minimise or compensate for any adverse impacts. Mitigation measures may take the form of infrastructure and facility design, or construction and operational methods.

Wherever possible, the Proponent has sought to achieve net benefit through the implementation of environmental, social and economic mitigation measures.

The EIS has been informed by a range of technical studies and reports which have been commissioned to assess the potential impacts of the proposed NEBP development, both positive and negative. The technical studies are appended to the EIS along with other relevant supporting documentation, as listed below.

Title	Author	Date	Appendix Reference
Terms of Reference	Coordinator General	22 December 2006	Appendix A
Proponent Details	РММ	May 2006	Appendix B1
Study Team	Cardno	November 2007	Appendix B2
Master Planning Vision Document	PMM	November 2007	Appendix C1
Planning Report	РММ	January 2008	Appendix C2
NEBP Area Plan	РММ	November 2007	Appendix C3
Net Benefit Assessment	AEC Group	January 2008	Appendix D
Economic Benefit Assessment	Urbis	September 2007	Appendix E1
Attached Dwelling Demand	Urbis	September 2007	Appendix E2
Business Park Assessment	Urbis	September 2007	Appendix E3
Bulky Goods	Urbis	September 2007	Appendix E4
Hotel Demand	Urbis	September 2007	Appendix E5
Golf Course Demand	Urbis	September 2007	Appendix E6
Caboolture City Marina Study	Pacific Southwest Strategy Group	14 March 2006	Appendix E7
Marina Demand Update	Pacific Southwest Strategy Group	10 September 2007	Appendix E8
Community Context Study	The Hornery Institute	September 2007	Appendix F
Community Consultation Report	Three Plus	November 2007	Appendix G

Table E2 Appendices to the EIS



Title	Author	Date	Appendix Reference
Stormwater Management Plan	Parsons Brinckerhoff October 2007		Appendix H1
Groundwater Impact Assessment	Coffey Geotechnics Pty Ltd	18 September 2007	Appendix H2
MIKE21 Flood Study	Parsons Brinckerhoff	4 October 2007	Appendix I
Riverbank Erosion Assessment	Cardno Environment	22 October 2007	Appendix J
Traffic Impact Assessment	Cardno Eppell Olsen	January 2008	Appendix K1
Traffic Impact Assessment- Addendum Report	Cardno Eppell Olsen	January 2008	Appendix K2
Terrestrial Ecology Assessment Report	Cardno Environment	9 November 2007	Appendix L1
Aquatic Ecology Assessment Report	The Ecology Lab	November 2007	Appendix L2
Matters of National Environmental Significance	Cardno Environment	23 November 2007	Appendix L3
Caboolture River Siltation Study	Cardno Lawson Treloar	16 November 2007	Appendix M1
Caboolture Waters: Waterways, Soils and Water Quality Management	4Site & Natural Solutions	13 August 2004	Appendix M2
Noise Impact Assessment	Cardno Environment	19 October 2007	Appendix N
Air Quality Assessment	Katestone Environmental Pty Ltd	October 07	Appendix O
Landscape Masterplan	PLACE Planning and Design	27 September 2007	Appendix P
Scenic Quality and Visual Impact	Studio Tekton	17 October 2007	Appendix Q
Geotechnical Interpretative Report	Coffey Geotechnics Pty Ltd	8 January 2007	Appendix R1
Caboolture River Dredging - Geo-environmental investigations.	Coffey Geotechnics Pty Ltd	3 May 2007	Appendix R2
Dredging Site Based Management Plan	Cardno Environment	19 November 2007	Appendix R3



Title	Author	Date	Appendix Reference
Acid Sulfate Soil Management Plan	Cardno Environment	19 November 2007	Appendix R4
Site Management Plan	Douglas Partners	2003	Appendix R5
Good Quality Agricultural Land Assessment	PLACE Environmental	7 March 2007	Appendix S
Cultural Heritage Assessment of Lot 10 on RP902079 and Lot 2 on RP902079 Caboolture Shire	Davies Heritage Consultants Pty Ltd	October 2003	Appendix T1
Indigenous Cultural Heritage Study of Lots 24 SP158298 and Lot 7 RP845326	Davies Heritage Consultants Pty Ltd	August 2006	Appendix T2
Cultural Heritage Survey Report	Gangalla Pty Ltd	August 2006	Appendix T3
Cultural Heritage Management Plan	Davies Heritage Consultants Pty Ltd & Gubbi Gubbi	May 2007	Appendix T4
Non-Indigenous Cultural Heritage Plan	Port Binnli Pty Ltd	October 2007	Appendix T5
Hazard & Risk Analysis	Simmonds & Bristow	October 2007	Appendix U
EIS Energy Report	Lectel Pty Ltd	25 September 2007	Appendix V
Environmental Impact Assessment- Water Supply & Sewerage Systems	GHD	October 2007	Appendix W
Construction Staging Plans	Laing O'Rourke	October 2007	Appendix X1
Construction Environmental Management Plan	Cardno Environment	19 November 2007	Appendix X2
Marina Site Based Management Plan	Cardno Environment	19 November 2007	Appendix Y1
Waste Management Technical Report (includes a Waste Management Plan)	Cardno Environment	22 November 2007	Appendix Y2
Bushfire Assessment Report	Cardno Environment	November 2007	Appendix Z



Community Consultation

From the outset, community input was sought to inform the development of the EIS technical studies. Communication and engagement activities included:

- establishment of a dedicated website and a toll free project inquiry line;
- presentation of two Community Information Days and two Agency Reference Group Information Days
- an ongoing survey to canvas community views between November 2006 and August 2007;
- local resident newsletters and survey to 1,100 households to canvas specific neighbourhood benefits, impacts and views;
- a community information booth at the Caboolture Sustainability Expo, Sydney Boat Show and Sanctuary Cove Boat Show;
- two business sector information evenings and one breakfast to canvass views of the commercial and light industry sector;
- two community and Chamber of Commerce presentations and individual local councillor representatives briefings;
- two all agencies meetings and a key stakeholder group meeting hosted by the Proponent which included site tours;
- media meetings including site tours;
- a meeting with recreational anglers, recreational boat club members and aquaculture industry representatives;
- an Indigenous Australians tour of the site;
- meetings with local authority staff, including working party, social planning and technical staff meetings to address development application and EIS requirements;
- web-based information for ease of access to community engagement activity with links to the CG site, ToR, the NEBP concept map, newsletters and fact sheets/posters (83,305 hits were recorded);
- individual (246) resident and stakeholder responses to enquiries and comments via, phone, facsimile, face to face discussion, letter or email; and
- radio interview and public announcements to publicise the project and promote major milestone events using local community radio including Indigenous AAA broadcasting and 4EB radio (translated announcements into local community languages).

Five project newsletters were distributed to 52,000 households in the study area and newsletters were posted or emailed to stakeholders on the NEBP and CSC databases.

In this way NEBP Pty Ltd has undertaken open community consultation in addition to the legislated environmental impact assessment process. The outcomes of the ongoing community consultation process have informed the technical studies on which this EIS is based.



NEBP Pty Ltd has invested in understanding the local community, identifying its positive attributes and exploring its issues and challenges. The team acknowledges that the development is occurring in the context of rapid growth and urbanization shire wide and is committed to delivering a sensitive mix of use and urban design response that will respect the existing character of the local area and enhance its amenity level.

The opportunity to deliver social, recreational and community infrastructure, sociocultural activities and place making strategies with a structured approach to "place management" allows the project to be sensitively integrated with its context whilst developing a strong identity and sense of place from the outset.

The sustained program of community engagement combined, with the proposed community development strategy will work with existing residents in the core catchment and begin the process of developing local ownership during the construction phase.

Need for the Development

The NEBP site has a unique set of strategic attributes that make it an ideal location for an integrated, master planned development.

Some of the NEBP site's key attributes which support the selected location of the proposed development include:

- strategically beneficial location on the southern banks of the Caboolture River, linking Caboolture to Moreton Bay;
- 9km of Caboolture River frontage, including deepwater access at the proposed marina site;
- direct access to the Bruce Highway;
- close proximity to Morayfield and Caboolture centres;
- close proximity to North-South rail line;
- a largely cleared, ecologically degraded site;
- sufficient size to accommodate a range of land uses, thereby enabling integration and synergies between the uses;
- the majority of the site is designated for urban purposes;
- infrastructure requirements are able to be accommodated by existing public utilities and projected upgrades which are commensurate with the scale of the proposed development;
- limited direct physical or visual interface to existing residential communities; and
- opportunities to provide the community with greater public access and use of the Caboolture River, relieving the community's current 'disconnect' with the river which has resulted from successive private ownership of the majority of the river frontage (on both sides of the river).



Benefits of the Proposal

Both the quantitative and qualitative assessments undertaken of the NEBP demonstrated a positive net benefit in keeping with the vision of the project.

The quantitative Cost Benefit Analysis (CBA) for the total project found that development of the NEBP is expected to deliver a total net benefit aim of \$2.5 billion in present value terms, with present value of revenues of \$3.8 billion and a present value of costs of \$1.3 billion. Overall, the NEBP development provides a benefit cost ratio (BCR) of 2.88 (i.e. returns \$2.88 for every dollar spent in delivery of the project).

The total project provides a positive direct net benefit (i.e. to the proponent) in present value terms of \$174 million with a BCR of 1.43. The project delivers a positive indirect net benefit (i.e. to stakeholders other then the proponent) in present value terms of \$2.3 billion with a BCR of 3.51.

It is clear that the NEBP development is desirable from the point of view of the Proponent and the broader community with a BCR of greater than one for all assessments, with the direct, indirect and overall impacts of the project being positive.

Impact	Present Value of Revenues (\$M)	Present Value of Costs (\$M)	Net Present Value (\$M)	Benefit: Cost Ratio
Direct Impacts	\$575	\$401	\$174	1.43
Indirect Impacts	\$3,251	\$926	\$2,324	3.51
Total Impacts	\$3,826	\$1,328	\$2,498	2.88

 Table E3
 Quantitative Cost Benefit Analysis Summary for the Total Project

Source: AECgroup

The qualitative CBA found that all aspects across the triple bottom line (economic, social and environmental) are expected to realise a net benefit to the State as a result of the NEBP development.

Qualitative economic impact assessment shows that the NEBP is expected to return a considerable positive net economic benefit, with a significantly higher score for benefits (22) than costs (-7). Net social and environmental benefits are also expected, with a net score of 11 for social and 11 for environmental.

Since the positive impacts of development across the economic, social and environmental aspects of the triple bottom line outweigh the negative impacts, the total development is deemed to deliver a positive net benefit for the State.



TBL Aspect	Average Likelihood	Average Consequence	Average Impact	Number of Impacts	Total Score
Economic					1
Benefits	Almost Certain	Moderate	High	8	22
Costs	Almost Certain	Major	Very High	2	-7
Net Position					15
Social					I
Benefits	Likely	Moderate	Medium	9	29
Costs	Likely	Moderate	Medium	9	-18
Net Position					11
Environmental					I
Benefits	Likely	Minor	Medium	10	19
Costs	Possible	Minor	Low	8	-8
Net Position					11

Table F4	Qualitative CBA Summar	ry for the Total Project
	Qualitative CDA Summa	y for the rotal Project

Source: AECgroup

A quantitative and qualitative CBA was also undertaken for the project elements that trigger specific net benefit policies under South-east Queensland Regional Coastal Management Plan (medium scope assessment) including policies:

- 2.1.3 Coastal-dependent land uses;
- 2.1.4 Canals and dry land marinas;
- 2.1.5 Maritime infrastructure;
- 2.1.9 Reclamation; and
- 2.8.1 Areas of state significance (natural resources).

The quantitative CBA for the medium scope assessment found that development of the NEBP is expected to deliver a total net benefit aim of \$1.01 billion in present value terms, with present value of revenues of \$1.61 billion and a present value of costs of \$598 million. Overall, the NEBP development provides a BCR of 2.69 (i.e. returns \$2.69 for every dollar spent in delivery of the project).

The medium scope assessment also shows a positive direct net benefit (i.e. to the proponent) in present value terms of \$82 million with a BCR of 1.46. The project elements as they relate to net benefit policies deliver a positive indirect net benefit (i.e. to stakeholders other then the proponent) in present value terms of \$928 million with a BCR of 3.20.



The 'net benefit' approach adopted by the proponents has resulted in the following key benefits being proposed.

- Substantial and sustainable injection of funding into the local and regional economy and the creation of up to 27,150 jobs.
- Rehabilitation of a 100 metre wide riparian zone along the site's 9 kilometre river frontage, providing a habitat connection, improving water quality, decreasing bank erosion and creating a pleasant backdrop to the development.
- Helping to address a substantial and growing unmet demand for marina berths and accommodating a shipyard and marine industry precinct underpinning the MIBA and strengthening SEQ's pre-eminent role in marine related construction and export.
- Utilising Water Sensitive Urban Design (WSUD) and stormwater management processes polishing stormwater from internal and external catchments aimed at improving water quality in the Caboolture River.
- Use of reticulated recycled water for appropriate uses, reducing potable water demand and nutrient and pollutant loads in the Caboolture River.
- A focus on quality urban design and built form, creating efficient buildings and businesses, based on sustainability principles.
- Clustering of complementary uses encouraging efficient knowledge and/or resource flows using Industrial Ecology (IE) principles.
- Facilitating the creation of a strengthened public transport system linking NEBP with Caboolture and Morayfield, increasing the vitality of all three areas, whilst strengthening Caboolture/Morayfield's role as a Principal Activity Centre under the SEQ Regional Plan.
- Use of Community Title to create an effective structure and process to proactively guide the development in such areas as building design and landscaping standards, whilst creating a mechanism to fund maintenance costs in perpetuity.
- Creating a social heart for Burpengary and a regional social and recreational destination.

Existing Environmental Values

Climate and Natural Hazards

The NEBP site is subject to average daily temperatures of between 14 and 25°C, and receives an average of 957mm of rain each year. Parts of the NEBP site, being low lying, are subject to periodic flooding.

The majority of the NEBP site is identified by the Queensland Rural Fire Service and the CSC Planning Scheme as being situated in a Medium Bushfire Hazard area. A site inspection identified that because slopes across the site are generally



low, and the majority of the site is covered by disturbed grassland, the site is rated as the lower end of the Medium Bushfire Hazard scale.

Land

The NEBP site is currently zoned in the CSC Planning Scheme for 'District Industry', 'Rural' and 'Rural Residential' uses. The NEBP site is mapped by the CSC Planning Scheme as containing the following attributes which are illustrated in Figure 6.

- Catchment Protection Areas for the protection of waterways and Declared Fish Habitat Areas.
- Ecological Corridors to strengthen and improve links between areas of State, regional, local and other conservation significance and areas of potential conservation significance that may currently be degraded.
- Regional and State Conservation areas including significant wetlands mapped in the Regional Coastal Plan.
- Scenic Amenity Areas in which development is to be regulated such that adverse impacts on the scenic qualities of the area are minimised.

Little built landform exists within the NEBP project area that is dominated by natural elements including ridgelines, waterways, and vegetation. The landscape character within the NEBP project area has been highly modified since European settlement from a long history of agriculture with the most predominant landscape features being the tree lined river and waterways. Previous clearing and farming activities, including pine planting, has resulted in patches of native vegetation existing within the NEBP site, particularly associated with watercourses. The dominant feature is cleared paddocks invaded by exotic weeds.

The NEBP site is surrounded by areas of environmental sensitivity, which are identified on Figure 7 and are detailed below.

- The Deception Bay Declared Fish Habitat Area, which extends along the entire length of the northern boundary, within the bounds of the Caboolture River. This area is protected by the *Fisheries Act 1994* due to the estuarine habitats that support commercial and recreational fisheries in close proximity to developing communities.
- The Habitat Protection Zone of the Moreton Bay Marine Park which is located within the Caboolture River and begins at the north-eastern boundary of the NEBP site then extends eastward along the Caboolture River.
- The Moreton Bay Ramsar wetlands which traverse the same area within the Caboolture River as the Moreton Bay Marine Park.
- South East Queensland Wader Bird Sites are mapped approximately 500m to the east of the NEBP site.

A view shed analysis identified very few localities surrounding the NEBP site where it is possible to achieve any significant ground elevation to be able to look down and or across the area. All potential viewpoints and receptors are either a sufficient



distance that visual impacts are not a concern, or will be masked from the NEBP site by existing or proposed vegetation.

A preliminary site contamination investigation was undertaken, which included a review of the NEBP site history and soil sampling. It was determined that approximately 20m³ of soil within of Lot 10 RP902079 is potentially contaminated. The potential contamination is limited to the immediate area surrounding the approximate location of an underground storage tank and fuel bowser. The area of potential contamination is identified in Figure 9. It is recommended that the contaminated soil be removed and disposed of to an appropriately licensed facility under the requirements of a Remediation Action Plan (RAP) approved by the Queensland Environmental Protection Agency (EPA).

The NEBP site's underlying geology consists of sedimentary estuarine and alluvial deposits, with some sandstone conglomerate occurring in the south of the NEBP site. Soils consist of sand, silt, mud and clay in varying proportions. The NEBP site soils are generally classified as having a low to moderate erosion potential, except for some areas of sandy soils which exist on the more sloping areas in the south and south-west of the NEBP site, which are classified as having a moderate-high erosion potential. The soils on site were assessed as being suitable for reuse for construction purposes, although mixing with alternative fill may be necessary for some uses, e.g. road or building foundations.

The geology and soils occurring on the NEBP site are illustrated on Figure 11.

Transport

The NEBP site is located to the east of the Bruce Highway, which currently forms part of the western boundary of the site. Buckley Road enters the site in the south. The major vehicular access to the NEBP site will be achieved from the Bruce Highway via the Buchanan Road interchange, with secondary access via Buckley Road.

The Department of Main Roads (DMR) has identified a road corridor to the east of the NEBP site to allow for the future construction of an arterial road (the North South Arterial). The corridor between Caboolture-Bribie Island Road and Deception Bay Road was notified under the *Transport Infrastructure Act* in 1994 and identified in the CSC Planning Scheme and SEQ Regional Plan. In its current alignment, the proposed North South Arterial (NSA) would require the construction of a bridge structure immediately to the west of Beachmere. The crossing of the Caboolture River at this point on its floodplain would require the North South Arterial to be elevated to allow for conveyance of flood waters. In addition, the proposed crossing west of Beachmere would traverse significant "protected" coastal wetlands adjacent to the mouth of the Caboolture River.

Through a workshop process and additional follow on meetings with DMR officers, a potential solution that re-routed the proposed alignment of the NSA through the NEBP site was discussed. The road layout makes provision for the major internal road corridor to potentially form part of the north-south link or a connection thereto. However the functioning of the NEBP development and access thereto is not reliant on a potential link to Bribie Island Road or the NSA connection.



Representatives from DMR have acknowledged the work undertaken by the NEBP Study team in providing the alternative route for the NSA. In addition, a study of alternatives for the NSA will be undertaken by DMR however this is considered to be unlikely to significantly affect the NEBP project.

Water Resources

Surface Water Quality

The proposed NEBP site is located adjacent to the middle estuary of the Caboolture River. Large parts of the NEBP site are within the Caboolture River floodplain, and tidal and freshwater wetlands occur throughout the lower areas of the NEBP site. Raff Creek traverses the NEBP site along with several natural, unnamed channels and some constructed channels.

The Caboolture River catchment, while largely undeveloped, has been extensively cleared for agriculture. As a result, the sediment and nutrient loads in the river are high, and the water quality can be described as poor. This is evidenced by the SEQ Ecosystem Health Monitoring Program, which issued a 2006 report card for the Caboolture River with a grading of D.

The *Environmental Protection Policy (Water) 1997* (EPP Water) has been used to identify the environmental values for the Caboolture River. The values that are relevant to the tidal estuary include:

- high value: secondary recreation, visual recreation, cultural heritage, aquaculture, drinking water;
- moderate to high value: human consumer;
- moderate value: aquatic ecosystem, wildlife habitat, irrigation, stock water, farm supply, oystering; and
- low value: primary recreation, industrial use.

Water Quality Objectives (WQOs) have been derived for water entering the Caboolture River from the site to achieve the protection of existing environmental values. The adopted WQOs for the NEBP site are based on mean annual load reduction targets, as defined by the CSC Planning Scheme. Where additional criteria apply, these have been adopted. The median pollutant concentrations as detailed in the EPP Water have not been adopted as an assessment benchmark, but instead will be achieved through the application of the WQOs and the principles of WSUD.

The following reduction targets are adopted as WQOs for the NEBP.

- 80% reduction in total suspended solids.
- 60% reduction in total phosphorous.
- 45% reduction in total nitrogen.
- 90% reduction in gross pollutants.



Water Quality

The CSC Planning Scheme Stormwater Code (CSC Stormwater Code) gives specific outcomes required for water quality control in the Caboolture region. Specific outcome SO14 of the CSC Stormwater Code states:

Stormwater discharge is to be disposed of adequately and achieve the following:

- no worsening of downstream conditions;
- no adverse impacts on adjoining or upstream lots;
- discharge from the site does not cause nuisance to any person, property of premises;
- any discharge onto downstream properties does not result in an increase in concentration of stormwater; and
- any discharge does not cause erosion.

The CSC Stormwater Code is used as the primary guide to achieve water quality objectives for NEBP. However, it is acknowledged that guidance from Healthy Waterways will be considered during the next design stage, as the application of WSUD principles (capturing of runoff and limiting the peak one-year ARI flow) are a practical means of stormwater management. Allowance is made in the Stormwater Management Plan for conceptual design of any post-development structures required to meet WSUD principles.

Groundwater

Standing groundwater levels were recorded in 44 shallow drilled boreholes and in 9 shallow and 3 deep standpipe piezometers across the NEBP site. Monitoring of groundwater levels demonstrated that rainfall strongly influences groundwater recharge, with the rate of such recharge influenced by soil infiltration rates and rock porosity.

Standing water levels in bores were observed to follow the topography gently and no high hydraulic gradient was observed in the shallow water system. Daily changes in standing water levels were observed close to the Caboolture River, which suggests tidal influence on groundwater levels in this area. Tidal influence was also shown to have an impact on water chemistry.

Groundwater quality was assessed over three water sampling rounds. In some shallow boreholes, water quality parameters including ammonia, chloride, pH, sulfate, sodium, total dissolved solids exceeded the limits in the Australian Drinking Water Guidelines (ADWG). Some shallow groundwater samples collected near the Caboolture River and associated tributaries within the NEBP site had high total dissolved solids which indicated a brackish water type and some interaction between surface water and groundwater. Further investigation would be required to fully understand the extent of the surface water/groundwater interaction, particularly that of saline intrusion. Deeper samples further from the Caboolture River exhibited lower total dissolved solids indicating a deposit of fresh water, and this groundwater has the potential for use in irrigation.



Water samples at shallow bores can be categorised into a group with higher magnesium, sodium, chloride and sulfate. Water samples at deeper bores exhibited a trend of lower sodium and chloride, and higher bicarbonate.

Sulfate levels in groundwater samples from shallow bores were higher than sulfate levels in deep bores indicating that there is some sulphide oxidation reaction occurring within the upper groundwater systems. Sulfate in shallower waters may be related to the presence of acid sulphate soils at some locations.

Within the NEBP site there are two existing boreholes located close to the homestead which are currently used to supply drinking water for cattle on site. Existing groundwater users within 3km of the NEBP site were identified from a search of the bore database managed by the Queensland Department of Natural Resources and Water (DNRW). There are 18 existing bores in this area, and these are generally privately owned and used for domestic or agricultural purposes.

Ecological investigations since 2004 have identified ecosystems within the NEBP site which are potentially groundwater sensitive, specifically the Paperbark Swamp and Tidal– and Mangrove/Swamp Oak and Tidal– Saltmarsh communities. Due to the thick presence of low permeability clay units at these locations, it is believed that these ecosystems are likely to be more dependent on rainfall and tidal inundation than groundwater.

Coastal Environment

Coastal Values

The Caboolture River and the NEBP site have a range of natural coastal features. Part of the Caboolture River is included within the Moreton Bay Marine Park. The river has been shown to support a diverse range of benthic and pelagic fish species, and the majority of the tidal reach of the river falls within the Deception Bay Fish Habitat Area. The eastern portion of the NEBP site's northern boundary adjoins the Moreton Bay Ramsar wetlands and Moreton Bay Marine Park. The entire frontage of the NEBP site adjoins the Deception Bay Fish Habitat Area.

The Coastal Management District (CMD) is declared under the *Coastal Protection and Management Act 1995*, and is generally defined as land up to HAT or extending 40m inland from MHWS, whichever is the greater. The mapped extent of the CMD has been ground truthed by Cardno and the appropriate CMD is presented in relation to the proposed Structure Plan in Figure 15.

Marine Vegetation

Small areas of marine vegetation including mangroves and saltmarsh exist on the NEBP site, mainly associated with tidal creeks and drains. At the location of the proposed entrance to the marina, few mangroves have been observed, as land is predominantly cleared of vegetation from past activities.

Outside the site, a mangrove forest exists approximately 3 kilometres upstream from the mouth on the northern side of the river, just downstream of the confluence with King John Creek. Nearer the NEBP site which is further upstream, the mangrove forests cover much smaller areas. The largest upstream mangrove forest



occurs opposite the existing marina and slipway "Monty's Marina" whilst a smaller stand occurs within the north eastern portion of the NEBP site.

Water Quality

Investigations of the Caboolture River have concluded that the overall water quality of the Caboolture River adjacent to the NEBP site is poor in relation to the WQOs which have been published by the EPA for the Caboolture River. This is evidenced by concentrations of dissolved oxygen, turbidity and nutrients. It has been documented that the water quality in the Caboolture River over time has been deteriorating. This result has been linked in all studies to the following pressures (in no particular order of importance):

- coastal development;
- the installation of a weir 19km upstream from the estuary;
- unmanaged stormwater runoff; and
- wastewater releases.

Sediment Quality

Sediment samples were collected and analysed from the Caboolture River adjacent to the NEBP site and nearer the river mouth, where dredging is proposed. Results show that concentrations of metals are generally low compared to ANZECC (2000) Sediment Quality Guidelines, although nickel and copper were slightly elevated in some samples.

Riparian Corridor

WQO's for riparian areas have also been developed under the EPP Water framework. WQO's for riparian areas located within the estuarine reaches of the Caboolture River catchment are presented below.

Riparian Function				
Ecological processes	Habitat	Bed and bank stability		
 Maintain or restore marine plants to achieve: shade over the near bank areas; moderation of temperature and dissolved oxygen extremes; organic cycling of leaf litter for nutrients and energy; and transformation of diffuse nitrogen inputs. 	 Eradicate weeds and maintain or restore: in-stream debris; and marine plants, trees, shrubs and ground cover on the banks. 	Maintain and restore bank vegetation to minimise erosion.		

Table E5	Aquatic Ecos	vstem Environmental	Value: WQO for Ri	parian Areas
	riquado E000			pariar / li ouo



Coastal Processes

The tidal range at the mouth of the Caboolture River is approximately 2.6m. HAT is +1.34m AHD and Lowest Astronomical Tide (LAT) is -1.26m AHD. To date no specific storm tide assessment within Caboolture Shire has not been undertaken. but 100 year Average Recurrence Interval (ARI) storm tide levels in the region vary from 1.3m AHD to 2.2m AHD.

Since 1998, bathymetric survey shows that the bed level of the lower estuarine section of the River has increased, causing the water depth to become shallower. The installation of the weir 19km upstream from the Caboolture River estuary has played a key role in loss of sediment transport downstream to the tidal reaches of the river. Sedimentation in the lower estuarine section of the Caboolture River is likely to be associated with reduced river flows during drought conditions and natural coastline drift processes.

Air

<u>Air Quality</u>

The Bruce Highway and local government roads surrounding the project area are the most significant existing sources of air pollutants in the area. The main pollutants which affect human health are those that are emitted by motor vehicles including carbon monoxide, oxides of nitrogen, volatile organic compounds and particulate matter. Existing industrial facilities within Caboolture Shire (such as the Narangba Industrial Estate located approximately 10km from the NEBP site) include activities such as poultry farming, sawmilling, gravel and sand quarrying, wood product manufacturing, pet food preparation and petroleum storage. The NEBP is well removed from these sources and it is therefore considered unlikely that the existing air quality of the NEBP site is greatly influenced by industrial emissions. All facilities in the region which have reported to the National Pollutant Inventory in 2004 have relatively low emission rates of all reported substances, compared to other facilities of similar nature in Australia.

Existing sensitive places which may be affected by adverse air quality emissions from the construction and operation of the proposed NEBP are:

- dwellings surrounding the NEBP site and adjoining local government roads;
- the Moreton Bay Marine Park; and
- the adjacent Moreton Bay Ramsar wetlands.

<u>Dust</u>

Background dust levels are required for the modelling to represent all regional sources and to quantify the potential impact of air pollutants from the proposed development. Data from the Queensland EPA's monitoring site at Mountain Creek (~47km north of the NEBP site) for the period 2001 to 2005 was obtained for analysis to determine a suitable background level for PM_{10} . The 24-hour average, 95th percentile, and annual average background concentrations used in the modelling assessment are 30 µg/m³ and 17 µg/m³, respectively.


Total Suspended Particles (TSP) is not recorded at any of the EPA monitoring stations. Data collected in Brisbane found PM_{10} to be an annual average background level of 24.2 µg/m³ for TSP.

There are no known measurements of dust deposition rate within the NEBP area. A background of 20 mg/m²/day was used in the Air Quality Assessment based on information collected in Southeast Queensland.

Air Quality Objectives

National standards and goals for air quality are set by agreement between the Federal and State Governments through the National Environment Protection Council (NEPC) and published in the National Environment Protection Measure (NEPM) for Ambient Air Quality. The standards and goals serve to control exposure of the general population to air pollutants and protect against adverse health effects resulting from emissions of carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), ozone (O₃) and particulate matter with aerodynamic diameter less than $10\mu m$ (PM₁₀). These pollutants are relevant because they commonly occur due to direct emissions from industry, traffic and domestic activities and as such, are generally used as indicators of urban air pollution. Deposition of particulate matter can result in dust nuisance which is a common issue during construction works.

Noise and Vibration

The NEBP site does not contain any noise sensitive places within the development area. However dwellings exist in the environment adjacent to the NEBP site which can potentially be impacted on by an increase or change in the noise and vibration in the locality.

The most significant noise source in the locality of the NEBP site which contributes to the ambience of the existing environment is road traffic from the Bruce Highway and local government roads. These roads include Trafalgar & Nolan Drive, Coach Road, Buckley Road and Farry Road which surround the NEBP site. Additional noise sources from rural activities exist such as those noise emissions from a horse training yard and stables (located on Trafalgar Drive).

Existing noise sensitive places which may be affected by noise from the construction and operation of the proposed NEBP are:

- dwellings surrounding the NEBP site and fronting the local government roads nominated above;
- Moreton Bay Marine Park; and
- adjacent Moreton Bay Ramsar wetlands

Background noise monitoring identified that dwellings surrounding the NEBP site are significantly affected by road traffic noise from the Bruce Highway and local government roads. A sound pressure level (SPL) of 55 dB(A) $L_{Aeq, 24 hours}$ was recorded in the locality of residences on Nolan and Trafalgar Drive. Lower noise levels were recorded at Coach Road and Farry Road because of the increased distance between the Bruce Highway at these locations, but the contribution of road traffic noise from local government roads to the background noise levels still exists.



Sensitive Place	SPL L _{Amax}	SPL L _{A10}	SPL L _{A90}	SPL L _{Aeq}
Residential A	75 dB(A)	56 dB(A)	48 dB(A)	55 dB(A)
Residential B	65 dB(A)	54 dB(A)	48 dB(A)	52 dB(A)
Residential D	59 dB(A)	46 dB(A)	41 dB(A)	45 dB(A)

Table E6Ambient Sound Pressure Levels Recorded from 29 July 2007-1August 2007

Nature Conservation

Terrestrial Flora

Historically the NEBP site has been subject to episodes of broad-scale vegetation clearance associated with native timber getting, livestock grazing and exotic pine plantation forestry. Currently, the NEBP site is being utilised for livestock production and as such, the majority of the site supports highly disturbed grassland vegetation. Interspersed throughout the grassland landscape are small areas of marine vegetation, paperbark swamps, eucalypt forest, native pine vegetation and heathland. The Caboolture River, which delineates the northern boundary of the NEBP site, supports riparian vegetation that has been reduced to a narrow fringe of terrestrial and marine plants with varying levels of weed incursion. There are also groves of cultivated exotic trees remaining along the banks of the Caboolture River where old homesteads used to exist.

A review of flora records from the NEBP site locality indicated 11 species of conservation significance that may potentially occur. Of these, four were considered to have a moderate likelihood of occurrence on the NEBP site, and seven were considered to have a low likelihood of occurrence. None of these or any other threatened flora species were recorded on the NEBP site, during field surveys.

A number of weed species were recorded on the NEBP site, including five species that are considered major pest plants in Queensland, and five species that are classified as significant weeds.

Terrestrial Fauna

The NEBP site and adjacent reaches of the Caboolture River provide habitat resources that are exploited by a diversity of terrestrial fauna. Whilst past and current land use practices have resulted in substantial modifications to the NEBP site's natural ecosystems, the modified ecosystems that remain provide food, shelter, breeding sites and movement corridors for species of native and introduced mammals, birds, reptiles and frogs. The diversity of terrestrial fauna that either permanently inhabit or periodically utilise the site is also a function of the following factors.

- The relatively large area of the NEBP site and diversity of vegetation and fauna habitats that occur therein.
- The position of the NEBP site adjacent to the Caboolture River.



• The relatively close proximity of the NEBP site to Moreton Bay to the east and the D'Aguilar Ranges to the west.

A total of 51 species of terrestrial mammal have been recorded in the EPA Wildlife Online database within a 10km radius of the NEBP site. During the various field surveys that have been carried out on the NEBP site a total of 20 species of terrestrial mammal have been recorded.

Birds are by far the most diverse group of terrestrial vertebrates in the NEBP site locality, with a total of 309 bird species recorded in the EPA database within a 10km radius of the NEBP site. A total of 89 bird species have been recorded during field surveys of the NEBP site.

A total of 45 species of terrestrial reptile and 26 species of amphibian have been recorded in the EPA database within a 10km radius of the NEBP site. A total of 13 species of terrestrial reptile and 6 species of amphibian have been recorded on the NEBP site.

A review of terrestrial fauna records from the NEBP site locality indicated 28 species that are listed as threatened species pursuant to either the NC Act or EPBC Act may potentially occur in the NEBP site locality.

The habitat requirements of each species have been examined to assess the likelihood that the species would utilise areas to be affected by the NEBP development. Each species has been allocated a likelihood of Very High, High, Moderate or Low. Two of threatened species have been observed on the site (Koala and Tusked frog) and a further four are considered to have a high probability of occurring on the NEBP site. The species observed on site or considered to have a high probability of occurring are listed below.

Table E7	Threatened Fauna Species Known or Likely To Occur At the NEBP
Site	

Common Name	Species Name	Status
Koala	Phascolarctos cinereus	Vulnerable- Queensland
Grey-headed flying-fox	Pteropus poliocephalus	Vulnerable- Commonwealth
Grey goshawk	Accipiter novaehollandiae	Rare- Queensland
Black-necked stork	Ephippiorhynchus asiaticus	Rare- Queensland
Wallum froglet	Crinia tinnula	Vulnerable- Queensland
Tusked frog	Adelotus brevis	Vulnerable- Queensland

A review of fauna records from the NEBP site locality indicated that 18 species of migratory bird species are known, or considered likely, to utilise available habitat resources in the NEBP site locality.

Whilst the NEBP site is not recognised as an important habitat area for migratory bird species, the NEBP site's complex of open grasslands, freshwater and saline wetlands, fringing forests and woodlands, do make a functional contribution towards the internationally recognised migratory shorebird habitat values of Moreton Bay.



Also of note is the presence of a White-bellied Sea-eagle nest within a large Queensland Blue gum located adjacent to the old homestead site.

Two species of vertebrate fauna that are known to occur on the NEBP site are listed as Class 2 pests within the *Land Protection (Pest and Stock Route Management) Regulation 2003* (LP Act). These species are:

- Red fox (*Vulpes vulpes*); and
- feral Pig (Sus scrofa).

Other non-native vertebrate species that are not specifically listed under the provisions of the LP Act but which may be considered pest species due to their capacity to have adverse environmental or economic impacts include:

- Black rat (*Rattus rattus*);
- House mouse (Mus musculus);
- Brown hare (*Lepus capensis*);
- feral Cat (*Felis catus*);
- Indian miner (Acridotheres tristis); and
- Cane toad (*Bufo marinus*).

The main invertebrate pest species that are known to occur in the NEBP site locality are species of mosquito and biting midge.

Aquatic Biology

Investigations to date have identified the following features in relation to aquatic ecology.

- The NEBP site comprises several areas of aquatic habitat, the most significant being Raff Creek and areas of mangroves and saltmarshes fringing the NEBP site boundary and Caboolture River. The tidal portion of Raff Creek habitat appears to be included within the Deception Bay Fish Habitat Area. Upstream of the tidal influence, this creek forms a drainage line. Further upstream and beyond the southern boundary of the NEBP site, a series of artificial, freshwater ponds have been excavated amid residential properties.
- The proposed entrance to the marina is in a section of the river subject to some erosion and with few aquatic plants. Several small, mangrove-lined channels occur to the east of the proposed marina entrance. Three species of mangroves have been identified on the NEBP site grey mangroves (*Avicennia marina*), milky mangroves and river mangroves (*Aegiceras corniculatum*). The channel closest to the proposed entrance contains little water and, at this stage, is considered to be of limited value as aquatic habitat.
- The weir on the Caboolture River forms a major barrier to fish passage (despite the presence of a small fishway) and has significant effects on the distribution of aquatic plants and on water chemistry.



- Whilst the Caboolture River retains significant features, there has been obvious alteration of the river by human activities in addition to the weir. Downstream of the NEBP site is Monty's Marina and slipway. This contains moorings within the main river channel and along the northern boundary of the river; it also has a large hardstand area and slipway running directly into the river. Further upstream, near the entrance to Goong Creek, there is a small residential area with several large vessels moored on the side of the river channel. In addition, there are small foreshore works, bank stabilisation and private slipways. Finally, there are two Sewage Treatment Plants (STP's), one discharging into the Caboolture River just downstream of the weir and one near the entrance to the river, discharging into Burpengary Creek. These STP's have been identified as problematic to water quality in previous studies.
- Parts of the Caboolture River are in areas prone to shoreline erosion, particularly where natural vegetation has been cleared to the edge of the river channel. Mangroves have provided some stabilisation of banks, particularly by the growth of pneumatophores (peg roots) which hold the sediment together.
- On the NEBP site there is evidence of degradation due to unauthorised access onto the property. This includes debris such as vehicles dumped on the shoreline and even in the river, and erosion of dirt tracks exacerbated by 4WD vehicles. Significant opportunities exist to improve the shoreline of the NEBP site by implementing appropriate management practices.
- Surveys of benthic invertebrates indicated a relatively low-diversity assemblage occurring both in the river channel (sub-tidal) and on river banks not colonised by mangroves. Fish communities in tidal creeks in and around the NEBP site were dominated numerically by mosquito fish, an introduced species. Sampling did, however, yield a number of native species, including ones of economic interest. Sampling in the river channel yielded more species of fish, but the sampling method was hampered by strong currents and limited areas available for sampling.
- Further work on invertebrates and fish in the navigation channel proposed for capital dredging and on adjacent intertidal flats revealed that assemblages of benthic invertebrates were relatively distinct between the navigation channel and flats, although fish assemblages were quite similar at the two habitats, suggesting that fish may range from the channel over the flats at mid to high tide.

Cultural Heritage

Indigenous Cultural Heritage

The NEBP site, located as it is adjacent to the Caboolture River, with some low ridgelines, as well as high banks and terraces, would have been suitable for the location of Indigenous campsites. The few remaining mature trees are evidence that the NEBP site was once densely vegetated. The tidal river coupled with other permanent water supplies, abundant vegetation and stone material for making artefacts means that there was a plentiful supply of good quality resources available to both Indigenous and non-Indigenous people to utilise.



However, the NEBP site has been subject to many degrading activities including cultivation, plantations and clearing. Other activities such as trail bike riding, furrowing and the construction of roads and trails may have damaged or scattered artefacts. The banks of the river are also actively eroding which may have exposed and transported some artefacts; and some non-Indigenous sites may have been vandalised. The NEBP site is also infested with weeds such as Lantana, but its dense cover may have provided some protection to cultural heritage material from both environmental and human impact. Because of the degrading activities and dense weed cover, it was difficult to establish the cultural significance, if any, of the artefacts that were found.

A 2003 cultural heritage survey on Lot 10 RP902079 and Lot 2 RP902075 identified the following cultural heritage sites:

- Area A: Site Complex—Shell and Artefact Scatter.
- Area B: Site Complex—Stone Artefact Scatters.
- Area C: Site Complex—Shell and Artefact Scatter.
- Location 1: Isolated Stone Artefact.
- Location 2: Isolated Stone Artefact.

A 2006 cultural heritage survey on Lot 24 SP158298 and Lot 7 RP845326 identified the following cultural heritage sites:

- Site 1: Shell Scatter an extension of Area C.
- Site 2: Shell and Artefact Scatter.

The locations referred to above are illustrated in Figure 17.

The cultural heritage surveys estimated that the existing level of disturbance on cultural heritage sites was considered as "Significant - Category 4" pursuant to the Duty of Care Guidelines. This generally means that it is unlikely that future activities, such as the development of the NEBP will further harm Aboriginal cultural heritage, and that the activity can proceed provided that principles of cultural heritage management are considered and addressed. An Indigenous Cultural Heritage Management Plan has been prepared for the project.

Non- Indigenous Cultural Heritage

The following sites of non-indigenous cultural heritage have been identified:

- Area D: "Morayfield Complex" remains of buildings and other structures.
- Area E: Boiler and Associated Dam.
- Area F: 1950s House Complex.
- Location 3: Exotic Plantings.
- Location 4: Memorial Stone.

The non-indigenous sites are of varying significance. However areas D, E and Location 4 were considered to be of greatest significance as these areas are associated with a prominent citizen and the first non-indigenous settlement of the area. This area also marks the introduction of Pacific Islander labour to the area



(the memorial stone site is considered to be that of a member of the Pacific Islander community).

The remaining non-indigenous sites were not considered to be significant, although it was recommended that the vegetation plantings in Location 3 be retained as a feature.

A Non-Indigenous Cultural Heritage Management Plan (Non-Indigenous CHMP) has also been developed specifically for the project.

Social

The current resident population of the existing Caboolture Shire (at the time of the 2006 Census) was 132,473 persons, including a small but stable Indigenous population.

The social values of the population are relatively diverse, although most residents have a strong sense of local identity and community. Like much of SEQ, Caboolture is undergoing strong growth and in-migration, which is changing the local population. However, the high population growth has resulted in some pressure on social infrastructure, such as access to social and community services, and also to perceived threats to liveability, public health and safety.

Community infrastructure, like schools, places of worship, hospitals and other related services are relatively close to the NEBP site, and are also clustered around established centres such as Morayfield, Caboolture and Narangba. Community infrastructure is predominantly found along the main transport corridors, and most of the region has adequate basic amenities such as banks, post offices, shops and community organisations.

Primary health care is a key issue for the local community. General practitioners are located in most population centres (with specialist centres in Caboolture), and some larger communities, such as Bribie Island, have access to community health centres. There is also a possible shortage of doctors, with residents reporting that some medical practices were not taking on new patients.

Educational facilities are relatively evenly distributed, and are found in all towns and regional centres. Both State and private schools are present. Tertiary and specialised infrastructure, such as TAFE and the Queensland University of Technology (QUT), is located close to the principal activity centre of Caboolture.

The region has dispersed sporting facilities, clustering around the urban spine and on Bribie Island. These include aquatic centres, bowls clubs, golf courses and water sports.

The Community Context Study showed that the image and identity of Caboolture are markedly different. The image (by outsiders) is one of negative social issues such as welfare dependency, low cost housing, the Woodford Correctional Facility, and increased traffic congestion on the Bruce Highway. However, the identity (as seen by those living and working in the community) is very different. The Cultural Context Study shows that residents saw the area as having diverse coastal and hinterland experiences, and is friendly, safe and relaxed, with a welcoming urban



yet country feel. It is also home to major cultural events, such as Farm Fantastic and the Woodford Folk Festival.

Residents of the Core Area (the four Census collection districts closest to the NEBP site) appreciated the area's convenience; its proximity to the highway and rail transport. They liked the semi rural area, with its natural environment and open space, mentioning the many parks, open bushland and waterways. However, negative perceptions included the increasing traffic congestion and rapid development, inadequate public transport and youth anti social behaviour such as graffiti and crime. Residents also wanted more local job opportunities and industrial and business developments. They wanted better public transport, a broader range of entertainment and dining options, and better activities and facilities for youth.

Economy

The Caboolture Shire, like much of South East Queensland, is experiencing a high population growth rate; for example, in the 5 years to June 2006, the Caboolture Local Government Area experienced one of the highest growth rates in Queensland.

The Caboolture Shire and surrounding area is an attractive coastal region, so is an appealing residential area. The SEQ Regional Plan has identified a target for Caboolture of 15,000 new dwellings by 2016, and an overall target of 26,400 new dwellings by 2026. Since June 2004, 4,755 new dwellings have been approved for development (3,637 detached and 1,118 other (mainly attached) dwellings). If the population growth and current development trends are to continue at the same rate, then Caboolture will run out of urban land between 2012 and 2017.

The existing housing market in Caboolture Shire is similar to the rest of SEQ, with low supply and high demand. The area within 2km of the NEBP site (the Core Catchment) as well as Burpengary and Narangba have relatively high property prices. Other areas, like Caboolture Central, are more affordable. However, in comparison with Brisbane and the Sunshine Coast, property values still represent reasonable value for money, and because of this, the region is attracting many new residents in search of more affordable housing.

The area has pockets of significant social and economic disadvantage as well as relative affluence. It is characterized by an ageing population, increasing ethnic diversity, increasing housing costs, decreased proportions of social housing and continuing strong population growth. Those living in the more disadvantaged areas of Deception Bay, Bribie Island and Caboolture Central are more likely to be unemployed and are less well educated, with lower than average household income levels. They are also more likely to rent rather than own their home and live in a household with reduced connectivity (no access to motor vehicle and internet).

Those living elsewhere, such as in the Core Catchment, Burpengary and Narangba, are more likely to live in a family with children under 15, have high qualifications and work in a professional job. They are more likely to earn comparatively high incomes, be purchasing their home, and own more than two cars and a broadband internet connection.

A summary of economic benefits of NEBP are as follows.



Table E8	Summary of Benefits
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Economic Benefits	FTE jobs	Expenditure/ Value Added (\$ Million)
Development Phase		Annually
Direct	777	\$1,912.5
Indirect	770	\$1,999.8
Govt Revenue		\$335.4
Operational Phase		Annually
Industry /Business Park Direct	12,423	\$1,151.7
Industry /Business Park Indirect	12,248	\$1,327.44
Residential Direct	899	\$34.4
Residential Indirect	850	\$40.2
Marina Precinct Direct	348	\$34.6
Marina Precinct Indirect	345	\$40.3
Golf Course Direct	15	\$2.7
Golf Course Indirect	21	\$3.2
Total Operational Direct	13,685	\$1,223.4
Total Operational Indirect	13,464	\$1,411.1
Govt Revenue		\$291.1
Total Operational (ex Govt)	27,150	\$2,634.5

Source: Urbis

Impact Assessment

Potential impacts of the NEBP proposal have been identified in the technical reporting undertaken in relation to NEBP, and where appropriate, suitable mitigation measures have been identified to control and manage impacts. Offsets and benefits have also been proposed where appropriate.

A summary of identified positive and negative impacts, key commitments and mitigation measures are outlined in the Impacts and Mitigation table presented below. An assessment of the residual impact has also been made that is, the impact remaining after the proposed mitigation measures have been implemented.



Table E9 Impacts and Mitigation

Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
Matters of National Environmental Significance (Section 1.7 and Appendix	Direct physical impacts on most of the site's terrestrial ecosystems and associated native flora and fauna species as a consequence of the clearance of native vegetation communities, cut & fill to achieve acceptable flooding outcomes and associated development works.	The provision of environmental off-sets are required to compensate for the clearance of some areas of existing vegetation and fauna habitat that will occur as a result of the NEBP development.	Adverse Low
L3)		The establishment and on-going maintenance of substantial revegetation and habitat enhancement works within the Open Space precincts of NEBP.	
	Bay associated with the dredging of the navigation channel and alterations to the patterns of usage of the Caboolture River that will result from the establishment of a marina at the NEBP site.	Management of the construction & operation of NEBP in accordance with a number of management plans.	
Climate (Section 4.1)	Potential for impacts on property and flooding during flooding or storm tide events greater that 1 in 100 year ARI.	Preparation of an evacuation plan and emergency response plan for the construction phase and for each development precinct.	Adverse Low
	Potential for NEBP property, residents and workers to be impacted to be affected by bushfire.	Design of the site in accordance with SPP 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide.	Adverse Low
Soils (Section 4.2.1.3)	Release of acid waters resulting from the exposure of acid sulfate soils.	Handling of all bulk earthworks and dredging material in accordance with the ASSMP, which includes details of monitoring, treatment and validation.	Adverse Low
		Monitoring of all water discharged from the site following dewatering of the marina basin during construction, and treatment if necessary prior to discharge.	
Land Use Suitability (Section 4.2.2.1)	Over-irrigation of effluent, potentially leading to loss of nutrients to groundwater; runoff of effluent to surface waters and decrease in capacity of soil to assimilate effluent.	Effluent irrigation of a Class A+ quality over a minimum 140 hectare irrigation area with grass cover (e.g. kikuyu), and no irrigation to occur on wet weather days.	Adverse Low



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
	Need for off-site disposal of soils if material is not suitable for reuse on site.	Geotechnical investigations have identified measures which can be implemented to render all material suitable for reuse, including mixing & compaction.	Neutral
Land Contamination (Section 4.2.2.2)	Release of contamination from contaminated lands, impacting on human health or groundwater.	Contaminated land will be fully remediated.	Positive Low
Soil Erosion (Section 4.2.2.3)	Soil erosion during construction works.	Progressive stabilisation and rehabilitation of disturbed areas to protect exposed earthworks.	Adverse Low
		Installation of engineer-designed erosion protection measures in accordance with the Institution of Engineers (Qld Division) Manual for Erosion and Sediment Controls.	
Soil Erosion (Section 4.2.2.3)	Soil erosion during operation.	Installation of engineer-designed permanent erosion protection measures in accordance with the Institution of Engineers (Qld Division) Manual for Erosion and Sediment Controls.	Positive Low
		Re-establish edge vegetation at property boundaries within MIBA and access roads.	
Landscape	Impacts on Landscape Character arising from	Protection of existing vegetation where practicable.	Neutral
Character (Section 4.2.2.4)	changes in landform and vegetation clearance.	Open space planning incorporated into the Structure Plan to ensure that the significant components of the landscape character are retained whist protecting the NEBP from flood impacts.	
Visual Amenity (Section 4.2.2.5)	Minor visual impact on views from Weier Road & Captain Wish Avenue, Farry Road & Buckley Road.	Proposed vegetation planting will screen views. Design of the NEBP structures to ensure that the views of taller structures in the centre of the site are mitigated by a transition zone of either lower buildings or	Low



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		vegetation, generally a combination of both, that does not dominate the views or impact on the visual amenity from view points surrounding the site.	
Lighting (Section 4.2.2.6)	Light spillage from fixed lighting. Glare and intrusion of fixed lighting. Glare and intrusion from headlights associated with vehicles accessing the site.	Minimisation of light spillage will be considered in detailed design of lighting design, including the use of landscaping and site fencing to contain of lighting, use of low-level bollard lighting where possible and the use of low-glare external advertising signage. The Structure Plan allows for effective buffering of the surrounding areas from light spillage by vegetation or single residential precincts or landscaping in the case of the marina village precincts.	Low
Transport (Section 4.2.2.7)	 Increase in traffic leading to impacts on the ability of the external road network to function efficiently, in particular: the Buchanan Road/Bruce highway interchange; the Uhlmann Road/Buckley Road intersection; and Bruce Highway on & off ramps between Uhlmann Road & Buchanan Road. 	Upgrade of Buchanan Road access and intersections with the Bruce Highway on and off-ramps. Minor upgrading to a dual lane roundabout at the Buchanan Road/Bruce Highway northbound. A further intersection upgrading to a signalised layout will be required prior to the completion of Stage 2 for further stages of the development. Minor upgrading to a dual lane roundabout of Buchanan Road/Bruce Highway southbound Intersection. A further upgrade to a signalised form, with additional turn and through lanes will be required prior to completion of Stage 2 to accommodate further development traffic. Upgrade to the Uhlmann Road/Buckley Road Intersection to a signalised layout with additional lanes on the eastern and northern approaches and slip lanes for left turns from the south and west. Upgrade to the Uhlmann Road/Bruce Highway	Positive Medium



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		northbound Intersection to allow for additional through and turn lanes.	
		Upgrade to the Uhlmann Road/Bruce Highway southbound Intersection.	
	High dependency on car use causing increased impacts on the internal road network.	Provision of sustainable transport modes throughout the development, such as public transport, bicycle and pedestrian networks.	Neutral
Waste (Section 4.3)	Waste spills and loss of containment of waste resulting in impacts to soils, surface water, groundwater, terrestrial and marine fauna, and human health.	Wastes to be managed in accordance with the <i>Environmental Protection (Waste Management) Regulation 2000</i> , and in accordance with the Waste Management Plan developed for the NEBP.	Neutral
		Waste avoidance, minimisation, reuse and recycling principles to be utilised wherever possible.	
		No disposal of solid or hazardous wastes on the NEBP site.	
		Design of marina waste facilities in accordance with 'Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand'.	
		Operation of the marina with regard to the Marina Industries Association of Australia (MIAA) 'Clean Marinas' accreditation programme.	
Water Resources (Section 4.4)	Increase in pollutant loads discharging to the Caboolture River arising from a change in land use.	The following reduction targets have been adopted for the surface water quality objectives for the development.	Neutral
		• 80% reduction in total suspended solids.	
		• 60% reduction in total phosphorous.	
		• 45% reduction in total nitrogen.	



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		90% reduction in gross pollutants.	
		A baseline water quality monitoring program will be established to determine long term trends in ecosystem health as a result of the proposed development.	
	Increase in pollutant loads relating to the disposal of additional sewage effluent generated by the development to Caboolture River.	Irrigation of 2.3 ML of treated effluent per day to landscaped areas of the site. This is equivalent to the entire sewage flows generated by the site. Therefore, removal of effluent discharged to the Caboolture River.	Neutral
	Damage to foreshore habitats as a result of increased public access	Control over shoreline access will be far greater than at present, which would help to enhance the management and ultimately the value of foreshore habitats.	Positive Medium
		Management would be likely to include walkways and educational signage along foreshore habitats, increasing public awareness.	
	Pollution from sewage and bilge discharge from boats.	Effluent discharge from boats will be prohibited. A sewage and bilge waste pump out facility will be provided at the marina.	Neutral
	Increase in quality of stormwater runoff due to an increase in impervious area.	Stormwater design will incorporate the following objectives: • capture and manage the first 15 mm/day of runoff from all impervious surfaces; and	Adverse Low
		 limit the post-development peak one-year Average Recurrence Interval (ARI) event discharge to the receiving waterway to the pre-development peak one-year Average Recurrence Interval (ARI) event discharge. 	
	Potential for development on the site to be affected	The development of the site includes a cut and fill plan to ensure the majority of the built form development will	Neutral



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
	by flooding.	be located above the 1 in 100 year (Q100) flood level.	
	Increase in flood levels on the site or on other properties upstream or downstream of the development as a result of changes in ground level on the site.	Flood mitigation measures including flood bypass channels, mitigation cut areas and earth diversion bunds have been included in the design to ensure no adverse impacts on flood storage or flood levels. Decrease in flood levels in areas surrounding the NEBP.	Neutral
Coastal Environment (Section 4.5)	Impacts on tidal prism, altering flow velocities in the Caboolture River.	Installation of lock system with pumped water exchange system to isolate marina basin from tidal flows.	Neutral
	Disturbance to coastal wetlands.	Coastal wetlands to be conserved and protected by a buffer zone.	Adverse Low
		Provision of open space with the objective of retaining, rehabilitating and conserving protected values including aquatic ecosystems, primary and secondary recreation and visual recreation identified in the 'Caboolture River Environmental Values and Water Quality Objectives' report by the EPA.	
		Retention and enhancement of areas of coastal wetland associated with Raff Creek.	
	Erosion of riverbank resulting from an increase in marine traffic.	Implement a monitoring program to assess the level of riverbank erosion over time.	Adverse Low
		Raising of levy on boat berths to facilitate a program of rehabilitation works in the Caboolture River corridor external to the site.	
		Contribution to the stabilisation and rehabilitation of the erosion prone area by planting riparian vegetation at a density and composition to enhance ecological	



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		processes.	
		In consultation with the EPA, investigate the feasibility of utilising material dredged from the Caboolture River navigational channel to create additional high tide roost sites for migratory wading birds.	
Air (Section 4.6)	Dust generation during construction works causing nuisance at surrounding sensitive places.	Technical reports demonstrate that dust levels will be in compliance with relevant standards.	Adverse Low
		Implementation of the air pollution control strategies outlined in the Construction Environmental Management Plan.	
	Generation of dust, odour or other air emissions during operation of MIBA precinct impacting on	Consideration of type of industry permitted to occupy MIBA precincts.	Adverse Low
	sensitive places within or outside the NEBP.	Compliance with Marina Site Based Management Plan developed for the site.	
		Provision of 420 hectare open space area as a buffer zone for dispersion of air pollutants.	
	Increase in greenhouse gas emissions as a result of the construction & operation of the development.	Sourcing of a proportion of energy from renewable sources, including biofuels & green electricity.	Adverse Low
		Monitoring of energy & fuel consumption.	
		Design of NEBP with a network of pedestrian & cycle routes to encourage the use of non-motorised transport.	
Noise and Vibration (Section 4.7)	Noise impacts during construction causing nuisance at surrounding sensitive places.	Implementation of the noise control strategies outlined in the Construction Environmental Management Plan.	Adverse Low- medium (short term)
	Noise impacts arising from uses with the MIBA precincts causing nuisance to sensitive places	Provide acoustic treatments (such as noise barriers) where required having regard for land area and the	Adverse Low



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
	within or outside the NEBP.	character of the adjacent sensitive use.	
		Acoustically attenuate noisy equipment where the operation of this equipment can adversely impact existing environmental values.	
		Comply with noise conditions of relevant approvals.	
Nature Conservation (Section 4.8)	Clearance of 13 hectares of remnant vegetation in the south-western sector of the NEBP site.	Establish a vegetation offset in accordance with DNRW's Policy for Vegetation Management Offsets - 23 August 2007'.	Adverse Low
	Direct physical impacts on terrestrial ecosystems arising from vegetation clearance necessary for landform changes and flood mitigation.	Establish and maintain substantial revegetation and habitat enhancement works within the Open Space precincts.	Adverse Low
		Establish cooperative partnership arrangements and other opportunities for community based groups such as Caboolture Regional Environmental Education Centre (CREEC).	
		Undertake extensive rehabilitation of degraded habitats within the site, including the Caboolture River riparian zone.	
	Potential for construction of flood mitigation banks to impact on habitat within Coastal Management District.	No mitigation is proposed for the direct impacts, as the proposed earth banks are necessary for the mitigation of flood impacts. Rehabilitation of riparian and coastal areas in other parts of the site will be undertaken which will provide an offset for these direct impacts.	Adverse Low
		Construction works will be undertaken in accordance with the Construction Environmental Management Plan to minimise the potential indirect impacts of construction.	
	Increase in nutrient loading arising from increased sewage loading to Burpengary East STP.	NEBP will provide area for irrigation of 2.3ML/day of treated sewage effluent on site. This effluent will be	Neutral



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		sourced from the South Caboolture STP, and is equivalent to the volume of effluent produced on the site.	
	Water quality and aquatic habitat changes due to the construction and operation of a marina.	Lock system for access by boats to and from the marina controls potential impacts of the marina basin on the tidal regime of the Caboolture River.	Adverse Low
		Potential build up of contaminants in the water and sediment will be mitigated somewhat by the pump system associated with the perched marina.	
		A Marina CEMP, SBMP and ongoing marina water quality monitoring has been prepared.	
	Noise, vibration and artificial lights impacting aquatic flora and fauna.	During construction of the marina basin it will be isolated from the estuary.	Adverse Low
		No blasting required for construction.	
		The lock system and speed limits will be implemented for boat traffic.	
		Lights to be directed away from the water, where possibly.	
	The predicted replenishment of sediments in the navigational channel from adjacent banks represents potential for impacts beyond the channel and hence within the designated Fish Habitat Area.	As dredging is contained within the navigation channel, which is the responsibility of Queensland Transport, no specific mitigation measures are proposed.	Adverse Medium
Cultural Heritage	Disturbance to or destruction of items or places of	Provision of a dedicated Heritage Park.	Adverse
(Section 4.9)	indigenous cultural heritage significance.	Nominate a staff member as the Cultural Heritage Coordinator. The Cultural Heritage Coordinator shall form a part of the Cultural Heritage Team and will maintain regular contact with the Gubbi Gubbi people.	Low
		The Cultural Heritage Team to undertake archaeological	



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		excavations of sites in areas A, B, C, Location 2 and selected areas of the high banks and terraces adjacent to the Caboolture River. Document all results and develop a management report based on the findings.	
		In the event of discovering cultural heritage material the Cultural Heritage Coordinator will notify the Indigenous Coordinator and the Archaeologist, who will collectively find, analyse, document, record and salvage the material if it is located in the disturbance area.	
		In the event of discovering human remains, all works will immediately cease and the Cultural Heritage Coordinator will immediately contact the Police.	
	Disturbance to or destruction of items or places of non- indigenous cultural heritage significance.	Provision of a dedicated Heritage Park. Prior to removal of the 1950's house complex it shall be documented, surveyed, photographed and plan drawings prepared according to the standards of the Australian Heritage Commission.	Adverse Low
		The memorial stone on the southern bank of the Caboolture River, shall be protected and preserved, and further historical research undertaken.	
Social (Section 4.10)	Benefits to the wider community by the creation of a community infrastructure.	Implementation of social infrastructure such as a Post Office, cycle and footpaths, walking trails and library, where appropriate.	Positive Medium
		Establishment of a community association and development strategy to help blend existing and emerging communities.	
		Contribute funding from each residential lot sale to a Housing trust for the provision of affordable housing in Caboolture.	



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		The introduction of a skills hub that provides pathways into the emerging employment opportunity will strengthen the tertiary educational provision available to the regional community (as well as to local residents).	
		The planned and timely delivery of a primary school and primary health care facilities in the community to the east of the highway will ensure that there is no negative impacts on the existing infrastructure base in the area and will deliver a net benefit to the local community in the core catchment.	
	Benefits through creation of construction jobs	1,632 direct & indirect construction jobs predicted to be created.	Positive Medium
	Benefits to Caboolture Shire by creation of long term employment.	Development of integrated development which includes residential, business, industry, recreation & community facilities, and contributing to the CSC's goal of 2 out of 3 residents living and working in Caboolture.	Positive High
		13,685 FTE direct employment opportunities predicted, and a further 13,464 indirect FTE jobs.	
	Impacts on housing affordability.	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.	Neutral
Health and Safety (Section 4.11) & Hazard and Risk (Section 4.13)	Heath & safety risks introduced during construction works.	Develop and implement a Workplace Management Plan which shall contain procedures to ensure that workplaces are managed in such a way that safety hazards are continually identified and reviewed.	Neutral
		Develop Safe Work Method Statements (SWMS) across the site to identify all potential hazards, the associated risks and the relevant control methods.	



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
	Health & Safety risks introduced by the use of dangerous or hazardous substances during the operation of the MIBA.	The MIBA is not intended to accommodate high risk industries. However, the following measures are proposed to minimise any risk.	Adverse Low
		• Ensure all hazardous substances brought onto the NEBP site are accompanied by a Material Safety Data Sheet and are entered in the Hazardous Substance Register.	
		• Develop and implement Emergency Response and Evacuation Plans which shall include a notification procedure and system in the event of a toxic substance or sewage release.	
		• Provide induction training, quality assurance training, safety and emergency response training and site management and supervision training to all personnel, where relevant. Record details of all training programmes undertaken by each staff member.	
		 Conduct internal workplace health and safety audits of the management system, hazard information and records, shift processes, safety measures and staff personal protective equipment. Maintain records of all audits 	
		• Conduct external workplace health and safety audits of the management system, hazard information and records, shift processes, safety measures and staff personal protective equipment. Maintain records of all audits.	
		 Implement and provide detection and alarm systems, shut-down systems for gas release, fire protection systems, containment areas for spills and runoff, personnel protective equipment, first aid equipment and clean-up procedures at 	



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		designated locations throughout the MIBA precinct.	
	Health & Safety risks introduced by storage & transport of fuel on the site.	Pursuant to the requirements of the <i>Dangerous Goods</i> <i>Safety Management Act 2001</i> , notify the Chief Executive Officer of the Department of Emergency Services of a Large Dangerous Goods Location (LDGL) for the storage of unleaded petrol within the marina.	Adverse Low
		Store all flammable and combustible liquids in accordance with 'AS 1940-2004 The storage and handling of flammable and combustible liquids'.	
		Transport fuels to the site using approved road tankers in accordance with the Australian Code for the Transportation of Dangerous Goods by Road and Rail.	
	Potential for nuisance from mosquitoes and midges, and for spread of mosquito borne diseases.	Monitor mosquito types and populations. Liaise with CSC to develop and implement appropriate mosquito management programmes. In addition to Council spray programmes, utilise low impact insecticides to control mosquito populations.	Adverse Low
	Public health risk from contact with recycled water used for irrigation & in gardens.	Effluent to be Class A+ standard, suitable for public contact.	Adverse Low
		Effluent irrigation to be conducted in accordance with the Queensland Water Recycling Guidelines.	
Economy (Section 4.12)	Benefits to local & regional employment.	Provide employment & training opportunities to local and regional workforce.	Positive High
		Where possible, engage the services of existing local and regional businesses in place of interstate and overseas trade.	
		Liaise with, and provide business and contracting	



Element & Relevant EIS Section	Potential Impact Identified	Commitment / Mitigation Measure	Residual Impact
		opportunities to Indigenous people.	
	Benefits to regional and State economy.	Delivery of net direct & indirect benefit of \$2.4 in net present value terms.	Positive High



Environmental Management

Several environmental management plans have been prepared in line with the values and vision of the NEBP development. The environmental management plans have been prepared to guide the development and provide a framework for the management of environmental impacts during construction and operation of NEBP. The management plans which have been prepared are appended to the EIS, and are listed below.

- 1. Dredging Site Based Management Plan.
- 2. Acid Sulfate Soil Management Plan.
- 3. Site Management Plan (Contamination).
- 4. Cultural Heritage Management Plan.
- 5. Non-Indigenous Cultural Heritage Management Plan.
- 6. Construction Environmental Management Plan.
- 7. Marina Construction Environmental Management Plan.
- 8. Remediation Action Plan.
- 9. Marina Site Based Management Plan.
- 10. Marina Water Quality Management.
- 11. Stormwater Management Plan
- 12. Waste Management Plan.
- 13. Transport Management Plan (part of the Traffic Impact Assessment).

The aforementioned plans have been developed based upon the findings and outcomes identified in the EIS, and aim to address the following matters.

- Achieve the levels of environmental performance required by legislation, relevant guidelines and company policies.
- Prevent, minimise and control potential impacts on the environment and the surrounding community by providing environmental management strategies and mitigation measures.
- Provide opportunities for continual improvement by setting measurable targets and objectives.
- Identify responsible parties.
- Outline procedures for complaint handling and incident investigation, including corrective action and reporting procedures.
- Identify emergency response procedures.
- Establish performance indicators.
- Specify a monitoring program.

Environmental audits are recommended during construction and operation of the development. The construction and operational environmental management plans are to be reviewed not less than annually, or as required following an audit.



Environmental training, including site inductions is to be provided to ensure best practice and due diligence is achieved by construction staff and contractors, and operational staff.

An overarching Emergency Response and Evacuation Plan is to be developed for NEBP. Individual premises may also be required to prepare an Emergency Response and Evacuation Plan.

A Safety Management System and Workplace Health and Safety Plan should also be produced for the construction and operational phases of the development.

Conclusions

The EIS has been based on technical reports which have thoroughly assessed the potential environmental, social and economic impacts of every aspect of the proposed NEBP. The findings of the technical reporting have informed the design of the NEBP and have driven the final form of the Structure Plan.

Where potential adverse impacts have been identified, appropriate mitigation measures have been proposed to manage and control the impacts. Mitigation measures that have been proposed within the EIS take the form of physical infrastructure works, rehabilitation works, financial contributions and ongoing environmental management strategies and commitments.

In addition, the proposal has been assessed as provided a number of significant social, economic and environmental benefits, and the overall net benefit assessment of the project by AEC Group identified that quantitatively and qualitatively, the development of the NEBP will provide a net benefit in environmental, social and economic terms.

It is concluded that the project is suitable for approval subject to reasonable and relevant conditions.



1. INTRODUCTION

This Environmental Impact Statement (EIS) has been prepared for Northeast Business Park Pty Ltd by Cardno (Qld) Pty Ltd, in accordance with the Terms of Reference (ToR) which was prepared by the Department of Infrastructure and Planning ('DIP') on behalf of the Coordinator General (CG), in December 2006. A copy of the ToR is provided in Appendix A.

1.1 **Project Proponent**

The proponent is Northeast Business Park Pty Ltd (previously referred to as Noosa Events Pty Ltd). The ABN of Northeast Business Park Pty Ltd issued by the Australian Securities & Investments Commission is 28 101 569 457 (ACN 101 569 457) and the registered office is located in Spring Hill, Queensland.

Northeast Business Park Pty Ltd is a Queensland registered company with shares held by the shareholders of Port Binnli Pty Ltd (50%), Laing O'Rourke Caboolture Developments Pty Ltd (25%) and a number of smaller shareholders (25%). Port Binnli Pty Ltd and Laing O'Rourke Pty Ltd have joined forces to undertake the development of the Northeast Business Park.

Further details of the two major shareholders, Port Binnli and Laing O'Rourke, are provided In Appendix B1.

1.2 **Project Description**

Two planning applications for Preliminary Approval have previously been lodged over the site. The original application was lodged by Lensworth Ltd in 2002, seeking Preliminary Approval for a mixed-use Business Park over the western portion of the site. In 2004, Noosa Events Pty Ltd (now Northeast Business Park Pty Ltd) purchased the neighbouring parcels to the east and proceeded to lodge a preliminary application over that land for the marina precinct.

The proponent realised that substantial synergies were possible between the two developments. Consequently, it was believed that the full potential could only be achieved if development of the two sites were planned as an integrated mixed use precinct. Accordingly, the proponent commenced negotiations to purchase the Lensworth properties. The Lensworth properties were subsequently purchased in 2005, and an integrated development proposal was formulated which involves a business park and a marina with 911 wet berths and 300 to 500 dry berths. The concept integrates appropriate business, industry, commercial, marina facilities, residential, heritage and recreational open space precincts. This proposal is known as the Northeast Business Park (NEBP) and will provide a place to live, work and play in a master planned riverside precinct.

In view of the size and strategic significance of the site, the needs of the Caboolture region, the development proposal, and the natural attributes of parts of the site and surrounding areas, the NEBP proposal was nominated to the DIP as a project of state significance under the *State Development and Public Works Organisation Act 1971* (SDPWO Act).



The NEBP was declared to be a "significant project" pursuant to the SDPWO Act by the CG on 21 June 2006, and the proponent was required to prepare an EIS for the project. Cardno has been appointed to co-ordinate and prepare the EIS, which will form the basis of local, State and Commonwealth approvals for the project.

The proposed development is located on 769 hectares of former pine plantation fronting the Caboolture River. The site comprises 7 lots, described in Table 1 below.

Land description	Address	Area (ha)
Lot 2 on RP902075	2-32 Nolan Drive, Morayfield	28.83
Lot 7 on RP845326	185 Farry Road, Burpengary	55.90
Lot 10 on RP902079	34 Nolan Drive, Morayfield	515.24
Lot 12 on RP145197	60 Trafalgar Drive, Morayfield	4.86
Lot 15 on RP902073	15 Nolan Drive, Morayfield	1.91
Lot 17 on RP902072	31 Trafalgar Drive, Morayfield	1.88
Lot 24 on SP158298	195-235 Farry Road, Burpengary	160.38
Total Area		769.00

Table 1	Real Property	Descriptions
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The NEBP is a multi-use business park and marina concept that will integrate industry, marina facilities, commercial, residential, heritage and recreational open space precincts. The locality of the site is shown on Figure 1, and the proposed development Structure Plan is presented as Figure 2.

Situated on the southern bank of the Caboolture River, approximately 40 kilometres north of Brisbane, the 769ha site is a former pine plantation that is currently privately owned and used for cattle grazing. An aerial photograph of the existing site is presented as Figure 3 and the existing cadastral boundaries of the land parcels listed in Table 1 above are presented in Figure 4.

The NEBP will integrate a diversity of business, industrial, recreational and residential precincts, which will create a community where residents can live, work and play in a centralised location. Development of the NEBP is therefore expected to enhance the social and economic status of Caboolture Shire.

Northeast Business Park is an integrated master planned development changing the face and advancing the identity, ecological health and prosperity of Caboolture and the SEQ region.

The key features of the development are listed below.

• Mixed Industry Business Areas (MIBA), incorporating clusters of quality industry and businesses providing local and regional employment,



accommodating a range of business activities, industries and training opportunities. A principal feature of the MIBA Precincts is a designated cluster of marine industry activities.

- World class 911 berth Marina with an associated shipyard providing dry boat storage and a cluster of maritime businesses with close connections to the marine industry cluster.
- A Marina Precinct including a vibrant and active Marina Village of cafés and restaurants, public promenades and a mix of villas and apartments.
- Hotel and Conference facilities.
- 420 hectares of open space (over half of the site area), including heritage park, playing fields, walking and cycling tracks and a championship golf course and clubhouse.
- Residential housing areas incorporating a range of housing sizes and products.
- Community facilities.
- Ability to accommodate retirement living and a primary school.

These features are shown in the development Structure Plan presented in Figure 2.

Detailed technical studies and consultations with the community, as well as local State and Commonwealth government agencies have been undertaken to ensure that the NEBP is developed in a manner that achieves balanced environmental, social and economic benefits. These technical studies include:

- environmental, social and economic demand assessments to justify the project proposal and provide alternatives;
- planning assessments to demonstrate how the proposal conforms with State, regional and local plans including an approval strategy framework;
- topographical and boundary surveys to inform the development outline;
- geotechnical analysis to determine land use capacities;
- landscape character and visual amenity studies to protect and enhance existing values;
- stormwater management and flood modelling to determine impacts on water resources and inform construction methodology and operational aspects;
- coastal process analysis to determine the impact of a marina and dredging on the physical attributes of the Caboolture River and to protect coastal processes and values;
- bathymetric surveys of the Caboolture River to determine navigable access to the site;
- air, noise and waste assessments to prevent environmental harm (including environmental nuisance) and achieve policy objectives;
- ecological assessments to determine areas of the site that warrant protection to preserve aquatic and terrestrial ecological attributes;



- cultural heritage assessments to determine areas of the site that warrant protection and restoration;
- social, economic and net benefit assessments to determine complimentary facilities and service types within the NEBP concept to meet community needs and expectations and principles of ecologically sustainable development;
- infrastructure and utility assessments to determine existing capacity, and upgrade requirements; and
- hazard and risk studies to ensure resident and non-resident safety from natural and anthropogenic causes.

The key technical studies which were commissioned to assess the potential impacts of the proposed NEBP are presented as Appendices to this EIS, and are listed in Table 2 below.

Title	Author	Date	Appendix Reference
Terms of Reference	Coordinator General	22 December 2006	Appendix A
Proponent Details	РММ	May 2006	Appendix B1
Study Team	Cardno	November 2007	Appendix B2
Master Planning Vision Document	РММ	November 2007	Appendix C1
Planning Report	РММ	November 2007	Appendix C2
NEBP Area Plan	PMM	November 2007	Appendix C3
Net Benefit Assessment	AEC Group	October 2007	Appendix D
Economic Benefit Assessment	Urbis	September 2007	Appendix E1
Attached Dwelling Demand	Urbis	September 2007	Appendix E2
Business Park Assessment	Urbis	September 2007	Appendix E3
Bulky Goods	Urbis	September 2007	Appendix E4
Hotel Demand	Urbis	September 2007	Appendix E5
Golf Course Demand	Urbis	September 2007	Appendix E6
Caboolture City Marina Study	Pacific Southwest Strategy Group	14 March 2006	Appendix E7

Table 2 List of Appendices



Title	Author	Date	Appendix Reference
Marina Demand Update	Pacific Southwest Strategy Group	10 September 2007	Appendix E8
Community Context Study	The Hornery Institute	September 2007	Appendix F
Community Consultation Report	Three Plus	November 2007	Appendix G
Stormwater Management Plan	Parsons Brinckerhoff	October 2007	Appendix H1
Groundwater Impact Assessment	Coffey Geotechnics Pty Ltd	18 September 2007	Appendix H2
MIKE21 Flood Study	Parsons Brinckerhoff	4 October 2007	Appendix I
Riverbank Erosion Assessment	Cardno Environment	22 October 2007	Appendix J
Traffic Impact Assessment (includes a Transport Management Plan)	Cardno Eppell Olsen	November 2007	Appendix K1
Traffic Impact Assessment- Addendum Report	Cardno Eppell Olsen	November 2007	Appendix K2
Terrestrial Ecology Assessment Report	Cardno Environment	9 November 2007	Appendix L1
Aquatic Ecology Assessment Report	The Ecology Lab	November 2007	Appendix L2
Matters of National Environmental Significance	Cardno Environment	23 November 2007	Appendix L3
Caboolture River Siltation Study	Cardno Lawson Treloar	16 November 2007	Appendix M1
Caboolture Waters: Waterways, Soils and Water Quality Management	4Site & Natural Solutions	13 August 2004	Appendix M2
Noise Impact Assessment	Cardno Environment	19 October 2007	Appendix N
Air Quality Assessment	Katestone Environmental Pty Ltd	October 07	Appendix O
Landscape Masterplan	PLACE Planning and Design	27 September 2007	Appendix P
Scenic Quality and Visual Impact	Studio Tekton	17 October 2007	Appendix Q



Title	Author	Date	Appendix Reference
Geotechnical Interpretative Report	Coffey Geotechnics Pty Ltd	8 January 2007	Appendix R1
Caboolture River Dredging - Geo-environmental investigations.	Coffey Geotechnics Pty Ltd	3 May 2007	Appendix R2
Dredging Site Based Management Plan	Cardno Environment	19 November 2007	Appendix R3
Acid Sulfate Soil Management Plan	Cardno Environment	19 November 2007	Appendix R4
Site Management Plan	Douglas Partners	2003	Appendix R5
Good Quality Agricultural Land Assessment	PLACE Environmental	7 March 2007	Appendix S
Cultural Heritage Assessment of Lot 10 on RP902079 and Lot 2 on RP902079 Caboolture Shire	Davies Heritage Consultants Pty Ltd	October 2003	Appendix T1
Indigenous Cultural Heritage Study of Lot 24 SP158298 and Lot 7 RP845326	Davies Heritage Consultants Pty Ltd	August 2006	Appendix T2
Cultural Heritage Survey Report	Gangalla Pty Ltd	August 2006	Appendix T3
Cultural Heritage Management Plan	Davies Heritage Consultants Pty Ltd & Gubbi Gubbi	May 2007	Appendix T4
Non-Indigenous Cultural Heritage Plan	Port Binnli Pty Ltd	October 2007	Appendix T5
Hazard & Risk Analysis	Simmonds & Bristow	October 2007	Appendix U
EIS Energy Report	Lectel Pty Ltd	25 September 2007	Appendix V
Environmental Impact Assessment- Water Supply & Sewerage Systems	GHD	October 2007	Appendix W
Construction Staging Plans	Laing O'Rourke	October 2007	Appendix X1
Construction Environmental Management Plan	Cardno Environment	19 November 2007	Appendix X2



Title	Author	Date	Appendix Reference
Marina Site Based Management Plan	Cardno Environment	19 November 2007	Appendix Y1
Waste Management Technical Report (includes a Waste Management Plan)	Cardno Environment	22 November 2007	Appendix Y2
Bushfire Assessment Report	Cardno Environment	November 2007	Appendix Z

Technical studies informing this EIS include those created as part of two applications for preliminary approval for a material change of use for a marina and industrial estate on parts of the subject land.

The centralised diversity of precincts within the NEBP is expected to cause an increase in population demands on infrastructure currently servicing the area. Additional water, sewage and electricity provisions will be incorporated into the NEBP.

Major landform adjustments that will occur to establish the NEBP will involve excavation of the marina basin to -1.0m AHD. Fill obtained from the excavation of the marina basin will be used to raise ground levels within residential precincts above the Q100 flood level. A plan of the proposed cut and fill is presented as Drawing 7900/33/05-103.

Following excavation of the marina basin, a lock will be established to connect the marina basin to the Caboolture River. The lock entrance to the marina basin is necessary to minimise the potential impacts of the development on the natural tidal prism. The marina will remain perched above the natural water level in the Caboolture River.

Bathymetric surveys have identified that dredging of the Caboolture River to -4.25m AHD is required to ensure all tide navigable access of the nominated boat types (drafts of approximately 3m) accessing the marina basin.

The business, tourism and recreation opportunities that will be created by the NEBP is expected to boost the local economy via the creation of 1,547 construction jobs as well as 13,685 long term permanent and casual local employment opportunities, and a further 13,464 indirect employment opportunities. In this regard, the Structure Plan satisfies the Queensland Government agenda to establish marine industry clusters, jobs and training to Queensland.



1.3 Project Objectives and Scope

1.3.1 Objectives

The proponent seeks to develop the site into a major integrated mixed-use business park and marine precinct. The development will comprise of a range of business and industry uses integrated with commercial, retail, residential, golf course, and environmental areas. The eastern end of the precinct will be underpinned by a marina and complementary marina facilities.

The development objectives of the proposal include:

- significant strengthening of the regional economy through development of a mixed industry business area;
- provision of a world class marina facility, providing an important link in the regional marine industry network;
- effective use of a strategically significant property;
- regeneration of a large, former pine plantation, that is currently highly degraded;
- improvements to water quality of the river by addressing existing water quality issues originating beyond the site, as well as adopting best practice water quality measures on the site and reusing sewage effluent currently being discharged into the Caboolture River;
- management of impacts and improvement of safety of escalating recreational boating in Moreton Bay and Pumicestone Passage;
- protection and extension of habitat areas associated with the declared fish habitat area;
- rehabilitation of site corridors to provide key connections in the wider ecological network,
- potentially stimulating rehabilitation opportunities beyond the site;
- provision of high quality urban design standards for built form and landscaping;
- provision of a structure and process ensuring development standards are consistent with the vision, and providing an internal funding mechanism to allow maintenance of the development in perpetuity at no cost to the public;
- creation of a vital 'heart' for Burpengary and a regional destination;
- facilitation of the enhancement of the local public transport network; and
- provision of a valuable and unique addition to the economic, social and recreational fabric of the region.

1.3.2 Background to the Proposal

Two planning applications for Preliminary Approval have previously been lodged over the subject site, and these are described in Table 3, below.



Sites	Application	Date Lodged	Status
Lot 2 on RP 902075 (28.83Ha) Part of Lot 10 on RP902079 (515.244ha)	Preliminary Approval for Material Change of Use (Section 3.1.6) (Business Park)	18/06/02	Decision Phase extended by applicant until 31/01/08
Lot 24 on SP158298 (136.379ha) Lot 7 on RP845326 (55.903ha)	Preliminary Approval for Material Change of Use (Section 3.1.6) (Mixed Use Development, including marina, residential, commercial and retail)	20/10/04	Information and Referral Phase extended by applicant until 31/01/08

Table 3 Previous Development Applications

The original application was lodged by Lensworth Ltd in 2002, seeking Preliminary Approval for a mixed-use Business Park over the western portion of the site. In 2004, Noosa Events Pty Ltd (now Northeast Business Park Pty Ltd) purchased the neighbouring parcels to the east (being Lot 24 on SP158298 and Lot 7 on SP 158 298) and proceeded to lodge a application for Preliminary Approval over that land for the marina precinct.

The proponents realised that substantial synergies were possible between the two developments. Consequently, it was believed that the full potential could only be achieved if the development was planned and developed as an integrated mixed use precinct. Accordingly, the proponents commenced negotiations to purchase the Lensworth properties. The Lensworth properties were subsequently purchased in 2005 after extended negotiations, which were lengthened by the intermediary sale of Lensworth to Stockland Ltd in late 2004.

The combination of these development proposals, both very substantial in their own right, has provided the basis to create a visionary and regionally significant precinct for Caboolture and South East Queensland. As an integrated proposal, the extent of the development is such that it is considered to be of considerable significance to the Caboolture Shire, the region and the State.

The approval process for such a development is complex. The process is further complicated by the need to effectively combine two current applications, along with two future applications (and others) covering elements not included in the original applications. This process would be cumbersome under the *Integrated Planning Act 1997* (IP Act), leading to a fragmented approach.

Utilisation of the coordination process and EIS-based assessment provisions of the SDPWO Act was viewed as the only viable means to combine the design, assessment and development of the precinct in an integrated and holistic manner, which is necessary to allow the full potential of the precinct to be realised.



1.3.3 Consequences of Not Proceeding with the Development

The Terms of Reference also asks for consideration regarding the consequences of not proceeding with the development. If taken literally, and the entire development did not proceed, the consequences would be severe for the region as there are no other sites which could provide comparable benefits. Caboolture would miss a significant opportunity to advance its identity and quality of life and ultimately struggle to properly fulfil its role as the Principle Activity Centre for the northern growth corridor as SEQ continues to grow.

As most of the site however is designated for District Industry, and there is clear need for District Industry uses, a more realistic comparison is the compliant scheme, addressed above.

1.4 The Environmental Impact Statement (EIS) Process

1.4.1 Methodology for the EIS

In view of the size and strategic significance of the subject site, the needs of the Caboolture region, the development proposal, and the natural attributes of parts of the site and surrounding areas, the NEBP proposal was nominated to the DIP as a project of state significance under the SDPWO Act.

An Initial Advice Statement (IAS) was submitted to the CG in May 2006 to present relevant information about the development to the public and agencies at the local, State and Federal levels to determine the nature and level of its interest in the proposal. The IAS:

- was prepared to assist the CG to make a determination regarding the significant project declaration;
- was to facilitate the preparation of Terms of Reference for EIS for the proposal; and
- addresses relevant statutory approvals and processes that will be necessary for the proposal to proceed.

The NEBP was declared to be a "significant project" under section 26(1) (a) of the SDPWO Act by the CG on 21 June 2006. The declaration initiates the statutory environmental impact assessment procedure of Part 4 of this Act, which requires the proponent to prepare an EIS for the project.

The EIS process, managed by the DIP on behalf of the CG, required the preparation of a Draft Terms of Reference (ToR) which was finalised in December 2006. A copy of the ToR is provided in Appendix A.

Publication of the Draft ToR was notified in the Courier Mail and the Australian newspapers and the CG website, and comments were invited on the Draft ToR for the project over the period from 16 October to 13 November 2006.



Ten comments in total were received regarding the ToR, seven from Government Agencies. Relevant comments received from Government Agencies, the public and interest groups were incorporated into the final ToR.

The ToR essentially outlines the issues that should be considered in the preparation of the EIS. Furthermore, the ToR provides the framework for the EIS, including information on the purposes and role of the EIS and the factors considered to be most significant for the proposal.

All potentially significant impacts of the proposed development on the environment have been investigated, and requirements for the mitigation of any adverse impacts have been detailed in this EIS.

For the purposes of this EIS, a definition of 'environment' has been adapted which includes social and economic aspects. The definition provided in Section 8 of the *Environmental Protection Act 1994* describes this and has been adopted throughout the assessment of values, impacts and mitigation measures. Environment includes:

- a. "ecosystems and their constituent parts, including people and communities; and
- b. all natural and physical resources; and
- 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; and
- d. the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c)".

Technical studies assessing the potential environmental impacts of the NEBP and previous proposals for development of the site have been ongoing since 2002. These have provided detailed information for preliminary approval applications and to inform the EIS in response to the requirements of the ToR. Additional relevant issues, particularly those raised by the community during public consultation are also addressed within technical studies. The studies, as appended to the EIS document, were carried out by experts in their related field of study.

To meet the requirements of the EIS, a robust methodology was employed to ensure transparent and inclusive consultation and an effective, two-way, communication process during the drafting of the ToR and development of the EIS.

Two community information days were held to provide opportunity for community involvement and education, and allowing for the identification of broad issues of concern to the local community and interest groups. In addition a number of organised consultations with separate interest groups were conducted. These consultations are summarised in Section 1.5 and detailed in Section 4.10 of this EIS. The community consultation process as it has been conducted within the EIS framework is illustrated in Figure 5.

The first community information day, held on 9 December 2006, highlighted the preliminary concept and expected influences on the surrounding area. The second information day was held on 11 August 2007 and presented the findings of the EIS


technical studies to date, providing a greater level of detail of the marina design and construction phasing, and known impacts and proposed mitigation measures.

The EIS document preparation has been ongoing since March 2007, concurrent with the finalisation of technical studies.

Once the EIS has been prepared to the satisfaction of the CG, the EIS will be made available for public inspection and a public notice will invite comments to the CG.

Written submissions must be forwarded to the CG within a 45 day allocated timeframe. The CG will review the submissions, and if deemed necessary, a Supplementary EIS will be prepared to address specific matters raised in submissions on the EIS.

After the public consultation period and submission of a Supplementary EIS if required, the CG must prepare a report evaluating the EIS and other related material pursuant to section 35 the SDPWO Act. The CG report will communicate conclusions reached on environmental effects of the project and mitigation measures taking into account all relevant information.

As the project involves development that would require an application for development approval for a material change of use under the IP Act, the CG report may, under section 39 of the SDPWO Act, state for the assessment manager one or more of the following:

- the conditions that must attach to the development approval;
- that the development approval must be for part of the development only;
- that the approval must be preliminary approval only.

Alternatively the CG report must state for the assessment manager:

- that there are no conditions or requirements for the project; or
- that the application for development approval be refused.

Further, the CG must:

- give reasons for the statements (above); and
- give the reasons to the assessment manager.

In addition to the CG's involvement in the EIS process, the statutory impact assessment process is the subject of a Bilateral Agreement between the Queensland and Commonwealth Governments under the SDPWO Act. This agreement relates to environmental assessment under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* ('EPBC Act') which requires the proponent to refer the proposal to the Australian Minister for the Environment and Water Resources. On 12 July 2005, the Australian Minister stated the proposal constituted a controlled action pursuant to Section 75 of the EPBC Act under the following controlling provisions.

- Sections 16 and 17B (wetlands of international importance).
- Sections 18 and 18A (listed threatened species and communities).



• Sections 20 and 20A (listed migratory species).

The Minister will grant/refuse approval for the proposal pursuant to Section 133 of the EPBC Act separately to the approval process undertaken against the SDPWO Act. A separate report will be released after that of the CG's report, in which conditions may be attached to the approval to mitigate impacts on matters of National Environmental Significance (NES) (refer to Section 1.7 of this EIS).

1.4.2 Objectives of the EIS

The objective of the EIS is to provide information to community and decision makers on the concepts, aspects and impacts of the development proposal, through comprehensively identifying, evaluating, and providing mitigation for issues associated with the development.

To comprehensively identify relevant issues and appropriate mitigation measures, all potential environmental impacts of the proposal were identified. Furthermore, appropriate infrastructure and facility requirements as well as design, construction and operational measures have been recommended to minimise or compensate for any adverse impacts as well as to further enhance benefits of the development proposal. This is clearly demonstrated in the Net Benefit Assessment attached as Appendix D.

The EIS also serves the purpose of identifying all necessary planning and environmental approvals including requirements pursuant to State and Commonwealth legislation, and appropriately addresses these requirements.

It is noted that the EIS is not only a key environmental document providing advice to decision makers considering the approvals for the proposal, but is also crucial in informing the public. The EIS details the envisaged scope of the proposal, the acceptable levels of impacts (beneficial and adverse) on environmental values, and how environmental values will be protected and enhanced through the discussion of options and alternatives and their environmental management outcomes.

A series of Environmental Management Plans have been prepared to detail the management measures which will be implemented to control and mitigate environmental impacts. The measures proposed within the Environmental Management Plans incorporate the recommendations of the technical reports prepared to support the EIS.

1.4.3 Submissions

The EIS will be advertised in relevant national, state and local newspapers. Over a 45 day public consultation period the public and private sector may make written comment to the CG.

The EIS will be forwarded to relevant Government agencies and made available to the wider community by:

• placement of paper and CD version of the EIS in publicly accessible locations including CSC; and



access to electronic copies on the Department of State Development's web page.

Written submissions must be forwarded to the CG within the 45 day allocated timeframe. The CG will review the submissions, and if requested by the CG the proponent is required to address any specific issues which are not identified in the EIS but which are identified during the EIS process in the format of a Supplementary EIS.

1.5 Public Consultation Process

The community consultation program undertaken in relation to the NEBP has been extensive. Feedback on the extensive and transparent approach to consultation and engagement with the community and Local and State Government representatives has been extremely positive.

The aim of the community engagement process during the EIS was to:

- ensure the community was aware of the EIS process and how the EIS would be formulated;
- inform the community about the key components of the proposal;
- provide a range of opportunities for community feedback and input into the final ToR for the EIS;
- deliver community feedback to the EIS technical study team to inform the final EIS report.

From the outset, community input was sought to inform the development of the EIS technical studies. A Community Engagement Plan was prepared and a variety of communication tools were developed.

Communication and engagement activities in total included:

- establishment of a dedicated website with project information, consultation program and delivery strategies and feedback mechanism;
- set up of a toll free project inquiry line;
- the delivery of two Community Information Days (257 residents attended the first Community Information Day with 286 residents attending the second information day);
- an ongoing survey to canvas community views between November 2006 and August 2007 using the database 'Consultation Manager' that enabled Community Consultants Three Plus to track and report inquiries, issues and team responses across all project interfaces, thus minimising risk, while enhancing transparency and accountability.
- local resident newsletters and survey to canvas specific neighbourhood benefits, impacts and views;
- community information booth at the Caboolture Sustainability Expo, Sydney Boat Show and Sanctuary Cove Boat Show;



- two business sector information evenings and one information breakfast to canvass views of the commercial and light industry sector;
- community and Chamber of Commerce presentations;
- two all agencies meetings and key stakeholder group meetings hosted by the Proponent which included site tours;
- media meetings including site tours;
- consultation with environmental stakeholder groups including site tours;
- meeting with recreational anglers, recreational boat club and aquaculture industry representatives;
- individual local councillor representatives briefings;
- three local resident potential impacts workshops;
- conceptual stage construction plans and reduction of potential construction impacts to inform EIS process;
- concept design, built form and recreational lifestyle benefits options to inform EIS process;
- conceptual traffic management plan and potential connectivity options to inform EIS process;
- Indigenous Australians tour of the site;
- council local authority staff planning meetings including working party, social planning and technical staff meetings to address development application and EIS requirements;
- web-based information for ease of access to community engagement activity with links to the CG site, ToR, the NEBP concept map, newsletters and fact sheets/posters;
- individual (246) resident and stakeholder responses to enquiries and comments via, phone, facsimile, face to face discussion, letter or email; and
- radio interview to publicise the project and promote major milestone events using local community radio including Indigenous AAA broadcasting and 4EB radio (translated announcements into local community languages).

Five project newsletters were distributed to residences in the study area and newsletters were posted or emailed to stakeholders on the NEBP and Caboolture Shire Council (CSC) databases.

Distribution and Consultation included:

- 52,000 individual households in CSC x 2 newsletters;
- 1,100 individual households in Burpengary community newsletter and survey;
- 1,000 newsletters at the Sanctuary Cove and Sydney Boat shows;
- 500 newsletters at the Caboolture Sustainability Expo;
- 19 elected representatives required duplicate copies for distribution;



- 248 community based organisations; including recreational, human services, religious, health, schools and sporting groups (237 delivered, 11 returned) received information regarding the Draft ToR. A further 234 community organisation information packages and letters were sent to key stakeholders to advise of public consultation opportunities during the development of the ToR;
- 309 consultation manager data base contacts also received information packages and invitation to public information day opportunities;
- four advertisements were published in print media including Caboolture Shire Herald, Northern Times, Courier Mail and Business Acumen for Draft ToR and a further four print media including Caboolture Shire Herald, Northern Times, Caboolture News, Bribie Weekly;
- information regarding the project and the EIS process was broadcast on four radio stations, including AAA radio, 4EB (ethnic broadcast in six community languages: Samoan, Tongan, Tagalog, Spanish, Italian and German) and the ABC (community languages Samoan, and Tongan);
- 32 private and public schools were contacted for both the Draft ToR and the final ToR;
- 159 local business have been invited to attend NEBP presentations;
- five (5) environmental groups were contacted and site tours and individual consultation provided to four (4) agencies; and
- three local resident potential impacts workshops were held.

In this way NEBP Pty Ltd has undertaken open community consultation in addition to the legislated environmental impact assessment process of which outcomes have informed the EIS technical studies on which this EIS is prepared.

1.6 **Project Approvals**

1.6.1 Relevant Legislation and Policy Requirements

1.6.1.1 Summary of Applicable Legislation

Commonwealth and State legislation and policy which are applicable to the proposed NEBP development includes the following legislation and Regulations made there under.

Commonwealth Legislation

• Environment Protection and Biodiversity Conservation Act 1999

State Legislation

- Environmental Protection Act 1994
- IP Act
- Acquisition of Land Act 1969



- Fisheries Act 1994
- Marine Parks Act 2004
- Land Act 1994
- Dangerous Goods and Safety Management Act 2001
- Nature Conservation Act 1992
- Coastal Protection and Management Act 1995
- Transport Operations (Marine Safety) Act 1994
- Transport Infrastructure Act 1994
- Fire and Rescue Service Act 1990
- Vegetation Management Act 1999
- Body Corporate and Community Management Act 1997
- Native Title (Qld) Act 1993
- State Development and Public Works Organisation Act 1971
- Aboriginal Cultural Heritage Act 2003
- Water Act 2000

State Planning Policies

- Mitigating the adverse impacts of flood, fire and landslide (State Planning Policy 1/03)
- Planning and Management involving Acid Sulfate Soils (State Planning Policy 2/02)
- Housing and Residential Development (State Planning Policy 1/07)
- Development and the Conservation of Agricultural Land (State Planning Policy 1/92)
- South-East Regional Coastal Management Plan August 2006 (has the effect of a State Planning Policy)

Local Planning Policies

- CSC Planning Scheme 2005, including overlays relevant for:
 - Acid Sulfate Soils
 - Bushfire Hazard
 - Catchment Protection
 - Nature Conservation
 - Scenic Amenity
 - Transport Infrastructure
- CSC Planning Scheme 1988 (Superseded)



• CSC Strategic Plan 1993 (Superseded)

Regional Strategic Plan

• South East Queensland Regional Plan

1.6.1.2 Relevance to the Development

Each relevant legislative instrument is briefly described below, and the relevance to the development is identified.

Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) seeks to protect matters of National Environmental Significance. It aims to streamline the national environmental assessment and approvals process, protects Australian biodiversity and integrates management of important natural and cultural places.

The EPBC Act requires the Proponent to refer the proposed action to the Commonwealth Department of Environment and Water Resources (DEWR) for assessment of impacts on matters of National Environmental Significance (NES) if the Proponent believes such matters could be affected.

The matters of NES identified in the Act are listed below.

- National Heritage places.
- World Heritage properties.
- Ramsar wetlands of international importance.
- Migratory species protected under international agreements.
- Nationally threatened species and ecological communities.
- Commonwealth marine environment.
- Nuclear actions.

DEWR make a determination on whether the action may proceed without further assessment, or whether it is regarded as a 'Controlled Action' requiring further assessment. Such further assessment may consist of an Environmental Impact Statement, which can be processed under an accredited Bilateral Agreement with the Queensland Government.

Relevance to the Northeast Business Park

In 2005 the Proponents referred the proposal to the then Commonwealth Department of Environment and Heritage and on the 12 July 2005 the Minister declared the project as a Controlled Action for the purposes of the EPBC Act.

The matters of National Environmental Significance identified in that declaration were:

• Sections 16 and 17B (wetlands of international importance);



- Sections 18 and 18A (listed threatened species and communities); and
- Sections 20 and 20A (listed migratory species).

These interests include the Ramsar Wetlands of Moreton Bay. These wetlands surrounding the lower reaches of the Caboolture River form part of the extensive Moreton Bay Ramsar Wetlands. Covering more than 110,000ha, the Moreton Bay wetlands are extremely varied, ranging from perched freshwater lakes and sedge swamps on the offshore sand islands, to intertidal mudflats, marshes, sandflats and mangroves next to the Bay's islands and the mainland

The wetlands provide habitat to numerous species of birds including those protected by international agreements of Japan Australia Birds Agreement (JAMBA) and China Australia Migratory Birds Agreement (CAMBA)

Integrated Planning Act 1997

The object of the IP Act is to provide a framework to integrate planning and development assessment so that development and its effects are managed in a way that is ecologically sustainable. The purpose is to achieve Ecologically Sustainable Development by coordinating and integrating planning at the local, regional and State levels, and managing the process by which development occurs and the effects of development on the environment.

To this purpose the IP Act provides a system of integrating approvals required under certain legislation (Integrated Development Assessment System, or IDAS). IDAS provides a staged assessment process that includes:

- application stage;
- information and referral stage;
- notification stage; and
- decision stage.

In addition, Schedule 8 of the IP Act prescribes certain development to be assessable or self assessable. This prescribed development that or that defined under a local government planning scheme is processed through the IP Act. However, not all legislation/approvals are processed by means of the IP Act. For example, the *Marine Parks Act 2004*, and certain provisions of other Acts including the *Dangerous Goods and Safety Management Act 2001* required separate approvals/permits to be obtained.

Under the IP Act it is necessary to provide properly made applications. These are required to be signed by the owner of the land, and for certain operational work, resource entitlement is required rather than owner's consent. The resource entitlement required and the entity that provides that entitlement is contained within schedule 10 of the *Integrated Planning Regulation 1998*.

The IP Act also contains provisions that require the regional plans developed and State Planning Policies to be incorporated within the local government planning schemes. A regional strategic plan is applicable for the local government area of the CSC.



Links are provided between the approval process of the IP Act and the *State Development and Public Works Organisation Act 1971*. The Coordinator General's report given as a result of the EIS provisions contained under the *State Development and Public Works Organisation Act 1971* becomes a concurrence response under the IP Act for development requiring a Material Change of Use.

Relevance to the Northeast Business Park

The South East Queensland (SEQ) Regional Plan was developed under the IP Act and contains regulatory features for assessing IP Act applications. However, since applications for the business park and marina pre-date the SEQ Regional Plan, the regulatory portions of the plan have limited effect on the project. These two applications for development over the site are current but remain undetermined. They are application MCU 2002-1079 for Preliminary Approval overriding the planning scheme and Material Change of Use (preliminary building work) lodged on the 18 June 2002 and MCU 2004-1420 for Preliminary Approval overriding the planning scheme for marina and building work.

Specific approvals and referrals required for the project that are incorporated under the IP Act relate to aspects of the following legislation and policy:

- Environmental Protection Act 1994;
- Coastal Protection and Management Act 1995;
- Transport Infrastructure Act 1994;
- Transport Operations (Marine Safety) Act 1994;
- Nature Conservation Act 1992;
- Fisheries Act 1994;
- Fire and Rescue Service Act 1990;
- Vegetation Management Act 1999;
- Water Act 2000;
- SPP 2/02 Planning and Managing Development involving Acid Sulfate Soils; and
- CSC Planning Scheme (both current and superseded planning schemes for existing applications).

The requirements under these instruments are listed below, together with other applicable legislation and policy.

Fisheries Act 1994

The object of the *Fisheries Act 1994* is to provide for the management, use, development and protection of fisheries resources and fish habitats, the management of aquaculture activities and helping to prevent shark attacks and for related purposes.



The Act and regulations made there under seek to regulate fisheries and protect fisheries habitat through the declaration of protected Fish Habitat Areas and protection of marine plants.

Relevance to the Northeast Business Park

The Deception Bay Fish Habitat Area (FHA-013) extends into the Caboolture River, excluding the navigation channel. The proposal will require approvals to be obtained for any works within or adjacent to the Fish Habitat Area.

Removal, destruction or damage to marine plants requires specific approval under this legislation. Dredging or development on any areas containing marine plants has the potential to disturb marine plants in or near waterways or tidal areas. These provisions of the Act are administered by the Department of Primary Industries and Fisheries.

It is anticipated that an amendment to the Deception Bay Fish Habitat Area (FHA.013) will be sought to excise a portion of the Fish Habitat Area that is within the Caboolture River and adjacent to the site. This portion is approximately 4,000m² in area, and will form the entrance lock to the marina basin. Excision of an area of habitat from within a declared fish habitat area requires formal revocation.

The legislative process for amending a declared fish habitat area is similar to that followed for a new declaration and is set out in the DPI operational policy (FHMOP 006), Fish Habitat Area Declaration and Review.

It is recommended that Queensland Fisheries Service undertake an initial assessment of the proposal and revocation and if required prepare terms of reference for a "Revocation Assessment Study" to be undertaken by the proponent.

Marine Parks Act 2004

The *Marine Parks Act 2004* provides for Marine Parks and the conservation of the marine environment amongst other purposes. The Act and regulations enable the declaration of Marine Parks and regulate activities contained within those areas.

Relevance to the Northeast Business Park

The Habitat Protection Zone of the Moreton Bay Marine Park which is located within the Caboolture River and begins at the northern boundary of the site then extends eastward along the Caboolture River.

Uses in the defined Marine Park are controlled by the 'Marine Parks (Moreton Bay) Zoning Plan 1997' which is due to expire on the 1 September 2008. Permits are required for activities such as dredging in the Habitat Protection Zone of the Marine Park.

It is recommended that the Minister prepare a draft amendment to the zoning plan to create a "works area" within the Caboolture River. The purpose of the "works area" would be in accordance with the zoning plan and provide for the carrying out of major works (capital dredging). These works are would be for the public benefit and for the provision of facilities for use by the public.



The public notification of the EIS, would be adequate public consultation for the proposed amendment to the Marine Parks (Moreton Bay) Zoning Plan 1997 and satisfy the requirements of the Marine Parks Act. Triggers exist for development within 100m of a Marine Park under the IP Act and provisions of this Act are administered by the Environmental Protection Agency through Queensland Parks and Wildlife.

Dangerous Goods and Safety Management Act 2001

This Act regulates locations involved in the manufacture, storage or sale of Dangerous Goods and provides a number of obligations to minimise the risk of hazards associated with such materials. Part 4 of the Dangerous Goods and *Safety Management Regulation 2001*, provide provisions for flammable and combustible liquids such as commonly used fuels.

Relevance to the Northeast Business Park

A fuel facility will require approval and licensing by the CSC under the provisions of this Act. The council is required to assess compliance with required standards for such matters as separation distances to protected works, equipment used and relevant fire protection systems.

Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) and the regulations made pursuant to this Act provide specific protection for Queensland's flora and fauna. It seeks to achieve this through an integrated and comprehensive conservation strategy for Queensland that involves:

- gathering of information and community education;
- dedication and declaration of protected areas;
- management of protected areas;
- protection for native wildlife and its habitat;
- use of protected areas to be ecologically sustainable; and
- recognition of interests of Aborigines and Torres Strait Islanders in nature and their cooperative involvement in its conservation.

Protected areas defined under the NC Act include:

- National parks (scientific);
- National parks;
- National parks(aboriginal land);
- National parks (Torres Strait Islander land);
- National parks (recovery);
- Conservation Parks;
- Resource Reserves;
- Nature Refuges;



- Coordinated conservation areas;
- Wilderness areas;
- World Heritage Management Areas; and
- International Agreement Areas.

International Agreement Areas also includes areas declared under another Act such as Ramsar Wetlands.

Wildlife (flora and fauna) can be declared under the NC Act within regulations in the following classes according to section 71 of the Act:

- extinct in the wild wildlife;
- endangered wildlife;
- vulnerable wildlife;
- rare wildlife;
- near threatened wildlife;
- least concern wildlife;
- international wildlife; and
- prohibited wildlife.

Management of wildlife is further regulated under a number of plans and regulations. The 'Nature Conservation (dugong) conservation plan 1991 and Nature conservation (whales and dolphins) conservation plan1997' take effect under the *Nature Conservation Act 1992.*

Certain triggers exist under the IP Act for development either in or located near a protected area.

Relevance to the Northeast Business Park

The Ramsar wetlands of Moreton Bay are a protected area for the purposes of the *Nature Conservation Act 1992.* As such, referral is required under the provisions of the IP Act for development either in or located near a protected area. The project is also being assessed in regard to its impact on Ramsar wetlands by the Commonwealth.

Approvals are also required under the *Nature Conservation Act 1992* should any endangered, rare or venerable wildlife be found on site requiring relocation.

Coastal Protection and Management Act 1995

The main objectives of the *Coastal Protection and Management Act* 1995 (CPM Act) are to:

i. provide for the protection, conservation, rehabilitation and management of the coast, including its resources and biological diversity;



- ii. have regard to the goal, core objectives and guiding principles of the national Strategy for Ecologically Sustainable Development in the use of the coastal zone;
- iii. provide, in conjunction with other legislation, a coordinated and integrated management and administrative framework for the ecologically sustainable development of the coastal zone;
- iv. encourage the enhancement of knowledge of coastal resources and effects of human activities on the coastal zone.

The CPM Act provides for the protection and management of the coast by preparing coastal management plans and declaring coastal management districts as areas requiring special development controls.

The 'State Coastal Management Plan- Queensland's Coastal Policy 2001' (SCMP) was prepared under the provisions of the CPM Act. The SCMP deals with matters of International, National and State significance and provides the policies and context for the development of Regional Coastal Management Plans.

In accordance with the provisions of the CPM Act a Regional Coastal Management Plan for the South East Region (SEQ RCMP) has been developed.

Various triggers contained within the *Integrated Planning Regulation 1998*, exist for development in the coastal zone pursuant to the CPM Act. These triggers require assessment to be made under the provisions of the Act and relevant Coastal Management Plans.

The aspects of development to be assessed include the effects on:

- (a) natural coastal, riverine and estuarine processes, including for example, erosion and accretion, wave and tidal current, littoral drift, tidal prism and tidal inundation;
- (b) natural topography and drainage of coastal land including, for example the integrity of dune systems and natural surface runoff;
- (c) coastal wetlands and other coastal ecological systems including, for example, the wildlife, biological diversity and water quality of the wetlands or systems;
- (d) places or objects that have cultural heritage landscape, historical, anthropological, archaeological or aesthetic significance or value; and
- (e) public access to the foreshore.

Provisions are also contained within Section 105 of the *Coastal Protection and Management Act 1995* to include the State and any Regional Coastal Plans as State Planning Policies for the purposes of the IP Act.

Removal of quarry material from State Land within the Coastal Management District will require approval of a resource allocation or approval of a dredge management plan under the provisions of the *Coastal Protection and Management Act 1995*. In deciding to approve either an allocation or dredge management plan the criteria contained in section 75 of the *Coastal Protection and Management Act 1995* must be considered. The criteria include:



- State and Regional Coastal Plans;
- impact of the removal including:
 - supply of sediments;
 - physical integrity;
 - existing allocations; and
 - ecologically sustainable development of land or watercourses on land;
- effect on environmental values including water quality objectives; and
- impact of removal and placement of spoil in affecting fish habitats and Marine Parks.

Schedule 8, Table 4, item 5 of the IP Act specifies that operational work for tidal work or work of a certain type in a Coastal Management District is assessable under the IP Act.

Relevance to the Northeast Business Park

The State Coastal Protection and Management Plan for Queensland is applicable and provides policy direction for Regional Coastal Plans. The SEQ RCMP covers the project area and declares Coastal Management Districts applicable along Caboolture River and associated tidal waterways. Development consisting of Material Change of Use and Reconfiguration within Coastal Management Districts requires referral to the Environmental Protection Agency (EPA) for assessment against the provisions of the CPM Act and policies of the SEQ RCMP

Operational works that require approval under the CPM Act specified in Schedule 8 Item 5 of Table 4 include:

- tidal works (including prescribed tidal works, in a local government tidal area);
- reclaiming land under tidal water; and
- constructing an artificial waterway either with or without being associated with a reconfiguration of a lot.

Development approvals are required for all works and the EIS provides the assessment necessary to make this determination to the extent possible, given that complete design details may not be available to recommend a full development approval for such works.

Transport Operations (Marine Safety) Act 1994

The *Transport Operations (Marine Safety) Act 1994* seeks to provide a system that achieves an appropriate balance between regulating the maritime industry to ensure marine safety, and enabling the effectiveness and efficiency of the Queensland maritime industry to be further developed.

In particular, the objectives of the Act include the establishment of a system so that marine safety can be effectively planned and managed and allows for the regulation



of certain matters through the *Transport Operations (Marine Safety) Regulation* 2004.

Development in or certain developments adjacent to navigable waters are to be referred to the Department of Transport, Maritime Safety to ensure that they are not likely to cause an impact or safety risk.

Relevance to the Northeast Business Park

The Integrated Planning Regulation 1998 specifies that operational works that are tidal works, are referred for approval pursuant to the *Transport Operations (Marine Safety) Act 1994.* These works will consist of the lock system, bridges over tidal waterways and other tidal works.

Transport Operations (Marine Pollution) Act 1995

The *Transport Operations (Marine Pollution) Act 1995* is an Act to protect Queensland's marine and coastal environment by minimising deliberate and negligent discharges of ship-sourced pollutants into coastal waters. This Act seeks to achieve this purpose by;

- providing an approach to protecting Queensland's marine and coastal environment from ship-sourced pollutants complementary to the approach of the Commonwealth and other states;
- (ii) making provision about the discharge of sewage from ships;
- (iii) giving power to deal with shipping causalities that are polluting, or are threatening to pollute coastal waters;
- (iv) enhancing, through education processes, industry and community awareness of the effects of ship-sourced pollutants on Queensland's marine and coastal environment; and
- (v) providing for the imposition of severe penalties on persons who pollute Queensland's marine and coastal environment in contravention to the Act.

The *Transport Operations (Marine Pollution) Regulation 1995* seeks to prescribe various matters pursuant to the Act.

Relevance to the Northeast Business Park

Regulations require vessels to have provision for containment of waste including sewage. Offences are created for discharging such wastes into coastal locations such as marinas. These provisions will be required to be enforced in the marina.

Transport Operations (Road Use Management) Act 1998

The objectives of this Act are consistent with the objectives of the *Transport Planning and Coordination Act 1994* and are to:

- provide for the effective and efficient management of road use;
- provide a scheme for managing the use of the State's roads; and



• provide for effective and efficient management of vehicle use in a public place.

To fulfil this purpose, the Act provides the powers, the regulations and standards necessary for controlling of access to the road network.

Relevance to the Northeast Business Park

The development provides public access for vehicles. Traffic management is required to be in accordance with the provisions contained within the legislation.

Transport Infrastructure Act 1994

This Act provides a regime for planning and management of transport infrastructure relating to roads, rail, ports and busways. It provides regulation of development that will impact on State Controlled Roads. The development is proposed adjacent to a State Controlled Road and the development will require referral to the Department of Main Roads.

The *Transport Infrastructure Act* 1994 provides a regime for planning and management of transport infrastructure relating to roads, rail, ports and busways. It provides regulation of development that will impact on State Controlled Roads.

Relevance to the Northeast Business Park

The development will require referral to the Department of Main Roads for assessment under triggers provided within the *Integrated Planning Regulation 1998.*

Resource entitlement may also be required for works within the State Controlled Road that interfere with a State Resource. Schedule 10 of the *Integrated Planning Regulation 1998* lists the State Resources and the entity that provides entitlement to such resources. The Department of Main Roads is the relevant department to provide resource entitlement for applications made pursuant to the IP Act.

The Act has further relates to the regulation, *Transport Infrastructure (State Controlled Roads) Regulation 2000.* This regulation requires the approval of encroachments and ancillary works listed in Schedule 1 of the regulation.

The development is located along a State Controlled Road. The development requires approval in accordance with the provisions of the regulation.

Maritime Safety Queensland Act 2002

The *Maritime Safety Queensland Act 2002* is an Act to establish the Maritime Safety Agency of Queensland and for other purposes. The Maritime Safety Agency of Queensland provides advice and functions related to marine safety.

Relevance to the Northeast Business Park

The Maritime Safety Agency administer provisions of the *Transport Operations* (*Marine Pollution*) Act 1995 and regulation.



Transport Planning and coordination Act 1994

The objective of the Transport Planning and coordination Act 1994 is to improve:

- (a) the economic trade and regional development performance of Queensland; and
- (b) the quality of life of Queenslanders by achieving overall transport effectiveness and efficiency through strategic planning and management of transport resources.

This process is achieved through the development of transport plans as approved through this Act.

Relevance to the Northeast Business Park

Transport Plans have been incorporated into the South East Queensland Regional Plan

Fire and Rescue Service Act 1990

This Act provides for fire safety requirements for certain occupancies amongst other things. Obligations exist for persons to ensure that certain buildings have the required fire safety requirements.

Relevance to the Northeast Business Park

The NEBP includes a Marina. Applications for developments involving marinas are required to be referred for assessment under this legislation.

Native Title (Qld)Act 1993

This Act is a continuation of Commonwealth legislation reflecting the High Court decision recognising occupation of Aboriginal and Torres Strait Islanders prior to European settlement.

Relevance to the Northeast Business Park

While freehold property is not affected by this legislation certain works outside freehold property will require notification under this legislation.

Aboriginal Cultural Heritage Act 2003

The purpose of this Act is to provide effective recognition, protection and conservation of Aboriginal cultural heritage. The legislation is applicable in regarding to providing a duty of care and in the development of management plans or treatment of areas.

Relevance to the Northeast Business Park

The development will be required to comply with the Duty of Care as detailed in the Act. Traditional owners have been involved in cultural heritage assessments and field studies on the site. The legislation will be applicable should any artefacts or other information be discovered on site.



State Development and Public Works Organisation Act 1971

The object of the SDPWO Act is to provide for State planning and development through a coordinated system of public works organisation for environmental coordination and for related purposes.

The Act provides for environmental assessment of major projects in Queensland and is the controlling legislation for this project at the State level. The *State Development and Public Works Organisation Act 1971* provides the power for the Coordinator General to designate major projects as "Significant Projects" and for these to be coordinated through environmental assessment provisions contained in Section 26 of the Act.

Following finalisation of the EIS, the CG reviews the EIS and prepares a report. This report may recommend the refusal or approval of the project and may impose conditions. The EIS and conditions become a concurrence response for the purpose of the IP Act and replace the information and referral and notification stages of the Integrated Development Assessment System of the IP Act.

The office of the CG is the authority responsible for coordinating the EIS process

Relevance to the Northeast Business Park

The NEBP was declared to be a "significant project" under section 26(1) (a) of the SDPWO Act by the CG on 21 June 2006. The declaration initiates the statutory environmental impact assessment procedure of Part 4 of this Act, which requires the proponent to prepare an EIS for the project.

The EIS process under this Act is the accredited process for Commonwealth approval.

Environmental Protection Act 1994

The object of the Environmental Protection Act 1994 (EP Act) is to "Protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends".

The EP Act contains provisions that allow the regulation of certain activities and matters, obligating everyone into having an environmental duty, creating offences of environmental harm and providing policies relating to certain matters. Current policies relating to waste, noise, air and water exist. These policies are:

- Environmental Protection (Water) Policy 1997;
- Environmental Protection (Noise) Policy 1997;
- Environmental Protection (Air) Policy 1997; and
- Environmental Protection (Waste Management) Policy 2000.



The EP Act also provides provisions for contaminated land and provide a list of activities where notification is required to the Environmental Protection Agency should these activities be conducted. Schedule 2 of the Act lists the notifiable activities. These include item 29 (fuel storage) which will be applicable to this project.

The *Environmental Protection Regulation 1998* provides a schedule of activities that require development approvals and requirements for registration certificates to be held. These activities are defined as are Environmentally Relevant Activities (ERAs) and include activities such as dredging, or operating a marina. ERAs are administered by the Environment Protection Agency or the Local Government depending upon circumstances prescribed in section 39 (Devolution of powers-environmentally relevant activities) of the *Environment Protection Regulation 1998*.

Environmental Protection Policies

These policies form part of the standard criteria to be considered by the Administering Authority when making decisions under the *Environmental Protection Act 1994.*

Environmental Protection (Noise) Policy 1997

This policy is relevant in identifying the acoustic environment to be protected.

Environmental Protection (Air) Policy 1997

This policy specifies air quality indicators and goals to protect environmental values.

Environmental Protection (Water) Policy 1997

This policy provides the framework for the identification of environmental values of waters and has allowed for the development of Queensland's Water Quality Guidelines. The policy also allows for the protection of waters through offence provisions and to enable decisions regarding planning schemes or development to consider the provisions of the policy.

In regard to this proposal, offences exist under the policy for the release of soil or sediment or other contaminants to water through either the construction or operation of the facility.

Environmental Protection (Waste Management) Policy 2000

This policy provides a strategic framework for managing waste. The policy provides a waste management hierarchy to be considered when in the decision making process in order to minimise the impact of waste in the community and on available resources. Waste provisions are also supported in the *Environmental Protection* (Waste Management) Regulation 2000.

Relevance to the Northeast Business Park

The Environmentally Relevant Activities that have been identified in regard to this project are:



ERA 11a: crude oil or petroleum storing in tanks or containers having a combined total storage capacity of:

- (a) 10,000L or more but less than 500,000L
- (b) 500,000L or more

ERA 73 Marina or sea plane mooring – operating a commercial marina or facility for mooring sea planes, including any land-based buildings or works used in association with the marina or mooring-

- (a) for less than 20 berths or moorings
- (b) for 20 or more, but less than 100, berths or moorings
- (c) for 100 or more berths or moorings

ERA 19 Dredging material- Dredging material from the bed of any waters (other than dredging by a port authority for which a royalty or similar charge is not payable) using plant or equipment having a design capacity of-

- (a) not more than 5,000t a year
- (b) 5,000t or more a year, but less than 100,000t a year
- (c) 100,000t a year or more

ERA 69- Boat Maintaining and Repair facility- Operating a commercial facility for maintaining or repairing any type of boat or inboard or outboard marine engine.

Development approvals for the above Environmentally Relevant Activities are required. These are to be assessed under the Standard Criteria of the *Environmental Protection Act 1994.*

The Standard Criteria are:

- (a) the principles of ecologically sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development', and
- (b) any applicable Environmental Protection Policy, and
- (c) any applicable Commonwealth, State, or Local Government Plans, standards, agreements or requirements, and
- (d) any applicable environmental impacts study, assessment or report, and
- (e) the character, resilience and values of the receiving environment, and
- (f) all submissions made by the applicant and submitters and
- (g) the best practice environmental management for activities under any relevant instrument or proposed instrument as follows
 - *i.* an environmental authority
 - *ii.* an environmental management program
 - iii. an environmental protection order
 - iv. a disposal permit
 - v. a development approval; and



- (h) the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out or proposed to be carried out under the instrument and
- (i) the public interest, and
- (j) any applicable site management plan, and
- (k) any integrated environmental management system or proposed integrated environmental management system, and
- (I) any other matter prescribed under a regulation.

Operators of Environmentally Relevant Activities are required to hold registration certificates pursuant to the *Environmental Protection Act 1994*. Applications for registration certificates will need to be applied for by operators of ERAs at the appropriate time.

The commencement of certain activities such as ERA 11(a) Petroleum Product Storage will require notification be made to the Environmental Protection Agency under the requirements of Section 371 (contaminated land) of the *Environmental Protection Act 1994.*

Item 29 of Schedule 2 of the *Environmental Protection Act 1994* lists petroleum product or oil storage in underground tanks of more than 200 litres capacity or above ground tanks in quantities of more than, those listed below, as being a notifiable activity for the purposes of contaminated land provisions of the *Environmental Protection Act 1994*. A time frame exists for notification once the activity has commenced:

- (i) Class 3 of packaging group 1 or 2 of more than 2,500 L;
- (ii) Class 3 of packaging group 3 of more than 5,000L; or
- (iii) Combustible liquids of more than 25,000L.

Under the provisions of the IP Act and triggered through Item 20 of Table 3 and Item 38 of Table 2 of Schedule 2 of the *Integrated Planning Regulation 1998*, the development is required to be assessed against the provisions of the EP Act as it is located within 100m of a wetland. The development will be required to be assessed against all matters of the standard criteria that relate to the protection of wetlands. The EIS will be used in this assessment.

The development of any environmental management plans shall be required to be consistent with the provisions of the EP Act, policies and regulations.

Vegetation Management Act 1999

The Vegetation Management Act 1999 (VM Act) seeks to regulate the conservation and management of vegetation communities. Within this legislation, regional ecosystems are defined as vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil.

The purpose of the Act is to regulate clearing of vegetation in a way that conserves:

• remnant endangered regional ecosystems;



- remnant of concern regional ecosystems;
- remnant not of concern regional ecosystems; and
- vegetation in declared areas.

The Act is also intended to:

- ensure clearing does not cause land degradation;
- prevent the loss of biodiversity; and
- maintain ecological processes while managing environmental effects and reduce greenhouse emissions.

To achieve this purpose requires the development of codes. Regional codes provide guidelines to acceptable outcomes of when and how vegetation can be removed for development amongst other purpose.

Relevance to the Northeast Business Park

The site contains remnant vegetation communities.

Assessable vegetation under the VM Act does not include mangroves or marine plants. Such marine plants and approvals for removal of marine plants are required through the provisions of the *Fisheries Act 1994*.

The approval mechanisms for clearing of vegetation which is defined as Operational Works for the purposes of the IP Act is dependent on the applicable current zoning of land. Land designated as rural use under the CSC Planning Scheme is considered "Environmental Use" for the purposes of the VM Act. Referral to the Department of Natural Resources and Water is required for any IP Act approval for the removal of vegetation. Vegetation removal is considered within Section 4.8 of the EIS.

Land Act 1994

The *Land Act 1994* consolidates laws relating to the administration and management of non-freehold land and deeds of grant in trust and the creation of freehold land and other related purposes.

The Department of Natural Resources and Water administering the *Land Act 1994* is required to determine whether the proposed use is a suitable use under the conditions of the existing lease, provide resource entitlement on State Land and determine appropriate tenure.

Relevance to the Northeast Business Park

The proposed development site includes State Land (bed of the Caboolture River) as well as freehold property.

Resource entitlement to undertake works is required on State Land. IP Act applications require resource entitlement instead of owners consent for certain operational works. Schedule 10 of the *Integrated Planning Regulation 1998* lists the resource entitlements required and the entity to provide the entitlements.



The *Land Act 1994* is also applicable for the registration of properties created through reconfiguration processes.

Water Act 2000

The object of the *Water Act 2000* is to provide for the sustainable management of water and other resources, a regulatory framework for providing water and sewerage services and the establishment and operation of water authorities and for other purposes.

The Water Act 2000 provides the powers for the development of water plans.

Relevance to the Northeast Business Park

The 'Water Resource (Moreton) Plan 2007' has been developed for the region. The project area is located in sub-catchment 10- Caboolture River sub-catchment. Works that allow the taking of, or interfering with, overland flow water are assessable development for the IP Act.

The 'Water Resource (Moreton) Plan 2007' allows the interfering with overland flows for a purpose that the Chief Executive reasonably considers is for water sensitive design, within the meaning of the SEQ Regional Plan for developments in urban areas. The project incorporates water sensitive design that will be assessed.

While most waterways within the project site are tidally influenced and development in association with those waterways is not assessed in accordance with this legislation, minor non tidal waterways may require the issue of Riverine Protection Permits. These will be assessed against the provisions of the *Water Act 2000, Water Regulation 2002* and policies of the Department of Natural Resources and Water.

Body Corporate and Community Management Act 1997

The object of this Act is to provide a flexible and contemporary communally based arrangements for the use of freehold land having regard to the secondary objects which are to:

- balance the rights of individuals;
- promote economic development;
- encourage tourism;
- provide legislative framework accommodating future trends in community title ling;
- provide flexibility in dealing with changing circumstances;
- provide consumer protection;
- provide accessibility to information; and
- provide dispute resolutions procedures.



Relevance to the Northeast Business Park

The NEBP is proposed to be developed under Community Title, guided by a Community Management Scheme. Community Title provides a legal structure allowing for stakeholders in the NEBP to provide detailed local control and management measures tailored to the needs of the development. Such a structure allows for long term control and management of community and environmental assets, allowing them to be maintained to a standard in keeping with the intent of the development. The Community Management Scheme is to be structured to account for the differing interests and responsibilities of different land uses to be implemented progressively.

Acquisition of Land Act 1969

This Act allows for the compulsory acquisition of land for a number of scheduled reasons.

Relevance to the Northeast Business Park

This Act may be used to acquire freehold land for community infrastructure both either on the project site or on other lands as a result of the project.

State Planning Policies

<u>SPP 2/02 Planning and Managing Development Involving Acid</u> <u>Sulfate soils</u>

SPP 2/02 applies to all land, soil or sediment at or below 5 metres AHD where the natural ground level is below 20 metres AHD and where the excavation of, or otherwise removing, 100 m³ or more of soil or sediment is proposed. The SPP also applies to land below 5 metres AHD where filling of land involving 500m³ or more of material with an average depth of 0.5m or greater is proposed.

The proposal involves the excavation of material on land less than 5 metres AHD and so this policy is relevant. Actual or potential Acid Sulfate Soils (ASS) must be sampled and treated in accordance with the Queensland Acid Sulfate Soil Technical Guidelines.

SPP 1/03 Mitigating the Adverse Impacts of Flood, Fire and Landslide

The development is proposed for land that may be subject to floods. The SPP will be required to meet the outcomes provided within the policy. This policy does not address stormtide inundation, this is addressed in the guideline 'Mitigating the impacts of stormtide inundation' produced by the Environmental Protection Agency. Both policies are relevant to the project and must be addressed.

SPP 1/07 Housing and Residential Development

The State Planning Policy will require the identification of future housing needs and opportunities for the delivery of housing diversity. It is applicable to the master planning of the NEBP.



SPP 1/92 Development and the Conservation of Agricultural Land

The State Planning Policy seeks to retain agricultural land for such purposes. The project area was formally used as agricultural land and provisions of the SPP are incorporated into the Local Government planning scheme.

South East Queensland Regional Plan

Provides planning objectives for the planning area. The SEQ Regional Plan contains both regulatory components and requirements to be incorporated within the Local Government's planning scheme.

Since the project is subject to development applications prior to the introduction of the SEQ Regional Plan, certain regulatory provisions are not applicable. However, all aspects will be addressed and are covered in Section 1.6.2.

Local Planning Policies

Local Planning Policies are addressed in Section 1.6.2.



1.6.1.3 Required Approvals

A summary of required approvals, together with the specific trigger under the legislative instruments listed above, and the agency involved in the assessment of the matter is provided in Table 4.

	Table 4	Required Approvals
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Legislation	Reasons for approval	Specific trigger	Referral Jurisdiction
Integrated Planning Act 1997	Resource entitlement for application to be made outside freehold such as in Caboolture River	Section 12 of the Integrated Planning Regulation 1998	DPIF to provide resource entitlement within Fish Habitat Areas. (Resource Allocation Authority as issued under the Fisheries Act is evidence of entitlement)
	Resource entitlement for navigation channel		DNRW to provide resource entitlement for the navigation channel within Caboolture River
	Development Applications for Material Change of Use- Preliminary Approval overriding the Planning Scheme, for uses as specified in the NEBP Area Plan for the MIBA Precincts and Open Space Precincts	Section 3.1.6 if the IP Act	Council - Assessment Manager
	Development Applications for Operational Works- bulk earthworks, & excavation- assessable against the planning scheme	Section 3.2.1 if the IP Act	Council - Assessment Manager
Environmental Protection Act 1994	MCU for the commencement of ERA 19 (Dredging)	Dredging bed or banks of waters	EPA- Concurrence Agency
	Registration certificate to be held by operator of activity	Item 1, Table 2 Schedule 2 Integrated Planning Regulation 1998.	



Legislation	Reasons for approval	Specific trigger	Referral Jurisdiction
	MCU for the commencement of ERA 69 (Boat Maintaining or Repairing facility) Registration certificate to be held by operator of activity	Operating a boat repair facility. Item 1, Table 2 Schedule 2 <i>Integrated Planning Regulation</i> 1998	EPA –Concurrence Agency (normally devolved to local government except when undertaken on same site as non devolved ERA, e.g. dredging)
	MCU for the commencement of ERA 73 (Marina) Registration certificate to be held by operator of activity.	Operating a Marina. Item 1, Table 2 Schedule 2 Integrated Planning Regulation 1998.	EPA –Concurrence Agency (normally devolved to local government except when undertaken on same site as non devolved ERA, e.g. dredging)
	MCU for the commencement of ERA 11a (Fuel Storage) Registration certificate to be held by operator of activity	Fuel storage Item 1, Table 2 Schedule 2 Integrated Planning Regulation 1998	EPA –Concurrence Agency (normally devolved to local government except when undertaken on same site as non devolved ERA, e.g. dredging)
Environmental Protection Act 1994	MCU Within 100m of a wetland	Item 20 of Table 3 of Schedule 2 Integrated Planning Regulation 1998	EPA – Advice Agency
	Reconfiguration of a lot within 100m of a wetland	Item 38 of Table 2 of Schedule 2 Integrated Planning Regulation 1998	EPA-Advice Agency
Nature Conservation Act 1992	Development within 100m of a protected area	Item 21 of Table 3 of Schedule 2 of <i>Integrated Planning Regulation</i> 1998.	EPA- Advice Agency
	Reconfiguration within 100m of a protected area	Item 39 of Table 2 of Schedule 2 of Integrated Planning Regulation 1998	EPA-Advice Agency



Legislation	Reasons for approval	Specific trigger	Referral Jurisdiction
	MCU for an urban purpose within 100m of a protected area	Item 40 of Table 2 of Schedule 2 of Integrated Planning Regulation 1998	EPA-Advice Agency
Coastal Protection and	Resource Allocation or Dredge Management Plan required for dredging	Part 5 Div 1 of Coastal Protection and Management Act 1995	EPA to provide Resource Allocation for Removal of Quarry Material
Management Act 1995	Operational works- tidal works And reclaiming land under tidal water or constructing an artificial waterway associated with the reconfiguration of a lot including Prescribed tidal works	Lock or any other works, under in or over tidal waters including navigation channels Item 12 of Table 2 of Schedule 2 of <i>Integrated Planning Regulation</i> 1998	EPA- Concurrence Agency
	MCU involving operational works or building works in a coastal management district	Item 6, Table 3 of Schedule 2 Integrated Planning Regulation 1998	EPA- Concurrence Agency
	Reconfiguring of a lot in a coastal management district	Item 13 of Table 2 of Schedule 2 of Integrated Planning Regulation 1998	EPA- Concurrence Agency
Transport Operations (Marine Safety) Act 1994	Operational works that is tidal works	Item 14 of Table 2 of Schedule 2 of Integrated Planning Regulation 1998	Department of Transport, Maritime Safety - Concurrence Agency
Marine Parks Act 2004	Permit required	Non IP Act	EPA (QPWS) issues Marine Park Permits
	Reconfiguring a lot within 100m of a Marine Park.	Item 39 of Table 2 of Schedule 2 of the <i>Integrated Planning</i> <i>Regulation 1998</i> .	EPA -Advice Agency
	Material Change of use within 100m of a Marine Park	Item 40 of Table 2 of Schedule 2 of the Integrated Planning Regulation 1998	EPA -Advice Agency



Legislation	Reasons for approval	Specific trigger	Referral Jurisdiction
Fisheries Act 1994	Resource Allocation required for works within a fish habitat area	Requirement for Resource Allocation Authority- Division 3A, Subdivision 1, Item 76B	DPIF issues Resource Allocation Authority
	Disturbance to marine plants	Dredging or building works that remove or damage marine plants Item 29 of Table 2 of Schedule 2 of <i>Integrated Planning Regulation</i> <i>1998</i>	DPIF- Concurrence Agency
	Building work in a declared fish habitat area	Building of lock Item 24 of Table 2 of Schedule 2 of Integrated Planning Regulation 1998	
	Operational work completely or partly within a declared fish habitat area	Dredging in river or building works Item 25 of Table 2 of Schedule 2 of <i>Integrated Planning Regulation</i> 1998	
	Development on land that adjoins a declared fish habitat area	Development on land adjoining the Caboolture River Item 26 of Table 2 of Schedule 2 of <i>Integrated Planning Regulation</i> 1998	
Fire and Rescue Service Act 1990	Operation works that is Tidal work and involves a Marina	Tidal work Item 17 of Table 2 of Schedule 2 of <i>Integrated Planning Regulation</i> 1998	Qld Fire and Rescue Service- Advice Agency



Legislation	Reasons for approval	Specific trigger	Referral Jurisdiction
Transport Infrastructure Act 1994	MCU on land contiguous to a State Controlled Road Also applies for reconfiguration	Item 1 Table 3 Schedule 2 of Integrated Planning Regulation 1998	Main Roads- Concurrence Agency
	Reconfiguration of a lot contiguous to a State Controlled Road	Item 2 Table 2 Schedule 2 of Integrated Planning Regulation 1998	Main Roads- Concurrence Agency
Dangerous Goods and Safety Management Act 2001	Approval for the storage of flammable and combustible materials	Licensing for storage of flammable and combustible liquids Non IP Act	Caboolture Shire Council.
Vegetation Management Act 1999	Clearing Vegetation on Lot 2 on RP 902075 and Lot 10 on RP 902079	Op works (where not associated with a reconfiguration)- Item 5 of Table 2 of Schedule 2 of <i>Integrated Planning Regulation</i> <i>1998</i> MCU- item 11 of Table 3 of Schedule 2 of <i>Integrated Planning</i> <i>Regulation 1998</i> Reconfiguration- Item 4 of Table 2 of Schedule 2 of <i>Integrated</i> <i>Planning Regulation 1998</i>	DNRW-Concurrence Agency
Native Title Assessment Native title Act (Qld) 1993	For works outside freehold property Any works within River- not freehold, eg tidal works or dredging.	Notification to be made	Caboolture Shire Council



Legislation	Reasons for approval	Specific trigger	Referral Jurisdiction
Water Act 2000	Any works within the bed & banks of non tidal waterways-Riverine Protection Permit	Non IP Act	DNRW
SPP 2/02 Planning and Managing development involving acid sulfate soils Land Act 1994	Dredging, excavation or filling in amounts exceeding specified volumes	Item 4 Table 3 Schedule 2 Integrated Planning Regulation 1998	DNRW -Advice Agency
Building Act 1975	If buildings of a specified type referral required to QFRA	Item 1 Table 1 Schedule 2 Integrated Planning Regulation 1998	QFRA -Advice Agency



1.6.2 Approval Program

Two existing applications are currently before Council, for a business park and marina. The status of these applications are as follows:

Table 5Summary of Current Applications

Application	Business Park	Marina
Extent	Lot 10 and Lot 2	Lot 7 and Lot 24
Application Date	18/06/2002	8/10/2004
Caboolture Shire Council Ref:	MCU-2002-1079	MCU-2004-1420
Referral Coordination Unit Ref:	RCU875	RCU1666
Application Type	Preliminary Approval overriding the Planning Scheme (s3.1.6)	Preliminary Approval overriding the Planning Scheme (s3.1.6)
Components Sought		
MCU – Uses	Mix of uses	Mix of uses
MCU – ERA	Not Sought	ERA 73 - Marina
ROL	Not Sought	Not Sought
Operational Work	Not Sought	Not Sought
Building Work	General Building Work (Preliminary Approval)	General Building Work (Preliminary Approval)
Referral Agencies	Department of Main Roads (Concurrence)	Department of Main Roads (Concurrence)
	Environmental Protection Agency (Concurrence)	Environmental Protection Agency (Concurrence)
IDAS Status		
Application Stage	Acknowledgement Notice issued 04/07/2002	Acknowledgement Notice issued 08/11/2004
Information and Referral Stage	Referral Coordination Information Request issued 16/08/2002	Referral Coordination Information Request issued 21/01/2005
	Extension to Information Request response period issued 7/08/2003	The Information Request response period has been extended a number of times.
	Information Request response issued 16/08/2004	Current Information Request Response due date – 31/01/2008



Notification Stage	Public Notification period 08/09/2004 to 26/10/2004 Statement of Compliance issued 29/10/2004	Public Notification has not occurred.
Decision Stage	Caboolture Shire Council's decision making period has been extended a number of times. Current decision due date – 31/01/2008	The Decision Stage has not commenced.

The existing applications remain live, but assessment will be delayed until the application for the overall development has been determined based on the EIS. The proposed assessment program is as follows.

- (a) Change the existing applications to match the scope of the NEBP proposals as described in the EIS documentation (undertaken prior to lodgement of the EIS).
- (b) Lodge and commence formal EIS assessment process including public advertising and government agency input.
- (c) CG report issued.
- (d) Commonwealth decision under EPBC Act.
- (e) Complete any recommendations arising through the CG's Report.
- (f) Council to determine the existing Preliminary Development applications (as changed) under the IDAS process (as modified by the SDPWO Act). This concludes assessment of the existing applications, resulting in Preliminary Approvals for the development.
- (g) Issue of resource owners consents and any necessary tenure across State land.
- (h) Making of supplementary applications, subject to the recommendations and enabling provisions of the CG's Report, and processed under normal assessment regimes.

This process is indicatively shown in the flowchart below.





Summary of Approvals Process

The two current applications are required to be assessed and decided according to the law in existence when the applications were made. Despite this, supplementary applications will address the aspects of assessable development with are now law but not included within the current applications (as changed).

Should the CG's report support the application, it is anticipated that the report will make recommendations regarding future approvals and enabling provisions, including:

- approval conditions for the two current applications (as changed);
- enabling consequential actions by the Government to undertake amendments to statutory instruments that will allow for the issue of resource owners consents;
- alterations to the Moreton Bay Zoning Plan to establish a "works area" to enable dredging;
- revocation of components of the Deception Bay Fish Habitat Area that are within the Caboolture River;
- recommendations/submission regarding the Draft Moreton Bay Marine Park Zoning Plan to enable dredging;
- recommendations regarding designating the appropriate Assessment Manager for particular applications;
- recommendations to State Government Agencies toward gaining the necessary tenure, resource entitlements and allocations and permits relevant to the NEBP proposal;
- amendments to the SEQ RCMP and other statutory instruments where required;



- amendments to the SEQ Regional Urban Footprint; and
- exemption from the regulatory provisions of the SEQ Regional plan.

The approval process under the EPBC Act will commence following the issue of the CG's report provided that the report supports the application. A decision from the Commonwealth Minister for Environment and Water Resources is then expected within two months, although this timeframe could be extended if the Commonwealth Government requires additional time to consider the findings of the EIS.

Following approval of the two current development application and supplementary applications, further development applications will be made for individual developments in accordance with the IP Act. Such applications will be lodged and assessed under the IP Act in the normal manner.

1.6.3 Planning Processes and Standards

This section provides the planning context and an assessment of the project's compliance with planning instruments of State, regional and local policies. A planning report has been prepared by PMM and this is presented in Appendix C2. The most explicit guidance on the use for the project site and associated development intentions is provided by the South East Queensland Regional Plan, the CSC Planning Scheme 2005 and the South East Regional Coastal Plan. However, there are a number of other policies, many incorporated into the aforementioned regional and local plans that are relevant to the proposal. Included in this section are the now superseded Caboolture Planning Scheme 1988 and Strategic Land Use Plan 1993. These planning instruments are still applicable for the two current, but undecided, IP Act applications which are currently before CSC.

In planning for the development, the proponent has adopted a 'net benefit' approach as the central philosophy of the development. The NEBP aims to achieve demonstrable social, environmental and economic benefits to the community in an ongoing, sustainable basis. To demonstrate the intent of the development, the NEBP Area Plan and Structure Plan have been developed. The Area Plan is presented in Appendix C3, and its purpose is to ensure that the NEBP is planned and developed in an orderly fashion and has the necessary infrastructure and services. The Area Plan ensures that adequate assessment processes and standards are established to guide future development of the site and preserve environmental assets. The plan's objective is also to ensure that development is of an intensity that is appropriate to the local development constraints, consistent with the aims of regional and local planning instruments.

The Area Plan provides for mixed industry and business area precincts, marina, residential and open space precincts. Codes are provided for residential (dual occupancy, house, enterprise), marina, reconfiguration and sector plans while applicable overlays are provided for ASS and environmental protection and rehabilitation. Full assessment of the Structure Plan against the relevant planning schemes and relevant policies has been completed.

1.6.3.1 South East Queensland Regional Plan

The SEQ Regional Plan came into effect in June 2005 and has been developed under IP Act. The purpose of the plan is to provide a sustainable growth management plan for the region until the year 2026. The SEQ Regional Plan has a direct effect in its own right and indirect effect through the amendment and alignment of Local Government Planning Schemes, State plans and polices. For the purpose of IP Act the SEQ Regional Plan is taken to be a State Interest.

The regulatory provisions of the SEQ Regional Plan are required to be taken into account in planning and development decision making, including the following.



- Qld Government Plans and polices.
- Local Government Planning Schemes and other plans and policies.
- Planning and development processes under IP Act.
- Development applications make under IP Act.

Where the Local Government Planning Schemes contradict the provisions of the SEQ Regional Plan then the Planning Scheme must be amended to ensure consistency.

The SEQ Regional Plan provides a vision for South East Queensland which is sustainable, affordable, prosperous and liveable. To achieve this vision, it provides strategic directions that relate to the NEBP proposal which are about:

- creating a more sustainable future;
- identifying land to accommodate future growth;
- promoting land use efficiency;
- enhancing the identity of regional communities;
- providing infrastructure and services; and
- integrating land use, transport and economic activity.

The SEQ Regional Plan identifies 12 regional policies which set out the desired outcomes required to meet the strategic directions. These include:

- 1. sustainability;
- 2. natural environment;
- 3. regional landscape;
- 4. natural resources;
- 5. rural features;
- 6. strong communities;
- 7. engaging aborigines and Torres Strait islander people;
- 8. urban development;
- 9. economic development;
- 10. infrastructure;
- 11. water management; and
- 12. infrastructure transport.

The policies are intended to guide local government planning schemes and development assessment and provide links to a number of key strategies. The proposed development has been assessed against these key strategies to ensure the objectives of the SEQ Regional Plan are met.

The land included in the project area is designated under the SEQ Regional Plan as listed in Table 6.


Land description	SEQ Regional Plan Designation
Lot 2 on RP902075	Urban
Lot 7 on RP845326	Regional landscape and rural production area
Lot 10 on RP902079	Urban and Regional landscape and rural production area
L12 on RP145197	Urban
Lot 15 on RP902073	Urban
Lot 17 on RP902072	Urban
Lot 24 on SP158298	Regional landscape and rural production areal

Table 6	SEQ Regional Plan Designations
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Part of the site lies outside the urban footprint and hence promotes consideration regarding whether the proposal complies with the purpose and intents of the SEQ Regional Plan, and whether the application process conforms to the Regulatory Provisions. However, it must be noted that both Development Applications are still current and were lodged prior to the publication of the Draft SEQ Regional Plan on 27 October, 2004. Therefore, according to s1.4 (1), the regulatory provisions of the SEQ Regional Plan do not apply to the current Development Applications.

Nevertheless, the project has been assessed against applicable outcomes of the SEQ Regional Plan, and it is considered that the development establishes overriding net benefit across environmental, economic and social sectors and has locational requirements necessitating urban development outside the urban footprint.

Moreover, if the development was to limited to a 'compliant development' consisting of a monoculture of District Industry within the urban footprint, it would provide substantially lesser benefits to the environment, the economy and the community; and this limitation would directly prevent the achievement of many of the main objectives of the SEQ Regional Plan.

The community would experience significant adverse economic and social impacts were the development not to proceed or proceed as a 'compliant proposal' In short; the proposal would conform to the SEQ Regional Plan even if the Regulatory Provisions were to apply.

However, an assessment of the project against all twelve regional policies of the SEQ Regional Plan has been undertaken and is detailed in the Planning Report prepared by PMM, which is attached as Appendix C2. The following gives a brief summary of how the NEBP conforms to each of the Desired Regional Outcomes of the SEQ Regional Plan.

Desired Regional Outcome (DRO) 1: Sustainability: "The region grows and changes in the most sustainable way; generating prosperity, maintaining and enhancing quality of life, and providing high levels of environmental protection".

• A key objective of the NEBP is to be an example of sustainable development; designed to maximise sustainable net benefits to the community, the environment and the economy.



- An Industrial Ecology framework has been proposed for the marine industry area, and other land uses have been located to complement each other.
- The integration of uses in a master-planned environment allows people to genuinely 'live, work and play' in one holistic community.
- The NEBP will also facilitate public transport.
- The development will clearly generate prosperity, enhance quality of life and provide high levels of environmental protection.

DRO 2: Natural Environment: "A healthy natural environment supports the region's rich biodiversity, clean air and water; and is sustainably managed to support economic development, outdoor lifestyles and community needs".

- The NEBP design aims to integrate all aspects of the development; social, cultural and lifestyle activities, economic and business activity and environmental maintenance. It balances economic and social development with environmental protection and open space areas.
- Areas of open space and managed access points to the river will protect riverbanks and meet community demand for river access and recreation areas.
- The NEBP will rehabilitate riparian vegetation and degraded lands. Eucalypt trees favoured by koalas and cockatoos will be an important feature of the native vegetation rehabilitation program.
- The design and management of the marina will decrease pollution impacts and improve water quality. Water sensitive urban design and constructed wetlands will be used to improve stormwater quality

DRO 3: Regional Landscape: "The key environmental, economic, social and cultural resources of the regional landscape are identified and secured to meet community needs and achieve ecological sustainability".

- The NEBP is designed to meet the demands of regional industry growth, and makes optimum use of the site to meet community needs whilst enhancing ecological sustainability.
- The cultural precinct and interpretation facilities will maintain and preserve the site's cultural assets and history.
- Rehabilitation of open space areas and community access to the Caboolture River will improve the community's access and ability to appreciate the landscape values of the site and surrounds.

DRO 4: Natural Resources: "Regional natural resource and rural protection areas are protected, enhanced and used sustainably".

- The declared Fish Habitat Area will be protected, and the riparian vegetation rehabilitated. Additional wetlands and natural areas will also be developed, meaning a potential increase in fish habitat area.
- Marine based activity will be regulated to reduce impacts of pollution on the Caboolture River. Water sensitive urban design principles will also improve stormwater quality.
- Degraded agricultural land will be developed in a responsible manner.

DRO 5: Rural Communities: "Rural communities are strong and viable with sustainable economies contributing to the health, character and liveability of the region".



• The economic flow-on effects from the NEBP are likely to filter through the whole region, and strengthen surrounding rural communities.

DRO 6: Strong Communities: "Cohesive, inclusive and healthy communities with a strong sense of identity and place, and access to a full range of services and facilities that meet diverse community needs".

- The range of recreational and community facilities offered by the NEBP are likely to improve community identity and ownership. The development will also provide employment opportunities and lifestyle choices that are either limited or not available in the region.
- The NEBP provides a complete community with a wide range of community facilities encouraging a 'live, work & play' lifestyle. Community and recreational facilities promote healthy lifestyles and provide overall benefit to the region.

DRO 7: Engaging Aboriginal and Torres Strait Islander Peoples: "Aboriginal and Torres Strait Islander peoples are actively involved in community planning and decision-making processes and Aboriginal Traditional Owners are engaged in business about their country".

- Cultural heritage studies have been undertaken and development is subject to an approved Cultural Heritage Management Plan
- The Heritage precinct highlights the Indigenous and European cultural heritage of the site and will be a valuable education resource to communicate the history of the site to visitors.
- The NEBP is committed to principles of equal opportunities and opportunities for education, training and employment.

DRO 8: Urban Development: "A compact and sustainable urban pattern of well-planned communities, supported by a network of accessible and convenient centres close to residential areas, employment locations and transport".

- The level of density of the NEBP is in accordance with the SEQ Regional Plan, and makes efficient use of a strategically located site.
- The NEBP provides important benefits to residents by co-locating residential areas next to employment areas and transport.
- The open space and integrated transport and recreation infrastructure complement regional urban development.
- The NEBP also complements the Morayfield/Caboolture Principal Activity Centre. Both areas cater to different markets, but employees located on the site are able to use facilities in both areas.

DRO 9: Economic Development: "A strong, resilient and diversified economy – growing prosperity in the region by utilising its competitive advantages to deliver exports, investment, and sustainable and accessible jobs".

- The NEBP will be a flagship employment district for the region, given the benefits of its proximity to the natural and built environment. This will create an outstanding business environment attracting high value and diversified businesses.
- The easily accessible strategic location of the marine industry hub gives the region a competitive advantage in supplying the current shortages in the marine industries market.
- Indirect economic flow-on effects from the development will have a direct economic benefit to the regional economy and the State.



• The integrated nature of the NEBP will give the region strong competitive advantages to deliver exports, investment, and sustainable, accessible jobs.

DRO 10: Infrastructure: "Regional infrastructure and services are planned, coordinated and delivered in a timely manner to support existing and future settlement patterns and desired community outcomes".

- Infrastructure (such as marine, residential, community and recreational facilities) will be provided and upgraded in an integrated and coordinated manner, with the equitable sharing of costs and benefits, thus benefiting the community.
- Employment, housing, facilities and public transport will all strengthen the role of Caboolture/Morayfield as the region's Principal Activity Centre.

DRO 11: Water Management: "Water in the region is managed on a sustainable and integrated basis to provide adequate supplies for human and environmental uses".

- The NEBP will have access to reticulated recycled water, reducing demands on potable water. Best practice water efficiency measures and water harvesting will further reduce water demand.
- Development and planning incorporates stormwater management strategies to reduce the nutrient and pollutant export from the site. The polishing of stormwater prior to discharge will improve the water quality of the Caboolture River, as will the regulation of marine related activity.

DRO 12: Integrated Transport: "A connected and accessible region based on an integrated transport system that supports more compact urban growth and efficient travel; connects people, places goods and services; and promotes public transport use, walking and cycling".

- The development will strengthen public transport links to Morayfield and Caboolture, including the northern rail corridor, and encourage greater public transport use and accessibility.
- The NEBP has been designed as a master-planned community providing efficient connections between people, employment and recreation whilst promoting public transport and walking and cycling.
- The site is well located to take strategic advantage of its location adjacent to the Bruce Highway and close to the northern rail corridor.

In developing the designations contained in the SEQ Regional Plan, there was no detailed analysis of the suitability of land for urban purposes. Rather the plan reflected on current designations within the local planning schemes. In the case of the project area, the urban footprint followed the designated District Industry boundary provided by the CSC Planning Scheme. Therefore it is considered that the proposed development better meets the objectives of the SEQ Regional Plan than an alternative proposal restricted to the District Industry uses with the current Urban footprint of the SEQ Regional Plan.

The SEQ Regional Plan foresees that a future that is sustainable, affordable, prosperous and liveable and provides direction for creating that objective. The Desired Regional Outcomes of the SEQ Regional Plan are more than adequately delivered by the NEBP.

1.6.3.2 Caboolture Local Growth Management Strategies and Priority Infrastructure Plan

These strategies aim to provide local level support to the SEQ Regional Plan. The Caboolture Local Growth Management Strategy and the Priority Infrastructure Plan are required to demonstrate how dwelling targets, employment and infrastructure are



accommodated within the SEQ Regional Plan. The infrastructure plan and program outline the priorities for the region over a ten year period. Local governments are required to deliver these by 2008 and plans are currently under development.

1.6.3.3 Local Planning Instruments

The NEBP is proposed solely within the Shire of Caboolture and as such is subject to the provisions of the Caboolture Planning Scheme. The current Planning Scheme commenced on 12 December 2005 and sets out standards to manage the growth expected to occur over the next 10 to 15 years. However the two applications under the provisions of the IP Act, currently before CSC were made subject to the former Caboolture Shire Plan 1988 and Strategic Plan 1993. As a result it is necessary to provide an assessment against both current and former plans. Detailed assessment against these instruments has been completed and is contained in the Planning Report attached as Appendix C2.

Caboolture Planning Scheme 1988

While superseded by the current IP Act compliant Planning Scheme, the 1988 Planning Scheme is relevant to the applications already lodged and currently before CSC. A strategic component of the 1988 Scheme is the corresponding Strategic Plan 1993 which provides the preferred dominant land uses and objectives for each of the uses. Under the 1998 Planning Scheme, the NEBP was zoned to allow only for Rural uses.

Strategic Plan 1993

The aim of this now superseded plan was to promote the general well being of residents by ensuring that balanced development occurs with the Shire. This was to be achieved through ecologically sustainable development, economic development and social and cultural development.

In contrast to the 1998 Planning Scheme, the 1993 Strategic Plan designated the project site as a proposed location for a sewerage treatment plant. However, since this time, CSC re-evaluated its Planning Scheme, based on the changing needs of the area. To this end, the uses described in the 1988 Town Planning Scheme and the 1993 Strategic Plan are considered no longer relevant to the site, as is evidenced by the District Industry Zoning of a significant part of Lot 10 under the CSC Planning Scheme.

Therefore, it is considered that the current Planning Scheme is more indicative of CSC's directions and intentions for development within the Shire and a complete analysis of the relevant aspects of the intent of the relevant zones has been completed against the current Caboolture Planning Scheme.

Caboolture Planning Scheme 2005

The current Caboolture Planning Scheme (the Planning Scheme) provides zones and precincts and maps land use constraints in the form of overlays. The scheme also states what can and cannot be undertaken in each zone, precinct or within areas mapped on the overlays and sets outcomes for development in each zone and precinct. The scheme also identifies what is required to be assessable and non assessable development, and both code and impact assessable. The Planning Scheme is required to be read together with the IP Act.

The Planning Scheme identifies the strategic framework for rural and open space areas, residential, commercial, industrial and general areas and divides the Shire into 3 planning areas, the central, eastern and western and into zones (use zones such as district centre, district industrial, local centre etc).



Section 1.9 of the Planning Scheme provides methods to deal with planning development for roads, watercourses and reclaimed land that are otherwise not mapped or identified under the Planning Scheme. Apart from the district codes, the Planning Scheme also contains overlays which contain assessment tables to determine the level of assessment required.

Codes are provided for 12 zones of the planning area, overlays and development for a stated purpose. The Codes are also applicable to the ongoing use as well as for assessment purpose.

The Planning Scheme seeks to achieve outcomes in accordance with the following levels.

- a. Desired environmental outcomes.
- b. Overall outcomes for planning areas, overlays and codes.
- c. Specific outcomes for zones, overlays and codes.
- d. Probable solutions for a specific outcome or acceptable solutions for complying with a self-assessable code.

Strategic Framework

The strategic framework in Part 1 of the Planning Scheme sets out the manner in which development is expected to be undertaken and establishes the overall parameters of the Planning Scheme. The NEBP project has been designed and its planning framework constructed in a manner in accordance with the strategic framework provided by the Planning Scheme. In particular the pattern of development promoted through the Structure Plan and Area Plan ensure the following.

- There is a clear delineation of development areas against the preservation of a large extent of open space areas within the development, providing an open space connection through the site that links Caboolture with Moreton Bay along the Caboolture River.
- Development capitalises upon the site's locational characteristics and advantages to maximise the economic and social benefits that arise from uses within the urban footprint.
- A range of residential housing opportunities are created in proximity to major employment locations, with a high degree of accessibility to public transport, services and centre activities.
- A mixture of interdependent uses occur in a manner that maximises the synergies created by the business and industry activities over time, establishing a range of employment led uses equivalent to the function of a mid level centre that supports the role of the Caboolture-Morayfield principal Activity Centre.
- The MIBA precincts are established as a high quality, master-planned location for environmentally responsible businesses and industries with a range of supporting uses.
- The NEBP Area Precincts have distinct and individual identities reinforced by contemporary sustainable architecture and landscape design which responds to the site character.

Desired Environmental Outcomes

Part 3 of the Planning Scheme sets out Desired Environmental Outcomes (DEOs) for the Shire. In order to achieve conformity with the Planning Scheme on a broad scale, initial planning has been largely based on the Desired Environmental Outcomes and intended outcomes for developed areas as detailed in the Planning Scheme. It is intended that



development be consistent with these principles which will ultimately provide outcomes to integrate existing and future development. The Planning Report provides a detailed summary of each DEO and its relationship with the project.

Zone Intents and Assessment Criteria

The planning area assigned to the proposed project is the Central Planning Area, and the Caboolture Planning Scheme identifies the NEBP lots as the falling into District Industry, Rural and Rural Residential zones. The mix of uses anticipated and defined by the Area Plan is not limited to the scope of the current zonings, rather the intent and assessment criteria contained in the developed Area Plan is framed around existing zones under the CSC Planning Scheme.

Linkages between the Area Plan Precincts and the Planning Scheme 2005 zones are defined in Table 7 below.

Precin	ct/Element	Source Zone(s)
1	MIBA Precincts	
1(1)	MIBA Esplanade	District Industry
1(2)	MIBA Core	District Industry
1(3)	MIBA Highway	District Industry
1(4)	MIBA Marine Industry	District Industry
MIBA (Community Nodes	Local Centre
2	Marina Precincts	
2(1)	Marina Basin	None Applicable
2(2)	Shipyard	None Applicable
2(3)	Marina Village	District Centre and Local Centre
2(4)	Marina Residential	Residential A and Residential B
2(5)	Hotel	Residential A and Residential B
2(6)	Marina Pavilion	None Applicable
2(7)	Golf Residential	Residential A and Residential B
3	Residential Precincts	
3(1)	Residential West	Residential A and Residential B
3(2)	Residential East	Residential A and Residential B
Reside	ential Community Nodes	Local Centre

Table 7 Relationship between Structure Plan Precincts and Planning Scheme Zones



Precinct/Element		Source Zone(s)
4	Open Space Precincts	
4(1)	Golf Club	Open Space
4(2)	Golf Course	Open Space
4(3)	Open Space	Open Space
4(4)	Community Mixed Use	Open Space

The overall outcomes for the Planning Scheme codes have been addressed and responses provided within the Planning Report. While the majority of the site falls within the Rural zone, the overall intents for the zone within the Planning Scheme have limited applicability given the nature of the development applications and the objectives for the NEBP project.

The Planning Report provides a full assessment of the proposed development against the Planning Schemes Codes associated with the uses proposed within the Area Plan. A brief summary of these follows (NEBP response against the number of the DEO from the Planning Scheme.

The NEBP aims to protect and rehabilitate riparian corridors and other areas within the site of local, regional and state ecological importance. Only 45% of the site will be developed, and the remaining 55% used for wetlands, open space, golf course, restored river banks, community parks, and recreation facilities.

The detailed planning for the NEBP will ensure that the project does not result in any adverse effects on the Caboolture River, the downstream wetlands or Moreton Bay. The provisions of the Area Plan, establish on-going development controls for sustainable development, whilst the Open Space Master Plan will preserve, restore and manage on-site areas of natural and environmental significance.

The previous intensive forestry activities on the site have resulted in substantial environmental degradation, limiting the utility of the soils for further forestry or agricultural use.

The significant hazards associated with the NEBP site concern the effects of flooding and stormwater on the built environment, as well as the marine precinct. Further, extensive design and analysis has produced an earthworks model which supports development and maintains flood free development areas with safe access. The detailed design controls of the Area Plan are designed to manage any future risks. With regard to industrial hazards, the Area Plan seeks to not only separate and buffer incompatible uses, but also limits intensive or polluting activities. Any such activities which do occur are required to comply with appropriate standards.

The commercial uses and precincts proposed have been planned to ensure they do not conflict with major functions of the Principal Activity Centre of Caboolture / Morayfield. The commercial uses are intended to complement the primary marine industries area, and are a key aspect for providing an integrated community. Commercial facilities will be provided over time to meet community needs and capitalise upon the opportunities brought by the co-location of the MIBA and marina.

The MIBA precincts comprise some 169ha, or 48% of the development area, consolidated in the western areas of the site in order to protect the amenities of the rural residential areas and the environmental values of Raff Creek and the riparian wetlands. The MIBA Precincts will accommodate a range of low impact activities that achieve economic



synergies and outcomes over and above those arising from a District Industry zoning. The education and training opportunities in the MIBA Precincts, provided in partnership with local organisations, will ensure that businesses locating at the NEBP and in nearby areas can develop and enhance workforce skills for the benefit of the region. The provision of Community Nodes further supports the NEBP, though easy access to daily services and support facilities for workers and businesses.

Development within the NEBP will complement the role of the Principal Activity Centre, by providing a mixture of uses with locational requirements that cannot be accommodated elsewhere. The staged development will result in a local economy that contributes strongly to the Caboolture and Morayfield centres.

The NEBP will result in a substantial shift in the function of the site, from a rural area to an active urban area which preserves the characteristics of the river flats and provides an opportunity to meet the continuing need for industrial and commercial development, accommodate specialist marine activities and create an integrated and sustainable business and residential community.

The NEBP incorporates social and physical infrastructure throughout the development in order to meet the needs of the community, including the provision of high-tech telecommunications, Community Nodes, active and passive recreational areas and the Marina Village.

As previously mentioned 55% of the site will be reserved for open space and recreational facilities. These will be well integrated into the community and will provide opportunities to maximise social interaction throughout the development.

The NEBP contains several areas of Indigenous and European cultural heritage. The Structure Plan aims to protect the remains of the Morayfield homestead within the Heritage Park, which will enhance the site's values and give it prominence within the community. Areas of Indigenous significance are addressed through the Cultural Heritage Management Plan (CHMP). The CHMP is presented as Appendix T4.

The master planning of the site aims to deliver a well balanced development that caters for a broad range of uses. The Area Plan and Structure Plan delineate a number of specific precincts, each of which clearly establish individual identities that reflect their location and function. Through this, the NEBP Area will establish a vibrant community and act as a local social focal point.

The Area Plan and Structure Plan provide a mix of uses and development opportunities which will respond to a wide variety of needs for industrial, residential and commercial activity.

The NEBP Structure Plan maintains the character of the river flats, with 55% of the site protected as open space, providing a significant component of the intra-urban break around Caboolture-Morayfield, and allowing for public access to the Caboolture River.

One intent of the NEBP Structure Plan is to achieve a mix of uses that support one another and allow for people to live and work in the development, avoiding the need for extensive commuting. Additionally, the NEBP Area Plan includes a series of specific outcomes which seek the efficient use of resources and energy. Additional measures will be imposed upon developments through the Design Guidelines, which are anticipated to address matters such as the source of materials, photovoltaic panels and other building features which diminish the need for reliance on non renewable sources. This will be maintained so that future development will be encouraged to conform to key sustainability initiatives. Residential development is proposed within the Northeast Business Park in a compact area



around the Marina Village and Community Nodes in a manner that can be effectively served by public transport.

Planning Scheme Overlays

The applicable codes for overlays contained within the Planning Scheme for the project area have been responded to. These are summarised as follows.

Acid Sulfate Soils

The acid sulfate soil overlay is relevant and an Acid Sulfate Soil Management Plan has been prepared (Appendix R4).

Bushfire Hazard: Medium Bushfire hazard

A Hazard and Risk Assessment Report has been prepared to address the potential for bushfire on the project site (Appendix U). In addition a Bushfire Assessment Report has been prepared and is presented in Appendix Z.

Catchment Protection

The overall intent and the open space rehabilitation program are intended to work towards achieving enhancements to water quality and the protection of riparian corridors. The site contains a Wetland Protection Area identified on the overlay map.

Nature Conservation

The Caboolture River is an ecological corridor, and contains areas identified on the Nature Conservation Overlay map as Nature Conservation Areas of Local, Regional and State Significance. Some of the existing vegetation functions as a buffer to riparian corridors. The proposed development proposes a range of responses to these issues by providing protection to significant nature conservation areas, and proposes rehabilitation and enhancement of ecological corridors and the appropriate management of works in sensitive areas.

Scenic Amenity; Scenic Amenity Areas

The visual impact of the development has been evaluated against the Scenic Amenity Overlay Code, and a Visual Amenity Report is attached as Appendix Q.

Transport Infrastructure

Transport and traffic reports have been completed (Appendices K1 and K2) which addresses the requirements of the overlay and considers the relationship of the development with the surrounding transport network.

Cultural Heritage

The NEBP site is not represented on this overlay; however the remnants of "Morayfield" and the Levi Walker marker are of local importance and will be incorporated into the cultural heritage park.

Koala Conservation

Habitat areas have been evaluated and rehabilitation measures incorporated into the design to mitigate any loss of koala habitat.



Development Codes

The Planning Scheme contains development codes. As the development applications associated with the NEBP presently seek only Preliminary Approvals and propose the project and development specific to the NEBP Area Plan, detailed responses to some aspects of the Development Codes contained in part 7 of the Planning Scheme have not been prepared. The proposed NEBP Area Plan incorporates relevant components from the Development codes into both the precinct codes and the NEBP Development Management Codes.

The applicable development codes are General Works Code, Landscaping Code, Lighting Code, Stormwater Code, and Transport, Access and Parking Code and these have been responded to. These are contained in the Planning Report.

Planning Scheme Policies

The Caboolture Planning Scheme contains 23 Planning Scheme Policies that provide methods for undertaking actions, or otherwise provide direction and guidance on development standards.

Detailed responses have been provided in regard to applicable Planning Scheme Policies (PSPs) and are contained in the Planning Report. The following applicable PSPs have been addressed within the technical reports which have been completed in respect of the proposed development.

- PSP 1 Acid Sulfate Soils.
- PSP 2 Community Wellbeing Impact Assessment.
- PSP 3 Cultural Heritage.
- PSP 6 Ecological Assessment.
- PSP 7 Economic Impacts.
- PSP 13 Koala Conservation.
- PSP 15 Noise.
- PSP 18 Scenic Amenity.
- PSP 19 Stormwater.
- PSP 21 Traffic, Access and Parking.

Other PSPs that are otherwise addressed include:

- PSP 4 Design and development manual;
- PSP 17 Open Space Contributions;
- PSP 20 Structure Plans;
- PSP 21a Transport network Developer Contributions; and
- PSP 22 Water Supply and Sewerage Infrastructure Contributions.

The Planning Scheme contains a strategic framework for development and provides zones, precincts and maps land-use constraints. The Planning Scheme also identifies the level of assessment. The Area Plan and strategic plan define the proposed development and this has been assessed against the codes and policies of the Planning Scheme.



Further detailed responses have been provided within the Planning Report that demonstrate consistency between the intent of the Planning Scheme and the proposed project.

State Planning Policies

The IP Act requires State Planning Policies (SPPs) to be incorporated into Planning Schemes or, as in the case of the State Planning Policy 2/02, be directly triggered through the approval mechanisms in IP Act.

The following SPPs are relevant to the NEBP.

- SPP1/92 Development and the Conservation of Agricultural Land.
- SPP 2/02 Planning and Managing Development involving Acid Sulfate Soils.
- SPP1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide.
- SPP 1/07 Housing and Residential Development.
- South East Queensland RCMP. While this is not a State Planning Policy, it has the effect of a State Planning Policy for the purpose of making and amending Planning Schemes and for assessing development applications

The RCMP has been developed under the statutory provisions of the *Coastal Protection and Management Act 1995,* and has a number of key policy areas that are aimed at achieving sustainable coastal management outcomes. The RCMP identifies a number of key principles which are relevant to the NEBP. These matters are specifically addressed and the project assessed against these policies in Section 4.5 of this EIS.

The SPPs have been addressed through the SEQ Regional Plan and Local Government Planning Scheme and are reflected in the Area Plan.

Northeast Business Park Area Plan

The Area Plan has been prepared as the statutory basis to guide and control development in the NEBP Area over the lifespan of the project.

The Area Plan is specifically tailored to the NEBP site and comprises a Structure Plan that indicatively designates development precincts. The Area Plan specifies the development intent for each precinct, overall outcomes, and preferred uses, the level of assessment required for future applications, relevant codes and development standards. The Area Plan will form part of a suite of Preliminary Approvals overriding the Planning Scheme for development of the NEBP. The Preliminary Approvals will operate under the provisions of IP Act.

The Area Plan applies only to the land contained within the associated applications for Preliminary Approval but when approved will apply to any subsequent development application in the NEBP Area. The Area Plan functions as part of the CSC Planning Scheme and must be read in conjunction with the Planning Scheme.

The purpose of the Area Plan is:

- to ensure that the NEBP is planned and developed in an orderly and sequential fashion and has the necessary infrastructure and Services provided in an efficient and timely manner;
- enable clear and efficient processing of subsequent applications which seek to implement the NEBP Structure Plan;



- ensure that adequate assessment processes and standards are established to guide future development of the site, consistent with the achievement of high environmental standards and the protection of the Caboolture River;
- ensure the achievement of the overall outcomes for the NEBP Area;
- provide certainty for stakeholders and residents as to the type and location of future land uses and infrastructure; and
- preserve environmental assets and ensure that development is of an intensity that is appropriate to the on-site land local development constraints.

Once approved the Area Plan will provide assessment levels and codes which will apply to precincts and development of a stated type. Overlay maps (comprising Structure Plan, movement network, ASS and environmental protection) are provided within the Area Plan to guide development for the project.



1.7 Accredited Process for Controlled Actions under Commonwealth Legislation

The NEBP development (referred to as an action pursuant to the EPBC Act) was referred to DEWR, formerly the Department of Environment and Heritage on 29 June 2006 for the Minister to determine whether Commonwealth approval is required for the action. A Decision notice was issued on the 12 July 2006 notifying that the proposal is a controlled action (i.e. requires Commonwealth approval) pursuant to Part 3, Division 1, of the EPBC Act. The controlling provisions were determined to be:

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

More specifically the NEBP development has the potential to affect the following Matters of National Environmental Significance (Matters of NES).

- The Ramsar listed wetlands of Moreton Bay.
- Known and potential habitat for a diversity of listed threatened wildlife species; and
- Known and potential habitat for a diversity of migratory species listed under international agreements, including:
 - appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) for which Australia is a Range State under the Convention;
 - the Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their Environment (CAMBA); and
 - the Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA).

A stand-alone report addressing the potential impacts on Matters of NES has been prepared and is presented in Appendix L3. A brief summary of the findings of the report is provided below.

Potential impacts on the Matters of NES that may result from the NEBP development include:

- major landform adjustment including the excavation of the marina basin and a balanced cut/fill operation within the site's Caboolture River flood plain to achieve the required flood immunity outcomes; and
- direct physical impacts associated on most of the site's terrestrial ecosystems and associated species of native flora and fauna as a consequence of the clearance of native vegetation communities and associated development works.

The likelihood that the proposed NEBP development would have a "significant impact" upon Matters of NES was assessed against the relevant criteria contained within the EPBC Act 'Policy Statement 1.1 – Significant Impact Guidelines'. The results of this assessment generally indicate that the proposed NEBP development <u>will not</u> have a "significant impact" on Matters of NES that occur within and adjacent to the site, given that a number of impact mitigation and management measures are proposed as part of the NEBP development, including the following.



- Development of the NEBP Area Plan, which is the statutory basis that will guide the and control development of the NEBP over the lifespan of the project.
- The provision of environmental off-sets to compensate for the clearance of some areas of existing vegetation and fauna habitat that will occur as a result of the NEBP development.
- The establishment and on-going maintenance of substantial revegetation and habitat and enhancement works within the NEBP Open Space precincts.
- The NEBP development will be managed in accordance with a number of management plans, including:
 - a Stormwater Management Plan designed to reduce high levels of nutrients already present and known to be affecting the ecology of Caboolture River;
 - a Construction Environmental Management Plan (CEMP) which provides mechanisms in which environmental performance of the NEBP construction works can be measured and if required, provides procedures for identifying and implementing corrective actions;
 - an Acid Sulfate Soil Management Plan (ASSMP) that has been designed to ensure that no significant adverse impacts on the receiving environment occur as a result of the disturbance of actual or potential ASS;
 - a Dredging Site Based Management Plan (SBMP), which outlines the potential impacts of Caboolture River navigation channel dredging activities and specifies mechanisms that will be incorporated to ensure environmental impacts associated with the dredging and spoil disposal are minimised as far as practicable; and
 - a Marina SBMP for various ERAs, associated with the NEBP marina and marine industry precincts, and provides an overarching framework for best practice environmental management for other ERAs that may be undertaken within the NEBP's marine industries precinct.



2. PROJECT NEED AND ALTERNATIVES

2.1 **Project Justification**

2.1.1 Suitability of the Location Proposed

The NEBP site has a unique set of strategic attributes that make it an ideal location for an integrated, master planned development.

Some of the site's key attributes which support the selected location of the proposed development include:

- strategically beneficial location on the southern banks of the Caboolture River, linking Caboolture to Moreton Bay;
- 9km of Caboolture River frontage, including deepwater access at the marina site;
- direct access to the Bruce Highway;
- its close proximity to Morayfield and Caboolture centres;
- its close proximity to North-South rail line;
- a largely cleared, ecologically degraded site;
- its sufficient size to accommodate a range of land uses, thereby enabling integration and synergies between the uses;
- the majority of the site is designated for urban purposes;
- infrastructure requirements are able to be accommodated by existing public utilities and projected upgrades which are commensurate with the scale of the proposed development;
- limited direct physical or visual interface to existing residential communities;
- opportunities to provide the community with greater public access and use of Caboolture River, relieving the community's current 'disconnect' with the river which has resulted from successive private ownership of the majority of the river frontage (on both sides of the river).

2.1.2 SEQ Regional Plan

The SEQ Regional Plan was established to manage growth in SEQ, and to provide vision and direction for future developments. The SEQ Regional Plan is the pre-eminent planning document in SEQ, taking precedence over all other statutory and non-statutory planning instruments. One of the central features of the SEQ Regional Plan is the creation of an 'urban footprint' designed to provide a limitation to both the reality and the perception of 'urban sprawl' eroding green space in the region. The Plan also sought to largely eradicate the practice of rural residential subdivision in city fringe areas, such as Caboolture and Beaudesert.

In the case of NEBP, the urban footprint followed the boundary of land designated for District Industry in the CSC Planning Scheme. The need for a Marina development in this location had not been seriously considered by the CSC at the time of drafting the Shire Plan. As a result, the land intended for the Marina and associated residential development is outside the CSC Planning Scheme urban footprint.



The Office of Urban Management (OUM) has sought to limit urban development outside of the designated urban footprint and to only consider such uses in exceptional circumstances.

The following table describes the attributes of the proposed development and the actions completed to date. These details collectively warrant the proposal to be exempt from the limitations imposed by the OUM for developments outside the designated urban footprint.

Attribute/Action	Justification
The original applications were lodged prior to the introduction of the Draft SEQ Regional Plan.	As such, the applications are not subject to the regulatory provisions of the SEQ Regional Plan
The development has clear locational requirements (e.g. adequate land area; ease of access).	Such position requirements necessitate the development, or part thereof, to be outside the Urban Footprint. In addition, there is a clear overriding need for the proposed development in respect of public needs and interests.
The development has been designed as an integrated master planned community, where each element of the development supports the success and vitality of other dependent elements.	As such, the land use mix is interdependent and can not have any substantive elements removed without adversely affecting the functioning of other elements. The complete development, as proposed, clearly satisfies the DEOs, principles and policies of the SEQ Regional Plan more so than a 'compliant development' proposal limited to the current urban footprint boundary.
The development has been strategically designed to provide net benefits to the community, the environment and the economy.	The development design satisfies the vast majority of the relevant DEOs, principles and policies of the SEQ Regional Plan in an exemplary manner.
The residential areas are an essential component of the proposed development and could not reasonably be located elsewhere to the same effect.	In consideration of the complete proposal, that is, the MIBA, Marina and surrounding Rural Residential development, the residential area itself also has particular locational requirements which necessitate the proposed development to occur outside the urban footprint.

Table 8	Justification for Exem	ntion from SEQ	Regional Plan Limitations

2.1.3 Need for the Project

Mixed Industry Business Area

The need for the MIBA development is evidenced in the following.

- The CSC included a portion of the site in the District Industry Area of the Draft Shire Plan in 2004.
- The Department of Tourism, Regional Development and Industry (DTRDI) required additional land to be added, recognising that further land would be required for business and industry use within the life of the Scheme. Accordingly, the western



two thirds (2/3) of the site was designated in the CSC Planning Scheme as District Industry.

 The CSC's Economic Development Issues Plan (EDIP) outlines a strategy for employment self containment within 20 years. This necessitates approximately 55,000 jobs over 20 years, including a current requirement of approximately 30,000 jobs. The Economic Benefit Assessment prepared by Urbis in September 2007, and presented in Appendix E1, estimate that the NEBP will directly and indirectly stimulate 27,150 Full Time Equivalent (FTE) operational jobs, in addition to 1,547 construction-related jobs.

The Industry and Employment Lands Report 2: 'Priority Locations and their Development Potential' prepared by Prosperous Places (Kemp, 2006) on behalf of the CSC, also identified a severe shortfall of employment vacancies in the Shire. The report recommended that additional lands, both inside and outside the urban footprint, should be identified and designated for future industrial development.

The Industry and Employment Lands Report further concluded that:

- an area of approximately 40 60 hectares of industrial land should be reserved for future major 'Regional Freight Distribution centre of State Significance';
- there is a need for a Clean Production Cluster (e.g. technology, food, medical and health products) in the area; and
- that at least 15 25 hectares of land should be provided for a Marine Industry Cluster of State and Regional Significance with deep water access to the Caboolture River.

Marina

SEQ is now and will remain the boating epicentre of Australia, given the regions' high use, supply and manufacture of recreational boats. Two thirds of Australian recreational boat building exports are manufactured in Queensland and the growth in this sector has averaged more than 9% over the last ten years (DTRDI, 2007)¹.

A survey, commissioned by the Queensland Government and conducted by the Boating Industry Association of Queensland (BIAQ), reported that Queensland's marine industry employs an estimated 11,000 people and contributed \$2.6 billion to the State's economy. The marine industry is considered to represent one of the largest sophisticated manufacturing and/or high value added sectors in the state, with significant potential for increased growth.

Pacific Southwest Strategy Group (PSSG) undertook a comprehensive review of Marine demand and marine industries in 2006 (and updated in 2007). This review is presented in Appendix E8. The review reported a total projected demand of approximately 10,404 berths by 2020. It should be noted that these figures are likely to be conservative, given the 7.1% growth in boat registrations over 8 months in 2006.

The 911 wet berths proposed for the NEBP represents 8.8% of the demand for additional wet berths in SEQ by 2020.

Commercial

The Business Park Assessment undertaken by Urbis (Appendix E3) analysed a number of leading business and industry developments in Australia. The report identified strong trends nationwide for increasing demand for office space in conjunction with, and in

http://www.dtrdi.qld.gov.au



addition to, industrial space. This demand is not only within the same buildings but also as stand alone facilities that benefit from the synergies of being linked to industrial uses.

The Urbis report found that a number of developments in traditional industrial areas in Sydney and Melbourne were incorporating office components ranging from 20% to 100%, with many exceeding a 50% office component. This trend is also emerging in Brisbane.

Key findings from the Urbis report with respect to recent tenant pre-commitment activity in Brisbane included the following.

- 37.3% of tenants had a requirement of 20% or more of office floor space with 13.7% having a requirement for 50% or more office space.
- Three of the tenants had requirements in excess of 3,000sqm of office space and eleven had requirements in excess of 1,000sqm. These figures represent significant office tenancies in a CBD market alone.
- Over the last seven years, approximately 15% of industrial pre-commitments in Brisbane have required an office component of 50% or greater.

The conclusion drawn from the Urbis assessment is as follows.

"Importantly, from the above figures it is concluded that future employment land development in South East Queensland needs to provide for a flexible mix of land uses and proportions of floor space in order to meet the various needs and requirements of employment land users. If this is not provided these users will go elsewhere, and in the case of major regional organisations this may mean bypassing Brisbane and / or the South East Region altogether".

The Urbis report outlined that this effect is recognised in the Sydney Metro Strategy which notes that more computer based production processes and enhanced logistics and inventory controls are leading to reductions in shop floor workers and an increase in office based employees. Associated with this is the trend towards 'operational consolidation' where businesses consolidate their operations at a single location combining head office, back office, manufacturing and distribution activities. The report illustrates this trend, citing eight examples of prominent companies who have undertaken such operational consolidation.

The Sydney Metro Strategy recognises the flexibility required in providing for business' accommodation needs and, importantly, refers to 'employment lands' rather than differentiating between industrial space and business park space. In this regard, the strategy notes "that many industrial activities now have higher office components with more white collar workers. This means that more jobs can be located in employment lands."

The NEBP has been designed to harness such trends, generating significantly greater employment densities than possible in traditional industrial precincts, whilst still providing the products required of 'District Industries'. As such, The NEBP represents a more efficient use of land and resources than traditional District Industries. Indeed, the wider adoption of this approach may go a long way to addressing the extent of the apparent shortage of 'industrial' land in the Caboolture Shire.

Whilst the majority of commercial floor space will be located in the MIBA, a relatively small amount of commercial floor space is anticipated for the Marina Village and Shipyard. Such commercial use is expected to locate in this area, as a result of relationships with the marina and/or marine industries.



Retail

The need for retail facilities within the development is based on the same principles as the Business Park and commercial needs. In short, retail facilities are integral to creating balanced and complete communities.

All retail components will be sized and staged to primarily meet the needs of the development and population growth. In other words, the proposed retail components will be intentionally sized to support relative self containment, rather than market redistribution, and shall also be staged to meet growing requirements over time. This approach has been adopted to ensure a complementary and beneficial effect on existing centres in the region, particularly those in Caboolture, Morayfield and Burpengary.

Retail elements of the proposed development are intended to be located within specific precincts. Descriptions of the retail elements, with respect to each Precinct as identified in the Structure Plan.

MIBA Community and Education and Training Nodes

These nodes support the daily needs of the local workforce, and therefore assist the MIBA to operate in a functional and efficient manner.

Marina Village

The inclusion of retail sectors is essential to achieve the desired function of the Marina Village, that is, to form the social heart of the development and provide the needs of the NEBP, and wider, community.

Retail in this precinct is essentially divided into three categories as detailed below.

- 1. **Convenience retail** such as local mini supermarket, bottle shop, chemist, medical centre, newsagent, bakery etc.
- 2. **Specialty retail** such as marine and boating accessories, bait and tackle, some fashion and tourist retail. It is assumed that these services will only be used by the local community of the marina given that they are typically a by-product of the marina and would therefore not exist in the region if the marina were not present. As a result, it is expected that such uses will only be present in small amounts at the marina village.
- 3. **Cafés, restaurants and tavern**. These uses will primarily support the NEBP community and are vital to the vision of the proposed development.

Initial estimates of retail uses envisaged in this precinct, including the tavern, are in the order of 11,000m² GFA.

Showrooms

Showroom facilitates in the MIBA are ancillary to the primary uses of the MIBA. However, such facilities allow businesses to display goods produced onsite, thereby enabling destination retail which often caters to trade. Despite the limited opportunity for showroom facilities, such uses will allow businesses throughout the MIBA to function as integrated services.

Ancillary retail has long been a standard approach in industrial areas however, more recent trends have seen some businesses requiring larger and more professional showrooms.



Retail Showroom Cluster

A retail showroom cluster has been proposed within the MIBA Highway Precinct 1(3). Such a cluster is proposed to primarily service the NEBP community and secondly, to attract custom from Highway traffic and to cater for demand deriving from population growth and the gradual increase in discretionary spending power in the region.

Urbis were commissioned to undertake a Bulky Goods report to assess the demand for Retail Showrooms in the region. This report is presented in Appendix E4. Allowing for some significant proposals approved but not constructed, an undersupply of bulky goods would occur from about 2011, and a total of approximately 45,000m² of GFA would be required in the region by 2021.

Retail warehousing is a use which could have an effect on external centres, primarily Morayfield, if not staged to match market absorption rates. Accordingly, the first stage of the cluster would be limited to 15,000 m² and would not commence until at least 2011. Subject to demand, the final development would be staged in two phases between 2011 and 2021 with the intent to further service the needs of the expected population growth, provide greater variety of choice to the local community. It is expected that staged development would not jeopardise Morayfield's primary role in this sector of the market.

Hotel and Conference Centre

A hotel and conference centre, including a day spa, is proposed at the north-eastern end of the Marina Precinct. The hotel and conference facility represents a valuable and necessary addition to the short term accommodation offerings in the Caboolture region, which is currently undersupplied for quality accommodation and conference facilities.

The location of the hotel facility will act as a land use 'anchor' at the north-eastern end of the marina precinct. The hotel will benefit from, and support, the adjacent marina and golf course. The hotel will also further benefit from its integration into a master planned business park environment with substantial riverfront open space, Heritage Park and recreational facilities.

The hotel and conference centre adds critical mass to the development population, thereby supporting and adding vibrancy to the marina village. The centre will be accessible by the boardwalk promenade and will enhance the viability of the public transport service facilitated by the development.

Urbis has undertaken a demand analysis in relation to the hotel and conference facility, and the resultant Hotel Demand Report is presented as Appendix E5. The findings of the analysis are as follows.

- There will be demand for a 120 room 5 star facility by 2013.
- There will be demand for 183 rooms by 2020.
- The hotel will set new standards for short term accommodation in the local area.
- The provision of a high quality facility not currently available in the area will likely to create a level of 'induced demand'.
- The facility will form part of a golf node linking with the prestigious golf courses at North Lakes and Pacific Harbour.
- The facility will generate and capture demand associated with the range of land uses offered by the development as a whole.

Recreational and Lifestyle Precincts

Overall, the development areas of the NEBP are set within more than 420 hectares of open space, including approximately 9 kilometres of river frontage, along with other social and recreational options, including:

- playing fields;
- heritage park;
- walking and cycling tracks;
- rehabilitation areas, wetlands and landscaped open spaces;
- community nodes and facilities;
- river access and river recreation pursuits; and
- hotel and conference facilities.

The provision of the aforementioned social, recreational and environmental areas will collectively contribute to make the NEBP a unique development opportunity and a vastly more attractive location for businesses. The provision of such services is considered essential to allow Caboolture to emerge as a superior location in a highly competitive regional, national and international marketplace.

Golf Course and Clubhouse

The golf course and clubhouse is not related to the locational requirement of the marina, but is seen as significant component of the amenity and lifestyle package combining to make the MIBA an exceptional business location proposition. The golf course and clubhouse will further add to the amenity and lifestyle benefits of the proposed residential area. The golf course also provides a significant attractive feature to the hotel and conference centre.

There are currently only three golf courses in the Caboolture Shire, being Caboolture, Woodford and Pacific Harbour at Bribie Island. Of these, only Pacific Harbour is of championship standard. The closest other championship golf course is at North Lakes.

The provision and location of the proposed golf course is considered to be the most appropriate use of the land and is expected to be of benefit to both the local community and surrounding region.

Urbis was commissioned to prepare a Golf Course Demand Assessment (Appendix E6) to gauge the community demand for a championship golf course at the NEBP. In summary, the report concluded that:

- assuming residential development begins in 2011, the course would be viable by 2014;
- the course would have little effect on the existing Caboolture and Woodford courses, due to a different standard of course attracting a different market; and
- there is potential that the site's location between North Lakes and Pacific Harbour could lead to the recognition of a golf hub or node, attracting visitors and tourists to the area. The co-location of the course with the marina and the hotel and conference facility would also help achieve this desirable outcome.

Residential Precincts

Whilst the key 'drivers' for the development are the MIBA and the marine precinct, and conversely, the key attractors for the MIBA are the high amenity, social, recreational and



environmental values of the development, the keystone of the development as a whole are the residential precincts.

Creating substantial areas of residential development in the NEBP is critical to the success of the development vision for a range of reasons, including the following.

- The residential development will provide a 'baseload' of people in close proximity to the commercial and retail precincts. This 'baseload' of people will support the range of recreational and social facilities proposed for the development which are integral to attracting high quality businesses, and are strongly desired by the local community.
- The NEBP is designed as a complete master planned community and residential development is a fundamental component of a complete community.
- Residential areas ensure that there is life and activity on nights and weekends, ensuring better use of facilities which in turn support the viability of commercial enterprises. Overall, the residential areas contribute to making the MIBA a safer area through greater activity and surveillance.
- The residential population is required to strengthen the ability to facilitate public transport links between the proposed development and Morayfield and Caboolture. Such links are vital for the success and efficiency of the MIBA, and further help to strengthen the functionality of Morayfield and Caboolture.
- The provision of residential development provides the ability for a relatively high percentage of people to live and work in the NEBP, thereby allowing residents to 'commute' to work by foot or bicycle, thus reducing traffic on external roads.
- The range of residential products to be offered increases the range of residential options available in the region, some of which are currently under-represented. By providing housing choices which range from affordable small lot housing through to premium golf and marina villas, as well as apartment living in a high amenity village environment, will enhance the character and identity of Caboolture.
- The residential population will be of a scale that requires and supports the provision of a range of social services, not only catering for the needs of the NEBP community, but also the needs of Burpengary residents east of the Bruce Highway who are currently isolated from most social services.
- A significant residential population is required to help amortise the rehabilitation and maintenance of the extensive open space areas and community facilities within the site, at a reasonable cost. Such rehabilitation and maintenance will be shared amongst all users of the site however, this would need to be limited somewhat if left only to the business users, and / or the CSC.
- Adjoining land to the south and south east is fragmented, Rural Residential development with a sparse population and limited redevelopment potential. There is currently limited land designated, or suitable, for residential development at urban densities within many kilometres of the site, that is, there are no other opportunities to locate the residential population required to support the proposed development within a reasonable proximity which would yield similar benefits.
- Co-location of working and living environments is the most efficient method for space utilisation and furthermore, creates vital and healthy communities which are one of the central principles of the SEQ Regional Plan.



2.1.4 Economic Benefits

The need for the proposed mix and balance of land uses in the development has been outlined above. This mix has been developed in order to maximise the relative benefits of each land use.

The economic benefits to be derived from the NEBP have been analysed by Urbis and are detailed in the Economic Benefit Assessment presented as Appendix E1. Based on the balance of land uses proposed, the assessment finds that, in addition to substantial development phase jobs and benefits, the development will generate significant jobs and expenditure over 20 years. The projected Full Time Equivalent (FTE) jobs and expenditure is shown in Table 9.

Economic Benefit	FTE jobs (annualised)	Expenditure/Value Added (Million \$)	Over 20 years (Million \$)
Total Operational Direct	13,685	\$1,223.4	\$24,468.0
Total Operational Indirect	13,464	\$1,441.1	\$28,822.0
Total Operational	27,150	\$2,634.5	\$52,690.0

Table 9NEBP Full Time Jobs and Expenditure

As demonstrated in Table 9, the number of jobs and the extent of economic benefits are of major significance to the region, as well as to the State economy. In perspective, the economic growth arising out of the development has been estimated to increase the size of the Caboolture economy by one third.

The development will be a major contributor to helping CSC achieve its goals to build business diversity and capacity in order to meet its self containment strategy, as outlined in the CSC's 2005-2009 Corporate Plan. This plan seeks to have two out of every three Caboolture workers living and working in the Shire, requiring 55,000 jobs to be created in the next 20 years.

The full extent of these benefits and alignment with State and Local policy positions is included in the Economic Benefit Assessment prepared by Urbis (Appendix E1), the Marina Demand Analysis prepared by PSSG (Appendix E8), and the Net Benefit Analysis prepared by AEC Group (AEC) (Appendix D).

Urbis has also undertaken a Business Park Assessment, which is attached as Appendix E3. A summary of the findings of this assessment include the following.

- With regard to accessibility issues, the location of the NEBP has a strong comparative advantage over (alternative) sites as it is situated adjacent the Bruce Highway and the Caboolture River. Caboolture is strategically located for region wide access to Brisbane or the Sunshine Coast.
- The NEBP would be a unique development that represents a significant upgrade in quality compared to the existing supply of industry / business park floor space in the northern Brisbane area. It represents an opportunity to be a leading example, at the national level, of the change which is occurring in industrial land uses.



The Economic Benefit Assessment found that some of the benefits relevant to the Business Park include the following.

- The NEBP will engage a local and regional workforce through the supply of alternative employment opportunities which are currently under-represented or absent in the region. This will inturn generate flow-on employment for other industries.
- The development will create the opportunity to significantly enhance the regional employment skills base through the provision of alternative employment and training opportunities.
- The subject site is strategically located in the northern part of SEQ where there is a distinct lack of major industry Business Park infrastructure.

In addition to being consistent with CSC's EDIP and Industry and Employment lands report, the Economic Benefits Assessment further determined the NEBP to be consistent with some of the State Government's key priorities, by:

- growing a diverse economy and creating jobs;
- realisation of the Smart State through education, skills and innovation;
- managing urban growth and building Queensland's regions; and
- protecting the environment for a sustainable future

The assessment also concluded that the NEBP will be consistent with many of the key Strategic Directions and Desired Outcomes of the SEQ Regional Plan. These are reviewed and discussed in detail in the Planning Report prepared by PMM.

In summary, the need for the NEBP is well supported by statutory and policy frameworks as well as key agencies relevant to the proposal.

The MIBA is considered to provide the base foundation for the NEBP development concept and provides the majority of the employment and economic benefits deriving from the project. The success of the MIBA component of the NEBP will have a major positive influence on long term employment and economic health of the Caboolture region, with flow-on effects into the State.

Accordingly, other aspects of the development have been tailored and conceived to support the MIBA such that it performs to its potential. Every aspect of the NEBP development concept is conceived around what is necessary to create a business park which is notable and competitive in a regional, national and international marketplace.

2.1.5 Social Benefits

In many ways, the ultimate measure of the merits and benefits of the NEBP will be the positive effects it creates for, and has, on the region's community. Whilst the development has been tailored to create an outstanding living and working environment for workers and residents, it has also been tailored to ensure that it has extensive flow-on benefits for the wider community. The extent of the local employment generation and stimulation to the local economy will create substantial flow-on effects throughout the region.

The recreational and lifestyle benefits created through the marina precincts and extensive riverfront open space precincts will create local and regional benefits strongly enhancing the identity of the region. Indeed, it is submitted that the creation of a marina on this formerly inaccessible part of the Caboolture River, will provide a clear strengthening of the



region's relationship with Moreton Bay, heralding the creation of the 'Moreton Bay Regional Council'.

Major social and recreational benefits of the NEBP include but are not limited to the following.

- Provision of a marina, providing enhanced access to Caboolture River and Moreton Bay.
- Marina Village including cafes, restaurants, tavern, retail, plaza, boardwalk and convenience shopping.
- Extensive open space areas including playing fields, heritage park, walking and cycling tracks, community nodes and facilities, river access and river recreation pursuits, rehabilitation areas, wetlands and landscaped open spaces.
- Hotel and conference facilities.
- Combined pre-school and primary school.
- Community nodes including child care and playgrounds.
- Public transport.

Housing Choice and Affordable Housing

Community equity is enhanced by the provision of a variety of housing alternatives ranging from highly desirable marina and golf frontage housing and apartments through to medium density and retirement living options. Affordable housing is addressed by a range of smaller allotments and smaller apartments which meet price points and detached studio apartments in outbuildings or on top of garages.

Finer grained methods to achieve greater affordability include 'enterprise residential' home business facilitation, enabling the synergies associated with home businesses. Other measures such as designing units with dual bedrooms / dual bathrooms facilitate differing family circumstances or shared housing.

A further initiative is the 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. Such an initiative is a combination of various schemes already in place in Brisbane, Gold Coast and other regional centres.

Extensive analysis of the current social demographics, community profile, and community opinions was undertaken by The Hornery Institute in its Community Context Study. The report analysed the presence and distribution of social and community services in the region. The mapping of social infrastructure demonstrated that existing areas of Burpengary East were distant from a wide array of basic social amenities. The NEBP development will therefore provide a critical mass of development to support the provision of many of these services.

In particular, the development will support a combined pre and primary school which does not currently exist and which could not be supported with the current Burpengary East population catchment. Other social services not currently meeting recognised service provision in Burpengary East, but which are able to be supported in the NEBP include:

- technical education and training facilities;
- general practitioners;
- banking;
- public transport linkages;



- community meeting rooms; and
- childcare centres.

A quantitative and qualitative analysis of net benefits, including social benefits, prepared by AEC is discussed in the Planning Report, which is presented as Appendix C2. The Net Benefit Report is included as Appendix D and the Community Context Study is presented as Appendix F.

2.1.6 Ecological Benefits

Rehabilitation

The site is a former pine plantation which has been farmed for generations. Accordingly, the areas of vegetation and habitat are isolated and limited. The long term ecological strategy for the site therefore relies upon extensive rehabilitation and effective management.

The aim of the rehabilitation is to create ecological net benefits arising out of the development.

Water Quality

A critical objective of the development is to improve the water quality in the Caboolture River.

A stormwater management framework has been prepared by Parsons Brinckerhoff (Appendix H1). This framework identifies the primary ways in which water quality improvement can be achieved. Such strategies include the following.

- **Use of recycled water**. The beneficial reuse of recycled water from the Caboolture South treatment plan will divert up to 9ML of recycled water from the Caboolture River onto site for non-potable uses.
- Water Sensitive Urban Design (WSUD). The use of best practice WSUD principles will be a prominent feature throughout the site for the purposes of controlling stormwater quality generated from the development areas.
- **Golf Course Water Sensitive Design**. The construction of the Golf Course provides an opportunity to design the earthworks and the necessary plantings as a series of WSUD treatment trains.

2.2 Alternatives to the Project

The EIS Terms of Reference (ToR) has requested a description of the "feasible alternatives, including conceptual, technological and locality alternatives to the project".

The development is of prime strategic importance to Caboolture Shire and Southeast Queensland as it will provide an important community and business focus for Caboolture and help to address a significant undersupply of marine facilities and associated uses. The development will provide a fully integrated business, industry, residential and recreational development, combining a complementary array of uses.

The NEBP is a unique development specifically tailored to meet the needs and opportunities provided by a unique site. The availability of alternative sites to accommodate the complete range of diverse uses of the proposed development has been considered by Urbis and PSSG in reports attached as Appendices E1-E8.



Given there is a dearth of suitable land available with the specific locational attributes necessary to attract and accommodate such marine facilities, the subject land and proposal is well placed to accommodate the unmet demand in the local region and State as a whole.

The EIS ToR has further requested an analysis of an alternative proposal which "does not require any disturbance to the bed and banks of the Caboolture River and which would provide appropriate vegetated buffers between tidal lands and all development related impacts".

As demonstrated in the Aquatic Ecology Investigation developed by the Ecology Lab Pty Ltd (Appendix L2), the Caboolture River has undergone significant alteration as a result of past and current anthropogenic activities within, and near the river's bed and banks. Such activities include the construction of a weir, marinas and slipways, residences, vessel mooring and sewage treatment plants. Other activities which have contributed to the substantial degradation of the river include land clearing, cattle grazing and vessel traffic.

The proposed entrance of the marina precinct occurs along a section of the river where few mangroves/saltmarshes are present. The basin itself would be excavated from disused farmland and tidal flow into and out of the basin would be controlled by a lock system. The remaining shoreline of the Caboolture River would be protected as riparian buffer, which would maintain its status as a biological corridor and Fish Habitat Area. Initial investigations of ASS indicate minimal potential for ASS formation.

Whilst vegetated buffers are being left or created between tidal lands and development areas, the absolute protection of the bed and banks of Caboolture River would necessitate the omission of the Marina Precinct in its entirety from the alternative proposal.

Recent studies on the projected demand for marine berths in Queensland identified the need for approximately 10,404 berths by 2020. The 911 wet berths proposed for the NEBP represents 8.8% of the demand for additional wet berths in SEQ. The omission of the Marina Precinct would place further undue pressure on the State's ability to meet this projected demand.

The existing and proposed disturbance to the bed and banks of the Caboolture provides both constraints and opportunities for the development. In consideration of the extensive mitigation and rehabilitation measures proposed by the Proponent, the environmental values of the beds and banks of the Caboolture River will be protected and enhanced once the development is constructed and fully operational.

Business and Industry Development

The major industry and business precincts of Southeast Queensland include those areas located in the Brisbane Local Government Area, Logan City, Gold Coast and Ipswich. These areas provide for approximately 4,300 hectares of land for such development. This is compromised of:

- Australia Tradecoast 1,300 hectares;
- Yatala 600 hectares;
- Logan 100 hectares;
- Bremer 300 hectares;
- Swanbank 1,000 hectares: and
- Ebenezer 1,050 hectares



This combined area of 4,300 hectares of suitable land falls well short of the 6,050 hectares estimated in the SEQRP required to accommodate the projected SEQ workforce by 2021. Consequently, South East Queensland requires an additional 1,750 hectares of employment hosting land – and this figure may be higher if the land hosts a low number of employees per hectare. There are further Industry and Business Precincts identified in Caboolture Shire and Pine Rivers Shire, of smaller scale to those major precincts listed above. Core Economics identified that there are six main industrial and employment precincts in the Caboolture Shire (Narangba/Deception Bay; Industry Drive and Berburrum Drive, Caboolture; Aerodrome Road, Caboolture; Burpengary; Morayfield; and Bribie Island, Bongaree) which provide approximately 1,130 hectares of suitable land. Approximately, 820 hectares of that land has been developed. Consequently, there is 310 hectares available in Caboolture. Such land is dominated by small-scale uses which cater for the local market and which have a low employee density (10 to 25 workers per hectare).

Additionally, the Northlakes Mixed industry Business Area provides for 87 hectares of suitable land which is currently undeveloped. Thus, of the additional 794 hectares of appropriately zoned land in Pine Rivers Shire, approximately 510 hectares is already utilised.

Given the above, there is approximately 594 hectares of land available – and such land is not appropriately located to provide for marine-related industries. The subject site – whilst not of the same scale as the major nodes in Australia Tradecoast or Yatala provides a significant opportunity to create a unique employment generating hub in the Caboolture Shire. It provides the opportunity for a node that is multi-functional and provides an Industry/Business Park value added by the co-location with marine precinct and marina (as well as residential) uses. Moreover, it will generate a higher worker rate and will lead to more local jobs – in line with Caboolture Shire Council's employment strategy from the 2005-2009 plan (i.e. 2 out of 3 workers in the Shire working locally within the next 20 years).

The need for a Mixed-use Business and Industry employment hub in this location has had strong support from both Council and State Government. This is reflected in the District Industry designation over the western sector of the site in the recently adopted Caboolture Shire Plan, the extent of which was extended by the Department of Local Government Planning Sport and Recreation prior to gazettal.

Marina and Marine Facilities

An integral component of the aforementioned node will be the proposed marine uses. PSSG has established that the location of the proposed marina on the site provides the opportunity to add critical mass and mix to the marine and related industries within SEQ. There is an identified lack of marina facilities and indeed marine orientated land within Queensland, Southeast Queensland and particularly the immediate area. In Southeast Queensland alone, boat registrations are anticipated to rise from approximately 102,000 in 2005 to 130,000 by 2010 (+27.5%) and to 212,000 by 2020.

Further, in Southeast Queensland there are 21 marina/marine precincts. They have a total capacity of 4,910 wet berths and all of these are either occupied or set aside for visitors. The Boating Industry Association Queensland have advised that in January of 2005, in Queensland there was a total waiting list of 1,480 for marina berths (comprising 795 wanting to purchase and a further 685 wishing to lease). By extrapolating the future demand for boat registrations versus the demand for berths, it is estimated that by 2010, there will be a need for a further 1,789 berths in Southeast Queensland, making a total demand of 3,269. Of these, only 1,136 berths are currently planned. Consequently, there will be a market undersupply to 2010 of 2,133 berths.



The Federal Government addressed the importance of the marine industry in the wider context in the 2005 publication *'New Horizons – Marine Industry Action Agenda'* prepared by the Department of Industry Tourism and Resources. Notably, the document mentions that there is a cluster of marine manufacturing facilities in South East Queensland. Most significantly however, the document notes that as a trend, the domestic marine market has experienced rapid growth but marine infrastructure (e.g. boat ramps, marinas and the like) has not kept pace with the growth.

The above finding has very significant implications with respect to the proposal. That is, that there is a shortage of such marine facilities in regions, the state and across Australia. Consequently, there is an obvious opportunity to provide such facilities and attract business, both from national and international firms. Given there is a dearth of suitable land available with the specific locational attributes necessary to attract and accommodate such marine facilities, the subject land and proposal is well placed to accommodate the unmet demand. This will be a fillip for not only the local area but also the state.

The document also explores the importance of fostering marine facilities given their economic, social and recreational benefits. Notwithstanding, a high emphasis is to be placed on ensuring that environmental implications are to be fully considered and values not compromised. The proposal is fully supportive of this approach.

Consequently, the proposal will provide the opportunity to facilitate diversity in the development of industries and jobs in the Caboolture Shire, the region and the state. This diversification will occur also as a result of the range of complementary uses usually associated with marinas. That is, marine-related industries, retail and commercial uses, accommodation and storage facilities.

The subject land therefore provides a valuable opportunity to help address this substantial and growing undersupply of marina berths and marine facilities, and reduce the current restriction on the inflow of economic and social benefits related to the marine industry.

Alternative Marina Sites

The site is considered to be appropriate for the proposal based on a range of criteria including accessibility, proximity to population, bathymetric profile of the river bed, synergies with the business park and other uses, existing infrastructure and environmental sensitivity.

The site has both deepwater frontage to Caboolture River and access to Deception Bay. Furthermore, there are no boundaries between this site and the river mouth. As a result, the marina will provide for 'tall masts'. This is an opportunity which is not otherwise available between Manly and Mooloolaba. For some time a number of State Governmentfunded initiatives have (in the past) identified Caboolture and the Caboolture River as the most viable potential marina site in Southeast Queensland. For example, the Regional Framework for Growth Management Taskforce identified the Caboolture region (encompassing Caboolture, Redcliffe and Pine Rivers Shires) as one of the "emerging marine precincts" for the State.

The Taskforce recognised the Caboolture region as both a domestic and international tourist destination, with sandy beaches, mud flats and river estuaries utilised by a wide range of water sports, charter operators and other leisure-based activities. Existing marine facilities in the region are located at Redcliffe and Brendale in the Pine Rivers Shire. Such facilities include boat builders, manufacturing, recreational and commercial craft, maintenance and servicing facilities.

It is noted that commercial marinas are located at Scarborough in Redcliffe and Bribie Island. However, the existing Bribie Island facility and the additional 150 berth facility on



Bribie Island do not provide the opportunities for 'tall masts' which are available at the subject site. There are no other potential marina sites from north of the Brisbane River to the Mary River, near Maryborough, that offer the same opportunities and minimal impacts for marina development. Port Binnli Pty Ltd has investigated all potential sites in this part of Queensland over the last five years to determine the viability of the subject site.

Existing marinas in closer settled areas of Southeast Queensland north of the Brisbane River have little or no room for further expansion. Within Southeast Queensland there are 21 marina /marine precincts with a total capacity exceeding 4,910 wet berths, all of which are occupied or set aside for visitors.

The Boating Industry Association Queensland have advised that in January of 2005, in Queensland there was a total waiting list of 1,480 for marina berths (comprising 795 wanting to purchase and a further 685 wishing to lease). By extrapolating the future demand for boat registrations versus the demand for berths, it is estimated that by 2010, there will be a need for a further 1,789 berths in Southeast Queensland, making a total demand of 3,269. Of these, only 1,136 berths are currently planned. Consequently, there will be a market undersupply to 2010 of 2,133 berths.

Furthermore, environmental constraints, coupled with distance to services and transport dramatically restrict the potential suitability of any other sites for development. Put simply, there are no other alternative potential sites worth considering.

Unique Development Opportunity

The development represents a rare confluence of need, opportunity and vision. There are a number of key factors driving the design of the proposal which create a compelling argument for its adoption:

- a demonstrated, supported need for a mixed business and industry employment hub in this location;
- a substantial and growing demand for marina berths and marine facilities;
- a site well suited to the creation of a marina, presenting possibly the last viable opportunity to create a substantial marina between Brisbane and Mooloolaba;
- a very large, strategically located, environmentally degraded site capable of colocating these important 'core' uses;
- a proposal which integrates these core uses with complementary uses such as marine industries, retail, restaurants, residential, golf course, cultural precinct and environmental rehabilitation into an regionally significant integrated precinct
- a proponent with the vision and capability to complete the project.

This combination of factors is considered to be unique in SEQ. The development is an opportunity to create a local and regional 'destination development' which adds substantially to the business and social fabric of the Caboolture Region, whilst providing very significant levels of environmental rehabilitation.

2.2.1 Compliant Scheme Comparison

In order to illustrate the comparative benefits of the proposal, against one which followed the current provisions of the Town Plan and the current Urban Footprint, an alternative 'compliant proposal' has been conceived.

This proposal is based on development within the urban footprint boundary, which is based on and coincident with the District Industry zoning boundary. The proposal adopts



'traditional' District Industry uses which accord directly with the CSC Planning Scheme requirements for District Industry. Accordingly, within the Urban Footprint, the proposal differs in the following areas:

- commercial percentage in industrial uses limited to a maximum 25% as per the Shire Plan;
- no retail warehousing;
- no child care; and
- area east of Raff Creek within Lot 10 above flood to be used for District Industry.

Of, course, the 'compliant' proposal would not extend beyond the urban footprint, and therefore does not include:

- the marina, shipyard and therefore, the marine industries cluster;
- marina village, including restaurants, cafés, tavern, plaza, convenience shopping;
- most social facilities;
- all residential uses ;
- resort and conference facilities,
- golf course and clubhouse;
- marina pavilion and other community facilities;
- education and training facility linked to marine industries cluster;
- the primary school; or
- retirement living.

Removal of these attributes drastically undermines the holistic vision of the project, significantly reduces the overall amenity, underpins the strategic attractiveness of the MIBA in the regional and national marketplace and diminishes it's ability to attract high value businesses, and, negatively impacts on the employment density able to be generated which thereby affects its ability to help address the employment shortages for the region. Many businesses, both interstate and overseas, which may be attracted to the NEBP development as a result of its integrated benefits, may otherwise not choose to locate in SEQ at all.

The lower value businesses attracted to the development would be less likely to achieve the design standards sought in the development vision; further reducing flow-on attractiveness and reducing sales rates. The lower employment densities and overall employment generation capability of the precinct would likely cause the CSC to seek to designate other, less well located land for industrial uses in an attempt to meet their employment targets. However, less suited industrial land would also struggle to attract the high value businesses targeted within CSC's Economic Development Action Plan.

In addition to reducing the strategic attractiveness and therefore the value of the land designated for the development, the uses which would be lost are very substantial economic generators in their own right, many of which have flow-on effects throughout the economy.

An economic analysis of this comparison proposal was undertaken by Urbis. This analysis found that the employment and expenditure directly generated from the development was sharply reduced in both the development and operational phases of the NEBP. Table 10 below presents the summary findings of the comparison.



	Full Time Equivalent Jobs	Direct Expenditure (\$ Millions)		
DEVELOPMENT PHASE				
NEBP Proposal	777	\$1,912.80		
Compliant Scheme	234	\$576.0		
Difference	- 543	- \$1,336.80		
OPERATIONAL PHASE				
NEBP Proposal	13,685	\$1,223.4		
Compliant Scheme	9,305	\$838.4		
Difference	- 4 380	- \$385.00		

Table 10 Economic Summary of Comparative Schemes

These differences demonstrate the stark differential between adoption of a synergistic development, tailored to the site and the region, and one in which a single land use is adopted which ignores the wider attributes and opportunities offered by the site and required in the region. It should be noted that for the sake of this comparison, only direct effects have been modelled. The indirect flow-on effects would also likely be reduced in commensurate proportions.

The compliant scheme comparison is found in Section 5.5.1 of the Business Park Assessment prepared by Urbis, included in Appendix E3.

Social, Recreational Benefits and Regional Identity Comparison

A comparison of the social benefits between the complete proposal and the 'compliant' proposal was even more obvious and graphic. None of the social and recreational facilities were able to be offered to the MIBA occupants and the community.

The social analysis work undertaken for the NEBP indicated that many social and recreational opportunities and services were lacking across a number of areas in the region. In particular, the lifestyle amenities to be offered in the marina village such as cafes, restaurants and tavern in a marina environment were lacking or underrepresented in the region. When viewed in conjunction with the golf course and clubhouse, marina pavilion, motel, and extensive open spaces, the lifestyle and amenity benefits were seen to be of great benefit to the community. This fact was strongly supported in direct community feedback received throughout the engagement process.

The combination of these factors strongly indicates that the complete proposal adds sufficient social and recreational benefits such that it would tangibly improve the image and identity of the region and would also help to reposition Caboolture in the regional business and industry landscape. This identity enhancement is further strengthened by the physical and conceptual linkages to the Caboolture River and Moreton Bay generated by the marina development; a linkage which has been 'hidden' from the community by the private ownership of extensive frontages to the Caboolture River over generations.



These benefits would be all but lost in the case of a 'compliant' proposal.

In addition to the direct loss of employment and economic benefits, the 'compliant' proposal undermines many of the indirect and flow-on benefits of the complete proposal. These include reduction or removal of critical mass of population required to support social facilities and services. These effects include:

- significantly reduced ability to facilitate public transport links to Morayfield and Caboolture;
- significantly reduced ability to support services such as health and medical services, education facilities, emergency services and sporting facilities;
- reduced economic benefits to the local economy reduces the community's ability to afford other social benefits in the community;
- removal of the affordable housing levy intended to help address housing accessibility in the region;
- loss of residential diversity and options, some of which are essentially impossible to replicate in the region;
- increased commuting to employment; and
- conflict with intents of the SEQ Regional Plan, particularly the inability to link employment, recreation and living areas in the one locality.

If developed in isolation, the District Industry area would be virtually deserted at night, leading to safety and security issues and significant costs in both the District Industry area and the adjoining riverfront open space.

Ecological Comparison

The compliant proposal would of course, not require disturbance of the bed and banks of the Caboolture River, however, it is noted that the area river being breached for the marina is, like most of the site, heavily disturbed by former practices, and the area proposed to be dredged is existing navigation channel.

The economic ability to address the ecological rehabilitation and maintenance needs of the riparian rehabilitation along the river and within Raff Creek and open space would be reduced on a proportionate basis, relative to the reduced development size. Land outside the urban footprint would be likely to remain in its current degraded state. In addition if development were constrained to a compliant form, this would be restricted to Lot 2 on RP 902075 and Lot 10 on RP 902079 only, which would not allow for the rehabilitation of riparian vegetation outside of these lots as is currently proposed.

It is acknowledged that the compliant proposal would not generate marine traffic on the Caboolture River, and the operational design issues associated with river dredging would not need to be dealt with. However, the river bank already suffers from considerable erosion largely due to lack of riparian vegetation. Revegetation initiatives offered by the Proponent to help address this issue would not be forthcoming. If the dredging was not proposed, the existing safety issue associated with accessing the river in low tides would not be addressed, and the environmental benefits derived from access to professional maintenance facilities, sewerage pump out facilities, and tightly controlled management associated with a professional marina would be lost.

Tidal vegetation is being respected in the current proposal with the exception of a limited amount which is being removed due to the marina development.



3. DESCRIPTION OF THE PROJECT

3.1 Ecological Sustainable Development

In Queensland, objectives and principles of ecological sustainable development (ESD) have been imbedded in all legislation and policy. There is a recognised need to incorporate the principles of sustainable development in environmental impact assessment and statements.

The National Strategy for ESD (NSESD, 1992) defines ESD as 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

The core objectives of the strategy are to:

- enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- provide for equity within and between generations; and
- protect biological diversity and maintain essential ecological processes and lifesupport systems.

The guiding principles of the strategy are:

- decision making processes should effectively integrate both long and short term economic, environmental, social and equity considerations;
- where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- the global dimension of environmental impacts of actions and policies should be recognised and considered;
- the need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised;
- the need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised;
- cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms; and
- decisions and actions should provide for broad community involvement on issues which affect them.

This EIS sets out the economic, social and environmental costs and benefits of the proposed development. In this way, decision makers using relevant legislation may be properly informed of the full range of costs and benefits of the project, and the risks can be well understood with mitigation measures proposed to manage these risks to appropriate levels. This EIS provides detailed information about the proposal and allows public and stakeholder discussion and comment on the proposed design, construction and operational aspects of the NEBP as well as the proposed measures for the mitigation of risks and impacts.

EIS outcomes identify that the proposed NEBP may have the potential to impact on the environment if particular elements are not appropriately managed during the construction and operation of the development. To manage these impacts the Proponent has adopted the "precautionary principle" in the assessment of all environmental issues and in the



recommendations for environmental management to ensure intergenerational equity. Intergenerational equity is defined as the present generation ensuring that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

The Intergovernmental Agreement on the Environment, endorsed on 1 May 1992, describes the precautionary principle as the following.

"Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

- *i)* careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- ii) an assessment of the risk-weighted consequences of various options".

To this end, the precautionary principle is applied to the scoping and planning of this development and it can be seen through the design, construction and operational aspects of the proposed development, that it will be of 'best practice standards'.

In developing this EIS, the Proponent has commissioned a range of technical studies to inform the following phases to mitigate environmental impacts through sustainable design, construction and operation of the proposal.

This EIS has identified both actual and potential adverse impacts of the proposed development. In identifying these, consideration has been given as to how these may be mitigated. Due to the location of the NEBP adjacent to areas of conservation significance, best practice standards, guidelines and operating procedures have been integrated into the design, construction and operation of the development.

The EIS documents the impacts and mitigation strategies for design, construction and operation. The following is an outline of the ways in which ESD principles have been incorporated into the proposed development.

3.1.1 Design

The Proponent has placed the greatest emphasis on the design phase in determining and mitigating impacts through good environmental, social and economic planning design.

The Proponent has undertaken the following works which are documented as part of this EIS.

- Determining the need for the development in South-east Queensland, and the Caboolture local area and the short- and long-term contribution of the development proposal to the local, regional and State economy, and to social equity and environmental value.
- Environmental assessment for all facets of the project.
- Community consultation for all facets of the project.
- Investigating alternatives to the current design to mitigate impacts and obtain improved outcomes for the developer, the community and the environment (refer to Section 2.2 of this EIS).

As a result of the collaborative approach to project design, the NEBP will be a purposedesigned marine industry, commercial and residential precinct which responds to the Government's agenda to bring marine industry clusters, jobs, training and housing to


Queensland and incorporates environmental controls which are world's best practice resulting in a net benefit to the Caboolture Shire and Moreton Bay region. Outcomes include:

- improving the polluted water quality of Caboolture River and Moreton Bay;
- integrating water re-use strategies;
- restoring degraded river banks, wetlands and natural bush land;
- providing enhanced and managed public access to the Caboolture River;
- rediscovering historical cultural elements and restoring these for public display;
- eradicating noxious weeds and remediating contaminated land;
- protection of important ecosystems and ecological features to maintain biological diversity;
- providing local jobs for local diverse communities in a sustainable development;
- attracting tourism dollars to a world class golf course, excellent marina berthing and servicing facilities, café society dining facilities and mixed use development;
- incorporating creative and diverse residential formats which reflect the emerging trends in family living in Australian society; and
- inclusive development through integration with Caboolture town centre public transportation, education & learning, and local public facilities.

In its entirety the NEBP will involve the development of less than half of the total land available within the site. The remaining land will be reserved and managed for ecological values and public access.

3.1.2 Construction

The construction phase of the project will carry the highest risk to the environment due to the intrusive nature of the activities such as bulk earthworks and due to the site's sensitive location adjacent to the Caboolture River. The Proponent is aware of these risks and as such has contributed significant resources to investigating and identifying any potential serious or irreversible threats to the environment including any potential hazards and risks. The proponent has commissioned technical experts in a range of fields to recommend strategies to mitigate potential impacts as far as practicable within the constraints of the design and economic feasibility.

The following mitigating strategies are proposed as part of the construction phase.

- Staging construction to successfully manage impacts on areas of conservation significance surrounding the site by reducing the land disturbance at any one time reducing the potential for erosion and sedimentation.
- Developing and implementing a management plan with performance objectives and control measures to mitigate potential impacts and risks. The Construction Environmental Management Plan, located in Appendix X2 addresses impacts such as: dust; noise and vibration; ASS; water quality; sediment and erosion; fire ants; waste; loss of ecosystems; and bushfire and includes strategies for complaint management, environmental emergencies and site rehabilitation.
- Conducting regular monitoring and auditing of the site and the activities throughout the construction stages and implementing corrective actions necessary as a result of these monitoring and auditing programs to meet specified performance objectives.



3.1.3 Operation

Once constructed, the development will move into its operational phase and with this comes a different set of potential impacts. Environmental impacts will require management to ensure emissions do not exceed their critical load. Critical load is the capability of the receiving environment (media) to disperse, absorb, neutralize and recycle emissions, and to prevent concentrations of toxins that cause unacceptable damage to human health.

Proposed strategies for the management of emissions to ensure they do not exceed their critical load are outlined below.

- Establish a baseline quality monitoring program to determine long term trends in ecosystem health as a result of the proposed development.
- Provide waste reception facilities for general refuse, bilge waste and other waste that are normally generated by activities at a marina, and impacts from unlawful discharges will be mitigated through management strategies such as bunding, cut off valves, gross pollutant traps and other safety devices.
- Provide refuelling facilities as part of this marina development that will be constructed and managed in accordance with Australian Standard 1940-2004 and other relevant standards.
- Implement the Stormwater Management Plan (SWMP) to preserve natural flows to the waterways and wetlands and to minimize the increase in pollutant loads associated with the development to protect and enhance riparian and wetland vegetation.
- Implement the Marina Site Based Management Plan (SBMP) for the marina operations which include such activities as managed mooring and boating, refuelling, waste management and maintenance dredging. This SBMP has been developed to protect areas of conservation significance surrounding the project area and in accordance with best practice regimes including the 'Clean Marinas Program'.
- Have all businesses operate under a Waste Management Plan (WMP) with the object of waste avoidance.
- Encourage new businesses to conduct greenhouse gas emission reporting.
- Develop educational opportunities to promote the importance of the region, the necessity to protect and manage it and ensure that people develop an understanding of the area and it's regional, national and international significance.
- Develop and implement sustainable initiatives proposed as part of the design such as restoring degraded riparian vegetation and riverbank.
- Develop a monitoring and auditing program for the life of the project to determine if development emissions are exceeding critical load with regard to baseline data and if any unforeseen impacts are occurring that may require corrective action.

It is expected that with appropriate environmental management controls as outlined in the management plans presented in Section 5 of this EIS and the proposal to continually review such plans, the project will not create irreversible environmental damage or result in significant financial losses to the proponent, the community or Government.

Social and economic aspects the development of the NEBP includes the following net benefits.

- Diversification of employment in the region and increased job opportunities in the local area.
- Opportunities for skills training in areas that will lead to employment.



- Diversification of local housing opportunity.
- Catalyst to a more comprehensive local public transport network.
- Increased neighbourhood retail and services to communities east of the Bruce Highway.
- Enrichment of community facilities and social infrastructure including health care, childcare and community meeting space.
- Total operational benefits including 27,599 full-time equivalent jobs and \$2.9 billion in expenditure and value-added benefits. Over a 20 year operational period, expenditure and value added benefits estimated at \$58.5 billion.
- Increased industrial and business park capacity.
- Industry development and trade through incubation and cluster.

In summary this EIS is an important tool for Local and State authorities to understand the scope of works and is a consultation tool for the local community and other interested parties. This EIS demonstrates that the NEBP development will not have any adverse impacts on biological diversity, the economic welfare of future generations or equity within and between generations. Indeed the proposed NEBP development will enhance these factors, and an environmental, economic and social net benefit can be clearly demonstrated locally, regionally and state-wide. Through innovative management from design through to operation, it is believed that this development can achieve compliance with the objectives of the NSESD and as such the project, will ensure the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.

3.1.4 Industrial Ecology

Industrial Ecology (IE) is systems science applied to the interface between human activity and natural systems. It is a framework that:

- understands short-term decisions in the context of long-term implications;
- identifies regional and global impacts of local actions; and
- uses a powerful set of methods and tools to guide policy, strategy, design, and investment with awareness of the systems context.

IE provides a systematic method of achieving the objectives of ESD, emphasising the positive side of resource optimisation as an approach to waste minimisation. Eco-industrial development is the side of IE that enables businesses, their employees, and residents to interact in a mutually beneficial manner, helping each other to be more resource efficient and cost effective. The IE approach results in strengthened relationships within and between businesses, the community and the environment.

Eco-industrial initiatives will be managed through the Body Corporate and its Community Title Schemes and Community Management Systems.

Eco-industrial practices for the MIBA can be easily managed due to the proximity of numerous commercial and industrial businesses within a common property. Businesses can improve environmental, social and economic performance through collaboration on waste minimisation, cleaner production, resource recovery, and environmental management. In some cases companies may be able to use by-products (energy, water and materials) of other companies, rather than disposing of them.

IE offers the following metrics that are relevant to all aspects of the NEBP design, construction, and operation.



- 1. *The ratio of virgin to recycled materials:* This ratio will be used in assessing the overall materials budget of the development. The lower the relative draw upon virgin materials (to replace materials lost from dissipation) the closer the system will be sustainable.
- 2. *Ratio of actual/potential recycled materials:* This ratio between volume of materials that could be recycled to the fraction actually recycled will be a second metric of the NEBP's resource sustainability.
- 3. *Ratio of renewable/fossil fuel sources:* This ratio is useful in design and construction of the buildings and infrastructure of the NEBP. The Proponents will set goals for improving the ratio in each phase of development.
- 4. *Materials, water, and energy efficiency:* The development value per unit of input will assess both the development process and operating efficiency of completed precincts.
- 5. *Resource input per unit of end-user service:* This ratio assesses resource use against the useful function gained and maintained for the end-user. This is a higher level metric for subsystems within the holistic development.

Benefits of applying IE during design, construction, and operation of the development include, but are not limited to:

- providing a whole system analysis of flows of wasted energy, water, and materials to achieve optimal level of waste minimization and resource recovery;
- identifying the highest and best use of waste resources that can be recovered;;
- minimising wastes, leading to a decrease in the volume of waste requiring disposal;
- increasing revenue through the sale of waste by-products and reduced disposal and transport costs;
- sharing training and new technologies for waste management; and
- providing a "green" image for the companies within an "eco" business park.

3.2 Location

3.2.1 Regional Context

The NEBP is located in Caboolture Shire, South East Queensland. Situated 8km inland from the coastline, adjacent to the Bruce Highway and 43km north of Brisbane CBD, the NEBP site is a 30 minute drive from Brisbane's International and Domestic airports.

Caboolture Shire is one of nine coastal jurisdictions within South East Queensland and extends from the D'Aguilar Range in the west to Bribie Island in the east and embraces rural areas, coastal townships and key urban centres. Caboolture Shire is bordered by Pine Rivers and Redcliffe City to the south, Caloundra City to the north and Kilcoy and Esk Shires to the west.

Caboolture Shire is located in the northern growth corridor of the Greater Brisbane Urban Area as identified in the South East Queensland Regional Plan and is a gateway location between Brisbane and the Sunshine Coast.

There are additional recreational marinas with the region at Bribie Island and Scarborough however no existing marina offers the same diversity and facilities proposed as part of the NEBP development in Queensland.

The location of the NEBP site is shown in Figure 1.



3.2.2 Local context

The NEBP site occurs in the coastal zone and encompasses 769 hectares of property on Farry Road, Burpengary. The site and lot boundaries are shown on Figure 4.

The NEBP site is vacant privately owned land that is bound:

- to the north by 9km of Caboolture River frontage, with land on the opposite side of the river being primarily rural and used for forestry activity;
- to the west by the Bruce Highway, with land on the opposite side of Bruce Highway developed with residential and open space areas; and
- to the south and east by privately owned rural residential properties with lot sizes ranging from 1-20 hectares, bushland, open grassland areas and limited agricultural and recreational land uses.

The eastern and northern sectors of the site have a "Rural" designation and the western sectors have a "District Industry" designation pursuant to the CSC Planning Scheme.

Northern parts of the site are mapped by the CSC Planning Scheme as containing:

- Catchment Protection Areas for the protection of waterways and Declared Fish Habitat Areas;
- Ecological Corridors to strengthen and improve links between areas of state, regional, local and other conservation significance and areas of conservation significance that may be degraded;
- Regional and State Conservation areas including significant wetlands mapped by the South East Queensland Regional Coastal Plan; and
- Scenic Amenity Areas in which development is to be regulated such that adverse impacts on the scenic qualities of the area are minimised.

The CSC Planning Scheme overlay areas are shown on Figure 6.

The site is also surrounded by areas of conservation significance as follows.

- The Deception Bay Declared Fish Habitat area, which extends along the entire length of the northern boundary, within the bounds of the Caboolture River. This area is protected by the Fisheries Act due to the estuarine habitats that support commercial and recreational fisheries in close proximity to developing communities.
- The Habitat Protection Zone of the Moreton Bay Marine Park which is located within the Caboolture River and begins at the north-eastern boundary of the site then extends eastward along the Caboolture River. This area is protected by the Marine Parks Act 2004 in order to:
 - conserve significant habitats, cultural heritage and amenity values of the marine park;
 - maintain the productivity and diversity of the ecological communities that occur within the marine park; and
 - provide for reasonable public use and enjoyment of the zone consistent with the conservation of the marine park.
- The Moreton Bay Ramsar wetlands which traverse the same area within the Caboolture River as the Moreton Bay Marine Park.



• South East Queensland Wader Bird Sites are mapped approximately 500m to the east of the site. This area is protected via the JAMBA and CAMBA convention to protect habitats of Migratory Birds.

The locations of these environmentally significant areas are shown in relation to the site on Figure 7.

3.2.3 Site Description

The NEBP site is relatively flat ranging in elevation from 3m AHD at the northern boundary to a knoll at 17.5m AHD towards the southern area of the site. Tidal levels of the Caboolture River, adjacent to the site are approximately 1.34m AHD for Highest Astronomical Tide and 0.81m AHD for Mean High Water Springs. Existing site elevations are presented in Figure 7.

Raff Creek traverses the NEBP site and flows from the southwest to the northeast boundary. Raff Creek is a tributary of the Gympie Creek System.

The site previously supported exotic pine plantations and was utilised for forestry purposes. As such, with the exception of a 1.3 hectares area of endangered remnant vegetation located at the south west corner of the site, the majority of the site is devoid of native vegetation. The site is characterised by large expanses of disturbed grassland, some scattered trees, Paperbark (*Melaleuca quinquenervia*) communities, Eucalypt open forest and areas of marine vegetation which fringe the Caboolture River and associated waterways and constructed drainage channels that are tidally influenced.

Endangered remnant vegetation is illustrated on Figure 7.

An aerial photograph of the site, taken in 2007, is presented in Figure 3.

3.3 Concept Master Plan

Master planning for the site has been undertaken by PMM, Studio Tekton and ML Design. Landscape master planning has been undertaken by PLACE Planning and Design (Place) and marina design has been undertaken by the Jetty Specialist. PMM has prepared the NEBP Area Plan, which will be the statutory basis to guide and control development in the NEBP Area over the lifespan of the project.

The Area Plan is specifically tailored to the NEBP site and is based on a Structure Plan that indicatively designates development precincts. The Area Plan specifies the development intent for each precinct, and identifies overall outcomes, preferred uses, the level of assessment required for future applications, relevant codes and development standards.

The Area Plan applies to the land illustrated on the Structure Plan, which is presented as Figure 2.

A detailed assessment of the proposed development Structure Plan against the South East Queensland Regional Plan and relevant Local Planning Instruments such as the CSC Planning Scheme is provided in the Planning Report produced by PMM and this is summarised in Section 1.6.3 of this EIS.

The precinct intents as described in full in the NEBP Area Plan are summarised below.



3.3.1 MIBA Precincts

The MIBA Precincts are located in the western portion of the NEBP site, encompassing the majority of the area of land zoned District Industry under the CSC Planning Scheme.

The intents for the MIBA Precincts are to establish a high quality mix of business and industry, attracting new business, employment and prosperity to the region, and providing scope for expansion of existing local industries.

All buildings will be subject to design controls and sustainability measures, and will integrate with high quality landscaping and open spaces that link to the Marina Precinct, Residential Precinct and other facilities to provide an outstanding environment for businesses and employees. Heavy industries with high environmental emissions or amenity impacts are not permitted.

The MIBA has been categorised into a number of precincts which are likely to attract differing uses. Whilst slightly differing height and density controls are proposed in some of the locations, these precincts are primarily intended to designate where clusters of differing uses are likely and/or encouraged. The MIBA Precincts layout accommodates a potential North South Arterial (NSA) corridor through the main boulevard, should it be required by the Department of Main Roads' route planning.

Precinct 1(1) MIBA Esplanade

The MIBA Esplanade Precinct is a highly visible linear precinct overlooking the open spaces, playing fields and golf courses, flanked by buildings of the highest quality. The prominent sites are expected to attract businesses that desire outstanding positions, built forms and amenity. Buildings will range in height (up to 6 commercial storeys or 25m) with a higher proportion of office components than other MIBA precincts.

Precinct 1(2) MIBA Core

The MIBA Core Precinct is centrally located in the MIBA and is buffered from any sensitive adjoining land uses. Accordingly, the MIBA Core Precinct is expected to accommodate a wide variety of business and industry uses, including logistics, manufacturing and processing that require significant site areas, infrastructure needs and specialist buildings, along with a range of smaller users such as turn-key warehouses and offices.

Buildings are expected to take on a variety of forms, and could rise to a height of around 25m or 6 storeys, but will generally be of less than 12m in height. Uses that require access by articulated vehicles are preferably located in the northern and central parts of the MIBA Core Precinct to internalise the majority of heavy vehicle traffic within this Precinct.

Precinct 1(3) MIBA Highway

The visual prominence of the MIBA Highway Precinct will attract businesses that require ready highway access and some level of exposure.

Uses, building designs, landscaping and signage will be carefully controlled along the Bruce Highway, to ensure that the Precinct's amenity and visual presentation to the Bruce Highway signify that Northeast Business Park is a high quality environment in which to conduct business. Buildings are expected to be generally in the order of 10m in height, although buildings up to 15m will be allowable.

A single cluster of retail showroom uses will be sequentially developed in the MIBA Highway Precinct to provide a level of operation that complements the existing retail hierarchy.

Precinct 1(4) MIBA Marine Industry

The MIBA Marine Industry Precinct is to develop as a cluster of marine related businesses and industry, located in proximity to the Marina and Shipyard. The cluster is intended to capitalise upon the advantages brought by co–location, and will promote synergies between businesses including product, by product and knowledge exchange.

Some specialist activities such as boat building and maintenance may require building heights of up to 25m, however the majority of buildings are expected to be less than 12m.

MIBA Community Nodes

The Structure Plan proposes the creation of well located Community Nodes in the MIBA Precincts, which are intended to provide services meeting the daily needs of the workforce, whilst creating attractive and functional places. The nodes are located adjacent to open space areas to provide attractive outlooks, and links to cycling and walking track networks.

MIBA Education and Training Node

An Education and Training Node is proposed adjacent to the marine industries cluster. Proposed as a multi-function precinct predominantly dedicated to housing education and job-skills training, with an initial focus on the marine industry sector, the Education and Training Node is expected to expand its role to cater for other uses and clusters that develop at the NEBP.

Indicative MIBA Plan

The Structure Plan provides for the general layout of the MIBA Precincts, showing the principle delineation of the Precincts and the higher order elements of the local road network. To provide information about the likely character of the MIBA Precincts, an indicative subdivision layout has been prepared, showing a potential lot layout. This is located within the Planning Report.

3.3.2 Marina Precincts

The Marina Precincts are located in the north eastern portion of the site, mostly contained within Lot 24 on SP 158298, though a small extent extends into Lot 10 on RP 902079.

The Marina Precincts are a key feature of the NEBP, accommodating marina berths and shipyard activities, complemented by highly desirable lifestyle options that broaden the function and community role of the development.

The NEBP site is considered to be by far the most responsible and appropriate location for a marina and marine cluster in the northern corridor of Brisbane. The facilities at the NEBP are the only significant new marina opportunity between Brisbane and the Sunshine Coast.

The Marina Precincts are intended as the social heart of the NEBP, offering relaxing waterfront boardwalks and a vibrant mix of uses. The inclusion of apartments and villas will provide a resident population to support the vitality of the marina village. Hotel and conference facilities will provide an additional asset within the Marina Precinct.

On sites within the Marina Village, adjacent to the Marina Basin and along the main boulevard, uses will be required to have the highest level of visual presentation. These areas will feature high quality landscaping to provide an attractive and integrated interface. The Marina Precinct layout accommodates the potential NSA corridor along the main boulevard.



Within the Marina Village Precinct, provision is made for the staged development of retail uses to the extent necessary to meet the demands of the MIBA workforce, the NEBP residents, marina users and population growth.

Precinct 2(1) Marina Basin

The Marina Basin set new standards of facilities, helping to satisfy the demand for marina berths and marine facilities to meet latent and growing regional demand.

Safe and effective maritime access is provided to and from the Caboolture River through a two access locks. Berthing options are provided for permanent and transitory boats, along with a boat lift facility providing access to the Shipyard and boat stacker which will accommodate 300-500 boats. Supporting services for boat users are provided in the Marina Basin, including fuelling, waste disposal points and sewage pump out facilities.

The marina berth layout concentrates pedestrian access and activity around the marina village centre, whilst extensive boardwalks and promenades bordered by shade trees provide ample access around the marina, to the lock facility and riverfront parkland, punctuated with places to sit and watch the marine activity.

Precinct 2(2) Shipyard

The Shipyard Precinct is to develop as a cluster of marine related businesses and industry. The Queensland Government has expressed the promotion of marine industries as a significant driver of economic growth and workforce development.

Activities in the Shipyard Precinct will include dry boat storage, secure car parking, boat repair and maintenance, service and storage uses, and specialist chandlery uses. The accommodation of these uses will in some instances require buildings of significant scale up to 25m in height, although the majority of buildings are expected to be less than 12m.

Precinct 2(3) Marina Village

The Marina Village Precinct is the social heart of the development meeting the needs and providing social facilities for the NEBP community and where appropriate, the wider community. It is intended to be a vibrant, village style precinct, focussed around a community plaza overlooking the marina.

Retail use in this precinct is essentially divided into three categories:

- Convenience retail including a local mini supermarket and associated shopping to service the NEBP community and the Marina residential precincts.
- Specialty retail: Some specialty retail will be likely to be attracted due to the marina village location. These uses may include outlets such as marine and boating accessories, bait and tackle, limited fashion and limited tourist retail.
- Cafés, restaurants and tavern: These uses are expected to be attracted to the boardwalk areas with a marina vista, as well as some specialist retail. The tavern is intended to locate adjacent to the shipyard addressing the plaza in order to reduce amenity impacts associated with outdoor bar, dining and entertainment areas.

These uses will primarily support the NEBP community and are vital to the vision for the development. The amenity values of the marina precinct will attract businesses and employees to the MIBA and marine industries, whilst a significant residential development in the area underpins the viability and vitality of the Marina Village and provides day-long activity. Any residential uses are to be carefully managed in order to minimise mutual amenity issues associated with adjacent uses.



Buildings within the Marina Village Precinct are to present a progressive contemporary, subtropical character appropriate to the marina environment and character. Building heights in the Marina Village are expected to be generally 2 to 3 storeys, though scope exists for higher buildings of up to 8 storeys.

Precinct 2(4) Marina Residential

The Marina Residential areas are envisaged to provide for a residential population that assists in sustaining the vitality and viability of the social and commercial uses associated with the marina, marine industries and the MIBA, and will broaden the diversity and choice of housing options available in the Caboolture region. As expressed through the SEQ Regional Plan, the close location of housing to employment and social opportunities contributes to a sustainable and balanced community.

Residential choices around the marina encompass waterfront villas and a series of towers comprising an array of apartment types. The residential towers are envisaged as being between 6 and 12 storeys, orientated to maximise northerly views encompassing the marina, Caboolture River, Moreton Bay and the Glasshouse Mountains.

Precinct 2(5) Hotel

The Hotel Precinct forms an 'anchor' of activities around the eastern edge of the Marina Basin, providing a destination at the opposite end of the marina to the Marina Village, particularly for pedestrians. The Hotel and Conference facilities provide a much needed enhancement of short-term business and leisure accommodation in a location accessible and attractive to the MIBA, marine facilities and golf course.

The design of the buildings and landscaping is intended to integrate positively with the form and style of the Marina Precincts, whilst providing a distinctive character denoting it's hotel function. Buildings within the Hotel Precinct may extend in height up to 8 storeys, allowing for the co-location of a mixture of activities. Car parking and servicing functions will be accommodated internally within the site, minimising visual and amenity impacts upon the adjacent residential and open space areas.

Precinct 2(6) Marina Pavilion

The Marina Pavilion Precinct provides an opportunity for the development of a community facility overlooking the Marina Basin. The Marina Pavilion potentially provides the possibility of small scale food and drinks and minor retailing activities on the lower floor and community accessible spaces on the upper floor. The Marina Pavilion Precinct also provides an area of open space suitable for a range of temporary uses.

The built form of the Marina Pavilion is limited to two-storeys, in order to maximise views through the site.

Precinct 2(7) Golf Residential

The Golf Residential Precinct provides a high quality residential environment that is oriented towards the golf course. Residential uses may consist of a mix of detached houses, dual occupancies, lower rise villas, terraces and townhouses.

If current or future traffic projections for the frontage road are sufficiently high, access will be via a service road or other suitable access arrangements separated from the higher order road by a landscaped corridor that includes appropriate noise mitigation measures.



Indicative Designs

The Structure Plan provides for the general layout of the Marina Precincts, showing the principle delineation of the Precincts and the higher order elements of the local road network.

To provide information about the potential character of the Marina Precincts and the buildings proposed, a series of indicative building designs have been prepared by ML Design which represent one way of complying with the precinct intents. These are located in the Planning Report.

3.3.3 Residential Precincts

The Residential Precincts are located in the southern portion of the NEBP site, and are divided between Lots 10 on RP 902079 and Lot 24 on SP 158298. The Residential Precincts are surrounded by the golf course and conservation areas, as well as having some interface with large lot rural residential development to the south of the site.

The Residential Precincts deliver housing choices and services that meet the needs of a wide cross section of people, allowing them to remain living and working in their local community.

The Residential Precincts are framed by the open space system and golf course, and are focused around Community Nodes. An opportunity exists to accommodate a primary school serving Burpengary and the NEBP Area. The Residential Precincts include local open spaces and pedestrian and cycle networks which link housing and parkland areas with the Community Nodes, Marina Precincts and Open Space Precincts.

Throughout the Residential Precincts, a range of residential housing options are characterised by contemporary built forms that respond to climatic conditions. Golf course frontage and premium housing will complement the contemporary mix of residential products that make up the majority of the housing choices. Housing affordability is addressed through the inclusion of a component of housing on smaller lots and medium density formats, as well as the ability for dual occupancies and studio apartments on purpose designed outbuildings. The Residential Precincts can accommodate one or more retirement villages, which supplement the retirement options in the Marina Precincts.

Home based businesses are facilitated by the NEBP Area Plan, allowing residents to engage in businesses that do not compromise residential amenity.

Precinct 3(1) Residential West

The Residential West Precinct provides connections between the Marina Precincts and Burpengary through an extension of Buckley Road. The Precinct has a close relationship with the Community Node activities occurring at the Golf Course and the potential school site. Residential housing options within the Residential West Precinct include detached houses, villas and townhouses, laneway (rear access housing), studio apartments and the opportunity for low-rise medium density to develop in various locations.

Precinct 3(2) Residential East

The Residential East precinct provides for a similar range of housing options, as above. Movement corridors within the Residential East Precinct provide pedestrian and cycle connectivity throughout the area and through the adjoining Golf Course to the Marina Precincts. The configuration of the Residential East Precinct preserves a future transport corridor for the State controlled road network that includes suitable land for noise buffering,



should the Department of Main Roads' route planning propose the positioning of the NSA through the NEBP site.

Community Nodes

Anticipated uses within the Community Nodes include neighbourhood convenience retail activities, opportunities for child care centres and medical facilities, along with recreation and leisure uses such as children's playgrounds, tennis courts and communal swimming pools. The Community Nodes may also provide community meeting spaces and facilities that support home based businesses.

The Community Nodes will act as movement hubs, providing a connection point between pedestrian and walking routes and public transport stops. Through this, the Community Nodes will also provide the basis for denser residential development in surrounding areas.

Education and Training Node

Precinct 3(1) Residential West includes the identification of an Education and Training Node, anticipated to take the form of a primary school on a site of approximately 5 hectares.

Provision of a primary school within or near to the Residential Precincts would be required towards completion of development within the NEBP Area on the basis of anticipated densities across the Residential Precincts and surrounding development in the Burpengary locality. The integration of a primary school with the residential area will enhance residential amenity and community identity, for the NEBP and Burpengary.

The potential school location is located near the extension of Buckley Rd and a supporting community node. Safe pedestrian and cycle routes will link the nodes to other residential areas and the open space precincts.

Indicative Plans

The Structure Plan provides for the general layout of the Residential Precincts, showing the principle delineation of the Precincts and the higher order elements of the local road network. To provide information about the potential character of the Residential Precincts and the mix of dwelling types and development yield available, indicative development layout plans have been prepared, providing one interpretation of development which would accord with the Structure Plan and development intent. These are presented within the Planning Report.

The actual development will be subject to detailed design undertaken closer to the time of development, and hence is subject to change. We note for instance that there is scope for retirement living precincts to be created, however these have not been shown in the current indicative layout.

3.3.4 Open Space Precincts

The Open Space Precincts are located throughout the NEBP site, extending along the Caboolture River, Raff Creek and the minor waterway corridors.

The Open Space Precincts provide an expansive backdrop framing and separating the major development precincts. The open space areas are divided into a series of precincts meeting a wide range of open space objectives. Being publicly accessible, the open spaces form a significant component of the NEBP's environmental, social and recreation opportunities throughout the development, including environmental protection and



restoration, recreation, cultural heritage, flood mitigation, riverine protection, pedestrian and cycle networks and a carbon sink.

Precinct 1(1) Golf Club

The Golf Club Precinct will function as a multi-function facility that combines the specialist Golf Club activities along with a range of community oriented uses that support the adjoining Residential Precincts. This co-location of club and community facilities potentially include uses such as community and business meeting spaces, a business support centre, gym, sauna and swimming pool.

Precinct 4(2) Golf Course

Upon completion, the NEBP Golf Course will comprise 18 holes, and is designed in a manner which allows for it to be developed in two stages. The golf course design allows pedestrian and cyclist connectivity across the course, enhancing the movement networks with the NEBP Area.

The NEBP golf course utilises the significant waterway corridors of Raff Creek and the minor watercourses between the Marina Precincts and the Residential Precincts. The course includes water features which are part of the broader integrated water management system throughout the NEBP Area. The inclusion of the golf course and its water features allow water quality enhancement and flow quantity management to limit adverse effects on the riparian environment.

Precinct 4(3) Open Space

The Open Space Precinct consists of a variety of areas and features which achieve a significant range of environmental, social and recreation opportunities. An Open Space Masterplan has been prepared by Place, and this is included in the Planning Report. Whilst generally publicly accessible for active and passive recreation, the Open Space Precinct includes areas set aside for active conservation and rehabilitated and revegetated riparian areas.

An area adjacent to the Caboolture River retains remnants of the early European settlement on the property called 'Moray Fields' including original homestead staircase, headstone, and mature exotic vegetation This location has been selected as a Heritage precinct including significant passive recreational areas themed around the historical context and supplemented by a proposed sculpture park. This public facility is accessed by road, cycle, foot, or from the river.

A proposed Environment Centre located adjacent to the main boulevard on the edge of the environmentally sensitive areas along Raff Creek, would provide an educational experience to visitors with links to the conservation areas and the environmental trail network. The buffer zone between the marina basin and the river is proposed to be developed as riverside parkland providing a more naturally themed contrast and open space alternative to the adjacent urbanised open space components on the other side of the Marina. It will provide significant access to the river for both residents and visitors.

An extensive network of cycle and walking tracks is proposed throughout the open space areas providing recreational opportunities and links between the various destinations and attractions. A series of canoe trails proposed by the CSC integrates with proposed river access to the open space destinations including landing points at the Heritage Park and near the Marina, providing another recreational option and encouraging access to the parklands by water.



Precinct 4(4) Community Multi-Use

The Community Multi-Use Precinct provides for community uses that require a close association with open space areas and the river. Initially anticipated as a clubhouse serving the sports fields, over time this is expected to provide accommodation for various organisations.

Indicative Plans

The Structure Plan provides for the general layout of the Open Space Precincts, showing the principle delineation of the Precincts, community use and sporting features, and the key order elements of the road network. An Open Space Masterplan has been prepared by Place, which includes an array of plans illustrating the various character areas within the Open Space Precincts Additionally, sample images of the Golf Clubhouse have been prepared by ML Design which represents one approach to development of the Clubhouse. The Open Space Masterplan and sample images have been included in the Planning Report.

3.3.5 Masterplan Changes

3.3.5.1 The Business Park Application

The Business Park Application has been changed as follows:

- Amendments to the Site Area:
 - o expansion of the application's extent to include Lots 12, 15 and 17; and
 - reduction of the application's extent over Lot 10 to encompass only the area to the north and west of Raff Creek.
- Development Proposals and the Preliminary Approval overriding the Planning Scheme (replacing the previously submitted proposals with the Information Request response) seek approval for:
 - the NEBP Area Plan (presented in Appendix C3) and Structure Plan (presented as Figure 2) across the amended Business Park Application area;
 - the proposed uses which are to be as per the NEBP Area Plan. In summary, these use are the MIBA Precincts and components of the Open Space Precincts including the Community Multi Use Precinct, Environment Centre and Heritage Park;
 - Preliminary Approval for bulk earthworks; and
 - facilitation of the potential NSA road corridor, including access to the Buchanan Rd interchange.

3.3.5.2 The Marina Application

The Marina Application has been changed as follows.

- Amendments to the Site Area:
 - o expansion of the extent of the application to include Lots 12 and 17 and;
 - inclusion of areas of Lot 10 within the Main Boulevard, part of Raff Creek and land generally to the south and east of Raff Creek.
- Development Proposals and the Preliminary Approval overriding the Planning Scheme (replacing the previously submitted proposals) to seek approval for:
 - the NEBP Area Plan and Structure Plan across the amended application area;



- the proposed uses, which are to be as per the NEBP Area Plan, but are summarised as Marina Precincts, Residential Precincts and the remaining Open Space Precincts, including the Golf Club and Course;
- Preliminary Approvals for ERAs 11 (Fuel Storage), 22 (Screening), 69 (Boat Maintaining) and 73 (Marina);
- Preliminary Approval for bulk earthworks; and
- facilitation of a potential NSA road corridor, including access to the Buchanan Road interchange.

3.4 Construction

3.4.1 Construction Phases

The construction phase of the proposed NEBP development will occur over a 10-12 year period. The built forms of the three major precincts of the NEBP include:

- MIBA;
- Residential Lots; and
- Marina.

During the construction phase approximately 1,500 direct and indirect construction related jobs will be generated. It is expected that the construction phase will attract workers from Caboolture, Brisbane and the Sunshine Coast.

The hours of operation for the construction works will be limited to between 6.30am to 6.30pm, Monday to Saturday. There will be no construction works conducted at the site on Sunday or public holidays which causes audible noise at sensitive places surrounding the construction site.

All construction drawings are attached to the EIS and are discussed in further detail throughout Section 3.4 of the EIS.

3.4.1.1 Construction Development Stages

Due to the large scale of the proposed development, construction works will be undertaken on a staged basis. Each of the fifteen development stages will be rolled out over a 15 year period, in accordance with relevant approvals and commercial requirements. The greater part of the major civil construction works are expected to be completed within 5 years.

Each development stage incorporates the following construction activities, where applicable:

- Bulk Earthworks;
- Marina Construction & Dredging Works;
- Infrastructure;
- Subdivision Works;
- Bridge Structures; and
- Golf Structures.

The indicative schedule and phasing plans for each development stage are provided in Appendix X1 and summarised in Table 11 below.



Stage & Year	Construction Activity	Construction Area
One June 2009	MIBA Land Precincts Highway Core	30 ha
Two June 2010	MIBA Land Precincts Esplanade Core	30 ha
Three End 2011	MIBA Land Precincts Marine Industry Highway (Bulky Goods) Esplanade inc. MIBA Node	25 ha (Highway: max 15,000m ² GFA)
	Residential Land West House Lots	10 ha
	Open Space & Recreation Golf Course 18 holes Golf Club Heritage & Riverside Park Community Multi Purpose Precinct	
	Education & Training Marine Training Centre	
	Marina Precinct Built Product Shipyard Village Tavern & Landmark Anchor Building Village Food & Beverage Village Retail/Commercial Village mixed use & Apartments Marina berths	Shipyard: 20,000m ² Village Apartments: 35 units Marina berths: 200 off
Four 2012/13	MIBA Land Precincts Esplanade Core	30 ha
	Residential Land West House Lots Residential Node	House Lots: 10 ha
	Education & Training School primary to year 7	
	Marina Precinct Shipyard Village Retail/Commercial Village Mixed use & Apartments Waterfront Villas	Shipyard: 10,000m ² Village Apartments: 32 units Waterfront Villas: 11 homes
Five 2013/14	MIBA Land Esplanade Core	25 ha
	Residential Land West House Lots	House Lots: 10 ha
	Marina Precinct Shipyard Village Food & Beverage Village Retail/Commercial	Shipyard: 10,000m ² Apartments: 32 units Waterfront Villas: 8 homes

Table 11 Development Stages – Construction Activities & Schedule



	Village Supermarket Apartments Waterfront Villas Resort Hotel Marina Berths	Resort Hotel: 120 rooms Marina berths: 65 off
Six 2014/15	MIBA Land Esplanade Marina Industry Highway	20 ha
	Residential Land West House Lots	House Lots: 10 ha
	Marina Precinct Apartments Waterfront Villas Marina berths	Apartments: 40 units Waterfront Villas: 7 homes Marina berths: 65 off
Seven 2015/16	MIBA Land Highway Esplanade	10 ha
	Residential Land South West - House Lots	House Lots: approx. 10 ha
	Marina Precinct Village Food & Beverage Village Retail/Commercial Apartments – 2 buildings Marina Berths	Apartments: 80 units Marina berths: 65 off
Eight 2016/17	Residential Land South West House Lots	House Lots: 10 ha
	Marina Precinct Residential Golf Villa Lots Village Food & Beverage Village Retail/Commercial Apartments Waterfront Villas Resort Hotel expansion Marina Berths	Golf Villa: 23 Lots Apartments: 56 units Waterfront Villas: 8 homes Resort Hotel: 80 rooms Marina berths: 65 off
Nine 2017/18	Residential Land East - House Lots	House Lots: 10 ha
	Marina Precinct Residential Golf Villa Lots Village Food & Beverage Village Retail/ Commercial Apartments – 2 buildings Marina Berths	Golf Villa: 22 Lots Apartments: 88 units Marina berths 65 off
Ten 2018/19	Residential Land East House Lots	House Lots: 10 ha
	Marina Precinct Residential Golf Villa Lots Apartments Waterfront Villas Marina Berths	Golf Villa: 37 Lots Apartments: 62 units Waterfront Villas: 12 homes Marina berths 65 off
Eleven 2019/20	Residential Land East House Lots	House Lots: 10 ha



	Marina Precinct Built Product Apartments – 2 buildings Waterfront Villas Marina Berths	Apartments: 82 units Waterfront Villas: 16 homes Marina berths 65 off
Twelve 2020/21	Residential Land East House Lots	House Lots: 10 ha
	Marina Precinct Built Product Apartments – 2 buildings Waterfront Villas Marina Berths	Apartments: 90 units Waterfront Villas: 12 homes Marina berths 65 off
Thirteen 2021/22	Marina Precinct Built Product Apartments – 2 buildings Waterfront Villas Marina Berths	Apartments: 80 units Waterfront Villas: 14 homes Marina berths 65 off
Fourteen 2022/23	Marina Precinct Built Product Apartments – 2 buildings Marina Berths	Apartments: 80 units Marina berths 65 off
Fifteen 2023/24	Marina Precinct Built Product Apartments – 2 buildings Marina Berths	Apartments: 56 units Marina berths 65 off

In general, all construction works will be of commercial standard and will comply with the Building Code of Australia and local authority requirements. The projects will be designed and administered by professional architects and engineering consultants and will be constructed by licensed building contractors. Furthermore, all buildings constructed within the NEBP will comply with body corporate by-laws.

3.4.2 Construction Precincts

3.4.2.1 Business Park

The construction of the MIBA will occur in seven stages, ranging from 10 to 40 hectares over a 10 year development timeframe. The applicable developments for each construction stage of the MIBA are described in Table 12 below.

Development Stage	Description
Stage 1	Highway-exposed, high quality industrial buildings
Stage 2	Architecturally influenced buildings with prominent office components
Stage 3	Marine industry related buildings, bulky goods warehousing and MIBA node
Stage 4	Industrial/warehousing/commercial buildings
Stage 5	Further commercial, warehousing and education/training
Stage 6	Additional bulky goods and marine industry
Stage 7	Commercial, highway exposed buildings

Table 12MIBA Construction Stages



3.4.2.2 Residential

Approximately 1,300 residential allotments will be constructed over ten stages throughout the NEBP development site. The first stage of the residential developments is expected to be finalised in June 2011.

- 600 800m² premium lots;
- 450 600m² traditional lots;
- 300 450m² courtyard/small lots;
- townhouse/mews dwellings; and
- a few medium density blocks up to three storey buildings.

3.4.2.3 Marina

The Marina Precinct includes the village, shipyard, hotel, villas and apartments.

Village

The proposed buildings associated with the village have been designed to offer a mixed use character with flexibility to size the tenancies to suit individual requirements. The construction of the village area is proposed in six stages as described in Table 13 below.

Development Stage	Description
Stage 1	 all roads; waterfront; boardwalk and plaza; tavern; Landmark building; one waterfront (type B) building which will include 2 or 3 restaurants and café; one type A building providing an office and retail facilities; appropriate amount of car parking; and mixed use apartment site.
Stage 2	 two type A buildings providing further office, retail and mixed use space facilities; additional car parking; apartment buildings.
Stage 3	 waterfront type B building; village supermarket and associated retail facilities; building type A; final section of car parking.
Stage 4	one type B waterfront building;one boulevard type A building.
Stage 5	in line with demand, further type B waterfront;village type A building.
Stage 6	final waterfront restaurants (type B);final retail and office building (type A).

 Table 13
 Marina Village Construction Stages



Shipyard

The shipyard and associated hardstand infrastructure will be constructed in stages, in line with the complete marina development. The 45,000m² hardstand will be staged over several years and will include a number of buildings to house boats for maintenance and associated works.

A four or five storey automated dry boat stacker building capable of housing up to 500 vessels will be the most significant feature of the shipyard. The construction of the stacker building will be staged to meet demands.

Hotel

The proposed hotel facility of the NEBP development is a 4 to 5 storey building, comprised of 200 rooms. The hotel will be constructed over two development phases as outlined in Table 14 and is expected to be complete by 2017.

Development Stage	Description	Expected Completion Date
Stage 1	120 roomsConference facilityHealth spa	2013/2014
Stage 2	further 80 rooms	2016/2017

 Table 14
 Marina Hotel Construction Stages

Villas & Apartments

The Marina villas and apartments will be constructed over 12 stages as detailed in Table 15 . The Marina villas will incorporate premium quality 2 level, three to four bedroom homes. The Marina apartments will also offer a variety of product mix including 2, 3 and 4 bedroom homes. The apartments will vary in height between 6, 8, 10 and 12 storeys. Carparking will generally be provided in the lower levels to ensure views over the buildings in the front.

The construction of buildings will be driven by demand and subsequent sales, but expected staging of construction is provided below in Table 15.



Development	Description	Expected Completion Date
Stage		
Stage 1	43 rooms	2012/2013
Stage 2	40 rooms	2013/2014
Stage 3	47 rooms	2014/2015
Stage 4	80 rooms	2015/2016
Stage 5	64 rooms	2016/2017
Stage 6	88 rooms	2017/2018
Stage 7	74 rooms	2018/2019
Stage 8	98 rooms	2019/2020
Stage 9	102 rooms	2020/2021
Stage 10	94 rooms	2021/2022
Stage 11	80 rooms	2022/2023
Stage 12	56 rooms	2023/2024

Table 15 Marina Villas and Apartments Construction Stages

3.4.3 Construction Methodology

3.4.3.1 **Pre-Construction Works**

A primary site construction compound will be approximately 2-3 hectares. Due to the development size and phasing, smaller satellite construction compounds will be positioned in around the site. Site construction compounds and storage facilities will be positioned away from overland flowpaths and will maintain a significant buffer distance from sensitive receptors, such as existing residential areas and waterways.

The primary site construction compound will be developed prior to commencing development stage 1 of the NEBP construction works and will include:

- a centralised control point for visitors, staff and contractors;
- a site office and amenities building;
- secure parking facilities for staff, visitors, contractors and for mobile heavy machinery such as bulldozers, scrapers, excavators, trucks and cranes;
- building material stockpiles;
- storage facilities for plant and equipment, health and safety devices, dangerous goods and hazardous substances.

During construction the following dangerous goods and hazardous substances will be stored and used on site:

- Diesel for fuelling of heavy machinery; and
- Agricultural lime (CaCO₃) for ASS treatment and neutralisation.

Storage of 50,000 litres of diesel is required during construction. Storage will be in an aboveground tank and bunded to contain 110% of the tanks capacity, thus resulting in a bund capacity of 55,000 litres.



3.4.3.2 Bulk Earthworks

Bulk earthworks will be undertaken in accordance with Cardno drawings 7800/33/05-500 to 512, which are attached to this EIS.

Prior to commencing bulk earthworks in Lot 10 on RP902079, in particular in the vicinity of the existing shed and office on site, two disused underground storage tanks will be removed and the area remediated, as per the Remediation Action Plan (RAP) prepared by Douglas Partners and provided within the CEMP presented as Appendix X2. The location of the potentially contaminated area is identified in Figure 9.

Bulk earthworks, including vegetation and topsoil stripping, will commence immediately following the establishment of the necessary environmental controls, the primary site construction compound and equipment deliveries to the site.

The bulk earthworks will be undertaken in three phases, as described in Table 16 below. The bulk earthworks phases are illustrated in the Construction Methodology document which is appended to the Construction Environmental Management Plan (Appendix X2).

Bulk Earthworks Phase	Descriptions of Works	
Phase 1	Excavation of flood plain mitigation areas A & B and western section of marina basin.	
	Filling of the Business Park.	
	Benching platforms to design levels.	
Phase 2	Continued excavation of marina basin.	
	Excavation of flood plain mitigation area D.	
	River dredging.	
	Filling Marina and western residential development areas.	
Phase 3	Exaction to fill balance of eastern residential development area.	

Table 16 Bulk Earthworks Activities and Schedule

The project's bulk earthworks have been designed to have a near neutral cut to fill balance (115% cut to fill ratio), with a cut volume of 4,304,939m3 and fill volume of 3,744,951m3. A drawing showing the cut and fill areas are illustrated in Drawing 7900/33/05-103.

The excavated fill from the marina extraction will be utilised to raise the site to the required design level so as to protect built elements of the development against flooding and storm surge. All excavated material will be sampled and treated in accordance with the ASSMP presented as Appendix R4 and Element 6 'Acid Sulfate Soil Management' of the Construction Environmental Management Plan (CEMP) (Appendix X2). No fill will be imported to the site unless it has been certified that the fill does not contain potential acid sulfate soils (PASS) or any hazardous contaminant as defined in the Queensland EP Act.

The combined duration of the three phases of the bulk earthworks is anticipated to be approximately three years. This estimated timeframe has taken into consideration periods of rainfall and other unfavourable weather conditions which may preclude the earthworks activities.



Marina Construction

Major landform adjustments that will occur to establish the NEBP will involve excavation of the marina basin to -1m AHD. The area of excavation for the marina basin will be approximately 322,605m2 to an average depth of 2.671 metres. Fill obtained from the excavation of the marina basin will be used to raise ground levels within residential precincts above the Q100 flood level. Bathymetric surveys have identified that dredging of the Caboolture River to -4.25m AHD is required to ensure navigable access of the appropriate boat types to the marina basin.

The excavation of the marina basin will be undertaken using dry excavation methods, until the final stage of marina excavation at the entrance to the Caboolture River where a cutter suction dredge will be used.

Revetment walls on the sides of the marina remote from the Caboolture River will comprise of segmental walling with geogrid soil reinforcement and free-draining backfill. The revetment walls will be constructed in the dry. The design and construction of the revetment walls will be in accordance with safety and environment legislative requirements.

The basin will be isolated from the tidal influences of the Caboolture River by a lock and weir structure. The lock entrance to the marina basin is necessary to minimise impacts on the existing tidal prism.

The lock and weir structure will be constructed in dry conditions. An earthen bund will remain in place between the structure and the Caboolture River until such time that the cutter suction dredging of the entrance into the marine is conducted.

Construction of the marina basin and lock and weir structure will be in accordance with Cardno drawings 7900/33/05-400 to 407, which are attached to this EIS.

Infrastructure

Major infrastructure upgrades are required to service the proposed development, including roads, water and sewer mains and power, telecommunications and gas networks. Such infrastructure is vital to the construction phase of the proposed development and is therefore scheduled to be completed within Development Stage 1. Gas, water, power and telecommunications services will generally be installed in trenches running parallel to the road network.

The installation of infrastructure in road reserve corridors of main roads will be undertaken in accordance with the Department of Main Roads (DMR) guideline, 'Installation of Underground Conduits within the Boundaries of the State-Controlled Road'.

Road layout plans and construction drawings are illustrated in Cardno drawings 7900/33/05-200 to 204, and are attached to the EIS.

Subdivision Works

Subdivision works will consist of local underground services reticulation, stormwater drainage requirements, road and pathway networks and landscaping activities. The timing of the subdivision works will be in accordance with the overall construction staging plans.

Bridge Structures

Three main bridge structures are proposed within the NEBP.



The Boulevard road bridge, a 440 metre long suspended structure, will serve as a critical link between the MIBA and the marina. The bridge will be built with 4 lanes including pedestrian and bikeway provisions. The construction of the Boulevard road bridge has been programmed into two phases. The first phase of two constructed lanes will be completed prior to the opening of the marina, which is scheduled to occur in June 2011. The second phase of the bridge construction will depend on the development progress and subsequent increase in vehicle traffic.

The other two bridges are both proposed to be two lanes wide and approximately 220 metres long. The first bridge will be constructed in unison with the Boulevard road bridge to provide the link to the first residential lot release. The second bridge will be constructed approximately five years later and will provide access to the remaining residential allotments.

Further details of the locations and layouts of the three bridges are provided in Cardno drawings 7900/33/05-300 to 307, which are attached to this EIS.

Golf Course

The 18 holes golf course will be constructed to accommodate both championship and standard social games by the end of 2011. The golf course will be constructed in two stages; the first stage will be limited to the construction of the 9 hole championship course whilst the second stage will involve the construction of the remaining 9 hole standard course.

The design of the golf course has yet to be finalised, but the final landform design will incorporate:

- WSUD measures;
- stormwater treatment in accordance with the Stormwater Management Plan; and
- earth diversion mounding as required for flood management.

3.4.3.3 Construction Materials, Plant and Equipment

An average of 30 machines per month will be utilised during each development stage of the construction works. Anticipated peak loads of 90 machines will be utilised in the second quarter of 2010. All machinery and associated equipment will be transported to and from the site via low loader semi trailers.

On-site mobile servicing will be provided to minimise off-site machinery movements. Onsite fuel stores with a capacity of 50,000 litres (maximum) will be contained in an aboveground tank will be appropriately bunded to contain 110% of the tanks capacity. This bunding will contain any spillage from the tank, in accordance with 'AS1940-2004 Storage and handling of flammable and combustible materials.

The construction plant and equipment required for the NEBP is outlined in Table 17 below.



Task	Type of Equipment Required	Anticipated Number of Equipment Required	Anticipated Number of Construction Staff
Initial establishment of the site	D7 dozer	1	4 operators
	30 tonne excavator	1	_
	20m ³ dump truck	1	_
	Grader	1	_
Bulk earthworks	D10 dozer	2	24 operators
and marina	40 tonne excavator	4	_
cxcavation	20m ³ dump truck	10	_
	16G grader	2	_
	8255 compactor	3	-
	Grader checkers	4	_
	Water truck	3	-
Marina construction	30 tonne excavator	3	6 operators and 20
	20 tonne all terrain crane	3	construction workers
Dredging	300m dredge Pilot Boat Pipe Handler	3	4 operators and 6 construction workers
Subdivision works	Grader	3	Minimum of 12 operators and 8 construction workers
	Roller	3	
	30 tonne excavator	3	
	D7 dozer	2	
	Loader	1	
	Scraper	2	
	Compactor	1	
Site access	16G grader	4	13 operators and 10
upgrade, road and interchanges	20 tonne roller	3	construction workers
development	Loader	2	
	615 scraper	2	
	Grade checkers	4	
	Water truck	2	
Boulevard bridge	Pile driving rig	2	9 operators and 15
	Hydraulic crane	3	construction workers
	All terrain crane	1	
	30 tonne excavator	2	
	loader	1	

Table 17 Construction Plant and Equipment



Task	Type of Equipment Required	Anticipated Number of Equipment Required	Anticipated Number of Construction Staff
Minor bridges	Pile driving rig	1	6 operators and 10
	80 tonne hydraulic crane	1	construction workers
	All terrain crane	1	
	30 tonne excavator	2	
	loader	1	
Golf Course	Grader	3	12 operators and 6
	30 tonne excavator	3	construction workers
	D7 dozer	2	
	Loader	1	
	615 scraper	2	
	Compactor	1	

3.4.4 Dredging

There will be a requirement to dredge silt and sand from the Caboolture River within the defined navigation channel to maintain navigable access to the Caboolture River and the NEBP site. The dredging of the navigation channel is defined in Cardno drawings 7900/33/01-300 to 317.

In addition, the excavation of an area approximately 150m x 30m will be necessary to create the entrance channel to the proposed lock and this will constitute capital dredging works.

Approximately 545,000m³ material will be removed during capital dredging works.

Dredging will be undertaken using cutter suction dredging equipment. Suction dredges act like underwater vacuum cleaners drawing bed material into the dredge. The cutter head describes arcs in the sediment loosening the material to aid removal. Cutter suction dredgers take the substratum profile down to the required depth at one location before moving onto the next. Slurry (sediment and water) is drawn up by this method and dredged material is pumped ashore via a pipeline.

Silt curtains will be employed at all times during dredging activities to minimise impacts caused by sedimentation to the marine environment and existing sensitive areas.

The proposed dredging profile includes a channel width of 50m excavated to a depth of RL -4.25 metres AHD. This channel depth will provide approximately 3.0m of water at LAT. The side batters of the channel will be shaped with a batter slope of 1:3 to tie into existing levels.

The depth of excavation required within the proposed 6.5km dredge channel varies to an approximate maximum of 2.8m.

Dredge spoil is proposed to be piped to the NEBP project area using a polyethylene spoil transfer pipeline, and will be deposited in Residential Area 2 for treatment. Residential Area 2 is shown on the Structure Plan presented as Figure 2.



The pipeline will extend upriver approximately 500m beyond the upper limit of the dredging and will exit from southern bank of the river at the existing easement for Farry Road.

The pipeline will then be located on land, extending approximately 1.5km along the Farry Road easement to meet the south-eastern corner of the NEBP project area, which is the location of the proposed dredge spoil area (noted as Residential Area 2 in Figure 2).

All of the relevant engineering drawings, together with further details of the methodology for dredging and for the control of environmental impacts is contained in the Dredging Site Based Management Plan presented as Appendix R3.

3.4.5 Acid Sulfate Soils

ASS has been addressed in more detail in Sections 4.2.1.3 and 4.2.2.2 of the EIS.

The identification, monitoring, treatment and management of ASS has been addressed in an ASSMP. A copy of the ASSMP is provided in Appendix R4.

3.4.6 Mitigation Measures

A CEMP has been developed to manage the potential impacts resulting from the construction of the NEBP. The CEMP addresses the following elements.

- Community awareness;
- Earthworks management;
- Erosion and sediment control;
- Water quality;
- ASS management;
- Flora and fauna management;
- Weed control;
- Mosquito and biting midge management;
- Air quality;
- Greenhouse gas abatement;
- Noise & vibration;
- Waste management;
- Dangerous hazardous materials;
- Cultural heritage management;
- Traffic; and
- Visual amenity.

Construction working hours will be between defined by conditions of relevant development approvals, but are expected to be Monday to Saturday between 6:30am and 6:30pm.

A copy of the CEMP is provided in Appendix X2.



3.5 Operations

3.5.1 Operational Framework

The NEBP development will comprise of four major operational precincts.

- Mixed Business and Industry Area.
- Marina.
- Residential.
- Environmental and open space.

Precincts associated with the NEBP are identified on the Structure Plan attached as Figure 2 and are described in Section 3.3 of this EIS. Concept images of the development and particularly the marina, illustrating the proposed buildings and structures are provided within the Planning Report attached as Appendix C2.

Development of precincts will be in accordance with the NEBP Local Area Plan which has specified Codes for each major operational precinct.

The NEBP Area Plan has been prepared as the statutory basis to guide and control development in the NEBP Area over the lifespan of the project.

The NEBP Area Plan is specifically tailored to the NEBP site and comprises a Structure Plan that indicatively designates development precincts. The NEBP Area Plan specifies the development intent for each precinct, overall outcomes, preferred uses, the level of assessment required for future applications, relevant codes and development standards.

The intent of the NEBP Area Plan is to provide overarching development principles and requirements to ensure that the NEBP:

- a) is planned and developed in an orderly and sequential fashion and has the necessary infrastructure and Services provided in an efficient and timely manner;
- b) enables clear and efficient processing of subsequent applications which seek to implement the NEBP Structure Plan;
- c) ensures adequate assessment processes and standards are established to guide future development of the site, consistent with the achievement of high environmental standards and the protection of the Caboolture River;
- d) ensure the achievement of the overall outcomes for the NEBP;
- e) provides certainty for stakeholders and residents as to the type and location of future land uses and infrastructure; and
- f) preserve environmental assets and ensure that development is of an intensity that is appropriate to the on–site and local development constraints.

It is proposed that the NEBP development will utilise the *Body Corporate and Community Management Act 1997* (BCCMA) and associated Regulations to produce various land interests for sale in a controlled development program providing a vehicle whereby detailed land use, design and operational issues can be tailored to the site.

The BCCMA will facilitate the creation of a number of supporting instruments to:

• ensure the architectural themes incorporated into the various precincts are maintained across the development in accordance with development approvals;



- ensure the landscape themes incorporated into the various precincts are maintained across the development in accordance with development approvals, in particular to manage the aesthetics of the main access linking the marina and residential precinct to the Bruce Highway; and
- ensure high design standards are met and maintained.

The initial intent of the NEBP is that the development will be undertaken to provide freehold title to allotments under the provisions of the BCCMA. Such a titling structure allows for controlled land use, design and siting and implementation of processes by which to provide for additional controls over the life of the development and to impose as little burden as possible on Local and State authorities with respect to the maintenance of the public access areas.

Such titling structure requires considerable attention to detail when determining such matters as the tailoring of Community Management Statements and the tiering of the Body Corporate. These matters need only be considered in principle at this stage, with further detail to be considered as the development progresses.

Three main precincts have been identified which are further divided into a total of 15 precincts.

There will be three forms of land tenure of the NEBP, and these are:

- Community Title Schemes;
- Freehold Lots; and
- Public Land.

The following preliminary Community Titles Schemes have been developed.

- Mixed Industry Business Area (MIBA) Scheme.
- Marina Residential Scheme.
- Residential Lots Scheme 1.
- Residential Lots Scheme 2.
- Hotel Scheme.

The 5 community title schemes are separate.

Features of each Community Title Scheme are provided in the Planning Report, and are discussed briefly hereafter.

3.5.1.1 Community Title Schemes

MIBA Scheme

The predominant use of lots within this Scheme will be Business and Industrial Use. Access to this Scheme will be by the existing public road. Other roads will be introduced to provide access to individual lots and will form part of common property. The Body Corporate will be responsible for the maintenance and control of the common property areas.

The Body Corporate will be a lessee as tenant in common of the public open space area and will have financial obligation to contribute to the upkeep of the public open space area.



Marina Residential Scheme

The predominant use of lots within this Scheme will be Residential and Accommodation. This Scheme will comprise of at least three subsidiary community title schemes, creating a Scheme of Villas on the Golf Course, a Scheme of Villas facing the Marina and a Scheme comprising of apartment buildings between the two villa Schemes.

Access to this Scheme will be by the proposed North South Arterial Corridor. Other roads will be introduced to provide access to individual lots and will form part of common property. The Body Corporate will be responsible for the maintenance and control of the common property areas.

The Body Corporate will be a lessee as tenant in common of the public open space area and will have financial obligation to contribute to the upkeep of the public open space area.

Residential Scheme 1

The predominant use of lots within this Scheme will be Residential Use. This Scheme will comprise of standard format lots and common property. The development of lots in this scheme will be staged.

Access to this Scheme will be by the proposed North South Arterial Corridor. Other roads will be introduced to provide access to individual lots and will form part of common property. The Body Corporate will be responsible for the maintenance and control of the common property areas.

The Body Corporate will be a lessee as tenant in common of the public open space area and will have financial obligation to contribute to the upkeep of the public open space area.

Residential Scheme 2

The predominant use of lots within this Scheme will also be Residential Use. This Scheme will comprise of standard format lots and common property. The development of lots in this scheme will be staged.

Access to this Scheme will be by surveyed access over the golf course to the proposed North South Arterial Corridor. Other roads will be introduced to provide access to individual lots and will form part of common property. The Body Corporate will be responsible for the maintenance and control of the common property areas. The Body Corporate will also be responsible to maintain the easement access.

The Body Corporate will be a lessee as tenant in common of the public open space area and will have financial obligation to contribute to the upkeep of the public open space area.

Hotel Scheme

The predominant use of lots within this Scheme will be Commercial and Accommodation Use.

Access to this Scheme will be by easement access over the common property of the Marina Residential Scheme to the proposed North South Arterial Corridor. Other roads will be introduced to provide access to individual lots and will form part of common property. The Body Corporate will also be responsible to maintain the easement access. The Body Corporate will also be responsible to maintain the easement access.

The Body Corporate will be a lessee as tenant in common of the public open space area and will have financial obligation to contribute to the upkeep of the public open space area.



3.5.1.2 Freehold Lots

There will be 8 freehold allotment types.

- Marina Pavilion.
- Marina and Lock.
- Recreation and Sporting Club.
- Marina Village.
- Golf Course.
- Ship yard;
- Open Space.
- School.

Each lot type is described below.

Marina Pavilion

The Marina Pavilion will provide facilities for the Marina including "The Marina Club", Marina Shower, Toilet and Laundromat, refuse disposal areas, car parking and marina administration office activities. The costs for these facilities will be met by a benefited area maintenance levy applied to Berth holders, the Marina Residential Scheme elements, tenants of the Marina Village commercial area and the Marina Pavilion.

Access to this parcel will be via private road (Access easement) off the main arterial road passing through the development. The management of this area shall be undertaken by the Marina Management Company.

Marina and Lock

The Marina and Lock will contain up to 911 floating vessel berths ranging in size and configuration for both mono hull and multi-hull vessels, queuing pontoons for access and egress to the marina basin, control facilities for the lock gates and water quality monitoring and will form part of the Marina Basin.

The costs for these facilities will be met by a benefited area maintenance levy applied to Berth holders, the Marina Residential Scheme elements, tenants of the Marina Village commercial area and the Marina Pavilion.

Access to this parcel will be via private road (Access easement) off the main arterial road passing through the development. Vessel access will be via the Caboolture River to Pumicestone Passage and Moreton Bay.

The management of this area shall be undertaken by the Marina Management Company.

Recreation and Sporting Club

The Recreation and Sporting Club will provide club and recreation facilities to the population of the development that will be maintained by an appointed manager. The cost of these facilities will be subsidised by contributions from the Community Title Schemes.

Access to this area will be via Buckley Road (Council controlled road) off the proposed main arterial road passing through the development.



The management of this area shall be undertaken by the Recreation and Sporting facilities management company.

Marina Village

The Marina Village will contain a number of commercial tenancies and car parking facilities. The village will be a focal point of social activity around the marina.

Access to this parcel will be off the main arterial road passing through the development.

The management of this area will be undertaken by the Marina Village management company.

Golf Course

The Golf Course will provide a major land based recreation facility to the population of the development including the public. The Golf Course will be maintained by an appointed manager.

Access to this parcel will be via Buckley Road off the main arterial road passing through the development.

The management of this area will be undertaken by the Recreation and Sporting facilities management company.

Ship Yard

The Shipyard will provide facilities such as a 300-500 dry boat stack, 65 tonne travel lit for vessel maintenance and various sheds for maintenance activities.

Access to this parcel will be off the main arterial road passing through the development.

The management of this area will be undertaken by the Marina Shipyard management company.

Open Space

Open space retained by the Developer shall be leased to all of the community title schemes as tenants in common. The developer will appoint a caretaker and the Lessees will be responsible for the costs of the maintenance of the area.

Access to the public open space will be from designated entry points form the North South Arterial Corridor.

School

The School land will be sold to the State of Queensland for the establishment of a public school.

Access to the school land will be via the North South Arterial Corridor and from Scheme land in Residential Scheme 1.

3.5.1.3 Public Land

Public land will consist of the State-Controlled Road as the proposed North South Arterial Corridor and the current public (and local) road Nolan Drive. The relevant authority will be



responsible for maintenance. In addition the Public Land will consist of a Public Park at the south west corner of the site adjoining Nolan Drive.

This Community Titles Scheme is further described and illustrated within the Planning Report. Operational environmental management will be of the highest quality in accordance with the mission and values of the NEBP with the development of the NEBP Area Plan.

3.5.2 Specific Maintenance Aspects of the Operation

Specific maintenance aspects of most relevance which have been addressed further in this section are those activities relating to:

- stormwater drainage;
- control of weeds and pests;
- emergency access provisions; and
- waste disposal.

3.5.2.1 Stormwater Drainage

A Stormwater Management Plan has been prepared as part of this EIS (attached as Appendix H1). Stormwater treatment measures are proposed, and treatment will be further enhanced by the proposed protection and enhancement of riparian and wetland vegetation. The overall management objective has been to preserve natural flows to the waterways and wetlands and to minimise the increase in pollutant loads.

Treatment trains have been prepare to ensure runoff from the site meets adopted Water Quality Objectives and are a series of stormwater treatment measures located in a catchment to provide a staged approach to removal of stormwater pollutants from runoff. Key measures include grass swales, bio-retention swales, litter and trash racks, gross pollutant traps and constructed wetlands.

Treatment measures for stormwater shall be monitored regularly to ensure effective operation.

3.5.2.2 Weeds and Pests

The control of weeds and pests in open spaces associated with the NEBP will be in accordance with a management plan to meet Code requirements and prevent runoff from pesticides and herbicides to stormwater drainage systems and will be undertaken by representatives of the Community Title Scheme when required.

A mosquito management plan has been prepared providing details on specific management mechanisms to be applied which will minimise the impact of mosquitos within the proposed development. Broadly, the methods applied to the management of mosquitoes are consistent with the relevant Queensland State Government documents relating to mosquito management, namely:

- Guidelines to minimise mosquito and biting midge problems in new development areas, produced by Queensland Health, 2002; and
- Mosquito Code of Practice for Queensland, produced by the Local Government Association of Queensland, 2002.



Proposed initiatives for mosquito management for the NEBP include:

- earthwork design to avoid creation of artificial ponds which may be likely to provide opportunities for mosquito breeding onsite (apart from those required in the stormwater treatment train);
- ensuring the site is free draining to minimise surface ponding of water which may provide for opportunistic breeding;
- control of potential mosquito breeding through habitat modification and minimised opportunities for onsite breeding in preference on reliance to chemical control; and
- avoiding the creation of large heavy areas of vegetation which may provide mosquito harbourage and movement corridors from identified breeding areas near the Caboolture River into the development.

3.5.2.3 Emergency Access Provisions

Emergency access provisions have been addressed in this EIS with sufficient site access from Buchanan Road east of the Bruce Highway. Refer to Section 4.13 for further detail.

3.5.2.4 Waste Disposal

Waste disposal refers to the final deposit of waste when the material is of no further use. This may include disposal to landfill. This is considered the least preferred and final option for the management of waste and should only be used where the waste cannot be otherwise reused or recycled.

Waste for disposal will be collected and transported, using appropriately licensed waste contractors, and deposited at the Caboolture landfill, on McNaught Road within the Caboolture Shire. The landfill is less than 10 kilometres from the site.

Waste avoidance, reduction, recycling and cleaner production strategies will be encouraged through the Body Corporate to the occupants of the NEBP, with particular emphasis on the business within the MIBA precinct.

To ensure the risk level from waste disposal, particularly within the MIBA precinct, is as low as reasonably practicable, a hazard and risk analysis concluded the following control measures could be implemented to reduce the potential risks associated with handling and disposal of waste:

- maintain a central database of the types and quantities of hazardous substances and dangerous goods used and stored on site as new industries are established;
- ensure site layout incorporates appropriate buffer zones between industry, fuel storage and residential development;
- prepare an Integrated Emergency Response Plan in consultation with each activity and Department of Emergency Services;
- construct temporary firewater containment and diversion structures that serve the industrial park as a whole to prevent contaminated discharges to the Caboolture River and associated watercourses; and
- install fire alarms that are connected to the Fire Communications Centre to minimise the risk of fire propagation between adjoining land uses.

More information on waste management and disposal is provided in Sections 3.8 and 4.3 of the EIS, and in Appendix Y2.



3.5.3 Marina Operations

The marina will be managed by the appointed Marina Manager in accordance with the Marina Site Based Management Plan (SBMP) which provides a detailed environmental management regime for the operation of the marina and marine industrial area, specifically for the conduct of Environmentally Relevant Activities (ERAs) and water quality monitoring.

The ERAs that are proposed as part of the marina are tabulated below.

Table 18 identifies the proposed on-site ERAs. Management of these ERAs is addressed in the Marina Site Based Management Plan presented as Appendix Y1.

ERA	Relevance to NEBP
ERA 11(a) Crude oil or petroleum product storing - storing crude oil or a petroleum product in tanks or containers having a combined total storage capacity of 10,000 litres or more but less than 500,000 litres.	Diesel and unleaded petrol will be dispensed at the refuelling wharf which will be available to marina vessels 24 hours a day. The marina will store 55 000 litres of diesel and 20 000 litres of unleaded petrol for refuelling in underground storage tanks.
<i>ERA 19(b) Dredging material</i> - dredging material from the bed of any waters (other than dredging by a port authority of material for which a royalty or similar charge is not payable) using plant or equipment having a design capacity of not more than 100,000 tonnes a year.	Maintenance dredging every 2-5 years is required to retain adequate depth within the Caboolture River for navigatibility (refer to Section 3.5.6 Maintenance Dredging).
ERA 69 Boat maintaining or repairing facility – operating a commercial facility for maintaining or repairing any type of boat or inboard or outboard marine engine.	Boat maintaining facilities are proposed as part of the marina services to provide essential complementary services.
<i>ERA 73 Marina or seaplane mooring</i> - operating a commercial marina or facility for mooring seaplanes, including any land-based buildings or works used in association with the marina or mooring for 100 or more berths or moorings.	The NEBP will contain 911 wet berths and 300- 500 dry berths.

 Table 18
 Proposed Environmentally Relevant Activities

Additional ERAs that may be associated with boat maintaining and repairing include:

- ERA 7(a) Chemical storage storing chemicals (other than crude oil, natural gas and petroleum products), including ozone depleting substances, gases or dangerous goods under the dangerous goods code in containers having a design storage volume of more than 10m3 but less than 1000m3.
- ERA 23 Abrasive Blasting commercially cleaning equipment or structures using a stream of abrasives.
- ERA 25 Metal surface coating commercial spray painting (other than spray painting motor vehicles), powder coating, enamelling, electroplating, anodising or galvanising.

These activities are known as ERAs because they have the potential to cause environmental harm by releasing contaminants to the receiving environment. ERAs are



prescribed in Schedule 1 of the *EP Regulation* and are administered by the EPA or local government. ERAs are required to be approved through development permits where conditions may apply. Operators of the activities are required to hold registration certificates issued pursuant to the EP Act.

The Marina SBMP has been developed to comply with legislative requirements including the **general environmental duty** that requires persons to take all reasonable and practicable measures to prevent or minimise environmental harm when carrying out activities to which this SBMP relates.

Regardless of this legislation, pollution prevention is an important economic and environmental concern for the Operator, in particular at its fuel wharf, sewage pump out and marina boat maintenance facilities, which are located:

- upstream from Moreton Bay Marine Park and Ramsar wetlands; and
- adjacent to Deception Bay Fish Habitat Area.

It is acknowledged by the operator and its customers that a sound environmental policy will contribute to the competitive strength, and will benefit the customers, tenants, and employees by enhancing the overall wellbeing and economic health of the marina community.

The purpose of the Marina SBMP is to demonstrate the environmental commitment by the operator to carry out activities in accordance with a structured program that:

- sets the environmental objectives or standards to be achieved over time;
- identifies the potential environmental harm and extraordinary factors that may cause environmental harm resulting from routine operations and establishes and documents measures to avoid and/or manage this harm as far as practicable;
- ensure all persons carrying out the activity are aware of environmental risks, and are trained in the measures and contingency plans to deal with them;
- implements monitoring of environmental performance to ensure the effectiveness of the measures and contingency plans;
- assists the communication of environmental information throughout the organisation and to the administering authorities; and
- provides for continual improvement.

The Marina SBMP is attached as Appendix Y1 of this EIS.

In particular, the SBMP addresses:

- the location and nature of ship yard operations including abrasive blasting and painting;
- the nature, sources, location and approximate quantities of all chemicals to be handled on site;
- use of bunds, dry-break couplings and containment for fuel oils, gases and other environmentally hazardous substances during transfer, use and storage;
- contingency plans for containing and cleaning up spills;
- water use and approximate amount and characteristics of solid and liquid wastes produced and method of disposal;
- details of sewage disposal for vessels utilising the marina;


- details of predicted vessel movements in the Caboolture River including the maximum displacement and draft of vessels intended to be catered for by the proposed marina;
- maintenance provisions for all structures within the marina precinct, including responsibility for maintenance works and monitoring requirements.

The location of the ship yard facilities is shown on the concept master plan and described in Section 3.3 of this EIS. In addition to the ERAs that are expected to be associated with the ship yard, dry stack boat storage and suppliers to these activities are predicted.

The types and quantities of hazardous substances that are known to be stored on site at the marina are summarised below.

 Table 19
 Hazardous Substances Stored as part of Marina Operations

Product Name	UN Number	Quantity (Litres)
Diesel Fuel	1202	55,000
Unleaded Petrol	1203	20,000

Diesel fuel is a combustible liquid and unleaded petrol is a flammable liquid with both products considered as dangerous goods.

Diesel is not being stored in sufficient quantities to trigger the requirement for a permitting for a dangerous goods location (LDGL) however unleaded petrol is stored in quantities greater than the threshold for a LDGL. The thresholds for LDGLs are provided in the *Dangerous Goods Safety Management Regulation 2001*.

A permit will be obtained for the marina for a LDGL in addition to a development approval for ERA 11(a) and potentially, a flammable and combustible materials license. The operator will be required to store flammable and combustible materials in accordance with Australian Standards 1940-2004 – *The storage and handling of flammable and combustible materials*.

In particular bunds shall be of sufficient size to contain 100% of a spill from the largest tank within the bund and 20 minutes of firewater. Bunds will contain compatible materials and storage tanks/drums will be located at a sufficient distance from the bund wall. Spill kits and spill procedures will be sign posted with staff trained in spill prevention and corrective action.

Fuel will be transported to the site by an approved road tanker, which would comply with the Australian Code for the Transportation of Dangerous Goods by Road and Rail. It is expected that diesel will comprise 73% of deliveries unleaded petrol comprising the remainder (based on storage quantities). It is estimated that there will be one tanker fuel delivery per month with the exception of public holiday times, when the number of deliveries may increase to two per month. Tankers would enter the NEBP site by the Buchanan Road/Bruce Highway Interchange.

No information on other hazardous substances stored on site is available however it has been determined that it is likely the marine and other industrial activities will store and use the following dangerous goods.

- Solvents.
- Engine oil.
- Fuel.



- Engine coolants.
- Paints.
- Anti-fouling paints.
- Fibreglass resins.
- Acids and alkalis.
- Pesticides (e.g. golf course).

Hazard events for dangerous goods storage are identified as and which require careful management:

- loss of contaminant of flammable and combustible substances;
- ignition of flammable and combustible substances (i.e. fire and/or explosion);
- accidental release of toxic fumes to air;
- firewaters, leaks and fuel and chemical spills; and
- gas leak.

Environmental emergencies will be managed using the following generic procedure that will be further detailed when design and marina operations are fully understood.

- 1. The Site Staff shall take appropriate steps to contain the released material. This shall include the use of spill absorbent material located adjacent to stored materials.
- 2. The Site Manager shall be notified and will make an initial assessment of the severity of the accidental release and the nature of the spilt material.
- 3. The Site Manager shall notify the General Manager of any accidental release of material using the Environmental Record Notification form and accompanying procedure.
- 4. The General Manager shall notify MSQ and EPA there has been a pollution incident if in the marina.
- 5. The General Manager shall take steps to treat, remove or otherwise manage the spilt material lawfully in consultation with relevant authorities.
- 6. The General Manger shall assess the work procedures and/or cause of the failure and implement any changes deemed to be appropriate, in consultation with the Site Manager to prevent reoccurrence of a similar incident in the future.
- 7. The General Manager shall make an assessment of the area to confirm the success of the remediation works and whether additional works are required.
- 8. The General Manager shall notify, in writing, the administering authorities in accordance with development approval conditions.

The marina offers waste disposal facilities for vessel sewage as it is an offence to release sewage into waters of a marina. Sewage facilities will be designed and operated in accordance with Australian Standards.

Waste storage facilities will be provided in accordance with the 'Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand'.

Vessel movement in the Caboolture River is subject to a number of factors, most importantly the success of leasing berths. However current demand in Southeast Queensland is high for recreational boating berths over 8.0m and it is expected that marine vessels will substantially increase on the Caboolture River.



The marina is a perched marina incorporating a lock and pumped water system. The marina bed level will be RL -1m, ensuring a minimum of 3.0m draft for vessels. Detailed lock and pumped water system are provided on drawings 7900/33/05-404 to 7900/33/05-405.

Tidal structures will be maintained when required in accordance with approval conditions. It is expected that maintenance works will be deemed excluded works under the CPM Act and Fisheries Act. The responsibility of tidal works maintenance will be devolved to the Jetty Specialists as the primary shareholder of Port Binnli Pty Ltd, the operator.

3.5.4 Maintenance Dredging

3.5.4.1 Marina Basin

Sediment sources to the Marina are expected from terrestrial runoff, inflow from the turnover system and lock operation and from flooding. With regard to terrestrial runoff, the perched marina will be higher than the majority of the surrounding terrain. The filled development pad adjacent to the Marina will also generally drain away from the Marina hence any runoff to the Marina water body will be minor. It is also considered that with adequate sediment erosion control during construction of the development and best practice stormwater treatment trains for any direct discharge, any suspended sediment concentrations in this runoff will also be negligible for the purposes of sedimentation estimates relative to other sources.

For flooding, turnover inflow and lock operation, suspended sediments from the Caboolture River will enter the marina and a portion of these sediments are expected to settle into the deep sections of the basin. Whilst further analysis will be required, based on typical loads entering the basin of 50mg/l, a 24 day turnover, and making a conservative allowance for siltation due to any flooding and lock operation for an average year, siltation depths are estimated to be only up to 2mm/yr using a wet density of 1600kg/m³. Based on the fact that the Marina has been over-excavated by 0.5m to give 3m depth, and designed with adequate site controls, it is not expected that de-silting of the marina will be required for at least 250 years. Such de-silting will be the responsibility of the body corporate.

3.5.4.2 Caboolture River

Modelling of the rates of siltation within the Caboolture River has been undertaken by Cardno Lawson Treloar. The resulting Siltation Study report is presented as Appendix M1. The modelling showed deposition of sand and silt through the dredged navigation channel and therefore, regular maintenance dredging will be required.

On a frequency of two to three years it is estimated that minor maintenance dredging of approximately 40,000m³ (approximately 0.5m depth of sediment accumulation within the navigation channel) will be required, particularly between chainages 4000 to 5000 as shown on Cardno's drawing number 7900/33/01-102.

In addition to the 2-3 year dredging program, dredging of the entire navigation channel will also be required on a five year frequency to maintain an underkeel clearance of 3.0m at LAT to ensure navigational safety. The approximate volume of additional dredging is estimated at 220,000m³. These estimates of dredge volume are likely to be conservative in the longer term as the dredged navigation channel approaches a dynamic equilibrium with the adjacent banks and flow regimes.

In general it is expected that the material deposited within the navigation channel will initially have a relatively high percentage of sand due to the redistribution of material from adjacent banks. However in time the percentage of fine material will increase as the



dredged navigation channel approaches a dynamic equilibrium with the adjacent banks and flow regimes. Flooding events are also likely to influence the deposition of fine material within the navigation channel. As such it is difficult to provide a long-term prediction on the composition of material removed from the river during maintenance dredging.

Whilst navigational safety remains the responsibility of Queensland Transport and the Harbour Master, it is anticipated that funding for ongoing maintenance dredging of the navigation channel will be at least partially funded by those generating significant boat traffic on the Caboolture River, including the NEBP.

Dredging will be undertaken using a small cutter suction dredge. The captured sediment slurry will be pumped to Residential Area 2 for disposal until indicative civil construction and development stages commence in 2017/2018 for Residential Land East.

The identified Dredge Spoil Disposal Area is intended for disposal of capital dredge spoil and maintenance dredge spoil prior to its development with residential housing in 2018. During this period of treatment of maintenance dredging spoil, an understanding of the quantity and characteristics will be gained allowing for appropriate designation of a longer term maintenance spoil disposal location ensuring effective and low risk treatment and management. Depending on the quality and quantity of spoil material, the likely management options (in order of preference) are:

- sale for construction purposes;
- sale for fill;
- beach nourishment;
- riverbank stabilisation;
- disposal off site on land purchased by the proponent for the purpose of dredge spoil storage.

It is expected that before the end of the 10 year period during which maintenance dredge spoil can be disposed of off-site, the issue of dredge spoil management in south-east Queensland will have been considered by the relevant State agencies, and strategic policy advice will have been issued. Future beneficial resource use and disposal strategies can therefore be formulated in accordance with this advice.

Further details on the methodology for dredging and the management of potential environmental impacts associated with dredging and dredge spoil disposal can be found in the Dredging Site Based Management Plan which is presented in Appendix R3.

3.6 Land Tenure

The Northeast Business Park site extends across seven (7) freehold titles, including one (1) freehold lot owned by the State of Queensland. The lots included are illustrated in Figure 4 and listed below in Table 20.



Land description	Address	Area (ha)	Registered Owners
Lot 2 on RP902075	2-32 Nolan Drive, Morayfield	28.83	Northeast Business Park Pty Ltd
Lot 7 on RP845326	185 Farry Road, Burpengary	55.90	Northeast Business Park Pty Ltd
Lot 10 on RP902079	34 Nolan Drive, Morayfield	515.24	Northeast Business Park Pty Ltd
L12 on RP145197	60 Trafalgar Drive, Morayfield	4.86	Northeast Business Park Pty Ltd
Lot 15 on RP902073	15 Nolan Drive, Morayfield	1.91	Northeast Business Park Pty Ltd
Lot 17 on RP902072	31 Trafalgar Drive, Morayfield	1.88	State of Queensland (Queensland Transport)
Lot 24 on SP158298	195-235 Farry Road, Burpengary	160.38	Northeast Business Park Pty Ltd

Table 20 Land Tenure

Lots surrounding the NEBP are predominantly freehold in nature. A small number of parcels near to the site are held by the State, predominantly as reserves for open space, generally administered by Caboolture Shire. Two lots are held by the State as freehold land adjacent to the Buchanan Road interchange.

Maps have been prepared to show the boundaries of the subject lots and the site in relation to natural features of the surrounding area and boundaries of relevant environmental designations. These are:

- Figure 1 Site Locality;
- Figure 2 Structure Plan
- Figure 3 2007 Aerial Photograph
- Figure 4 Cadastral Plan Showing Lot Boundaries;
- Figure 7 Areas of Conservation Significance; and
- Figure 8 Existing Site Contours.

Further, detailed construction drawings and staging plans have been prepared by Laing O'Rourke, and these are appended to the Construction Environmental Management Plan presented as Appendix X2.

Civil design drawings are attached to the EIS. These provide details of areas of cut and fill, and the locations of bridges and infrastructure.

Details of future land tenure arrangements including freehold and community title areas are provided in Section 3.5.1 of this EIS.



3.7 Infrastructure Requirements

3.7.1 Transport

NEBP Pty Ltd commissioned Cardno Eppell Olsen (CEO) to prepare an assessment of the expected impacts of traffic generated by the proposed development on existing road networks. Road, pedestrian and cycle routes have been incorporated into the design to service the proposed NEBP development. CEO has prepared a Traffic Impact Assessment (TIA), which is attached as Appendix K1 and K2 of this EIS.

In this section, summary information is provided on road transport requirements for public roads during both construction and operational phases. Impacts and mitigation strategies are discussed in detail in Section 4.2.2.7 of the EIS. A Transport Management Plan is also include in Section 4.2.2.7.

3.7.1.1 Road Network

The major vehicular access to the site will be from Buchanan Road, with secondary access via Buckley Road. This access system provides sufficient capacity to adequately service the traffic demands likely to be generated by the development.

Review of the 2016 traffic patterns using a recognised modelling program reveals that the development impacts will be limited to the immediate area, including the Buchanan Road interchange, Uhlmann Road interchange and Buckley Road. This is expected with the development aiming to provide enhanced local employment opportunities. Analysis of intersections, midblocks and ramps has been undertaken surrounding the immediate project area to develop a staged road works program which meets the demands of the development.

Buckley Road would be used as a secondary access to the development and the current road form will be upgraded to a higher standard, particularly in the northern section. It is also proposed to include intersection treatments at Northwood Drive, Ridgewood Drive, Cobb Road and Coach Road as part of the overall upgrade of Buckley Road to reinforce the appropriate speed environment and reduce the attractiveness for large vehicles.

Strategic modelling for the future year 2016 suggests that the overall traffic generation potential of the NEBP is in the order of 37,700 total vehicle trips per day with the summary trip distribution presented in Table 21.

From/To NEBP	Total Vehicle Trips
Internal	8, 268
North East & Bribie Island	4,840
South West of Bruce Highway	12,430
South of NEBP/East of the Bruce Highway	5,829
Northern Caboolture	2,657
South of Pine River	3,703
Total NEBP External Trips	29,466
Total NEBP Trips	37,734

Table 21 Total Vehicle Trips



It should be noted that the strategic model data has been used to identify the scope of broader network impacts, jobs balance and traffic distribution only. More detailed assessment has been undertaken for the purpose of intersection and ramp analysis.

The major internal road network is shown on the structure plan as Figure 2 of the EIS. Minor roads at this stage are conceptual and will be revisited once the site and lot layouts are further developed.

The conceptual road internal road layout and hierarchy classifications including potential cross sections are shown on Figure 10.

Two access points from the external road network are proposed via Buchanan Road and Buckley Road. The ultimate configuration of Buchanan Road is illustrated in Figure 11. The Main Boulevard would connect the two access points and provide a connection between the industrial business park in the western section and the marina and residential components in the eastern portion of the project area, serving as a main connection within the site and to the external road network.

The Main Boulevard would generally be designed to an arterial standard however additional pavement width is proposed to allow provision of on-road bike paths.

The Main Boulevard includes three waterway crossings.

Four access points are proposed from the Main Boulevard to service the industrial precinct with intersections requiring signalised form, although intersections in the eastern section of the boulevard may be managed with roundabout control.

The marina road network will be pedestrian friendly. A potential marina main street design has been considered for the harbour front link, with wider footpaths to cater for active shop/restaurant frontage.

Links to the residential areas would be designed with one of two basic cross sections depending on the number of lots served and function. The proposed residential access and collector standards are generally consistent with CSC requirements, however a wider verge and pavement width has been adopted for collector links to better cater for bus, bicycle and pedestrian movements.

The internal road network has been designed to be consistent with best practice road hierarchy guidelines, and it is proposed that speed and intersection management strategies be implemented to support the principles adopted. Detailed design will advance the geometric characteristics of the network which will include road cross section, pedestrian, cycle and public transport facilities.

3.7.1.2 Construction Traffic

Construction traffic will fall into one of two categories:

- development construction to build the marina and sites for sale to end users; or
- end user construction of the business premises and residences forming the ultimate community.

Both categories of construction traffic have been included in analysis of traffic volumes by factoring the generation of operating uses onsite to account for additional employees involved in construction.

Construction traffic will involve the transport of certain types of larger heavy equipment which may involve special traffic controls. The construction schedule attached to the



Construction Environmental Management Plan presented in Appendix X2 of this EIS shows the periods during which large loads may need to be transported and the planned type and quantity of plant and equipment. Indivisible loads are not anticipated beyond normal construction equipment. Normal transport arrangements for movement of heavy equipment will be adhered to, including the requirement to obtain permits if necessary.

Construction traffic will access the site using Buchanan Road.

3.7.1.3 Operational Traffic

Operational traffic consisting of heavy vehicles will, in the majority of cases, be destined for the business park including ship building/marine facilities. A smaller percentage of heavy vehicles will be delivery vehicles accessing the marina, marina retail and hotel. Heavy vehicles on internal roads will be monitored for potential adverse impacts with environmental incidents including spills, noise and exhaust fumes addressed in this EIS and operational management plans.

Trucks transporting fuel to the marina are required to comply with the 'Australian Code for the Transport of Dangerous Goods by Road and Rail — Sixth Edition' (ADG Code) or the most recent edition.

Regulated waste generated by the development will be transported in accordance with Queensland's code of environmental compliance developed by the EPA. Environmental conditions include the use of suitably designed vehicles, tanks, containers or secondary containers that are appropriate for containing transported waste and spill clean up measures.

Traffic Routes

It is expected traffic to and from the residential and marina precincts will have a higher reliance on Buckley Road, while traffic from the industrial component of the development would predominantly make use of the main boulevard and the Buchanan Road interchange. A very small proportion of trips relating to the industrial precinct will make use of the Buckley Road link to access destinations in the local area south of the site.

Parking

Parking requirements have been preliminary assessed based on the CSC parking guidelines. An exception has been considered for the marina where a slightly lower parking allocation of around 0.6 spaces per wet berth is proposed, due to the relatively high potential for boat owners to reside within walking distance.

The expected parking demand is tabulated in Table 22.



Land Use	Proposed	Wee	Weekday		Weekend	
	Spaces	Day time	Night time	Day time	Night time	
Multiple Dwellings (Visitor Spaces)	309	185	247	309	309	
Restaurant/Tavern/Yacht Club	279	209	251	209	279	
Shop/Retail	500	375	500	500	0	
Office	350	350	70	0	0	
Marina Berths	480	360	240	480	360	
TOTAL	1,918	1,480	1,308	1,498	948	

Table 22	Parking Space Demand
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Based on the mixture of uses proposed on site, it may be possible to relax standard CSC rates to account for temporal variations. Parking provisions will be further assessed at a later stage when design and component land use yields are better understood.

3.7.2 Energy

The EIS should describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the proposal. The locations of any easements should be shown on the infrastructure plan. Energy conservation should be briefly described in the context of any Commonwealth, State and local government policies.

The EIS Terms of Reference (ToR) has requested a description of *"all energy requirements, including electricity, natural gas and/or solid and liquid fuel requirements for the construction and operation of the proposal".* The ToR further requests the locations of any existing easements and the energy conservation methods of the proposed development.

The Proponent engaged the services of Lectel Pty Ltd to undertake an assessment of the energy requirements and the potential service options for the proposed development. The assessment included both electricity and gas options, including the sustainability of each use, in conjunction with the conceptual design of the NEBP development. A copy of the Lectel Pty Ltd report is provided in Appendix V.

Electricity

An 11kV overhead network exists along both Nolan and Buckley Roads. Initially, the electricity supply requirements can be provided to the site by installing a network extension to the existing 11kV network. The extension is anticipated to be completed in 2009 and will be able to service the first stage of development.

Energex will install an overhead network extension however, unground extensions are possible. An overhead extension may necessitate upgrades to the existing grade poles and/or cables whilst underground extension will involve some trenching and vegetation clearing, especially along Buckley Road.

The total electricity requirements for the whole development will be 24-27MVA, which will need installation of a 33kV network that will satisfy the electricity supply requirements for the remaining stages of development. The anticipated total electrical load of the NEBP will



therefore require the establishment of a new Energex 33kV zone substation. Energex have advised a lead time of 2 years following land purchase to the operation of the new zone substation, therefore, the anticipated completion of the 33kV supply network and zone substation is expected to be between 2010 and 2011.

The location of the proposed zone substation is adjacent to the NEBP development and will be developed and managed by Energex. Energex will comply with CSC development conditions for the desired type of construction and will complete their own environmental assessments as part of the development planning for any new substation.

Minimal noise and visual impacts are anticipated for the installation of the zone substation through the provision of screening/fences and landscaping, if required. The proposed substation will not contain any easements over it (excluding electrical).

Prior to the establishment of the new zone substation, 33kV feeder routes will be installed, at the discretion of Energex, from existing substations at Morayfield North and South. These feeders will be used to augment the capacity of the existing 11kV network until the new zone substation is commissioned. The existing 11kV overhead feeder routes in Morayfield have been built with provision to add 33kV cable on the top of the poles.

For routes only feeding the NEBP internal customers, no easements are required. Any new feeders to the development site will likely be on the electricity alignment along gazetted roads. Energex will adopt either a 0-900mm alignment from the property boundary or 1 metre from the back of the kerb. The alignment throughout the development site will be consistent.

Additional conduits will need to be installed in the footpath in close proximity to the new substation. No empty conduits exist across the Bruce Highway either at Buchanan Road or Coach Road which may necessitate some underground directional drilling.

Internal Electricity Reticulation

Whether the internal electricity reticulation and street-lighting is to be privately owned or an Energex network, HV and LV underground cables will be required to be installed throughout the NEBP. Numerous 125mm conduits and PMTs will be required at intervals throughout the NEBP. It is recommended that Energex maintain the electricity network, as they have the best network maintenance and service restoration capability and will only maintain their own network. The development is community titled, therefore, minimum 2 metre wide easements are required for the electrical network assets along the footpath, otherwise they must be on road reserve.

Depending on customer loads, one PMT may be required per commercial/industrial property, whereas a single PMT can supply up to 120 residential customers. In industrial/commercial precincts, PMT sites are required every six lots, though not all sites will have a PMT installed initially to allow for future growth. During the first stages of development, a PMT will be installed every fifteen lots.

Gas

The Proponent is investigating option for energy supply to the site which is both economical and environmentally sustainable. The installation of natural gas facilities throughout the NEBP for uses such as hot water, cooking and outdoor heating, will result in few carbon dioxide emissions and lower Pad-Mount Transformers (PMTs) and cable demands, thereby reducing the greenhouse impacts of the development as well as construction costs.

The nearest natural gas infrastructure is located at Narangba, approximately 7km from the NEBP development site. Envestra is the owner of the natural gas distribution network in



the area. Envestra have supplied preliminary plans to extend a pipeline further north of the NEBP development, meaning the availability of reticulated gas within the development will allow Energex to reduce electrical planning by 500W per household, which will potential reduce the amount of HV cabling and PMTs required for installation.

The Proponent is continuing to evaluate all energy options for the NEBP site, by considering both sustainable and economical outcomes of the available and alternative methods. Other initiatives being considered include greenhouse-friendly hot water systems, solar panels, tidal flow pumps, building insulation and compact fluorescent lamps, hydrogen fuel cells and other emerging technologies, in accordance with the Queensland Government's 'Climate Smart 2050' policy.

The aim of the ongoing energy assessments are designed to optimise investment whilst reducing the impact on the environment.

3.7.3 Water Supply and Storage

NEBP Pty Ltd has commissioned an assessment on the expected water usage of the proposed development, including the quality and quantity of water supplied to the site (and source) and water conservation and management measures to address infrastructure requirements specified in Section 3.7.3 of the ToR.

This section has been informed by the GHD (2007) report entitled Environmental Impact Assessment – Water Supply and Sewerage Systems for Northeast Business Park Pty Ltd, which is presented as Appendix W.

An Equivalent Person (EP) is used as a standard unit for water demand. One EP represents the average use of water by a typical person in a residential setting over the long term and has been estimated in accordance with CSC's Planning Scheme 'Policy 22 Water Supply and Sewerage Infrastructure Contributions'.

Water demand has been estimated based on the population projections of the NEBP that total 9439 Equivalent Persons (EP). This total EP is made up of 2759 EP within the district industry precinct, 915 within the community precinct and 5765 within the residential precinct. These population projections are for the entire development and will be staged that has been nominally grouped to occur over the following phases:

- Phase 1: 2008-2011 Development Horizon;
- Phase 2: 2011-2016 Development Horizon;
- Phase 3: 2016-2021 Development Horizon; and
- Phase 4: 2021-2025 Development Horizon.

Phase 1 of the development is expected to have a total EP loading of 1000EP with no allowance for residential development. Phase 2 has an expected loading of 4250EP with the addition of further business park development, marina construction and operation including marina village residences, and residential lots. Phases 3 and 4 includes the development of the remaining residential lots and apartment/villa properties, the final stages of the business park and the construction of a 120 room resort having an expected loading of 2830 EP and 1360 EP respectively.

These EPs are for the operational aspect of the NEBP development.

The potable water demand based on the EPs for a business as usual approach using the nominated average water consumption adopted by CSC Contribution Policy for infrastructure planning is 350L/EP/day which corresponds to a total average potable water demand of 4.0ML/day including 0.7ML/day required for golf course irrigation (shown in



Table 23). However the proponent has not adopted a business as usual approach with a vision of sustainable development.

Land Use	Water EP	Total BAU Demand (ML/day)
Residential	5765	2.0
Non-residential (District Industry and Community Precincts)	3674	1.3
Golf Course		0.7
Total	9439	4.0

Table 23 B	Business as Usual	(BAU) Potab	e Water Demand
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The Proponent propose as part of the development of a multi-use precinct to significantly reduce water consumption by incorporating water saving strategies including demand management (eg. water efficient fittings) and using recycled water, due to the onset of increasingly onerous water restrictions and in accordance with best practice environmental management.

A water balance to quantify the substantial reduction in potable water demand has been used to assess the overall water demands from the development.

The proposed water sources and uses are summarised below.

The water efficient initiatives proposed across the development includes the following.

- Water saving devices.
- Dual reticulation technology.
- Installation of rainwater tanks.
- Educating the residents and emphasising the importance of conserving water in the development.

Water Efficient Devices

The level of water efficiency of devices in homes and the commercial/industrial precincts will affect the water demand and the amount of wastewater generated. The Water Efficiencies Labelling and Standards Scheme is a national program which dictates compulsory water efficiency labelling performance standards to all household products that use water and aims to reduce urban water consumption in Australia.

The Proponent proposes to implement a number of water efficient devices to comply with relevant laws requiring certain fittings in new buildings to achieve a minimum specified level of water efficiency. Water efficient devices with the following labels will be installed throughout the development:

- 3 star showerheads;
- 4 star toilet suites; and
- 3 star tap aerators/flow regulators^{2.}

The reduction afforded by water efficient devices depends on the total amount of water used for various activities. Recent research identifies that the majority of water in a

² 3+ stars designates a fitting is water efficient with ratings varying from 1 star to 6 stars.



household is used, assuming a business as usual approach, in the toilet (32%), bathroom (32%) and laundry (23%) and as such water saving initiatives have focused on reducing potable water demand for these activities.

Water efficient fittings such as 3 star showerheads, 4 star toilet suites and 3 star aerators on tap fittings were estimated to reduce the development's water supply demand by 8%. The potable water supply demand is reduced to 3.6ML/day (including 0.7ML/day for golf course irrigation) based on a flow rate of 310L/EP/day with efficient fittings as the sole water saving initiative.

Dual Reticulation Technology

The potable water demand across the entire development can be significantly reduced with the installation of smart sewers incorporating recycled water for use in toilet flushing, irrigating gardens, sports fields, public space and the golf course.

The NEBP Integrated Water Management study prepared by GHD (2007) investigated the feasibility of a number of water recycling initiatives for the site, including greywater recycling, a Biowater network, and dual reticulation systems.

The analysis concluded that the use of dual reticulation technology using irrigation water sourced from the South Caboolture Water Reclamation Plant (WRP) is an acceptable water recycling initiative. This was due to the low risk of nutrient leaching and low impact on public health as recycled water from the South Caboolture WRP has a class A+ quality complying with stringent water recycling guidelines.

The nutrient export risk from irrigating recycled water has been assessed under the land Section 4.1.2.3 of this EIS.

The demand for recycled water due to toilet flushing is estimated at 54L/EP/day. A water balance study calculated the demands for irrigation, with 40% of total irrigation demand assumed to be for the golf course. The demand for recycled water was estimated at 2.3ML/EP/day.

The average potable water saving from the use of recycled water for irrigation equates to 114L/EP/day which compares to the CSC standard reduction of 110L/EP/day.

The use of recycled water in addition to water efficient devices significantly reduces the demand on potable water by 71% to 1.3ML/day across the entire development.

Rainwater Tanks

The installation of rainwater tanks to provide supplementary water supply to residential precincts has since become a common occurrence in South-east Queensland due to the implemented and enforced water restrictions. The advantages of rainwater are that they are publicly perceived as a natural, chemical free water source in addition to offsetting the detrimental effects of urbanisation on increasing flood levels and minimising stormwater flows from new developments.

Given that rainwater will generally contain leaves, dirt, detritus and bird and animal dropping it is considered that the quality is more suitable for non-potable sources such as garden irrigation, toilet flushing or for hot water systems.

It is proposed that mains water would be used to top up tanks once the water level in the tank went under the threshold value to ensure a reliable supply of water to the hot water systems, bathroom and laundry. Therefore to minimise the amount of mains water used



and to maximise the storage space for the next rainfall, a trickle top up system will be installed.

The estimated water saving from rainwater tanks for various residential precincts has been estimated and presented in Appendix W.

It is predicted that the weighted average water saving from installation and effective management of rainwater tanks throughout various residential development components is 68.9L/EP/day and for the business precinct, the substitution of potable water with rainwater was calculated as 28.3L/EP/day in the absence of specific data on type of businesses occupying premises and their water demand.

In short, with recycled water initiatives including the installation of water efficient devices and rain water tanks, the estimated potable water saving with rainwater tanks is 81% from the business as usual scenario.

The total the potable water demand has been reduced to 1.3ML/day with a demand for 2.3ML/day of recycled water which includes 0.7ML/day for golf course irrigation as shown in Table 24.

Land Use	Potable Water Demand (ML/day)	Recycled Water Demand (ML/day)
Residential	0.8	1.0
Non-residential	0.5	0.6
Golf Course	0	0.7
Total	1.3	2.3

Table 24 Average Total Water Demand

The benefits of rainwater tanks substituting potable water usage were not considered in the overall water demand calculations, however the yield from rainwater tanks across the development was determined to be approximately 0.7ML/day with the intention for rainwater usage in washing cloths, hot water systems and basins.

This means that less potable water will be consumed by the development than even the South-east Queensland's community level 5 water restriction targets of 140L/EP/day with an estimated average 77L/EP/day for residential precincts and 118L/EP/day for commercial/industrial precincts as shown in Table 25.

Table 25 Potable Water Consumption Rates

	Residential	Non-residential
Business as Usual	350	350
Non-residential	77	118

In summary the proposed water sources and uses across the development to achieve the water savings are tabulated in Table 26.



Table 26	Proposed	Water	Sources	and Uses

Alternative Water Source	Proposed Uses	
Class A+ recycled water supplied by South Caboolture WRP (and future Burpengary East WRP) using a dual reticulation system.	 Flushing toilets; Suitable industrial uses; and Irrigating gardens, sports fields, public space and the golf course. 	
 Rainwater tanks, including: 3,000 litre slimline tanks being installed in the smaller lots; 7,500 litre tanks being installed on each of the residences; A sub-surface 92,000 litre tank is installed at the resort; A communal 92,000 litre tank constructed below-ground to service all the apartments; and Some rainwater tanks in the industrial precinct 	 Washing clothes; Hot water systems; and Basins. 	
Cab Water Municipal Potable Water Supply	 Potable water uses (drinking and cooking); and Topping up the rainwater tanks. 	

Servicing Strategy

Previous CSC planning for the site has provided water supply infrastructure for industrial land uses located to the west of the site. However the increased scale and breadth of the development has necessitated additional infrastructure to appropriately service the entire development in addition to providing a recycled water trunk network across the site.

In short the demand for potable water due to the installation of water efficient devices, recycled water technologies and rainwater tanks throughout the development has significantly decreased with predicted sizing of potable water infrastructure based on a reduced rate of 142L/EP/day. This rate takes into account demand reduction arising from these water saving strategies.

The potable water supply trunk network has been developed maintaining the previously identified connection to Morayfield Low Level Water Zone. The existing water network in the region is presented in Appendix W.

The Morayfield Water Supply Zone is serviced from the Morayfield Reservoir Complex with boosted supply through the Morayfield Low Level Booster Pump. As there is no reticulation connecting the proposed development site to the existing potable water network, new infrastructure is proposed to progressively meet the demands for each development phase. The proposed water supply network is presented in Appendix W.

Several augmentations to the Morayfield Water Supply Infrastructure have been identified as part of the future planning works including increased Morayfield storage and booster pump capacity, and a number of pipeline augmentations in the area surrounding the development outline as shown in Appendix W.

The preliminary conceptual design of the potable water reticulation was undertaken with sizing of mains based on peaking factors and design parameters. This potable water network analysis assumed all fire flows demands through the NEBP are met utilising potable water as required by CSC. However the Recycling Water Guidelines supports fire



fighting with recycled water if there is adequate provisional pressure available in the recycled water system supplying the area.

The recycled water network proposed to achieve projected water targets of the NEBP is presented in Appendix W. CSCs South Caboolture WRP is located approximately 1 kilometre from the development and produces Class A+ recycled water for reuse in toilets, in water features as well as irrigation. Connections and timings are identified in this appendix.

As there is no reticulation connecting the proposed development site new infrastructure is proposed within and external to the site to progressively meet the demands for each development phase. There is potential for upsizing planned recycled water services to the area of Coach Road West in association with the development proposal.

Several augmentations have been identified as part of the future planning works including the construction of a dedicated pump station and rising main at the South Caboolture WRP.

Full recycled water demand projected for the NEBP is expected to outstrip the supply capacity of the South Caboolture WRP as development progresses and as such recycled water will be supplemented through a future connection with the Burpengary East Sewage Treatment Plant when upgrades are planned in 2009.

Recycled water will be supplied to the NEBP site from the South Caboolture WRP during Phases 1 and 2. The South Caboolture WRP currently produces approximately 9ML/day of Class A+ recycled water from a catchment of 37,500EP. Thereafter recycled water is proposed to be transferred back to the site from the Burpengary East WRP. However this can only occur once the plant is upgraded to produce an acceptable effluent quality. Whatever the source, recycled water from preliminary discussions with CSC will not be a site constraint.

The recycled water trunk network has been sized in accordance with appropriate supply standards and enables both residential and commercial/industrial usage, in addition to supplying the irrigation needs for the proposed golf course. A large on-site storage tank will be available for golf course irrigation demand and as such, peaking factors have been reduced.

The preliminary conceptual design of the recycled water reticulation network has been undertaken with sizing of mains based on peaking factors and design parameters including those advocated by the Queensland Water Recycling Guidelines.

The recycled water network will be aligned and staged in conjunction with the potable water network construction.

3.7.4 Stormwater Drainage

The proposed stormwater system and associated management represent best practice in environmental management and water sensitive urban design. Parsons Brinckerhoff has produced a Stormwater Management Plan and a MIKE21 Flood Study, which is attached as Appendix H1 and I respectively.

During the construction phase of the project, measures to minimise erosion and control sediment export from the site will be implemented. The measures will be designed using the Institution of Engineers Soil Erosion and Sediment Control Guidelines.

During operation of the development the proposed stormwater management measures for catchments are dependent on the land uses, catchment area and topography. Therefore, each catchment requires a unique treatment train. Treatment trains are a series of



stormwater treatment measures located in a catchment to provide a staged approach to removal of stormwater pollutants from runoff. The key measures include (but are not limited to) grass swales, bio-retention swales and constructed wetlands. The objective of the conceptual stormwater treatment design is to use the large areas of low lying floodplains for the location of large water quality treatment elements. These locations will need to be finalised in detailed design to ensure that they are suitably separate from the site's ecologically sensitive areas highlighted in previous studies.

The following outlines the treatment measures incorporated into the conceptual design.

- Swales (incorporating buffer strips) are used to convey stormwater and to remove coarse and medium sediment. They are included in most treatment trains to reduce pollutant loads. Swales can be incorporated into urban designs along streets, (within the median strip or footpaths), in parklands and between allotments where maintenance access can be preserved. Swales are typically at the upstream end of the treatment train.
- Bio-retention swales are located at the downstream end of a swale to provide efficient treatment through fine filtration, extended detention treatment and some biological uptake. They are particularly efficient at removing nitrogen and other soluble or fine particulate contaminants. They also provide conveyance.
- Constructed wetlands are shallow, extensively vegetated water bodies that use vegetation enhanced sedimentation, fine filtration and biological pollutant uptake processes to improve stormwater quality.

Undeveloped catchments do not require any treatment elements, but catchments with a large increase in impervious area require a number of treatment elements. The initial treatment for all land uses is the use of grass swales. Swales will drain via bio-retention devices into constructed wetlands. Treated stormwater will ultimately drain from the wetlands into the Caboolture River.

3.7.5 Sewerage

The proponent has commissioned an assessment of sewerage infrastructure requirements based to address infrastructure requirements specified in the ToR under Section 3.7.5

This section has been informed by the GHD (2007) report entitled Environmental Impact Assessment – Water Supply and Sewerage Systems for Northeast Business Park Pty Ltd, which is presented as Appendix W.

An EP is used as a standard unit for water demand. One EP represents the average use of water by a typical person in a residential setting over the long term and has been estimated in accordance with CSC's Planning Scheme Policy 22 *Water Supply and Sewerage Infrastructure Contributions*.

Sewerage demand has been estimated based on the population projections of the NEBP that total 9779 Equivalent Persons (EP). This total EP is made up of 2759 EP within the district industry precinct, 1100 within the community precinct and 5910 within the residential precinct. These population projections are for the entire development and will be staged that has been nominally grouped to occur over the following phases:

- Phase 1: 2008-2011 Development Horizon;
- Phase 2: 2011-2016 Development Horizon;
- Phase 3: 2016-2021 Development Horizon; and
- Phase 4: 2021-2025 Development Horizon.



Phase 1 of the development is expected to have a total EP loading of 1000EP with no allowance for residential development. Phase 2 has an expected loading of 4250EP with the addition of further business park development, marina construction and operation including marina village residences, and residential lots. Phases 3 and 4 includes the development of the remaining residential lots and apartment/villa properties, the final stages of the business park and the construction of a 120 room resort having an expected loading of 2830 EP and 1360 EP respectively.

The sewage loads based on the EPs for a business as usual approach using the nominated average dry weather flows (ADWF) adopted by CSC Contribution Policy for infrastructure planning is 240L/EP/day which corresponds to a total average sewage flow of 2.3ML/day across the development. The peak wet weather flows (PWWF) have been calculated as 5 x ADWF.

Land Use	Sewer EP	Total BAU Demand (ADWF) (ML/day)	Total BAU Demand (PWWF) (ML/day)
Residential	5910	1.4	7
Non-residential (District Industry and Community Precincts)	3869	0.9	4.5
Total	9779	2.3	11.5

Table 27Business as Usual (BAU) Sewage Flows

The proponent proposes as part of the development of a multi-use precinct to significantly reduce water consumption and therefore sewerage flows due to onset of increasingly onerous water restrictions and in accordance with best practice environmental management.

The water efficient initiatives proposed in Section 3.7.3 of the EIS and utilising smart sewers will also reduce peak sewage flows to an average total sewage ADWF from 2.3ML/day to 1.9ML/day based on a reduced flow rate of 204L/EP/day. The PWWF has been calculated as 3 x ADWF.

Table 28 Proposed Smart Sewer Flows

Land Use	Total ADWF (ML/day)	Total PWWF (ML/day)
Residential	1.2	3.6
Non-residential (District Industry and Community Precincts)	0.8	2.4
Total	1.9	5.7

Servicing Strategy

Previous CSC planning for the site has provided sewerage infrastructure for industrial land uses located to the west of the site. However the increased scale and breadth of the development has necessitated additional infrastructure to appropriately service the entire development, in addition to providing potable and recycled water trunk networks across the site.



The sewerage trunk network has been developed maintaining the previously identified connection to the South Caboolture Sewage Treatment Plant (STP). The existing sewerage network within the region is presented in Appendix W.

As the development is proposed to generate ADWF in a greater capacity that the receiving South Caboolture STP, the Burpengary East STP located approximately 5 kilometres south-east of the site is proposed to service part of the ultimate development.

The proposed sewerage network presented in Appendix W involves dividing the development into essentially two distinct catchments associated with the received STP. The western catchment discharging to South Caboolture STP encompasses the industrial precinct and will be the first connected to CSC's system in accordance with the planned phases of development. This however will require forward planning of connecting infrastructure to meet the proposed timing for connection of the development.

The entire residential precinct and commercial and marine precincts will discharge flows from the eastern catchment to the Burpengary East STP.

New infrastructure has been designed in accordance with the minimum levels of service outlined in the relevant CSC and DNRW guidelines.

Smart sewers are proposed as the centralised sewerage collection system due to the low lying ground and high groundwater levels. Smart sewers are specifically designed to limit the amount of groundwater and stormwater inflow and infiltration into the wastewater collection network and therefore reduce the amount of operational maintenance. Concurrently greenhouse gas emissions are reduced as the water treatment plant receives a reduced sewage load.

Due to low lying areas, a number of internal lift stations will be required throughout the site to enable adequate peak wet weather servicing.

3.7.6 Telecommunications

The EIS Terms of Reference (ToR) has requested a description of "any impacts of the project on existing telecommunications infrastructure (such as optical cables, microwave towers, etc) and identify the owners of that infrastructure".

The project Proponent engaged the services of Lectel Pty Ltd to undertake an assessment of the potential impacts on existing telecommunications infrastructure in the subject area as well as the telecommunication infrastructure needs of the proposed development, which include telephone, internet, mobile, free to air and pay television services.

Telstra are currently mandated to provide a copper cable telephone network (PSTN), free of charge to the developer (excluding trenching and any civil headworks costs). Although the PSTN will be full-owned by Telstra, other service providers are able to resell their services to NEBP across the Telstra-owned PSTN network. An alternative to PSTN is an optic fibre network which can be purchased, at a cost, from Telstra "Smart Community". As with any development, the proponent is able to procure private telecommunication optic fibre network options from other carriers such as Uecomm/Fujitsu and Pivit.

All telecommunications infrastructure will be installed underground on the road reserve throughout the development and will be jointed within in-ground pits. Some trenching may be required leading up to the development. Telstra infrastructure plans indicate that adequate existing conduits and optic fibre cable is readily available in the vicinity of the proposed development.



The proposal area is expected to receive adequate mobile phone coverage from Telstra, Optus and Vodafone repeater stations which are situated along the highway, including wireless data coverage from existing base stations. The proposal area is also located within the Austar satellite digital pay TV footprint for pay TV services.

The proponent will likely install both a private optic fibre telecommunications service as well as Telstra copper networks throughout the development. As identified by Lectel, the rationale for installing both networks includes:

- control over delivery of rapidly changing technology;
- greater variety of services offered;
- flexibility of options to manage operation and billing;
- ability to integrate with other utilities and services within the development;
- customisation of network and content unique to NEBP; and
- access to Telstra services (including analogue data such as EFTPOS).

Regardless of the selected service provider or the network option, the impact assessment concluded that no environmental impacts are expected to occur by extending telecommunication services to the NEBP or any subsequent reticulation.

3.7.7 Other infrastructure

Site Construction Compound

A Site Construction Compound will be established prior to commencement of construction. The fenced Site Construction Compound will be approximately two to three hectares and will provide a central hub for:

- managing construction activities;
- provision of on-site security;
- storage of equipment and building materials;
- construction vehicle parking; and
- first aid and training facilities.

Other facilities to be provided within the Site Construction Compound include:

- gatehouse;
- lunchrooms;
- change rooms; and
- amenities block.

No overnight accommodation for the construction workforce will be provided on site. Construction workers will utilise the existing housing market in the area or commute from Brisbane or the Sunshine Coast.

On site mobile servicing will be conducted to minimise off-site machinery movements, therefore, a permanent motor vehicle workshop will not be developed during the construction phases. Where on-site servicing will be carried out pollution control methods will be utilised, such as temporary bunding, access to spill absorbent material and emergency response equipment.



Fuel Storage Areas

The types and quantities of dangerous goods that are known to be stored within the development are summarised in Table 29, below.

Product Name	Proper Shipping Name (if DG)	UN Number (if DG)	Class/Type	PG	Quantity (Litres)
Construction P	hase				
Diesel fuel	Diesel fuel N.O.S.	1202	Combustible liquid C1 (flashpoint not greater than 150 ^o C)	N/A	50,000
Operational Ph	nase - Marina				
Unleaded petrol	Motor spirit	1203	Class 3 Flammable Liquids	PG11 (medium danger)	20,000
Diesel fuel	Diesel fuel N.O.S.	1202	Combustible liquid C1 (flashpoint not greater than 150 ^o C)	N/A	50,000

 Table 29
 Known Dangerous Goods Stored within the Development

In the case of the construction phase, diesel fuel will be stored in an aboveground tank that will be bunded with a containment capacity of 100% of the total fuel volume. In the case of the marina, it is proposed to store the diesel and unleaded petrol in underground fuel storage tanks.

All fuels will be managed in accordance with AS 1940:2004 - *The Storage and Handling of Flammable and Combustible Liquids.*

The storage of fuel within the marina will trigger Large Dangerous Goods Location (LDGL) notification to the Chief Executive Officer of the Department of Emergency Services, in accordance with the DGSM.

3.8 Waste Management

A key component of environmental protection is the management of waste. Waste, if mismanaged, has the potential to cause environmental harm or, when disposed, may constitute a resource loss. Strategies to minimise the production of waste and improve the beneficial use of materials that would otherwise be wasted have been considered.

3.8.1 Character and Quantities of Waste Materials

The exact nature of industries within MIBA are unknown and therefore a more detailed assessment of wastes and emissions produced from the occupants cannot be undertaken at this stage. However, the typical industries and business identified to occupy MIBA include:

- Marine industries;
- Biotech (including the pharmaceutical sector);



- Information and Communication Technology; and
- Logistics/Warehouses.

Other industries and businesses which could also be considered as being suitable for the MIBA include aviation and food related industries.

Prior to any business commencing operation within the NEBP development that produces waste and air emissions outside those already listed in the EIS an assessment of their waste and air emissions will be conducted. The results of the assessment shall be reviewed by the Body Corporate prior to the signing of any contract of sale or lease agreement.

The vision of the NEBP does not include "Special Industry" businesses which may be hazardous, noxious or offensive and that require separation from more sensitive land uses.

3.8.1.1 Waste Management Hierarchy

NEBP will utilise the waste management hierarchy to guide design and implementation choices in all phases of the project development and operation. Some measures will apply across the hierarchy, such as:

- design of site development, infrastructure, and guidelines for buildings;
- training in construction environmental best practices for construction contractors and their employees;
- environmental best practices for commercial and industrial firms, the marina, golf course, and other precincts; and
- covenants, restrictions, and regulations placed upon the different precincts.

Waste Avoidance

Waste avoidance may be achieved by preventing or reducing the amount of waste generated by an activity through process or product redesign or substitution of raw materials. In NEBP construction and operations waste avoidance and minimization practices will include the following.

- High performance design principles will seek efficient use of all resources in the development process and in the lifecycle of the buildings and infrastructure.
- Efficient use of non-renewable resources including improved equipment use.
- Accurate estimation of raw material quantities to avoid excessive unused materials requiring disposal.
- Selection of materials on the basis of waste minimisation (quantity of packaging etc).
- Installation of resource efficient appliances and fittings to reduce operational waste.
- Alternatives to plastic bags will be provided at retail outlets.

Waste avoidance provides the greatest opportunity for limiting waste during construction and operation of the development.

Waste Reduction

Waste reduction can be implemented during design, construction and operation. Opportunities for waste reduction during the design of the buildings and the construction methodology employed shall consider the following measures.

• Retention of vegetation during design and construction.

- Project management control during construction.
- Management of estimating and ordering, such as material ordering, delivery, placement and tracking of materials.
- Implementation of supplier and service provider contracts which focus on environmental performance, such as "just in time" ordering of construction materials and supplies, reduction in packaging materials.
- Reduce toxic materials risks through material substitution.

Waste Reuse

Waste reduction will be implemented during design, construction and operation. Opportunities for waste reduction through the design of the buildings and construction best practices will include the following measures.

- Project management control during construction.
- Management of estimating and ordering, such as material ordering, delivery, placement and tracking of materials.
- Implementation of supplier and service provider contracts which focus on environmental performance, such as "just in time" ordering of construction materials and supplies, reduction in packaging materials.
- Reducing toxic materials risks through material substitution.
- Retention of vegetation, when feasible, during design and construction.

Waste Recycling

Waste recycling refers to the reprocessing of waste materials to produce new products. Materials should be selected on the basis of recyclability including end-of-life recyclability. Opportunities for waste recycling may include the following measures.

- Materials salvaged and reused where possible.
- Purchasing recyclable or recycled materials.
- Separation and collection of recyclable materials.

All wastes unable to be reused on site will be transferred to the Transfer Station at the Caboolture landfill on McNaught Road, Caboolture where they will be sorted into re-usable, recyclable and waste disposal streams. The Caboolture landfill also has a "Recycling Shop".

There are options for recycling of waste stream elements at the development during construction. There is the potential for reuse or re-milling of timber materials collected from construction sites. Timber may also be reused onsite or chipped for use in landscaping.

Operators of the development may encourage waste reuse and recycling through provision of waste separation facilities and collection of recyclable materials. This element of the waste hierarchy provides the greatest opportunity for limiting waste during construction and operation of the development.

Cleaner Production

The EPP Waste defines 'Cleaner Production' as program to identify and implement ways of improving a production process so that the process:

• uses less energy, water or another input; or



- generates less waste; or
- generates waste that is less environmentally harmful.

Opportunities for cleaner production and best practice waste management techniques may include the following measures.

- Support to commercial and industrial firms to incorporate cleaner production in all aspects of their operations, as well as their physical facilities.
- Sustainable building principles incorporated into the design controls and guidelines for development of each lot.
- Selecting renewable resources for construction materials, where possible.
- Including a proportion of renewable fuel sources for construction vehicles, plant and equipment.
- A network of pedestrian and cycle pathways will be provided to reduce the reliance on motor vehicle transport.
- Reuse of greywater will be conducted on large lots.
- Treated effluent from the nearby Sewage Treatment Plant will be polished to class A and A+ standards for reuse in irrigation of open space areas and approved uses via a dual reticulation system.
- Golf course irrigation water will be entirely sourced from treated effluent.
- Packaging and environmental measures will be used as a selection criterion for suppliers.
- Colour-coded and/or labelled wheelie bins will be used for recyclable waste streams such as paper, cardboard and aluminium cans.
- Waste storage and recycling areas will be located and designed to complement the streetscape.

Sustainable building principles will promote self sufficiency at the household, community and commercial level by maximising water and energy efficiency and minimising waste generation throughout the lifecycle of each building.

Waste Disposal

Waste disposal refers to the final deposit of waste when the material is of no further use. This may include disposal to landfill. This is considered the least preferred and final option for the management of waste and should only be used where the waste cannot be otherwise reused or recycled.

Waste for disposal will be collected and transported, using appropriately licensed waste contractors, and deposited at the Caboolture landfill, on McNaught Road within the Caboolture Shire. The landfill is less than 10 kilometres from the site.

3.8.1.2 Waste Streams

Due to the staging of the development over a 10-12 year period construction and operational waste will be generated simultaneously.

Typically domestic waste comprises approximately 50% of the volume of waste generated and disposed to landfill, construction and demolition waste consists of 25% of waste generated and the remaining 25% of waste streams are re-usable and/or recyclable.



Construction Wastes

Whenever feasible, construction will include the use of modular components, purchase of materials cut to standard sizes or pre-fabricated materials to reduce the need for off-cuts. Material choices for building construction shall include a proportion of renewable or recyclable components, although use of renewable and recyclable components shall not compromise the construction of the buildings in accordance with the relevant development codes and the Building Code of Australia.

Construction site disturbance will be limited to minimise unnecessary excavation and removal of vegetation. It is anticipated that a neutral surplus of fill will result. If however, there is surplus fill it will be used for topsoil during landscaping. Landscaping for the development will utilise mulch from the native vegetation removed during site preparation.

Separate skip bins will be provided within the construction site compound to facilitate waste segregation and maximise economic reuse and recycling.

Contracts for builders and suppliers shall include an environmental performance component. Contractors and suppliers will have to pre-qualifying for tendering based on environmental performance and consideration of potential environmental impact of supplying the material or good. Builders and suppliers shall also be required to identify the source of the material or good, seek to provide alternatives and not just automatically use new materials, provide options for pre-fabrication, minimize packaging materials and access to "just in time" ordering.

Construction project management is also important for managing waste streams. For example, works scheduling organising trades, material delivery and placement, construction site compound layout and organisation can contribute to effective reuse and minimisation of wastes.

Plastic waste will be kept to a minimum with alternatives to plastic being a selection criterion for suppliers delivering materials for construction. For example when feasible, requisitions will order metal strapping instead of plastic wrapping or shrink wrap. Any plastic waste generated will be recycled, where possible.

Fuel storage will be kept to a minimum and will be used for refuelling of equipment during construction. Storage and handling of fuels will be conducted in accordance with 'AS 1940 – 2004 The storage and handling of flammable and combustible liquids'. Where possible, a proportion of the fuel used in the construction vehicles, plant and equipment shall include renewable fuels and/or ethanol based fuel.

Capital dredging of the navigation channel in the Caboolture River will be conducted during construction. Approximately 545,000m³ of dredge spoil will be generated. The dredge spoil shall be treated for PASS and used as fill within the NEBP development, on Lot 24 on Plan SP158289. The dredge spoil disposal area is approximately 51 hectares in size.

Tailwater from the dredge spoil area will be produced during dredging activities. The tailwater treatment system will include a series of treatment ponds to be constructed within the dredge spoil disposal area on Lot 24 on Plan SP158289. The tailwater treatment system will enable further settlement of sediment from the tailwaters. The water will be tested, and treated if necessary, to ensure the required water quality parameters are met, prior to being released to the receiving environment, namely the Caboolture River.

Any construction waste that cannot be recycled or reused and requires disposal, will be transported to the Caboolture landfill. A waste acceptance agreement must be sought from the Landfill Manager prior to dispatch of waste from the site. Records of approval will be



kept on file as part of the recording requirement of the Waste Management Plan (refer to section 6).

An inventory of wastes likely to be generated during the construction of the development is outlined in Table 30 below. Actual waste estimates are approximate and may vary from that anticipated.

Waste Description	Anticipated Waste Volume Generated (% of total materials ordered, or otherwise specified)	Waste Storage	Waste Management Technique	Frequency of Collection
Fill and soil (not contaminated)	Cut volume 4,304,939m ³ Fill volume 3,744,951m ³	Dedicated stockpile location at each stage of construction located away from overland flowpaths and near the construction site compound.	Reused on the site where possible.	As required.
Fill and soil (contaminated)	Approximately 20m ³ of material has been identified as potentially contaminated due to past activities such as dipping cattle, underground fuel storage and illegal waste disposal.	Dedicated stockpile located away from overland flowpaths.	Disposal destination to be specified in the Disposal Permit issued under the conditions of the Contaminated Land section Chapter 7, Part 8 of the EP Act.	As per Disposal Permit.
Capital dredge spoil and tailwaters	545,000m ³	Dredge spoil shall be transferred directly from the Caboolture River to the disposal location within the NEBP development, on Lot 24 on Plan SP158289.	Treated for potential ASS and used as fill within the NEBP development, on Lot 24 on Plan SP158289. The disposal area is approximately 51ha in size. Tailwater from the series of tailwater treatment ponds will be discharged to	Capital dredging works over a 21 month period.

 Table 30
 Inventory of Solid and Liquid Wastes Produced on Site during Construction



Waste Description	Anticipated Waste Volume Generated (% of total materials ordered, or otherwise specified)	Waste Storage	Waste Management Technique	Frequency of Collection
			the Caboolture River following settlement, testing and treatment if required.	
ASS	To be validated during monitoring.	Dedicated stockpile location at each stage of construction located away from overland flowpaths, in accordance with the ASSMP	On site treatment and reuse as fill.	As required.
Groundwater seepage during excavation	Not known	Will be treated in situ and discharged	Treated for potential acidity and water quality objectives, in accordance with the ASSMP and CEMP.	As required.
Timber	5%	Storage bay with separation of reusable materials from wood scrap.	Timber off cuts to be reused onsite where possible, otherwise will be transported and processed at the Waste Transfer Station at Caboolture landfill, ideally for reuse in other construction. Scrap wood could be shredded for composting on site.	Weekly during construction.
Vegetation	47,000 m ²	Dedicated green waste storage bay in construction site compound.	Mulching for reuse on site as landscaping material.	As required.



Waste Description	Anticipated Waste Volume Generated (% of total materials ordered, or otherwise specified)	Waste Storage	Waste Management Technique	Frequency of Collection
Scrap metal	3-5%	Metal recycling skip bin in construction site compound.	Metal recycling contractor off site.	Weekly during construction.
Cable and wire	1%	Metal waste segregated into metal recycling skip bin. Plastic waste segregated into dedicated plastic skip bin. Other waste not capable of reuse or recycling to placed in the general waste skip bin within the construction site compound.	Metal Recycling Contractor off site. Plastic Recycling Contractor off site. Other waste disposed to Caboolture landfill.	Weekly during construction.
Concrete, bricks, tile and rubble	5-20%	Dedicated construction waste skip bin within the construction site compound.	Disposal to Caboolture landfill or ground for aggregate.	Weekly during construction.
Plasterboard	5-20%	Dedicated construction waste skip bin within the construction site compound.	Reused on site, where possible or disposed of at Caboolture landfill.	Weekly during construction.
Packaging wastes, plastic, glass and timber	5%	Separate skip bins provided for plastic, glass and timber within the construction site compound.	Recycled off site.	Weekly during construction.
Domestic and general waste, incl. organic and food waste	52%	Dedicated general waste skip bins within the construction site compound.	Disposal to Caboolture landfill.	Twice weekly during construction.
Domestic wastewater	140 litres per Equivalent Person (EP), per day ¹ .	Licensed waste contractor until tertiary sewage treatment plant	Treated effluent will be polished to class A and A+ for reuse in	Continuous.



Waste Description	Anticipated Waste Volume Generated (% of total materials ordered, or otherwise specified)	Waste Storage	Waste Management Technique	Frequency of Collection
		is constructed and operational.	irrigation and approved uses via a dual reticulation system. Greywater will be reused on large lots.	
Contaminated stormwater runoff	Dependant on rain event.	Stormwater containment and treatment devices.	Containment, treatment and release as per Stormwater Management Plan.	Following a rain event.
Diesel and other fuels	Diesel storage up to 50,000 litres and Unleaded petrol storage up to 20,000 litres.	Bunded drum store within construction site compound.	To be collected, transported and recycled by a Fuel Recycling Contractor off site.	Monthly during construction.
Paints and other chemicals	1%	Bunded drum store within construction site compound.	To be collected, transported and disposed of by an EPA licensed waste contractor off site.	As required.
Water collected in waste storage and bunded areas.	Dependant on volume of bund.	Bunded area	Treatment to water quality objectives outlined in CEMP and then discharged, otherwise collection by an EPA licensed waste contractor.	Following a rain event.

¹ Source: AS/NZS 1547:2000 On-site domestic wastewater management.

Operational Wastes

Domestic and general waste will be the largest waste stream generated during operation of the development. The remaining wastes streams generated include recyclable wastes such as paper, cardboard, plastics, glass, metals and organic waste.

Colour-coded and/or labelled wheelie bins will be provided to segregate and collect these wastes streams. These bins will be located at temporary waste compounds to be designed and located at each residential lot, marina, hotel, golf course, commercial, retail and



industrial business. These temporary bin compounds will be designed and located to ensure that they are easily accessible from each part of the building and from the collection point and includes adequate access and manoeuvring space, at least an area equivalent to the combined footprint of the bins.

Plastic waste will be kept to a minimum and retail outlets will be encouraged to supply alternatives to plastic bags, such as biodegradable or cotton bags. Any plastic waste generated will be recycled, where possible.

Based on siltation modelling of the Caboolture River conducted in November 2007 by Cardno Lawson and Treloar minor maintenance dredging will be required every two years at some locations in the navigational channel in the Caboolture River. The minor dredging will generate approximately 40,000m3 of dredge spoil. Dredging of the entire navigational channel will be required every two to five years and will generate dredge spoil totalling 220,000m³.

The dredge spoil location for maintenance dredging up to approximately 2017 (Construction Stage 9) will be a 51ha area on Lot 24 on Plan SP158289, which will be used for residential purposes, and is designated as Residential East 3(2) area on the proposed Development Plan.

The dredge spoil disposal area identified above provides for at least two episodes of maintenance dredging. During this period, an understanding of the quantity and characteristics of dredge material will be gained and this will allow appropriate designation of a longer term maintenance spoil disposal location ensuring effective and low risk treatment and management. This strategy for planning for long term disposal of dredge spoil is consistent with government initiatives to investigate alternative long-term spoil disposal options in Southeast Queensland.

Use of hazardous chemicals will be minimal, however, some pesticides and other chemicals may be used during maintenance of the golf course and other open space areas, as part of municipal duties to be undertaken by the Operator of the development. Storage and handling of hazardous and other chemicals will be in accordance with the relevant Australian Standard.

An inventory of wastes likely to be generated during the operation of the development is outlined in Table 31 below. Actual waste estimates may vary from that anticipated.

Waste Description	Anticipated Waste Volume Generated	Waste Storage	Waste Management Technique	Frequency of Collection (during normal operation)
Domestic and general waste	1.05 tonnes per person, per annum ¹	Individual general waste bins at each residence, business and at temporary bin compounds at commercial and tourist sites.	To be collected and transported to Caboolture landfill by the approved Council waste contractor.	Weekly.
Organic and food waste		Promotion of composting at individual residence/premises, where feasible.	On site reuse as landscaping material & soil conditioners.	As Required.

 Table 31
 Inventory of Solid and Liquid Wastes Produced on Site during Operation



Waste Description	Anticipated Waste Volume Generated	Waste Storage	Waste Management Technique	Frequency of Collection (during normal operation)
Maintenance dredge spoil and tailwaters	40,000m ³ every two-three years. 200,000m ³ every five years.	Dredge spoil shall be transferred directly from the Caboolture River to the disposal location within the NEBP development, on Lot 24 on Plan SP158289 until approximately 2017. After which an alternative dredge spoil disposal location will be identified in accordance with the current policies and guidelines prepared by the State government.	Treated for potential ASS and used as fill within the NEBP development, on Lot 24 on Plan SP158289. The disposal area is approximately 51ha in size. Tailwater from the series of tailwater treatment ponds will be discharged to the Caboolture River following settlement, testing and treatment if required.	Minor dredging at some location in the Caboolture River navigation channel every two-three years, with the entire navigational channel being dredge every five years.
Green waste	Not known	Storage locations provided within each precinct.	To be mulched and reused on site, where feasible. Alternatively, it will be collected and transported to the green waste facility at Caboolture landfill's Waste Transfer Station.	As required.
Domestic wastewater	140 litres per EP, per day ²	South Caboolture Sewage Treatment Plant.	Treated effluent will be polished to class A and A+ for reuse in irrigation and approved uses via a dual reticulation system. Greywater will be reused on large lots.	Continuous.



Waste Description	Anticipated Waste Volume Generated	Waste Storage	Waste Management Technique	Frequency of Collection (during normal operation)
Metals	0.75 tonnes of domestic recyclable waste per person, per annum ¹	Dedicated metal recycling bins at various locations within the development, especially within the marine industry area and MIBA.	Recycling contractor off site.	Fortnightly, or as required.
Plastics		Domestic recycling bin provided at each residence/premises. Non-domestic recycling bin(s) provided within each precinct.	To be collected and transported to the Waste Transfer Station at Caboolture landfill by a licensed waste contractor.	Fortnightly, or as required.
Glass		Domestic recycling bin provided at each residence/premises. Non-domestic recycling bin(s) provided within each precinct.	To be collected and transported to the Waste Transfer Station at Caboolture landfill by a licensed waste contractor.	Fortnightly, or as required.
Paper and cardboard		Domestic recycling bin provided at each residence/premises. Non-domestic recycling bin(s) provided within each precinct.	To be collected and transported to the Waste Transfer Station at Caboolture landfill by a licensed waste contractor.	Fortnightly, or as required.
Diesel and other fuels	Marina fuel storage not more than 100,000 litres.	Storage in bunded storage areas within the marine and commercial precincts.	Commercial quantities to be collected by a recycling contractor. Household quantities to be transported to the oil recycling container provided at the Waste Transfer Station, in the Caboolture landfill.	As required.



Waste Description	Anticipated Waste Volume Generated	Waste Storage	Waste Management Technique	Frequency of Collection (during normal operation)
Hazardous and other chemicals	Not known.	Storage in bunded storage areas within MIBA, marine industry and commercial precincts, resort/hotel, and golf course.	To be collected and transported off site by a licensed waste contractor.	As required.
Electrical and electronic equipment (E- waste)	Not known.	Dedicated e-waste bin within the residential, MIBA and commercial precincts.	Recycled and re- manufactured off site by a licensed waste contractor.	Annually, or as required.
Marina wastes (sewage and bilge water pump out facilities)	Dependant on throughput.	Storage tank provided at the marina.	To be emptied by an appropriately licensed waste contractor.	Not less than weekly, or as required during busy periods.
Contaminated stormwater runoff	Dependant on rain event.	Stormwater containment and treatment devices.	Containment, treatment and release as per Stormwater Management Plan.	Following a rain event.
Water collected in waste storage and bunded areas	Dependant on volume of bund.	Bunded area	Treatment to water quality objectives outlined in the Marina SBMP and then discharged, otherwise collection by an EPA licensed waste contractor.	Following a rain event.

¹ Source: Australian Bureau of Statistics (4613.0 – Australia's Environment: Issues and Trends, 2006).

² Source: AS/NZS 1547:2000 On-site domestic wastewater management.

3.8.2 Air Emissions

More information on the types of air emissions and emission rates are identified in Section 4.6 of the EIS.

Construction

Construction of the NEBP infrastructure and buildings has the potential to cause elevated levels of dust if it is not appropriately managed. The relatively high wind speed nature of the



site increases the potential for elevated dust levels, and therefore dust minimisation and management strategies should be implemented from the commencement of construction.

Developing the NEBP will involve the cut and fill of approximately 4.3 million and 3.7 million tonnes of material, respectively, from the site which will be redistributed to other parts of the site.

Deposition of particulate matter can result in dust nuisance and reduced public amenity, for example due to soiling of clothes, building surfaces and other surfaces. This is most commonly an issue during construction activities. The main activities of each construction phase which are likely to cause adverse dust emissions to neighbouring residential areas include:

- bulldozing;
- scrapers removing topsoil;
- scrapers unloading topsoil;
- loading of excavated material;
- wheel generated dust due to transport of material from cut area to fill location;
- dumping of fill material;
- compacting; and
- wind erosion of exposed areas and stockpiles.

Operation

The main attributor to air pollutants and dust emissions during the operational stage will be from the Marine Industry precinct. This area will incorporate a shipyard with a travel lift, abrasive blasting, specialist paint and maintenance activities, and a refuelling station. The high frequency of light winds from the south-west may transport fugitive releases of odours or exhaust emissions from the Marine Industry precinct to the north-east of the site.

Activities such as spray painting, abrasive blasting, fibre glassing and refuelling have the potential to emit odorous and noxious compounds that could cause nuisance at neighbouring residential areas. A development permit and registration certificate will be issued for these ERAs and will include conditions to ensure that no offensive odours or elevated pollutant levels occur beyond the boundary of the facility or at the surrounding residences.

Air pollutants from predicted traffic volumes of the operational phase have also been assessed by Katestone Environmental Pty Ltd (Katestone). Roads within the District Industry zone of the NEBP are likely to carry a higher proportion of heavy vehicles due to the nature of the tenancies. Emissions from vehicles idling and accelerating generate elevated levels of air pollutants, notably particulate matter.

It is expected that approximately 62,842 vehicles per day will access the site. Separation distances which will exist between traffic areas within the NEBP and existing/proposed buildings will ensure that adjoining sensitive areas are not affected by environmental nuisance from air pollutants. To ensure the nearest residences are not unduly impacted by emissions from traffic, the minimum separation distance between the NEBP roads and the residences is 4 to 10 metres.

Other sources of air emissions could greenhouse gases from maintenance of gardens, lawns and the golf course, potential odour from effluent irrigation and emissions from air conditioning units and cooling towers.



More detail on the impacts and mitigation measures relating to air emissions is provided in Section 4.6 of the EIS.

3.8.3 Solid Waste Disposal

Construction

All wastes will be segregated and stored according to waste streams within the construction site compound before their transport to the CSC owned landfill at McNaught Road, Caboolture. The landfill is less than 10 kilometres from the site and is capable of handling domestic and general waste from the development.

The Caboolture landfill is capable of accepting construction and demolition wastes and provides recycling opportunities at the Waste Transfer Station and Recycling Shop at the landfill. Alternatively there are licensed waste collectors in the region that can collect, segregate and recycle most waste streams generated during the construction of the proposed development.

No burial of wastes will be conducted on site. Any solid waste that can not be reused or recycled on site, and that is not hazardous or considered regulated under Schedule 7 of the EP Regulation, will be transported to the Caboolture landfill.

Operation

All wastes will be segregated and stored according to waste streams at the temporary bin compounds before their transport to the Waste Transfer Station and landfill at Caboolture. All wastes will be segregated and stored in colour-coded and/or labelled bins according to waste streams at this facility.

Each residential lot will be provided with a 140 litre wheelie bin for general refuse and a 240 litre wheelie bin for recyclables, such as paper, cardboard, aluminium cans and glass. Residential lots will be serviced by a kerbside collection where general refuse will be collected weekly and recyclables collected fortnightly. Apartment buildings will have collection and storage areas for household deposit.

Commercial and industrial premises will need to enter into a waste arrangement with a licensed waste contractor for collection and disposal of general waste. Each business will be responsible for their own waste management.

No burial of wastes will be conducted on site. , Any solid waste that can not be reused or recycled on site, and that is not hazardous or considered regulated under Schedule 7 of the EP Regulation, will be transported to the Caboolture landfill.

3.8.4 Liquid Waste

Liquid waste streams generated during construction and operation of the development are provided in Table 30 and Table 31 of Section 3.8.1, including the waste management technique.

Liquid Waste Reuse

Domestic wastewater treated to Class A+ recycled water standards will be supplied by the South Caboolture Water Reclamation Plant (WRP), and in the future the Burpengary East WRP, using a dual reticulation system. Reuse options of the recycled water will be for flushing toilets; in industrial processes where the water is suitable for use and for irrigating gardens, sports fields, open space and the golf course.



Opportunities for liquid waste reuse will also be investigated between businesses and industries within the development, in accordance with the principles of Industrial Ecology provided in the Waste Management Technical Report (Appendix Y2) and Section 3.1.4 of the EIS.


4. ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS

4.1 Climate

Katestone provided a description of the meteorology of the area in its technical report titled Air Quality Assessment of the Proposed Northeast Business Park, Caboolture (October, 2007). This report is attached as Appendix O.

The nearest meteorological station to the NEBP is the Queensland EPA's Deception Bay monitoring station situated 10 kilometres to the southeast of the NEBP. Records of wind speed and wind direction at this monitoring station commenced in January 1995.

The nearest long-term record of climatic conditions is available from the Bureau of Meteorology station at the Brisbane Airport, approximately 30 kilometres southeast from the NEBP. An automatic weather station capable of recording half-hourly average wind speed, direction, temperature, dewpoint, relative humidity and pressure was installed in July 1994.

The average maximum and minimum temperatures for each month as well as the average monthly temperature is illustrated in Table 32 below. The hottest 1-hour average temperature recorded between 1992 and May 2007 was 40.2°C in February 2004. The coldest 1-hour average temperature recorded between 1992 and May 2007 was 1.6°C in July 2002. Relative humidity is the highest in June averaging 70% and lowest in September average 58%. Atmospheric pressure varies throughout the year with higher averages occurring in winter. The highest monthly average rainfall occurs in summer in December with 131 mm. The lowest monthly average rainfall occurs in winter with the lowest average of 26.4 mm occurring in July.

Month	Average temperature (^o C)	Average relative humidity (%)	Average air pressure (hPa)	Monthly average rainfall (mm)
January	24.9	73.0	1012	120.9
February	24.9	73.9	1013	111.2
March	23.6	73.9	1015	80.6
April	21.0	74.4	1019	56.6
Мау	17.9	74.0	1019	119.2
June	15.5	73.5	1020	63.0
July	14.5	70.2	1021	26.1
August	15.6	69.4	1020	37.0
September	18.5	70.0	1019	33.5
October	20.7	70.4	1016	71.9
November	22.1	71.7	1016	105.9
December	23.9	72.1	1013	131.1

Table 32Monthly averages for temperature, relative humidity, atmospheric pressure
and rainfall from July 1994 to May 2007.

Source: Katestone 'Air Quality Assessment of the Proposed Northeast Business Park, Caboolture' (October, 2007)



Data was collected at the Brisbane Airport (BoM) and Deception Bay (EPA) monitoring stations for the period July 1994 to May 2007 and January 1995 to August 2005, respectively.

Light to moderate southwesterly winds dominate in the early morning at Deception Bay, before strengthening during the day and becoming northeasterly and east-southeasterly winds signalling the arrival of the seabreeze. In the evening winds become lighter. At both monitoring stations moderate to strong northeasterly and east-southeasterly winds dominate in summer and spring. Light to moderate southwesterly winds prevail in spring and winter.

4.1.1 Flooding

The Planning Scheme states that flooding in the Caboolture area has resulted in damage to buildings and agriculture, loss of life and disruption to normal services.

Caboolture has always experienced nuisance flooding which has affected properties along the Caboolture River, King John Creek and Lagoon Creek, and has caused the closure of local roads. It should also be noted that all coastal areas may be subject to flooding resulting from storm surge. There has also been some erosion and destabilisation of the river banks along the development site, possibly as a result of flooding.

A flood model was completed by Parsons Brinkerhoff for the NEBP using the MIKE21 flood modelling program. The Flood Study is provided in Appendix I.

The development of the site includes a cut and fill plan to ensure the majority of the development will be located above the 1 in 100 year (Q100) flood level. The following flood mitigation measures have been designed into the development plan to ensure that the development of the NEBP does not cause an increase in flood levels:

- north by-pass channel cut 1.5 metres AHD;
- wider north by-pass channel cut to 2.5 metres AHD;
- Raff Creek cut to 2.0 metres AHD;
- south by-pass channel cut to 1.5 metres AHD; and
- eight flood diversion banks (earth) three near the marina, three on the eastern boundary, one on the northern boundary and one in the mid section of the development. The location of the flood diversion banks is shown on Cardno drawing 7900/33/05-104.

The flood study concluded that with the provision of the abovementioned flood mitigation measures in the development design there will no net loss of flood storage across the development site and no increase in flood levels over adjoining properties, which is in accordance with the main conditions of CSC's 'Flood Plain Management Policy 803/02'. The mitigation measures reduce peak water levels for a 100 year ARI event across the flood plain due to the conveyance of flood waters through the development, thus reducing the conveyance of flood waters in the northern section of the lower Caboolture River floodplain, north of the Caboolture River. Overall the development provides a net benefit to the community in terms of flooding. Flood review will be ongoing in consultation with CSC.

A risk assessment of the incidence of flooding, potential consequences and preventative measures has been addressed in the Simmonds & Bristow 'Hazard and Risk Analysis Northeast Business Park' (October, 2007). A copy of the 'Hazard and Risk Analysis Northeast Business Park' is provided in Appendix U.



The Hazard and Risk Analysis report indicates that the risk of flooding on the development is high, however, the residual risk after mitigation measures described above have been implemented the risk is reduced to low-medium.

4.1.2 Bushfires

Cardno has developed a Bushfire Assessment Report, which is presented in Appendix Z.

The majority of the NEBP site is identified by the Queensland Rural Fire Service (QFRS) as being situated in a Medium Bushfire Hazard area, a designation which is also reflected in the Caboolture Planning Scheme Central Planning Area Overlay Map CO2 (Bushfire Hazard). In such an area SPP 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide requires that any development maintain the safety of people and property by mitigating the risk through:

- lot design and the siting of buildings;
- including firebreaks and fire protection zones that provide adequate setbacks between buildings/structures and hazardous vegetation, and access for fire-fighting/other emergency vehicles;
- providing adequate road access for firefighting/other emergency vehicles and safe evacuation; and
- providing an adequate and accessible water supply for fire-fighting purposes.

A site inspection was undertaken and the following assessment was made.

- 1. The majority of the site is characterised by slopes under 5%.
- 2. The majority of the site is dominated by a disturbed grassland community which is considered to have an equivalent vegetation hazard score of 5. Some areas within the disturbed grassland community occur on steeper slopes with northerly aspects and support scattered woodland clumps and patches of acacia regrowth. As such the total bushfire hazard score for this community varies from 6 to 11.5.
- 3. The Paperbark open forest community in the site's south, that is associated with watercourses across its central extent, has a total bushfire hazard score of 9.
- 4. The Scribbly gum shrubby open forest community in the site's south-west has a total bushfire hazard score of 9.
- 5. The disturbed mixed species woodland has a total bushfire hazard score of 7.
- 6. The marine communities which border the Caboolture River have an equivalent vegetation hazard score of 0.
- 7. Those areas of the site proposed for development will not ultimately support vegetation that has the capacity to convey bushfire and represent a Low Bushfire Hazard Management Area.

Based on the above, the majority of the site has a total hazard score of 6-9, placing it at the lower end of the Medium Bushfire Hazard rating scale. The exceptions to this are the marine vegetation communities which adjoin the Caboolture River and which have a Low Bushfire Hazard rating.

Land to the east and south-east of the site supports similarly disturbed grasslands and scattered woodlands and, as such, occurs within a Medium Bushfire Hazard Management Area. Land south of the site has been principally developed for rural residential and other urban purposes and, as such, is considered have a Low Bushfire Hazard rating. The exception to this is land situated immediately to the south of the Swampy paperbark forest community in the site's south, which supports a clump of paperbark forest contiguous with that which occurs on site. It is considered that, even following development of the site, this



patch of paperbark forest would have a Medium Bushfire Hazard rating. The site is bordered to the north by an effective firebreak in the form of the Caboolture River which, as a consequence, is considered to have a Low Bushfire Hazard rating.

The proposed development of the site will increase the number of people living and working in or adjacent to an area that the Queensland Rural Fire Service has mapped as being a Medium Bushfire Hazard Management Area. In this respect it is noted that, following a site inspection, it has been determined that the site occurs within an area identified as a Medium Bushfire Hazard Management Area.

The proposed development must achieve the objectives of SPP 1/03 as they relate to maintaining the safety of people and property, by:

- a) avoiding areas of High or Medium bushfire hazard; or
- b) mitigating the risk through:
 - i. allotment design and the siting of buildings; and
 - ii. including firebreaks that provide adequate:
 - setbacks between buildings/structures and hazardous vegetation, and
 - access for fire-fighting/other emergency vehicles;
 - iii. providing adequate road access for fire-fighting/other emergency vehicles and safe evacuation; and
 - iv. providing an adequate and accessible water supply for fire fighting purposes.

The proposed development meets the above objectives. Under the proposed plan of development, the bushfire rating across most of the site would be reduced to that of a Low Bushfire Hazard. A 50 metre wide "safety buffer" will be maintained to the Medium Bushfire Hazard Management Area, and buildings would be established outside the 50m safety buffer except:

- the south-eastern corner of the site where the Residential (East) area adjoins offsite disturbed grassland and scattered woodland communities;
- the southern sections of the site where the Residential (East) and Residential (West) areas adjoin an off-site Swampy paperbark forest community;
- the central northern parts of the site where the MIBA Esplanade and MIBA Marine Industry areas adjoin areas of open space which support disturbed grassland and riparian vegetation communities; and
- the south-western corner of the site where the MIBA Highway and MIBA Core areas adjoin a retained Scribbly gum shrubby open forest community.

Within these sections of the site, developed areas are proposed within the 50m wide "safety buffer" that forms part of the Medium Bushfire Hazard Management Area associated with these retained and off-site areas of vegetation. In these sections of the site, the proposed development will not achieve compliance with objective a) of SPP 1/03 (i.e. locating development on land that is not subject to a High or Medium bushfire hazard).

As such, the proposed development needs to satisfy the intent of objective b) to achieve compliance with SPP 1/03 as it relates to maintaining the safety of people and property. An assessment of the proposed development's compliance with the solutions presented within the SPP 1/03.

A risk assessment of the incidence of bushfire, potential consequences and preventative measures has been addressed in the Simmonds & Bristow 'Hazard and Risk Analysis Northeast Business Park' which provided in Appendix U.



The Hazard and Risk Analysis report indicates that the risk of bushfire on the development is medium-high, however, the residual risk after the following mitigation measures are implemented the risk is reduced to low-medium.

- Preparation of an evacuation plan and emergency response plan for the construction phase and for each development precinct.
- Fire response training for construction workers.
- Supply of fire fighting water during the construction phase and for the residential, business park, industrial, retail, commercial and education precincts.
- Establish fire breaks around the site that provide adequate set back from buildings and hazardous vegetation.
- Provide adequate fire trails and road access for emergency services vehicles and for safe evacuation.

Ensure adequate insurance is obtained by the Body Corporate and occupants of the residential, business park, industrial, retail, commercial and education precincts within the development for protection against bushfires.

All flammable and combustible liquids to be stored in accordance with AS 1940-2004 The storage and handling of flammable and combustible materials.

4.2 Land

4.2.1 Description of Environmental Values

This section describes the existing values of the land area affected by the proposed NEBP development including topography/geomorphology, regional and site geology, soil characteristics, land use, proximity to environmentally sensitive areas, landscape character and visual amenity.

4.2.1.1 Topography, Geomorphology and Bathymetry

The topography and geomorphology of the project area comprises broadly low hilly lands and rounded rises which occur within the central south-western and central southern sectors that merge downslope into broad flat to gently undulating alluvial plains, estuarine plains and the active floodplain associated with the Caboolture River.

Surface elevations on site vary from the RL 10.0m - 17.5m AHD in the low hilly lands and rounded rises to RL 1.5m - 5.0m AHD in the low plains. Contours of the project area are shown on Figure 7. HAT in the Caboolture River adjacent to the site is approximately 1.34m AHD and MHWS is approximately 0.81m AHD. Raff Creek traverses the NEBP site and flows from the southwest to the northeast boundary.

Drainage is mostly indirect and poorly defined due to the topography of the land being relatively flat with minor gradients. There are various low-lying areas which tend to pond water or remain wet for significant periods of the year as a result of swampy oxbows, prior stream channels and cut-off meanders occurring on site.

Terrain units have been mapped to provide a description of the physical environment giving the occurrence and distribution of landform units, geology and soil types within the project area. The relationship between landform categories, geological regimes and soil classes is illustrated in Figure 12. A full description of the terrain units is given in Appendix R1.



Predicted changes to topography and geomorphology as a result of the proposed development, together with associated impacts and mitigation measures are discussed in Section 4.2.2.1 of this EIS.

4.2.1.2 Geology

The geology of the project area has been identified by the Geological Survey of Queensland as shown on the 1:100,000 Geological Map for Caboolture (9443). The geological regimes that occur within the study area are described by in Appendix R1 and include the following.

- Quaternary Holocene Recent Alluvial Deposits (Qha); these sediments comprise of clay silt, sand and gravel deposits in the active floodplain, in stream channels and in intermediate and lower stream terraces. As mapped, this geological regime occurs within the central, northern and south-eastern sectors of the site.
- Quaternary Estuarine Deposits (Qe); these sediments comprise of clay, silt, sand and muds deposited in the low-lying estuarine plains upstream of the mouth of the Caboolture River. As mapped, this geological regime occurs in the central-eastern sector of the site and includes remnants of abandoned river channels, oxbow swamplands, tidal channels and slightly elevated estuarine flats with scattered mangroves and mangroves fringing tidal areas.
- Quaternary Alluvium (Qa); these comprise of undifferentiated fluvial deposits and older alluvial/slopewash deposits that generally occur inland of the more recent Holocene (Qha) deposits and generally at slightly higher elevations typically above RL 2.0m – 5.0m AHD or higher. In the project area they comprise mostly of dark brown and yellow-brown often mottled sandy clays and medium to heavy clays. As mapped, this geological regime occurs in flat to broadly depressional re-entrant valley floors intersecting the central western site boundary and in the south western sector of the site.
- Triassic-Jurassic Landsborough Sandstone (RJI); this formation comprises lithofeldspathic labile and quartzose sandstone, siltstone, shale and minor pebble conglomerate. In the project area it mostly comprises of sandstone. As mapped, this geological regime occurs associated with the low hilly lands and rounded rises in the central south-western and central southern sectors of the site.

No geological faults have been mapped within or in close proximity to the site.

In summary the geology of the project area can be described as deeply weathered Triassic-Jurassic Landsborough Sandstone overlain by a sequence of sandy Quaternary units and sand dunes, the latter at specific locations as shown in Figure 12.

To provide site specific detail to a desk top study on geological regimes, a borehole investigation of the project area characterised the site as being generally overlain with silty sands or clayey sands up to 0.5m below ground level and inorganic clays, followed by clayey sands or inorganic clays from 0.5m below ground level to 2.0m in depth. Coffee rock was also identified in some areas of the site by its hard cemented organic sand to loamy sand texture with high iron content.

In particular, the geology of the area proposed for marina basin was targeted in a field investigation by Coffey Geotechnics Pty Ltd (Coffey) in 2007 (Appendix R1) and historically by Siemon in 2005, as this will be the most highly disturbed area of the proposal. It was found the marina basin is sandstone (bedrock) between 9.0m - 13.0m below ground level (with a high bearing value) which is thereafter overlain by sandy clay and clay of medium to high plasticity from 2.0m - 9.0m below ground level with sand as the upper layer. Part of the marina basin on the western side has a soil profile comprising almost entirely of clay. Cross sections of soil profiles are provided within Appendix R1. It is noted groundwater at



the marina area has been encountered between 0.5 metres and 1.5 metres below ground level.

4.2.1.3 Soils

Six general Soil Type Classes have been identified as part of the terrain mapping and borehole information in accordance with relevant guidelines including the Australian Soil and Land Survey Field Handbook (McDonald et al. 1990) and Australian Soil Classification (Isbell, 1996). The occurrence of these soil types within the site area is identified on a terrain unit basis as shown on Figure 12.

Soil morphology in the area is principally related to the lithology of the parent material, the relative age of the soils, topographic position in the landscape and hydrology. The results of the soil surveys and subsequent laboratory analysis are given in Appendix R1.

In undertaking current soil mapping and analysis of the physical and chemical properties of soil, the potential for soil erosion, exposure of ASS and land contamination (including from proposed effluent irrigation) was considered based on the existing environmental values. Concurrently the suitability of material for construction and agricultural purposes was also determined.

This information was used to assess the potential for environmental impacts and to inform the construction and operation of the development (as detailed in sections 3.4 and 3.5 of this EIS) and mitigate impacts from construction and operation of the development as detailed in Section 4.2.2 of this EIS.

Soil Erosion

The susceptibility of the existing land surface to erosion has been found to relate to a number of factors including rainfall, run off, soil erodibility, surface hydrology, surface slope and length, surface cover and condition, and land use.

Estimating soil loss through water erosion is difficult as a result of the interrelationship between existing soil water content and runoff (typically the wetter the soil the more quickly run off will be produced) and markedly seasonal rainfall patterns in Australia (typically the project area has wet summers and dry winters), as detailed in Section 4.1 of this EIS.

The assessment of erosion potential is provided in Table 33 below.

Geological Regime	Landform Category	Soil Type	Erosion Potential ³
Qha	С	1-4	Moderate
Qha	С	5	Low- Moderate
Qha	С	6	Low

Table 33Erosion Potential based on Terrain Units

³ The potential for erosion in the project area as a result of disturbance of surface soil for construction or development activities has been assessed (and based on soil erodibility classes adopted from Mills and Murphy, 1977) as follows.

Low - The combination of surface slope, run-off and soil erodibility is such that no appreciable erosion damage is anticipated.

Moderate – Significant short-term erosion is likely to occur due to the combination of slope, soil erodibility factors and extent of run-on/run-off.

High – High to very high erosion losses are likely due to steepness of slopes, soil erodibility factors due to exposure of wind and surface runoff conditions.



Qha	D	5	Low
Qha	D	6	Low
Qha	E	6	Moderate
Qha	G	1	Moderate
Qe	D	6	Low
Qe	F	6	Moderate
Qa	С	5	Low- Moderate ⁴
Qa	С	6	Low- Moderate
Qa	E	6	Low- Moderate
RJI	А	2	Low
RJI	В	3	Moderate -High
RJI	В	4	Moderate -High

The potential impact and mitigation measures, with regard to soil erosion potential, are described in Section 4.2.2.3 'Soil erosion' of this EIS.

Acid Sulfate Soils

ASS are soils containing iron sulphide. As potential ASS (PASS), soils exist in an anaerobic state. Upon exposure to oxygen the iron sulphide is converted to iron sulphate, simultaneously releasing acid. Soils are then referred to as Actual ASS (AASS). When soils release unacceptable quantities of acid, when compared against standard criteria, detailed management is critical.

ASS investigations have been undertaken across the site since 2003. An initial ASS investigation was undertaken on Lots 10 and 2 by Douglas Partners. Results identified low to moderate ASS levels within 8 of 20 test pits exceeding the Queensland Acid Sulfate Soil Investigation Team (QASSIT) Action Criteria between 0.5m and 2.0m below surface level. An ASSMP was prepared by Douglas Partners for these lots.

The most current assessment was undertaken by Coffey (Appendix R1) considered all land encompassed by the development outline and determined the frequency and location of boreholes and laboratory tests based on a desktop study of terrain mapping and existing borehole information. This has resulted in a more focused ASS field investigation with regard to the proposed land uses whilst reducing the requirement for extremely high sampling density (due to the site size) and provided for ongoing targeted ASS sampling during the construction phases.

The current sampling methodology, analysis results and ASS investigation findings are attached as Appendix R1. Where possible the 'Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland' (Ahern *et al.* 1998) was followed in this ASS investigation.

Based on the terrain mapping and laboratory results, the terrain units containing actual ASS are C5, C6, E6 and F6 which are located predominantly within low plains of the project area below RL 5.0m AHD. Terrain Units are identified on Figure 12.

⁴ The terrain unit Qa C.5 has been identified from laboratory analysis of soil samples to exhibit increasing levels of sodicity from sodic to strongly sodic levels with depth which would increase the susceptibility of land to severe gully erosion and tunnel erosion.



The potential impact of ASS, including appropriate mitigation measures, is discussed in Section 4.2.2.2 of this EIS.

Land Contamination

A search of the Environmental Management Register (EMR) has been undertaken as part of this EIS process to determine whether land, that is part of the development, has been potentially contaminated by previous land uses. Search results are presented with the Planning Report attached as Appendix C2.

The search identified Lot 10 on RP902079 as the sole land parcel subject to the development, currently listed on the EMR for the notifiable activity of petroleum product or oil storage. In this instance the preliminary site contamination investigation undertaken by Douglas Partners (2003) as part of a previous development proposal for Lot 10 is deemed relevant to this development proposal.

The preliminary site contamination investigation included a site historical review, inspection, soil sampling and laboratory testing, to identify and characterise any the extent of areas of soil contamination caused by historical use.

The site history undertaken with regard to Lot 10 identified the following previous uses since 1949 based on review of aerial photography.

- Grazing.
- Dairy Sheds and cattle dip including associated chemical storage pad.
- Above ground (2000 litres) and underground (2000 litres) diesel and/or oil storage tank.
- Pine plantation.
- Illegal waste disposal.

Soil samples were collected from the subject lot and targeted in areas previously used for fuel storage, dipping cattle, and waste disposal. Analytical results were compared to EPA's 'Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland' (March, 1998).

Soil samples were analysed for the following parameters:

- heavy metals (arsenic, cadmium, chromium, copper, lead, nickel and zinc);
- total petroleum hydrocarbons (TPH);
- monocyclic aromatic hydrocarbons including benzene, toluene, ethylbenzene and xylene (BTEX);
- organochlorine and organophosphorus compounds (OC/OP); and
- herbicides.

Laboratory results were compared to environmental investigation levels (EILs) and healthbased investigation levels (HBILs) for residential (Type A) and commercial/industrial (Type F) under the 'Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland' (March, 1998).

An analysis of the results has identified the concentration of heavy metals was generally below EILs and HBILs except for 6 samples which marginally exceeded levels for arsenic (1), chromium (3) and zinc (2), and 1 TPH sample at a depth of 2.0m down gradient of



where the underground storage tank was located that is above the EIL as recorded in the EMR. Approximately 20m³ of material has been identified as potentially contaminated.

In summary the soil contamination on Lot 10 is limited to the immediate area surrounding the approximate location of the underground storage tank and bowser.

Soil Suitability for Effluent Irrigation

Due to the demand for recycled water from the onset of increasingly onerous water restrictions and in accordance with best practice environmental management, the suitability of land for effluent irrigation has been assessed by GHD and is included in the assessment provided as Appendix W.

Class A+ recycled water, suitable for irrigation purposes without health risks, is proposed to be sourced from the Caboolture Water Reclamation Plant (and at a later stage from the Burpengary East Water Reclamation Plant) at the NEBP having regard to onsite constraints based on the nutrient export risk to surface and ground waters via deep drainage.

The demand for recycled water for irrigation purposes and the irrigation capacity of the soils on the site has been determined through MEDLI modelling. Modelling, based on various assumptions, predicts that up to 2.3ML per day can be reused on site.

Of the 2.3 ML/day it is proposed that 30.5% will be irrigated over the 140 hectares of Golf Course, with the remainder used for residential and non-residential purposes including garden watering and toilet flushing.

Soil Suitability for Construction Purposes

A geotechnical investigation into the suitability of the material for construction purposes, namely fill material, has been undertaken in conjunction with the soil classification and ASS field investigations. It is proposed to reuse all suitable material on site as fill to achieve required flood immunity in developed areas.

Standard compaction and California Bearing Ratio (CBR) tests were undertaken to assess the suitability for on site material for reuse. Slight to moderate swelling and low CBR has been recorded in test pit samples at a depth between 0.5m - 0.9 metres below ground level (Douglas Partners, 2004) which is primarily a reflection of the variable plasticity and reactivity across the subject sites.

Results suggest that the silty clay material tested is a potential source of fill material but which may need to be mixed with alternative fill material for areas with potentially stringent engineering/building construction requirements (eg. roads and building pads for tall buildings).

The impacts from use of in situ material as construction fill has been described in sections 4.2.2.1 'Land Use Suitability' and 4.2.2.3 'Soil Erosion' where appropriate.

Agricultural Land Suitability

An assessment of the suitability of the land as agricultural land was undertaken in accordance with SPP 1/92: Development and the Conservation of Agricultural Land to determine the existing (pre-development) suitability of the land as agricultural land. The assessment and results of this technical study are attached in Appendix S.

The existing agricultural land uses in the locality include forestry, tree crops, small crops and grazing pastures.



The suitability of the project area as agricultural land was evaluated for rain-fed tree and small crops and grazing enterprises using terrain mapping. The occurrence and distribution of agricultural land classes are presented in Appendix S.

Suitable agricultural land has been identified in relatively small and patchy areas within the site. The maximum extent of Agricultural Land Class A (that is land suitable for current and potential crops with limitations to production which range from nil to moderate) is a total of 21.4 hectares and for Class B (that is land marginally suitable for current and potential crops due to severe limitations, but suitable for pastures) a total of 116.7 hectares. This suitable land represents 18% of the project area but which is fragmented which presents obvious limitations.

The factors limiting the extent of suitable agricultural land within the project area is the low plant available water storage capacity due to the sandy nature of soils, impeded or slow internal profile drainage, low nutrient reserves and retention capacity, high levels of acidity particularly in the subsoil, and surface drainage conditions.

4.2.1.4 Land Use

The tenure of the land that will wholly contain the components of the NEBP is "freehold title". Certificates of title for each lot on plan within the bounds of the project area are presented within the Planning Report which is attached as Appendix C2. The tenure of the land is detailed further in Section 3.6 of this EIS.

With regard to native title, the High Court of Australia held that native title is extinguished by valid government acts that are inconsistent with the continued existence of native title rights and interests, such as the grant of freehold estates. The NEBP is contained wholly within freehold land and as such pursuant to section 20(2) of the *Native Title Act 1993*, native title is not relevant to the assessment of this EIS.

The eastern and northern sectors of the site have a "Rural" designation and the western sectors have a "District Industry" and "Rural Residential" designation pursuant to the Planning Scheme Zoning Maps. The Planning Scheme designation and objectives are discussed in detail in Section 1.6 as they relate to the development proposal.

In addition to the Planning Scheme zonings, the Regional Plan has identified part of this project area as an "Urban Footprint". An Urban Footprint identifies land to provide for the region's urban development needs to 2026 but which includes land that is not available or appropriate to development for a range of reasons.

4.2.1.5 Infrastructure

The proposed energy network is detailed in Section 3.7.2 of this EIS.

The proposed potable water, recycled water and sewage network is illustrated on Figures attached to Appendix W and detailed in Section 3.7.3 and 3.7.5 of this EIS.

The proposed conceptual stormwater drainage system has been illustrated in the Stormwater Management Plan that addresses stormwater quality and quantity and the principles of water sensitive urban design. The Stormwater Management Plan is attached as Appendix H1 and is detailed in Section 3.7.4 of this EIS.

The potential impact (soil erosion and ASS) of installing infrastructure on environmentally sensitive areas is discussed under appropriate mitigation measures sub-sections under Section 4.2.2 of this EIS.



4.2.1.6 Sensitive Environmental Areas

The sensitive environmental areas surrounding and within the site that could be affected, directly or indirectly, by the proposal, in both the construction and operational phases have been identified in an environmental impact assessment.

Northern and eastern parts of the site, that is land directly adjacent to the Caboolture River, are mapped by the Planning Scheme as containing the following attributes which are illustrated in Figure 7.

- Catchment Protection Areas for the protection of waterways and Declared Fish Habitat Areas;
- Ecological Corridors to strengthen and improve links between areas of state, regional, local and other conservation significance and areas of conservation significance that may be degraded;
- Regional and State Conservation areas including significant wetlands mapped by the Regional Coastal Plan; and
- Scenic Amenity Areas in which development is to be regulated such that adverse impacts on the scenic qualities of the area are minimised.

The southern and western parts of the site have small and fragmented regional and state mapped nature conservation areas, specifically 1.3ha of endangered remnant vegetation located in the southwest corner of the site due to the majority of the site previously supporting exotic pine plantations.

The project site is characterised by large expanses of disturbed grassland, some scattered trees, Paperbark (*Melaleuca quinquenervia*) communities, Eucalypt open forest and areas of marine vegetation which fringe the Caboolture River and associated waterways and constructed drainage channels that are tidally influenced.

The site is surrounded by areas of environmental sensitivity as follows.

- The Deception Bay Declared Fish Habitat area, which extends along the entire length of the northern boundary, within the bounds of the Caboolture River. This area is protected by the Fisheries Act due to the estuarine habitats that support commercial and recreational fisheries in close proximity to developing communities.
- The Habitat Protection Zone of the Moreton Bay Marine Park which is located within the Caboolture River and begins at the north-eastern boundary of the site then extends eastward along the Caboolture River. This area is protected by the Marine Parks Act 2004.
- The Moreton Bay Ramsar Wetlands listed as a wetland of importance and afforded protection under the EPBC Act.
- South East Queensland Wader Bird Sites are mapped approximately 500m to the east of the site. This area is protected via the JAMBA and CAMBA convention to protect habitats of Migratory Birds.

4.2.1.7 Landscape Character

The landscape character of the project site and surrounding area is described in detail in Appendix Q.

This section summarises the existing landscape character of the project area and surrounds which are likely to be affected by the proposed development and relates to the description of particular scenic values in Section 4.2.1.8 of this EIS.



Little built landform exists within the project area that is dominated by natural elements including ridgelines and waterways.

Two primary ridgelines run diagonally to the northeast partially through the project area from the southwest and southern boundaries. Ridges are gently sloping to a flat floodplain which covers the majority of the site area. A low sandy ridge at the centre of the project area represents an ancient shoreline to Moreton Bay.

The Caboolture River is a tree lined meandering river along the northern boundary of the project area which forms a distinct green boundary to the project area, except for areas of cleared riparian vegetation.

Of particular importance in this boundary is the Bunya and Hoop pines dominating the river frontage where an original European settlement was located (otherwise known within the development as the Heritage Area) and mangroves which have colonised and offer bank stability in various areas.

Previous clearing and farming activities, including pine planting, has resulted in patches of vegetation existing within the project area, particularly associated with watercourses. The dominant feature is cleared paddocks invaded by exotic weeds.

The eastern tributary of Raff Creek partly flows through a significant stand of Melaleuca forest and where both tributaries join, Swamp oak and marine vegetation including marine couch and mangroves are flourishing.

In summary the landscape character within the project area has been highly modified since European settlement from a long history of agriculture with the most predominant landscape features being the tree lined river and waterways and the heritage area.

Detailed aspects of the varying regional characteristics include:

- undulating terrain utilised for cattle grazing and crop planting;
- a number of population centres that are generally small scale in terms of total population numbers and building characteristics;
- the city of Caboolture which has a large population base and comparatively large scale buildings;
- a number of river and stream systems, the largest being the Caboolture River; and
- heavily forested areas.

Whilst there are many land use types in the area, there is a certain overall synergy between the various land uses and the topographical characteristics of the region. This synergy, together with different textures and the wide geographical extent of the area provides a rich visual experience and forms part of the wide regional visual catchment accessible through a number of roads, private land and public land in the region.

The surrounding landscape consists of basically three land zones, a coastal strip, urban spine and rural hinterland.

The immediate area surrounding the project area is part of the coastal strip adjacent to Deception Bay and is populated with rural and residential land pattern to the south and west with the rural residential lots fronting Farry Road adjacent to Lot 7 being the most clearly discernible rural residential development from within the project area.

The urban spine surrounding the project area is west of the Bruce Highway with significant urbanisation around communities of Burpengary, Caboolture, Morayfield and Narangba



beyond. The Bruce Highway is located to the east of the project area but which is screened by vegetation.

The rural hinterland includes the Glass House Mountains approximately 16 kilometres in distance.

The views across the project area are discussed in Section 4.2.1.8 of this EIS.

4.2.1.8 Visual Amenity

This section describes the existing landscape character, panoramas and views that have, or could be expected to have, value to the community whether of local, regional, Statewide, national or international significance. A Scenic Quality and Visual Impact Assessment has been prepared by Studio Tekton, and this is presented in Appendix Q.

The character and visual amenity in the locality of the proposed development is consistent with the following DEOs outcomes for scenic amenity under the Planning Scheme.

- Development for hillsides or ridgelines is designed and located:
 - to retain important skyline elements, including tree canopies for vegetated ridgelines; and
 - to retain and enhance significant views into and out of the area.
- Development for waterways is designed and located:
 - o in a manner which is subservient to the landscape;
 - o to retain and enhance views along the waterway; and
 - to conserve significant vegetation where possible.
- Development is designed and constructed of materials and with finishes that complement the integrity of the landscape and do not dominate the natural science landscape.

Lot 2, 10 and 15 are zoned District Industry with no particular scenic amenity values.

Lots 7 and 24 have scenic amenity values over northern parts of the lots but not high values when compared to the Glass House Mountains and publicly accessible portions of the Caboolture River.

Lots 12 and 17 are zoned rural residential with no particular scenic amenity values.

A view shed analysis identified very few localities surrounding the project area where it will be possible to achieve any significant ground elevation to be able to look down and or across the NEBP. The viewing points which do exist, particularly the Glass House Mountains (approximately 16km away),isolated landforms including Round Mountain, Mount Elimbah and Mount Miketeebumulgrai to the northwest (over 6km away) and lots fronting Farry Road are either a sufficient distance to not be of concern or are screened existing or proposed vegetation.

Riverbank vegetation restricts views onto the site from the Bruce Highway and the Caboolture-Beachmere Road. Views from the Caboolture River are restricted by height of the river banks, bank vegetation and are tide dependent.

The existing ridgelines restrict views from Nolan Road.



4.2.2 Potential Impacts and Mitigation Measures

The potential impacts identified as a result of the proposed construction and operation of the NEBP, relating specifically to land-based environmental values, are summarised below and are detailed in the following sub-sections.

Construction

- Adverse land use impacts on adjacent land uses (refer to Section 4.2.2.1 Land Use Suitability).
- Contamination of land from waste, ASS and spills at chemical and fuel storage areas (refer to Section 4.2.2.2. Land Contamination).
- Disturbance to land from vegetation clearing and earthworks (refer to Section 4.2.2.3 Soil erosion).
- Increased risk of erosion and sedimentation from rainfall, overland flow and wind action/wave action (the latter from marine traffic) (refer to Section 4.2.2.3 Soil Erosion).
- Change to existing landscape character resulting from changes to topography and vegetation clearing (refer to Section 4.2.2.4 Landscape character).
- Loss of visual amenity at panoramas and outlooks (refer to Section 4.2.2.5 Visual Amenity).

Operation

- Adverse land use impacts on adjacent land uses (refer to Section 4.2.2.1 Land Use Suitability);
- Contamination of land from wastes (refer to Section 4.2.2.2 Land Contamination).
- Change to existing landscape character from changes to topography and vegetation cleaning (refer to Section 4.2.2.4 Landscape character).
- Loss of visual amenity at panoramas and outlooks (refer to Section 4.2.2.5 Visual Amenity).
- Increase in night lighting (from road traffic) causing impacts on fauna and residents (refer to Section 4.2.2.6 Lighting).
- Increase in transport affecting local and state government controlled roads (refer to Section 4.2.2.7 Transport).

This section also identifies, in response to the identified potential impacts, measures which will protect and/or enhance environmentally sensitive areas.

4.2.2.1 Land Use Suitability

The land use designation by Local and State Government is consistent with the findings of the Good Quality Agricultural Land Assessment (GQAL) by Place, which is presented as Appendix S. The GQAL Assessment identified the development land used for agricultural purposes will not be financially viable and therefore planned for alternative uses. The local and State government have designated areas of good quality agricultural land on site as follows:

• The SEQ Regional Plan identifies areas of Class A and Class A-B within an Urban Footprint which has ultimately given consideration to the needs of South East Queensland for the next 20 years through extensive consultation with the community, governments and industry.



• The Planning Scheme identifies areas of Class A and Class A-B within District Industry Zonings.

Approximately 20% of the site is identified as Class A or B, but this land has been zoned in the CSC Planning Scheme for District Industry. The remainder of the site is identified as Class C or D land. As such there are no identifiable impacts from use of land as Urban Footprint as opposed to agricultural land. In this instance the environmental impacts of using the site for agricultural purposes instead of proposed land uses has been addressed.

Impacts have been identified arising from the use of land for agriculture based on the limiting factors of the soil. These are:

- nutrient runoff to waters arising from significant application of fertilisers due to the soil's low nutrient and retention capacity;
- soil erosion from water runoff; and
- use of reticulated water for irrigation due to low water storage capacity in an area currently subject to drought-induced water restrictions.

In agricultural terms, the economic returns of establishing agricultural enterprises on the site instead of the proposed development would be poor with no net benefit for the community.

Suitability of Land for Effluent Irrigation

No adverse impacts are predicted arising from the use of Class A+ effluent for irrigation providing the following criteria are met:

- a minimum of 140 hectares of effluent irrigation area;
- A+ quality recycled water ;
- no irrigation on wet weather days; and
- partial establishment of crop cover (kikuyu grass) prior to application of recycled water.

Suitability of Land for Construction Purposes

A geotechnical investigation identified the potential for material extracted during marina basin bulk earthworks to be used as fill to elevate building platforms for residential development. The potential impacts from using such fill are:

- adverse changes to hydrology by increasing the water table;
- adverse changes to landscape character and visual amenity resulting from changes to topography and geomorphology;
- land contamination, if existing material is naturally, or has artificially been, contaminated by toxicants, and exposure of ASS; and
- increase in potential for soil erosion and subsequent degradation of quality of stormwater run-off.

Mitigation measures to control these potential impacts have been identified under relevant sub-sections of this EIS.

In addition there is a risk of subsidence/failure from potential geotechnical weak materials. This aspect will be mitigated through further geotechnical testing (including soil settlement and bearing monitoring) during the development to ensure that a suitable building platform is prepared for building works.



Suitability of Land to Support Marina Foundations

An investigation on the suitability of the land was undertaken by Coffey in 2007 to inform the design of the marina basin and construction methodology with particular focus on foundation aspects, quay walls or batters of the marina basin and excavation method.

The design and construction methodology has incorporated the following recommendations from the geotechnical investigation :

- A clay cut off trench must be constructed between the Caboolture River and the marina to prevent leakage into the marina during construction. The cut-off trench will extend to the underlying clay stratum at a depth of about 6m.
- The lock structure will be constructed also in dry conditions, with a bund to remain between the structure and the River.
- Revetment wall construction will be completed under dry conditions in accordance with relevant standards and manufacturer's instructions.
- Revetments on the sides of the marina remote from the River will comprise segmental walling (Hanson Vertica or similar) with geogrid soil reinforcement and free-draining backfill.
- Revetment foundations will be prepared in accordance with design requirements.
- The foundation for the lock and weir structure will be prepared in accordance with design requirements, as verified by geotechnical inspection.

The geotechnical constraints are presented in below for the entire project area with mitigation measures proposed. Particular regard is paid to geological properties that influence ground stability, occupational health and safety, rehabilitation programs and the quality of wastewater release (sediment laden waters and/or acidic waters). A detailed constraints table is given as Table 9.1 of Appendix R1.

Proposed Land Use	Impacts	Mitigation Measures
MIBA Residential Businesses	Loose sand may complicate excavations, earthworks and foundation design, also in combination with a high ground water table. ASS may be exposed.	Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control. Implement the Erosion and Sediment Control Plan that is part of the EMP in Section 5 of this EIS. Implement the ASSMP that is part of the EMP in Section 5 of this EIS. Dewater deep basements achieving water quality release criteria that are specified in the EMP in Section 5 of this EIS.

Table 34	Geotechnical Impacts and Mitigation Measures
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Proposed Land Use	Impacts	Mitigation Measures
Marine Industry	High groundwater table may reduce bearing value of soil. Soft sandy clay may complicate foundation design in terms of allowable settlement and differential settlement.	Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control. Implement the Erosion and Sediment Control Plan that is part of the EMP in Section 5 of this EIS. Dewater deep basements achieving water quality release criteria that are specified in the EMP in Section 5 of this EIS.
Ship yard	Loose sand may complicate excavations, earthworks and foundation design. The soft highly plasticity clay may be a constraint with regard to foundations, settlements, and differential settlement and shrink-well behaviour. High groundwater table may reduce bearing value of soil. Coffee Rock may present difficulties with regards to foundations, particularly piling.	Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control. Implement the Erosion and Sediment Control Plan that is part of the EMP in Section 5 of this EIS. Establish shrink swell characteristics for high plasticity clays. Dewater deep basements achieving water quality release criteria that are specified in the EMP in Section 5 of this EIS.
Commercial/Retail Village Residential/Hotel Multilevel Residential Low Rise-medium density Golf Course Residential	Dune sand can be loose to very loose and soft clay can complicate excavations, earthworks and foundation design. High groundwater table may reduce bearing value of soil. ASS may be exposed. Coffee Rock may present difficulties with regards to foundations, particularly piling.	Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control. Implement the Erosion and Sediment Control Plan that is part of the EMP in Section 5 of this EIS. Implement the ASSMP that is part of the EMP in Section 5 of this EIS. Dewater deep basements achieving water quality release criteria that are specified in the EMP in Section 5 of this EIS. Establish shrink swell characteristics for high plasticity clays.



Proposed Land Use	Impacts	Mitigation Measures
Golf Club/leisure facilities	Softer clay layers could be a constraint with regards to foundations, settlement and differential settlement. Relative large depth to bedrock may be a constraint if pile foundations are considered.	Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control.
River view Residential Dry land Residential	ASS will be exposed.	Implement the ASSMP that is part of the EMP in Section 5 of this EIS.
Golf Course and wetland	ASS will be exposed. Loose silt in combination with high groundwater table may complicate excavation and foundation design. Runoff of silt-laden water in a storm event due to Soil Class 4 having poorly drained clayey subsoils that may be slightly to moderately dispersive.	Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control. Implement the ASSMP that is part of the EMP in Section 5 of this EIS.
Recreational/environmental /leisure (rehabilitated areas)	Soft silty clay may be a constraint with regards to foundations, settlement and differential settlement. ASS will be exposed.	Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control. Implement the ASSMP that is part of the EMP in Section 5 of this EIS.
Marina Basin	Loose sand in the northern part of the basin presents complications with regards to foundation design, earthworks, quay walls anchor design and batter design, specifically in combination with the high groundwater table. The surface soils of Soil Class 1 are prone to erosion, in particular wind erosion, where the surface vegetation is disturbed or removed. Soft high plasticity clay may be a constraint with regards to foundations, settlement. ASS will be exposed.	Carry out further geotechnical investigations within the proposed marina basin. Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control. Stage construction to manage high groundwater table in combination with loose sands. Implement the Erosion and Sediment Control Plan that is part of the EMP in Section 5 of this EIS. Implement the ASSMP that is part of the EMP in Section 5 of this EIS. Dewater deep basements achieving water quality release



Proposed Land Use	Impacts	Mitigation Measures
		criteria that are specified in the EMP in Section 5 of this EIS.
Heritage Precinct	Loose sand and soft clay restrict possibilities with regards to foundation designs. ASS will be exposed.	Consideration to results of field investigations for optimising foundation design and reducing geotechnical risk in the design phase and informing the construction methodology, particularly in regard to erosion and sediment control. Implement the ASSMP that is part of the EMP in Section 5 of this EIS. Implement the Erosion and Sediment Control Plan that is part of the EMP in Section 5 of this EIS.

4.2.2.2 Land Contamination

Acid Sulfate Soils

Land disturbance by the development has the potential to impact on environmentally sensitive areas through exposure of ASS. Impacts from acid generation include:

- changes to water chemistry of receiving water bodies and groundwater resources;
- sedimentation and erosion (due to loss of aquatic vegetation from changes to water quality);
- loss of good quality fertile soils through expression of soil acidity; and
- impacts on fauna species (disease, mortality) of affected ecosystems, particularly within receiving aquatic ecosystems.

The potential for acid generation has been determined based on terrain mapping in association with bulk earthworks likely to expose PASS considering the size of the project site. Major extractive earthworks are contained within the marina basin which also covers landform categories C5 and C6 which do contain ASS. Earthworks to fill building platforms will be undertaken in other landform categories however it is anticipated fill works will not expose ASS to oxygen or lower the level of groundwater. The depth of groundwater in the business park area has been measured at greater than 20 metres within the Landsborough Sandstone and at other locations at a depth of 2 metres. Coffey has prepared a Groundwater Impact Assessment , which is presented as Appendix H2 and which should be referred to for a detailed description of the existing standing water levels, direction of groundwater flow and water chemistry. Groundwater is also discussed further in Section 4.4 of the EIS.

An ASSMP had been prepared for Lot 2 on RP 902075 and Lot 10 on RP 902079 as part of the previous development proposal. This ASSMP proposed management strategies on the application to develop subject lots into a modern business and industrial precinct which is consistent with the current development and therefore remains current and effective.

A whole of site ASSMP has been developed to address potential impacts from ASS exposure which includes management strategies consistent with the existing ASSMP, which is presented in Appendix R4. The ASSMP will guide development and remediation works with a particular focus on controlling or remediating the generation of acid potential from excavated soil, with particular emphasis on Lot 24 where high disturbance of ASS will



occur, being the area of excavation of the marina basin, according to terrain mapping and subsequent assessments as discussed in Section 4.2.1.3. The objective of the ASSMP is to provide management options for prevention of environmental impacts resulting from the disturbance of potential ASS materials.

The construction methodology incorporates the hierarchy of ASS management principles in line with the QASSIT Guidelines of:

- avoidance;
- minimisation of disturbance;
- neutralisation;
- hydraulic separation; and
- strategic reburial.

The ASSMP will address the treatment and disposal of potential ASS arising from the dredging of the navigational channel of the Caboolture River to provide sufficient depth for boats to access the marina.

The ASSMP has been included in the Environmental Management Plan (refer to Section 5 of this EIS).

Contaminated Land

It was proposed by Douglas Partners (2004) that a Remediation Action Plan (RAP) and Site Management Plan (SMP) is developed as a result of the contamination finding. A RAP and SMP was prepared by Douglas Partners subsequent to the site investigation with the primary objectives being:

- to make the site safe for planned future use (including residential);
- to prevent the potential long-term generation and release of contaminated surface water, groundwater and soils impacting on the environment of adjoining land and aquifers; and
- to ensure the protection of the community and local environment.

Remedial action to be carried out, as identified in the plan will consist of the following.

- Excavation of the underground fuel storage tanks, bowser and vent pipe and disposal off-site.
- Excavation of petroleum hydrocarbon affected soil which is to be validated and bioremediating on site or disposal off site.
- Excavation of any soil found to be contaminated as a result of further testing and disposal off site.

The SMP has been prepared with the purpose of managing contamination whilst it remains on site in a manner that protects human health and the environment.

The SMP is attached as Appendix R5. The RAP is incorporated into the CEMP which is presented as Appendix X2.

Wastes

Waste streams generated during construction and operation of the development is provided in more detail in Section 3.8.1.2 of the EIS.



A Waste Management Plan (WMP) has been prepared as part of the Waste Management Technical Report. In addition, waste management components have been included in the CEMP and SBMP for operation of the marina and associated development that will mitigate the risk of land contamination from wastes. Mitigation measures include appropriate storage and handling of wastes in accordance with best practice environmental guidelines.

The following objectives will be adopted for management of waste during development and operation.

- To ensure procedures are implemented during construction to minimise environmental impacts and properly dispose of pollutants and waste materials arising from construction processes.
- To employ waste avoidance and reduction strategies during construction and operation to eliminate waste at the source by reviewing site procedures and purchase of materials.
- To implement measures for evaluation of all waste stream elements and identification of wastes that can be reused or recycled.
- To adopt implementation measures during construction and operation of the development to minimise the volume of waste sent to landfill and to prevent wastes entering the stormwater drainage network.

A copy of the WMP is provided in the Waste Management Technical Report included as Appendix Y2.

Additional methods proposed to prevent land contamination during the construction of the marina, with particular regard to handling, storage and disposal of hazardous substances have been included in the CEMP and operational SBMP for the marina with regard to refuelling and sewage pump-out facilities.

4.2.2.3 Soil Erosion

The major impact resulting from soil erosion during the construction phase is the likely increase in sediment loss via stormwater run-off and associated increase in suspended solids within receiving waters, namely the Caboolture River. The impact of sediment laden stormwater on the existing environmental values of the Caboolture River has been identified in detail under Section 4.5 Coastal Environment.

The quality of stormwater run-off will also be determined by the chemical properties of soils that will be disturbed by the development proposal.

Terrain mapping has identified that a number of terrain units where the risk of loss of sediments is moderate to high and which will be mitigated by implementation of an effective sediment and erosion control plan to prevent releases to waters.

The sediment and erosion control plan will be produced during the detailed design stage, and has the following objectives.

- Reduce the potential for erosion and subsequent sedimentation.
- Minimise the effect on the marine water quality and drainage path.
- Ensure materials that may contaminate waters are not released to any waters in a direct or indirect manner or unmanaged on land as a result of construction activities.

Mitigation measures to minimise potential impacts from land disturbance on soils and landforms include the following.



- Dry excavation of the marina basin.
- Ongoing geotechnical investigations.
- Staged construction as detailed in Section 3.4 of this EIS to minimise extent of exposed surface and subsurface material.
- Progressive stabilisation and rehabilitation of disturbed areas to protect exposed earthworks.
- Development of an erosion risk map to inform the site specific erosion and sediment control planning by the Contractor.
- Installation of engineer-designed temporary and permanent erosion protection measures in accordance with the Institution of Engineers (Qld Division) Manual for Erosion and Sediment Controls to adequately contain runoff from all areas of disturbed land and promote controlled releases, and which will include:
 - o silt curtains during dredging of the weir structure;
 - sediment control fences down gradient of exposed earthworks and stockpiles;
 - sedimentation ponds and basins designed to capture runoff from a 1 in 5 year 24 hour rainfall event;
 - o check dams;
 - o cut off drains;
 - o gross pollutant traps;
 - o bunding of chemical and fuel storages;
 - chemical surface stabilisation;
 - erosion control mats;
 - o mulching;
 - o soil cement treatment;
 - o surface roughening;
 - o vehicle/equipment shakedown areas;
 - vehicle/equipment washdown areas; and
 - o stormwater and overland flow diversion structures.

Temporary and permanent erosion and sediment control devices are proposed to be installed prior to the commencement of works and are ti be checked daily.

A Stormwater Management Plan has been prepared by Parsons Brinkerhoff and is presented as Appendix H1. The Stormwater Management Plan aims to preserve natural flows to the waterways and wetlands that feature within and surrounding the site and to minimise the increase in pollutant loads to these environmentally sensitive areas during the operation of the NEBP development. It was identified that stormwater runoff from unmanaged development will not meet the adopted water quality objectives for total suspended solids, total nitrogen or total phosphorus. As such a number of key mitigation measures have been added into the design of the development including grass swales, bioretention swales, litter and trash racks, gross pollutant traps and constructed wetlands.



4.2.2.4 Landscape Character

The Structure Plan has been designed with a significant component of open space, which will ensure that the significant components of the landscape character are retained whist protecting the NEBP from flood impacts.

Changes to topography are addressed under relevant sections including soil erosion, land contamination and stormwater management.

Riparian vegetation and paperbark stands will be protected where practicable and vegetation will be enhanced by the rehabilitation of a proposed 100m buffer adjacent to the river, with broad scale clearing offset by significant open space planning and landscaping.

The open space planning has been undertaken by Place which has proposed plantings with a variety of species suitable to the terrain and landscape objectives. Detailed landscape planning will be undertaken at the detailed design stage.

4.2.2.5 Visual Amenity

A Scenic Quality and Visual Impact Assessment has been prepared by Studio Tekton, and this is presented in Appendix Q. The major views, view sheds, existing viewing outlooks, ridgelines and other features contributing to the amenity of the area including the identification of areas of the proposal that have the capacity to absorb land use changes without detriment to the existing visual quality and landscape character and value of exiting vegetation as a visual screen were assessed using the following methodology.

- 1. Likely visibility of proposed buildings through use of site cross-sections incorporating both existing and proposed vegetation.
- 2. Review of the exiting landform of the site and surrounding area in order to define the view shed of the proposed structures above 16 metres.
- 3. Verification of heights using a cherry picker crane with buckets at 25m and 36m above the natural ground level from several locations.
- 4. Review of the 3-dimensional imagery produced by V2i to comment on the likely visual impact.

Site cross-sections in the Scenic Quality and Visual Impact Assessment have been illustrated for the MIBA entry, river flat low lying terrain and Marina Village residential precincts and rural residential/residential east interfaces.

It was determined that development opposite the Bruce Highway will create a marker for traffic signifying passing the town of Caboolture which the Highway currently lacks.

Residential precincts adjoining the boundary of the development will be low scale and in keeping with a Residential Area Zone of 2 storeys and therefore no impact is anticipated.

Under the planning scheme building heights must not detract from the amenity of adjoining or surrounding uses through direct overlooking of private areas, blocking or significantly impinging upon the penetration of desirable natural light and breezes or impending significant view corridors.

As such a view shed analysis focused on taller structures of the business park and marine village precincts where there is potential for observers to see buildings which differ significantly from rural or rural residential low density housing, cause a shadowing effect or block sea breezes. Buildings above 16m are expected to be visible from the Glass House Mountains but with these viewpoints being 16km from the site with a background of rural land, and Deception Bay being some distance further again, buildings will be viewed



against a terrestrial backdrop and will not adversely affect the scenic amenity of the Glass House Mountains providing building materials have no or low reflectivity.

Assessment of proposed buildings at 25m and 36m height within the MIBA determined that these buildings will be discernible in the distance above existing vegetation from Weir Road and Captain Wish Avenue however the impact is not significant due to the proposed vegetation which will mask the effect over distance.

No impact is anticipated views from on Trafalgar Drive, the Trafalgar Drive and Buchanan roundabout, Buchanan Drive near Coach Road, King Street/Bribie Island and Uhlmann road bridges from buildings proposed within the MIBA.

Taller buildings are also proposed for the Marine Village Precinct and this height was then assessed from a number of viewing points. These buildings will be discernible from Beachmere Road and the Timothy Esplanade jetty but with the distant tree line, buildings while visible will have a minimal visual amenity impact.

Views are unaffected from boat ramps at Saint Smith Road and Uhlmann Road, and from other locations to the west such as Weier Road and Forges Crescent.

Lots fronting Farry Road and Buckley Road have a clear view of the site, but the low elevation means that the proposed foreground development, namely two-storey residential dwellings, and golf course vegetation will significantly mask these views.

In summary the location of the taller structures in the middle of the NEBP will ensure that the higher buildings are mitigated by a transition zone of either lower buildings or vegetation, generally a combination of both, that does not dominate the views or impact on the visual amenity from view points surrounding the site.

The following mitigation measures are suggested to reduce the visual impact of the NEBP development during construction and operation:

- use sites within the inundation area where possible for temporary building structures;
- suppress dust during construction phases while transforming the topography of the site;
- screen temporary storage compounds and construction buildings to prevent impact to Farry Road residents before replanting;
- reinstate edge vegetation at property boundaries and access roads progressively;
- utilise landform character to blend embankments into the natural landform of the area; and
- vegetate banks of the Caboolture River with endemic native species.

4.2.2.6 Lighting

The proposed development has the potential to impact upon adjoining properties in a number of ways including:

- light spillage from fixed lighting;
- potential glare and intrusion of fixed lighting; and
- potential glare and intrusion from headlights associated with vehicles accessing the site.

No detailed lighting design is available at this stage however it is assumed lighting will include:



- pole mounted ground level car park flood lighting;
- low level bollard lighting to car parks, marina village and marina;
- security florescent lighting to building permitters with appropriate glare shields where required by location.

The Structure Plan allows for effective buffering of the surrounding areas from light spillage by vegetation or single residential precincts or landscaping in the case of the marina village precincts.

The following strategies will be incorporated into design planning to minimise further light spillage from the proposal:

- landscaping and site fencing to assist in the containment of lighting within the project area;
- use of low-level bollard lighting to car parking areas, marina and other areas where possible;
- transitional lighting from exiting roadways/residential areas; and
- use of low-glare external advertising signage.

4.2.2.7 Transport

This section provides details of the expected impacts on the existing road network rising from the development proposal. Mitigation strategies for a reduction of impacts from traffic on external and internal roads during construction and operational phases of the proposed development are also discussed.

CEO has prepared a Traffic Impact Assessment (TIA) which has influenced this section of the EIS. The TIA is presented in Appendix K1.

Impacts on the Existing Road Network

The TIA identifies potential impacts on the following key roads.

- Uhlmann Road east of the Bruce Highway interchange.
- Buchanan Road.
- Bruce Highway.
- Buckley Road.
- Coach Road.
- Nolan Drive.

Existing traffic volumes in the TIA were determined by manual count taken on 16 March 2006 during peak periods between 6.00am – 9.00am and 3.00pm and 6.00pm.

Strategic modelling was undertaken based on proposed land uses and yields to establish the following.

- potential impacts on the broader transport network;
- background traffic growth without the NEBP; and
- expected distribution of development generated traffic trips.

The predicted traffic volumes on external roads is presented in Table 35 below. The total volume of traffic generated by the NEBP development in 2016 will be approximately 37,700 trips with 29,500 of these external to the site. Analysis suggests that development impacts



are expected to be relatively limited outside of the immediate area with the initiative of providing local employment opportunities thereby reducing long distance trips.

Road	Location	2016 base	2016 base + NEBP	Diffe	rence
Bruce Highway	North of Bribie Island Road	85,953	86,771	818	1%
Bruce Highway	North of Buchanan Road	116,851	120,180	3,329	3%
Bruce Highway	South of Buchanan Road	111,145	112,426	1,281	1%
Bruce Highway	South of Uhlmann Road	127,496	130,587	3,091	2%
Bruce Highway	South of Old Bay Road	130,736	131,750	1,014	1%
Bribie Island Road	East of the Bruce Highway	39,622	40,532	910	2%
Lower King Street	West of the Bruce Highway	29,673	30,061	388	1%
Buchanan Road	West of the Bruce Highway	26,224	31,104	4,880	19%
Morayfield Road	South of Buchanan Road	34,308	34,042	-266	-1%
Morayfield Road	North of Buchanan Road	48,322	49,706	1,384	3%
Graham Road	South of Glenwood Drive	20,584	21,275	691	3%
Uhlmann Road	West of the Bruce Highway	16,033	17,617	1,584	10%
Morayfield Road	South of Uhlmann Road	11,832	11,107	-725	-6%
Morayfield Road	North of Uhlmann Road	27,289	27,638	349	1%

 Table 35
 Modelled Traffic Volumes

Therefore the traffic assessment has focused primarily on the capacity and operation of roads in the local area.

Background traffic volumes (without the NEBP development) were determined from predicted traffic growth rates obtained from CSC and DMR and additional sources were used to determine impacts from the development on local roads including Uhlmann Road, Buchanan Road and Buckley Road and relevant sections of the Bruce Highway.

Traffic growth rates vary significantly with high growth rates (3-10%pa) adopted for the years 2006-2016, stabilising in the long term period 2016-2031 between 3 - 5%pa for Buchanan Road and Uhlmann Road interchanges. A nominal 3%pa growth was applied to through traffic on Uhlmann Road, Buchanan Road and Buckley Road. Growth rates on the Bruce Highway have been adopted in accordance with the 'Bruce Highway Upgrade, Uhlmann Road to Caboolture Bypass' report produced by Arup for the DMR in July 2006.

Traffic growth rates adopted are considered to be conservative to assess future traffic operations and upgrades potentially required at these locations.

Traffic distribution was also modelled. The following broad distribution of traffic across the local road network has been adopted based on distribution patterns identified in the CEO model.



- Bruce Highway North 35%.
- Buchanan Road West 30%.
- Uhlmann Road West 5%.
- Uhlmann Road East 2%.
- Buckley Road South 1%.
- Bruce Highway South 27%.

The internal distribution of traffic has also been assessed to determine the external traffic demand of the future residents.

Development traffic volumes including percentage of heavy vehicles have been determined based on yield data for the Residential Precincts, MIBA and Marina separately. Ultimate traffic generation potential has been assessed based on existing survey data, review of reference documents and the experience of CEO. Ultimate traffic volumes are presented in Table 36 below.

Land Use	Daily		AM Peak		PM Peak	
	Total	External	Total	External	Total	External
Residential	14,394	7,950	1,439	717	1,439	618
Business Park - Industry	33,045	25,950	3,304	2,554	3,304	2,436
Business Park – Neighbourhood Centre	4,000	0	400	0	400	0
Marina Village	9,283	3,523	444	133	1,355	593
Other	2,120	1,160	132	95	235	196
TOTAL	62,842	38,582	5,719	3,499	6,734	3,844

Table 36 Ultimate Traffic Volumes

Adopting the traffic generation rates and distribution parameters discussed for the proposed development, the potential traffic generation has been assigned to the road network. Background traffic with development volumes have been presented in the TIA for various stages of the development. Traffic volumes for stages 1 and 2 and ultimate traffic volumes are appended to the TIA (Appendix K1).

A road works program has been prepared for the short term works that would be required to cater for the initial stages of the development. In short the works are generally limited to the Buchanan Road access and intersections with the Bruce Highway on and off-ramps. In the longer term, additional works would be required along the Bruce Highway, Buchanan Road interchange, Uhlmann Road interchange and Buckley Road/Uhlmann Road intersection to provide a high capacity network with the ability to cater for the 2030 future year design horizon. Upgrading would be required to provide traffic signal control at all of the above intersections, duplication of both overpasses and additional lanes along the Bruce Highway.

Short and long term upgrades considered in the road works program based on background traffic volumes and expected traffic generation resulting from the NEBP are listed below.



The following upgrades to intersections will be required.

- Minor upgrading to a dual lane roundabout at the Buchanan Road/Bruce Highway Northbound Intersection to cater for background plus Stage 2 traffic volumes. A further intersection upgrading to a signalised layout will be required prior to the completion of Stage 2 for further stages of the development.
- Minor upgrading to a dual lane roundabout of Buchanan Road/Bruce Highway Southbound Intersection to cater for background plus Stage 2 traffic demand. A further upgrade to a signalised form, with additional turn and through lanes will be required prior to completion of Stage 2 to accommodate further development traffic.
- Upgrade to the Uhlmann Road/Buckley Road Intersection to a signalised layout with additional lanes on the eastern and northern approaches and slip lanes for left turns from the south and west by 2020 to provide adequate capacity for the 2030 design horizon with full development traffic.
- Upgrade to the Uhlmann Road/Bruce Highway Northbound Intersection to allow for additional through and turn lanes to meet 2020 and 2030 demands.
- Upgrade to the Uhlmann Road/Bruce Highway Southbound Intersection to accommodate projected 2020 background traffic volumes.

The following upgrades (from analysis of ramp densities) to the Bruce Highway will be required.

- Widening the Bruce Highway to 8 lanes by 2020 to accommodate predicted background traffic volumes without development traffic. This is supported by the findings of a report by Arup commissioned by DMR, which recommends widening of the Bruce Highway to 8 lanes south of Buchanan Road and 10 lanes to the north of Buchanan Road in 2021.
- With the Bruce Highway widened to 8 lanes, upgrades should also be undertaken to provide two lane ramps at the Uhlmann Road northbound off-ramp by 2020 and Buchanan Road southbound off-ramp by 2030. Two lane ramps would operate satisfactorily providing a reasonable life for the works involved in 8 lanes.

The following upgrades (from midblock analysis) to local road configurations will be required.

- Buchanan Road will require upgrading to 4 lanes, west of the Bruce Highway sometime prior to 2030 due to a growth in background traffic volumes. With development traffic, Buchanan Road will likely require upgrading to 4 lanes before completion of Stage 3, expected to occur sometime around 2011 including widening of the approach roadway to properly develop stand up lanes.
- Uhlmann Road will require upgrading to 4 lanes west of the Bruce Highway by 2013.

The ultimate configurations of Buchanan Road and Uhlmann Road are illustrated in Figure 11.

A 2 lane configuration of Buckley Road is expected to be sufficient to cater for the background plus development volumes scenario in 2030. It should be noted that the standard of the link will need to be improved to accommodate the higher vehicle, bicycle and pedestrian demand.

The Proponent would be responsible for the majority of works at the Buchanan Road interchange and development access. Works required along Uhlmann Road and the Bruce Highway are generally driven by growth in background traffic, although the development would be likely to influence the timing of works. Suggested works have been proposed in consideration of local and state network planning and the proposed works are generally



consistent with the Planning Scheme, DMR infrastructure program and with the recommendations of the Bruce Highway upgrade study prepared by Arup.

Consideration has been given to Section 10.4 of the SEQ Regional Plan 'Protecting Key Sites and Corridors' in planning for traffic management, specifically in the development of a Transport Management Plan.

It is important to note that discussions and cooperative research with DMR in relation to the North-South arterial corridor which is proposed to be constructed through the NEBP development has been undertaken. The development site layout and transport network has been designed to accommodate a high capacity link to or through the site, should this be required in future years.

Heavy Vehicle Management

Heavy vehicles will be encouraged to access the MIBA using Buchanan Road and access the Bruce Highway.

Intersection treatments which are proposed as part of the overall upgrade of Buckley Road could also include roundabout or deviated T intersection treatments at Northwood Drive, Ridgewood Drive, Cobb Road and Coach Road to reinforce a lower speed environment and reduce the attraction for larger vehicles to access the site using these routes. Heavy vehicle movements along these roads shall also be restricted by signage and load limits.

Road Spill Contingency Plans

Internal road upgrades and maintenance will be undertaken under a body corporate agreement. A procedure to identify when road upgrades and maintenance is required long term will be investigated at a later stage of the development when further detail on road layout, cross sections and design is available.

Spill contingency plans for the road traffic related spills within transport nodes will be developed as part of the operational management plans.

The site is located close to Caboolture centres and local businesses offering waste services which can be contracted to attend to spills of a large scale requiring disposal of contaminated material. A Waste Management Plan has been prepared for the NEBP development and addresses the transport and disposal of waste material off site.

Traffic Noise

The Noise Impact Assessment commissioned by NEBP Pty Ltd and prepared by Cardno (2007) demonstrates that noise emissions from heavy construction vehicles are expected to negatively impact on Residential Area A (Trafalgar and Nolan Drive Residents) which is in close proximity to the major entry and interchange off the Bruce Highway during construction phases. It was a recommendation in this report that construction traffic be restricted from accessing the site to between the times of 6.30am and 6.30pm Monday to Saturday.

Heavy vehicle management during the operational phase of the development has been discussed above, and the proposed mitigating strategies are expected to address potential noise impacts during the operational development phase at noise sensitive places.

Existing attenuation distances will be sufficient to mitigate noise impacts in the long term from ultimate traffic volumes on Buchanan Road which is the preferred traffic route for heavy vehicles accessing the business park.



Traffic Emissions

Air quality modelling completed by Katestone, and provided in Appendix O, identified no adverse impact at sensitive places from an increase in exhaust fumes is expected with existing attenuation distances generally greater than 10 metres from the road edge at a worst case scenario. This scenario assumed a congested road with 40,000 vehicles accessing the road daily with 10% of vehicles as heavy vehicles, and a road gradient of zero.

Transport Management Plan

The ToR requires a Transport Management Plan (TMP) detailing how development transport would be provided for and managed over the longer term, including the provision for public transport, walking and cycling networks.

A TMP has been prepared by CEO and can be found in Section 9 of the TIA presented as Appendix K1. The TMP is guided by key goals and targets which have been identified in planning documents produced by the Local and State Government, including the Planning Scheme and SEQ Regional Plan.

The NEBP represents a significant opportunity to develop an iconic and attractive recreational path network which could attract local and regional visitors to the site. There is a specific intent to provide a high quality recreational and commuter network with very convenient and safe connections to current and proposed future external attractions.

A range of travel demand management strategies have been developed to maximise opportunities for the NEBP to achieve increased use of sustainable travel modes. These strategies include mechanisms to increase the awareness of available public transport, bicycle and pedestrian networks, which could include signage, direct advertising and web site information. Other transport modes including golf buggies have also been considered for the NEBP.

A new regular bus route from the NEBP to destinations including Morayfield and Caboolture rail stations, Caboolture town centre and Morayfield regional shopping centre would be appropriate in light of the existing and proposed development east of the Bruce Highway and achieving regional connectivity to the NEBP.

A short-term strategy to achieving key goals and objectives would be for NEBP Pty Ltd to fund a privately operated bus service connecting the NEBP to surrounding centres and existing public transport services. In the long term it is expected that this service would eventually fall under the responsibility of the State Government (TransLink).

A comprehensive local and regional pedestrian and cycle network is planned by CSC in the area development locality. With a substantial area reserved for open space within the NEBP, a high level of connectivity is expected to existing and planned pedestrian and cycle networks will be achieved, in addition to an extensive internal pedestrian and cycle network.

More detailed structure planning will be undertaken during the detailed design phases of the NEBP to clearly define the internal pedestrian and cycle network; however, a set of guiding principles has been established which will facilitate appropriate and logical provision of infrastructure on road corridors. Off-road paths would be provided throughout the NEBP to and within key precincts including the residential, golf course, and parkland areas.

The conceptual public transport, pedestrian and cycle network is shown in Figure 13.



A range of travel demand management strategies have been developed, and included in the TMP, to maximise opportunities in the NEBP to achieve increased use of sustainable travel modes including the following.

- Way-finding signage.
- Welcome packages for residents and businesses.
- Travel Information on a website.
- Recreational Pedestrian and Cycling Network.
- Golf Buggy Network.

4.3 Waste

4.3.1 Description of Environmental Values

The NEBP site is currently privately owned and used for cattle grazing, and there is evidence of illegal waste dumping and vandalism on site. The majority of the site is disturbed and has previously supported exotic pine plantations for forestry purposes.

Prior to commencement of construction in Lot 10 RP902079 a small area of contaminated soil associated with a former underground fuel storage tank will require to be remediated. This must be in accordance with the approved RAP which is attached to the CEMP presented as Appendix X2. Actions will include the following.

- Excavation of the underground fuel storage tanks, bowser and vent pipe and disposal off-site.
- Excavation of petroleum hydrocarbon affected soil which is to be validated and bioremediating on site or disposal off site.
- Excavation of any soil found to be contaminated as a result of further testing and disposal off site.

Any waste produced from removal of the underground storage tanks and associated infrastructure, including the contaminated soil will be disposed of at an appropriately licensed facility in accordance with a Disposal Permit issued under the conditions of the Contaminated Land section of Chapter 7, Part 8 of the EP Act.

Until the remedial actions are undertaken, the requirements outlined in the SMP, will manage the contamination of the area to protect human health and the environment.

4.3.2 Potential Impacts and Mitigation Measures

Some risks to the environment may occur as a result of waste management activities. The environmental risks range from potential environmental harm, such as pollution of waterways, to environmental nuisance, such as odour complaints. The potential impacts of the proposed development on the receiving environment are listed below.

- Waste spills and loss of containment of waste resulting in impacts to soils, surface water, groundwater, terrestrial and marine fauna, and human health.
- Flooding of temporary waste storage areas causing dispersal.
- Littering and contamination of waterways.
- Plastic waste causing mortality to marine fauna.
- Waste spills and related incidents from transportation of waste on and off the site.



- Cross contamination of wastes, making wastes unsuitable for reuse and/or recycling, thus increasing the quantity of waste being disposed of to landfill.
- Increased pressure on regional landfills, requiring early closure and replacement.
- Odour and noise generation from waste handling and storage.
- Propagation of pests, vermin and disease vectors.

To minimise the impacts outlined above, the following mitigation measures will be undertaken during construction and operation of the proposed development:

- Wastes to be managed in accordance with the *Environmental Protection (Waste Management) Regulation 2000.*
- Waste avoidance, minimisation, reuse and recycling principles to be utilised wherever possible, especially those provided in Section 2 and 3 of this report.
- Wastes to be segregated to assist in recovery and recycling.
- Construction and demolition wastes to be reused and recycled, wherever possible.
- No disposal of solid or hazardous wastes on site.
- Construction Materials will be fabricated off site where possible to minimise the generation of waste.
- In order to reduce waste volumes, where possible, all wastes generated from construction and operational activities will be reused on site or sent to recyclers. Disposal to appropriately licensed waste facilities will only be undertaken where reuse or recycling is not possible or feasible.
- Where appropriate waste generators will be encouraged to segregate wastes at the source to minimise cross contamination of waste streams.
- Waste will only be transported by appropriately licensed waste transporters.
- Colour-coded and/or labelled bins will be provided for each waste stream to assist in the segregation of wastes and maximise waste recovery and recycling.
- Alternatives to plastic bags to be provided at retail outlets.
- Design of marina waste facilities in accordance with 'Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand'.
- Operation of the marina with regard to the Marina Industries Association of Australia (MIAA) 'Clean Marinas' accreditation programme.
- Records of waste quantities removed from the site are to be maintained.
- A waste audit will be conducted when the development is operational and when each new stage of development becomes operational. The purpose of the waste audit will be to identify:
 - o types and volumes of wastes generated;
 - o further opportunities for waste avoidance, reuse and recycling;
 - waste storage and segregation methods;
 - waste treatment and disposal techniques; and
 - o destination of waste materials.

A Waste Management Plan is to be developed and implemented, which incorporates the mitigation measures outlined in the previous and current sections of this report. The Waste



Management Plan is included in the Waste Management Technical Report provided in Appendix Y2.

A summary of the wastes generated during construction and operation of the development and their proposed waste management technique is provided in Table 37.

Waste Source	Waste Type	Waste Management Technique
Construction	Fill and soil (not contaminated)	Reuse
Construction	Fill and soil (contaminated)	Disposal
Construction	Dredge spoil	Reuse, as fill
Construction	Tailwaters from dredge spoil disposal.	Treatment and discharge or disposal
Construction	Acid Sulfate Soils	Treatment and reuse
Construction	Groundwater seepage during excavation	Treatment and disposal
Construction	Timber	Reuse
Construction	Vegetation	Reuse, as mulch/compost
Construction	Scrap metal	Recycle
Construction	Cable and wire	Recycle or disposal
Construction	Concrete, bricks, tiles and rubble	Reuse as crushed aggregate, where feasible
Construction	Plasterboard	Reuse or disposal
Construction	Packaging wastes, plastic, glass and timber	Recycle
Construction	Domestic and general waste	Disposal
Construction	Organic and food waste	Compost
Construction	Domestic wastewater	Post treatment reuse
Construction	Contaminated stormwater runoff	Treatment and discharge or disposal
Construction	Diesel and other fuels	Recycle
Construction	Paint and other chemicals	Disposal
Construction	Water collected in waste storage and bunded areas	Treatment and discharge or disposal
Operation	Domestic waste	Disposal
Operation	Organic and food waste	Compost
Operation	Maintenance dredge spoil	Reuse, as fill
Operation	Green waste	Reuse
Operation	Domestic wastewater	Post treatment reuse
Operation	Metals	Recycle
Operation	Plastics	Recycle
Operation	Glass	Recycle

 Table 37
 Waste Management Summary



Waste Source	Waste Type	Waste Management Technique
Operation	Paper and cardboard	Recycle
Operation	Diesel and other fuels	Recycle
Operation	Hazardous and other chemicals	Disposal, through approved technology
Operation	Electrical and electronic equipment (E-waste)	Recycle or re-manufacture
Operation	Marina sewage pump out	Disposal
Operation	Contaminated stormwater runoff	Treatment and discharge or disposal
Operation	Water collected in waste storage and bunded areas	Treatment and discharge or disposal

4.4 Water Resources

4.4.1 Description of Environmental Values

This section provides a description of surface waterways and groundwater within the project area. Details are provided of the existing surface water drainage patterns, including flooding frequency and characteristics.

Parsons Brinckerhoff has produced a Stormwater Management Plan and a MIKE21 Flood Study, which are attached as Appendix H1 and I respectively. The Ecology Lab as prepared an Aquatic Ecology Investigation which is presented as Appendix L2.

The quality of coastal waters is discussed in detail in Section 4.5 and has therefore not been addressed in this section.

4.4.1.1 Surface Waterways

Background

The NEBP site is located adjacent to the middle estuary of the Caboolture River. Large parts of the site are within the Caboolture River floodplain, and tidal and freshwater wetlands occur throughout the lower areas of the site. Raff Creek traverses the site along with several natural, unnamed channels and some constructed channels.

The NEBP site is at the downstream end of a larger catchment that is approximately 2,554 hectares in area. The external catchment comprises undeveloped, previously agricultural land with residential areas and minor impervious surfaces comprising of residential buildings, pavements and roads. It is expected that minimal water quality treatment exists for the external catchments and therefore is expected that the water quality flowing through the proposed developed site is fairly poor.

Vegetation has been largely cleared from the terrestrial areas. The site was last used as a softwood plantation and prior to that was variously grazed and cropped. Natural vegetation occurs generally in the low lying areas of the site, including drainage lines, freshwater swamps, tidal creeks and banks of the Caboolture River. Vegetation communities are identified in more detail within the Terrestrial Ecology Assessment Report presented in Appendix L1.



The soils on the site vary from well drained to poorly drained, and soils within parts of the site have been identified as being PASS.

A key feature of the Caboolture River is the presence of a weir 19 kilometres upstream of the river mouth. This weir creates a freshwater reservoir used to supply the township of Caboolture. It also forms a barrier to saltwater intrusion from Moreton Bay and hence forms the upper limit of the estuary of the Caboolture River. This has important ecological implications because it reduces the amount of estuarine habitat present compared to the original river, it affects water quality (particularly salinity), and it impedes the movement of aquatic organisms within the river, many of which migrate between saltwater and freshwater.

There are relatively few creeks that flow into the Caboolture River downstream of the weir. The only creek passing through the project area is Raff Creek, part of the Gympie Creek system, which enters the site approximately 600 metres to the east of the south-western site corner and flows in a northeast direction towards the Caboolture River. The largest constructed channel traverses through the site in an east-northeast direction from the western border.

External to the site, Sheep Station Creek flows into the river from the south just upstream of the South Caboolture Sewage Treatment Plant. Goong Creek flows into the river from the north and on the opposite side of the river to the NEBP site. The largest tributary of the Caboolture River is King John Creek. This flows into the Caboolture River from the north and about 3 kilometres upstream of the river mouth, at Deception Bay. It is also well downstream of the NEBP site.

Stormwater runoff from the site generally flows to the waterways on site and thereafter to the Caboolture River. Significant catchment areas external to the development boundary generate overland stormwater flows that enter Caboolture River via the development site. Due to the relatively flat topography, low lying areas on the southern part of the site are poorly drained with minor ponding of water occurring after significant rainfall events.

Low lying areas adjacent to the Caboolture River are inundated during high tides. This is evidenced by the presence of marine vegetation within these areas, consisting of tidal mangroves and salt marsh communities.

Water Quality Values

Caboolture is experiencing rapid urbanisation. As a result, increased stormwater and treated wastewater discharges have increased sediment and nutrient loads flowing into the Caboolture River. The city of Caboolture sources its water supply from the Caboolture River, extracting from just upstream of the Caboolture weir, which is below the main population area. Treated wastewater is discharged upstream of the Bruce Highway Bridge. There are limited flows in the river and there is very little flushing of nutrients. The nutrients tend to accumulate leading to algal blooms.

Water quality within SEQ has received extensive consideration by government as a means of assessing the ecological health of Moreton Bay and the freshwater and estuarine components of rivers within the region. One initiative is the implementation of an Ecosystem Health Monitoring Program (EHMP). This program includes monitoring to assess the effectiveness of management actions within the Strategy and provides an audit mechanism for management action. The program began in 1999 and expanded to the Sunshine Coast in October 2001.

Reporting for the program includes the presentation of an Environmental Health Index (EHI) to identify whether water quality management objectives have been met (or how


monitoring data compare to objectives) and this has been used to generate report card grades for various waterways and parts of Moreton Bay.

The SEQ EHMP produced a 2006 Report Card for Caboolture River (Estuarine) with a grading of D. The main conclusions of the water quality were:

- increased concentrations of nutrients in the middle and upper reaches compared to 2005;
- turbidity generally low throughout;
- degraded bank and riparian habitats; and
- some nutrient processing.

Previous years' results include:

- 2001: C
- 2002: C
- 2003: C-
- 2004: C-
- 2005: D+.
- 2006: D
- 2007: D

Since 2000, the estuary of the Caboolture River has graded between C- and D, which is essentially "poor" to "fair" in terms of ecological health. The grades also show a gradual decline in health over the period of assessment, with the poorer grading in 2006 attributed to increased concentrations of nutrients in the middle and upper estuary compared to 2005, and poor riparian cover and bank stability (Healthy Waterways, 2007).

Previous assessments have identified low saturation of dissolved oxygen and elevated concentrations of total phosphorus. Compared to other estuaries in the program, the Caboolture River is intermediate, being similar to the Pine Rivers in 2006, better than the Logan, Bremer and Brisbane rivers, and below expectations compared to the Noosa, Mooloolah, Coomera and Nerang rivers.

The EPP Water has been used to identify the environmental values for the Caboolture River. These environmental values are used to determine the WQOs relevant to the development site. They are based on the importance of protecting the environmental values as determined by local stakeholders. Under the EPP Water all environmental values require protection; the ratings indicate the preference by local stakeholders. The values that are relevant to the tidal estuary include:

- high value: secondary recreation, visual recreation, cultural heritage, aquaculture, drinking water;
- moderate to high value: human consumer;
- moderate value: aquatic ecosystem, wildlife habitat, irrigation, stock water, farm supply, oystering; and
- low value: primary recreation, industrial use.



Water Quality Objectives

Queensland Water Quality Guidelines (QWQG)

The proposed development land uses are primarily made up of industrial, commercial and residential land uses. The potential pollutants expected in stormwater runoff from the site are referred to in Table 38 together with the relevant WQOs for Caboolture River based on the QWQG and the 'Caboolture River Environmental Values and Water Quality Objectives' report (EPA, 2007). Mid-estuary objectives are adopted as the site is draining into the Caboolture River.

Indicator	WQO	Environmental Value
Suspended solids	median < 20 mg/L	Primary contact recreation
Total Phosphorous	median 0.025 mg/L	Aquatic ecosystem
Total Nitrogen	median 0.30 mg/L	Aquatic ecosystem
Chlorophyll 'a'	median < 4 μg/L	Aquatic ecosystem
Dissolved Oxygen	Between 85-100 % saturation over a 24 hour period	Aquatic ecosystem
рН	Between 7.0 – 8.4	Primary contact recreation
Chemical contaminants	Free from chemicals or pollutants that are either toxic to humans, animals, plants and other organisms or irritating to the skin or mucus membranes	Aquatic ecosystem, Primary contact recreation. Aquatic Foods (cooked)
	Refer to ANZECC (1992) guidelines for chemical contaminants and tainting substances.	
Surface films and debris	Oils and petrochemical films should not be noticeable as a visible film nor detected by odour. Free from floating debris and litter.	Aquatic ecosystem Primary contact recreation
Faecal coliforms	1,000cfu/100 mL	Primary contact recreation Aquaculture
Turbidity	< 8 NTU	Primary contact recreation

 Table 38
 Water Quality Objectives for Aquatic Ecosystems- Mid Estuary

The WQOs specified by the QWQG for litter, hydrocarbons, heavy metals and faecal coliforms are not necessarily achievable with current best practice models. Until more appropriate WQOs are available for these pollutants, the maximum possible reduction in litter, faecal coliforms, hydrocarbons and heavy metals must be achieved, taking into account site topography and other constraints.

CSC Desired Mean Annual Load Reductions

The CSC Planning Scheme Stormwater Code (December 2005) gives specific outcomes required for water quality control in the Caboolture region. Specific outcomes of the Stormwater code (SO4) states:



The total effect of permanent water quality control measures [should] achieve reductions in the mean annual load generated by the development site at a minimum of:

- 80% for Suspended Sediment;
- 45% for Total Phosphorus; and
- 45% for Total Nitrogen.

The Stormwater Code notes that "should the overall effectiveness of the optimal treatment train for the development catchment not meet mean annual load reduction targets then specific concentrations as defined by local water quality or Brisbane City Council Water Quality Guidelines should be used as the water quality objective for stormwater discharging from development sites".

<u>Water Sensitive Urban Design – Design Objectives For Urban Stormwater Management</u> (Draft Implementation Guideline No. 7)

The Draft Implementation Guideline is currently under consideration by the Office of Urban Management (OUM) in consultation with several South East Queensland councils and working groups. CSC is noted in this list.

The document adopts a total water cycle management approach as the framework for managing urban water quality in SEQ. This approach endorses water sensitive design and is supported by State legislation.

The purpose of the draft document is to 'put forward a series of design objectives for use in the best practice management or operational urban stormwater quality and quantity across SEQ, as part of an overall WSUD approach'. The following extract detailed the stormwater quality design objectives:

- 80% reduction in total suspended solids;
- 60% reduction in total phosphorous;
- 45% reduction in total nitrogen; and
- 90% reduction in gross pollutants.

Adopted Water Quality Objectives

The adopted WQOs for the site are based on mean annual load reduction targets, as defined by the CSC Planning Scheme. Where additional criteria, such as the best practice guidelines noted in the Healthy Waterways documentation provide further guidance on appropriate reduction targets for additional pollutants, or are more conservative that the CSC Planning Scheme targets, these have been adopted. The median pollutant concentrations as detailed in the EPP Water have not been adopted as an assessment benchmark, but instead will be achieved through the principles of WSUD.

Therefore, the following reduction targets are adopted as water quality objectives for this development:

- 80% reduction in total suspended solids;
- 60% reduction in total phosphorous;
- 45% reduction in total nitrogen; and
- 90% reduction in gross pollutants.

The Healthy Waterways report (2007) states that:



"The application of WSUD principles through best management practices are a practical means of significantly contributing to the protection and achievement of Environmental Values and Water Quality Objectives in South East Queensland waterways and Moreton Bay".

Water Quality Objectives

CSC Shire Plan

The CSC Planning Scheme Stormwater Code (December 2005) gives specific outcomes required for water quality control in the Caboolture region. Specific outcome SO14of the Stormwater code states:

"Stormwater discharge is disposed of adequately and achieves the following:

- no worsening of downstream conditions;
- no adverse impacts on adjoining or upstream lots;
- discharge from the site does not cause nuisance to any person, property of premises;
- any discharge onto downstream properties does not result in an increase in concentration of stormwater; and
- any discharge does not cause erosion."

Water Sensitive Urban Design – Design Objectives For Urban Stormwater Management (Draft Implementation Guideline No. 7)

Table 39 below summarises the design objectives for water quality, as outlined in the Healthy Waterways guidance document.

Table 39	Design	Objectives	for Water	Quality
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Criterion	Design Objective
Frequency flow management	Capture and manage the first 15 mm/day of runoff from all impervious surfaces
Waterway stability management	Limit the post-development peak one-year Average Recurrence Interval (ARI) event discharge to the receiving waterway to the pre-development peak one-year Average Recurrence Interval (ARI) event discharge.

Adopted Water Quality Objectives

The CSC Planning Scheme Stormwater Code is used as the primary guide to achieve water quality objectives. However, it is acknowledged that the Healthy Waterways guidance will be considered during the next design stage as the application of WSUD principles (capturing of runoff and limiting the peak one-year ARI flow) are a practical means of stormwater management. Allowance is made in the Stormwater Management Plan prepared by Parsons Brinckerhoff (2007) for conceptual design of any post-development structures required to meet WSUD principles.

4.4.1.2 Groundwater

The Proponent commissioned Coffey to undertake a Groundwater Impact Assessment (2007) to determine the potential impact of the proposed NEBP development on the



groundwater regime. This study described the existing site conditions, identified groundwater stakeholders and determined the groundwater regimes and groundwater chemistry. The potential impacts are discussed in Section 4.4.2.2 of this EIS including appropriate mitigation measures to avoid adverse impacts to groundwater.

The technical report which has informed this section is attached as Appendix H2.

The Groundwater Impact Assessment refers to a number of existing reports previously prepared for the Proponent and to existing information from the DNRW and BoM. The Assessment also refers to the commissioned intrusive investigation to describe the existing hydrological environment as well as additional works undertaken by Coffey to describe the existing environment.

Local topography, geology, surface water runoff, rainfall volume and distribution and vegetation characteristics all influenced the existing groundwater regime in the proposal area. These aspects of the site are discussed in detail in 4.2, 4.4.1 and 4.8 of the EIS.

Standing groundwater levels were recorded both manually and by data loggers in 44 shallow drilled boreholes and 9 shallow and 3 deep standpipe piezometers across the site. A summary of groundwater levels at bores and piezometer locations is given the Groundwater Impact Assessment with a plan of borehole locations included in the in the Groundwater Impact Assessment, provided as Appendix H2.

Monitoring of groundwater levels demonstrate that rainfall strongly influences groundwater recharge with the rate of such recharge influenced by soil infiltration rates and rock porosity.

Daily changes in standing water levels were observed in bores and piezometers located close to the Caboolture River (i.e. <275m), which suggests tidal influence on groundwater levels. Tidal influence was also shown to have an impact on water chemistry.

Standing water levels in bores were observed to follow the topography gently and no high hydraulic gradient was observed in the shallow water system. The hydraulic properties of water bearing rock and soils were determined using pumping tests. The pumping parameters are discussed in Section 3.6 of the Coffey report.

Geological cross sections with approximate standing water levels are shown in Figures 4-7 of the Coffey report. Cross sections show the depth to the aquifers.

Groundwater quality was assessed over three water sampling rounds with results detailed in Appendices G1, G2 and G3 of the Coffey report. In some shallow boreholes, water quality parameters including ammonia, chloride, pH, sulfate, sodium, total dissolved solids exceeded the limits in the Australian Drinking Water Guidelines (ADWG).

Some shallow groundwater samples collected near the Caboolture River and associated tributaries within the project area had high total dissolved solids which indicated a brackish water type and some interaction between surface water and groundwater. Further investigation would be required to fully understand the extent of the surface water/groundwater interaction, particularly that of saline intrusion. Deeper samples further from the Caboolture River exhibited lower total dissolved solids indicating a deposit of fresh water, and this groundwater has the potential for use as irrigation and watering lawns.

Water samples at shallow bores (PZA1, PZB11, PZD2 and EBH1) can be categorised into the water group with higher magnesium, sodium, chloride and sulfate. Water samples at deeper bores (MBH12 and MBH13) exhibited a trend of lower sodium and chloride, and higher bicarbonate.



Sulfate levels in groundwater samples from shallow bores were higher than sulfate levels in deep bores indicating that there is some sulphide oxidation reaction occurring within the upper groundwater systems. Sulfate in shallower waters may be related to the presence of ASS at some locations.

Existing groundwater users within 3km of the project area were identified from a search of the bore database managed by DNRW. There are 18 existing bores in this area, and these are generally privately owned and used for domestic or agricultural purposes. A summary of the data on these bores, where available, is presented as Appendix I of the Coffey report. These results include borehole ID, location, standing water level (when drilled), and available groundwater quality. Pumping data, draw down and recharge at normal pump rates and seasonal variations of water levels were unavailable.

Within the site there are two existing boreholes located close to the homestead which are currently used to supply drinking water for cattle on site.

Ecological investigations since 2004 have identified ecosystems within the site which are potentially groundwater sensitive, specifically the Paperbark Swamp and Tidal– and Mangrove/Swamp Oak and Tidal– Saltmarsh communities. Due to the thick presence of low permeability clay units at these locations, it is believed that these ecosystems are likely to be more dependent on rainfall and tidal inundation than groundwater.

4.4.2 Potential Impacts and Mitigation Measures

4.4.2.1 Surface Water and Water Courses

Flooding

A MIKE21 flood model was prepared by Parsons Brinckerhoff, which is included as Appendix I. The flood model demonstrated that without mitigation, flood levels would increase across the site when developed in accordance with the master plan. Flood mitigation has therefore been incorporated into the site design, to offset the increased peak flood levels outside the development site.

Four mitigation cases were presented in the flood modelling report. In each mitigation option a combination of earth diversion banks and additional land cuts were required. The flood mitigation elements were located in four distinct areas within the development.

- North by-pass channel.
- Wider north by-pass channel.
- Raff Creek.
- Southern by-pass channel.

The preferred mitigation case consists of:

- north by-pass channel cut to 1.5 metres AHD, grass managed;
- wider north by-pass channel cut to 2.5 metres AHD, grass managed;
- Raff Creek cut to 2.0 metres AHD, grass managed;
- south by-pass channel cut to 1.5 metres AHD, grass managed; and
- eight earth diversion banks three near the marina, three on the eastern boundary, one in the north-western section and one in the mid section of the development.



It is estimated that the total earthworks required for flood mitigation purposes is 952,446 $\mbox{m}^3.$

The flood model demonstrates that the mitigated development scenario results in overall reductions in peak water levels during the 100 year ARI events across the flood plain. This is due to the flood mitigation works that increase the conveyance through the development site and therefore reduce the flood conveyance through the northern section of the lower Caboolture River floodplain (north of the Caboolture River).

The changes in the flow velocities within Caboolture River due to the flood mitigation works are insignificant when compared to the existing case velocities. The dredging of the existing navigation channel has the most significant impact on water velocity.

Overall the proposed works represent a net benefit for the community in terms of flooding. The peak flood levels will be lowered in much of the surrounding flood plain with localised peak flood level increases occurring only within the site boundary or in locations where existing infrastructure will not be impacted.

Stormwater Quality

Operational Phase

The Stormwater Management Plan, attached as Appendix H1, calculated the predicted pollutant loads entering the Caboolture River for the existing case, and for the developed scenario. The model shows that there is a significant increase in the pollutant loads for all pollutants in the unmitigated developed case, due to the increase in impervious areas and changes in land use types. Mitigation measures are therefore proposed to be incorporated into the development of the NEBP. Discharges into the Caboolture River from the site with mitigation in place are predicted to meet the adopted stormwater targets.

The proposed stormwater management measures for catchments are dependent on the land uses, catchment area and topography. Therefore, each catchment requires a unique treatment train. Treatment trains are a series of stormwater treatment measures located in a catchment to provide a staged approach to removal of stormwater pollutants from runoff. The key measures include (but are not limited to) grass swales, bioretention swales and constructed wetlands. The objective of the conceptual stormwater treatment design is to use the large areas of low lying floodplains for the location of large water quality treatment elements. These locations will need to be finalised in detailed design to ensure that they are suitably separate from the site's ecologically sensitive areas highlighted in previous studies.

The following outlines the treatment measures incorporated into the conceptual design.

- Swales (incorporating buffer strips) are used to convey stormwater and to remove coarse and medium sediment. They are included in most treatment trains to reduce pollutant loads. Swales can be incorporated into urban designs along streets, (within the median strip or footpaths), in parklands and between allotments where maintenance access can be preserved. Swales are typically at the upstream end of the treatment train.
- Bio-retention swales are located at the downstream end of a swale to provide efficient treatment through fine filtration, extended detention treatment and some biological uptake. They are particularly efficient at removing nitrogen and other soluble or fine particulate contaminants. They also provide conveyance.
- Constructed wetlands are shallow, extensively vegetated water bodies that use vegetation enhanced sedimentation, fine filtration and biological pollutant uptake processes to improve stormwater quality.



Undeveloped catchments do not require any treatment elements, but catchments with a large increase in impervious area require a number of treatment elements. The initial treatment for all land uses is the use of grass swales. Swales will drain via bio-retention devices into constructed wetlands. Treated stormwater will ultimately drain from the wetlands into the Caboolture River.

Construction Phase

During the construction phase of the project, measures to minimise erosion and control sediment export from the site will be implemented. The measures will be designed using the 'Institution of Engineers Soil Erosion and Sediment Control Guidelines'.

A detailed erosion and sediment control (ESC) plan will be produced before the construction phase of development to meet the above WQOs. The plan will address the following items:

- an assessment or erosion hazard, considering soils, topography, climate, timing and type of development;
- plans showing existing and final site contours;
- plans showing temporary and final drainage works;
- plans showing all earthworks, including all roads, re-grading and areas of cut and fill;
- plans showing location and type of all ESC treatment measures;
- plans showing diversions drains and bund to divert "clean" runoff around areas of disturbance;
- revegetation and rehabilitation program for the site;
- maintenance program for all ESC treatment measures; and
- details of construction methods, schedule and sequence for all ESC treatment measures.

Aquatic Habitats

An assessment of impacts on aquatic habitats within and outside the study site is presented in Appendix L2. The key activities and the assessments of resultant impacts on aquatic ecology are outlined below.

Construction of Marina Basin.

The proposed Marina basin covers an area of about 28.5 hectares and includes two small tidal creeks and a short section of river frontage of about 120 metres. These creeks are very narrow and shallow, and support small amounts of mangrove and saltmarsh habitat. Removal of these creeks constitutes a loss of less than 5% of each habitat on the project site.

Sampling of fish and decapods indicated these creeks are of limited value in terms of fish habitat. Therefore, loss of this area is considered to be of minor significance, with the potential to be more than compensated for by creation of fish habitat in the marina basin and rehabilitation of degraded wetland elsewhere on the site.

The method of construction of the marina basin would ensure isolation of the works from the Caboolture River until the basin was cut and formed. Water collecting in the basin during construction would be pumping into the river only if it were of an appropriate quality.



Navigational Dredging

The navigational channel that is proposed to be dredged occur outside the declared Fish Habitat Area and hence this would not be disturbed directly by the project. The channel is, however, within the Moreton Bay Marine Park and all efforts would be made to minimise any impacts within the park.

The use of a cutter suction dredge would minimise water quality issues within the river, as sediments would be removed as a slurry and pumped away from the river for treatment and use on the project site. The treatment of sediments on site would be subject to stringent environmental management in terms of runoff and acid soils.

No seagrasses have been observed in or adjacent to the navigational channel, hence no beds are predicted to be lost as a result of dredging. Similarly, mangroves and saltmarshes are naturally set back from the channel and would not be directly disturbed by dredging. The pipeline transferring slurry from the dredge site to the project site would pass over land and once a precise route is available, its potential impact on wetland habitat should be assessed and an alternative route found, if warranted.

The dredging of sediments from the river bed of the navigational channel would cause the removal and mortality of benthic organisms living on and within the sediments that are dredged. Our benthic surveys of the channel indicate a fauna typical of this habitat, but with limited diversity. Many of the benthic organisms are preyed upon by larger invertebrates and fish and the dredging potentially represents a loss of productivity within the lower reaches of the river.

This is mitigated naturally by the strong likelihood that disturbed sediments would be readily recolonised by benthos. Re-colonisation would occur via settlement of invertebrate propagules from the plankton and migration from adjacent, undisturbed areas. Re-colonisation would be expected to occur over timescales of months. During the relatively extended period of the dredging campaign it is predicted that large areas of the channel would function in an ecological sense in a similar way to the present.

In general, most fish would be able to avoid the dredge head and so would not be entrained in the dredge slurry. Some smaller bottom dwelling fish, such as gobies and flatfish would be entrained and lost. The impact of this loss is expected to be relatively small. Similarly, larger organisms such as dolphins, dugong and marine turtles would be most unlikely to be affected by the suction head as it is highly focused on the seabed. Moreover, the vessel moves relatively slowly and marine mammals and marine reptiles would be able to avoid it.

Foreshore Management

Currently there is evidence of unauthorised access and use of the foreshores of the property for fishing, camping, disposal of refuse and riding trail bikes. This is likely to contribute to erosion on the site and to general degradation. As part of the proposal, the foreshores would be managed to allow access for anglers, picnickers, etc, as long as minimum environmental standards were maintained. In addition, other parts of the foreshore with valuable habitat would be specifically protected.

A significant positive benefit of the proposed development is that there would be far greater control on shoreline access than is currently the case. This would help to enhance the management and ultimately the value of the Fish Habitat Area and improve the amenity of the region.

In addition to shoreline access, there is potential to create an environmental walkway through some of the mangrove and saltmarsh wetlands of the project site. Similar walkways



have proved to be very popular in several coastal towns and would provide an additional recreational and educational outlet for local residents and marina patrons.

The success of management action in relation to the marina basin, other precincts and the foreshore of the study site would be evaluated by periodic audits of the site and systems put into place. This type of approach has been applied to other marina complexes in Australia.

The design of the proposed development is such that direct physical disturbance to the Caboolture River would be confined to the marina entrance, with most of the foreshore of the property protected and improved. Clearly, one impact that needs to be addressed is the potential effect of vessels utilising the marina on the ecology of the river. Currently there are large vessels berthed at private moorings upstream of the proposed marina entrance at Monty's Marina, which is just downstream of the proposed marina entrance. Thus, there are already relatively large vessels within the river. The river is also subject to speed limits. Provided that vessels stay within the appropriate navigation channels and observe the speed limit, it is predicted that there would be little increased impact on the ecology of the Caboolture River.

Stormwater and Sewerage Issues

The proposed stormwater system and associated management represent best practice in environmental management and water sensitive urban design, hence impacts associated with stormwater on the aquatic environment are predicted to be minimal. Sewage from the western portion of the project site would be pumped to South Caboolture STP, treated to a very high standard and then re-used as appropriate on the project site. This avoids the discharge into the Caboolture River of additional effluent that would be generated by the development.

Sewage from the eastern portion, including the marina precinct, would be pumped to East Burpengary STP. This effluent would not receive additional treatment and would ultimately be released into Deception Bay, with a risk of enhancing the frequency and magnitude of *Lyngbya* blooms. However, the proposed had identified that the additional effluent loading to the Burpengary STP would in fact trigger the upgrade of this plant and would therefore result in a higher level of treatment for all effluent from the STP.

Weeds and Pests

The EIS has identified the need to control harmful impacts that may be associated with the treatment of weeds and pests at the project site. Treatment of mosquitoes would be addressed by controlling habitat vital to their life cycle, with use of chemical control not a preferred approach. However, control of mosquitoes by controlling or altering habitat could affect estuarine wetlands. Such impacts are manageable but need to be considered explicitly in management plans. For example, any proposal to drain specific ponded areas should be accompanied by an assessment of impacts. In some cases, improving tidal exchange to ponds may retain habitat for fish and aquatic invertebrates whilst assisting in the control of mosquito larvae.

Mosquito fish (*Gambusia holbrooki*) were introduced into Australia and many other countries in the belief that they would control mosquito populations. These fish have been found to be very successful competitors for aquatic resources and are often considered to be a pest species. They can thrive in both fresh and brackish water and appear to prefer still waters. They occur in tidal channels and pools on the project site and in other parts of the Caboolture River. Constructed wetlands could be used by mosquito fish and management plans should include provision to inhibit, as best as possible, the spread of this species.



Lyngbya majuscula is a blue green alga that causes coastal algal blooms in Deception Bay and other parts of Moreton Bay. Measures proposed in relation to construction and management of the site are aimed at minimising the release of nutrients which could in turn lead to or enhance blooms. Two issues, however, need further consideration. First, the NEBP should ensure that the risk of micro-nutrients (e.g. iron) into the Caboolture River is minimised. This can be achieved by measures already proposed to address acid soils (disturbance of which could dissolve and hence mobilise iron compounds) and site runoff. These measures should be accompanied by water quality monitoring specifically targeted at metals and nutrients. Second, the additional loads of effluent from the East Burpengary STP could exacerbate blooms and, as stated above, it is recommended that a similar level of treatment and re-use be implemented at East Burpengary as proposed for South Caboolture STP.

Operation of the Marina

A Marina SBMP governing the operation of the marina is presented in Appendix Y1. The Marina SBMP covers a large range of activities, management, monitoring and funding arrangements. There is also a management plan developed specifically for the marina basin to cover monitoring and aquatic habitats. Given the exemplary operational activities of the Mackay Marina (The Ecology Lab 2003) it is considered that the operation of the marina at NEBP would have a strong likelihood of being able to manage operational issues in an environmentally effective way.

Maintenance Dredging of the Navigational Channel in the Caboolture River

Maintenance dredging would be required on a relatively frequent basis, with small amounts being dredged every two to three years and a large campaign required every five years. Key issues in relation to aquatic ecology include the following:

- Water quality including treatment and disposal of tailwaters.
- Ongoing disturbance to biota of the river channel during maintenance dredging.
- Impacts on adjacent sand flats, as dredged material is replaced by sand from these sand flats, which provide habitat for fish and invertebrates and protection for mangroves and saltmarshes that are located on the landward side.

Marina Water Quality

The marina will be separated from the Caboolture River by a navigation lock and tidal exchange system. The marina system is proposed to have a pumped exchange system that is designed to provide approximately 24 day turnover of the marina volume while maintaining the marina water level generally constant. The intake will be located at the opposite end of the marina to the outlet to minimise short circuiting and the turnover time is considered to provide the appropriate balance between flushing/residence time and maintaining the natural ecology of the marina.

A Marina Water Quality Management Plan has been prepared by Cardno Lawson Treloar, and is included in the Marina SBMP presented in Appendix Y1. There is potential for marina activities to impact on the quality of water within the Caboolture River, however with proper management, the likelihood and severity of any impacts will be minimised.

An important part of the maintenance of the Marina will be strict management of fuel, effluent, hazardous chemicals and restriction of boat maintenance activities. Key items within the Marina Site Based Management Plan (SBMP) which relate to the management of water quality include:

• on-site laundry and ablution facilities will be provided for live-aboards;



- effluent discharge within the proposed facility will be prohibited;
- a no release policy from vessels within the marina will be applied and no activities such as hull cleaning, abrasive blasting, painting or underwater processes shall take place within the marina;
- the provision of emergency marina response and maintenance plans, to ensure that any chemical or fuel spill, algal outbreak, water quality or aquatic weed problem is contained within the site and appropriately dealt with;
- fuel or hazardous chemical storage is to be appropriately managed and safeguarded. The refuelling station within the proposed facility will be to best practice standards to minimise any spilling or leakage into the waterway system;
- silt curtains are to be utilised during all maintenance dredging operations;
- waste reception facilities will be provided and maintained.
- booms, spill kits and containment systems will be provided on site for emergency use to contain spills;
- any wash down areas are to be fitted with spring loaded on/off valves which require the operator to physically hold the hose to obtain water and remain off when not in use;
- any waste water from any wash down area must not be directed to stormwater or waters of the marina; and
- dry vacuuming of paved areas rather than hosing is to be implemented.

The Marina will act as a short-term safeguard in the event that any spills may occur. The availability of a readily-deployable floating boom to prevent spread and dilution of the spilled material will also be an important part of the solution. Only residents and mooring owners will have access to the marina berths, and they therefore have a vested interest in ensuring that spills are quickly and economically controlled. Suitable education of all boat owners as to the following of correct procedure will aid this process significantly.

4.4.2.2 Groundwater

Groundwater modelling has been undertaken to simulate any drawdown of groundwater pressure heads within external bores that may develop due to the proposal, particularly from the proposed excavation for the marina, for bores external to the site.

The direction of groundwater flow is not expected to be affected by the proposed development.

Groundwater pressure head close to the marina basin (<400 metres) may temporarily decline during excavation due to the dewatering of the excavation, which will be undertaken in the dry. Groundwater pressure heads are expected return to normal on the flooding of the marina with only slight variations to the pre-development heads.

Lowering of groundwater levels during construction of the marina may however expose ASS. Once released the sulphuric acid and other toxic substances could be mobilised and enter the groundwater systems and migrate towards the Caboolture River. Management of earthworks will be in accordance with an Acid Sulfate Soil Management Plan to minimise the potential for impacts arising from exposure of ASS.

No impact on groundwater levels of existing bores beyond the area of marina excavation is expected.



No long-term impact on the chemistry of existing boreholes external to the project area is likely, because all are located up gradient from the development.

It is however possible that changes to groundwater chemistry may occur as a result of the development due to the introduction of roadways and industry. There is a potential risk of contamination from hydrocarbons from roadways and any petrol stations which may be proposed in the future however, the operational management of the site will be controlled to minimise such risks.

Changes to surface and slope stability from temporary changes to groundwater levels can also occur and may have design implications for the proposed development.

Recommendations for groundwater management to minimise the potential for each impact includes:

- monitoring of groundwater levels in existing monitoring bores adjacent to the proposed marina during marina excavation;
- conducting surface water monitoring to establish baseline on surface water quality and monitoring surface water runoff during construction upstream and downstream of the project area to determine quality of potential recharge;
- developing a monitoring program for groundwater chemistry to provide water quality data at the site pre and post development;
- designing the Acid Sulfate Soil Management Plan to contain and neutralise any ASS encountered and disturbed during excavation;
- conducting ongoing geotechnical investigations to reduce the risk of slope instability in the cut and fill areas to ensure appropriate building platforms are maintained;
- treating water runoff from marina excavation to acceptable levels prior to entry to the Caboolture River as tidal influenced groundwater has been identified; and
- minimising the excavation/construction phase to avoid long periods of acid sulfate soil exposure.

The recommendations contained in the Groundwater Impact Assessment have been incorporated into the following management plans which will be used to guide the development and operation of the site.

- Construction Environmental Management Plan.
- Acid Sulfate Soil Management Plan.
- Dredging Site Based Management Plan.
- Marina Site Based Management Plan.

4.5 Coastal Environment

4.5.1 Description of Environmental Values

4.5.1.1 Coastal Values

Certain areas and aspects of the NEBP site possess values recognised by the SEQ RCMP (refer to the Terrestrial Ecology Assessment Report (TEAR) presented in Appendix L1). These values are described below.

1. The northern and south-western sectors of the site are mapped as supporting areas of "Significant Coastal Wetlands" pursuant to Map 8: Areas of State Significance (Natural Resources) of the SEQ RCMP. The mapped areas of "Significant Coastal



Wetlands" along the northern boundary of the site encompass areas identified during field surveys as supporting riparian, mixed marine and disturbed Saltwater couch grassland communities The mapped area of "Significant Coastal Wetlands" in the southern sector of the site supports Paperbark (*Melaleuca quinquenervia*) open forest.

- 2. The south-western sector is mapped as supporting "Endangered Regional Ecosystems" pursuant to Map 8 Areas of State Significance (Natural Resources) of the SEQ RCMP. The extent of this mapped area is generally analogous to area described as the Scribbly gum woodland in the TEAR.
- 3. Whilst no part of the NEBP site is classified as being Shore Bird Habitat on Map 10A: Areas of Coastal Biodiversity Significance (Marine) of the SEQ RCMP, areas of Shore Bird Habitat do occur on adjacent land to the east and within the downstream sectors of the Caboolture River and Moreton Bay. Recognised Critical Shore Bird Habitat occur adjacent to the mouth of the Caboolture River.

It is also noted that past land uses have resulted in the degradation of the natural environment of the site and in this respect opportunities for rehabilitation of degraded coastal resources are available at the site.

The Coastal Management District (CMD) (formerly known as an erosion prone area) is declared under the CPM Act, and is generally defined as land up to HAT or extending 40m inland from MHWS, whichever is the greater.

The CMD is mapped by EPA at a large scale, and as such the mapped extent is subject to inconsistency when viewed at an individual site level. Cardno has defined the extent of the CMD to greater precision using aerial photography and using ground truthing data gathered during the terrestrial ecology assessment for the NEBP site. A map of the CMD as defined by EPA mapping and by Cardno is presented as Figure 14. The proposed development in relation to the CMD is illustrated in Figure 15 Further discussion of the CMD mapping is provided in Section 4.5.2 within the response to Policy 2.2.2 *Erosion Prone Areas*.

The coastal environment within the locality of the NEBP project area is described in detail within the following reports and a summary is provided below.

- The Ecology Lab Pty Ltd (2007) Proposed Redevelopment of Land at Caboolture: Aquatic Ecology Description of Existing Environment, Preliminary Assessment of Impacts & Outline of Environmental Management. This report is attached as Appendix L2.
- Cardno (Qld) Pty Ltd (2007) Matters of National Environmental Significance. This report is attached as Appendix L3.
- Cardno (Qld) Pty Ltd (2007) Terrestrial Ecology Assessment Report. This report is attached as Appendix L1.
- Cardno (Qld) Pty Ltd (2007) Caboolture River Siltation Study. This report is attached as Appendix M1.

The Caboolture River and the NEBP project area have a range of natural coastal features. Part of the Caboolture River is included within the Moreton Bay Marine Park. The river has been shown to support a diverse range of benthic and pelagic fish species, and the majority of the tidal reach of the river falls within the Deception Bay Fish Habitat Area. The eastern portion of the project area's northern boundary adjoins the Moreton Bay Ramsar wetlands and Moreton Bay Marine Park. The entire frontage of the project area adjoins the Deception Bay Fish Habitat Area.



4.5.1.2 Marine Vegetation

The entrance of the Caboolture River into Deception Bay is characterised by a well defined channel, with very broad sand flats within Deception Bay on either side of the entrance. A significant feature of the entrance to the Caboolture River is the presence of very large stands of mangroves on either side of the river mouth.

A large mangrove forest exists approximately 3 kilometres upstream from the mouth on the northern side of the river, just downstream of the confluence with King John Creek. Nearer the project area which is further upstream, the mangrove forests cover much smaller areas. The largest upstream mangrove forest occurs opposite the existing "Monty's Marina" and slipway, whilst a smaller stand occurs within the north eastern portion of the project area.

At the location of the proposed entrance to the marina very few mangroves have been observed, as land is predominantly cleared of vegetation from past activities. Within the project area, several small, mangrove-lined channels exist to the east of the proposed marina entrance.

A small tidal creek known as Raff Creek flows into the project area at about the middle point of the river frontage. This creek is mangrove-lined, flooding up to the mangroves at high tide and draining to show exposed mudflats at low tide. The tidal portion of Raff Creek is considered to be included within the Deception Bay Fish Habitat Area. Upstream of the tidal influence, this creek forms a drainage line.

Several parts of the project area's property frontage on the Caboolture River have extensive growth of mangroves supporting fish and benthic communities.

Marine vegetation distribution was mapped Cardno and is presented in Figure 16.

4.5.1.3 Water Quality

Caboolture River

This section describes the coastal resources of the potentially affected area with respect to values identified in the EPP Water.

The SCMP and SEQ RCMP in terms of development and use of the coastal zone refers to the EPP Water where environmental values and water quality objectives have been determined for coastal waters.

A set of Environmental Values and water quality objectives (WQOs) for the Caboolture River have been published by the EPA in the report, 'Caboolture River Environmental Values and Water Quality Objectives' dated March 2007. The WQOs are intended to protect the Environmental Values of the Caboolture River and achieve the objectives of the EPP Water.

The Environmental Values for the tidal waters of the Caboolture River are presented in Table 40 below.



Table 40	Caboolture	River	Environmental	Values
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Environmental Values	Caboolture River
Aquatic Ecosystem	\checkmark
Human Consumers	\checkmark
Primary Recreation	\checkmark
Secondary Recreation	\checkmark
Visual Recreation	\checkmark
Cultural and Spiritual Values	\checkmark
Industrial Use	\checkmark
Aquaculture	\checkmark
Oystering	\checkmark
Seagrass	✓

With these Environmental Values in mind, WQOs have been adopted for the Caboolture River as shown in Table 41.

Indicator	Water Quality Indicator				
	Deception	Lower	Mid	Upper	
	Bay	estuary	estuary	estuary	
Turbidity	< 6 NTU	< 6 NTU	< 8 NTU	< 25 NTU	
Suspended Solids		< 15 mg/L	< 20 mg/L	< 25 mg/L	
Chlorophyll a	< 1.6 μg/L	< 2 µg/L	< 4 μg/L	< 8 μg/L	
Total Nitrogen	< 200 μg/L	< 200 μg/L	< 300 μg/L	< 450 μg/L	
oxidised Nitrogen	< 2 µg/L	< 3 µg/L	< 10 μg/L	< 15 μg/L	
ammonia	< 5 µg/L	< 8 µg/L	< 10 μg/L	< 30 µg/L	
organic Nitrogen	< 190 μg/L	< 180 μg/L	< 280 μg/L	< 400 μg/L	
Total Phosphorous	< 30 µg/L	< 20 μg/L	< 25 μg/L	< 30 µg/L	
filterable reactive phosphorus	< 14 µg/L	< 6 µg/L	< 6 μg/L	< 10 µg/L	
Dissolved Oxygen (% saturation)	95-105	90-105	85-105	80-105	
рН	8.1-8.4	8.0-8.4	7.0-8.4	7.0-8.4	
Secchi Depth	> 1.3m	> 1.5m	> 1.0m	> 0.5m	

 Table 41
 Water Quality Objectives to Protect Aquatic Ecosystem Environmental Value

The water quality of the Caboolture River has been previously described in reports prepared by 4Site & Natural Solutions (Appendix M2) and the Aquatic Ecology Investigation (Appendix L2).

The 4Site & Natural Solutions report concluded that the overall water quality of the Caboolture River adjacent to the site is poor, which is evidenced by concentrations of dissolved oxygen, turbidity and nutrients.

The Aquatic Ecology Investigation has also shown that the water quality of the Caboolture River is under considerable stress. The water quality parameters measured in the Caboolture River in December 2005 and January 2006 show that the existing water quality is poor in relation to the WQOs stated in Table 41 above. The measured levels of nutrients



and suspended sediments were significantly above the WQOs and the levels of dissolved oxygen were significantly below the WQO.

The Ecology Lab Pty Ltd found that within the water column, levels of copper at all monitoring sites were high relative to ANZECC (2000) Guidelines, and zinc concentrations were also relatively high at two sampling points.

In summary, the water quality assessments undertaken in the Caboolture River have shown:

- high levels of turbidity;
- high levels of nutrients;
- generally low levels of dissolved oxygen;
- generally low concentrations of metals within the water and sediments, with the exception of copper and zinc; and
- pH is generally within recommended guidelines.

The results of project sampling are consistent with past monitoring by the EPA and CSC undertaken as part of the Ecosystem Health Monitoring Program (1999+) and the Caboolture River Water Quality Study (Counihan, R. *et al* 2002).

From these reporting mechanisms the overall water quality in the estuarine reach of the Caboolture River has also been described as poor. Trend analysis for the Caboolture River has shown gradual decline in health in terms of nutrients and turbidity with the poor grading attributed to natural and anthropogenic processes, specifically wastewater releases.

The Caboolture River Water Quality Study undertaken in 1999-2001 generally concludes, in comparison with the 'Queensland Water Quality Guidelines' (QWQG, 2006):

- good pH levels;
- good conductivity;
- poor downward trend in concentration of dissolved oxygen in the middle estuary;
- poor to good turbidity (generally poor in the middle estuary); and
- high concentrations of total nitrogen and total phosphorus, particularly between 4.8km and 17.1km upstream.

This report also identifies that pattern of poor water quality at estuarine sites was also evident in a number of other physical indicators, including the size and intensity of riparian vegetation, reach environs, bank stability and channel diversity. The riverbank erosion assessment of the Caboolture River (Cardno, 2007), which is attached as Appendix J found that the riverbanks of the tidal reach of the Caboolture River, from the estuary to upstream of the project area, particularly the middle estuary, are severely eroded.

As discussed above, it is well documented that the water quality in the Caboolture River over time has been deteriorating. This result has been linked in all studies to the following human activities (in no particular order of importance):

- coastal development;
- the installation of a weir 19km upstream from the estuary;
- unmanaged stormwater runoff; and
- wastewater releases.



4.5.1.4 Riparian Corridor and Tributaries

WQO's for riparian areas have also been developed under the EPP Water framework. WQO's for riparian areas located within the estuarine reaches of the Caboolture River catchment are presented in Table 42.

Table 42	Aquatic Ecosystem Environmental Value: WQO for Riparian Area	as

Riparian Function		
Ecological processes	Habitat	Bed and bank stability
 Maintain or restore marine plants to achieve: shade over the near bank areas; moderation of temperature and dissolved oxygen extremes; organic cycling of leaf litter for nutrients and energy; and transformation of diffuse nitrogen inputs. 	 Eradicate weeds and maintain or restore: in-stream debris; and marine plants, trees, shrubs and ground cover on the banks. 	Maintain and restore bank vegetation to minimise erosion.

Water quality data for the project area obtained by The Ecology Lab Pty Ltd (2007) indicate variable levels through time and among sampling locations. pH was often slightly lower than the ANZECC (2000) guideline which probably reflects low salinity at some of the times of sampling. Two values taken from the northern sector of the project area in August 2006 were comparatively low (pH = 5.44), but overall the values are close to neutral and there was little evidence of any acid runoff into the tidal creeks during the periods of sampling.

As with the Caboolture River, dissolved oxygen was variable, ranging from hypoxic to hyperoxic in a few of the readings. Turbidity was generally above the ANZECC (2000) guidelines.

Concentrations of metals in the water collected from the project area were minimal. ANZECC (2000) guidelines were exceeded for copper in one sample and zinc in another. While concentrations of nutrients often exceeded the guidelines, it cannot be determined on the data collected whether elevated levels of nutrients are of local origin or perhaps transported onto the site from the Caboolture River by tidal exchange.

4.5.1.5 Coastal Processes

Sediment Quality

Sediment samples were collected and analysed by The Ecology Lab and Coffey in 2007. The sediment samples show that concentrations of metals are generally low compared to ANZECC (2000) sediment quality guidelines, although nickel and copper were slightly greater than the ANZECC Effects-range Low guidelines in four samples. A detailed analysis of sediments within the project area and Caboolture River middle estuary can be found appended to the Ecology Lab Pty Ltd report which is attached as Appendix L2.

Downstream at the Caboolture River mouth, where dredging of the existing navigation channel is proposed, Coffey found the following:

- soils are PASS;
- no contaminants were present above the relevant guideline levels; and
- soils can be readily cut and pumped and will settle quickly.



A detailed summary of laboratory analyses for estuarine sediments are appended to Appendix R2 presented as a map of sediment types based on their physical and chemical properties. Depth profiles are included.

Bathymetry and Siltation

The following describes the existing coastal processes in the tidal reaches of the Caboolture River including bathymetry and tidal flows, and presents trends in sedimentation and erosion.

In the upper estuarine section of the river in the vicinity of the project area there has been a natural deepening of the river. However, since 1998, bathymetric survey shows that the bed level of the lower estuarine section of the River has increased, causing the water depth to become shallower.

The installation of the weir 19km upstream from the Caboolture River estuary has played a key role in loss of sediment transport downstream to the tidal reaches of the River and this is reported in the Cardno (2007) report entitled Preliminary Assessment of Riverbank Erosion (Appendix J).

Sedimentation in the lower estuarine section of the River is likely to be associated with reduced river flows during drought conditions and natural coastline drift processes. Historical bathymetric survey of the Caboolture River prior to 1998 is not available and as such the relationship between river flooding events and sedimentation of the lower section of the river cannot be quantified.

Tidal Flow Patterns and Levels

The tidal range at the mouth of the Caboolture River is approximately 2.6m. Table 43 provides the levels of the various tidal planes at the mouth of the Caboolture River.

Tidal Plane	Level (m AHD)
Highest Astronomical Tide	1.34
Mean High Water Spring Tide	0.81
Mean High Water Neap Tide	0.36
Mean Sea Level	-0.05
Mean Low Water Neap Tide	-0.57
Mean Low Water Spring Tide	-0.94
Lowest Astronomical Tide	-1.26

Table 43 Tidal Levels at the Mouth of the Caboolture River

Tidal flow patterns within the Caboolture River have been assessed as part the Siltation Study presented as Appendix M1 to assess siltation within the River following capital dredging of the navigation channel.

Moreton Bay is regularly subject to elevated water levels associated with meteorological events. The difference between the elevated water level and the predicted tide level is referred to as storm surge and when combined with the astronomical tide is referred to as storm tide. The Caboolture River discharges to Moreton Bay approximately 7.5km downstream of the project area and is subject to storm tides.

To date a specific storm tide assessment within Caboolture Shire has not been undertaken. It is understood that CSC, along with other Councils, is currently investigating the storm tide threat within Southeast Queensland, and it is anticipated that their investigation will be completed in the latter half of 2008.

Table 44 presents the storm tide levels at Cape Moreton, Brisbane and Point Lookout as reported by Harper (1998).

Tidal Plane	Tide Level at Average Recurrence Interval (ARI) (m AHD)					
	50 Years	50 Years 100 Years 500 Years 1000 Years 10000 Years				
Cape Moreton	1.3	1.3	1.5	1.5	1.7	
Brisbane	2.0	2.2	2.9	3.2	4.1	
Point Lookout	1.3	1.3	1.5	1.5	1.7	

Table 44Regional Storm Tide Levels

4.5.2 Potential Impacts and Mitigation Measures

4.5.2.1 Coastal Processes and Resources

The SCMP and SEQ RCMP will operate in conjunction with other policies and instruments in delivering the object of the CPM Act which is to:

- provide for the protection, conservation, rehabilitation and management of the coast, including its resources and biological diversity;
- have regard to the goal, core objectives and guiding principles of the National Strategy for Ecologically Sustainable Development in the use of the coastal zone;
- provide, in conjunction with other legislation, a coordinated and integrated management and administrative framework for the ecologically sustainable development of the coastal zone; and
- encourage the enhancement of knowledge of coastal resources and the effect of human activities on the coastal zone.

Policies contained in the SCMP provide guidance on how the coastal zone is to be managed including those related to coastal use and development and coastal processes.

The coastal zone has been defined under section 15 of the CPM Act as:

"coastal waters; or all areas to the landward side of coastal waters in which there are physical features, ecological or natural processes or human activities that affect, or potentially affect, the coast or coastal resources".

Coastal resources are defined under the CPM Act as:

"the natural (further defined as "natural and physical features and processes of the coastal zone, including wildlife, soil, water, minerals and air") and cultural (further defined as "places or objects that have anthropological, archaeological, historical, scientific, spiritual, visual or sociological significance or value such as significance or value under Aboriginal tradition or Island custom") resources of the coastal zone".

The RCMP provides specific management advice for protection of the coastal resources and their values within the coastal zone in the area to which it applies. The RCMP applies to an area that extends from and includes Maroochy Shire in the north to the Queensland-New South Wales border to the south and to the limit of Queensland waters to the east.



The RCMP has identified coastal resources at specific locations and associated values and pressures. The coastal resources relevant to the development proposal are tabulated below.

Coastal Resource	Specific Location	Values	Pressures
Soft- bottom (benthic) systems	Majority of Moreton Bay except coral and rocky reefs	 fishing habitat for native plants and animals nutrient sink and source nursery habitat biological productivity Indigenous Traditional Owner fishing practices 	 boating and anchoring catchment run-off trawling dredging and extraction land reclamation shipping access predicted impacts of climate change and sealevel rise invasive pests and weeds
Mid-water column (pelagic) systems	Marine waters	 biological productivity and diversity commercial and recreational fishing habitat for native plants and animals Indigenous Traditional Owner cultural resources feeding habitat and migration pathway for marine species 	 catchment run-off commercial and recreational fishing intensity sand extraction water pollution boat strikes on marine animals shipping access predicted climate change impacts (eg. ocean warming) recreational and tourism activities
Coastal and estuarine waters	Moreton Bay Major river systems throughout the region including Caboolture River	 scenic amenity recreational amenity Indigenous Traditional Owner cultural resources Indigenous Traditional Owner fishing practices cultural heritage habitat for plants and animals feeding and breeding habitat for marine species migration pathway for marine species recreational and commercial fish species setting for tourism activities setting for coastal dependent development 	 coastal development land clearing catchment run-off and siltation dredging and extraction land reclamation fishing intensity introduced marine species acid sulfate soil disturbance recreational/tourism activities boating boat strikes on marine species water pollution including industrial discharges predicted impacts of climate change and sealevel rise invasive pests and weeds dams, weirs, barriers

Caboolture and Moreton Bay Coastal Resources, Locations, Values and Table 45 Pressures



Coastal Resource	Specific Location	Values	Pressures
Indigenous Traditional Owner cultural resources	Coastal zone	 Indigenous Traditional Owner spiritual significance, cultural significance and knowledge systems 	 significance for Indigenous Traditional Owner self determination access impacts coastal development land clearing sand mining illegal collecting of native species recreation and tourism activities water extraction water pollution rubbish dumping boating and anchoring fishing intensity insufficient data records habitat loss boat strikes on marine animals dams, weirs, irrigation channels erosion and land degradation acid sulfate soil disturbance predicted impacts of climate change and sea-level rise decline in water quality loss of wetland habitat industrial discharges dredging reclamation disturbance from inappropriate human activity and domestic animals
Cultural Sites	Coastal Zone	 cultural understanding aesthetic features social and community identity scientific significance historic heritage educational role spiritual significance Indigenous Traditional Owner spiritual significance Indigenous Traditional Owner knowledge systems 	 insufficient data records land clearing coastal development lack of understanding and respect recreation and tourism activities predicted climate change impacts



The policies under the SCMP and RCMP that are applicable to the development proposed within the NEBP site include:

- 2.1.2 Settlement pattern and design
- 2.1.3 Coastal-dependent land uses
- 2.1.4 Canals and dry land marinas
- 2.1.5 Maritime Infrastructure
- 2.1.8 Dredging
- 2.1.10 Tourism and Recreational Activities
- 2.1.15 Non-tidal artificial waterways
- 2.2.1 Adaptation to climate change
- 2.2.2 Erosion prone areas
- 2.2.4 Coastal hazards
- 2.3.1 Future need for access
- 2.4.1 Water quality management
- 2.4.4 Stormwater management
- 2.4.5 Groundwater quality
- 2.4.6 Acid sulfate soils
- 2.4.7 Algal Blooms
- 2.5.2 Involvement of Indigenous Traditional Owners in managing their cultural resources
- 2.6.2 Cultural Heritage
- 2.8.1 Areas of state significance (natural resources)
- 2.8.2 Coastal wetlands
- 2.8.3 Biodiversity
- 2.8.4 Rehabilitation of coastal resources
- 2.8.5 Pest species management

The consistency of the development proposal with the principles of each Policy is discussed below. These policies address specific issues associated with physical coastal processes, water quality and environmentally sensitive areas. The assessment on the potential of the proposed works to impact on bank erosion is presented in section 4.5.2.2.

The consistency of navigational dredging with the relevant policies of the SCMP and RCMP has been addressed in the Dredging Site Based Management Plan (Dredging SBMP) attached as Appendix R3 with a summary version given in response to policy 2.1.8 *Dredging* in this EIS. It was generally concluded that whilst dredging may have a potential temporary impact on the coast, specifically relating to reduced water quality, there is a net benefit to the works which in addition to management strategies outlined in the Dredging SBMP offsets temporarily degraded water quality as the only quantitative identifiable impact.

Policy 2.1.2 Settlement Pattern and Design

Land on the coast has been identified under this Policy as a valuable and finite resource that has important ecological, economic and social values. As such, the development of



urban land uses has a major impact on coastal resources and needs to be carefully planned and managed to minimise adverse impacts.

To the extent practicable this Policy advocates that the coast is conserved in its natural or non-urban state outside of the existing urban areas. Growth of urban settlements should in particular not occur on or within erosion pone areas, significant coastal wetlands, riparian sites, sites containing important coastal resources of economic, social and cultural and ecological values, or areas identified as having or the potential to have unacceptable risk from coastal hazards.

Response

The NEBP development proposal involves a multi-use business park and marina concept on freehold land within the Caboolture Shire and is situated adjoining the Bruce Highway, the major gateway route for the population from Brisbane to north Queensland.

In recognition of the central location of the project area and substantial population growth within South East Queensland, parts of the project area have been designated for industrial development whilst the remaining area is zoned rural under the CSC Planning Scheme (which is consistent with planning for South East Queensland under the SEQ Regional Plan).

The proposal for the MIBA is located entirely within the area designated as District Industry however a material change of use is proposed to enable development of the remaining land as a marina and residential development that is complementary to the MIBA and ensures the economic and social viability of the entire development.

Comprehensive and extensive study has been undertaken in relation to interest areas of this Policy including the CMD (erosion prone area) (refer to response to Policy 2.2.2 *Erosion prone areas*), significant coastal wetlands (refer to response to Policy 2.8.1), riparian sites and sites containing high ecological values to inform the design of the development in order to meet the principles of ecologically sustainable development which is further discussed in Section 3.1 of this EIS.

With regard to Policy 2.2.2 *Erosion pone areas*, the CMD has been remapped as part of studies undertaken during the development design. The design has taken this mapping into consideration in order to avoid significant loss of the CMD and achieve Policy objectives. A 100m buffer is proposed between the development footprint and the Caboolture River has been incorporated in the master planning (apart from a lock which is proposed to provide access from the river to the marina). This will minimise the risk of erosion impacts, allow for short term fluctuations in the shoreline to occur without requiring the construction of future property protection works, and will be located entirely within freehold property.

With respect to the RCMP policies on areas of state significance (natural resources), the following points are relevant.

- The site is not mapped as supporting areas of remnant coastal vegetation.
- The northern and south-western sectors of the site are mapped as supporting areas of "Significant Coastal Wetlands" pursuant to Map 8: Areas of State Significance (Natural Resources) of the RCMP.
- The south-western sector is mapped as supporting "Endangered Regional Ecosystems" pursuant to Map 8. The mapped areas of "Significant Coastal Wetlands" along the northern boundary of the site encompass areas identified during field surveys as supporting Riparian, Mixed marine and Disturbed Saltwater couch grassland communities.



- The project area has been investigated and it provides potential habitat resources for a number of significant and migratory wildlife species.
- The site does not contain any coastal dune systems.
- Past land uses have resulted in the degradation of the natural environment of the site and in this respect opportunities for rehabilitation of degraded coastal resources are available at the site.

The mapped coastal wetlands within the project area are wholly conserved by the proposed environmental buffer zone (refer to the structure plan discussed in further detail under Section 3.3 of the EIS) however the coastal wetlands are highly disturbed and are considered for the purposes of the terrestrial and aquatic ecology reporting, as not of State significance.

In accordance with Policy 2.1.2 the NEBP provides open space development with the objective of retaining, rehabilitating and conserving protected values including aquatic ecosystems, primary and secondary recreation and visual recreation identified in the 'Caboolture River Environmental Values and Water Quality Objectives' report by the EPA.

Approximately half of the project area is also below the Q100 flood level which as part of the development has necessitated significant bulk earthworks to ensure the development is protected from flood and storm tides. Building platforms for commercial ventures are raised 100mm above the Q100 with residential development elevated to Q100 + 300mm. In addition the marina has been design as a perched marina with a lock system which will aid in limiting the adverse impact of storm tide on the marina and associated marina villages. Storm tide is discussed more in the response to 2.2.4 *Coastal Hazards*.

Policy 2.1.3 Coastal-Dependent Land Uses

This Policy provides that adequate provision needs to be made for coastal dependent land uses. Where there is competition for available land, preference should be given to necessary coastal dependent land uses ahead of other urban land uses and in the planning for new coastal dependent land uses outside existing township, areas should avoid impacts on coastal resources and values.

It is recognised that development is not supported under this Policy in environmentally sensitive areas unless a net benefit for the State is demonstrated by the assessable development. This includes areas:

- of state significance (natural resources);
- with an increased risk of flooding and coastal hazards;
- within largely undeveloped tidal waterways (including the Caboolture River); and
- declared as Fish Habitat.

This Policy requires that when determining new areas within land designated for urban purposes where marine industry precinct development is proposed, the following studies are required:

- assessing net benefit taking into account all economic, social and environmental impacts and
- modelling of natural hydrology and tidal prisms.

In addition new marine industry precincts must demonstrate that construction and operation will not result in direct or indirect adverse impacts, including cumulative impacts, on the following matters, unless there is a net benefit for the State.



- a) Areas of coastal biodiversity significance (refer to Policy 2.8.1 and Policy 2.8.3);
- b) Coastal wetlands, including the opportunity to rehabilitate, restore or enhance degraded coastal wetlands and values (refer to Policy 2.8.2);
- c) Areas of value to Indigenous Traditional Owners (refer to Policy 2.5.1);
- d) Areas of state significance (cultural heritage) (refer to Policy 2.6.1);
- e) Public access to and along the foreshore, or public useability of coastal waters (refer to Policy 2.3.1);
- f) Identified environmental values and water quality objectives under the EPP Water; and
- g) Vulnerable areas for precursors to algal blooms (refer to Policy 2.4.7).

Proposals deemed of net benefit to the State, must:

- i) demonstrate that they have no significant direct or cumulative adverse impacts on areas or values identified under (a) to (g) above;
- ii) ensure impacts are mitigated and minimised; and
- iii) ensure there is a net gain of coastal resources and values.

Response

The NEBP is planned on land adjoining existing urban areas with precincts which are in high demand in Southeast Queensland and that will promote and assist in supporting the social and economic growth of the region. No other suitable and currently available alternative sites within the Caboolture and wider region have been identified. Project justification, need and project alternatives are discussed in depth in Section 2 of the EIS.

The marine industry precincts associated with the NEBP have been located within land designated for district industry under the Planning Scheme. However the dry land marina is entirely located within land designated for rural purposes.

In proposing the location of the marina within an tidal waterway which is classified as undeveloped (although some development of waterway exists) and is part of the Deception Bay Fish Habitat Area and in an area subject to flooding, an assessment of net benefit was undertaken to provide support for the proposed coastal-dependent land uses associated with the NEBP development proposal.

It is noted that the Caboolture River is not entirely undeveloped. Monty's Marina and associated slipway is located downstream of the NEBP. This marina contains moorings within the main river channel and along the northern boundary of the river; it also has a large hardstand areas and slipway running directly into the river. Further upstream, near the entrance to Goong Creek, there is a small residential area with several large vessels moored on the side of the river channel. In addition, minor foreshore works such as bank stabilisation and private slipways have been constructed in this area. A public jetty adjoins the Beachmere Boat Hire and dry storage facility nearer to the estuary and a public boat ramp is located downstream on the right bank of the River. A concentration of navigational beacons is also located within the Caboolture River channel.

The development results in an impact to coastal resources and their values as discussed throughout section 4.5. The Proponent has commissioned AEC Group to assess the impacts of the development to determine whether the NEBP development has a net benefit for the State.

A net benefit for the State is defined under the RCMP as "there is a net benefit (taking into account all financial, social and environmental impacts) to the State as a whole, as distinct



from sectorial, commercial, private or regional gain, and the proposal delivers the greatest net benefit of all viable alternatives". Provision of such infrastructure must also ensure there is a net gain of coastal resources and their values.

The Net Benefit Assessment was undertaken by AEC in accordance with the 'Draft Net Benefit Assessment Guidelines – General Requirements for Net Benefit Test' being prepared by the EPA and in direct consultation with EPA. This report is attached as Appendix D. This study assessed the net benefit of the development compared to the current site usage across the triple bottom line (economic, social and environmental) in a State context and references coastal policies relevant to the development. Where the positive impacts of the development outweigh the negative impacts, the development is deemed to deliver a positive net benefit.

To determine a net benefit for the State two scopes within the analysis were examined to provide sufficient information for decision makers to determine the net benefit of project elements related to the CMD (medium scope assessment) and the total project as it relates to the coastal zone.

The net benefit assessment consisted of two assessments to satisfy SCMP and RCMP requirements.

- 1. A threshold assessment: to demonstrate that the project delivers benefits beyond those delivered to the proponent and that alternative sites have been considered, with the selected site providing the greatest net benefit of all viable alternatives.
- 2. A formal assessment: in the form of a cost benefit analysis to identify that the direct (proponent based) and indirect (external stakeholder based) benefits of the project exceed the direct and indirect costs of a project. Where an identified impact is unable to be quantified in dollar terms the impact is assessed qualitatively within a likelihood and consequence risk framework (outlined in the Assessment Methodology section of this report).

The quantitative Cost Benefit Analysis (CBA) for the total project found that development of the NEBP is expected to deliver a total net benefit aim of \$2.5 billion in present value terms, with present value of revenues of \$3.8 billion and a present value of costs of \$1.3 billion. Overall, the NEBP development provides a benefit cost ratio (BCR) of 2.88 (i.e. returns \$2.88 for every dollar spent in delivery of the project).

The total project provides a positive direct net benefit (i.e. to the proponent) in present value terms of \$174 million with a BCR of 1.43. The project delivers a positive indirect net benefit (i.e. to stakeholders other then the proponent) in present value terms of \$2.3 billion with a BCR of 3.51.

It is clear that the NEBP development is desirable from the point of view of the Proponent and the broader community with a BCR of greater than one for all assessments, with the direct, indirect and overall impacts of the project being positive.

The qualitative CBA found that all aspects across the triple bottom line (economic, social and environmental) are expected to realise a net benefit to the State as a result of the NEBP development.

The qualitative (for the total project) economic impact assessment shows that the NEBP is expected to return a considerable positive net economic benefit, with a significantly higher score for benefits (22) than costs (-7). Net social and environmental benefits are also expected, with a net score of 11 for social and 11 for environmental.



Since the positive impacts of development across the economic, social and environmental aspects of the triple bottom line outweigh the negative impacts, the total development is deemed to deliver a positive net benefit for the State.

The quantitative and qualitative CBA has considered all coastal policies under the RCMP which trigger net benefit in a medium scope net benefit assessment including:

- 2.1.3 Coastal-dependent land uses;
- 2.1.4 Canals and dry land marinas;
- 2.1.5 Maritime infrastructure;
- 2.1.9 Reclamation; and
- 2.8.1 Areas of state significance (natural resources).

The quantitative CBA for the medium scope assessment found that development of the NEBP is expected to deliver a total net benefit aim of \$1.01 billion in present value terms, with present value of revenues of \$1.61 billion and a present value of costs of \$598 million. Overall, the NEBP development provides a BCR of 2.69 (i.e. returns \$2.69 for every dollar spent in delivery of the project).

The medium scope assessment also shows a positive direct net benefit (i.e. to the proponent) in present value terms of \$82 million with a BCR of 1.46. The project elements as they relate to net benefit policies deliver a positive indirect net benefit (i.e. to stakeholders other then the proponent) in present value terms of \$928 million with a BCR of 3.20.

It is clear that the NEBP development is desirable from the point of view of the Proponent and the broader community with a BCR of greater than one for all assessments, with the direct, indirect and overall impacts of the project elements, related to net benefit policies, being positive.

The qualitative CBA also found that all aspects across the triple bottom line (economic, social and environmental) are expected to realise a net benefit to the State as a result of the NEBP development in the medium scope assessment.

A review of the net economic, environmental and social benefits is discussed in depth in the AEC report, which supports a net benefit for the State.

Of particular importance to this assessment and policy 2.1.3 is:

- the proposal to retain and rehabilitate riparian vegetation and coastal wetlands within the NEBP site, including a setback of 100m from the banks of the river to developable land;
- the provision of marine industries and facilities that will facilitate and assist in the management of the increasing demand for maritime infrastructure, for example berths and out of water maintenance;
- the anticipated improvement in water quality in the Caboolture River resulting from NEBP stormwater management having a beneficial impact on subsequent water quality in Moreton Bay, an area of state significance (natural resources); and
- funding for rehabilitation works in the Caboolture River corridor external to the site.

Technical studies were also undertaken to determine the impact on the natural hydrology, to further support the development of the NEBP in the proposed location and address Policy 2.1.3 *Coastal-dependent land uses*.

Modelling of the natural hydrology has been undertaken to determine whether the development can occur without adversely affecting the natural hydrology. Flood modelling outcomes have been assessed against CSC's two main floodplain management conditions:



- no net loss of flood storage across the development site; and
- no resultant increase in flood levels over the adjoining properties.

The flood model undertaken by Parsons Brinkerhoff (attached as Appendix I) shows that the use of mitigation cuts and eight earth diversion banks is to result in overall reductions in the peak water levels during the 100 year ARI events across the flood plain. This is due to flood mitigation works that increase the conveyance through the development project area and therefore reduce the flood conveyance through the northern section of the lower Caboolture River floodplain.

The changes to the flow velocities within the Caboolture Rive due to the flood mitigation works are also insignificant when compared to base case velocities.

Overall it was stated in the Flood Study that the proposed works associated with the NEBP will represent a net benefit for the community in terms of flooding. The peak flood levels will be lowered in much of the surrounding flood plain with localised peak flood level increases occurring only within the site boundary or in locations where existing infrastructure will not be adversely affected.

In order to address all aspects of this policy groundwater modelling was also undertaken to determine the impact to standing groundwater levels, direction of flow and water chemistry and the results discussed in the Groundwater Impact Assessment presented as Appendix H2. It was concluded that temporary changes to standing water levels near the marina will occur during construction but are expected to return to pre development levels post construction. No other significant changes to groundwater parameters are anticipated within the project area and in surrounding properties. A groundwater monitoring program is to be undertaken as part of the construction works and during the development's operational phase to assess trends in groundwater levels, flow and chemistry to inform mitigation strategies when adverse impacts are identified.

No modelling was undertaken on the impact to tidal prisms from marina operations. This is because the proposed marina will be isolated from the tidal prism of the Caboolture River by a lock, which will limit tidal exchange and therefore any adverse impact to existing tidal prisms of the Caboolture River surrounding the marina entrance.

Areas of value to Traditional Owners and areas of State Significance (cultural heritage) are discussed further under their relevant policies. In summary the Proponent has undertaken substantial community consultation with Traditional Owners. The NEBP project area has a long indigenous history; rich in animal and plant resources, and was an important area for cultural activities, and the management of these indigenous cultural heritage values has been considered in the project design and management proposals. The Caboolture area is also important for non indigenous European cultural heritage, as it was an important agricultural area for sugar cane and cotton growing. In fact, the property is the site of the original property of George Raff, one of the original settlers and sugar cane farmers in the area. The remains of his old homestead, after which Morayfield was named, will be preserved in the Heritage Park.

Strategies to mitigate potential impacts from the construction and operation of the proposed NEBP have been assessed by expert technical consultants whose advice has been incorporated into one or more of the following documents.

- Construction Environmental Management Plan.
- Marina Site Based Management Plan.
- Acid Sulfate Soil Management Plan.
- Waste Management Plan.



- Transport Management Plan.
- Cultural Heritage Management Plan.

These management plans in addition to technical studies demonstrate the net benefit outcomes of the NEBP which are tabulated below.

Table 46	Net	Benefits
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Aspect	Benefits	
Economic	 Increased business confidence (investment attraction) Tourism diversification and support (increased visitation and spend) Value adding and clustering efficiencies of the marine sector Generation of additional employment positions (construction & operation) Improved local and regional traffic linkages (construction & operation) Reduction in average peak flood height 	
Social	 Improved river safety from dredging activities Public transport network Improved social and community infrastructure and services Improved access to areas for recreational and leisure activity Improved visual amenity Range and choice of residential alternatives Protection of unique environmental and heritage assets Affordable land strategy Enhancement of community interaction and cohesion 	
Environmental	 Improvement of fish habitat and decreased erosion Creation of wetlands (environmental protection and maintenance) Use of recycled water Improved water quality (site run-off) Improved water quality (Boat operator education and facilities) Management of weed/pest species Reduced pollution from travel to work Creation of terrestrial habitats Improved resource efficiency and recovery Improved bushfire management 	

Policy 2.1.4 Canals and Dry Land Marinas

This Policy identifies coastal management issues associated dry land marinas in the SEQ region including:

- increased tidal prisms that can result in greater tidal flows causing bank erosion and affecting sediment deposition patterns, leading to navigational problems;
- channels cutting through foreshores and the creation of privately owned water frontages resulting in the loss or restriction of public access;
- potential loss of coastal wetlands, including degradation of coastal wetland ecosystems and other low-lying coastal areas;
- changes to natural hydrology;
- potential loss of Indigenous Traditional Owner cultural resources, including fish traps, shell middens and waterways of significance in the practice of their culture;



- degraded water quality though increased turbidity, disturbance of ASS and inadequate tidal range for water circulation and flushing;
- potential disturbance to fish habitats and migratory pathways;
- need for ongoing dredging and disposal of dredge-material from the construction and maintenance of canals and dry land marinas;
- loss of remaining largely undeveloped tidal waterways and important riparian habitat areas; and
- potential cumulative effects that may degrade the tidal system.

Regionally new canals and dry land marinas, including the proposed expansion of existing developments, must demonstrate that construction and operation will not adversely affect coastal resources and their values unless a dry land marina is a net benefit for the State.

Response

As identified previously in the response to Policy 2.1.3 *Coastal-dependent land uses*, the NEBP development proposal has been master planned to prevent unacceptable loss of coastal wetlands, important riparian habitat areas and on-site cultural values, and changes to natural hydrology. The NEBP will in addition to meeting the above criteria enhance water quality through water sensitive urban design.

Public access to the tidal reaches of the Caboolture River is currently unmanaged, and boat access is restricted to various jetties and ramps, predominantly privately owned. However a public boat ramp exists closer to the Caboolture River estuary providing the preferred public access to the coast and Caboolture River due to access and parking. No-go boating restrictions do not apply on the Caboolture River and as such once in the river, access to the coast and upstream is limited only by the weir located 19km upstream of the river mouth.

It is important to note that access to the coast is hampered at low tide for large boats due to the existing sand deposits at the Caboolture River mouth and that no navigation dredging has been undertaken according to EPA approval records and advice from Queensland Transport. During the consultation phase with environmental and community groups on environmental interests regarding the river, navigational dredging was seen as a benefit by recreational fishing anglers.

The NEBP development proposal provides a new access for the public to the coast that was previously restricted through undeveloped freehold title. The marina including coastal boardwalks, fishing jetties and canoe landings provides additional access to the middle estuary of the Caboolture River by boaters and non-boaters alike to enjoy the existing and rehabilitated coastal resources whilst preventing any significant adverse impacts to coastal resources and their values.

Water sensitive design has been incorporated into the NEBP development including management strategies for enhancement of poor water quality in the Caboolture River during construction and management of the development. This is discussed further under Policy 2.4.1 *Water quality*.

Policy 2.1.5 Maritime Infrastructure

Policy 2.1.5 identifies that undeveloped tidal waterways in the region have high environmental, biodiversity, cultural, recreational and tourism values and that the construction and use of maritime infrastructure in these undeveloped tidal waterways can result in significant adverse impacts on coastal resources and values. While the preference



is for new maritime infrastructure to be located in developed tidal waterways in locations that recognise public access requirements and protection of natural and cultural values of the waterway, new maritime infrastructure in undeveloped tidal waterways is acceptable provided there is a net benefit for the State or the new structures:

- i) will not impact on the stability of the foreshore or result in the need for the construction of revetment walls or hardening of the bank;
- ii) will not necessitate capital dredging or an increased intensity of maintenance dredging to service the proposed facility;
- iii) will result in negligible impacts on ecological systems associated with significant natural resources, coastal wetlands, riparian vegetation and critical habitat (refer to policies 2.8.1, 2.8.2 and 2.8.3);
- iv) are located between lots that have existing maritime infrastructure and are located within the Urban Footprint as identified in the SEQ Regional Plan; and
- v) will not result in the loss of public access to the coast (refer to Policy 2.3.1).

Response

Pressures from recreational activities, including recreational boating, as well as public transport and marine tourism have been caused by:

- continuing urbanisation of the environment and the premium placed on waterfront land;
- the growth in leisure time, combined with low-cost, mass-produced, high-speed recreational craft; and
- the growth in tourism.

The Caboolture River contains an existing navigation channel, which is currently in need of dredging. Modifications and upgrades to this navigation channel have been proposed by the Harbour Master, and these are proposed to be facilitated by the NEBP development. In addition to a navigational channel, maritime infrastructure exists in the river and owned by private and commercial landowners. The location of the existing maritime infrastructure and a discussion of the scale and intensity of this is presented in the assessment of riverbank erosion attached as Appendix J.

The scale and intensity of the existing maritime infrastructure supports and encourages current boat use within the River. As part of the consultation phase river boat traffic was surveyed with the results tabulated below.



Date	Time	Recreational boating type	Number
			(moored)
9 June 2006	4.00am to 3.00pm	Small Trawler	1 (1)
		Tinny	18 (2)
		Catamaran	7 (6)
		Double Catamaran	3 (2)
		Yacht	4 (2)
		Zodiac/inflatable boat	3
		Speed boat	3
10 June 2007	8.00am to 11.00am	Small Trawler	1 (1)
		Tinny	16 (1)
		Catamaran	6 (6)
		Double Catamaran	2 (2)
		Yacht	8 (3)
		Zodiac/inflatable boat	3
		Speed boat	1
16 June 2007	4.00am to 8.30am	Small Trawler	0
		Tinny	5 (2)
		Catamaran	4 (4)
		Double Catamaran	5 (2)
		Yacht	7 (7)
		Zodiac/inflatable boat	1
18 June 2007	5.00am to 8.30am	Small Trawler	1 (1)
		Tinny	7 (1)
		Catamaran	6 (6)
		Double Catamaran	2 (2)
		Yacht	8 (8)
		Zodiac/inflatable boat	2

Table 47	Existing Boat Traffic on the Caboolture River
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Since the development will involve capital dredging works at the Caboolture River estuary to provide safe navigational passage for large boats to access the marina upstream, the Proponent must demonstrate that the marina and associated facilities (including dredging works) will provide a net benefit for the State.

Southeast Queensland is now and will remain the boating epicentre of Australia, when considering the use, supply and manufacture of recreational boats. Two thirds of Australia's recreational boat building exports are manufactured in Queensland and the growth in this sector has averaged more than 9% growth over a ten year period. Queensland is set to overtake NSW as having the highest number of boating registrations in Australia.

The Boating Industry Association of Queensland estimates that the Queensland marine industry contributed \$2.6 billion to the State's economy, providing 11,000 jobs. The marine industry is considered to represent one of the largest sophisticated manufacturing and /or high value added sectors in the state, with significant potential for increased growth.

PSSG undertook a comprehensive review of marina and marine industries demand in 2006, which was updated in 2007. These studies are presented as Appendix E7 and E8 respectively. It was identified that a total demand of 10,404 berths would exist by 2020. It is noted that this figures is likely to be conservative, given the growth in registrations of boats greater than 8 metres in length of 7.1% in 2006.

The NEBP proposal includes 911 wet berths, representing 8.8% of the demand for additional wet berths in SEQ by 2020. By alleviating the pressure for berths in South East



Queensland, which represents a multi-million dollar economic and tourism industry, a new marina at the Caboolture River has a net benefit for the State. The Net Benefit Assessment produced by AEC (Appendix D) further supports this.

The Proponent has pledged to undertake a monitoring program to assess any impacts arising from the increase in the number of boat users on the Caboolture River. The monitoring program will specifically address riverbank erosion as this was identified as the most likely impact from increased maritime transport within a largely undeveloped waterway.

A funding model, to be administered by an independent group such as an environmental body, will be developed for ongoing riparian vegetation works downstream of the marina, in order to improve the quality of riparian vegetation and protect banks against boat wash. This will be funded by a levy on each wet and dry berth, payable when leased. An educational program will also be developed by the Proponent to inform boat users about boat wash, its impacts and how to minimise it. It is intended that this will be run by the marina management, with input from relevant agencies including Maritime Safety Qeensland, EPA, It is intended that these initiatives will provide a mechanism for community focus on riparian maintenance where previously no programs exist ensuring on-ground tangible results.

Policy 2.1.8 Dredging

This Policy identifies major coastal management issues associated with dredging in Southeast Queensland, namely the sustainability of at-sea disposal and viability of land-based disposal of dredge material, and provides development guidance for management of dredging.

Response

This application involves dredging approximately 6.5km of the existing defined navigational channel to provide safe passage for boats. The dredge spoil will be transferred to land within the NEBP for dewatering and use as fill material for the NEBP to enable land levels to be constructed to prevent Q100 flood impacts to built form.

The main concern arising from dredging operations within coastal wetlands would be the potential increase in turbidity (poor water quality) of Caboolture River due to disturbance of sediments at the dredge site. A decrease in the depth to which light penetrates (euphotic depth) could potentially impact on floral & faunal communities in the waterways although no seagrass communities have been identified within Caboolture River. Management of dredging activities is to focus on the control of turbidity and development conditions will reflect appropriate turbidity levels.

Release of tailwaters from dredge spoil treatment ponds will be treated to the water quality objectives provided in the Dredging SBMP (Cardno, 2007) presented in Appendix R3. Refer also to the response to Policy 2.4.1.

Table 48 below has been prepared to demonstrate compliance with this Policy.



Requirement	Response
No degradation or alteration of surrounding natural environment.	Due to the nature of the proposed dredge activity and the measures outlined in the Dredging SBMP, the impact of the dredge works will not result in significant degradation or alteration of the surrounding natural environment.
	The proposed dredging works is not expected to alter the ability of the adjoining land to function as a barrier protecting lands from coastal waters.
	Dredging will be located entirely within the navigational channel of the Caboolture River.
	It is anticipated that the characteristics of dredge material will be entirely uncontaminated sand, with fines increasing in proportion further upstream. The settling periods in the lower and upper reaches of the Caboolture River where navigational dredging is occurring are sufficient to prevent long term suspension and therefore degradation of the natural environment, specifically species requiring light penetration.
No impact on groundwater levels, recharge rates or the supply of water to coastal wetlands.	The limited depth of dredging proposed is not expected to result in alteration of groundwater levels, groundwater recharge rates or the supply of water to coastal wetlands.
No impact to coastal habitats.	The biodiversity of coastal wetlands may be impacted on by the increase of total suspended solids (TSS) in the water column reducing light photons to benthic organisms or phytoplankton within the immediate area. However various existing activities within Caboolture River contribute to TSS including altered land uses and poor catchment management resulting in increased rates of bank erosion and sediment transport. A long term decline in water quality may severely impact on coastal wetlands.
	Borehole testing has indicated that all soils will settle rapidly but higher turbidity may persist for soils in the upper reaches of the dredge area. This Dredging SBMP addresses concerns and includes varied implementation strategies to enhance current water quality within Caboolture River including silt curtains and the development of a water quality monitoring program during dredging cycles.
	In summary the location and existing environmental values of the proposed dredge area, the dredge activity is not expected to result in degradation of fisheries habitat or unacceptable disturbance of coastal habitats. No clearing or damage to marine vegetation is proposed as a result of the proposed dredging activity within the defined navigational channel.

Table 48Compliance with Policy 2.1.8 of the RCMP



Requirement	Response
Rehandling of dredge material involving the treatment of material such as silts, muds and clays to stabilise contaminants and remove water for eventual placement at land- based sites.	Dredge spoil will be piped to the disposal area with spoil eventually utilised as engineered fill when mixed with other appropriate materials. A tailwater treatment system has been devised to ensure water released to the receiving environment meets relevant WQOs specified in the Dredging SBMP, which are sourced from the <i>EPP Water</i> , Schedule 1.
An effective dredge-material handling facility needs to be close to navigable water, enabling barge and dredge access for transportation of material and pump-out facilities, includes lage- scale land parcels suitable for placement and drying of large volumes of material; and have relatively low conservation, agricultural and community values.	A large scale parcel of land (known as Residential Area 2) has been designated as the dredge spoil disposal area with sufficient capacity for capital dredging spoil and 2 maintenance dredging episodes over 10 years, including a tailwater treatment system.
	This large scale parcel of land is part of the area requiring fill to achieve suitable building platforms above the Q100 flood level. Spoil will eventually build up in this area providing the adequate ground levels for flood protection.
	The spoil disposal area has low conservation, agricultural and community values as described in the EIS.
	Long term dredge spoil disposal arising from maintenance dredging is being considered with a number of alterative strategies proposed. The site makes land available for dredge spoil disposal until the year 2016 when Residential Area 2 shall be developed. Spoil may be utilised during this time as construction fill. Thereafter the use of dredge spoil as a beneficial resource is being investigated (refer to section 3.5.4). Long term use shall be consistent with SEQ's proposed policy on dredge spoil handling and disposal.
Contaminated dredge spoil can pollute dredge-management placement sites, groundwater and adjacent areas.	The dredge spoil within the defined dredge area has been assessed for toxicant levels. The dredge spoil has no unacceptable contaminants. As such the toxicity of water runoff is expected to be within water quality guidelines.
	Material that may be released to receiving waters from dredge spoil disposal areas and tailwater treatment ponds is not foreign to the receiving environment and generally will have minimal impact on coastal wetland functions (compared to other activities such as treatment plans discharging foreign material into the marine environment).
Dredging activities will avoid adverse impacts on coastal resources in areas of state significance.	With proposed WQOs and monitoring regime as discussed above, adverse impacts are identified early and corrective action proposed in accordance with this Dredge SMBP.
	It is expected that potential dredging impacts, specifically increased TSS, will be minimal due to the nature of the dredge spoil and the mitigation measures proposed in the Dredging SBMP.


Requirement	Response
Appropriate handling and treatment procedures for dredge-material in which ASS are present must be established.	An Acid Sulfate Soil Management Plan (ASSMP) has been prepared to ensure appropriate handling and treatment of dredge material that is found to be potential or actual ASS during capital dredging works downstream of the site.

Policy 2.1.10 Tourism and Recreational Activities

This Policy identifies Southeast Queensland one of Australian's major destinations with more tourism and recreation activities dependent on high quality coastal resources. As such the quality and diversity of tourism within the region can be adversely affected by:

- conflicting uses and activities such as the use of high-speed motorcraft (including personal watercraft) in inshore waters competing with fishing and swimming;
- disturbance of nesting shorebirds and other wildlife, including intertidal and marine species;
- development restricting public access to and along the foreshore (refer to policies 2.3.1 and 2.1.5);
- seasonal variations in faunal activity, such as the migration of certain species of birds and whales resulting in the restriction of opportunity for nature-based tourism within SEQ;
- recreational succession where changes to levels or type of development result in the loss of an existing tourism or recreational opportunity (e.g., the conversion of caravan parks to higher density tourism developments, resulting in the loss of an important tourism resource in the region);
- increased level of infrastructure, which alters the recreational setting (e.g., the sealing of walking paths or roads or provision of toilets, which 'develops' a previously undeveloped 'natural' area); and
- loss and disturbance to and displacement of biodiversity, including shorebird feeding and roosting, whales and fish habitats (refer to Policy 2.8.3).

Response

The NEBP will not adversely affect existing tourism and recreational activities in SEQ, but will rather add to the suite of attractive destinations for residents and tourists alike to enjoy Caboolture's River ecosystems.

The proposal to establish a marina in the Caboolture River will not conflict with existing uses and activities given the existing poor nature of the ecosystem. Both fishing and swimming upstream of the Caboolture River is generally unpopular due to deteriorated water quality from past and present natural and anthropogenic causes. In fact through water sensitive urban design and rehabilitation of existing riparian vegetation and coastal wetlands, this development will encourage more diverse tourism and recreational activities within the Caboolture River and thus Southeast Queensland that are in high demand, specifically:

- fishing through fish attracting devices;
- eating out and socialising through restaurants and commercial ventures including retial and golfing, and picnic areas (including public toilet facilities);
- sight-seeing through displays of artwork and cultural heritage, and controlled architectural design; and



 exercising through coastal boardwalks and pedestrian and/or bicycle trails and canoe landings.

During the consultation process environmental and community groups raised concerns relating to tourism and recreational activities including crab potting. The NEBP development has the potential to disturb crab potting and fishing spots through introducing increased marine vessels within the system. The NEBP development proposal encompassing new infrastructure directly related to enhancing tourism and recreational activities within the River will offset this potential impact. It is noted that in the consultation process, Monty's marina was cited as the most popular fishing spot for families. The NEBP development does not introduce traffic to this region as the proposed lock entrance to the marina is located downstream of Monty's marina.

Policy 2.1.15 Non-Tidal Artificial Waterways

This Policy defines non-tidal artificial waterways as channels, lakes and other bodies of water where:

- the natural tidal exchange is fully, or partially inhibited by a lock, weir or similar structure; or
- located on low-lying coastal areas, including the coastal flood plain and wetland areas that are not connected to or intended to be connected to tidal water.

It was identified that coastal management issues associated with the inappropriate location, construction and management of non-tidal artificial waterways may include the following impacts (that have not been previously identified in other policies since assessed):

- loss of diversity of landscapes;
- loss of freshwater environments caused by salt water intrusion;
- poor water quality associated with the exposure of contaminants (including ASS and poor quality groundwater) and influxes of stormwater;
- degraded water quality of waterways connected to or downstream of non-tidal artificial waterways resulting from flushing via a weir or pipe, overtopping from flooding, surface run-off or groundwater seepage;
- public health and amenity issues (e.g. nuisances from odour);
- contaminated water being released into tidal waterways with potential implications for Lyngbya blooms in the marine environment of Moreton Bay;
- depleted fish resources as wild fish and other aquatic fauna are isolated within the artificial waterway (fish kills may also result from degraded water quality);
- altered tidal flows in adjacent tidal waterways resulting from the flushing of non-tidal artificial waterways via a lock, weir or other artificial mechanism (e.g., pumping system or pipes) or from extraction of water to fill and maintain the non-tidal artificial waterway; and
- need for ongoing dredging and disposal of dredge-material from the construction and maintenance of non-tidal artificial waterways.

Response

The NEBP will, through the Structure Plan, increase the range and scope of existing landscapes, and these will be complementary to the natural landscapes of the coastal zone, within which the development is located. The management of the site will be achieved through a body corporate scheme, including the management of pest and weed species.



Minor loss of suitable agricultural land has been identified in a report by Place (Appendix S) but loss of agricultural land has no profound impact on the agricultural productivity of the region with suitable agricultural land within the site being of a small size and very fragmented. The potential use of the site as agricultural land is discussed further in Section 4.2 of this EIS. The assessment identified the development land, if used for agricultural purposes will not be financially viable and therefore planned for alternative uses. This is consistent with planning across South East Queensland.

The existing water quality of the Caboolture River will be enhanced through water sensitive urban design, rehabilitation of riparian vegetation and strict water quality management of the closed marina in accordance with the Marina SBMP (Appendix Y1). The Marina SBMP includes preventative measures for fuel/sewage spillage, litter, bilge water and thermal pollution. A strict no-maintenance Policy for boats will be endorsed, and maintenance of prescribed tidal work will be carefully managed to avoid heavy metal and litter contamination of marine waters. This is further discussed in response to Policy 2.4.1 water quality.

The need for ongoing dredging of the proposed marina basin will be minimal, considering the lock arrangement and controlled tidal influence. The lock is designed to ensure that sediment drift downstream in a flood event or as a result of natural processes is not inhibited and the need for additional hard engineering erosion protection measures beyond that designed for is avoided.

The design of the proposed NEBP marina ensures:

- i. water quality standards within and adjacent are not adversely affected throughout the construction of the artificial waterway (refer to Policy 2.4.1 *Water Quality*);
- ii. water quality standards within the marina are maintained in accordance with the Marina SBMP (including a Lake Management Plan) so as to not adversely affect water quality external to the marina within the Caboolture River and encourage a new ecosystem within the marina;
- iii. no increase in the concentrations of nutrients of concern exiting the marina during construction, operation and maintenance;
- iv. no adverse impact on groundwater, in particular, aquifers that support coastal wetlands (refer to Policy 2.4.5 *Groundwater quality*); and
- v. no adverse impacts on the environmental flows of tidal waterways adjacent to or downstream of the marina.

Policy 2.2.2 Erosion Prone Areas

This Policy recognises the importance of land directly adjoining the coast as a valuable feature warranting protection from development to protect life and property. To the extent practicable, erosion prone areas are to remain undeveloped apart from acceptable temporary or relocatable structures for safety and recreational purposes.

Policy 2.2.2 indicates that development of land within an undeveloped erosion prone area is not supported unless it can be demonstrated that potential adverse impacts on coastal resources and values, in particular natural coastal processes, can be avoided. In particular, permanent building works must be located outside the erosion prone area. However for lots that are completely or predominantly located within an erosion prone area, permanent building works are located as far landward as possible within the erosion prone area, to:

i) minimise the risk of erosion impacts;



- ii) allow for natural short-term fluctuations in the shoreline to occur without requiring the construction of future property protection works; and
- iii) be set back from the seaward property boundary at a sufficient distance to ensure that any future property protection works can be located entirely on the freehold property.

Where development does occur on a lot within the erosion prone area it must be set back as far landward as possible, the area in front of the setback area stabilised and rehabilitated to a natural state involving:

- i) the use of locally occurring native flora species planted at a density and composition to enhance ecological processes; and
- ii) removal of any unapproved improvements, structures and buildings.

Response

The RCMP has mapped the coastal management district (CMD) (formerly referred to as the erosion prone area) in segments 40 metres from mean high water springs (MHWS also referred to high water mark) or at Highest Astronomical Tide (HAT).

The CMD map presented in the RCMP is primarily an illustration to help interpret the plan. The map was produced using the EPA's geographic information system and depicts data sources from numerous agencies. It is important to note that the data is of varying currency and accuracy. The EPA advises that while reasonable care and attention has been taken in collecting, processing and compiling data shown on the CMD map, the EPA does not guarantee the accuracy and reliability of the information presented in any way.

The CMD map for Caboolture presented in the RCMP illustrates a significant portion of the project area is contained within the CMD. To confirm the accuracy of EPA's CMD, remapping of the CMD within the project area was undertaken by Cardno. Existing CMD as mapped under the RCMP and the revised CMD for the project area as mapped by Cardno are provided as Figure 14.

The position of MHWS and HAT levels were determined based on detailed ground surface level survey data, QASCO high resolution aerial photography (June 2007) and ground truthed vegetation mapping. The landward extent of mangrove occurrence was used as the basis for determining the functional MHWS levels across the NEBP site and the landward extent of saltmarsh vegetation was used as the basis for determining the functional HAT levels across the NEBP site.

A minor loss to certain segments of the revised CMD will occur from the development proposal, specifically in the location proposed for the dry-land marina as shown on Figure 15. The water quality within the closed marina shall be maintained using a pump system to ensure adequate water circulation to retain high levels of dissolved oxygen and will be monitored for source pollutants as detailed in the Marina SBMP which is attached as Appendix Y1.

Generally the CMD has been protected in the master planning of the site, with the Proponent maintaining more than half of the site as undeveloped open space to act as an environmental buffer between the proposed development and the tidal environment of the Caboolture River. In particular, open space has been allocated to areas of the CMD (including use as golf course), and roads are designed to pass over Raff Creek using bridge structures that have been designed in accordance with Code for prescribed tidal works in the Coastal Regulation; Schedule 4A.

The CMD will also be rehabilitated, offsetting the loss of the segments of the CMD in which development is proposed. In addition a 100m buffer from the banks of the Caboolture



River will be retained, and this buffer includes part of the CMD. The buffer will be rehabilitated by weed eradication and replanting of vegetation to extend the riparian vegetation zone, which is identified as an important tool in stabilising riverbanks and improving stormwater runoff and ultimately water quality. Stable riverbanks will result in less siltation to coastal waters thereby protecting sensitive ecosystems, such as seagrass, within the protected Moreton Bay Marine Park and Moreton Bay Ramsar Wetlands. This action is consistent with the committed actions of the Moreton Bay Action Plan for 2007-2012 (South East Queensland Healthy Waterways Partnership, 2007).

The NEBP development has been designed to minimise the risk of erosion impacts, allow for natural short-term fluctuations in the shoreline to occur without requiring the construction of future property protection works, and is located entirely within freehold land.

Where the development does occur within the erosion prone area it has been set back a minimum of 100 metres from the river bank, with the Proponent agreeing to stabilisation and rehabilitation of the erosion prone area by planting riparian vegetation at a density and composition to enhance ecological processes (refer to the Landscape Master Plan, attached as Appendix P).

Where proposed development within the erosion prone area is threatened by erosion, the following matters will be considered in determining the most appropriate defensive action to protect land uses and infrastructure:

- a. the value (economic, social and environmental) of the existing development;
- b. the practicality and cost of any defensive action; and
- c. the potential adverse impacts to coastal resources and values associated with any defensive action.

It is an objective of this development that works are consistent with the CPM Act and that soft engineering stabilisation structures (when necessary) will be preferred to hard engineering solutions for erosion protection.

When no soft engineering solution is viable it is understood hard engineering (such as revetments walls) will only be supported where:

- a. there is an immediate or critical threat of loss or damage to existing development from erosion impacts;
- b. no viable alternatives such as revegetation or bank reconstruction have been demonstrated to provide a similar or adequate level of protection from erosion; and
- c. potential adverse impacts on coastal processes and scenic amenity are minimised through remedial actions.

Other structures associated with the development within the erosion prone area including fishing jetties, coastal boardwalks and canoe landings are considered as temporary and/or relocatable and therefore not assessed against the RCMP.

Potential erosion impacts as a result of development, specifically navigational dredging, are further discussed in section 4.5.2.2.

Policy 2.2.4 Coastal Hazards

Coastal hazards include events such as storm tides, cyclone effects and related inundation. These events can place human life and property on the coast at risk over and above the risks associated with overland flooding events from high rainfall in the catchment.



When determining new areas for urban land uses on the coast, an evaluation is to be carried out to identify the level of potential risk to life and property from coastal hazards. Development in areas on the coast identified as having a risk of being affected by coastal hazards needs to be carefully considered and wherever possible, be retained undeveloped. Where areas vulnerable to storm tide inundation have been developed, further development in these areas needs to address:

- its vulnerability to sea level rise and storm tide inundation; and
- the proposed access to and protection of evacuation routes.

Response

To date a specific storm tide assessment within Caboolture Shire has not been undertaken. It is understood that CSC, along with other Councils, is currently investigating the storm tide threat within Southeast Queensland, and it is anticipated that the investigation will be completed in the latter half of 2008 in accordance with EPA's storm tide guidelines.

Cardno Lawson Treloar (CLT) has undertaken a detailed hydrodynamic and morphological assessment of Caboolture River to assess the morphological changes of the river following capital dredging of the navigation channel.

There is a requirement for ongoing maintenance dredging to maintain an adequate navigational depth of 3.0 metres below LAT every two to three years through chainages 4,000 to 5,000 and every 5 years along the entire length of the QT preferred navigation channel. The location of the navigation channel and chainages is provided on Cardno drawings 7900/33/01-301 to 317.

Capital dredging of an existing silted estuary has been shown to improve flood mitigation upstream thereby reducing the risk to coastal developers upstream from sea level rise and storm tide inundation, and providing all tide evacuation routes for large and small marine transport in times of coastal hazards.

Moreton Bay is regularly subject to elevated water levels associated with meteorological events. The difference between the elevated water level and the predicted tide level is referred to as storm surge and when combined with the astronomical tide is referred to as storm tide. The Caboolture River discharges to Moreton Bay approximately 7.5km downstream of the project area and is subject to storm tides.

In general, the change in bed depth (a maximum of 2.2m) at the estuary through dredging works is not expected to have a significant adverse effect on storm tide levels upstream at the NEBP project area given the setback of 100m from the development footprint and closed marina system.

The proposed development therefore complies with the intent of the coastal hazard policy of the State Coastal Plan.

Policy 2.3.1 Future Need for Access

This Policy was prepared to protect public access to the foreshore or of public useability of coastal waters given the public demand for access.

Response

The NEBP development involves the development of new coastal-dependent land uses which includes a public marina and access for the public to the erosion prone areas and coastal zone previously denied that is contained within the project area.



Mechanisms which have enhanced public access to the coast (other than the new dry land marina and lock arrangement) include:

- public fishing jetties;
- public boardwalks and paths (pedestrian and bicycle access) and heritage trails;
- public picnic and toilet facilities;
- public marina promenade;
- canoe access and landings;
- hotel accommodation;
- refuelling and sewage pump out facilities;
- provision of public transport from regional centres of Caboolture, Morayfield and Burpengary;
- dry stack boat storage; and
- complementary social (eg. sports centre, education facility and community node), retail and residential precincts.

There is also a potential for tourist operators to establish a base within the marina for which to access the Moreton Bay Marine Park, particularly during whale seasons, offering sight seeing activities and diving adventures.

A Transport Management Plan has been prepared by Cardno Eppell Olsen, as part of the Traffic Impact Assessment report presented in Appendix K1, to provide for appropriate public transport facilities to the NEBP site and should be referred to when assessing this Policy.

Policy 2.4.1 Water Quality Management

This Policy identifies that the management of water quality is vital for the protection of public health and wellbeing in addition to the protection and maintenance of coastal resources. It is required under this Policy that where WQOs have been identified for coastal waters in accordance with the EPP Water, the development and use of the coastal zone is planned and managed to protect the identified values and achieve the WQOs.

Response

The proponent has focused on improving the poor water quality of the Caboolture River in the design, construction and ongoing management of the MIBA and marina. The proponent has commissioned various technical studies to determine appropriate mitigation measures for the minimisation of the potential impacts on water quality arising from activities including:

- bulk earthworks (construction);
- disturbance of contaminated land;
- residential and commercial development (operation);
- use of recycled water for dual reticulation, irrigation of landscapes and sports fields (construction and operation);
- controlled boat maintenance activities (operation);
- regulated fuel storage (construction and operation); and
- marina activities (operation).



Management strategies have been devised to address potential impacts from potentially contaminative activities. Mitigation measures that are part of the NEBP development include the following.

- Erosion and sedimentation controls during construction works in accordance with the Construction Environmental Management Plan.
- Storage of flammable and combustible materials in accordance with relevant Australian Standards.
- Bunded dewatering dredge spoil disposal ponds in accordance with the Dredging SBMP.
- Disposal of contaminated land in accordance with a Remediation Action Plan.
- Storage and disposal of wastes in accordance with a Waste Management Plan.
- Conducting surface water monitoring to establish baseline surface water quality.
- Water quality release criteria in accordance with WQO's under the EPP Water for the middle estuary of the Caboolture River (apart from suspended solids which have been increased for releases during construction based on existing water quality and nature of construction activities on site);
- WQOs for marina water quality management consistent with the EPP Water under the Marina SBMP.
- Water Sensitive Urban Design.
- Assessment of land for suitability for effluent irrigation.
- Identification, treatment and management of exposed ASS in accordance with the ASSMP.
- Provision of refuelling, waste and sewage pump out facilities which are designed in accordance with Australian Standards and managed in accordance with best practice guidelines.
- Operation of the marina in accordance with the Clean Marinas Australian Code of Ethics and Compliance Checklist.
- Rehabilitation of riparian vegetation to protect and enhance the intrusive values of the natural water cycle.
- Riverbank erosion monitoring program and management initiatives.
- Establishment of significant open space to minimise disturbance to natural landforms, wetlands, watercourses and riparian zones.
- Installation of duel reticulation for new commercial and residential development to minimise wastewater generation and promote efficient use of potable water.
- Significant Council headwork's contributions to ensure treatment of wastewater to a standard suitable for effluent reuse.

Stormwater management specifically is discussed is response to Policy 2.4.4.

The improved water quality expected by the proposal will enhance ecological communities within the River, encouraging more recreational fishing.

By incorporating the above mitigating strategies into the design, construction and management of the NEBP, the development is viewed as consistent with this Policy's principles and outcomes.



Policy 2.4.4 Stormwater Management

Under this Policy stormwater runoff (quality and quantity) must be managed in accordance with best practice, to ensure the environmental values of estuaries and other coastal waters are protected. In particular, ecosystems which have experienced minimal impacts and are particularly vulnerable to the effects arising from stormwater runoff are a priority. It is noted that best practice may be achieved through the preparation and implementation of local government environmental plans for urban stormwater quality management, as set out in the EPP Water.

Response

A Stormwater Management Plan is attached as Appendix H1. This identifies appropriate the Water Quality Objectives (WQOs) for stormwater discharges from the site, and identifies proposed mitigation and treatment measures for the management of stormwater quality and quantity.

The Stormwater Management Plan states the following.

- The development proposal increases the area of developed land and therefore has the potential to increase the quantity of stormwater runoff from impervious areas.
- The Caboolture River is under increasing pressure from increased stormwater and sewage discharges, boosting sediment and nutrient loads.
- Existing water quality in the Caboolture River adjacent to the site is poor.
- In order to achieve the WQOs identified in the EPP Water, pollutant load reduction targets have been adopted, in accordance with water sensitive urban design guidelines.
- A water quality model was developed for the assessment of nutrient and suspended solid concentrations in stormwater.
- The key measures to be incorporated into the stormwater treatment train are grass swales, bio-retention basins and constructed wetlands.
- The model shows that runoff from the site meets the reduction targets for Total Phosphorus, Total Nitrogen and Total Suspended Solids.
- Peak water flows will increase as a result of the development, and to attenuate the increased water quantity, storage will be provided on site, comprising approximately 1% of the total development site area.
- It is expected that the bio-retention basions and wetlands which are proposed as part of the stormwater treatment train together with WSUD practices at the street scale will provide the necessary stormwater storage capacity.

The Stormwater Management Plan demonstrates that the quality and quantity of stormwater runoff will be managed in accordance with best practice, to ensure that environmental values of the estuaries and other coastal waters are protected.

Best practice will be achieved through the implementation of management measures recommended in the Stormwater Management Plan including:

- soft engineering approaches such as the rehabilitation of the riparian vegetation within the site, the use of bio-retention basins and swales;
- control of land management practices, in particular during construction to minimise erosion and sedimentation potential; and



• hard engineering where appropriate, such as the use of gross pollutant traps and stormwater quality improvement devices for the treatment of stormwater runoff from the marine industry and MIBA areas.

Recommendations for management of stormwater quality have been incorporated into the following management plans which will be used to guide the development and operation of the site.

- Construction Environmental Management Plan.
- Acid Sulfate Soil Management Plan.
- Marina Site Based Management Plan.

Policy 2.4.5 Groundwater Quality

This Policy identifies that the loss of groundwater quality can have impacts on the quality of coastal waters and on coastal ecosystems such as wetlands.

Under this Policy groundwater quality and recharge processes are to be maintained and land uses and activities are not to lower the watertable to expose ASS or permit unsustainable ingress of saline water to freshwater aquifers.

Response

The Proponent commissioned a Groundwater Impact Assessment to determine the potential impact of the proposed NEBP development on the groundwater regime. This study described the existing site conditions, identified groundwater stakeholders and determined the groundwater regimes and groundwater chemistry.

The existing groundwater regime is discussed further in Section 4.4 of the EIS. Briefly the Groundwater Impact Assessment concluded the following.

- The direction of groundwater flow is not expected to be affected by the proposed development.
- Groundwater pressure head close to the marina basin (<400 metres) may temporarily decline during excavation due to the dewatering of the excavation, which will be undertaken in the dry. Groundwater pressure heads are expected return to normal on the flooding of the marina with only slight variations to the pre-development heads.
- Lowering of groundwater levels during construction of the marina may however expose ASS. Once released the sulphuric acid and other toxic substances could be mobilised and enter the groundwater systems and migrate towards the Caboolture River.
- No impact on groundwater levels of existing bores beyond the area of marina excavation is expected.
- There is a potential risk of contamination from hydrocarbons from petrol stations (if developed in the future) and/or roadways.
- Changes to surface and slope stability from temporary changes to groundwater levels can also occur and may have design implications for the proposed development.
- No long-term impact on the chemistry of existing boreholes external to the project area is likely, because all are located up gradient from the development.

Recommendations for mitigation contained in the Groundwater Impact Assessment have been incorporated into the following management plans which will be used to guide the development and operation of the site.



- Construction Environmental management Plan.
- Acid Sulfate Soil Management Plan.
- Dredging Site Based Management Plan.
- Marina Site Based Management Plan.

Policy 2.4.6 Acid Sulfate Soils

This Policy identifies that ASS occur naturally and are most common in low-lying, floodprone coastal areas and that issues arise for coastal management when these soils are disturbed. Exposure to the atmosphere through excavation or lowering of the watertable can result in acid leachate, which can have adverse impacts on the quality and values of coastal waters and ecosystems.

Regional direction under this Policy is to refer to the 'State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils'.

Response

ASS were identified on site in an investigation by Douglas Partners (2003) and Coffey in 2007 (presented as Appendix R1). There is potential for ASS exposure during development construction with both actual and potential ASS measured under laboratory conditions. ASS is discussed in detail under Section 4.2 of the EIS.

An ASSMP has been prepared accordance with the State Planning Policy 2/02 to effectively identify, treat and manage ASS exposed during bulk earthworks and ongoing construction thereby addressing this Policy under the RCMP.

Policy 2.4.7 Algal Blooms

This Policy reports that blooms of algae in coastal waters, including the cyanobacterium *Lyngbya majuscula* (Lyngbya), can pose a significant threat to human health, biodiversity, water quality and the recreational and commercial values of coastal waterways, particularly in northern Deception Bay where algal blooms are increasing in incidence, duration and intensity. It is identified in the Policy that land-based development and management activities that alter the natural hydrological regime can encourage algal blooms by altering groundwater levels and composition, surface-water run-off, and causing increased transport of increased loads of nutrients to coastal waters. Nutrients of concern that may contribute to algal growth include iron, phosphorus, nitrogen and dissolved organic substances.

The intent of this Policy therefore that development and activities that potentially lead to increases in nutrient loads or alter natural hydrologic regimes in the SEQ coastal zone are to be managed to avoid or minimise the release and movement of nutrients of concern to coastal waters.

Response

The NEBP site located in an area mapped within the RCMP in a high to very high Nutrient Export Area. An assessment of the occurrence and impact of Lyngbya with regard to the development proposal was undertaken by the Ecology Lab (refer to Appendix L2).

The findings of the assessment identified:

- 1. blooms are becoming more frequent in Deception Bay;
- 2. blooms are triggered and/or sustained by high levels of nutrients (specifically Phosphorus and Nitrogen) and micronutrients (iron);



- 3. blooms have a potential to affect the value of the Deception Bay Fish Habitat Area;
- 4. blooms have potential impacts on human health;
- 5. blooms have potential to inhibit seagrass growth;
- 6. bloom effects may worsen by disturbance of acid soils.

Healthy Waterways (2007c) provides an Action Plan for dealing with coastal algal blooms in South East Queensland. The Action Plan Target for this is:

By 2026, in all SEQ estuarine and marine waterways, the intensity, frequency and extent of existing Coastal Algal Blooms have been reduced, no new Coastal Algal Blooms have occurred and the impacts of Coastal Algal Blooms events have been minimised.

To minimise the risk of algal blooms, the NEBP development ensures:

- no lowering of existing groundwater levels where PASS or AASS are present;
- avoidance or minimisation of the export of nutrients of concern exiting the site either through surface water or groundwater, particularly iron, nitrogen, phosphorus and dissolved organics;
- minimal disturbance of coastal wetlands (refer to Policy 2.8.2);
- the maintenance and enhancement of riparian vegetation; and
- best practice stormwater quality management (refer to Policy 2.4.4), including best practice water sensitive urban design principles and sediment controls.

Caboolture Shire Council (CSC) conducts regular surveillance of the beach areas where algae blooms are known to occur. A status report is communicated every month to Councillors and relevant stakeholders. In the Lyngbya season from October to March surveillance frequency is increased and reported on a fortnightly basis. The extent and movement of the bloom and proximity to the Shire's foreshores is reported. An assessment is made and management actions taken according to the CSC Lyngbya mitigation response plan

Management documentation has been prepared during the process of design and assessment of the NEBP development which address Policy 2.4.7 through reducing nutrients.

The responses to Policies 2.4.1 *Water quality*, 2.4.5 *Groundwater quality* and 2.4.6 *Acid sulfate soils* further address the issue of management of water quality, which is the primary determinant for Lyngbya blooms in the area.

Policy 2.5.2 Involvement of Indigenous Traditional Owners in managing their cultural resources

This Policy recognises the value of Indigenous Traditional Owner environmental management practices, including the connection between saltwater and freshwater peoples and lands (which reflects a catchment wide approach to management). It is encouraged by this Policy, when planning for coastal development that culturally appropriate involvement and acknowledgement of Indigenous Traditional Owners and their communities occurs.

Response

The development of the NEBP proposal has been undertaken with the involvement of the Traditional Owners, the Gubbi Gubbi people. This is discussed in further detail under Section 4.9 of the EIS. A Cultural Heritage Management Plan has been prepared with the involvement of all parties, and has been approved by the Department of Natural Resources



and Water, pursuant to the *Aboriginal Cultural Heritage Act 2003.* Policy 2.5.2 of the RCMP is therefore addressed.

Policy 2.6.2 Cultural Heritage

This Policy notes that cultural heritage is important as it provides a key understanding of the past and a sense of identity for all Queenslanders. In addition to its role in promoting social and community well-being, cultural heritage also provides significant economic benefits through tourism and recreation.

Under this Policy development and use of the coast is to be managed to conserve cultural heritage places and objects in accordance with relevant State and Commonwealth laws.

Response

Both Indigenous and Non-Indigenous Cultural Heritage Management Plans have been prepared, and these provide a detailed strategy to deal with any areas or items of cultural heritage significance. Construction and operational workers will be given a cultural heritage induction course to improve their awareness, understanding, ability to recognise any items that may be uncovered during construction or operation and the procedures that must be followed should this occur. Cultural Heritage is discussed in further detail in Section 4.9 of the EIS.

The proposed development incorporates a Heritage Park, which is intended to provide an interpretative experience that encourages the aim of fostering public access to the river, realising the public recreational use of open space, and rediscovering the historical cultural elements of the site.

Policy 2.8.1 Areas of State Significance (natural resources)

This Policy states that "land identified to be developed in the future for urban, maritime and rural land uses in regional plans, planning schemes and port land use plans is to be located outside of areas of state significance (natural resources). Existing urban, maritime and rural land uses within 'areas of state significance (natural resources)' will not expand in these areas unless it can be demonstrated that there will be no adverse impacts on coastal resources and their values".

In this regard, areas of state significance (natural resources) are those that include:

- significant coastal wetlands;
- significant coastal dune systems;
- endangered regional ecosystems; and
- protected areas (State Land), land declared critical habitat, and areas of major interest as defined under the NC Act.

Under this Policy, development and activities, proposed within an area of state significance (natural resources) or located within 100 metres of an area of state significance (natural resources) must:

- a. be compatible with the protection, maintenance and enhancement of the area's coastal resources and values;
- b. maintain and protect the current extent and diversity of significant coastal wetlands within the SEQ region, in particular,
 - i) degraded, disturbed or modified areas within significant coastal wetlands, significant coastal dunes and endangered regional ecosystems remain



undeveloped and are rehabilitated to restore values and ecological functioning; and

- ii) the direct or cumulative loss or degradation of significant coastal wetland through altering the hydrological regime, burning, discharges or the introduction of pollutants and species non-native to the local area, is not supported;
- c. provide and maintain an appropriate buffer between the areas of state significance (natural resources) and the development or activity to ensure no adverse impacts on the area's values. The size and type of buffer will be determined, having regard to the ecosystem function, ecological connectivity, size, values and vulnerability of the area's coastal resources and values and the potential impacts and threats posed by the development or activity;
- d. require best practice water quality management, including water-sensitive urban design principles, to avoid direct or cumulative impacts from neighbouring development. In particular, development and activities upstream of or neighbouring coastal wetlands maintain and enhance environmental values and water quality, including groundwater hydrology of receiving coastal wetlands (refer to policies 2.4.2 Wastewater discharges to coastal waters, 2.4.4 Stormwater management and 2.4.5 Groundwater quality); and
- e. require the enhancement and rehabilitation of areas of state significance (natural resources), particularly significant coastal wetlands, significant coastal dunes and endangered regional ecosystems.

Response

The project area is surrounded by areas of state significance as follows.

- The Deception Bay Declared Fish Habitat area, which extends along the entire length of the northern boundary, within the bounds of the Caboolture River and upstream of tidal creek including Raff Creek. This area is protected by the Fisheries Act due to the estuarine habitats that support commercial and recreational fisheries in close proximity to developing communities.
- The Habitat Protection Zone of the Moreton Bay Marine Park which is located within the Caboolture River and begins at the northern boundary of the site then extends eastward along the Caboolture River. This area is protected by the *Marine Parks Act 2004* in order to:
 - conserve significant habitats, cultural heritage and amenity values of the marine park;
 - maintain the productivity and diversity of the ecological communities that occur within the marine park; and
 - provide for reasonable public use and enjoyment of the zone consistent with the conservation of the marine park.
- The Moreton Bay Ramsar wetlands which traverse the same area within the Caboolture River as the Moreton Bay Marine Park. The general ecological values of the Moreton Bay Ramsar wetlands include the following.
 - Moreton Bay represents one of Australia's largest estuarine bays which are enclosed by a barrier island of vegetated sand dunes.
 - Moreton Bay supports intertidal areas of mangroves, seagrass and saltmarsh which provide habitat for water birds. These intertidal areas represent one of only three such areas on the east coast of Australia.
 - Moreton Bay supports at least 43 species of shorebirds including 30 migratory species listed by JAMBA and CAMBA, 55 species of algae associated with mangroves, over 355 species of marine invertebrates, seven species of seagrass



and seven species of mangroves. In addition, Moreton Bay supports greater than 50,000 wintering and staging birds during the non-breeding season.

- Moreton Bay provides foraging and habitat resources for the Dugong and several threatened turtle species.
- South East Queensland Wader Bird Sites are mapped approximately 500m to the east of the site. This area is protected via the JAMBA and CAMBA convention to protect habitats of Migratory Birds.

The locations of areas of conservation significance are shown in relation to the development project area on Figure 7.

The NEBP development will involve some disturbance to vegetation identified as significant coastal wetlands (i.e. approximately 2.0 hectares of disturbed saltwater couch grassland) for the purposes of establishing the marina. However the NEBP Structure Plan also provides for the retention and enhancement of areas of coastal wetland associated with Raff Creek; the fish habitat areas extending into tidal waters of Raff Creek will also be enhanced by the proposed riparian rehabilitation scheme. Whilst these wetland areas have not been mapped as significant coastal wetlands they are, from an ecological perspective, of greater conservation value than the mapped area of significant coastal wetland proposed for disturbance (refer to Appendix L1).

The NEBP will also involve the clearance of some areas of endangered regional ecosystems from the south-western sector of the site. In respect of this clearance it is noted that appropriate offsets are proposed in accordance with DNRW's 'Policy for Vegetation Management Offsets - 23 August 2007'. The NEBP proposal also provides for substantial on-site revegetation and enhancement works that will provide additional compensation for the loss of areas of endangered regional ecosystems in the south-west of the site.

It is also noted that the NEBP will result in changes to the volume and composition of boating traffic that currently utilises the Caboolture River. Such changes in boat traffic will create a need for additional dredging of the existing Caboolture River navigation channel. These aspects of the NEBP proposal have the potential to impact upon coastal wetland and shore bird habitat values of affected sectors of the Caboolture River and Moreton Bay. In this respect it is important that appropriate impact avoidance and mitigation strategies are implemented to preserve the values of the Caboolture River and Moreton Bay. Such measures are also required independently of the NEBP development.

Policy 2.8.2 Coastal Wetlands

This Policy states that:

"Direct and cumulative impacts from increased urban development and industrial, recreational and tourism activities have resulted in the loss, modification, fragmentation and/or degradation of coastal wetlands and values."

The Caboolture River Wetlands are noted as an example of a large and intact coastal wetland system. Major issues for the long-term maintenance and protection of SEQ's coastal wetlands include:

- pressure to develop these modified or degraded coastal wetlands in preference to enhancing or rehabilitating areas for biodiversity values and ecological-functioning benefits for the State and the SEQ region;
- a lack of coordination between State and local governments, Indigenous Traditional Owners, industry, community groups and private landholders to achieve long-term protection and enhancement of SEQ's remaining coastal wetlands;



- a lack of consideration of climate-change impacts and associated sea-level rise on ecological functioning and habitat values in the management and protection of coastal wetlands and values (refer to Policy 2.2.1 Adaptation to climate change); and
- public pressure for coastal wetlands to be modified to mitigate potential nuisances of mosquitos and midges to some people who live, work or recreate in close proximity to coastal wetlands.

Development activities for future infrastructure of State and Commonwealth significance, must demonstrate minimisation and mitigation of impacts on coastal wetlands and values by identifying measures or strategies to mitigate potential adverse impacts, such as mangrove mitigation, offsetting loss of wetlands to ensure a net gain of coastal resources and values, and the rehabilitation of other coastal wetland areas.

Response

The northern and south-western sectors of the site are mapped as supporting areas of "Significant Coastal Wetlands" pursuant to Map 8: Areas of State Significance (Natural Resources) of the RCMP. The mapped areas of "Significant Coastal Wetlands" along the northern boundary of the site encompass areas identified during field surveys as supporting riparian, mixed marine and disturbed Saltwater couch grassland communities. The mapped area of "Significant Coastal Wetlands" in the southern sector of the site supports Paperbark (*Melaleuca quinquenervia*) open forest (refer to Appendix L1).

The NEBP development will involve some disturbance to vegetation identified as significant coastal wetlands (i.e. approximately 2.0 hectares of disturbed saltwater couch grassland) for the purposes of establishing the marina.

Compliance with Policy 2.8.2 is detailed below.

- A buffer of 100m to the Caboolture River is proposed to minimise impacts on coastal values, and this buffer is proposed to be rehabilitated within the site.
- The NEBP Structure Plan provides for the retention and enhancement of areas of coastal wetland associated with Raff Creek. Whilst these wetland areas have not been mapped as significant coastal wetlands they are, from an ecological perspective, of greater conservation value than the mapped area of significant coastal wetland proposed for disturbance.
- Appropriate management of water quality (as detailed in responses to Policies 2.4.1-2.4.7) will ensure no detrimental impact on the water quality of the Caboolture River arising from the proposed development.
- The proponent has committed to the development of a catchment-wide strategy for the rehabilitation of the Caboolture River, with the goal of improving water quality and riparian function.

Policy 2.8.3 Biodiversity

This Policy states that "key issues affecting the ongoing ecological and ecosystem functioning of SEQ's biodiversity are the loss, fragmentation and degradation of coastal resources, in particular:

- riparian vegetation;
- coastal wetlands;
- shorebird habitat;
- fish habitat and fish migratory pathways;



- marine species habitat; and
- benthic communities."

Response

Policy 2.8.3 is of relevance to this assessment of the NEBP development, given that the site supports:

- riparian vegetation along the Caboolture River, Raff Creek and drainage lines that traverse the site;
- areas of freshwater and tidal wetlands; and
- suitable habitat resources for shorebirds.

In respect of these issues, the NEBP development makes provision for

- the retention of approximately 55% of the site within the Open Space network, which encompasses the majority of the site's riparian vegetation, wetlands and shorebird habitats;
- the removal of livestock from the site and the management of weeds and feral pests;
- extensive rehabilitation of degraded habitats within the site, including the Caboolture River riparian zone, wetlands and shorebird habitats;
- protection on ecological values and function of the Caboolture River and ultimately Moreton Bay through appropriate buffering, stormwater management and environmental management practices; and
- improved environmental awareness through the establishment and operation of an Environment Centre.

Policy 2.8.4 Rehabilitation of Coastal Resources

This Policy states that "The rehabilitation and enhancement of coastal resources will improve values and functioning of the coastal zone in the future." The Policy encourages the rehabilitation of degraded coastal areas and resources, with the priority being the restoration of degraded coastal ecosystems to their natural ecological, physical and aesthetic condition.

Response

The Caboolture River is not specifically identified as a priority area for rehabilitation in the RCMP, however, the proposal includes the rehabilitation of 9km of riparian land fronting the Caboolture River, and is therefore compliant with the Policy. Further, the proponent has committed to the facilitation of off site rehabilitation measures with the objective of improving the quality and functionality of riparian vegetation.

Policy 2.8.5 Pest Species Management

This Policy states that "coastal and marine environments are under pressure from pest species which have been introduced intentionally (e.g. for ornamental or agricultural purposes) or accidentally (e.g. through ballast water or on the hulls of boats)."

The focus of pest management activities is on minimising the risk of introducing new pest species and reducing or at least controlling the impact of pest species infestations. Management of pest species will have regard to:



- preventing the introduction, establishment and spread of pest species in the coastal zone; and
- managing the impacts of existing and new pest species.

Response

The objectives of the Policy will be achieved through raising the level of awareness of pest species within the marina community, and the implementation of appropriate management measures during the operation of the marina. Existing pest species have been identified on the NEBP site, including the mosquito fish and a number of terrestrial flora and fauna species.

The CEMP and Marina SBMP include elements relating to pest species management to ensure the NEBP development does not contribute to increases in scale and intensity of existing pest species and where possible, reduce the existing scale and intensity of pest species.

4.5.2.2 Riverbank Erosion

To accurately assess the erosion impacts of the NEBP development on the Caboolture River a survey of existing riverbank erosion was undertaken by Cardno attached as Appendix J.

The riverbank erosion assessment was undertaken on a study area extending from upstream of the NEBP site to the lower reaches of the Caboolture River where capital dredging works is proposed to ensure safe navigation of vessels accessing the NEBP development.

Characteristics considered as part of the assessment of erosion included channel geometry, adjacent land uses, depth and composition of fringing vegetation and bank properties and artificial structures. The aims of the study were to provide baseline monitoring data on the extent of riverbank erosion on the Caboolture River (including estuary) and to identify some possible local causes of this erosion to determine potential impacts from the proposed development and identify possible strategies for the management of erosion, including repeat erosion monitoring locations to inform future restoration projects.

Major findings of the riverbank erosion survey are listed below.

- Rivers and estuaries are highly dynamic and erosion is a naturally occurring phenomenon however the process of erosion can change when human activities within river catchments interfere with normal environmental conditions, increasing rates of erosion beyond environmentally benign levels.
- There has been no significant change to channel alignment and bathymetry (the latter over the last 10 years).
- The extent of fringing vegetation differed significantly along the length of the study area, generally decreasing in size travelling upstream where land was increasingly modified.
- Erosion was predominantly present in the upper tidal reaches of the Caboolture River.
- Severe erosion was found in close proximity to the NEBP site.
- Erosion was clearly evident on both the left and right bank of the Caboolture River however the scale of erosion on the left bank was far greater, a consequence of altered land uses.
- In total some 9km of riverbank was classified as severely eroded, with approximately 12km of riverbank showing signs of some erosion.



- Severe riverbank erosion was generally located where the river meandered.
- A steep slope combined with minimal vegetation cover decrease bank stability and are significant attributes influencing erosion.
- Boat wash has the potential to increase the rate of bank erosion where riparian vegetation is lacking.

Pressures which have contributed to accelerated erosion within the River system (in approximate order of importance) include:

- clearing of fringing vegetation and stock grazing;
- coastal development;
- alterations in stormwater runoff patterns;
- poor water quality; and
- boat wash.

As such riverbank erosion was identified as an important issue for the NEBP development because:

- it involves the construction of a dry-land marina within a largely undeveloped waterway;
- it involves dredging 6.5km of riverbed for navigation purposes;
- the number of vessels utilising the Caboolture River will substantially increase;
- the existing riparian buffer within the development site (and along the river frontage) has in places been removed or invaded by weeds due to past and current land uses; and
- the continuing urbanisation of land fronting the Caboolture River.

The access to the dry-land marina is proposed upstream of a meander where severe erosion and lack of riparian vegetation was recorded. In direct contrast dredging for navigational safety at the estuary is proposed along river frontage where pressures are less intense. It is expected that existing riparian vegetation in the vicinity of the proposed navigational channel will aid in prevention of riverbank erosion, particularly in areas were significant siltation, and therefore ongoing dredging, is predicted.

The areas of potential slumping can be determined by reviewing the erosion potential reported in the riverbank erosion assessment along river banks where the preferred navigational channel alignment is proposed. It is noted that bank slope and shape of the existing river bank and undisturbed riparian vegetation adjacent to the proposed dredging location, naturally encourages a stable environment therefore minimising erosion potential from dredging works.

The design of the channel has also considered erosion impacts (and consequent impacts on the Ramsar wetlands) with the alignment preferred by Queensland Transport and the design bed incorporating 1:3 batters which tie into existing bathymetry.

The NEBP development has committed to extensive mitigating strategies to reduce the risk of accelerated erosion. The Proponent proposes:

- revegetation and rehabilitation of 9km of the riparian zone on the right bank within the NEBP project area that is severely degraded;
- maintaining a 100m riparian buffer between the development and high water mark (with the exception of the marina lock allowing boat access to and from the Caboolture River by marina users);
- developing a funding model through a component of the marina berth and dry storage levy that will be allocated to a trust administered by local environmental catchment groups to restore eroded areas downstream of the NEBP site;



- leading by example being a responsible developer and erosion conscious private land owner;
- investing \$18 million in managing stormwater runoff from a previously unmanaged 769ha former pine plantation;
- committing to a mariner education program by the Marina Management about the Caboolture River ecosystem;
- adhering to Government objectives for protecting and preserving the environment;
- implementing an improved and managed (regulated) boat speed environment within the Caboolture River; and
- undertaking an erosion monitoring program to measure potential impacts on riverbanks from the Caboolture River estuary to upstream of the NEBP site.

Under Maritime law, the responsible body to monitor and manage the movement of ships in Queensland waters is Maritime Safety Queensland. The use of boating patrols and cameras as a preventative action to limiting impacts of boat wash which increase proportionally with speed, will be in cooperation with MSQ and funded through a berth levy.

In conclusion, the combination of initiatives proposed by the Proponent for mitigating riverbank erosion will result in a significant improvement to the Caboolture River. The result of these initiatives will benefit all those in the community that use the river and enjoy its environmental amenity and aspects whilst providing a development which advances the identity and prosperity of the Caboolture region and ecological health of the Caboolture River.

4.6 Air

4.6.1 Description of Environmental Values

Katestone has prepared an assessment of the potential impacts of air quality during the construction and operational phases of the development titled 'Air Quality Assessment of the Proposed Northeast Business Park, Caboolture. This report is attached as Appendix O.

The NEBP is a multi-use marina and MIBA concept that will integrate marina facilities, industry, commercial, residential, heritage and recreational open space precincts. The exact nature of all activities that will be situated within the developed NEBP has not been predetermined. As a result, a generic air quality assessment has been undertaken using a quantitative air quality modelling program, which includes:

- a description of environmental values, including meteorology and background levels of pollutants; and
- an assessment of potential impacts against the relevant state goals and guidelines and identification of mitigation measures.

The NEBP is zoned District Industry and Rural under the CSC Planning Scheme and consequently, the activities used for assessing the potential air quality impacts involved standard transport, warehousing, manufacturing and packing emissions. More detailed air quality assessments may be required when considering the location of certain specific activities within the NEBP, at such time as activities taking place on the site have been determined, and any such assessment shall be carried out by the proposed occupant.

This section describes the existing values of the locality and the potential impacts on air quality during the construction and operational phases as a result of the proposed NEBP development. This section also provides recommendations for mitigation measures to be employed during the life of the development.



Existing Environment

The Bruce Highway and local government roads surrounding the NEBP are the most significant existing sources of air pollutants in the area. The main pollutants which are affect human health are those that are emitted by motor vehicles. These include carbon monoxide, oxides of nitrogen, volatile organic compounds and particulate matter.

Previous air quality assessments conducted by Katestone for highways and bypasses have shown that at 10 metres from the road, impacts have fallen to less than 67% of the corresponding air quality goals. Whilst the Bruce Highway is expected to be an important source of air pollutants, it is well separated from the proposed NEBP site. Consequently, the ground-level concentrations of air pollutants associated with the Bruce Highway are expected to be well below the limiting air quality standards and goals.

Existing industrial facilities within Caboolture Shire (such as the Narangba Industrial Estate located approximately 10km from the site) include activities such as poultry farming, sawmilling, gravel and sand quarrying, wood product manufacturing, pet food preparation and petroleum storage. The NEBP is well removed from these sources and it is therefore considered unlikely that the existing air quality of the NEBP is greatly influenced by industrial emissions. All facilities of the region which have reported to the National Pollutant Inventory in 2004 – were found to have relatively low emission rates of all reported substances, compared to other facilities of similar nature in Australia.

Existing sensitive places which may be affected by adverse air quality emissions from the construction and operation of the proposed NEBP are:

- dwellings surrounding the project area and adjoining local government roads;
- the Moreton Bay Marine Park; and
- the adjacent Moreton Bay Ramsar wetlands.

The nearest meteorological station to the NEBP is the Queensland Environmental Protection Agency's Deception Bay monitoring station situated 10 kilometres to the southeast of the NEBP. This station has recorded wind speeds and wind direction since January 1995. The Bureau of Meteorology station at the Brisbane Airport is located approximately 30 kilometres from the NEBP site and provides long-term records of climatic conditions. The automatic weather station at the Brisbane Airport is capable of recording half-hourly average wind speed, direction, rainfall, temperature, dewpoint, relative humidity and pressure. Data obtained from both stations have been used in the climate assessment of the proposal area.

For the period from July 1994 to May 2007, the average temperature ranged from 14.5° C in winter to 25° C during summer. The average relative humidity ranged from 69.4 - 74.4% and the average pressure ranged from 1012 - 1021 hPa. Average monthly rainfall ranged from 26 - 131mm.

Wind flows in the area are important feature for understanding the capacity of the air to disperse air pollutants. Wind speed is particular important for evaluating the impact of dust emissions from the site during the construction phase. The nearest meteorological station to the NEBP that records wind speed and direction is the EPA's Deception Bay monitoring station, which is situated 10 kilometres to the southeast of the NEBP. Light to moderate south-westerly winds dominate in the early morning, before strengthening during the day and becoming north-easterly and east-southeasterly winds signalling the arrival of the sea breeze. In the evening, winds become lighter. Both the Deception Bay and Brisbane Airport monitoring stations indicate moderate to strong north-easterly and east-southeasterly winds dominating in summer and spring. Light to moderate south-westerly winds prevail in spring and winter.



Background Air Quality

Background dust levels are required for the modelling to represent all regional sources and to quantify the potential impact of air pollutants from the proposed development. Data from the Queensland EPA's monitoring site at Mountain Creek (~47km north of the NEBP) for the period 2001 to 2005 was obtained for analysis to determine a suitable background level for PM_{10} . The 24-hour average, 95th percentile, and annual average background concentrations used in this modelling assessment are 30 µg/m³ and 17 µg/m³, respectively.

Total Suspended Particles (TSP) is not recorded at any of the EPA monitoring stations. Data collected in Brisbane found PM_{10} to be an annual average background level of 24.2 μ g/m³ for TSP.

There are no known measurements of dust deposition rate within the NEBP area. A background of 20 mg/m²/day has been used in this assessment based on information collected in Southeast Queensland.

The above data was used in the dispersion modelling which was undertaken using the Ausplume model (Version 6).

Air Quality Objectives

The Queensland Government's objective in relation to air quality is defined under Section 3 of the *Environmental Protection Act 1994* (EP Act). The objective of the EP Act is to protect Queensland's environment while allowing the development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).

The EP Act provides the Environment Minister the power to create Environmental Protection Policies that identify and aim to protect environmental values of the atmosphere which are conducive to the health and well-being of humans and biological integrity.

Air quality objectives associated with the construction and operation of the NEBP development have been determined by environmental values stipulated in the *Environmental Protection (Air) Policy 1997* (EPP Air).

Conditions attached to a Development Approval (DA) will provide the ability for the Chief Executive of the EPA to restrict air quality to levels which prevent nuisance associated with the conduct of environmentally relevant activities (ERAs).

ERAs proposed to be conducted as part of the development may include:

- ERA 11 crude oil or petroleum product storing;
- ERA 19 dredging material;
- ERA 62 concrete batching;
- ERA 69 boat maintaining or repairing facility; and
- ERA 73 marina or seaplane mooring.

National standards and goals for air quality are set by agreement between the Federal and State Governments through the National Environment Protection Council (NEPC) and published in the National Environment Protection Measure (NEPM) for Ambient Air Quality. The standards and goals serve to control exposure of the general population to air pollutants and protect against adverse health effects resulting from emissions of carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), ozone (O₃) and particulate matter with aerodynamic diameter less than $10\mu m$ (PM₁₀). These pollutants are relevant because they commonly occur due to direct emissions from industry, traffic and domestic



activities and as such, are generally used as indicators of urban air pollution. Deposition of particulate matter can result in dust nuisance which is a common issue during construction works. The dust deposition guideline in Table 49 below is not defined in the EPP Air, but has been recommended by the EPA as a design goal for avoiding nuisance during the construction phase.

Pollutant	Averaging period	Volume	Units
Sulphur dioxide	10-minute	700	µg/m3
	1-hour	570	µg/m3
	24-hour	100/228	µg/m3
	Annual	60	µg/m3
Nitrogen dioxide	1-hour	320/246	µg/m3
	Annual	30/62	µg/m3
Carbon monoxide	8-hour	10,000/11,247	mg/m3
Particulate matter (diameter <10µm) (PM10)	24-hour	150/50	µg/m3
	Annual	50	µg/m3
Particulate matter (diameter <2.5µm) (PM2.5)	24-hour	25	µg/m3
	Annual	8	µg/m3
Total suspended particulates (TSP)	Annual	90	µg/m3
Deposited dust	Annual	120	mg/m2/day
Note: NEPM advisory	reporting standard.		

 Table 49
 Impact Assessment Criteria for Pollutants (EPP Air)

The Queensland EPA commonly requires new industries to be assessed against best practice environmental management for new industrial sources of air pollutants. In undertaking such an assessment, the Queensland EPA relies upon the ANZECC/NHMRC guidelines (1985) and more recent regulations from other state jurisdictions.

Recommendations for assessing and managing odour from new developments in Queensland are detailed in the Queensland EPA's odour guideline (2004). The guideline is intended for assessing the suitability of any odorous activity that may be located in the NEBP.

Odour is measured in odour units (ou). Ground level sources must comply with a guideline of 2.5 ou for a 1-hour average. Industrial and infrastructure projects shall be designed and operated to ensure that environmental nuisance and environmental harm do not occur. The air quality standards, goals and guidelines described above are commonly used as a benchmark for ensuring that any potential environment harm or nuisance as a result of the development is minimised.



4.6.1.1 Greenhouse Gas Emissions

The NEBP will release greenhouse gases both indirectly and directly as a result of activities such as fuel use by vehicles and electricity use during both the construction and operational phases.

The Australian Greenhouse Office (AGO) of the Department of the Environment and Water Resources (DEWR) monitors and compiles databases on anthropogenic activities that produce greenhouse gases in Australia. The AGO methodology for calculating greenhouse gas emissions is published in the 'AGO Factors and Methods Works' (AGO, 2006a) which defines three scopes of emission categories, as follows:

- Scope 1: this covers the direct emission sources within the boundary of an organisation such as the emissions from fuel combustion of vehicles.
- Scope 2: this covers indirect emissions from consuming purchased electricity, steam or heat that is produced by another organisation.
- Scope 3: this covers all other indirect emissions from sources that are not owned or controlled by an organisation but occur as a consequence of the organisations activities (e.g. off-site waste disposal, emissions associated with production of fuels and emissions from transmission, distribution and generation of electricity).

The major activities of the proposed NEBP that produce greenhouse gas emissions have been identified as follows.

- Scope 1: petrol, diesel and fuel oil combustion in vehicular and marine traffic.
- Scope 2: electricity consumption.
- Scope 3: production, transport and distribution of fuel and electricity.

Table 50 below summarises the greenhouse gas emission factors used to quantify greenhouse gas emissions of each scope from the proposed NEBP.

Activity/Source	Units	Scope 1	Scope 2	Scope 3	Full fuel cycle
Petrol combustion	t CO _{2-e} /kL	2.4	-	0.3	2.7
Diesel combustion	t CO _{2-e} /kL	2.7	-	0.3	3.0
Electricity consumption	kg CO _{2-e} /GL	-	251	40	291

Table 50Greenhouse gas emission factors (AGO, 2006)

The greenhouse gas emissions during the construction and operational phases of the proposed NEBP have been calculated by Katestone, using the methodology prescribed by the AGO.

The greenhouse gas emissions resulting from the construction activities of the NEBP have been calculated based on the following assumptions.

- Haul trucks travelled at total of 100,000 kilometres per year; and
- Other vehicles travelled a total of 30,000 kilometres per year.

The greenhouse gas emissions resulting from the operation of the NEBP have been calculated based on the expected vehicular traffic accessing the MIBA, residential areas and the marina precinct. The emissions were calculated using the following assumptions.



- MIBA:
 - the number of vehicles accessing the MIBA per day is 26,460;
 - the percentage of vehicles that are commercial/heavy vehicles is 10%;
 - the MIBA operates 6 days per week, 52 weeks per year;
 - o distance travelled from Bruce Highway off-ramp to MIBA and back is 6.1km; and
 - fuel efficiencies of a passenger car and a heavy vehicle are 0.113 L/km and 0.546 L/km, respectively (AGO, 2006).
- Residential and Marina Precinct:
 - the number of vehicle accessing the area is 11,461;
 - o the percentage of vehicles that are commercial/heavy vehicles is 0%;
 - distance travelled from Bruce Highway off-ramp to residential area and marina and back is 16km; and
 - o fuel efficiency of a passenger car is 0.113 L/km.

Table 51 and Table 52 below provide an inventory of projected annual emissions for each greenhouse gas during both construction and operational phases, with total emissions expressed in ' CO_2 equivalent' terms.

Table 51	Greenhouse Gas	Emissions during	Construction of the NE	BΡ
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Activity/Source	Units	Scope 1	Scope 2	Scope 3	Full fuel cycle
Haul	t CO _{2-e}	147	-	16	164
Excavators/compactors	t CO _{2-e}	55	-	6	61
Total					225

Table 52	Greenhouse G	Jas Emissions d	luring Operation	of the NEBP
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Activity/Source	Units	Scope 1	Scope 2	Scope 3	Full fuel cycle
MIBA	t CO _{2-e}	19,946	-	2,389	21,817
Residential Areas	t CO _{2-e}	15,461	-	1,933	16,750
Marina Precinct	t CO _{2-e}	2,768	-	346	2,998
Total					41,565

It is expected that 0.0002 Mt CO_{2-e} greenhouse gas emissions will be generated per year during the construction of the NEBP, whilst approximately 0.042 Mt CO_{2-e} greenhouse gas emissions will be generated per year from the operation of the NEBP.

4.6.2 Potential Impacts and Mitigation Measures

Construction Impacts

The construction phase of the NEBP will involve the cut and fill of approximately 4.3 million and 3.7 million tonnes of material, respectively, from the site which will be redistributed to other parts of the site. The construction phase therefore has the potential to cause elevated levels of dust if it is not appropriately managed. High wind speeds across the site will also increase the potential for elevated dust levels. It is therefore essential that



appropriate mitigation and management strategies be implemented upon commencement of the construction phase.

The construction phase will be undertaken in three phases:

Construction Phase 1:
Construction Phase 2:
area.filling of the proposed MIBA area to the Q100 flood levels.
development of marina and levelling of proposed residential
construction Phase 3:
residential area.Construction Phase 3:
residential area.continued development of marina and levelling of proposed
residential area.

The main activities of each construction phase which are likely to cause adverse dust emissions to neighbouring residential areas include:

- bulldozing;
- scrapers removing topsoil;
- scrapers unloading topsoil;
- loading of excavated material;
- wheel generated dust due to transport of material from cut area to fill location;
- dumping of fill material;
- compacting; and
- wind erosion of exposed areas and stockpiles.

Based on the maximum type and quantity of plant and equipment which is predicted to be used at any one time, the potential emission rates from the aforementioned activities were calculated using published emissions factors from the US EPA (1995) AP42, Fifth Edition, Volume 1 Stationary Point and Area Sources. The emissions factors are presented in Table 53.

Table 53	Emission Factors	Used In the Modelling	g of Construction	Activities
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Activity	Units	TSP	PM ₁₀
Bulldozing	kg/hr	1.37	0.26
Scrapers unloading topsoil	kg/Mg	0.02	0.04
Scrapers removing topsoil	kg/Mg	0.029	0.005
Haulage	g/VKT	2884	804
Truck dumping fill	kg/Mg	0.018	0.003
Compacting	kg/hr	1.37	0.26
Wind erosion of stockpiles and exposed areas	Mg/ha/yr	0.85	0.425

In calculating the emission rates of TSP and PM10, the following assumptions were made:

- moisture content is 10% (range of 7 14%);
- water is sprayed on the haul roads at a rate of 2 L/m²/hr resulting in a 50% control; and
- stabilisation of material to reduce emissions by 30%.

The calculated emission rates from the construction activities are presented in Table 54.



Activity	Units	TSP	PM ₁₀
Bulldozing	kg/hr	0.38	0.07
Scrapers unloading topsoil	kg/Mg	1.06	0.29
Scrapers removing topsoil	kg/Mg	0.77	0.21
Haulage	g/VKT	5	2
Truck dumping fill	kg/Mg	0.67	0.26
Compacting	kg/hr	0.53	0.25
Wind erosion of stockpiles and exposed areas	Mg/ha/yr	1.7	0.8

Table 54 Emission Rates Used In the Modelling of Construction Activities

The results from the dispersion modelling predicted a maximum 24-hour average ground-level concentrations of PM_{10} for each construction phase. The modelling indicates that ground level concentrations of PM_{10} are predicted to be lower than 130 µg/m³ for Phase 1 and 3 at all locations outside the NEBP site. In sensitive areas, the highest predicted ground-level concentrations occur at residences to the south of the site. These predicted levels are below the air quality goal of 150 µg/m³.

During Phase 2 of the construction works, the maximum 24-hour average ground-level concentrations of PM_{10} are predicted to be between 140 and 148 μ g/m³ at nearby residences which is below the EPP Air goal of 150 μ g/m³.

The results of the modelling indicate that maximum PM_{10} emissions from all phases of the construction works will be below the EPP Air goals. It is therefore considered that even during the most intense phase of the construction works, the NEBP will not result in adverse dust impacts at the sensitive receptors.

The maximum annual average ground-level concentration of TSP predicted to occur at a residence external to the proposed site is 76 μ g/m³. The modelling indicates that there are no exceedances of the EPP Air goal of 90 μ g/m³ predicted to occur at any sensitive receptors external to the NEBP site during any phase of the construction works.

The maximum dust deposition rate predicted to occur off site is $120 \text{ mg/m}^2/\text{day}$. The maximum predicted emissions rate at the nearest residence to the site, during all phases of the construction works is $113 \text{ mg/m}^2/\text{day}$. These rates are below the recommended guideline of $120 \text{ mg/m}^2/\text{day}$.

In conclusion, the air quality modelling for all phases of the construction works indicate that levels of dust, predicted to occur at residences surrounding the site, are below the relevant goals and guidelines. Through the implementation of appropriate mitigation and management measures (e.g. watering of haul roads) it is expected that the construction phase of the NEBP will comply with all relevant quality objectives to prevent and/or avoid validated complaints.

Operational Impacts

The main attributor to air pollutants and dust emissions during the operational stage will be from the Marine Industry precinct. This area will incorporate a shipyard with a travel lift, abrasive blasting, specialist paint and maintenance activities, and a refuelling station. The high frequency of light winds from the south-west may transport fugitive releases of odours or exhaust emissions from the Marine Industry precinct to the north-east of the site.

Activities such as spray painting, abrasive blasting, fibre glassing and refuelling have the potential to emit odorous and noxious compounds that could cause nuisance at



neighbouring residential areas. A development permit and registration certificate will be issued for these ERAs and will include conditions to ensure that no offensive odours or elevated pollutant levels occur beyond the boundary of the facility or at the surrounding residences.

Air pollutants from predicted traffic volumes of the operational phase were assessed. It is expected that approximately 37,921 vehicles per day will access the site. Separation distances which will exist between traffic areas within the NEBP and existing/proposed buildings will ensure that adjoining sensitive areas are not affected by environmental nuisance from air pollutants. The Air Quality Assessment determined that, to ensure the nearest residences are not unduly impacted by dust emissions from traffic, the minimum separation distance between the NEBP roads and the residences is 4 - 10 metres. Given that the existing residential locations are set back, or separated from the NEBP at a distance greater than 27m, it is considered unlikely that these premises will be adversely impacted by traffic dust emissions during the operation of the NEBP.

The CSC does not have specific guidelines for assessing the suitability of air quality at proposed childcare centres. However, the Brisbane City Council (BCC) has developed guidelines for assessing the suitability of air quality at proposed childcare centre sites. The guideline specifies three levels of assessment depending on the risk of adverse impact: Low-Risk, Medium-Risk and High-Risk scenarios. The risk level relates to the proximity of the proposed childcare centre to common urban activities that could be associated with adverse air quality impacts.

The assessment by Katestone identified that the most suitable location for the childcare centre within the NEBP would be the location that satisfies the criteria for a low risk site.

A low risk site is described as more than:

- 40 metres from a road carrying greater than 15,000 vehicles per day;
- 100 metres from a controlled intersection and roundabout incorporating suburban road or arterial road; and
- 150 metres from industry or service station.

If the aforementioned criteria cannot be achieved, a detailed air quality assessment will be required once the type and location of various industries are confirmed within the NEBP.

In summary, the air quality modelling for the operational phase of the NEBP indicate that levels of air impurities, predicted to occur at sensitive receptors surrounding the site, are below the relevant goals and guidelines. Through the implementation of appropriate mitigation and management measures (e.g. watering of haul roads) it is expected that the operation of the NEBP will comply with all relevant quality objectives to prevent and/or avoid validated complaints.

Mitigation Measures

Construction

The construction of the NEBP infrastructure and buildings has the potential to cause elevated levels of dust nuisance if not appropriately managed. Even though the modelling results demonstrate compliance with relevant air quality criteria, the construction phase of the NEBP will still require the implementation of appropriate mitigation and management strategies to ensure that dust emissions from the construction works will not unduly impact surrounding sensitive receptors.

A Construction Environmental Management Plan (CEMP) has been developed to manage and control potential impacts from construction activities on the site. The CEMP is



attached as Appendix X2. The CEMP incorporates mitigation measures which shall be implemented during the construction phase to address potential adverse air quality and dust emissions. These strategies include but are not limited to the following.

- Any dust generating activities, such as earthworks, shall cease during excessively windy conditions if airborne dust is causing a nuisance.
- The area of open ground exposed at any one time shall be minimised as far as practicable.
- Activities resulting in the introduction of excessive dust and fumes to the local atmosphere shall be minimised as far as practicable.
- The size of stockpiles shall be minimised as far as practicable and long-term earthen stockpiles will be compacted and revegetated as soon as possible. Stockpiles shall be regularly monitored to ensure no material loss to surrounding areas and the atmosphere. Where material loss is occurring from long term stockpiles, install windbreaks and/or sediment fences. During windy conditions, stockpiles shall be watered, if and where necessary.
- Physical barriers shall be erected where practicable to prevent the excessive movement of dust.
- A vehicle speed limit of 40km/h shall be maintained within the site. All employees, contractors and visitors shall be advised of the speed limits in the site induction.
- Haul vehicles carrying loose materials shall be covered prior to exiting the site. Any spillage of wastes, contaminants or other materials from the haul vehicles shall be cleaned up as quickly as practicable.
- Machinery and vehicle tyres will be regularly cleaned to prevent track-out of dust to public roads.
- A water truck shall be used during earth moving and vegetation clearing works to provide dust suppression. Water trucks are to be deployed when dust is visible for longer than 15 minutes.
- Burning or incineration of waste materials, including green waste, will not be conducted onsite at any time. Green waste shall be transported offsite by a licensed contractor for appropriate disposal.

The issue of air quality is subjective and typically complaint driven. In the event of an air quality complaint, an investigation will commence in the effort to resolve the complaint and ameliorate the excessive emission, if and where applicable. The appropriate procedures to be employed following a complaint are described in the CEMP.

Operational

The operational phase of the NEBP has the potential to cause elevated levels of dust nuisance if not appropriately managed. High wind speed across the site increases the potential for dispersal of dust emissions which in turn impact on the quality of air of the surrounding environment. The following measures will be undertaken to reduce such risks.

- Air conditioning intakes on buildings shall be located where truck movement or idling engine emissions cannot adversely affect the indoor air quality.
- Air conditioning intakes will be suitably located, away from the proposed Marine Industry Precinct to avoid potential odour nuisance.
- A suitable separation distance will be maintained between internal roadways and buildings.



- New industries shall be designed and operated to ensure compliance with air quality standards and to minimise air pollutants to the maximum extent that is economically feasible.
- Industries with particular requirements for low air pollution (such as food storage, food manufacturing, child care centres or pharmaceutical manufacturing facilities) will not be located close to the proposed transport corridor or Marine Industry Precinct.
- The introduction of new activities with fugitive releases of odour or air pollutants shall be placed on the north east edge of the MIBA.

Under normal circumstances, industrial facilities will comply with emission standards and ambient air quality goals however, there may be occasions when unfavourable meteorological conditions (e.g. strong winds) may contribute to elevated concentrations of pollutants and/or odours. Careful planning within the NEBP, with regard to siting various industries, will assist in minimising the potential air quality impacts on surrounding sensitive receptors under adverse weather conditions.

The Victorian EPA has developed guidelines that provide recommendations for the minimum separation distances required between sensitive land uses and industries to avoid adverse impacts. The Queensland EPA refers to, and uses, these separation distances that were developed by the Victorian EPA.



Table 55Recommended buffer distances to protect residential land uses from
potential air quality impacts from industries (VIC EPA, 1990).

Activity	Recommended separation distance (m)
Manufacturing, food, beverages, tobacco	
Smallgoods	100
Milk products	100
Bakeries	100
Chemical, Petroleum and coal products	
Formaldehyde production	300
Paints and ink -blending and mixing	300
Cosmetic and toilet paper preparations	100
Pharmaceutical and veterinary products	1,000
Non-metallic mineral products	
Glass and glass products	500
Bricks, tiles, pipes etc with production rate exceeding 10,000 tonnes per annum	200
Concrete batching plants	100
Plaster products	100
Basic metal products	
Iron and steel production up to 1,000,000 tonnes per year	500
Miscellaneous manufacturing	
Fibreglass manufacturing	200
Transport and storage	
Transfer stations	300
Non-metallic mineral products	
Concrete batching plants	100
Bitumen batching plants	500
Plaster products	100
Concrete or stone articles	100

Along with the above separation distances, a significant dedicated area of open space will be retained. The position of the Golf Course and the open space area will reduce the nuisance associated with fugitive releases of air pollutants from the NEBP.

In conclusion, adverse air quality emissions generated from the operation of the NEBP can be successfully mitigated to ensure compliance with relevant quality objectives and goals.



4.6.2.1 Greenhouse Gas Abatement

The construction and operation of the NEBP will result in the indirect and direct release greenhouse gases. In the effort to avoid and/or minimise these emissions, the following mitigation measures are proposed.

- A certain proportion of the energy supplies sourced for the construction of the NEBP will consist of renewable energy. The percentage of renewable energy provided by electricity provider will be monitored.
- A percentage of the fuel used for construction and operational vehicles and equipment will be from renewable sources such as biodiesel or ethanol based fuels. The percentage of renewable fuel provided by electricity provider will be monitored.
- The construction program and traffic movements will be designed to minimise the distance travelled by construction vehicles. Fuel consumption to be monitored on a regular basis.
- When vehicles, equipment and power are not in use they will be turned off.
- Site offices and amenities buildings to be appropriately positioned so as to minimise the need for lighting, air-conditioning and heating. When the site office and amenities building are not in use, the lights and air conditioner shall be switched off.
- Training will be provided to all site personnel in the induction programme. The training will outline the importance of energy efficiency and greenhouse gas abatement.
- Ongoing monitoring of energy and fuel consumption will be undertaken. Any detected excessive energy consumption shall be treated with appropriate measures to reduce energy consumption. Such measures may include an energy audit to determine the devices of highest energy consumption followed by replacement or servicing of the device. The site Environmental Management Officer will regularly monitor energy and fuel consumption.
- Construction workers will be encouraged to use alternative transport methods, such as public transport and car pooling when travelling to and from the development site. The Contractor will ensure alternative transport methods are easily accessible for construction workers.
- The NEBP design will incorporate a network of on-road cycle lanes and dedicated pedestrian and cycle paths linking all key areas of the development as well as providing linkages to the external network. The co-location of land uses in a parkland setting is seen as being particularly conducive to encouraging high rates of pedestrian and cycle activity, thereby reducing greenhouse gases and improving quality of life and promoting healthy lifestyles.



4.7 Noise and Vibration

4.7.1 Description of Environmental Values

Background

The existing NEBP site does not contain any noise sensitive places within the development outline however dwellings exist in the locality of the site which can potentially be impacted on by an increase or change in the noise and vibration in the locality.

This section describes the existing values of the locality affected by the proposed NEBP development and potential impacts of changes in noise and vibration. Both the construction and operational phases have been considered including recommendations to mitigate such impacts and is informed by the following technical reports.

Cardno (Qld) Pty Ltd has prepared an assessment of the potential impacts of noise during the construction and operational phases of the development titled Northeast Business Park Noise Impact Assessment. This report is attached as Appendix N.

In addition, Max Winders & Associates undertook an assessment of the noise impacts arising from the business park element of the development titled. 'Noise Impact Assessment – Proposed Caboolture River Business Park, Parcel 62, 2-32 & 34 Nolan Drive, Morayfield' This is appended to the Noise Impact Assessment Report provided in Appendix N. This report has been reviewed and where necessary, additional information is presented within the Noise Impact Assessment Report.

Existing Environment

The most significant noise source in the locality of the proposed NEBP development which contributes to the ambience of the existing environment is road traffic from the Bruce Highway and local government roads. These roads include Trafalgar & Nolan Drive, Coach Road, Buckley Road and Farry Road which surround the project area. Additional noise sources from rural activities exist such as noise emissions from a horse training yard and stables (located on Trafalgar Drive).

Existing noise sensitive places which may be affected by noise from the construction and operation of the proposed NEBP are:

- dwellings surrounding the project area and fronting local government roads nominated above;
- Moreton Bay Marine Park; and
- adjacent Moreton Bay Ramsar wetlands

Noise sensitive places are defined in the *Environmental Protection (Noise) Policy* 1997 (EPP Noise) as being:

- a) a dwelling;
- b) a library, childcare centre, kindergarten, school, college, university or other educational institution;
- c) a hospital, surgery or other medical institution;
- d) a protected area, or an area identified under a conservation plan as a critical habitat or an area of major interest, under the *Nature Conservation Act 1992*;
- e) a marine park under the Marine Parks Act 1982;



f) a park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment.

For reporting purposes the existing residents where noise monitoring was conducted is listed below.

- Nolan & Trafalgar Drive Residential "A"
- Coach Road Residential "B"
- Buckley Road Residential "C"
- Farry Road Residential "D".

Max Winders & Associates (2004) monitored noise within Residential Areas A, B and C. With additional baseline noise monitoring being undertaken by Cardno in 2007 at Residential Areas A, B and D.

Background Noise

Dwellings surrounding the project area are significantly affected by road traffic noise from the Bruce Highway and local government roads. A sound pressure level (SPL) of 55 dB(A) $L_{Aeq, 24 \text{ hours}}$ was recorded at Residential Area A. Lower noise levels were recorded at Residential areas B and D because of the increased distance between the Bruce Highway and the sensitive places.

The contribution of road traffic noise from local government roads is still regarded as significant, which is demonstrated by the SPLs recorded across all monitoring locations. The results from baseline monitoring from 29 July 2007 to 1 August 2007 are summarised in Table 56.

Sensitive Place	SPL L _{Amax} dB(A)	SPL L _{A10} dB(A)	SPL L _{A90} dB(A)	SPL L _{Aeq} dB(A)
Residential A	75	56	48	55
Residential B	65	54	48	52
Residential D	59	46	41	45

Table 56Ambient Sound pressure Levels Recorded from 29 July 2007-1 August 2007

Note: existing background noise levels were monitored at the most sensitive point in an affected residential area, being (in metres) the closest noise sensitive place to the development.

Less recent data acquired by Max Winders & Associates (MW&A) in a study completed in 2004, recorded noise levels which do not significantly vary from the current levels. An SPL of 54.3 dB(A) $L_{Aeq, 24 hour}$ was recorded at a place comparable to Residential Area B.

The methodology used by Cardno to assess noise impacts was in accordance with the Queensland EPA 'Noise Measurement Guidelines' (3rd Edition 1 March 2000), the EPP Noise (Part 5) and the following Australian Standards.

- 'AS 1055.2-1997 Acoustics Description and measurement of environmental noise – Application to specific situations'.
- 'AS 2436 –1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites'.



Background Vibration

The most significant existing vibration source in the locality of the proposed NEBP development is the Bruce Highway. Local government roads, namely Trafalgar & Nolan Drive, Coach Road, Buckley Road and Farry Road, which surround the project area, are secondary contributors.

Objectives - Noise

Acoustic quality objectives associated with the construction and operation of the NEBP have been determined based on the environmental values to be enhanced or protected under the *Environmental Protection (Noise) Policy 1997* (EPP Noise) and on the characteristics of the predicted emissions. Values identified under the EPP Noise are those qualities of the acoustic environment that are conducive to:

- a) the wellbeing of the community or a part of the community, including its social and economic amenity; or
- b) the wellbeing of an individual, including the individual's opportunity to have sleep, relaxation and conversation without unreasonable interference from intrusive noise.

In Queensland, the EPP Noise provides the framework for assessing and managing noise from developments such as the proposal to which this EIS relates under the EP Act.

Conditions attached to any approval of the proposed development provide the ability for the Chief Executive of the EP Act, the Environmental Protection Agency, to restrict noise levels to prevent nuisance associated with the conduct of environmentally relevant activities (ERAs) to prevent environmental harm. ERAs which may be conducted on site are:

- ERA 11 crude oil or petroleum product storing;
- ERA 19 dredging material;
- ERA 62 concrete batching;
- ERA 69 boat maintaining or repairing facility; and
- ERA 73 marina or seaplane mooring.

The definition of environmental harm includes environmental nuisance, which is defined under section 15 of the EP Act as:

"Unreasonable interference or likely interference with an environmental value caused by:

- a) noise, dust, odour, light; or
- b) an unhealthy, offensive or unsightly condition because of contamination; or
- c) another way prescribed by regulation".

The EIS and development approval process also provides the ability for Councils to plan for noise control across the development proposal for works that are assessable against a local government planning scheme.

Objectives for the construction and operation of the NEBP are proposed. A background plus excess criteria is proposed for the construction phases at noise sensitive places with the background noise level being the background SPL $L_{A90,T}$. The proposed noise limits are presented below in Table 57.



Table 57	Construction	Noise Limits
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Period	Noise Level at Noise Sensitive Place (externally)	Noise Level at Commercial Premise
Day 7.00am – 6.00pm	Background noise level plus 5 dB(A)	Background noise level plus 10 (dB(A)
Evening 6.00pm – 10.00pm	Background noise level plus 5 dB(A)	Background noise level plus 10 (dB(A)
Night 10.00pm – 7.00am	Background noise level plus 3 dB(A)	Background noise level plus 8 (dB(A)

This objective is proposed based on the characteristics of potential noise sources during the construction and noise being subjective and primarily complaint driven. Compliance with this criterion will be measured on receipt of a complaint in accordance with a predetermined procedure to successfully resolve complaints.

For operational aspects across the development layout, planned noise levels (PNLs) have been developed in accordance with the Ecoaccess guideline (2004) 'Planning for noise control', which accounts for three factors in protecting environmental values. These are:

- control and prevention of background creep in the case of steady noise level from equipment such as that caused by ventilation fans and other continuously operating machinery;
- containment of various noise levels and short-term noise events, such as those caused by forklift trucks and isolated hand tools, to an 'acceptable' level above background noise level; and
- the setting of noise levels that should not be exceeded to avoid sleep disturbance.

The relevant criteria (PNL) for the operation of the NEBP development for various time periods are presented in Table 58.

Time Period	Maximum hourly sound pressure level, L _{Aeq,1 hour} (PNL)
7.00am – 6.00pm	55 dB(A)
6.00pm – 10.00pm	50 dB(A)
10.00pm – 7.00am	45 dB(A)

Table 58Operational Planning Noise Levels

Where compliance with the above criteria is achieved, the maximum SPL within any habitable dwelling will not exceed 55 dB(A) $L_{Aeq,T}$. Compliance with this noise level measured internally at any noise sensitive place is required under the Local Government planning scheme for residential premises.

Objectives - Vibration

There are no specific Queensland guidelines for the assessment of vibration from developments of this type.

No blasting will be undertaken as part of this development and as construction activities have the potential to result in ground vibration, vibration causing activities will be managed as part of the construction methodology. Mitigation measures required will be site specific


and may be complaint driven. These will be developed in consultation with any complainant and relevant administering authorities. Expert advice will be sought when necessary.

4.7.2 Potential Impacts and Mitigation Measures

Construction Impacts

Impacts from noise generated during the construction of the NEBP may arise throughout the construction which extends from June 2009 to December 2024. Construction will be staged to manage impacts, including noise.

Potential noise sources during the construction of the NEBP development will include:

- vehicle movements;
- sheet pile driving when constructing the marina and pile driving when constructing multiple bridges;
- dredging and excavation of material for fill purposes and the marina lock;
- spreading of fill material to mitigate against flood damage and storm surge;
- building works including concrete batching (if undertaken on site); and
- plant and equipment noise.

The potential emissions from noise sources have been calculated based on the maximum type and quantity of plant and equipment which is predicted to be used at any one time, being the worst case scenario for emission levels. The assessment of the worst case scenario has been used for assessment purposes to encourage appropriate approval conditioning. Predicted noise levels are tabulated in the Noise Impact Assessment, prepared by Cardno and attached as Appendix N.

Preliminary noise emissions will result from site establishment and the primary noise emissions thereafter are expected to originate from activities including bulk earthworks (cut and fill) and residential, commercial and industrial sub-division works. Activities have been organised into 11 stages across the construction period with stages designed to mitigate noise progressively at sensitive places. For example Residential Area A may be affected initially by site establishment works and the construction of the entry point however thereafter (from 2014) will be protected from noise emissions by the progressively built elements and complete bulk earthworks. This is a similar scenario for sensitive places located within Residential Areas B-D with impacts first expected from site establishment and bulk earthworks and thereafter from residential sub division works, golf course construction and bridge building commencing at later stages.

In line with planning for the worst case scenario, the prediction of noise emissions included noise sources located at the boundary of the precinct under construction. Separation distances in most cases will be, in reality, significantly grater than those assumed, and as a result the predicted noise levels are a conservative estimate.

Predicted noise emissions however did not consider the reduction in noise emission at a sensitive place from building components (materials). The internal amenity of a residential premise is further assured by a typical 10 dB(A) reduction in noise from building components of dwellings with windows open and 25 dB(A) when openings are closed providing existing dwellings are built of standard construction materials. This will result in less than a 5% probability of disturbing sleep.

Therefore the following factors will significantly reduce impacts at sensitive places and ensure compliance with relevant objectives and/or conditions of approval.

• Staged Construction.



- Attenuation distances.
- Noise reduction afforded over time by structure built as part of the staged development.
- Noise reduction offered by building components of sensitive places.
- Proposed mitigation strategies including established complaint procedures.

Off-site impacts arising from noise generated by construction traffic and dredging of the Caboolture River were also assessed qualitatively as part of the Noise Impact Assessment. The community consultation process identified off-site impacts were important, particularly noise emissions from construction traffic.

Traffic volumes at the Buchanan Road interchange will significantly increase during the construction phase, including the percentage of heavy vehicles. Traffic volumes for the Buchanan Road interchange, the primary site access, have been obtained from the Traffic Impact Assessment presented as Appendix K1. Traffic volumes were modelling using the Calculation of Road Traffic Noise model to determine road traffic noise levels at existing sensitive places. With the closest sensitive place approximately 130 metres from the proposed interchange, noise levels were predicted at less than SPL 68 dB(A) LA10(18hour) based on construction traffic volumes as a result of the development which is the criteria imposed by Main Roads for new road works adjacent to existing dwellings.

Therefore no existing sensitive places are likely to be affected by construction traffic noise. Mitigation measures proposed are those restricting times of vehicle movements for construction traffic to between 6.30am and 6.30pm Monday to Saturday.

Noise emissions from cutter suction dredging of the river may contribute to a reduction of the existing acoustic environment in the locality of the Caboolture estuary and Moreton Bay but which will be appropriately mitigated to prevent impacts on terrestrial and marine animals and avifauna associated with sensitive places including the Moreton Bay Marine Park and Moreton Bay Ramsar Wetlands.

Operational Impacts

Potential noise sources during operation of the proposed development will include:

- motor boats;
- boat rigging (generally on windy days);
- entertainment noise (crowds and music);
- refrigeration units;
- air-conditioners and ventilation fans;
- on-site vehicular movements in the car parking areas;
- delivery vehicles to the resort tourism and commercial mixed use precincts;
- noise associated with transferring boats and lowering/raising boats; and
- noise associated with ship-yard operations and boat repairing including activities such as abrasive blasting.

The potential for the operation of the development, in particular commercial premises, to cause environmental nuisance has been assessed. The assessment of noise emissions from various noise sources associated with the MIBA and marina operation has determined that predicted noise impacts can be successfully managed by the proposed mitigation measures. These measures together with the separation distances which will exist between noise sources and existing/proposed noise sensitive places and the physical



attenuation afforded by buildings as they are constructed, will ensure sensitive places will not experience environmental nuisance from noise.

The predicted external SPL at the worst affected sensitive place from the MIBA was 57 dB(A) which would achieve compliance with the internal acoustic quality objective of 55 dB(A) required by CSC. This is primarily due to the typical noise reduction afforded by building materials of the sensitive places (with windows open) which was not considered as part of the noise impact assessment for emissions from the MIBA.

Mitigation Measures

Mitigation measures for noise have been incorporated in to the master plan by locating potential noise sources in areas furthest from existing and proposed sensitive places whilst maintaining significant open space to promote consistency with the principles of ecologically sustainable development.

Mitigation measures to be implemented to address potential noise impacts associated with the construction of the development include the following.

- Where practicable noisy plant or processes shall be replaced by less noisy alternatives.
- All plant and equipment shall be used in accordance with manufacturer's instructions.
- Care will be taken to locate and orientate noisy equipment away from noise sensitive places where practicable.
- Machines used intermittently, including cranes, dozers, graders, back hoes, and loaders, shall be shut down in the intervening periods between work.
- Where machines are fitted with engine covers, these shall be kept closed when the machine is in use.
- Materials shall not be dropped from a height onto either trucks, barge(s) or hardstands.
- All plant and machinery to be in good working order with operational mufflers where required.
- Regular and effective maintenance of stationary and mobile plant and equipment including off-site vehicles shall be undertaken.
- A builder or building contractor must not carry out building work on a building site in a way that makes or causes audible noise to be made from the building work:
 - On a Sunday or public holiday, at any time; or
 - On a Saturday or business day, before 6.30am or after 6.30pm.
- Community consultation shall be undertaken to notify the potentially affected residents of noisy construction periods prior to commencing the works.
- Compliance with noise conditions of relevant approvals is compulsory.
- Use of temporary and/or permanent barricades or screens to reduce noise by removing line of sight to noisy plant/equipment.

As the issue of noise is subjective and complaint driven, in the event of a noise complaint, an investigation will commence to successfully resolve the complaint in accordance with the established complaint procedure developed as part of the Construction Environmental Management Plan (CEMP). A noise management plan will be prepared if requested by the administering authorities to implement changes to procedures and/or plant and equipment.



Mitigation measures to be implemented to address potential noise impacts associated with the operation of the commercial ventures associated with the development proposal include the following controls.

- Apply boat speed limits within the marina.
- Road traffic speed limits within each precinct to consider impacts of noise.
- Limit operational hours of commercial and business facilities.
- Acoustically attenuate air conditioning units and refrigeration equipment.
- Provide acoustic treatments (such as noise barriers) having regard for land area, the character of the use relative to its setting and any prominent views.
- Comply with noise conditions of relevant approvals.

In conclusion adverse noise emissions generated from construction and operational activities associated with the NEBP development can be successfully mitigated to ensure compliance with relevant acoustic quality objectives to prevent and/or avoid validated complaints.

These mitigation strategies have been incorporated into the CEMP presented in Section 5 of this EIS.

4.8 Nature Conservation

The proponent has commissioned assessment of the terrestrial and aquatic ecology of the site, and these assessments are presented as:

- Cardno Terrestrial Ecological Assessment Report (TEAR) (2007) Appendix L1.
- The Ecology Lab Aquatic Ecology Investigation (2007) Appendix L2.

4.8.1 Description of Environmental Values

4.8.1.1 Terrestrial Flora

Historically the site has been subject to episodes of broad-scale vegetation clearance associated with native timber getting, livestock grazing and exotic pine plantation forestry. Currently recently the site is being utilised for livestock production and as such, the majority of the site supports highly disturbed grassland vegetation. Interspersed throughout the grassland landscape are small areas of marine vegetation, paperbark swamps, eucalypt forest, native pine vegetation and heathland. The Caboolture River, which delineates the northern boundary of the site, supports riparian vegetation that has been reduced to a narrow fringe of terrestrial and marine plants with varying levels of weed incursion. There are also groves of cultivated exotic trees remaining along the banks of the Caboolture River where old homesteads used to exist.

The current and certified Regional Ecosystem Map generated for the site indicates that the majority of the site is mapped as a non-remnant "Plantation Forest" with a small area of mapped remnant vegetation occurring in the south-western sector of the site (i.e. Lot 2 on RP902075 and Lot 10 on RP902079). The remnant vegetation is briefly described as follows:

- **RE 12.5.3** *Eucalyptus tindaliae* and/or *E. racemosa* open forest on remnant Tertiary surfaces. This RE type has an "Endangered" status pursuant to the VM Act.
- **RE 12.3.5** *Melaleuca quinquenervia* open forest on coastal alluvium. This RE type has a "Not Of Concern" status pursuant to the VM Act.



Descriptions of the structure and floristic composition of the vegetation communities identified on the site are provided in Table 59 and their distributions across the site are illustrated in Figure 16.

Vegetation Type	Description & Area	Status Pursuant to the VM Act
Mixed marine vegetation	Encompasses 38.7 ha (5%) of the site and occurs along the banks of the Caboolture River and within lower-lying areas that are associated with tidally influenced sectors of Raff Creek and minor drainage channels that traverse the site.	Broadly analogous to RE 12.1.3 which is briefly described as 'Mangrove shrubland to low closed forest on Quaternary estuarine deposits' and has "Not of Concern" status.
Paperbark (<i>Melaleuca</i> <i>quinquenervia</i>) open forest	Occupies 19.9 ha (or 2.5%) of the site and occurs in three discrete locations within the site. The largest patch is associated with an unnamed tributary of Raff Creek in the south-east of the site and occupies an area of 11.2 ha. The other two patches of are associated with Raff Creek and are located in the very south-western corner of the site and the central south of the site. These two patches form part of a contiguous band of Paperbark open forest associated with Raff Creek which extends into adjoining land to the south of the site.	The far south-western community has been classified on the current Certified RE Map as remnant vegetation comprised of RE 12.3.5, whilst the balance of this community is classified as being non-remnant vegetation.
Disturbed grassland	Occupies 598 ha (or 78%) of the site area. This community supports a number of constructed and natural water bodies that are generally in a degraded state as a result of livestock traffic and vegetation removal. These waterbodies support a range of exotic grasses and native rushes and sedge species. Some of these areas also support scattered Swamp oak and Broad-leaved paperbark.	This community is not analogous to any described RE type and is classified as either non-remnant vegetation or plantation forest on the current Certified RE Map.
Cypress pine (Callitris columellaris) woodland	Exists as two isolated patches, situated in the central sector of the site, that collectively encompass approximately 1.8 ha (or 0.2%) of the site area.	This community is not analogous to any described RE type and is classified as non-remnant vegetation on the current Certified RE Map.
Disturbed Saltwater couch (<i>Sporobolus</i> <i>virginicus</i>) grassland	Occurs as three isolated patches that collectively encompass 7.7 ha (or 1.0%) of the site. This community occurs adjacent to the Caboolture River and associated drainage channels that are subject to tidal influence.	This community is broadly analogous to RE 12.1.2, which is briefly described as 'Saltpan vegetation comprised of <i>Sporobolus virginicus</i> grassland and samphire herbland on Quaternary estuarine deposits and has a "Not of Concern" status pursuant to the VM Act. The Certified RE map classifies this community as being non- remnant vegetation

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Vegetation Type	Description & Area	Status Pursuant to the VM Act
Swamp oak (<i>Casuarina</i> <i>glauca</i>) woodland	Occupies approximately 5 ha (or 0.7%) of the site area and is comprised of three fragmented patches associated with highly disturbed drainage channels.	This community is analogous to RE 12.1.1, which is briefly described as <i>Casuarina</i> <i>glauca</i> ± <i>Melaleuca</i> <i>quinquenervia</i> ± mangrove open forest on margins of Quaternary estuarine deposits and has an "Of Concern" status. The Certified RE map classifies this community as being non-remnant vegetation.
Disturbed mixed species woodland	Occupies a narrow strip in the central portion of the site covering approximately 7.1 ha (or 0.9%) of the site.	This community is not analogous to any described RE type because of the sparsity of the over storey vegetation and high levels of weed incursion. The Certified RE map classifies this community as being non- remnant vegetation.
Swampy heathland	Occurs in the central sector of the site and covers approximately 1.5 ha (or 0.2%) of the site.	This community is broadly analogous to RE12.3.13, which is briefly described as 'Closed or wet heathland on seasonally waterlogged Quaternary alluvial plains along coastal lowlands' and has an "Of Concern" status pursuant to the VM Act. The Certified RE map classifies this community as being non- remnant vegetation.
Mixed riparian vegetation	Occupies 34.5 ha (or 4.5%) of the site area, the majority of which occurs along northern boundary fringing the Caboolture River. There are also smaller areas of this community associated with Raff Creek in the central sector of the site.	This community contains elements from a number of regional ecosystem types. The Certified RE map classifies this community as being non-remnant vegetation.
Cultivated vegetation	Occupies 12.9 ha (or 1.7%) of the site and is comprised of actively cultivated vegetation associated with existing dwellings and old homesteads within the site.	This community is not analogous to any described RE type and is classified as non-remnant vegetation on the current Certified RE Map.
Scribbly gum (<i>Eucalyptus</i> <i>racemosa</i>) shrubby open forest	occupies 15.5 ha (or 2.0%) of the site and occurs as a single patch in the south-western corner of the site.	The Certified RE map classifies this community as being remnant vegetation comprised of RE 12.5.3.
Regenerating paperbark forest	Directly adjoins the northern extent of the Scribbly gum shrubby forest and covers approximately 12.6 ha (or 1.6%) of the site.	This community is in a highly disturbed state and is classified as non-remnant vegetation on the current



Vegetation Type	Description & Area	Status Pursuant to the VM
		Act
		Certified RE Map.
Regenerating <i>Acacia</i> dominated woodland	Covers 13.4 ha (or 1.7%)of the site. This community is confined to the central portion of the site on an island of slightly elevated land (i.e. 2 m AHD) encircled by tidal reaches of Raff Creek and the Caboolture River and adjoining land that supports marine vegetation.	This community is not analogous to any described RE type owing to it's highly disturbed nature, density of weed species and sparsity of wooded vegetation. This community is classified on the current Certified RE Map as being non-remnant vegetation

Threatened Flora Species

A review of flora records from the site locality indicated 11 species of conservation significance that may potentially occur in the site locality. Details of threatened flora species, their relevant status under the EPBC Act and NC Act, potential on-site habitat, and likelihood of occurrence on site are provided in Table 60.

Species Name	Common Name	Status	Potential on- site habitat	Likelihood of occurrence
Acacia attenuata	-	CV, QV	Scribbly gum open forest, Paperbark open forest	Moderate
Arthraxon hispidus	Hairy Joint Grass	CV, QV	Fringes of Paperbark open forest	Moderate
Bosistoa selwynii	Heart-leaved Bosistoa	CV	None	Low
Bosistoa transversa	Three-leaved Bosistoa	CV	None	Low
Elaeocarpus coorangooloo	Brown Quandong	QR	None	Low
Cryptostylis hunteriana	Leafless Tongue Orchid	CV	Swampy heath	Moderate
Dodonaea rupicola	Glass House Mountains Hop Bush	CV, QV	None	Low
Leptospermum leuhmannii	-	QR	None	Low
Macadamiaintegrifolia	Bush nut	CV, QV	None	Low
Macadamia ternifolia	Bopple nut	CV, QV	None	Low
Phaius australis	Lesser swamp-orchid	CE, QE	Paperbark open forest	Moderate

* CE, CV = Commonwealth (*Endangered, Vulnerable*) – EPBC Act

QE, QV, QR = Queensland (*Endangered*, *Vulnerable*, *Rare*) – NC Act

None of these or any other threatened flora species were recorded on the site, during field surveys carried out as part of this or previous site assessments (i.e. Yurrah Pty Ltd, June



2004), or are otherwise considered to have a high probability of occurrence at the site. This circumstance is attributable to the absolute lack of suitable habitat for some species (e.g. *Leptospermum leuhmannii* and *Dodonaea rupicola*) or the degradation of potential habitat by anthropogenic disturbance (i.e. vegetation clearance, altered fire regimes, establishment of exotic pine plantations, livestock grazing, displacement by weeds) for species such as *Phaius australis*.

Weed Species

Surveys within the site have identified a number of significant weed species pursuant to the LP Act and its related Regulation. Pursuant to the LP Act it is significant species are classified as follows.

Class 1 - These species have the potential to become serious pests if they are ever introduced into the State. The aim is to keep these out of Queensland and eradicate any that are found.

Class 2 - These species are major pests in Queensland. Most have the potential to spread over much larger areas of the State. The aim is to reduce the rate at which these species invade new areas and to suppress existing infestations.

Class 3 - These species are significant weeds that have spread over most of their potential range but need to be controlled in environmentally significant areas. Their sale needs to be restricted to help avoid re-invasion of areas where these pests have been controlled.

Weed species identified on the site are listed below.

Class 2 pest plants:

- Groundsel bush (*Baccharis halimifolia*), infestations of this species are scattered throughout the site;
- Prickly pear (*Opuntia* sp.), this species was recorded within disturbed cleared areas and within the Cypress pine woodland;
- Water hyacinth (*Eichhornia crassipes*), this weed occurs within the paperbark forest in the south-eastern sector of the site;
- Mother-of-millions (*Bryophyllum* sp.), infestations of this species are scattered throughout site; and
- Salvinia (*Salvinia molesta*), a small constructed waterbody associated with the old homestead/heritage area supports a dense infestation of this species.

Class 3 pest plants:

- Camphor laurel (*Cinnamomum camphora*), the highest densities of this species were recorded within areas of cultivated vegetation and the northern extents of riparian vegetation associated with Caboolture River;
- Lantana (*Lantana camara*), this species is scattered in its distribution across the site;
- Asparagus fern (*Asparagus africanus*), this species is scattered in its distribution across the site;
- Chinese elm (*Celtis sinensis*), this weed occurs mostly within areas of disturbed riparian vegetation; and
- Broad-leaved pepper tree (*Schinus terebinthifolius*) is scattered in its distribution across the site, with the highest densities occurring within areas of disturbed riparian vegetation.



4.8.1.2 Terrestrial Fauna

The NEBP site and adjacent reaches of the Caboolture River provide habitat resources that are exploited by a diversity of terrestrial fauna. Whilst past and current land use practices have resulted in substantial modifications to the site's natural ecosystems, the modified ecosystems that remain provide food, shelter, breeding sites and movement corridors for many species of native and introduced mammals, birds, reptiles and frogs. The diversity of terrestrial fauna that either permanently inhabit or periodically utilise the site is also a function of the following factors:

- the relatively large area of the site and diversity of vegetation and fauna habitats that occur therein;
- the position of the site adjacent to the Caboolture River; and
- the relatively close proximity of the site to Moreton Bay to the east and the D'Aguilar Ranges to the west.

The influence of the above factors is reflected in the results of a search of the EPA Wildlife Online database, for a 10km radius search area centred on the site, which are provided in the TEAR. Within this search area the EPA Wildlife Online database contains recorded sightings of over 430 species of terrestrial vertebrate fauna, with a total of 127 species having been observed on the NEBP site during the course of field surveys. A list of fauna species observed at the NEBP site is provided in the TEAR.

A total of 51 species of terrestrial mammal have been recorded in the EPA database within a 10km radius of the NEBP site. During the various field surveys that have been carried out on the NEBP site a total of 20 species of terrestrial mammal have been recorded.

Birds are by far the most diverse group of terrestrial vertebrates in the site locality, with a total of 309 bird species recorded in the EPA database within a 10km radius of the NEBP site. A total of 89 bird species have been recorded during field surveys of the site.

A total of 45 species of terrestrial reptile and 26 species of amphibian have been recorded in the EPA database within a 10km radius of the NEBP site. A total of 13 species of terrestrial reptile and 6 species of amphibian have been recorded on the site.

Threatened Fauna Species

A review of terrestrial fauna records from the site locality indicated 28 species that are listed as threatened species pursuant to either the NC Act or EPBC Act may potentially occur in the site locality. Profiles of each of these species, including details concerning their general ecology and habitat requirements, are provided in Appendix L1. For each species an assessment of the likelihood of occurrence on the site is also provided based on the results of field surveys and consideration of its known habitat requirements and the availability of suitable habitat on the site.

The habitat requirements of each species have been examined to assess the likelihood that the species would utilise areas to be affected by the NEBP development. Each species has been allocated a rating of Very High, High, Moderate or Low according to the following criteria:

- **Very High:** species observed in areas of suitable habitat to be directly affected by the proposal.
- **High:** no site observations but both EPA database and DEWR database records for the species in the locality, with substantial areas of suitable habitat to be directly affected by the proposal.



- **Moderate:** no site observations, but EPA database records for the species in the locality and at least some suitable habitat to be directly affected by the proposal.
- Low: no site observations, but either EPA database records or DEWR records for the species in the locality, with no suitable habitat to be directly affected by the proposal.

Details of threatened fauna species that have been observed (Koala and Tusked frog) at the site or which are considered to have high probability of occurrence at the site, are provided in Table 61.

Species Name	Common Name	Status
Koala	Phascolarctos cinereus	QV
Grey-headed flying-fox	Pteropus poliocephalus	CV
Grey goshawk	Accipiter novaehollandiae	QR
Black-necked stork	Ephippiorhynchus asiaticus	QR
Wallum froglet	Crinia tinnula	QV
Tusked frog	Adelotus brevis	QV

Table 61 Threatened Fauna Species Known or Likely To Occur At the NEBP Site

* CE, CV = Commonwealth (*Endangered, Vulnerable*) – EPBC Act QE, QV, QR = Queensland (*Endangered, Vulnerable, Rare*) – NC Act

Migratory Species

For the purpose of the TEAR, significant migratory species are species listed under international conventions for the protection of migratory species and their habitats, including the JAMBA and CAMBA, other than migratory species that are also recognised as a threatened species.

A review of fauna records from the site locality indicated that 18 species of migratory bird species are known, or considered likely, to utilise available habitat resources in the site locality.

Whilst the site is not recognised as an important habitat area for migratory bird species, the site's complex of open grasslands, freshwater and saline wetlands, fringing forests and woodlands, do make a functional contribution towards the internationally recognised migratory shorebird habitat values of Moreton Bay. The relationship between the NEBP site and recognised areas of important habitat for migratory and resident shorebirds is illustrated in the TEAR (Appendix L1). With reference to this figure, the lower reaches of the Caboolture River and adjacent shoreline of Moreton Bay are recognised as general habitat for shorebirds, with two known critical high tide roost site being located to the south of the mouth of the Caboolture River.

Also of note is the presence of a White-bellied Sea-eagle nest within a large Qld Blue gum located adjacent to the old homestead site. The position of this nest is illustrated in illustrated in the TEAR.

Pest Species

Vertebrate Pests

Two species of vertebrate fauna that are known to occur on the site are listed as Class 2 pets within the *Land Protection (Pest and Stock Route Management) Regulation 2003* (LP Act). These species are:

• Red fox (*Vulpes vulpes*);



• feral Pig (Sus scrofa);

Other non-native vertebrate species that are not specifically listed under the provisions of the LP Act but which may be considered pest species due to their capacity to have adverse environmental or economic impacts include:

- Black rat (*Rattus rattus*);
- House mouse (*Mus musculus*);
- Brown hare (*Lepus capensis*);
- feral Cat (Felis catus);
- Indian miner (Acridotheres tristis); and
- Cane toad (*Bufo marinus*).

Invertebrate Pest Species

The main invertebrate pest species that are known to occur in the site locality are species of mosquito and biting midge. The freshwater and saline wetlands and waterbodies within the site locality presently provide a range of different habitat types for a variety of mosquito species known to be serious pests and vectors of communicable human viruses within the Caboolture Shire. These habitats include the following:

- 1. Slightly brackish and freshwater pools in Paperbark wetlands and mangroves provide habitat for *Verrallina funerea* and *Ochlerotatus vigilax*, which are known vectors of Ross River Virus and Barmah Forest fever. Both species are most frequently experienced at pest levels in areas situated within 5 kilometres of breeding grounds.
- 2. Freshwater pools, provide habitat for *Culex annulirostris*, *Oclherotatus notoscriptus*, *Coquillettidia linealis* and *Culex quinquefasciatus*, which are known vectors of viruses such as Ross River Virus, Barmah Forest Virus, Australian Encephalitis, Japanese Encephalitis, Murray Valley Encephalitis and Kunjin.
- 3. Intertidal and brackish pools provide habitat for *Culex sitiens* and *Aedes alterans*, both known to be vectors of Ross River Virus.

Biting midge species are not known to transmit disease amongst humans and as such do not possess the same public health management significance as mosquitoes. Nevertheless biting midge may during periods of high abundance cause discomfort to people residing in close proximity to midge breeding/larval habitats. It is likely that the NEBP site provides habitat for the several pestiferous species of biting midge, namely *Culicoides subimmaculatus, C. molestus* and *C. longior.* The main areas of potential breeding habitat for these species are the mangrove flats and banks of the Caboolture River and Raff Creek.

4.8.1.3 Aquatic Biology

Coastal Values

Certain areas and aspects of the NEBP site possess values recognised by the RCMP that warrant consideration in relation to ecological assessment.

1. The northern and south-western sectors of the site are mapped as supporting areas of "Significant Coastal Wetlands" pursuant to Map 8: Areas of State Significance (Natural Resources) of the SEQ RCMP. The mapped areas of "Significant Coastal Wetlands" along the northern boundary of the site encompass areas identified during field surveys as supporting riparian, mixed marine and disturbed Saltwater



couch grassland communities. The mapped area of "Significant Coastal Wetlands" in the southern sector of the site supports Paperbark (*Melaleuca quinquenervia*) open forest .

- 2. The south-western sector is mapped as supporting "Endangered Regional Ecosystems" pursuant to Map 8 Areas of State Significance (Natural Resources) of the SEQ RCMP. The extent of this mapped area is generally analogous to area described as the Scribbly gum woodland.
- 3. Whilst no part of the NEBP site is classified as being Shore Bird Habitat on Map 10A: Areas of Coastal Biodiversity Significance (Marine) of the SEQ RCMP, areas of Shore Bird Habitat do occur on adjacent land to the east and within the downstream sectors of the Caboolture River and Moreton Bay. Recognised Critical Shore Bird Habitat occur adjacent to the mouth of the Caboolture River.

It is also noted that past land uses have resulted in the degradation of the natural environment of the site and in this respect opportunities for rehabilitation of degraded coastal resources are available at the site.

The project site and surrounding areas have been studied by staff from The Ecology Lab since December 2004. Ongoing and more detailed studies were undertaken from December 2005 to August 2006, with additional supplementary works planned for March 2007 in relation to requirements for capital dredging of the lower reaches of the Caboolture River.

Aquatic Biology

Investigations to date have identified the following features in relation to aquatic ecology.

- The project site comprises several areas of aquatic habitat, the most significant appearing to be Raff Creek and areas of mangroves and saltmarshes fringing the site boundary and Caboolture River. The tidal portion of Raff Creek habitat appears to be included within the Deception Bay Fish Habitat Area. Upstream of the tidal influence, this creek forms a drainage line. Further upstream and beyond the southern boundary of the study site, a series of artificial, freshwater ponds has been excavated amid residential properties.
- The proposed entrance to the marina is in a section of the river subject to some erosion and with few aquatic plants. Several small, mangrove-lined channels occur to the east of the proposed marina entrance. Three species of mangroves have been identified on the site grey mangroves (*Avicennia marina*), milky mangroves and river mangroves (*Aegiceras corniculatum*). The channel closest to the proposed entrance contains little water and, at this stage, is considered to be of limited value as aquatic habitat.
- The weir on the Caboolture River forms a major barrier to fish passage (despite the presence of a small fishway) and has significant effects on the distribution of aquatic plants and on water chemistry.
- Whilst the Caboolture River retains significant features, there has been obvious alteration of the river by human activities in addition to the weir. Downstream of the study site is Monty's marina and slipway. This marina contains moorings within the main river channel and along the northern boundary of the river; it also has a large hardstand area and slipway running directly into the river. Further upstream, near the entrance to Goong Creek, there is a small residential area with several large vessels moored on the side of the river channel. In addition, there are small foreshore works, bank stabilisation and private slipways. Finally, there are two Sewage Treatment Plants, one discharging into the Caboolture River just downstream of the weir and one near the entrance to the river, discharging into



Burpengary Creek. These STPs have been identified as problematic in previous studies (see above).

- Parts of the Caboolture River are in areas prone to shoreline erosion, particularly where natural vegetation has been cleared to the edge of the river channel. Mangroves have provided some stabilisation of banks, particularly by the growth of pneumatophores (peg roots) which hold the sediment together. Potential processes causing erosion identified to date include:
 - land clearing and cattle grazing;
 - possible changes to flow and sediment transport associated with construction of the weir, and
 - vessel traffic on the river.
- At the project site there is evidence of degradation due to unauthorised access onto the property. This includes debris such as vehicles dumped on the shoreline and even in the river, and erosion of dirt tracks exacerbated by 4WD vehicles. Significant opportunities exist to improve the shoreline of the property boundary by implementing appropriate management practices.
- Measurement of water quality within the Caboolture River provided strong support for the findings of other assessments, namely that water quality is poor. This was evidenced by supersaturation of oxygen in surface waters and depletion of oxygen at the bottom and by high levels of turbidity. High levels of nutrients have also been detected

4.8.2 Potential Impacts and Mitigation Measures

4.8.2.1 Terrestrial Ecology

From a terrestrial ecology perspective, it is noted that the majority of the NEBP site (approximately 78%) has been cleared of native vegetation and associated fauna habitat and has historically been used for livestock grazing and plantation pine cultivation. The key impacts of the development of the proposed Structure Plan are as follows.

- Major landform adjustments will be required to establish the NEBP development, including excavation of the marina basin and a balanced cut/fill operation within the site's Caboolture River flood plain to achieve required flood immunity outcomes for the NEBP and adjacent properties located within the Caboolture River floodplain.
- 2. The proposed plan of development will have direct physical impacts on most of the site's terrestrial ecosystems and associated species of native flora and fauna as a consequence of the clearance of native vegetation communities and associated development works.
- 3. The impact of the NEBP development upon the site's terrestrial ecosystems is variable, with the majority of development occurring with disturbed grassland area, with very limited impact upon some vegetation communities and the complete removal of others. A summary of the impacts of the NEBP development upon each of the identified vegetation communities is in Table 62 below.



Vegetation Community	Current Extent (Ha)	Extent to be Removed/Modifi ed	% to be Retained
Mixed Marine Vegetation	38.7	2.9	92.5
Paperbark Open Forest	19.9	2.7	86.6
Disturbed Grassland	598.5	394.6	34.1
Cypress Pine Woodland	1.8	1.8	0.00
Disturbed Saltwater Couch Grassland	7.7	2.0	74.0
Swamp Oak Woodland	5.0	5.0	100
Disturbed Mixed Species Woodland	7.1	6.0	15.0
Swampy Heathland	1.5	1.5	0.00
Riparian Vegetation	34.5	0.2	99.3
Cultivated Vegetation	12.9	2.0	84.5
Scribbly Gum Shrubby Open Forest	15.5	12.2	21.3
Regenerating Paperbark Forest	12.6	12.6	0.00
Regenerating <i>Acacia</i> dominated woodland	13.4	0.6	95.0
TOTAL	769	442	42.5

Table 62 Extent of Vegetation Community Removal/Modification and Retention

4. The proposed Structure Plan makes provision for the establishment of a network of Open Space Precincts, encompassing approximately 420 hectares or 55% of the site area. The Open Space Precincts will encompasses the majority of the site's open forest, woodland, riparian and wetland habitats. Within these Open Space Precincts there is a commitment to undertake significant ecological rehabilitation and restoration works that are designed to offset the loss, or modification, of ecosystem values that will occur as a consequence of the NEBP development.

A number of impact mitigation and management strategies are proposed for implementation as part of the NEBP development. A summary of these strategies is provided below.

Land Use Design and Assessment Processes

The NEBP is proposed to be developed under Community Title, guided by a Community Management Scheme. Community Title provides a legal structure allowing for stakeholders in the development to provide detailed local control and management measures tailored to the needs of the development. Such a structure allows for long term control and management of community and environmental assets, allowing them to be maintained to a standard in keeping with the intent of the development.



The NEBP Area Plan, which has been prepared by PMM, is the statutory basis to guide and control development of the NEBP over the lifespan of the project. The NEBP Area Plan is specifically tailored to the NEBP site and comprises a Structure Plan that indicatively designates development precincts. The NEBP Area Plan specifies the development intent for each precinct, overall outcomes, preferred uses, the level of assessment required for future applications, relevant codes and development standards.

Vegetation and Habitat Offsets

An integral component of the NEBP development is the provision of environmental off-sets to compensate for the clearance of some areas of existing vegetation and fauna habitat that is required for the NEBP development to proceed. Vegetation and habitat offset that form part of the NEBP proposal include the following.

- The provision of a vegetation offset in accordance with DNRW's 'Policy for Vegetation Management Offsets - 23 August 2007' in respect of the clearance of approximately 13 hectares of remnant vegetation in the south-western sector of the site. In this respect Northeast Business Park Pty Ltd has engaged Greening Australia to find and secure an appropriate offset that satisfies the policy requirements of the DNRW. A suitable site has been found and agreement reached with the landholder in terms of the utilisation of the land as an environmental offset.
- The establishment and on-going maintenance of substantial revegetation and habitat enhancement works within the NEBP Open Space precincts. These works will be carried out in general accord with the Landscape Master Plan Report (LMPR), prepared by Place. The LMPR provides a conceptual framework for the Open Space and Recreation Areas included in the NEBP development and aims to achieve considerable benefits to the environment and community through the:
 - extensive rehabilitation of degraded habitats within the site, including the Caboolture River riparian zone;
 - o enhancement of the ecological values and health of open space areas;
 - protection on ecological values and function of the Caboolture River and ultimately Moreton Bay;
 - weed control and management;
 - controlled public access for the enjoyment of the environmentally sensitive areas (i.e. Caboolture River);
 - provision of local job opportunities in the fields of landscape construction, landscape maintenance, revegetation and environmental rehabilitation;
 - provision of cooperative partnership arrangements and other opportunities for community based groups such as Caboolture Regional Environmental Education Centre (CREEC) to contribute in a mutually beneficial way to the development of the site; and
 - the implementation of Water Sensitive design (WSUD) and Crime Prevention Through Environmental Design (CPTED) principles.

Mosquito and Biting Midge Management

The site is located adjacent to the Caboolture River and associated wetlands which contain substantial areas of suitable breeding habitat for various species of biting midge and mosquito. Whilst the NEBP development would reduce the extent of available mosquito breeding habitat, through the removal of some ephemeral waterbodies and constructed drainage channels, substantial areas of biting insect breeding habitat would be retained



due to their recognised environmental values. To ensure that retained areas of mosquito and biting midge habitat within and external to the site do not have an unacceptable impact upon existing and future residents of the locality a number of management measures will be adopted. These management measures are described below.

- 1. Mosquito Management Code of Practice The management of mosquito and biting midge incursions from naturally occurring habitats is a public health matter and addressed by CSC and other relevant governing agency that have a role to play in the management of areas containing biting insect breeding habitats (e.g. DPIF and the EPA). At present, CSC manages mosquito in accordance with guidelines set down in the Mosquito Management Code of Practice prepared by the Australian Institute of Environmental Health. The Code was developed under the *Environmental Protection Act 1994* and is currently used by Councils during the undertaking of mosquito management work. The NEBP Body Corporate would work with CSC, and other relevant agencies, to ensure the effective continuation of existing mosquito and biting midge management programs.
- 2. Artificial Waterbody Management The NEBP marina and any other waterbodies that are constructed for stormwater quality management purposes would be designed to minimise the potential for such water bodies to become breeding habitats for mosquito or biting midge. In this respect all artificial waterbodies to be established within the NEBP would achieve compliance with the design specifications of Section 4.3.2.2 Artificial wetlands/water impoundments of Queensland Health's 'Guidelines to Minimise Mosquito and Biting Midge Problems in New Development Areas'.
- 3. Buildings Design and Materials Building constructed at the NEBP are intended to have a contemporary and sustainable design. Consistent with this philosophy inhabited buildings would be fitted with screens on windows and doorways to minimise the potential for adverse amenity and/or health impacts associated with exposure to mosquito and biting midge.
- 4. Community Education Knowledge that mosquito and biting midge occur in the area and knowledge of personal and household protection measures that can be taken, is an important aspect of any effective mosquito and biting midge management strategy. The NEBP Body Corporate, in consultation with CSC and Queensland Health, will develop and implement a program of community awareness and education concerning mosquito and biting midge.

General Environmental Management

The NEBP development will be managed in accordance with a number of management plans that have been prepared in respect of specific aspects and/or phases of the development. These management plans include the following.

- A CEMP has been prepared as part of the NEBP EIS to detail the environmental management measures which will be adopted during the construction of the NEBP. The CEMP incorporates the mitigation measures that have been recommended in the EIS technical reports. In particular, the CEMP provides mechanisms in which the environmental performance of the NEBP construction works can be measured and, if required, provides procedures for identifying and implementing corrective actions. The CEMP considers a number of issues including:
 - Earthworks Management;
 - Erosion and Sedimentation Control;
 - Water Quality Management;
 - Flora and Fauna Management;
 - Weed Control;



- Mosquito and Biting Midge Management;
- Waste Management;
- Dangerous and Hazardous Materials Management; and
- Traffic Management.
- 2. An ASSMP has been prepared to detail the procedures for the management of ASS likely to be disturbed through civil bulk earthworks and Caboolture River dredging associated with the NEBP development proposal. The ASSMP specifies management performance objectives, control measures and monitoring requirements based on the findings of the geotechnical investigations. The ASSMP has been designed to ensure that no significant adverse impact on the receiving environment occur as a result of the disturbance of actual or potential ASS.
- 3. A Dredging SBMP, which outlines the potential impacts of Caboolture Rive navigation channel dredging activities and specifies mechanisms that will be incorporated to ensure environmental impacts associated with the dredging and spoil disposal are minimised as far as practicable.
- 4. A SBMP for various ERAs, associated with the NEBP marina and marine industry precincts, including ERA 11 'crude oil or petroleum product storing', ERA 19 'dredging' (i.e. maintenance dredging), and ERA 73 'marina or seaplane mooring'. The Marina SBMP also provides an overarching framework for best practice environmental management for other ERAs that may be undertaken within the NEBP's marine industries precinct such as abrasive blasting (ERA 23), metal surface coating (ERA 25) and motor vehicle workshop (ERA 28).
- 5. A Stormwater Management Plan, which provides a stormwater quality management strategy to be adopted to achieve the CSC's pollution reduction targets and the Queensland Water Quality Objectives (WQO) for the Caboolture River.
- 6. A Landscape Master Plan Report, prepared by Place, which provides a conceptual framework for the Open Space and Recreation Areas included in the NEBP development.

4.8.2.2 Aquatic Ecology

Construction

Construction of the Marina Basin

The proposed Marina basin covers an area of about 28.5 hectares and includes two small tidal creeks and a short section of river frontage of about 120 metres. These creeks are very narrow and shallow, and support small amounts of mangrove and saltmarsh habitat. Removal of these creeks constitutes a loss of less than 5% of each habitat on the project site.

Sampling of fish and decapods indicated these creeks are of limited value in terms of fish habitat. Therefore, loss of this area is considered to be of minor significance, with the potential to be more than compensated for by creation of fish habitat in the marina basin and rehabilitation of degraded wetland elsewhere on the site.

The construction of the marina basin represents an increase in the water resources available for ecological processes, with a small amount lost due to the removal of a tidal creek. Given that there are numerous other tidal creeks in the system (with others, including Raff Creek) at the project site), this loss is considered to be small.



Flood Mitigation Works

Flood mitigation works are necessary on the site to allow for conveyance of floodwaters around infrastructure. The works involve:

- Four cuts in the landform to create by-pass channels. In essence, none of these would be in estuarine wetlands, although the edges of two cuts are at the CMD boundaries for two arms of Raff Creek.
- Construction of eight earthen flood diversion banks. Most of these also occur beyond estuarine wetlands (and hence outside the CMD). However, one large embankment would occur within the CMD in the central portion of the project site and another small embankment would extend between the northeast corner of the marina precinct and Raff Creek. Both these embankments have the potential to cause a loss of saltmarshes and mangroves as a result of emplacement of the embankment and accessing the site to deposit earth there.

Capital Dredging within the Caboolture River

The navigational channel that is proposed to be dredged is within the Moreton Bay Marine Park. The use of a cutter suction dredge would minimise water quality issues within the river, as sediments would be removed as a slurry and pumped away from the river for treatment and use on the project site.

No seagrasses have been observed in or adjacent to the navigational channel, hence no beds are predicted to be lost as a result of dredging. Similarly, mangroves and saltmarshes are naturally set back from the channel and would not be directly disturbed by dredging.

The dredging of sediments from the river bed of the navigational channel would cause the removal and mortality of benthic organisms living on and within the sediments that are dredged. Benthic surveys, conducted by The Ecology Lab of the channel indicate a fauna typical of this habitat, but with limited diversity. Many of the benthic organisms are preyed upon by larger invertebrates and fish and the dredging potentially represents a loss of productivity within the lower reaches of the river.

This is mitigated naturally by the strong likelihood that disturbed sediments would be readily recolonised by benthos. Recolonisation would occur via settlement of invertebrate propagules from the plankton and migration from adjacent, undisturbed areas. Recolonisation would be expected to occur over timescales of months. During the relatively extended period of the dredging campaign it is predicted that large areas of the channel would function in an ecological sense in a similar way to the present.

In general, most fish would be able to avoid the dredge head and so would not be entrained in the dredge slurry. Some smaller bottom dwelling fish, such as gobies and flatfish would be entrained and lost. The impact of this loss is expected to be relatively small. Similarly, larger organisms such as dolphins, dugong and marine turtles would be most unlikely to be affected by the suction head as it is highly focused on the seabed. Moreover, the dredging vessel moves relatively slowly and marine mammals and marine reptiles would be able to avoid it.

Operation

Road Network

Roads generally would not be built through or over wetland habitats, the exception being the crossing of Raff Creek by the arterial road to the marina precinct. Potentially the road crossing could create a disturbance to the creek and affect flows within it. Best practice in



environmental management and design warrants that the crossing be constructed to maintain connectivity of water upstream and downstream and to maintain fish passage.

Stormwater and Sewerage

The proposed stormwater system and associated management represent best practice in environmental management and WSUD, hence impacts associated with stormwater on the aquatic environment are predicted to be minimal.

Sewage from the western portion of the project site would be pumped to South Caboolture WWTP, treated to a very high standard and then re-used as appropriate on the project site. This avoids the discharge into the Caboolture River of additional effluent that would be generated by the development.

Weeds and Pests

Mosquito fish (*Gambusia holbrooki*) were introduced into Australia and many other countries in the belief that they would control mosquito populations. These fish have been found to be very successful competitors for aquatic resources and are often considered to be a pest species. They can thrive in both fresh and brackish water and appear to prefer still waters. They occur in tidal channels and pools on the project site and in other parts of the Caboolture River. Creation of constructed wetlands could be used by mosquito fish and management plans should include provision to inhibit, as best as possible, the spread of this species.

Lyngbya majuscula is a type of blue green algae that causes coastal algal blooms in Deception Bay and other parts of Moreton Bay. Measures proposed in relation to construction and management of the site are aimed at minimising the release of nutrients which could in turn lead to or enhance blooms.

Operation of the Marina

Given the exemplary operational activities of Port Binnli's Mackay Marina it is considered that the operation of the marina at NEBP would have a strong likelihood of being able to manage operational issues in an environmentally effective way. Other specific issues associated with the ongoing operation of the marina include:

- requirements for maintenance dredging in the marina basin;
- lock operation and queuing pontoons; and
- water and habitat quality of the marina basin.

The use of a lock system for access by boats to and from the marina controls potential impacts of the basin on the tidal regime of the Caboolture River. If uncontrolled tides flowed into and out of the marina, changes would occur in the tidal penetration into and flushing of the river. Lock systems are common in many areas to avoid tidal impacts.

Several issues are important in terms of the quality of the habitat within the basin:

- Fish and invertebrates would be able to move into and out of the marina basin via the lock system and possibly also via the turnover pumps proposed for replacing water in the basin.
- Habitat for aquatic biota would be provided around the marina berths, on the bed of the basin and around the shoreline, especially along the frontage of the section of environmental protection zone, between the basin and the river.
- It is expected that the aquatic biota within the basin would be a subset of that occurring in the adjacent river habitat. Species expected to inhabit the basin



include mullet, bream, toadfish, mud crabs and prawns. The substratum (bed) of the basin would support marine worms, amphipods and molluscs, with more diversity if the bed consists of soft sediment such as mud or fine sand, rather than compacted clay.

- There is scope for enhancing aquatic habitat along the environmental protection zone by planting aquatic flora, for example reed beds (*Phragmites*).
- Apart from the habitat of the basin itself, it would be critical to ensure adequate water quality. The pump system, wind action and movements of vessels would help to mix the waters of the basin and inhibit stratification. Potential build up of contaminants of concern in the water and sediments of the basin would be mitigated somewhat by the pump system and the staging of availability of marinas berths over time, which allows for monitoring and anticipation of any problems. It is recommended that the pump system be modularised so that it can be increased if it is found that greater water exchange is necessary to maintain water quality; and that water quality monitoring include measurements of nutrients, coliform bacteria, oil and grease, and metals such as copper and zinc (which is sourced from sacrificial anodes) both in the marina basin and the adjacent river.

Noise, Vibration and Artificial Lights

Noise, vibration and artificial lighting would not be an issue at the project site during construction due to the isolation of the marina basin from the estuary and the buffer set between the river frontage and development. During operation, there would be noise and vibration associated with vessel movements. Speed limits would be strictly limited both in the marina and river which should help to minimise noise and vibrations. Given that such noise/disturbance is normally associated with marinas and that marinas have been shown to support a varied flora and fauna, this is not expected to be problematic.

There would also be lighting associated with the marina structures and probably at the lock and queuing pontoons. Again, lighting is normally associated with marinas. Even with lighting, there would be a shadow under the berths due to boats and the berth structures. Moreover, the behaviour of many organisms would be to habituate to lighting; hence impacts are likely to be small. There may also be street lighting on the road crossing of Raff Creek. This is likely to have little effect on biota, but could be minimised by ensuring that lights are directed away from the water.

Dredging machinery would have both noise, vibration and, depending on hours of operation lighting. The lower portions of the Caboolture River already have substantial noise and vibration associated with the operation of small run-about boats which can be noise and very fast. In the context of the noise environment, it is considered that noise and lighting associated with dredging activities would have little impact on the aquatic environment.

Management of Shoreline and Wetland Access

A significant positive benefit of the proposed development is that there would be far greater control on shoreline access than is currently the case. This would help to enhance the management and ultimately the value of the Fish Habitat Area and improve the amenity of the region.

Maintenance Dredging of the Navigational Channel in the Caboolture River

Maintenance dredging would be required, with approximately 40,000m³ of dredged material every two to three years and 220,00m³ dredged every five years. Key issues in relation to aquatic ecology during maintenance dredging include the following:

• Water quality including treatment and disposal of slurry water. Effects on water quality of the Caboolture River are likely to be similar to or less than the



capital dredging program. Depending on monitoring the effects of the capital dredging on water quality, it may not be necessary to use silt curtains. With the capital dredging and with maintenance dredging up to 2018, the project site would be used for storage of the dredge spoil and treatment of the slurry water. Following 2018 it may be necessary to use a different site for dewatering prior to sale or disposal and potential impacts associated with that site would need to be assessed.

- Ongoing disturbance to biota of the river channel. Maintenance dredging would constitute an ongoing disturbance, albeit at a small scale, to biota occurring in the river channel. Removal of sediment to a depth of 0.5 m below the bed surface would be sufficient to remove most benthic invertebrates in the path of the dredge head. In periods between dredging there would be rapid recolonisation monitoring the effects of capital dredging would provide a firm basis for understanding the best ways of managing the maintenance dredging in order to have minimal ongoing effects.
- **Impacts on adjacent sand flats.** Sediment is expected to be transported into the navigation channel to replace the sediment removed by dredging. The extent to which this is likely to occur has not been determined, however, on the basis of the information now available, it must be concluded that loss of bank/flat habitat adjacent to the channel could have an impact for the following reasons:
 - The flats are relatively productive and provide a habitat for benthic invertebrates and fish likely to feed (or avoid larger predators) over the flats at high tide.
 - The flats provide protection for mangroves and saltmarshes on the landward side of the flats. Therefore, loss of the flats may expose marine vegetation to erosion.
 - The flats, being outside the navigational channel, are within FHA-013. Impacts to the flats would also extend the extent of disturbance within the Moreton Bay Marina Park.

Mitigation Measures

Marina Construction and Operation

Construction of the basin is proposed to ensure it is kept isolated from the estuary until its construction is completed. Disturbed sediments would be assessed for acid sulfate soils and treated as appropriate. Any dewatering of the basin will be subject to control to ensure suitable water quality prior to discharge. Management of this process could be enhanced by monitoring both the water to be discharged and the ambient river conditions.

A CEMP has been prepared and is provided in Appendix X2.

An operational SBMP has been prepared to manage the marina operations, the Marina SBMP also include a management plan developed specifically for the marina basin to cover marina water quality and monitoring. A copy of the Marina SBMP is provided in Appendix Y1.

Exchange of water would be facilitated by vessels entering and leaving the lock and by the pumping system. This would lead to colonisation and migration of aquatic organisms to the basin although the timing of this is difficult to predict. The marina basin would not have a tidal range, so would be few, if any intertidal organisms colonising that habitat. Apart from this, it is predicted that the basin would develop a flora and fauna that is a sub-set of the adjacent estuary.

Habitats within the marina basin include the solid surfaces of marina structures and the foreshores. The northern foreshore, however, could be developed with a sloping shoreline



and wetland vegetation such as reed beds. The basin floor would be colonised by benthic invertebrates, which would live and in the substratum. The extent to which organisms would bore or burrow into the substratum would depend on the bed itself, for example a harder substratum would have fewer burrowing and boring organisms. Siltation is predicted to be very small (~ 2 mm/year). This has two consequences. First, there would be virtually no need for maintenance dredging, so the bed would essentially remain undisturbed. Second, the very gradual build-up of sediments would provide habitat for benthic organisms, which are often very small.

Flood Mitigation Works

Two of the proposed flood mitigation embankments would be built into wetlands on the project site. These have potential to cause damage to the wetland in three ways:

- access during construction;
- emplacement of the embankments which may cover wetland habitat; and
- changes to water flow into and around wetland habitat.

It is recommended that the embankments be placed to avoid wetlands. If this is unavoidable, the wetland that would be affected should be carefully assessed. If there is scope for adjusting their position, then this should be considered based on an assessment of their value. Again, there may be some scope for orientation of the wetlands in order to minimise an adverse effects on flow of water to the wetlands. These measures should be considered as part of the detailed design of the development.

Coastal Environment

Key mitigation measures to address the coastal environment is as follows:

- Specialist studies on flooding and tides indicate little change as a result of the proposed development.
- The entrance to the marina represents a small loss of river frontage; by far the major proportion of the site's frontage would not be developed under the proposal.
- Boat movements within the river would be strictly regulated and supported by education of marina patrons. Hence, this potential source of shoreline erosion would be incorporated into management of the project.
- There is a risk that capital and ongoing maintenance dredging would cause some erosion of adjacent flats in the lower Caboolture River. It is recommended that this be evaluated further as part of the detailed design of the project.

Dredging

The predicted replenishment of sediments in the navigational channel from adjacent banks represents potential for impacts beyond the channel and hence within the designated Fish Habitat Area. It would also broaden the extent of impacts in the Moreton Bay Marine Park. As this dredging is contained within the navigation channel, which is the responsibility of Queensland Transport, no specific mitigation measures are proposed.

Marine Mammals and Marine Reptiles

Apart from dolphins, the likely occurrence of other marina mammals and marine reptiles in the Caboolture River is very small. Dolphins may occur in the river, but speed restrictions for vessels should address issues of potential boat strike. Occurrence of dugong in the river and Deception Bay is also likely to be small, given the general absence in the area of the species of seagrasses on which they feed. Hence, there is a low risk of effects from the proposed development on these marine animals.



The concentration of vessels berthed in the marina basin provides an opportunity to place signs along the catwalks and entrance ways advising of the importance of adhering to speed limits, where the speed limits apply and the need to watch for any marine mammals or marine reptiles at all times which boating.

Movements of Aquatic Species

Tidal creeks on the project site are not proposed to be altered. The crossing of Raff Creek should be designed to provide for movement of aquatic species. Similarly, the emplacement of flood mitigation embankments should be designed to cause minimal or no decrease in access to the wetlands for aquatic species. These measures should all be achievable, but would require consideration during the detailed design stage of the project.

4.9 Cultural Heritage

Two cultural heritage surveys were conducted within the project area by Davies Heritage Consultants Pty Ltd in accordance with the *Aboriginal Cultural Heritage Act 2003* (ACH Act).

A survey of Lot 10 RP902079 and Lot 2 RP902075 was undertaken with representatives of the Gubbi Gubbi people. The Cultural Heritage Assessment report relating to this site is documented in Appendix T1. A survey of Lot 24 SP158298 and Lot 7 RP845326 was also undertaken with representative of Gangalla Pty Ltd. Gangalla Pty Ltd represented the Aboriginal Party for this area and this Indigenous Cultural Heritage Study is documented in Appendix T2. A further Cultural Heritage study undertaken by Gangalla Pty Ltd is presented as Appendix T3.

Both reports revealed that Indigenous and non-Indigenous cultural heritage sites are located within the project area. A description of the cultural heritage sites found is provided in Sections 4.9.1.1 and 4.9.1.2; and the location of these finds is highlighted on Figure 17. Mitigation measures to minimise and manage potential impacts of construction and operation of the development on cultural heritage sites are provided in Section 4.9.2.

Lot 15, on RP902073, Lot 12 on RP145197 and Lot 17 on RP902072 are not included in cultural heritage surveys as these lots were added after completion of the surveys. These lots comprise a total of 8.65 hectares of land.

4.9.1 Description of Environmental Values

This section describes the existing cultural heritage values that may be affected by the project. Describe the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.

The NEBP is adjacent to the Caboolture River, and generally consists of low-lying river flats, with wetlands and creeks. Some low ridgelines are present, as well as high banks and terraces which would have been suitable for the location of campsites. The few remaining mature trees are evidence that the site was once densely vegetated. The tidal river coupled with other permanent water supplies, abundant vegetation and stone material for making artefacts means that there was a plentiful supply of good quality resources available to both Indigenous and non-Indigenous people to utilise.

However, the site has been subject to many degrading activities including cultivation, plantations and clearing. Other activities such as trail bike riding, furrowing and the construction of roads and trails may have damaged or scattered artefacts. The banks of the river are also actively eroding which may have exposed and transported some artefacts; and some non-Indigenous sites may have vandalised as a result. The site is also



infested with weeds such as Lantana, but its dense cover may have provided some protection to cultural heritage material from both environmental and human impact. However, because of the degrading activities and dense weed cover, it was difficult to establish the cultural significance, if any, of the artefacts that were found.

It is also important to note that with Aboriginal cultural heritage, some features of an area may have important cultural meaning for local Aboriginal people, even if no artefacts are found. The Indigenous Cultural Heritage Management Plan (Indigenous CHMP) provides a detailed strategy to deal with any cultural heritage materials found during construction or operation of the NEBP. To achieve this, construction workers will be given a cultural heritage induction course to improve their awareness, understanding, ability to recognise any items that may be uncovered during construction and the procedures that must be followed should this occur.

The area also has some non-Indigenous historical sites and these can be very important to non-Indigenous people by providing a sense of place and a record of past generations. To this end, it will be important to management the site in a way that respects both Indigenous and non-Indigenous Cultural Heritage is preserved.

4.9.1.1 Indigenous Cultural Heritage

An Indigenous CHMP for the site was developed in May 2007 for the proponent, based on the results of the cultural heritage surveys conducted by Davies Heritage Consultants Pty Ltd in 2003 for Lot 10 RP902079 and Lot 2 RP902075, and Gangalla Pty Ltd in 2006 for Lot 24 SP158298 and Lot 7 RP845326.

The Indigenous CHMP has been prepared in accordance with the provisions of Part 7 of the ACHA and was approved by DNRW on 30 October 2007. A copy of the Indigenous CHMP is provided in Appendix T4.

Notification, consultation and endorsement of aboriginal parties have been conducted in accordance with the ACHA and the registered Native Title Claimants. The cultural heritage surveys were conducted by a recognised expert, Susan Davies (Archaeologist with Davies Heritage Consultants Pty Ltd); together with a representative of the Gubbi Gubbi people (Dr Eve Fesl) and Gangalla Pty Ltd for whom the land has cultural significance.

In preparing the Indigenous CHMP and cultural heritage surveys, the proponent has striven to comply with the ACHA Duty of Care guidelines, in particular, that a person who carries out an activity must take all reasonable and practical measures to make sure that the activity does not harm Aboriginal Cultural Heritage. There were no specific requirements for confidentiality, however if this becomes an issue, confidentiality will be strictly adhered to.

Of note, the cultural heritage surveys estimated that the existing level of disturbance on cultural heritage sites was considered as "Significant - Category 4" of the Duty of Care guidelines. This generally means that it is unlikely that future activities, such as the development of the NEBP will further harm Aboriginal Cultural Heritage, and that the activity can proceed provided the following principles are considered and addressed.

That some areas and landscape features might retain residual significance (i.e. scarred trees, burials, artefact scatters) and collaboration with the Aboriginal party and their views are essential in helping to assess the significance of these areas.

It is vital to be informed about any cultural heritage significance that may attach to such features and due care must be taken before doing anything that may cause additional disturbance to the feature or its close surrounds. Consultation with the Aboriginal party is essential in this regard.



A search of the inventory of recorded Aboriginal sites on the Cultural Heritage Database held by DNRW indicates that the site has recorded Aboriginal cultural heritage sites, as per the following table. However, it is not possible to conclusively guarantee the accuracy of these recordings (in particular, the longitude and latitude location description for each site) and extra diligence is required when operating in these locations.

Site ID	Latitude	Longitude	Attribute
KB:G63	-27.10997	152.99437	SHELL MIDDEN, ARTEFACT
KB:G64	-27.11011	152.98983	ARTEFACT
KB:G64	-27.11107	152.98609	ARTEFACT
KB:G64	-27.11023	152.98908	ARTEFACT
KB:G64	-27.11008	152.99032	ARTEFACT
KB:G64	-27.1103	152.98889	ARTEFACT
KB:G64	-27.11125	152.98518	ARTEFACT
KB:G65	-27.11423	153.00132	SHELL MIDDEN, ARTEFACT
KB:G66	-27.11917	152.99786	ARTEFACT

 Table 63
 Location of Cultural Heritage Sites

The Gubbi Gubbi people played a major part in the two original cultural heritage surveys and in the development of the Indigenous CHMP, due to their particular knowledge about traditions, observances, customs and beliefs associated with the area. The Gubbi Gubbi people have responsibility under aboriginal tradition for some or all of the project area this right must be respected during construction.

The two cultural heritage surveys systematically investigated the site to locate and record Indigenous (and non-Indigenous) heritage places in consulted with the Gubbi Gubbi people regarding the likely areas where cultural heritage material might be located. As expected in an area with such rich and diverse natural resources, the surveys found a number of sites that contained Indigenous cultural heritage material. The findings of the surveys are summarised below.

The 2003 cultural heritage survey for Lot 10 RP902079 and Lot 2 RP902075 identified the following cultural heritage sites:

- Area A: Site Complex—Shell and Artefact Scatter. A previously cultivated area, used for pine plantations and possibly growing cotton or sugar cane. A sparse cover of shell fragments and isolated quartz artefacts was found, but it is considered that the area has a high potential for further material buried beneath the disturbed layers of soil.
- Area B: Site Complex—Stone Artefact Scatters. A variety of stone artefacts were found alongside a dirt track on a ridgeline. The track was eroded in parts, and covered with gravel in others. It was considered a high probability that more material was present on either side of the track, where ground visibility was very poor.
- Area C: Site Complex—Shell and Artefact Scatter. Sparse scatters of shell fragments and some stone artefacts were found on slightly higher ground close to a tidal creek. The area was disturbed, as it was previously used for pine planting and a cattle yard was also found nearby. It was considered highly likely that more buried material might be found.



- Location 1: Isolated Stone Artefact. An isolated piece of quartz found on the high bank of the Caboolture River. Although not obviously an artefact, quartz is not naturally found in the area, so it was considered that it had been transported there by man. The area was densely vegetated with regrowth, so must have been cleared in the past. There was a possibility that more artefacts might be found under ground or under the leaf litter.
- Location 2: Isolated Stone Artefact. Pieces of quartz, one clearly an artefact, were found on the crest of a ridge. The area had previously been used as a pine plantation and for the cultivation of other crops. It was considered highly likely that further buried material might be found.

The 2006 cultural heritage survey by Gangalla Pty Ltd for Lot 24 SP158298 and Lot 7 RP845326 identified the following cultural heritage sites:

- Site 1: Shell Scatter an extension of Area C. A scatter of shells on slightly elevated terrain. The area has been previously disturbed by vegetation clearance, and it is considered highly likely that more material may be located under the soil or under the thick grass growing on the site.
- Site 2: Shell and Artefact Scatter. A sparse cover of shells and isolated stone artefacts. The area has been extensively disturbed by trail bike riders, however it was considered highly likely that more material might exist underneath the soil.

The locations referred to above are illustrated in Figure 17.

The cultural heritage surveyors found it difficult to assess the significance of the finds, as it was thought that greater amounts of material might be buried underground or beneath the thick vegetation or the gravel that was imported to harden tracks. Many areas of the site have also been disturbed from clearing, agriculture and other activities. A site map identifying areas that have potential for more cultural heritage material to be found has been produced on advice from the cultural heritage consultant and the Gubbi Gubbi representatives. This site map is provided as Figure 18,

The findings of the cultural heritage surveys also recommended that further investigations of some of the sites be undertaken by a qualified archaeologist with the appropriate permit.

Although the site is already impacted by past clearing, agriculture and other activities the development may potentially impact on both known and unknown (i.e. buried) cultural heritage material. The unknown cultural heritage material has a high risk of being disturbed. It is important that further study is done to find out how much buried material there might be and its significance to either Indigenous or non-Indigenous people.

Recommendations from the two cultural heritage surveys are summarised below.

- Further archaeological investigations are required in areas referred to as Area A, B, C, Location 2 and selected areas of the banks and terraces next to the Caboolture River to identify if additional cultural heritage material is present.
- Shovel test in Areas A and C to see if there is any buried archaeological material.
- In Area B, Location 2 and selected areas of the high banks and terraces of the Caboolture River, excavate 1m x 1m areas, sieve the soil and keep any material found for further analysis. In densely vegetated areas, this can be done with a Bobcat.
- When the excavations are finished, document and assess any findings and recommend management options for each area where appropriate.



- Subsurface testing to determine if any underground archaeological material is present, and if so, how extensive it is. The survey recommended that this be done prior to beginning of any construction activities.
- A grid placed over the ground at Sites 1 & 2, and test pits dug, soil sieved, and any material found to be collated and analysed. Slashing vegetation at Site 1 was also recommended to get better access to the soil surface.
- Cultural Heritage Management Plan (Indigenous Cultural Heritage)

An Indigenous Cultural Heritage Management Plan (Indigenous CHMP) has been developed specifically for the project.

Based on the findings and recommendation of the two cultural heritage surveys the Proponent and the Gubbi Gubbi people prepared a comprehensive Indigenous CHMP. The Indigenous CHMP was developed in accordance with the requirements of the ACHA which includes the following.

- Specific provisions to be undertaken if human remains are found.
- Procedures to implement the recommendations of the two cultural heritage surveys.
- Methods to identify, protect and manage any cultural heritage sites in the area.
- Involvement of Indigenous people in managing any cultural heritage that may be found in the area.

The Indigenous CHMP details some principles of Indigenous cultural heritage management, in particular to respecting, understanding and valuing any cultural heritage materials found during construction or operation of the NEBP. To this end, construction workers will be given a cultural heritage induction course to improve their awareness, understanding, ability to recognise any items that may be uncovered during construction and the procedures that must be followed should this occur.

Further to the above, it is necessary to put into place actions and procedures to manage or minimise the possibility of damaging cultural heritage sites. This shall include directly involving the Gubbi Gubbi people in the development and implementation of the Indigenous CHMP and the management and protection of any sites that have been identified with Indigenous cultural heritage values. It may be necessary to consult further professional experts, such as an archaeologist in some cases.

The Indigenous CHMP has specific actions detailing the responsibilities of the specified parties, which include:

- Northeast Business Park Pty Ltd (NEBP Pty Ltd). NEBP Pty Ltd must nominate a Cultural Heritage Coordinator and Site Officer; ensure all construction staff are aware of their responsibilities under the Indigenous CHMP and fund an Induction and Workplace Health and Safety Program, supply protective equipment and pay for the services of the Gubbi Gubbi people and an archaeologist when required.
- **Cultural Heritage Coordinator.** Provide a point of contact between NEBP Pty Ltd and the Indigenous Coordinator. Manage issues such as nominating people for the cultural heritage induction, dealing with disputes and other human resource management issues; inform the Indigenous Coordinator if any material is found and arranging for its assessment and documentation.
- **Gubbi Gubbi people.** Nominate an Indigenous Coordinator and an alternative to act as a focal point of communication with NEBP Pty Ltd. Endeavour to meet all objectives of the Indigenous CHMP, comply with work schedules and operational procedures of the NEBP, and assist in the protection and management of cultural heritage sites.



- Indigenous Coordinator. Organise the cultural heritage induction program, nominate Monitors and make them aware of their responsibilities, rosters etc. Provide report/s to the Cultural Heritage Coordinator detailing the results of the cultural heritage work resulting from the recommendations of any cultural heritage work undertaken before construction commences. Together with the Archaeologist, arrange for the assessment, documentation and management of any cultural heritage material discovered. Keep members of the Gubbi Gubbi informed during the process.
- **Monitors.** With the archaeologist, Monitors undertake cultural heritage work and mitigation measures prior to and during construction; keep the Indigenous Coordinator updated about the progress of any cultural heritage work; undertake monitoring duties and immediately inform the Site Officer of the location of any cultural heritage material.
- Archaeologist. Undertake cultural heritage work prior to construction according to the recommendations of the cultural heritage surveys; provide archaeological significance and impact assessments, and in consultation with the Gubbi Gubbi, give mitigation and management recommendations for any sites with high archaeological potential. Assist in induction programs and be on call in case of any significant finds.
- **Site Officer.** Notify the Cultural Heritage Coordinator if any human bone or cultural heritage material is uncovered; flag and fence area if anything is found and manage Monitors.
- **Construction Contractors.** Ensure that they and all staff are aware of their responsibilities under the Indigenous CHMP.

The Indigenous CHMP also details the employment related responsibilities of the NEBP Pty Ltd towards members of the Gubbi Gubbi people, such as the provision of workers compensation, superannuation and tax contributions in accordance with agreements and provides procedures for notification, reporting and conflict resolution for any matters relating to the Indigenous CHMP.

Pre-Construction Management of cultural heritage sites is addressed in the Indigenous CHMP and it requires that the nomination of the Cultural Heritage and Indigenous Coordinators and Monitors is made prior to any work commencing. It also requires the cultural heritage team must undertake any work in accordance with the recommendations of the previous cultural heritage surveys and the reporting of this work is to be by the Archaeologist. The report will detail the significance of the cultural heritage sites, the results of the impact assessment, and any practical mitigation and management measures to be implemented before and during construction.

Construction management of cultural heritage sites is addressed in the Indigenous CHMP. The Indigenous CHMP requires monitoring of vegetation clearing and earthworks is required to ensure that these actions do not disturb identified sites and if any new sites are found, that these are managed appropriately. It also details staff management issues for Monitors, such as rosters, work schedules and absences.

It extensively details the procedure to be followed if human remains are uncovered, including legal requirements, the necessity for dignity and respect, and the appropriate aboriginal involvement if the remains are of aboriginal person. The procedure to be followed requires that all activities near the find stop immediately, the site is flagged and the Site Officer, Cultural Heritage Coordinator and appropriate agencies are informed.

Further to the above, the Indigenous CHMP also details what to do in the case of Indigenous archaeological material is found when Monitors are/not present; including:

• stopping all work;



- flagging the site and notifying the Site Officer, Cultural Heritage Coordinator and if necessary the Archaeologist;
- if a Monitor is not present, the Site Officer will notify the Cultural Heritage Coordinator; and
- access to the site to be restricted until a monitor or the archaeologist can assess the find.

4.9.1.2 Non-Indigenous Cultural Heritage

The Cultural Heritage Assessment included a section on non-indigenous cultural heritage, and a copy of the required EPA permit. The cultural heritage surveys were conducted by a recognised expert, Susan Davies (Archaeologist with Davies Heritage Consultants Pty. Ltd).

The landscape master plan developed by Place also briefly details the non-indigenous cultural heritage and provides recent and historical photographs of the house complex, as well as a map and historical timeline.

A copy of the landscape master plan is provided in Appendix P.

the Cultural Heritage Assessment identified the following sites of non-indigenous cultural heritage:

- Area D: "Morayfield Complex" remains of buildings and other structures. Generally structures possibly remaining from the original "Raff" homestead include a set of rendered steps, stone lined well and windmill, remains of fencing, a cattle yard, exotic plantings and other remnants of habitation which possibly date from the 1860s. The steps, well and windmill are relatively intact, and the remaining items except for the plantings, are generally in ruins.
- Area E: Boiler and Associated Dam. A rusting steam boiler, hand made bricks and the remains of a dam are located in this are but somewhat obscured by thick vegetation.
- Area F: 1950s House Complex. A low set house with detached garage/shed and associated farm buildings, such as animal pens and a dairy are located in this area. All buildings have been vandalised.
- Location 3: Exotic Plantings. Mature exotic species located south of the Caboolture River on a high bank/terrace are located here and maybe of some significance.
- Location 4: Memorial Stone. On the southern bank of the Caboolture River, a headstone is found and inscribed is "*To the memory of Levi Walker, drowned in 1869 whilst bathing in the Caboolture River*". This is in relatively good condition.

The non-indigenous sites are of varying significance. However areas D, E and Location 4 which were of significance as these areas are associated with a prominent citizen and the first non-indigenous settlement of the area. This area also marks the introduction of Pacific Islander labour to the area (the memorial stone site is considered to be that of a member of the Pacific Islander community).

Therefore, Areas D, E and Location 4 are worthy of further archaeological investigation as material relevant to the history of the area could be found. As yet undiscovered sites, such as a rubbish dump associated with the house complex could provide important insights into the history of the property (i.e. tools, equipment or domestic items).



The remaining non-indigenous sites were not considered to be significant, although it was recommended that the plantings in Location 3 should be retained as a feature.

With regard to the potential impact of the development on the non-indigenous cultural material, it is considered that the area with the highest potential for disturbance and therefore impact is Area D. Area D will be incorporated into the open public space and parkland areas. Therefore, protection and minimisation of impact to Area D could be managed by the Body Corporate as part of the community titles scheme.

Cultural Heritage Management Plan (Non-Indigenous Cultural Heritage)

A Non-Indigenous Cultural Heritage Management Plan (Non-Indigenous CHMP) has also been developed specifically for the project.

Based on the findings and recommendation of the two cultural heritage surveys, the Proponent has commissioned a Non-Indigenous CHMP. The Non-Indigenous CHMP was developed in accordance with the statutory requirements of the *Queensland Heritage Act 1992* and comprises four distinct elements.

Objectives of the Non-Indigenous CHMP are:

- to implement recommendations contained within the Cultural Heritage Assessment;
- to provide procedures to identify, protect and/or manage cultural heritage sites in the Project Area;
- to involve the Queensland State Government in the management of Non-Indigenous cultural heritage sites;
- to provide procedures to satisfy all relevant statutory requirements;
- set agreements in place in relation to work required by this Non-Indigenous CHMP; and
- allow NEBP Pty Ltd to fulfil its commercial obligations and objectives.

Principles of Non-Indigenous Cultural Heritage management:

- respect, understanding and value for cultural heritage materials;
- put actions and procedures into place to minimise or manage the potential impact of the project on any cultural heritage sites;
- acknowledge, protect and manage cultural heritage traditions and values;
- manage the impact of the project through cultural heritage management procedures agreed between the parties;
- acknowledge the cultural significance of the sites;
- acknowledge that cultural heritage management strategies must be practical, realistic and take into account commercial realities; and
- acknowledge cultural and intellectual property rights to Non-Indigenous cultural heritage belongs to the Queensland State Government.

Responsibilities of each party to this Non-Indigenous CHMP are as follows.

- Northeast Business Park Pty Ltd (NEBP Pty Ltd). NEBP Pty Ltd must nominate a Cultural Heritage Coordinator and Site Officer; ensure all construction staff are aware of their responsibilities under the Non-Indigenous CHMP and fund an Induction and Workplace Health and Safety Program, supply protective equipment and employ an Archaeologist for cultural heritage work.
- **Cultural Heritage Coordinator.** Provide a point of contact between NEBP Pty Ltd and the Queensland State Government Coordinator. Provide a Work Schedule to



the Queensland State Government Coordinator, and ascertain from that person the appropriate State Government representatives to undertake the cultural heritage induction. Inform the Queensland State Government Coordinator if any material is found and the appropriate Government departments if human remains are found.

- Queensland State Government. Nominate a representative with the appropriate skills and experience to act as Queensland State Government Coordinator and an alternative to act as a focal point of communication with NEBP Pty Ltd. Endeavour to meet all cultural heritage objectives of the Non-Indigenous CHMP, comply with work schedules and operational procedures of the NEBP, and assist in the protection and management of cultural heritage sites.
- Queensland State Government Coordinator. Organise the cultural heritage induction program, compile a list of Monitors and make them aware of their responsibilities, tasks, rosters etc. Provide report/s to the Cultural Heritage Coordinator detailing the results and significance assessment of the cultural heritage work before construction commences. Liaise with the Archaeologist in relation to appropriate management strategies to be implemented if any cultural heritage material is uncovered. Keep individual members of the Queensland State Government informed of progress of matters pertaining to Non-Indigenous cultural heritage.
- **Monitors.** With the archaeologist, Monitors undertake cultural heritage work and mitigation measures prior to and during construction; keep the Queensland State Government Coordinator updated about the progress of any cultural heritage work; undertake monitoring duties and immediately inform the Site Officer of the location of any cultural heritage material. Provide own transport, meals and safety equipment.
- Archaeologist. Undertake cultural heritage work prior to construction according to the recommendations of the cultural heritage surveys; provide archaeological significance and impact assessments, and give mitigation and management recommendations for any sites with high archaeological potential. Assist in induction programs and be on call in case of any significant finds.
- **Site Officer.** Notify the Cultural Heritage Coordinator if any human bone or cultural heritage material is uncovered; flag and fence area if anything is found and manage Monitors.
- **Construction Contractors.** Ensure that they and all staff are aware of their responsibilities under the Non-Indigenous CHMP.

Non-Indigenous Cultural Heritage Management

Pre-Construction Management of cultural heritage sites is addressed in the Non-Indigenous CHMP and it requires that the nomination of the Cultural Heritage and Queensland State Government Coordinators and Monitors is made prior to any work commencing. It also requires the cultural heritage team must undertake any work in accordance with the recommendations of the previous cultural heritage surveys and the reporting of this work is to be by the Archaeologist. The report will detail the significance of the cultural heritage sites, the results of the impact assessment, and any practical mitigation and management measures to be implemented before and during construction, and must be provided to NEBP Pty Ltd within two weeks of the completion of the cultural heritage work.

Construction management of cultural heritage sites is addressed in the Non-Indigenous CHMP. The Non-Indigenous CHMP requires monitoring of vegetation clearing and earthworks is required to ensure that these actions do not disturb identified sites and if any new sites are found, that these are managed appropriately. It also details staff management issues for Monitors, such as rosters, work schedules and absences.



It extensively details the procedure to be followed if human remains are uncovered, including legal requirements, the necessity for dignity and respect, and the appropriate aboriginal involvement if the remains are of aboriginal person. The procedure to be followed requires that all activities near the find stop immediately, the site is flagged and the Site Officer, Cultural Heritage Coordinator and appropriate agencies are informed.

Further to the above, the Non-Indigenous CHMP also details what to do in the case of Non-Indigenous archaeological material is found when Monitors are/not present; including:

- stopping all work;
- flagging the site and notifying the Site Officer, Cultural Heritage Coordinator, Queensland State Government Coordinator and Archaeologist;
- if a Monitor is not present, the Site Officer will notify the Cultural Heritage Coordinator, and that person will advise the Queensland State Government Coordinator;
- access to the site to be restricted until the Archaeologist and/or Queensland State Government Coordinator can assess the find and notify when work can recommence in the area of the find; and
- the Queensland State Government must provide a report to NEBP Pty Ltd detailing the results of Monitoring work within 2 weeks of the cessation of monitoring activities.

4.9.2 Potential Impacts and Mitigation Measures

It is proposed to establish a Heritage Park as part of the development, which secure the protection of the "Moray Fields" site, and will commemorate both indigenous an non-indigenous cultural heritage. The Heritage Park will provide an interpretative experience, which will enhance the site's values and give it prominence within the community.

The Indigenous Cultural Heritage Management Plan (Indigenous CHMP) was negotiated between the proponent (Northeast Business Park Pty Ltd) and the Gubbi Gubbi people, and has been approved by the Chief Executive of the DNRW. The Indigenous CHMP has a clearly defined process for including Aboriginal people associated with the development area (in this instance, the Gubbi Gubbi, traditional custodians of the land) in protection and management of Indigenous cultural heritage. Not only are they an integral part of the Indigenous CHMP, representatives of the Gubbi Gubbi played a vital role in the original cultural heritage surveys.

Under Section 9.0 - Cultural Heritage Management, the Indigenous CHMP details specific processes for mitigation, management and protection of identified cultural heritage places and material in the project area for pre, during and post construction. NEBP Pty Ltd has the responsibility of nominating a staff member as Cultural Heritage Coordinator, who will contact the Gubbi Gubbi who will, in turn, nominate an Indigenous Coordinator, an alternative, and Monitors for the project. These people will form the Cultural Heritage team. The Cultural Heritage Coordinator and Indigenous Coordinators will also be responsible for organising and managing a cultural heritage induction course (awareness training) for all appropriate contractors and staff.

The Cultural Heritage team will undertake the recommended cultural heritage work, according to appropriate archaeological standards of accuracy and reliability. This work includes commencing limited archaeological excavations of sites in areas A, B, C, Location 2 and selected areas of the high banks and terraces adjacent to the Caboolture River. The work will require shovel testing, sieving of soil, and the removal and retention of all Indigenous artefacts found. At the completion of the work, the results will be documented and a report drafted assessing the significance of the finds, and recommending management measures for each area.



All work will be performed under a permit issued by the Environmental Protection Agency, and any material collected will be done so by a qualified archaeologist with the approval and assistance of the Gubbi Gubbi people.

During construction, the Monitors will be on hand to monitor the initial vegetation clearing and earthwork activities (including foundation excavations) according to a work schedule. If human remains are found, work in the vicinity of the burial must cease immediately. Of note, any human remains found must be treated with utmost respect and dignity; however the legal requirements for handling human remains must be addressed. For example, it will be necessary to notify the police. If the remains are discovered to be of an aboriginal person, appropriate aboriginal people will be allowed final decision-making powers. If otherwise, the discovery site will be deemed a crime scene.

If Indigenous cultural heritage material is uncovered during construction activities, the Indigenous CHMP puts into place actions that must be taken when Monitors are/not present. In all cases, work in the vicinity of the find should cease immediately, and the site fenced or flagged so as not to further disturb the cultural material. The Indigenous Coordinator must be notified of the discovery, and this person, together with the Archaeologist, will record the location of the find, and analyse, document and record all archaeological material discovered.

Based on the results of the cultural heritage work undertaken before or during construction activities, further archaeological work may be required. The archaeologist must provide the Cultural Heritage Coordinator with a report detailing the results of work undertaken in the project area, and this report should contain a significance assessment of any sites, as well as clearly outlining management recommendations and the processes necessary to implement these.

The Indigenous CHMP also offers a detailed process for conflict resolution; all disputes should initially be negotiated between NEBP Pty Ltd and the Cultural Heritage Team. A dispute will only be considered to exist if these initial discussions have failed to resolve the matter. If unresolved disputes occur, a meeting will be called between the different parties; and if an impasse continues, an independent arbitrator from the DNRW will be called to resolve the dispute.

With regard to Non-Indigenous cultural heritage sites, management of any cultural heritage material found should broadly follow the same principles of Indigenous cultural heritage as well as the detailed project management set down in the Non-Indigenous CHMP. For example, Areas D and E should be protected from impacts during and after the construction phase and include techniques to preserve items and prevent further deteriorating.

Prior to removal, Area F should be documented, surveyed, photographed and plan drawings prepared according to the standards of the Australian Heritage Commission. Location 4, the memorial stone, should be protected and preserved, and further historical research undertaken. Of note, the Cultural Heritage study flagged the potential that further wells might be found on the property; and this issue will need to be appropriately risk managed, both in the construction and operational phases of the development.

In addition to the Non-Indigenous CHMP, management of any Non-Indigenous cultural heritage material found should also follow the principles of the Burra Charter, the nationally accepted standard for the conservation of places of cultural significance. The Burra Charter defines appropriate principles and procedures for work on heritage places, and is aimed at all people who care for culturally significant places and has been the basis for all heritage legislation in Australia.



The Charter sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance, including owners, managers and custodians. The Burra Charter advocates a cautious approach to change: do as much as necessary to care for the place, but otherwise change it as little as possible so that its cultural significance is retained.

The Burra Charter requires that any work on a place of cultural significance should be preceded by an analysis of physical, documentary, oral and other evidence, drawing on appropriate knowledge, skills and disciplines. In addition, the Charter provides guidance for the conservation and management of places of cultural significance. Conservation and preservation are integral parts of the management of places of cultural significance and an ongoing responsibility.

4.10 Social

4.10.1 Description of Environmental Values

The proposed NEBP will be a landmark, mixed use precinct, with a marina, business and industrial uses, mixed density residential, recreational areas and leisure facilities. It is situated in a low density area, surrounded by semi rural properties and limited agricultural and recreational uses. It is adjacent to the Bruce Highway, and on the southern bank of the Caboolture River.

The Community Context Study (Appendix F) classifies the area into three zones; the Core Catchment (the four Census collection districts comprising the residential community adjacent and within 2km of the NEBP); the Primary Catchment (within a 5km radius; and including Caboolture CBD, Morayfield, Burpengary, Narangba and Deception Bay): and an Extended Catchment (within a 10km radius; and including the remainder of Caboolture Shire, and the northern parts of Pine Rivers Shire).

The Caboolture Shire has a diverse settlement pattern, with areas of high urbanisation, commercial and industrial activity, as well as large tracts of relatively undeveloped land. Caboolture is a strategic gateway location in the northern corridor between Brisbane and the Sunshine Coast.

Community Infrastructure and Services, Access and Mobility

Community infrastructure, like schools, places of worship, hospitals and other related services are relatively close to the site; and are also clustered around established centres such as Morayfield, Caboolture and Narangba. Community infrastructure is also predominantly found along the main transport corridors, and most of the region has adequate basic amenities such as banks, post offices, shops and community organisations. Festivals and events are also important, and some, like the Woodford Folk Festival, draw from a large national and international audience.

Caboolture has good road and rail infrastructure that allows easy north-south access for regional passengers and freight, as it is bisected by both the Bruce Highway, and the Brisbane to Cairns railway line. The area has a close relationship with Brisbane, with over 30% of the labour market working in the city.

Whilst there is good provision of regional north-south transport links, there are low levels of road access from west to east, and poor public transport and pedestrian infrastructure like bike paths. The area also has high levels of traffic congestion on the Bruce and D'Aguilar Highways, with a high number of heavy vehicles. The lack of access to public transport, especially buses, is a major deficiency. Because the community infrastructure is so



clustered along transport networks, it is essential that the community have access to a wider range of public transport options.

The SEQ Regional Infrastructure Plan will provide for major new transport infrastructure, and includes widening the Bruce Highway to six lanes, the staged construction of the Caboolture Northern Bypass and upgrades to the railway line. The North Moreton Transport Network Study will also investigate existing and future transport networks.

At present, there seems little provision for improved public transport (such as an improved bus service), and many, especially the elderly and economically disadvantaged, do not have ready access to private motor vehicles. Some residents of areas such as Caboolture Central (11.9%) and Bribie Island (10.2%) lack any access to a motor vehicle. Further, even in areas that are serviced by a bus route, the buses do not run regularly, even at peak hours, and other times, such as weekends, are less frequent or nonexistent.

The Caboolture River also forms a physical and psychological barrier to public and private transport between the east and west portion of the Shire. However, with the development of the NEBP, the river will become a key access point to Moreton and Deception Bays.

Population and Demographics of the Affected Community

The current resident population of the existing Caboolture Shire (at the time of the 2006 Census) was 132,473 persons, including a small but stable Indigenous population. The population of the Core Catchment was 3,511 with slightly more males than females, and is experiencing levels of high population growth; since 2001, it has grown 25%. An additional 34,281 residents in the northern communities of Pine Rivers Shire are also within the community catchment for the project.

Key local trends include pockets of significant social and economic disadvantage as well as relative affluence, an ageing population, increasing ethnic diversity, increased housing costs, decreased proportions of social housing and continuing strong population growth.

Those living in the more disadvantaged areas of Deception Bay, Bribie Island and Caboolture Central were more likely to be unemployed and are less well educated, with lower than average household income levels. They are also more likely to rent rather than own their home and live in a household with reduced connectivity (no access to motor vehicle and internet).

Those living elsewhere, such as in the Core Catchment, Burpengary and Narangba, were more likely to live in a family with children under 15, have high qualifications and work in a professional job. They are more likely to earn comparatively high incomes, be purchasing their home, and own more than two cars and a broadband internet connection.

There is also increasing polarisation between the communities of the study area; the Core Catchment is more affluent and is closely aligned with Burpengary-Narangba, whilst Caboolture Central, Deception Bay and Bribie Island have a greater incidence of socially disengaged and disadvantaged.

Notably, new residents moving into the area, especially to master planned developments such as Pacific Harbour, North Lakes and Narangba Valley, have a significantly different set of demographic characteristics to those current in Caboolture Shire—they are more affluent, more educated and tend to be employed in white collar or skilled trade occupations.



Local Community Values, Vitality and Lifestyles

The "image" of a place describes how it is seen by outsiders, whilst its "identity" describes how it is understood by those who live and work there. A positive image and strong identity are important contributors to social capital and community wellbeing.

The Community Context Study showed that the image and identity of Caboolture are markedly different. The image (by outsiders) is one of negative social issues such as welfare dependency, low cost housing, the Woodford Correctional Facility, and increased traffic congestion on the Bruce Highway.

However, the identity (as seen by those living and working in the community) is very different. The Cultural Context Study shows that residents saw the area as having diverse coastal and hinterland experiences, and is friendly, safe and relaxed, with a welcoming urban yet country feel. It is also home to major cultural events, such as Farm Fantastic and the Woodford Folk Festival.

Residents of the Core Area appreciated the area's convenience; its proximity to the highway and rail transport. They liked the semi rural area, with its natural environment and open space, mentioning the many parks, open bushland and waterways. However, negative perceptions included the increasing traffic congestion and rapid development, inadequate public transport and youth anti social behaviour such as graffiti and crime.

The development of the NEBP will potentially address both the concerns of local residents and the negative image seen by outsiders. The large scale multiple use development of the NEBP will improve both the economic outlook for Caboolture (with local employment creation, industry incubators and flow-on benefits); and this will have beneficial flow-on effects to the social environment.

Residents also wanted more local job opportunities and industrial and business developments. They wanted better public transport, a broader range of entertainment and dining options, and better activities and facilities for youth. All of these will be addressed by the NEBP, as will local residents' desire for more trees, parklands, cycling and walking paths.

Recreational, Cultural, Leisure and Sporting Facilities and Activities

The region has dispersed sporting facilities, clustering around the urban spine and on Bribie Island. These include aquatic centres, bowls clubs, golf courses and water sports. The NEBP marine precinct will provide a valuable new opportunity for the community to access sporting facilities and activities.

Parklands and open spaces are highly valued by local residents. Park infrastructure such as barbeque areas and play equipment is relatively well supplied, although the standard of this differs. Residents also expressed a desire for more dog off-leash areas.

Health and Educational Facilities

Primary health care is a key issue for the local community. General practitioners are located in most population centres (with specialist centres in Caboolture), and some larger communities, such as Bribie Island, have access to community health centres. There is also a possible shortage of doctors, with residents reporting that some medical practices were not taking on new patients.

Educational facilities are relatively evenly distributed, and are found in all towns and regional centres. Both state and private schools are found, with a larger proportion of state schools in the more affluent parts of the community, such as northern Pine Rivers Shire.


Tertiary and specialised infrastructure, such as TAFE and the Queensland University of Technology (QUT), is located close to the principal activity centre of Caboolture.

On Farm Activities near the Proposed Activities

The NEBP site is a 769 hectares former pine plantation, and historically was farmed with sugar cane and cotton. There are few existing agricultural properties near the site, and most agricultural activities are practiced in the Extended Catchment area (10km or more from the site); crops include strawberries and pineapples. The timber industry is important, although not to the extent practiced in the past. DPI Forestry softwood plantations are still found near Glasshouse Mountains.

There are significant numbers of rural residential properties in the core catchment, and adjoining the NEBP site. However, these properties are used more for "lifestyle acreage" rather than for farming activities. The property sizes range from 1-20ha, which is too small for any significant farming enterprises. This area, immediately surrounding the NEBP, is largely dependent on the socio cultural, human services and recreational infrastructure available elsewhere in Caboolture and Pine Rivers Shires. The NEBP will provide significant services and infrastructure at a much more convenient location.

Current Property Values

The Core Catchment, Burpengary and Narangba have high mortgage repayments, indicating relatively high property prices. However, in comparison with Brisbane, property values still represent reasonable value for money. Even so, house prices have risen 199% since 2001, and the median house price is now \$280,000. It is increasingly difficult for the average local person to enter the property market, and because of this, there is a very high demand for affordable housing, especially from younger, first time home buyers.

Demand for housing is driven by the high population growth, and the demographic changes of the local residents (such as the ageing, increasingly affluent population). Most existing housing is detached, low density and low rise, and there is a scarcity of both smaller and larger properties. There is also an increasing demand for medium density and apartment living, especially around transport nodes.

The private rental market is very tight, as investment properties are being sold, and the demand for private rentals is increasing because of local population growth. There is an estimated vacancy rate of less than 3%; and rent increases as high as 33-47% have been noted. This is worsened by the declining availability of public housing stock.

Number of Properties & Families Directly Affected By the Project

The actual NEBP site comprises 7 lots, all of which are vacant, and currently used only for ad hoc grazing. Nobody lives on the site, apart from a caretaker, employed by the NEBP.

Within the core area, there are currently 1,035 occupied and 25 unoccupied dwellings; and 3,511 residents comprising 958 families (as at the 2006 Census). It is reasonable to assume that each of these households will be affected to some extent and at some stage of the development process. NEBP Pty Ltd has therefore been working with these property owners during the master planning exercise to ensure that all potentially affected parties are aware of the development and that their concerns and preferences have been identified, and responded to as far as practicable.

The Integrity of Social Conditions; and Public Health and Safety

The social values are relatively diverse, although most residents have a strong sense of local identity and community. Like much of SEQ, Caboolture is undergoing strong growth



and in-migration, which is changing the local population. In some transitional areas, like Bribie Island and Deception Bay (which, in the past, have been relatively disadvantaged), the increasing affluence brought in by newcomers is leading to a growing sense of community pride.

However, the high population growth has resulted in some pressure on social infrastructure, such as access to social and community services, and also to perceived threats to liveability, public health and safety. Some residents saw development as a threat to the country lifestyle; leading to increased levels of youth vandalism and problems such as graffiti. The increasing traffic congestion is seen as a major issue by all groups.

Access to services and infrastructure is to some extent dependent on access to private motor vehicles. Regional transport links (especially north-south) are very good, and include the Bruce Highway and railway line. However, local public transport, especially busses, is poor, and those without a car can find it difficult to access services. This is more relevant to those living in the disadvantaged areas such as Caboolture Central or Deception Bay than the Core Catchment, which recorded the highest proportion of households with four or more vehicles. The high proportion of motor vehicles might also reflect the lack of public transport.

4.10.2 Potential Impacts and Mitigation Measures

The Community Context Study included the collection and interpretation of baseline data, key issues identification (detailed description of current local issues and assessment of positive and negative impacts from development) and an impact assessment (with recommendations on enhancing positive benefits and remediation strategies for negative impacts).

The study also included a literature review, using relevant local documents, strategic policy documents and Australian Bureau of Statistics data from the 2001 and 2006 Census. Observational field work was also conducted, with visits to the local area. A "consultative scan" was also used to get the opinion of key agencies such as the Department of Communities (DoC), community organisations and other local authorities.

In addition, a limited "cultural probe" of a set of focus group participants was undertaken. This included interviews, facilitated group discussions, and personal reflection exercises. The small group was paid an incentive to participate, and provided useful information on residents' attitudes to their local area, preferences for a range of recreational facilities and reactions to past and future changes.

The Cultural Probe also gave some valuable insights on how the community perceives the local area, and what they would like changed. For example, focus group attendees expressed a desire for more industrial and business developments, more trees, parklands and walking/cycling paths, more activities and facilities for youth and a broader range of entertainment and dining options. These will all be significantly improved by the development of the NEBP.

On the other hand, they also expressed dissatisfaction with the level of traffic congestion, high density residential development and the threat of development to the semi-rural lifestyle; and all of these are potential impacts of the development of the NEBP site.

Impacts on Demographic, Social, Cultural and Economic Profiles

The demographic, social, cultural and economic profiles are already changing rapidly due to external factors not related to development. Due to the good access to regional transport networks, proximity to Brisbane and relatively affordable properties, the area is



experiencing rapid population growth. The NEBP will introduce a projected 5,715 new residents to the region; this population alone will increase the size core catchment by 163 per cent. However, the current regional population is experiencing a trend of rapid and sustained population growth particularly in the communities of the urban spine. Furthermore, the additional resident base resulting from the NEBP reflects only a small proportion of the region's population growth planned in the SEQ Regional Plan.

The profile of the usual resident population has changed considerably since 2001, particularly on Bribie Island and Deception Bay. Communities in Northern Pine Rivers have also been exposed to rapid growth, and major developments such as North Lakes have dramatically changed the region. The profile of the new residents anticipated to move to the region due the NEBP is likely to be similar to the existing residents of the Core Catchment, specifically family oriented, more affluent and with a higher level of tertiary qualifications and skills.

Like the rest of SEQ, the region is experiencing an ageing population, increasing ethnic diversity, increased housing costs, decreasing proportions of social housing and continuing strong population growth. The introduction of medium density apartment will likely result in some diversification of the local community through the introduction of more single person households, young independent couples and older couples with no dependent children. Therefore, the development of the NEBP is likely to intensify the high rates of population growth and increasing ethnic diversity; but to lessen the impact of others, such as the proportion of affordable housing (the development includes a levy on residential sales which will be used to help fund affordable housing). An agreed amount from the sale of each residential property will be transferred to the Trust, to build affordable housing on land provided by the Moreton Bay Regional Council.

The CSC has a strategy to increase self-containment of jobs, so that two thirds of residents are employed within the Shire. However, even at current high levels of population growth, this still leads to a shortfall of 31,000 jobs by 2026. In contrast, a large multi use development such as the NEBP is likely to have significant positive benefits for the local economy, and make up for a significant proportion of this job shortfall.

It is also anticipated that apart from improving access to jobs, the NEBP will create major housing and other economic opportunities such as the Marine Industries Precinct. The provision of extensive parklands and recreational facilities, as well as the marine aspect, will enhance recreation opportunities and facilitate access to the river.

In order to address the inherent pockets of disadvantage in the broader area, three key strategies have been addressed to improve equity:

- An employment and training program to target local people with an interest in construction skills.
- An affordable housing trust to deliver medium density affordable rental housing for local people on sites close to appropriate services.
- Providing public transport connections throughout the site and to surrounding communities.

Impacts on Local Residents, Current Land Uses, Existing Lifestyles, Enterprises

The NEBP will have a major impact on the current land use of the site, given that the property was previously used for a pine plantation and is currently vacant. The large scale will result in major changes to the character and level of activity in the local and regional area. The creation of a significant employment and lifestyle centre will enhance the identity of Caboolture at a regional level, and alter current travel patterns in the surrounding area.



At a local level, the most obvious effect of the development will be to change the rural residential nature of land on the eastern side of the Bruce Highway.

With regard to existing lifestyles and enterprises; some key drivers for residents included children, home and pets. As an example of this; many residents' routine and special needs were dominated by pre and primary school children. Many activities such as gardening or BBQs also highlighted the importance of home; and this was also reflected in the strong emphasis on dogs.

Another important lifestyle asset was water; the majority of residents nominated specific lakes or waterfronts as their preferred locations for relaxation and recreation. Of note, all residents related quite broadly to the regional area, often travelling away from the local area to access work or recreational activities.

In addition the Structure Plan for the NEBP has been finalised in consultation with local community members from the rural residential communities most closely affected by the proposed development. The incremental delivery of the project and the dedicated community engagement focus will ensure a gradual (rather than accelerated) process of change that will allow the local community to understand and accept the new character of the area within a realistic timeframe.

Key design strategies to mitigate the potential negative impacts include the following.

- Location of the marina away from the majority of the established residential area to the south of the site.
- Adequate vegetation buffers and/or open spaces between the site and adjoining users.
- Relocation of district playing fields to mitigate light and noise issues for neighbours.

The NEBP will have a significant positive benefit on the local community, providing improved access to preferred lifestyle activities, such as water-based recreation, parklands, and arts, culture and entertainment. The latter is very important to many of the current and incoming residents; many of whom have a strong desire for increased dining and cultural facilities. In addition, on-site events and activities will be held to encourage residents from the broader local area to visit and learn about the regional recreation assets and employment opportunities available. In conclusion, the additional lifestyle and human services infrastructure including transport opportunity, combined with enhanced employment opportunities within the area will add to local amenity.

Impacts on Residential Amenity and Recreational Amenity

The potential impacts on residential amenity during the construction phases are likely to include:

- deliveries;
- construction traffic;
- noise;
- dust;
- compromised pedestrian/animal safety; and
- uncertainty about the future.

During the operational phase they will include:

• changes to the rural residential character;



- increased private vehicles on local roads; and
- delivery vehicles.

However, the engagement and public information process is designed to negate misconceptions and anxiety caused by lack of or incorrect information. Mitigation options for identified impacts to residential amenity include:

- the main construction and service route will be Buchanan Road to the north of the site;
- during the enabling works and development phase the construction worker numbers predicted are relatively small and parking compounds will be provided on site;
- increased congestion on local roads has been modelled and it is anticipated that the NEBP will result in relatively small increases in congestion;
- upgrade works are proposed to key intersections and interchanges to manage increased traffic flow particularly at peak periods.

However, over time, it is anticipated that there will be an imperceptible negative impact accruing to the development of the site and a series of measurable social and community benefits resulting from the increased degree of local community, recreational, human services and lifestyle infrastructure within the local area. Further, it is also reasonable to assume that the increased prestige associated with the development may have a positive 'knock on' effect in terms of capital values locally.

It is likely, that the NEBP will have largely positive impacts on residential and recreational amenity. The NEBP includes a large parkland area which includes a Heritage Park and many different recreation opportunities, including a golf course. It also includes a marina, which will provide improved access to the Caboolture River and water-based recreation activities. The residential component will provide future residents with an opportunity to live and work in a high quality, master planned community.

In general, the extensive inclusion of parklands, extended public access to the river and the development of the marina precinct, combined with the wide-scale diversification of the local economy and the creation of new employment opportunities, means that the development of the NEBP responds to many of the aspects of the area that the community perceives as negative.

Impacts Associated with Increased Traffic Loads

This is largely covered in the previous point. However, in addition, the site has good access to major transport networks, such as the Bruce Highway and north-south railway link. Despite this, the site has limited connectivity; with inadequate road connections with the rest of the Shire to the west of the highway, no bus routes south of the Caboolture River, east of the Bruce Highway and north of Deception Bay Road, and no dedicated cycleways. The closest railway station is Morayfield, which is over 2km away. The NEBP will require access to efficient, quality public transport, particularly busses, and this is currently not the case. If this not provided, the scale of the development will potentially have major negative impacts on traffic congestion.

Key traffic issues identified include:

- road movement in all suburbs is challenging, especially in peak hour;
- the capacity of the Bruce Highway is being exceeded;
- the Bruce Highway is a regional asset;
- east-west movements are poor;



- rail connections are generally good;
- no bus route south of the Caboolture River, east of the Highway or north of Deception Bay Road ;
- minimal connection between bus and rail services; and
- inadequate dedicated cycle paths and footpaths.

Impacts Associated with Altered Marine Habitat Areas

There are unlikely to be any negative social impacts associated with altered marine habitat areas. Marinas and their associated structures are often sites of enhanced fish habitat, and attractive areas for recreational fishing, which is an important social activity.

Impacts on Local and State Labour Markets

The Economic Benefit Reports (Appendix E1) cover these issues in detail. The Caboolture Corporate Plan 2005-2009 incorporates an employment strategy of 2 out of every 3 workers living and working in Caboolture. At present, there is only approximately 50% self-containment in the Shire. To achieve this goal, over 30,000 new jobs are needed in the next 20 years.

The NEBP will engage a local and regional workforce through the supply of alternative employment opportunities, which currently are under-represented or absent in the region, and generate flow-on employment in other local industries. The NEBP will also significantly enhance the regional employment skills base through the providing training opportunities. Both Indigenous and disadvantaged people will be specifically targeted, to improve their opportunities for local employment and training.

It is estimated that, in 20 years, the total operational benefits will result in 27,599 Full Time Equivalent (FTE) jobs, adding some \$58.5 billion extra revenue into the community. A significant proportion of these jobs will be generated locally, and will also generate indirect local employment in production and consumption inputs (if the income from the jobs is mainly spent in the local area).

Another issue that will benefit from the NEBP will be the provision of higher level jobs, which are scarce in the region, with the result that many professionals and high level administrators travel to Brisbane for work. Providing high-level employment opportunities is also an essential component of a major project such as this, helping retain valuable skilled staff in the local area.

The incoming residents on the population profile of the study area are likely to increase the proportions of relatively affluent and advantaged residents. The NEBP will specifically enhance the proportion of higher income individuals and households, increasing educational attainment levels and raising the proportion of residents employed in professional, para professional and technically skilled roles.

Housing Trends and Future Projections

In general, the area is experiencing high levels of housing demand, and low levels of supply. This is particularly relevant to the low cost housing and rental markets. The Core Catchment has the highest level of homes being purchased, and high levels of rental houses were found in Caboolture CBD, Deception Bay and Morayfield. These areas also had high levels of state housing authority rentals, as well as high levels of housing stress, with housing costs of more than 30% of gross income.



The rental market is extremely tight, with a vacancy rate of less than 3%. Median weekly rents in the area have also increased significantly; from 33-47% in the period 2001-2006. This increase has been greater than the average for both Queensland and Australia. The private rental market in general is very restricted; as investment properties are being sold to realise capital gains and population growth has caused an increase in rental demand. A reduction in caravan berths and public housing stock has added further pressure to the most disadvantaged members of the community.

The existing housing stock is mostly detached, low density and low rise and suited more to families with children. Housing stock is diverse in terms of age and quality; older construction methods like fibro and weatherboard are being superseded by more modern, higher quality construction. Also, although household sizes have fallen slightly, there is still a significant shortage of both small (1-2 bedroom) and very large properties (5 bedrooms or more). The pressure on housing supply is aggravated by changes in the demographic status of local residents, and the need for a greater variety of housing stock.

Key trends in housing demand are the shift towards smaller households; increasing appeal of medium density and apartment options; growing demand for housing for independent living for the elderly; "tree-change" and "sea-change" movements, and increasing capital and rental values. Demand outstrips supply in all sectors of the market, particularly in the affordable housing sector. There is also a need to provide housing for the other end of the spectrum, such as for prestige homes to cater for the in-migration of more affluent people.

Key issues with housing affordability are:

- houses in the Caboolture area still offer relatively good value for money;
- average house prices have risen dramatically, so despite the good value, many residents can no longer afford to buy or trade up;
- very tight rental market, with increasing rents and lack of liquidity;
- current housing stock is often inappropriate;
- Caboolture has historically had many housing commission properties;
- berths in caravan parks are reducing; and
- an absolute lack of affordable housing for sale or rent.

There is some potential for the project to cause further exacerbation of the local housing demand issues – particularly with respect to accommodation for temporary construction workforce and for new owners moving into the area whilst their houses are being built. These impacts are most likely to be felt in the local rental markets and caravan sites (where they occur at all).

Over time, no housing demand impacts are envisaged as the project offers a diverse range of net new accommodation in the region. The central location of the site within Southeast Queensland means that it is accessible to a sizeable and well skilled construction workforce within a reasonable drive time. Therefore, given the size of the anticipated construction team, major impacts in the local rental market are not foreseen.

In the long term, the development of residential accommodation at the NEBP will add diversification to the local housing supply particularly with respect to:

- town house and apartment style dwellings;
- 600-800 m2 lot developments; and
- luxury and prestige homes.



It is proposed that the issue of delivering affordable rental housing be met off site through special purpose housing. In addition, if further caravan site accommodation is required, this will be addressed in consultation with the relevant local CSC department.

In conclusion, the range of product type in the NEBP (by dwelling type, lot size and number of bedrooms) increases the diversity of housing in the local area. Over time, it is likely that the connectivity, lifestyle amenity and employment opportunity arising from the development of the NEBP will likely lead to increases to both capital and rental values.

Proposed Income Levels For Urban Residential and Affordable Housing

The NEBP will provide 85 attached marina dwellings, 927 attached apartment dwellings, 120 attached resort rooms, 203 detached golf course frontage dwellings, 987 detached dry lots and 88 detached golf villas. The construction cost of these residences is estimated at \$776 million. The NEBP will also provide 987 Dry Lots (lots for detached dwellings) with an average lot size of 612m² and average dwelling size of 225m², of medium standard brick veneer with two bathrooms at a cost of approximately \$320,000.

The urban residential component of the project provides a diversity of dwelling types, and range of income levels required by potential purchasers. For example, selling prices for vacant land will range from \$250,000 for golf villas to \$425,000 for golf frontage properties and over \$700,000 for waterfront villas. The price of the attached dwellings will differ according to their position, and quality of construction.

Based on the proposed development yield, it is expected that the site will be able to cater for home-owning households earning upwards of \$85,000 per annum. In addition, the diverse housing range will allow for smaller and more affordable opportunities as well as the delivery of stock to the prestige home market.

Affordable housing opportunities will be enhanced elsewhere in the Shire as a result of the proposed development through the voluntary provision of an affordable housing levy to be directed to a trust fund used by a non-profit agency (in partnership with the new Moreton Bay Regional Council and the NEBP) to help leverage the provision of affordable housing in the area. An amount from each sale of residential property will be transferred to the Trust, and the funds from this will help provide affordable housing on land provided by the Trust. With approximately 1,300 residential parcels to be created within the project, the Trust could potentially be in receipt of in excess of \$2 million towards providing affordable housing.

The Community Context study also found that the existing private housing in Caboolture is well suited to first and second family purchasers with deficits in the larger, more expensive homes and smaller units/townhouse sectors. The NEBP will provide for a diversification of housing stock in the area, through the delivery of larger, prestige homes, as well as the development of homes on smaller lots, and of medium density apartments.

Service Revenue and Work Flow to Existing Communities

It is estimated that the NEBP proposal will result in approximately \$2.02 billion being spent locally during the 18 year development phase, and another \$2.11 billion of value added expenditure (money earned in the NEBP and spent on goods and services elsewhere in the local area). In addition, during the operation of the NEBP, it is estimated that, annually, a further \$34.6 million will be spent locally with another \$40.2 million value in local expenditure.

The development phase of the NEBP will create approximately 13,984 local employment years, which equates to 777 full time equivalent (FTE) jobs per year. Most of these will be in the construction sector, but will also include jobs in finance, property and business



services. The NEBP will also indirectly generate another 770 FTE local jobs outside the development, through production and consumption induced impacts (like residents spending money in the local area).

Impacts on Local Residents Values and Aspirations

A key issue regarding image and identity is that Caboolture's image and identity are at odds, with conflict between outside public perceptions and the reality experienced by insiders. Thus, the high quality NEBP should provide an opportunity to marry the image and identity of the Shire. It will act as an attractor development, and incoming residents and visitors will get an opportunity to experience for themselves the diverse attractions of the region. For example, some new residents, after moving into the area from Brisbane, expressed surprise and satisfaction at the range of facilities and the better environment available to them.

Despite their pride in the area, local residents understand that it lacks employment opportunity and has a history of over reliance on welfare, they are concerned for the future of their young people and would like access to more lifestyle amenity (and more public transport options to reach new opportunities as they emerge) in their own community.

Rapid urbanisation has resulted in:

- a threat to the semi-rural lifestyle of the area;
- over-demands on the capacity of infrastructure and services;
- changing composition and dynamic of the community; and
- greenfield developments need to be integrated into established areas.

The NEBP is, of course, a wide-scale greenfield development, which could impact on the capacity of local infrastructure and services. It could also be seen as threatening the semi rural lifestyle. However, the development's significant economic benefits and employment generation capacity, together with the way in which it will be integrated in the local area, will allow residents greater access to a wide range of future opportunities. Community engagement and development activities will also promote greater ownership and participation in the site's opportunities as they develop; and local routes for cycling, walking and bus transportation will assist in the integration between the new community and existing residential areas.

Of note, the residents surveyed expressed significant positive feedback about the development, indicating that the welcome provision (and diversity of) employment activity and the scale and quality of the recreational amenity proposed will represent a net benefit to the immediate neighbours and an asset to the regional community.

A community development strategy for the NEBP will be prepared prior to commencement, recognising the importance of developing an early identity for the project. The vision for the project has been based on creating a destination with a clear identify and a strong sense of place, enriching the regional area in terms of recreational assets and lifestyle opportunity.

The planned community development strategy will establish broader opportunities to engage with the community and deliver capacity raising programs. The NEBP intends that the Community House will be the early focus for community development initiatives. The creation and delivery of this long term community development program will address issues of change management and community capacity building using many different means of engagement.



Ability to Live In Accordance With Their Own Values and Priorities

Although this is extensively detailed in the Cultural Heritage Reports and Indigenous CHMP (Appendices T1-T4); the Community Context Study gives a brief indigenous and non indigenous history of the area. For example, the development has a long indigenous history; rich in animal and plant resources, it was an important area for cultural activities, and includes evidence of bora rings, and artefact manufacturing sites. Bribie Island was also an important site for early encounters between Aboriginal people and European settlers.

The Caboolture area was also important for non indigenous European cultural heritage. It was the northern-most border of NSW, and an important agricultural area, for sugar cane and cotton growing. In fact, the property is the site of the original property of George Raff, one of the original settlers and sugar cane farmers in the area. The remains of his old homestead, after which Morayfield was named, will be preserved in the Heritage Park.

The Indigenous CHMP provides comprehensive details on the management of indigenous cultural heritage on the property, including the necessity to respect and value any artefacts that have been, or may be found during construction of the NEBP. The Gubbi Gubbi people (the traditional owners of the land) have been directly involved in all aspects of the Indigenous CHMP, which provides for a Cultural Heritage Officer and indigenous on-site Monitors. The NEBP also intends to ensure the inclusion of Indigenous entrepreneurs in any community liaison or potential business opportunities.

The Cultural Context Study also highlights the increasing ethnic diversity in the region; including the large Samoan population in the Deception Bay area. It is important, for example, that diverse cultures can live in accordance with their own values and priorities such as access to suitable housing; for example, some ethnic groups require larger housing than "average" for extended family groups. It is also important that residents for whom English is not their native tongue, have access to educational and training facilities to help them learn English, and successfully integrate with the wider community.

Access to Services and Housing

Master-planned Greenfield developments such as the NEBP can offer rare opportunities to make holistic and integrated social planning decisions, taking into account issues such as the relationship between a development and surrounding centres; the staging of the development and introduction of infrastructure; public transport; existing social infrastructure; and the opportunity to increase affordability.

Key issues identified are:

- Increased social polarization, particularly as incoming residents tend to be more affluent than many in the established community.
- Overdependence on the welfare state, and a high proportion of pensioners.
- Increased presence of culturally and linguistically diverse residents.

Access to health, allied health and aged care services is compromised by the ageing population and a lack of infrastructure and services, particularly good public transport.

The social infrastructure study and needs analysis has recognised that primary health care in the local community is deficient, and has planned to include a primary health care facility to meet local needs, and also to mitigate any future impacts on the existing infrastructure.



Ability to Participate In Regional and Local Employment and Training

Key employment issues identified include the following.

- Need for further self-containment beyond current level of 44%.
- Further diversification; more high level jobs needed to prevent leakage of skilled workers.
- Long term, inter-generational unemployment is an issue for some in the community.
- Local firms experience some skills shortages.
- Local people have skills deficits; there is a lack of real pathways between skills training and employment outcomes.

A major aim of the NEBP is to provide local employment and training facilities. There will be significant skills acquisition opportunities available throughout the development and operational phases. There will be a unique training facility within the development to implement education and training reforms, as well as upgrade education and skills for potential employees. The NEBP will therefore have a significant long term beneficial impact on local workforce skills.

The first community partnership has already been established with Cadet, a large training provider. This partnership is integral to the NEBP's commitment to creating employment and training opportunities for local people. The introduction of a skills hub that provides pathways into the emerging employment opportunity will strengthen the tertiary education provision available to the regional community, as well as to local residents.

New Project Workforce

Based on the 2001 Census, the top 5 occupations for the Caboolture area were: Intermediate Clerical, Sales and Service Workers; Tradespersons; Labourers; Intermediate Production and Transport Workers; and Elementary Clerical, Sales and Service Workers. The top industries of employment were Retail Trade; Manufacturing; Health and Community Services; Construction and Property and Business Services. All of these will benefit by the construction of the NEBP, giving greater access to locally based employment opportunities. The project will likely have major economic flow-on effects to the local and regional community.

Approximately, 1,632 direct and indirect construction jobs are predicted with a further 13,685 direct and 13,464 indirect FTE employment opportunities predicted once the development is fully operational.

The workforce population will exceed the onsite resident population, and the development is also likely to attract a significant visitor population. It is a goal of the NEBP to source labour whenever possible from the local area, and to provide first class training facilities, which will substantially add to the skill basis of the region. The has a strategic goal of containment, aiming to have 2 out of every 3 residents also working within the Shire. The NEBP supports that goal, and its ability to generate significant new employment, will substantially aid in the realisation of that strategy.

A single Job Network agency will act as first point of contact to coordinate staff recruitment for the project; and encourage the participation of both indigenous and disadvantaged people. This is particularly relevant given the relatively high proportion of disadvantaged people in areas close to the development.



Educational Impacts of the Proposed Development

There is a reasonable distribution of state primary and secondary schools across the study area; as well as private education infrastructure. Most specialised training providers, such as the Tafe and QUT are centralised around Caboolture.

The NEBP will provide a pre-school integrated with a P-7 Primary School. The NEBP also includes a unique training facility to implement education and training reforms and upgrade education and training for potential employees. The planned and timely delivery of this primary school will ensure that there is no negative impact on the existing infrastructure and will deliver a net benefit to the community of the core area.

The NEBP will provide an improved appreciation of conservation areas and environmental education; the development also includes a Heritage Park which will encourage the appreciation of cultural heritage. Of note, the Indigenous CHMP will require all appropriate construction staff (and other relevant personnel) to attend a cultural heritage induction, which will be very useful to raise awareness of a wider population to cultural heritage issues.

Mitigation/Enhancement Strategies for Identified Impacts to Social Values

The Cultural Context Study also undertook a social infrastructure audit to consider the current provision of infrastructure and services on a local and regional basis, and makes a preliminary assessment of additional infrastructure that will be required by the projected population of the NEBP. In summary, the identified social infrastructure required in the NEBP is:

- a Post Office, ATM and Bank required in the local shopping centre;
- some faith based infrastructure required when site is fully developed;
- local shopping centre required east of highway;
- dining precinct is a highly desirable lifestyle attribute;
- access to train station imperative;
- bus routes and interchange imperative;
- cycle and footpaths highly desired;
- 2 community meeting rooms and one multipurpose hall required;
- integrated P-7 Primary School required;
- vocational training centre if possible;
- at least 2 registered childcare centres with adequate baby places;
- community hub with new regional library desirable;
- local heritage captured throughout site is desirable;
- community Police Beat recommended;
- ambulance layover optional;
- community health centre with at least 7 GPs required;
- network of playgrounds;
- indoor sports centre once population mature;
- sports clubs desirable at earliest opportunity;
- hotel possible as part of mix;



- marina precinct inherent tourist attraction;
- park network with walking trails and dog-off leash area; and
- 50 affordable housing beds provided off-site by Housing Trust option.

The NEBP understands the twin drivers of achieving social self containment and not placing an additional burden on the existing infrastructure and services, and the need to establish connections with the neighbouring communities to maximize physical and social integration.

To achieve the above goals, the NEBP is making a provision for the inclusion of a primary school, childcare facilities, vocational education and training hub, health care centre, retail and services precinct, community halls and meeting spaces, district playing fields and amenities for sports clubs, dog off leash area, tennis courts, playgrounds and barbecue facilities. These will complement the marina facility, regional parkland and golf course amenities.

The establishment of a community association and the community development strategy will help blend the existing and emerging communities. The festivals and events program will also add depth to the cultural program across the region and establish an early identity for the area.

In conclusion, the net outcome for the local community will be an increase in cultural, community, human services, social and recreational amenities in their neighbourhood. The NEBP should provide a comparatively greater level of social benefit than cost. Key beneficial social impacts of the Northeast Business Park are expected to include:

- Improved access to areas for recreational and leisure activity though the development of wetlands, pathways, golf courses, fishing platforms, marina berths, other sporting, cultural and open space areas, and café and dining precincts.
- Improved visual amenity, with improved access to environmental attractions including the Caboolture River and the improvement of degraded land.
- The development of a Heritage Park precinct, which will assist in the retention and maintenance of unique environmental and heritage assets.
- Enhancement of community interaction and cohesion, which is important to a well functioning business and residential community and can significantly influence an individual's wellbeing.

4.11 Health and Safety

4.11.1 Description of Environmental Values

NEBP Pty Ltd holds health and safety as a core business value and is committed to creating a future free of incidents and injuries, where all stakeholders actively create safe and healthy environments.

There are a number of existing industrial facilities within Caboolture Shire including poultry farms, log saw milling, gravel and sand quarrying, wood product manufacturing, pet food preparation and petroleum storage. The NEBP is well removed from these sources and the existing air quality and impact on the NEBP is unlikely to be greatly influenced by industrial emissions.

The Victorian EPA has developed guidelines that provide recommendations for the minimum separation distances required between sensitive land uses and industries to



avoid adverse impacts. Separation distances for general industrial activities that could have the potential to impact air quality are listed in Table 64, below.

Table 64Recommended Buffer Distances to Protect Residential Land Uses fromPotential Emissions from Industries (VIC EPA, 1990)

Activity	Recommended Separation Distance (metres)	
Manufacturing, food, beverages, tobacco		
Smallgoods	100	
Milk products	100	
Bakeries	100	
Chemical, petroleum and coal products		
Paints and ink blending and mixing	300	
Cosmetic and toilet paper preparations	100	
Pharmaceutical and veterinary products	1,000	
Non-metallic mineral products		
Glass and glass products	500	
Bricks, tiles, pipes production, with a production rate exceeding 10,000 tonnes per annum	200	
Concrete batching plants	100	
Plaster products	100	
Basic metal products		
Iron and steel production up to 1,000,000 tonnes per annum	500	
Miscellaneous manufacturing		
Fibreglass manufacturing	200	
Transport and storage		
Transfer stations	300	
Non-metallic mineral products		
Bitumen batching plants	500	
Plaster products	100	
Concrete or stone articles	100	

Activities such as warehousing, logistics and storage that have a low risk of causing significant emissions of air pollutants do not require buffers as large as those shown inTable 64. Such activities can be located within the intervening buffers between sensitive landuses and industries with a greater potential for impact.

Various industries require different separation distances ranging from 100 metres to 1,000 metres. Careful planning of the NEBP and in the MIBA precinct with regard to siting of the various industries will assist in minimising impacts on sensitive receptors. These activities may be subject to site-specific risk assessment study in accordance with the requirements of the relevant government authority particularly if they are an Environmentally Relevant Activity (ERA) under the *Environmental Protection Regulation 1998*. Such assessment



studies will ensure that appropriate controls are implemented to ensure adverse impacts do not occur.

Generation of odours from industrial activities has the potential to impact on odour sensitive places, such as residences, schools, hospitals, caravan parks, national parks, shops and business premises. The separation distances outlined above are achieved for existing odour sensitive places.

The location of the nearest existing child care facility, hospital, aged care facility and school in relation to the NEBP is presented as Figure 19.

4.11.2 Potential Impacts and Mitigation Measures

A detailed assessment of the hazards and risk associated with construction and operation of the development has been prepared by Simmonds and Bristow in the report titled 'Hazard and Risk Analysis for Northeast Business Park'. A full copy of this report with the outcome of the risk assessments is provided in Appendix U.

Further to the above, more information on Hazard and Risk is provided in Section 4.13 of the EIS.

Construction

A Workplace Management Plan will be created prior to the commencement of work in any of the Precincts. It will contain procedures to ensure that workplaces are managed in such a way that safety hazards are continually identified and reviewed. This will, in turn, allow for control actions to be put in place to provide workplaces that are safe and without risk to the health of key stakeholders including workers, the general public and the environment.

All potential hazards/risks in the workplace will be broken down into activities, which follow the sequence of construction. These activities are provided for in Safe Work Method Statements (SWMS) which will identify the potential hazards of all proposed work, assess the risks involved with the work and will develop controls to eliminate, or minimise, the risk.

No hazardous substances are to be brought onto the site without a Material Safety Data Sheet (MSDS) being lodged and the substances details recorded in the Hazardous Substance Register.

A maximum of 50,000 litres of diesel will be stored on site during construction works to fuel heavy machinery required for construction and development. The location of the diesel fuel will be at a suitable location near the site construction compound and will be bunded to contain at least 110% capacity of the largest tank.

Storage of dangerous goods will be in accordance with the *Dangerous Goods Safety Management Act 2001*, *Dangerous Goods Safety Management Regulation 2001* and relevant Australian Standards, such as 'AS 1940-2004 The storage and handling of flammable and combustible liquids'.

Product Name	Proper Shipping Name (if DG)	UN Number (if DG)	Class/Type	PG	Quantity (Litres)
Diesel fuel	Diesel fuel N.O.S.	1202	Combustible liquid C1 (flashpoint not greater than 150 ^o C)	N/A	50,000

 Table 65
 Dangerous Goods Stored During Construction Phase



Air

The release and dispersion of toxic material to the atmosphere can adversely affect exposed persons and the environment. Toxic concentrations of airborne contaminants can result from:

- the evolution of toxic combustion products during fire;
- vapours from toxic liquids;
- reactions of materials giving off toxic vapours or gases;
- liquid spills entering watercourses or contaminating land or groundwater; and
- spills of solid materials and dispersion of dusts by the wind.

The effects from exposure to toxic fumes can range from fatality or injury (e.g. damage to respiratory or nervous system) to irritation of eyes, throat or skin.

Premises that have particular requirements for indoor air quality, such as food storage, food manufacturing or pharmaceutical manufacturing, may need more stringent protection from air pollution, and assessment on a case-by-case basis will be carried out. All industries will be encouraged to investigate opportunities to reduce air emissions through the application of waste prevention and minimisation, cleaner production and best practice environmental management.

Dust

24-hour and Annual Average PM10

The predicted maximum 24-hour average ground-level concentrations of PM_{10} for construction phases 1 to 3 are below 130 µg/m₃ at locations outside the NEBP development. In sensitive areas, the highest predicted ground-level concentrations are at residences to the south of the site. These are below air quality goals and are unlikely to result in adverse impacts. For construction phase 2, the maximum 24-hour average ground-level concentrations of PM₁₀ are predicted to be below the EPP Air goal of 150 µg/m₃ at nearby residences. PM₁₀ concentrations are predicted to be between 140 and 148 µg/m₃, at the residences to the south.

The annual average air quality goals are met outside the site boundary with the maximum of $39 \mu g/m_3$ predicted at a residence with the inclusion of a background of 17.0 g/m₃.

Total Suspended Particulates (TSP)

The annual average ground-level concentrations of TSP predicted due to construction phases 1 to 3 indicate no exceedances of the EPP Air goal of 90 μ g/m₃ at the nearest residence. The maximum annual average ground-level concentration of TSP predicted to occur at a residence is 76 μ g/m₃, with the inclusion of 24.2 μ g/m₃ as a background.

Noise

A noise assessment was completed by Cardno to assess the impacts of noise during construction and operation of the development on existing land uses. A full copy of the Noise Impact Assessment (October, 2007) is provided in Appendix N.

Potential impacts from construction noise at noise sensitive places close to the development are expected from the use of heavy plant and equipment used for:

• site establishment;



- bulk earthworks;
- sub-division works;
- golf course construction; and
- bridge building.

Mitigation measures have been proposed to reduce potential noise impacts from construction works, in particular staging development and standard noise control strategies.

Potential noise impacts from the operation of the development include industrial activities in MIBA and the Marine Industry precinct, and road traffic noise. The noise reduction afforded by structures and landforms will mitigate noise from marina operations on sensitive places and operational noise from MIBA will comply with relevant noise criteria. Furthermore, recommendations for mitigating noise from the MIBA precinct have been made in accordance with best practice standards due to the close proximity of the precinct boundary to existing residences. Mitigation measures include an open space area between MIBA and existing residences, and acoustic timber fencing along the boundary facing towards existing residents on Coach Road to protect dwellings from noise sources.

Noise generated by off-site impacts from road traffic accessing the NEBP development from the major access point, Buchanan Road, was found to not significantly affect existing residents on Trafalgar Drive due to an existing 130 metres separation distance to the closest dwelling to the road. Road works are also not anticipated to adversely affect the internal amenity of existing dwellings, particularly as the quality of the existing environment is already reduced due to the proximity of this area to the Bruce Highway. Additional noise mitigation measures such as restricting delivery times and work hours during construction phases will be sufficient to prevent any deterioration of amenity.

Off-site impacts relating to noise from the dredging of the Caboolture River were deemed negligible due to the limited number of dwellings in the vicinity of the defined dredge area.

Odour

The high frequency of light winds from the south-west may transport fugitive releases of odours from sewage pumpouts or exhaust emissions from boats in the marina to the northeast. However, as there is good buffering in this direction, there is a low risk of nuisance associated with fugitive releases of air pollutants from the NEBP. Any activities with fugitive releases of odour or air pollutants should be placed on the northeast edge of the MIBA precinct.

Recommendations for assessing and managing odour from new developments in Queensland are detailed in the Queensland EPA's odour guideline (2004). The guideline is intended for application to new developments and should be used to assess the suitability of any odorous activity that may be located in the NEBP. Industries and businesses that have the potential to generate odours within the MIBA and Marine Industry precinct will be designed and operated to ensure that environmental nuisance and environmental harm do not occur.

Whilst under normal circumstances industrial facilities will comply with emission standards and ambient air quality goals, there may be occasions that may result in elevated concentrations of pollutants and/or odour. Separation distances assist in mitigating the impact of non-conforming conditions at sensitive locations by allowing a greater distance over which emissions are dispersed. Separation distances are also used as a screening level air quality assessment tool for small activities that may not be subject to detailed assessment processes.



Simmonds and Bristow conducted a hazard and risk analysis on the impacts associated with vector-borne diseases on the development. A summary of the possible consequences and preventative measures are outlined in Table 66, below. A full copy of Simmonds and Bristow's Hazard and Risk Analysis for Northeast Business Park (October, 2007) is provided in Appendix U.

Function / Operation	Possible Consequences	Preventative / Protective Measures
Construction	Water stagnation and mosquito breeding, bacterial and viral growth	Any water pooled to be drained as soon as possible.
	growth	Water should be disposed appropriately based on the source of the water.
		Prepare and implement a Stormwater Management Plan for construction activities.
Residential, MIBA, Marine Industry, Commercial. Retail	Residents and employees impacted by mosquito-borne disease such as Ross River and	Monitoring of mosquito types and populations.
and Education	Barmah Forest virus.	Council spraying program, as necessary.
		Use of low impact insecticides to minimise impacts on non-target species.
Marina	Boat owners and marina employees impacted by mosquito- borne disease such as Ross River	Monitoring of mosquito types and populations.
	and Barmah Forest virus.	Provision of adequate amenities and toilet facilities.
	pollutants from the marina facility and boats, including microbiological contamination.	Provision of pump out facilities connected to the sewage treatment system.
		Adequate flushing of marina to maintain the water quality of the marina basin.
		Fines or release of sewage into the marina basin.

Table 66	Possible Consequences and Preventative Measures for Vector-borne
Diseases	

Recycled Water Usage

gardens and open space, and for any appropriate industrial purposes will be used on site via a dual reticulation system.

Whenever recycled water is irrigated, nutrient export can potentially occur via deep drainage to the groundwater, if the nutrients in the applied water are in excess of what the vegetation can use. The sustainability of irrigating recycled water is heavily influenced by



the quality of the recycled water, the characteristics of the soils and their leaching risk, the climate, and the irrigation regime adopted.

MEDLI modeling was conducted to assess the risk of nutrient export to the environment through leaching to groundwater. Typically Class A+ has low nutrient concentration with a Total Nitrogen level of 1.8mg/L and Total Phosphorous 0.3 mg/L. Soil conditions are variable across the site, and in some cases groundwater and or bedrock is not encountered for a substantial depth (8m) whereas groundwater is relatively shallow (0.5m) in other locations. More detail on the analysis of groundwater and soil characteristics is outlined in the Coffey Groundwater Impact Assessment (September, 2007) and Geotechnical Interpretative Report (January, 2007) provided in Appendix H2 and Appendix R1, respectively

The MEDLI modeling also concluded that irrigating Class A+ water sourced from the South Caboolture WRP was within the acceptable limits outlined in the Queensland WQG 2006, provided application rates did not exceed 20mm per day.

Class A+ recycled water classification means that it is safe for relatively high contact water uses such as toilet flushing, fire fighting, and for use in water features, as well as irrigation. Although, Class A+ recycled water it is not approved for drinking or potable purposes.

To reduce the risk to public health, the following preventative measures advocated by the 'Queensland Water Recycling Guidelines' will be adopted for the proposed recycled water network.

- Recycled water pipelines should be constructed of a permanently deep purple or lilac coloured pipe.
- Continual monitoring of water quality, including microbiological quality.
- Inspections, particularly of all new services, are essential to mimimise the risk of cross connections to the water supply.
- Procedures to be development and implemented in the event the recycled water does not meet the required criteria.
- Emergency shutdown system to be installed in the event of contamination.
- Signs are erected (in English and any other appropriate community language) to warn that recycled water is used and not to drink it.

A health risk analysis carried out by the QLD Fire and Rescue Service Steering Committee states that Class A+ recycled water is considered safe for firefighting provided appropriate controls are implemented. The 'Queensland Water Recycling Guidelines' also suggests that there is a negligible health risk associated with utilising recycled water for fire fighting purposes and that it may be advantageous to meet fire fighting demands through the recycled water network.

While there may be negligible health risks associated with the use of Class A+ recycled water, the 'Queensland Water Recycling Guidelines' recommend employers of fire fighters to ensure the health and safety of their employees under the *Workplace Health and Safety Act 1995* whenever recycled water is proposed for fire fighting purposes.

Mosquito and Biting Midges

The site is located adjacent to the Caboolture River and associated wetlands which contain substantial areas of suitable breeding habitat for various species of biting midge and mosquito. In addition to nuisance biting, mosquitoes can spread diseases such as Ross River virus and Barmah Forest virus. There is a high risk of nuisance biting and an



increased risk of disease transmission for residences located up to 5 kilometres from breeding sites.

Whilst the NEBP development would reduce the extent of available mosquito breeding habitat, through the removal of some ephemeral waterbodies and constructed drainage channels, substantial areas of biting insect breeding habitat would be retained due to their recognised environmental values. To ensure that retained areas of mosquito and biting midge habitat within and external to the site do not have an unacceptable impact upon existing and future residents of the locality, a number of management measures will be adopted. These management measures have been described in Section 4.8.2.1.

Vehicle Accidents

A construction safety management plan will be prepared by the appointed contractor prior to commencement of construction. Construction road safety will be addressed by speed limiting and controlling access to the construction site through a dedicated site entry and exit point. Any contractors will be inducted before commencing work on site.

As fill or spoil materials are not proposed to be transported onto or off the site, movement of plant on and off the site will be the only significant heavy vehicle movements on the external road system. Special permissions for some large items of plant would be sought, if needed, via normal permitting processes.

Road upgrades associated with the NEBP development is intended to improve the operation of intersections along Morayfield Road, reduce traffic delays and improve safety.

Childcare Centre

The CSC currently does not have specific guidelines for assessing the suitability of air quality at proposed childcare centres. The Brisbane City Council (BCC) has developed guidelines for assessing the suitability of air quality at proposed childcare centre sites. The guideline specifies three levels of assessment depending on the risk of adverse impact: Low-Risk, Medium-Risk and High-Risk scenarios. The risk level relates to the proximity of the proposed childcare centre to common urban activities that could be associated with adverse air quality impacts. These activities include: major roads, intersections, industry and service stations. Each level of assessment has specific assessment criteria and, depending on whether or not the criteria can be complied with, a more detailed assessment may be necessary. The assessment hierarchy is summarised in Table 67 below.

	-		
Criteria	Low risk	Medium risk	High risk
Distance from road carrying greater than 15,000 vehicles per day	> 40 metres	>20 metres and <40 metres	<20 metres
Distance from controlled intersection and roundabout incorporating suburban road or arterial road	>100 metres	<100 metres	<50 metres
Distance from industry or service station	>150 metres	>100 metres and <150 metres	<100 metres

 Table 67
 Assessment Criteria: Low, Medium and High Risk for Child Care Centres

If the Low-Risk criteria are satisfied, no further assessment is required. If one of the Medium-Risk criteria or High-Risk criteria is satisfied a detailed air quality assessment including dispersion modelling may be required. The location of any child care facility will be within the community node identified on Figure 2. An assessment of the location of the child care facility in relation to the above criteria will be assessed prior to construction.



Marine Industry & Marina

The Marine Industry precinct of the NEBP will incorporate a shipyard with a travel lift, abrasive blasting and specialist paint and maintenance activities as well as a refueling station. Activities such as abrasive blasting, spray painting, refueling and fibre glassing have the potential to emit odorous and noxious compounds that could cause nuisance at neighbouring residential areas, depending on the distance between the residences and the marine industry, local meteorological conditions and operating conditions within the marine industry precinct and associated facilities.

The development permit and registration certificate issued to these facilities will include a general requirement to ensure that no offensive odours or elevated pollutant levels occur beyond the boundary of the facility and/or at the nearest sensitive locations. These activities may be subject to site-specific air quality impact assessment study in accordance with the requirements of the relevant government authority particularly for Environmentally Relevant Activities (ERAs) under the *Environmental Protection Regulation 1998*.

The following ERAs associated with fuel storage and boat maintenance and repair are triggered in the marine industries precinct:

- Boat maintaining and repairing ERA 69;
- Marina or seaplane mooring ERA 73;
- Crude oil or petroleum product storing ERA 11.
- Chemical storage ERA 7;
- Abrasive blasting ERA 23; and
- Metal surface coating ERA 25.

Boating Accidents

According to Maritime Safety Queensland the majority of historical marine incidents were associated with activities occurring while vessels were traversing calm, clear and open water. Very few incidents were reported where the vessels were in the marina. The occasional collision has been known to happen when navigating a vessel into port. Sixty percent of all Queensland marine incidents occur in Brisbane or Gold Coast waters (Maritime Safety Queensland 2007).

In Queensland the majority of marine vessels registered are for recreational use (97%), with 2.8% registered as commercial fishing or commercial passenger vessels. The majority of incidents reported involved recreational vessels (Maritime Safety Queensland). Motorboats, sail boats and speedboats were the top three vessel types involved in incidents with 600-650 incidents occurring, on average, each year (2000-2005).

The marina and marina lock has been designed to minimise the potential for boat collisions.

Zone Substation

Information on zone substation incidents reported by Energy Australia was obtained, including additional information from TransGrid (2005), who operate 82 substations in NSW. Transformer incidents outlined in TransGrid's 2004/2005 Annual Report indicate that transformer explosion and fire could be expected in a substation at about 1-2% on a yearly basis.

TransGrid list 6147 units among their assets. The capacities of these units range from 11 kV to 500kV (3961 current transformers and 1478 capacitor voltage transformers). If a failure rate of 0.005 per transformer year is applied, this would be equivalent to 30 units.



Across all of TransGrid's facilities throughout NSW, in any year, three or less units are expected to suffer fire depending upon oil or gas filled if a frequency of 1 in 10 failures is adopted.

Contaminated Land

A search of the Environmental Management Register (EMR) and Contaminated Land Register (CLR) was undertaken to determine if there is any land contaminated from previous land uses within the development area. The search identified that Lot 10 on RP902079 is listed on the EMR for the notifiable activity of petroleum product or oil storage.

A preliminary site contamination investigation, which included a review of the site history and soil sampling of Lot 10 RP902079 was undertaken and it was determined that approximately 20m³ of soil within the lot has been identified as potentially contaminated. The potential contamination is limited to the immediate area surrounding the approximate location of the underground storage tank and bowser. The area of potential contamination is identified in Figure 9.

Douglas Partners prepared a Site Management Plan (SMP) and a Remediation Action Plan (RAP) for Lot 10 RP902079 in 2004. A copy of the SMP and RAP is provided in Appendix Y1 and Z2, respectively. Prior to commencement of construction in Lot 10 RP902079 the remedial action to be carried out, as identified in the RAP will consist of the following.

- Excavation of the underground fuel storage tanks, bowser and vent pipe and disposal off-site.
- Excavation of petroleum hydrocarbon affected soil which is to be validated and bioremediating on site or disposal off site.
- Excavation of any soil found to be contaminated as a result of further testing and disposal off site.

Until the remedial actions are undertaken, the requirements outlined in the SMP, will manage the contamination of the area to protect human health and the environment.

Dangerous Goods

A hazardous material is a material which, in sufficient quantities, has the potential to cause harm to people, property or the environment because of its chemical, physical or biological qualities. Dangerous goods are chemicals that have the potential to present an immediate threat to people, property or the environment if not properly controlled. They are classified according to the nature of the hazard into nine classes, some of which are divided into subclasses.

The *Dangerous Goods Safety Management Act 2001* (DGSM Act) was developed by the Department of Emergency Services' Chemical Hazards and Emergency Management CHEM Services in consultation with stakeholders from industry, State Government departments, the Local Government Association of Queensland and community groups.

The overall objective of the DGSM Act is to protect people, property and the environment from harm caused by hazardous materials, particularly dangerous goods (CHEM Services 2001).

The requirements of the DGSM legislation increase as the quantity of dangerous goods stored at any premises exceeds specified amounts. Premises are classified into one of four categories as the quantity of dangerous goods or hazardous materials increases, namely:



- Small quantities minor storage workplaces (a minor storage workplace refers to 'a
 workplace that is not a major hazard facility or a dangerous goods location, where
 stated dangerous goods or combustible liquids are stored or handled');
- Medium quantities dangerous goods locations (DGLs);
- Large quantities large dangerous goods locations (LDGLs); and
- Very large quantities major hazard facilities (MHFs).

The threshold quantities for DGLs, LDGLs and MHFs are detailed in Schedules 1 and 2 of the DGSM Regulation. The legislation describes general safety obligations for everyone involved with the storage or handling of dangerous goods, as well as detailed obligations for each of the four dangerous goods categories.

The types and quantities of hazardous substances that are known to be stored within the development are summarised below.

Product Name	UN Number	Quantity (Litres)
Diesel Fuel	1202	55,000
Unleaded Petrol	1203	20,000

Table 68Dangerous Goods Stored at the Marina

Other dangerous goods may also be stored at specific businesses within the MIBA and Marine Industry precinct, although exact products and quantities are not known at this stage. Prior to any business or industry commencing operation within the development, a risk assessment will be conducted on the nature, type and quantities of materials to be stored and their associated emissions and potential impact on neighbouring businesses and residences.

Small quantities of other dangerous goods that may be used and stored within the development are outlined in Table 69 below.

Type of Dangerous Goods	Storage Location	Use
Fuel, diesel, oil and coolants	Golf Course	Mower and equipment fuel
Pesticides	Golf Course	Golf course maintenance
Cleaning chemicals	Motel	Cleaning
Paints, antifouling agents, solvents, fibreglass resins, acids and alkalis	Marine Industry	Boat maintenance and repair

Table 69	Anticipated Dangerous Goods Stored in Other Parts of the Development
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Diesel is not being stored in sufficient quantities to trigger the requirement for a permit for a large dangerous goods location (LDGL) however unleaded petrol is stored in quantities greater than the threshold for a LDGL. The thresholds for LDGLs are provided in Schedule 1 of the DGSM Regulation 2001.

Storage of dangerous goods will be in accordance with the DGSM Act 2001, DGSM Regulation 2001 and relevant Australian Standards, such as 'AS 1940-2004 The storage and handling of flammable and combustible liquids'.



Transport of Dangerous Goods

Fuel will be transported to the site by an approved road tanker, which would comply with the Australian Code for the Transportation of Dangerous Goods by Road and Rail. It is expected that diesel will comprise 73% of deliveries unleaded petrol (ULP) comprising the remainder (based on storage quantities). It is estimated that there will be one tanker fuel delivery per month with the exception of public holiday times, when the number of deliveries may increase to two per month.

Tankers would enter the NEBP site by the Buchanan Road/Bruce Highway interchange. Buchanan Road currently serves a function of carrying traffic between the Bruce Highway and Morayfield Road. It also serves the growing number of residential lots to the west of the Bruce Highway. East of the Bruce Highway, Nolan Drive and Trafalgar Road serve Buchanan Road with low volumes of traffic from a reasonably undeveloped/low density area.

The design intent for the internal road network is to direct most traffic to the Buchanan Road intersection, limiting the extent of traffic using the local roads to the south of the site and preventing heavy vehicles from using the local network, and thus reducing the risk of transporting dangerous goods through residential areas.

Security

Any business or industry within the MIBA and Marine Industry precinct that involves the use and storage of hazardous substances and dangerous goods, particularly external storage, shall be enclosed by a security fence. All buildings and gates should be securely locked and windows fitted with security locks. A security firm will be contracted to monitor any intruder alarm systems.

Natural Events

<u>Bushfire</u>

Cardno has conducted a bushfire assessment of the proposed development which is provided in Appendix Z1, and is summarised below.

The majority of the NEBP site is identified by the Queensland Rural Fire Service (QFRS) as being situated in a Medium Bushfire Hazard area, a designation which is also reflected in the CSC Planning Scheme's 'Central Planning Area Overlay Map CO2 Bushfire Hazard'. Therefore, SPP1/03 requires the development maintains the safety of people and property by mitigating the risk through:

- lot design and the siting of buildings;
- including firebreaks and fire protection zones that provide adequate setbacks between buildings/structures and hazardous vegetation, and access for fire-fighting/other emergency vehicles;
- providing adequate road access for fire fighting/other emergency vehicles and safe evacuation; and
- providing an adequate and accessible water supply for fire-fighting purposes.

Land to the east and south-east of the site supports similarly disturbed grasslands and scattered woodlands and, as such, occurs within a Medium Bushfire Hazard Management Area. Land south of the site has been principally developed for rural residential and other urban purposes and, as such, is considered have a Low Bushfire Hazard rating.



The exception to this is land situated immediately to the south of the Swampy paperbark forest community in the site's south, which supports a clump of paperbark forest contiguous with that which occurs on site. It is considered that, even following development of the site, this patch of paperbark forest would have a Medium Bushfire Hazard rating. The site is bordered to the north by an effective firebreak in the form of the Caboolture River which, as a consequence, is considered to have a Low Bushfire Hazard rating.

Under the proposed plan of development, the majority of vegetation within the site's southern, central, eastern and western extents would be removed to establish buildings, roads and other infrastructure, or would be modified to establish the golf course. As such, the current bushfire rating across most of the site would be reduced to that of a Low Bushfire Hazard.

Further to the Bushfire Assessment Report completed by Cardno, Simmonds and Bristow conducted a hazard and risk analysis of the potential for bushfires on the development. A summary of the possible consequences and preventative measures are outlined in Table 70, below. A full copy of Simmonds and Bristow's Hazard and Risk Analysis for Northeast Business Park (October, 2007) is provided in Appendix U.

Function / Operation	Possible Consequences	Preventative / Protective Measures
Construction	 Impacts on construction workers, such as: Injury, e.g. smoke inhalation or burns; and Fatality. 	Fire response training and emergency evacuation plan. Supply of fire fighting water. Establishment of firebreaks. Emergency Services access to the site.
Residential, MIBA, Marine Industry, Commercial, Retail and Education	 Impacts on residents, visitors and workers, such as: Injury, e.g. smoke inhalation or burns; and Fatality. 	 Emergency Response and Evacuation plan for each precinct. Supply of fire fighting water. Establishment of firebreaks that: provides for adequate set back between buildings and hazardous vegetation (i.e. 30-50 metres). provides for adequate evacuation and access for fire fighting and other emergency vehicles.

Table 70	Possible Consequences and Preventative Measures for Bushfires
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Flood

Caboolture has always experienced nuisance flooding affecting properties along the Caboolture River, King John Creek and Lagoon Creek, as well as closing local roads. It should also be noted that all coastal areas may be subject to flooding resulting from storm surge.

Riparian area adjacent the Caboolture River is known to be subject to periodic flooding. Minor waterways that are tributaries of the Caboolture River and that may be subject to minor flooding also transect the site. Those areas of land known to be subject to flooding,



from the Caboolture River, have been retained as open space while those that may be subject to minor flooding from the tributaries are well within the golf course/open space area.

Further to the above, the development of the site includes a cut and fill plan to ensure the majority of the development will be located above the 1 in 100 year (Q100) flood level.

A risk assessment of the incidence of flooding, potential consequences and preventative measures has been addressed in the Simmonds & Bristow 'Hazard and Risk Analysis Northeast Business Park' provided in Appendix U.

The Hazard and Risk Analysis report indicates that the risk of flooding on the development is high, however, the residual risk after mitigation measures have been implemented is reduced to a low-medium risk.

Table 71 below summarises the potential consequences of flooding and the preventative measures to minimise the impact.

Function / Operation	Possible Consequences	Preventative / Protective Measures
Construction	Quantities of sediment released to the Caboolture River and/or tributaries.	Early implementation of flood mitigation measures, such as flood diversion bunds.
	Destruction of property and equipment.	Sediment and erosion control plans to be implemented.
Residential, MIBA,	Release of toxic substances.	Stormwater management plans for
Commercial, Retail	Release of sewage.	hazardous substance storage.
and Education	Destruction of property and equipment.	Emergency Response Plans to be developed, which include
	Pooling of stagnant water, creating odour emissions and increasing the risk of water-borne disease or	notification procedure in the event of a toxic substance or sewage release.
	disease vectors (e.g. mosquitos).	Public warning and notification system to be implemented.
Marina	Property and boat damage or destruction.	Marina Lock release system for water above defined level.
		Emergency Response and Evacuation Plan to be developed for the Marina, and implemented by the Marina Manager.

Table 71 Possible Consequences and Preventative Measures for Flooding

Safety Management System

A Safety Management System (SMS) is recommended for the development. The SMS shall be the primary means of ensuring risk from activities conducted at a facility is maintained at an acceptable level.

The main components of a SMS are:

• commitment and leadership;



- planning;
- implementation;
- monitoring, measurement and evaluation; and
- auditing and review.

Table 72	Major Components of a Safety Management System

Commitment and Leadership	Planning	Implementation	Monitoring, Measurement and Evaluation	Auditing and Review
Safety Policy	Objectives and targets	Hazard identification and risk assessment	Performance criteria	Formal auditing arrangement
Provision of sufficient resources	Information requirements	Safety assurance	Inspection, monitoring and testing	Review of performance and effectiveness
Responsibility and accountability	Safety plans	System of work / Safe Work Procedures	Incident reporting and investigation	
Communication		Training		
		Emergency preparedness		
		Change management		

Source: Simmonds and Bristow 'Hazard and Risk Analysis for Northeast Business Park' (October, 2007)

Training and Education

The operation of the facilities within the NEBP will depend on a preventative and quality assurance approach to reduce and maintain low risks. Key training components for all staff and operators are:

- induction Training for all staff;
- quality assurance training;
- safety and emergency response; and
- site management and supervision training is emphasised to ensure risk management and quality standards are met.

Workplace training including inductions should be prepared in consultation with a specialist occupational hygienist, where necessary, and delivered by a person competent in that training. Appropriate procedures will ensure all staff be sufficiently trained and aware of the requirements in the case of an emergency to protect human health and property and the environment. Records of all training undertaken by staff should be kept on site.

Supervisors and process operators should hold appropriate qualifications and specialist training in automated and manual procedures needed to ensure efficient and safe operation of all plant and equipment (this is particularly relevant to the construction phase, the marine industries precinct and the marina). Any maintenance work should be performed by qualified persons with specialist training and knowledge of process hazards.



The operators of each facility are also to ensure adequate staff training in occupational health and safety, environmental and public safety. Competency training shall address the hazards and risks presented by the warehouse operation including odours, dusts, toxic fumes and gases, fire and explosion.

Cadet, in cooperation with the Department of Employment and Training, is the preferred training and service provider for the development.

Audits

Internal workplace health and safety audits of the management system, hazard information and records, shift processes, safety measures and staff personal protective equipment should be conducted on occupants within the MIBA and Marine Industries precinct, not less than bi-annually. External audits should be conducted on an annual basis while the development continues to grow and new industries are established within the MIBA and Marine Industries precinct. Major equipment or process changes should be audited promptly. Records of all audits should be maintained for review purposes.

Emergency Response

Reduction of fire risk should be managed through placarding and warning signs, enforcement of No Smoking or ignition sources in operational/storage areas and restricted to access by staff only. A Fire Safety Study should be carried out on premises that will be storing significant volumes of Dangerous Goods. Fire fighting facilities (location, number and type) should be approved by the local fire service. Fire extinguishers should be available near storage facilities. Training in the use of firefighting equipment and emergency drills should be held for any new staff and maintained regularly. Regular contact with the local fire service should be maintained.

Emergency response from off-site is to be provided primarily by the Queensland Fire and Rescue Service and Chemical Hazards and Emergency Management Services (CHEM Services) for hazardous chemicals and materials (Queensland Department of Emergency Services).

The nearest Fire Stations are located at Caboolture and Deception Bay. The standard procedure in the event of an emergency is to contact the Department of Emergency Services by dialling 000. The response time to the proposed development location would be within ten minutes form the nearest Fire Stations.

The Fire Service provides 24 hour emergency response services to any hazardous materials incident within the state in co-operation with CHEM Services. Through training and experience, the firefighters attached to the units are able to provide expert advice and operate specialised hazardous materials equipment. Emergency response time to the site would be relatively rapid from the nearest Fire Service. Specialised CHEM Services response could be delayed but adequate hazard knowledge and containment could be readily co-ordinated by the site operators.

The major factors in terms of fire fighting response are:

- The type and quantity of chemicals present;
- Storage practices and process activities;
- Absence of automatic fire detection/suppression systems;
- Accessibility for the fire service;
- Containment capability;



- Proximity to Caboolture River and watercourses and
- Proximity to other premises storing dangerous goods (Department of Emergency Services 2007).

An Emergency Response and Evacuation Plan prepared in accordance with the relevant Australian Standards and the Queensland Fire and Rescue Service (QFRS) 'Fire and Evacuation Guidelines' will be developed prior to construction and operation of the development. Individual businesses will also be required to prepare their own Emergency and Evacuation plans.

The QFRS guidelines cover general considerations as well as specific guidelines for different land uses relevant to this development:

- Public Assembly Buildings;
- Commercial Premises (high-rise and large low-rise); and
- Factories and Warehouses.

Emergency plans are to coordinate the alarm, notification, response, management and rehabilitation requirements in the events of a major accident. Key components in the formulation of Emergency Plans are:

- Ensuring that all persons on-site have appropriate training in the implementation of the emergency plans;
- Consultation with emergency services to formulate and agree to on-site and off-site emergency plan for action; and
- Public consultation with local residents and community during preparation of off-site emergency plans.

Details on information to be included in on-site and off-site emergency plans are given in the Australian Standards, along with updates and reporting requirements for major accidents and near misses.

The operator of the facility is to evaluate and implement appropriate measures to limit the consequences of a major accident. Such measures should take into account the likely warning periods that will be available onsite and offsite. Measures may include:

- Early detection and alarm systems;
- Communication systems;
- Shutdown systems for gas release;
- Fire protection systems including automatic control of tank or bund fires;
- Containment for spills and firewater runoff;
- Personal protective equipment;
- Safety refuges for site personnel;
- First aid equipment and trained personnel; and
- Clean-up procedures.



4.12 Economy

4.12.1 Description of Environmental Values

Existing Housing Market/ Rental Accommodation

The Caboolture Shire and surrounding area is an attractive coastal region, so is an appealing residential area. The South East Queensland Regional Plan (SEQ Regional Plan) has identified a target for Caboolture of 15,000 new dwellings by 2016, and an overall target of 26,400 new dwellings by 2026. Since June 2004, 4,755 new dwellings have been approved for development (3,637 detached and 1,118 other (mainly attached) dwellings). If the population growth and current development trends are to continue at the same rate, then Caboolture will run out of urban land between 2012 and 2017.

The existing housing market in Caboolture Shire is similar to the rest of SEQ, with low supply and high demand. The area within 2km of the NEBP (the Core Catchment) as well as Burpengary and Narangba have relatively high property prices. Other areas, like Caboolture Central, are more affordable. However, in comparison with Brisbane and the Sunshine Coast, property values still represent reasonable value for money, and because of this, the region is attracting many new residents in search of more affordable housing.

However, house prices have risen 199% since 2001, and the median house price is now \$280,000. It is increasingly difficult for the average local person to enter the property market, which reflects the wider issue of housing affordability. There is a very high demand for affordable housing, especially from younger, first time home buyers.

The rental market is tight, with an estimated vacancy rate of less than 3%. Rental prices are also high; recent rent increases have been as high as 33-47%. As investment properties are sold to realise capital gains, the supply of rental properties is decreasing; but at the same time, the demand for private rentals is increasing because of local population growth. The lack of rental property is further aggravated by the declining availability of public housing stock.

Demand for housing is driven by the high population growth, and the demographic changes of local residents (such as ageing and increasing affluent population). Most existing housing is detached, low density and low rise, and there is a scarcity of both smaller and larger properties. There is also an increasing demand for medium density and apartment living, especially around transport nodes.

The NEBP will provide a substantial quantity of different accommodation options, including a large range of attached housing. Attached housing is estimated to form a growing proportion of new dwelling approvals in the area, from three main markets; current residents demanding smaller dwellings as household size changes; new residents aged 55 years and over; and new residents aged from 0-54 years.

The attached dwelling component of the NEBP will provide 1,132 new dwellings over 13.6 years, ranging from 1-3 bedroom attached dwellings. Of note, a high proportion (15-25%) of 1 bedroom dwellings has deliberately been provided, to cater for the demand from single and older people, both increasingly common household types. Average household size for attached dwellings is approximately 1.6 people per dwelling, and this is forecast to decrease by some 0.1 person per household every 10 years.

It is also forecast that in 2007, 20% of new residents aged 55 years and older will live in attached dwellings, and this will rise to 26% by the completion of the project. New residents aged from 0-54 years will grow from 12% in 2007 to 18% to 2019.



The NEBP will also range in size, type and surrounding environment. For example, the average 2 bedroom attached dwelling will sell for approximately \$250,000 and the premium waterfront villas should sell in excess of \$700,000 (in today's market). The different dwelling types, quality and prices will cater to wide range of people, of differing demographics as well as income.

Economic Viability

The area has pockets of significant social and economic disadvantage as well as relative affluence. It is characterized by an ageing population, increasing ethnic diversity, increasing housing costs, decreased proportions of social housing and continuing strong population growth.

Those living in the more disadvantaged areas of Deception Bay, Bribie Island and Caboolture Central are more likely to be unemployed and are less well educated, with lower than average household income levels. They are also more likely to rent rather than own their home and live in a household with reduced connectivity (no access to motor vehicle and internet).

Those living elsewhere, such as in the Core Catchment, Burpengary and Narangba, are more likely to live in a family with children under 15, have high qualifications and work in a professional job. They are more likely to earn comparatively high incomes, be purchasing their home, and own more than two cars and a broadband internet connection.

Drought and rural downturn are not relevant to an urban development such as the NEBP, which is a landmark mixed use business, residential, marine and industrial precinct. Indeed, changing an unused, former pine plantation to an urban use will significantly benefit the local area, diversifying the economic base, and increasing the skill set of the local population.

Existing Large-Scale Developments and Their Regional Effects

Examples of similar large scale, multi use business parks can be found in Brisbane, Logan, Gold Coast and Ipswich areas. For example, the Australia TradeCoast region covers approximately 8,000ha (with a developable 1,300ha). This area includes the Metroplex on Gateway, one of Brisbane's largest industrial business parks. Metroplex is located on a 62ha site with a 650m frontage of the Brisbane River. On completion, Metroplex will have in excess of 200,000 m2 of gross floor area, and will house a workforce of approximately 4,500.

Other large scale developments north of Brisbane include the Virginia/Geebung area, and Northgate. Although a further 45ha at Northgate has been allocated for future industrial use, the industrial land is rapidly approaching capacity. There are a number of other industrial parks further away from the region, including south of Brisbane, and on the Sunshine Coast. However, despite these other industrial areas, SEQ still requires an additional 1,750ha of land to cater for future industrial and business needs.

The Caboolture Shire has a number of small scale industrial parks, around Narangba, Morayfield and Burpengary; Aerodrome Road, Industry Drive and Beerburrum Road and on Bribie Island/Bongaree. Most of these are dominated by local workshops and warehouses, which general have a low employee density. None are similar to the proposed NEBP, with its diverse, multi-functional industry, residential and marine uses.

There are potentially alternative available sites for the business and industry precincts within the Caboolture and wider region. However, the development of these sites would not deliver the integrated benefits associated with the NEBP, including the concentration and co-location of business, the social "work, live play" utility associated with the



incorporation of the marina, residential, community open space and recreational areas and the environmental restoration and improvement delivered by the development. There are no suitable and currently available alternative sites for the marina and marine facilities within the Caboolture and wider region.

4.12.2 Potential Impacts and Mitigation Measures

The Significance of the Proposal on the Local and Regional Economic Context

The NEBP is expected to be very important to the local and regional economy. An estimated \$2.02 billion is predicted to be spent locally during the development phase of the project, and this will generate an additional \$2.11 billion of flow-on spending (spending in the surrounding area). This is a total of \$4.13 billion during the development phase.

In the ongoing operational phase of the NEBP, it is estimated that the residential market will bring in \$74.7 million local spending per annum; the Marina will bring in \$74.8 million per annum; the Golf Club/Course \$5.9 million per annum; and the Business Park \$2.71 billion per annum. This totals \$2.9 billion per annum, and more than \$57.3 billion over 20 years.

Key benefits of the NEBP include the following.

- Supplying alternative employment opportunities to a local and regional workforce.
- Generating flow-on employment to other industries.
- Significantly improving the regional employment skills base through providing enhanced employment and training opportunities.
- Building a marina (which requires a specialised site that cannot be accommodated elsewhere).
- Establishing a marine industry cluster for the strategically located northern corridor of greater Brisbane and Caboolture.
- An opportunity for people to reside in close proximity to their place of work or business.

In addition to the quantifiable expenditure and regional benefits, the proposed NEBP will have other, less tangible, benefits. These include expansion of the marine industry, and the transport/logistics and wholesaling business opportunities facilitated by the site's ideal location next to the Bruce Highway. The NEBP will also provide benefits in its support of the SEQ Regional Plan and the economic objectives of the CSC.

Long and Short-Term Beneficial and Adverse Impacts

The NEBP is expected to afford important benefits to the community; for example, as a diverse economic node for employment generation and as a regional business service centre and industry cluster.

At present, there are insufficient jobs in Caboolture Shire for the current population, let alone to sustain the high rate of growth. The CSC Plan 2005-2009 incorporates an employment strategy that aims to achieve 2 out of every 3 workers living in and working in Caboolture. To do this, Caboolture Shire requires more than 30,000 new jobs over the next 20 years. At present, more than 50% of residents work outside of Caboolture Shire, including more than 30% in Brisbane.

The NEBP project is expected to generate 21,558 Full Time Equivalent (FTE) jobs, of which 12,935 will be sourced locally. The development is also expected to indirectly generate 12,184 FTE jobs through production and consumption related effects; which in total represent 25,199 FTE jobs for the local area. The NEBP would thus be able to



provide a significant proportion of the new jobs planned for by the Caboolture employment strategy.

Overall the NEBP is a significant opportunity to be an economic node for employment generating uses. In addition, it is a place where people can live, and participate in a range of recreational pursuits. The key economic benefits generated from the NEBP are assessed to generally be of high impact, and significantly outweigh any economic costs. Key beneficial economic impacts of the NEBP include:

- The generation of additional employment, during both construction and operation of the Northeast Business Park;
- Increased tourism visitation and spending, driven by water based tourism opportunities, the golf course and improved linkages with other tourism activities in the region;
- Efficiency and productivity gains through clustering and development of the high value marine sector; and
- Improved local and regional traffic linkages during the operational phase of the development, enhancing both the internal links of the Caboolture region and external links with other regional centres.

By comparison, only one key economic cost was identified as a result of the Northeast Business Park, with additional infrastructure costs such as roads, water, wastewater, gas, electricity and ICT, to meet the needs of the residential and business populations of the NEBP is anticipated to have a very high impact.

Potential for Direct Equity Investment by Local Businesses or Communities

There is great potential for investment by local businesses and communities. In particular, the marina will provide an important marine industry cluster, giving opportunities for local businesses to invest in an industry type not well represented in the area. For example the Gold Coast marine industries precincts are important employment generators, and are established as the nation's leading recreational boatbuilding and service centre.

Over 450 companies and 4,500 employees comprise the Gold Coast marine industry, which in 2005/2006 injected over \$550 million into the local economy, and exported goods worth over \$250 million. There are no marine clusters of any significance anywhere near the site; and the NEBP will provide a major opportunity for local companies to invest in established or start-up businesses.

The business park will offer a strong opportunity not only for marine industries, but also for a variety of industries engaged in advanced manufacturing. Queensland has a relatively strong and diverse manufacturing sector, which employs more than 20,000 highly skilled workers, and is vital to the economy of the State. It is likely that the advanced manufacturing that would occur in the NEBP would be innovative, value-adding technologies which would drive growth in a broad range of industries, including biotech, aerospace, ICT and electronics. All of these have a high potential for direct equity investment by local businesses and communities.

Cost To Government of Any Additional Infrastructure Provision

Additional infrastructure, such as roads, water, wastewater, gas, electricity and ICT, will be required to meet the needs of the residential and business populations of the NEBP. A provision has been made in the quantitative assessment for the additional infrastructure required in the site development costs to be funded by the proponent. However, it is expected that infrastructure providers will also contribute to the costs of completing these



works. The final proportion of additional infrastructure cost funded by each party is still the subject of negotiation.

Implications for Future Development

To the north of the site is the Caboolture River, beyond which is mostly rural land used for forestry. The west of the site is bounded by the Bruce Highway, and beyond that by residential development and open space areas. The south and east of the site are mainly privately owned small rural residential properties (from 1-20ha), open grassland, and limited agricultural and recreational uses. The area is also close to protected areas of conservation significance, such as the Deception Bay Fish Habitat Area, and the Moreton Bay Ramsar wetlands.

The CSC's Economic Development Issue Plan (EDIP) aims to facilitate economic growth through higher employment and growth industries around strategic themes. The strongest support to the EDIP is given through the following aspects.

The NEBP will be a place to do business. The industry/MIBA will feature marina based industries and a range of businesses with a large and diverse employment base.

The NEBP will provide increased industrial and business park capacity, a key component of the CSC's approach to business development. The opportunities provided by the proposed NEBP are significant, and the types of business that may be attracted to the development will diversify the economic base of Caboolture and of the region.

Growing industry development and trade through incubation and cluster. The potential for the development of a cluster of marine and associated industries represents considerable benefits in terms of greater employment growth and training opportunities.

The development of "employment lands" will also help achieve the CSC Corporate Plan 2005-2009 which has a strategy for self containment; i.e. that 2 out of every 3 residents are employed locally. To achieve this goal, approximately 30,000 more jobs are needed in the Shire.

The SEQ Regional Plan defines the Caboolture/Morayfield area as a Principal Activity Centre, and indicates that the expected transport and infrastructure growth in the Brisbane/Sunshine Coast corridor is expected to drive future investment and employment opportunity. Some key desired outcomes of the SEQ Regional Plan which are relevant to the NEBP are:

- economic development;
- industry and business development;
- "Smart State"—the promotion of innovation, skills and technology;
- total water cycle management;
- environmental values and water quality; and
- employment and economic activity areas.

Further, the NEBP aligns with many of the Queensland State Government's key priorities, and includes the following:

- growing a diverse economy and creating jobs;
- the realisation of the smart state through education, skills and innovation;
- managing urban growth and building Queensland's regions;
- · protecting the environment for a sustainable future; and



• growing a diverse economy and creating jobs.

Impact on the Balance of Zones and Development in the Shire

The NEBP will be a unique development, and a leading example of the recent change that is occurring in industrial land uses. A number of important commercial and demographic changes reflect broader worker needs, which require more diverse land uses in employment areas.

Land uses tend to change over time, towards the highest and best use. For example, industrial businesses that used to be located in the inner city are increasingly moving outwards to peripheral locations where rents are cheaper, and space is less limited. The new generation of business parks is also more compact and accessible; increasingly diverse and flexible, and blends industrial warehouse with office space.

In this manner, it is possible to create a business environment that can sustain a wider mix of facilities and services, provide workplaces within easy reach of homes, and deliver a land-use mix incorporating a significant proportion of homes, to ensure vitality after work hours. In this way, vehicle trips are reduced, the land use mix is more diverse; also, the 24-hour use of the premises improves security and safety.

The idea of "employment lands" is associated with the emergence of business parks, and has been adopted by both the Sydney Metropolitan Strategy and Melbourne Regional Planning instruments. A key finding of the Business Park Assessment (Appendix E3) is that there is an increasing demand for office space in conjunction with industrial development. Technological advances are leading to a reduction in floor workers, and more office-based workers. Modern industrial activities often have higher office components with more "white-collar" workers.

The CSC Planning Scheme provides zoning for brownfield and greenfield industrial development and expansion. Caboolture caters for most types of industry, from small service industry to large scale warehousing and general heavy industry. The Plan provides for three types of industrial land use categories; Regional, District and Local

The site of the proposed NEBP is located in the District Industrial area, which is characterised by the Caboolture Plan as: small to medium sized industry, needs more than 2000m² of land, produces minimal off-site impacts, relatively attractive and well-landscaped, could benefit from good quality neighbouring businesses, and/or serve Caboolture's larger markets.

According to the Caboolture Planning Area Code 5.9, some relevant desired outcomes of the District Industry zone include.

- (i) "District industry areas provide for uses, that due to their nature and operation, are unlikely to have significant adverse amenity or environmental impacts upon adjacent or nearby land.
- (iii) Uses in the Industry area provide for safety, comfort and enjoyment of workers and visitors.
- (vi) Building design and layout permit a multiplicity of uses and functions, maximises energy efficiency and optimises the use of space".

Whilst dwellings have not previously been considered an appropriate use for the District Industrial Zone, planning authorities need to be more flexible to include recent key changes to the industrial/business market. Recent changes in broader worker needs necessitate a much more diverse mix of land uses in employment areas. Workers now require, or even



demand, the provision of retail services, accommodation, recreational facilities and social services in close proximity to their workplaces.

A major criticism of early business parks was the lack of facilities for workers, who had to drive some distance to access basic food and beverage outlets. Recent business park developments such as Southgate Corporate Park even include major supermarkets and shopping centres. As well as retail, workers also need recreation, and many business parks now include gyms, swimming pools and walking paths. Other needs are for child care facilities, medical facilities and pharmacies.

There is also an increasing trend for residents to be located in close proximity to their place of work. Further, businesses often attract visitors to their premises, for training, meetings, seminars and team visits. This trend is reflected in the trend for business orientated hotels in employment locations. By the NEBP being able to provide long term as well as short term accommodation for workers will enable residents to be located in close proximity to their potential place of work, and enjoy recreational uses. This will also help ease traffic congestion, which is a serious issue in SEQ; and have significant environmental, social and economic benefits by reducing car use, increasing family and recreational time and save transport, fuel and other costs.

The Potential Economic Impact of Any Major Hazard

No major hazards have been identified.

The Distributional Effects of the Proposal Including Proposals to Mitigate Any Negative Impact on Disadvantaged Groups

A large multi use development such as the NEBP is likely to have significant positive benefits for the local and regional economy; improving access to jobs, housing and other economic opportunities. The extensive parklands and recreational facilities, as well as the marina will benefit local recreation, and the use of the Caboolture River.

Like most of SEQ, the region is experiencing an ageing population, increasing ethnic diversity, increased housing costs, decreasing proportions of social housing and continuing strong population growth. The development of the NEBP is likely to intensify some of these, such as the high rates of population growth and increasing ethnic diversity; but to lessen the impact of others, such as the proportion of affordable housing (the development includes a levy on residential sales which will be used to help fund affordable housing). An agreed amount from the sale of each residential property will be used to build affordable housing on land provided by the Moreton Bay Regional Council.

Another important part of the proposal is creating jobs; some areas, like Deception Bay, Bribie Island and Caboolture Central have significantly higher levels of unemployment, including multi generational unemployment. The NEBP will create significant employment opportunities. For example, during the development phase, it is estimated that the project will create 777 FTE local jobs pa, and indirectly generate another 770 FTE jobs in the local community. During the life of the project, it is estimated that it will generate in total 13,685 FTE direct jobs, and 13,464 FTE indirect jobs.

There will be significant opportunities to work with Indigenous people, to improve economic and social wellbeing. The NEBP will also ensure that Indigenous people are incorporated into any community liaison, and are given opportunities to be involved in business and contracting opportunities.

In addition, the NEBP will provide significant opportunities for training. There will be significant opportunities for skills acquisition, both in the development and the operational phase of the park. The NEBP proposes a unique training facility within the development to


implement education and training reforms and upgrade education and training for potential employees. Given the long term life of the project, the NEBP will have a major positive impact on improving local workforce skills for current and future needs.

Value of Lost or Gained Opportunities for Future Economic Activities

The multitude of economic values and job creation opportunities accruing throughout the life of the development, and the flow-on benefits to the surrounding area are likely to lead to significant gains for future economic activities. The multiplier effects of the development (spending money earned at the NEBP elsewhere in the local area) will likely lead to many opportunities from local entrepreneurs. Further, the training component of the development will significantly improve the skill set of the local people, which means that they will be more employable, and able to earn higher incomes in future. It is difficult to see any lost opportunities for future economic activities arising from the NEBP.

Impacts on Local Property Values

Of note, the NEBP also proposes to establish an affordable housing Trust; and an agreed amount from the sale of each residential property will be transferred to the Trust to provide affordable housing on land provided by the Moreton Bay Regional Council

The NEBP has a major potential to generate significant job growth for the region, and obviously these people will require housing. A key strength of the development is the ability to offer residential accommodation in close proximity to jobs and recreational and social facilities. This mix of land uses has other benefits besides economic ones; for example, by reducing the need for car-based commuting, with consequent environmental and social benefits.

The NEBP will increase the range of housing types in the local area, and it is likely that, over time, the increased connectivity, amenity and employment opportunities offered by the NEBP will offer increases to both capital and rental property values.

4.13 Hazard and Risk

4.13.1 Description of Environmental Values

This section provides the hazards and risks during construction and operation of the development. An assessment of the risks has been conducted on the hazards identified and risk mitigation measures have been recommended. Simmonds and Bristow prepared a 'Hazard and Risk Analysis for Northeast Business Park' report dated October, 2007. A full copy of this report, with the risk assessment is provided in Appendix U.

The risk assessment was a qualitative conservative assessment because the final mix of land uses within the NEBP was unknown. The risk assessment covered both environmental and land use safety risks for both the construction and operation phases. In addition it considered both site activities and the potential impacts of natural events (particularly flooding and mosquito-borne disease).

4.13.1.1 Construction

The development of each of the precincts within the NEBP will be staged over a 20 year period in accordance with approvals and commercial requirements. The general sequence of works for each stage includes site establishment, site clearing, earthworks and infrastructure.



There will be 50 000 litres of diesel stored on site during construction works to fuel heavy machinery including bulldozers, scrapers, excavators, trucks and cranes.

The marina basin will be isolated from the Caboolture River for the majority of its construction and then opened to the main river for operational purposes. The construction of the marina will require dry excavation works in the order of 1,500,000m³.

Each of the precincts within the NEBP will be serviced by water, sewer, power and telecommunications. The potential for the supply of natural gas is also under investigation. Sewage flows from the development will be fed to the South Caboolture Sewage Treatment Plant, which requires upgrading of the pipe network.

It is also proposed to use Class A+ recycled water on the site for landscape irrigation (e.g. golf course) and industrial process water. A dual reticulation system servicing residential and commercial property uses would allow other uses of recycled water.

A hazard identified analysis was applied to the NEBP development to systematically consider hazards that may result from the proposed activities. The following hazardous events were identified for the dredging phase of the development:

- breakage or burst of suction hoses during dredging;
- failure of land disposal sluices and bunds (e.g. during flood conditions);
- barge collision or capsize; and
- extreme weather.

Silt runoff controls could also fail under intense rainfall and flood conditions during the excavation and earthworks stages of the development.

Several hazards associated with the operation of community infrastructure were also identified. These hazards were:

- Equipment failure leading to fire in the zone substation (required to supply the anticipated ultimate electrical load of the NEBP); and
- Leaks from gas pipelines (feasibility still under consideration).

4.13.1.2 Operation

The NEBP development will comprise five major precincts.

- MIBA;
- Marina.
- Golf course.
- Residential.
- Environmental and open space.

Business, Industry and the Marina

The business and industry precinct will comprise general industry, service industry, motor vehicle repairs, fuel depot, storage facility and public utility.

The marina precinct includes marine industry and shipyard as well as the marina basin and residential developments. The marine industries sector includes ship building, boat repairing and dry stack boat storage as well as suppliers to these activities.



The following marine industries activities are Environmentally Relevant Activities (ERAs) under the EP Act:

- Boat maintaining and repairing ERA 69;
- Marina or seaplane mooring ERA 73; and
- Crude oil or petroleum product storing ERA 11.

ERAs that may be associated with boat maintaining and repairing included:

- Chemical storage (ERA 7);
- Abrasive blasting (ERA 23); and
- Metal surface coating (ERA 25).

A fuel dock will be located within the marina basin and access area, which will be available to marina vessels 24 hours per day, 7 days per week. The marina will store 55,000 litres of diesel and 20,000 litres of unleaded petrol for fuelling of marina vessels.

Residential

The land based residential options include a village residential hotel, multi-level residential development, low-rise medium density and golf course residential. The number of residences was estimated to be 2500 while the residential population was estimated to be around 5300.

Open Space

This precinct occupies much of the land between the main proposed access road and the Caboolture River. The golf course and golf club are to be located on the southern side of the proposed access road.

The major hazards from the proposed business, industry and marina activities are associated with the storage of dangerous goods. Premises are classified into one of four categories as the quantity of dangerous goods stored exceeds specified amounts.

The only activity for which the quantity of dangerous goods to be stored is known is the fuel dock in the marina. The quantity of diesel to be stored at the marina is below the threshold quantity for a large dangerous goods location of 100,000 litres. The quantity of unleaded petrol to be stored at the marina however exceeds the quantity for a large dangerous goods location of 2,500 litres.

The types of hazardous events identified in association with the storage of dangerous goods were:

- loss of containment of flammable and combustible substances;
- ignition of flammable and combustible substances (i.e. fire and/or explosion);
- accidental releases of toxic fumes to air;
- firewaters, leaks and fuel and chemical spills; and
- gas leak (gas pipeline or bottle).

Several possible hazardous events were identified for the supply of recycled water for industrial processes. These events were:

- sewage treatment plant failure (i.e. water contains contamination);
- pipeline failure (i.e. release of recycled water); and



• failure of the dual reticulation water which could lead to unintended use of the water (e.g. drinking).

Description of Environmental Values

The environmental values that may be affected by the proposal are primarily those provided by the Caboolture River. These values include aquatic ecosystems comprising significant wetlands and fish habitat areas. The major potential hazard to this value is exposure to toxicants from marine industries or the marina that are released to the aquatic environment by the stormwater system. This includes the release of fire waters produced in an emergency situation (e.g. fire or explosion), which could contain raw chemicals, waste materials and combustion products. The level of risk from these events was assessed qualitatively according to scales described in this report.

The level of residual risk (with proposed control measures) associated with these events was determined to be medium. The likelihood of a fire in the marine industries sector was shown to be higher (classified as likely) than other activities based on frequency data provided by the 'Fire Engineering Guidelines' for industrial occupancies. The consequences of this event vary depending on the types and quantities of hazardous substances stored and used by the activity. For Large Dangerous Goods Locations, the consequences could be major, which indicates the potential for injury to one or more persons or potentially harmful to regional ecosystems (e.g. Deception Bay).

The potential impacts of both natural and emergency situations as a result of the proposal on sensitive areas and resources, community infrastructure, places of residence and work and recreational areas was also qualitatively assessed in this report the highest risks (medium level) were:

- Business Park supply of untreated recycled water because of treatment plant failure (environmental and human health);
- Marine Industries fire or explosion (environmental, human health and property);
- Marine Industries spill into stormwater and tidal contamination (environmental);
- Marina fire or explosion (environmental, human health and property);
- Marina sewage release (environmental);
- Boat entrance channel collision (human health and property);
- Residential, commercial, retail and education activities supply of untreated recycled water because of treatment plant failure (environmental and human health); and
- Disease vectors mosquito-borne diseases such as Ross River virus (human health).

Risk Assessment

The risk analysis qualitatively evaluates the potential hazards and risks associated with the NEBP development during the construction phase and the operational phase. The risk analysis was carried out in two stages:

- 1. without control measures (inherent potential risk); and
- 2. with control measures as described in the Hazard Identification section (residual risk).

In terms of inherent potential risk, there were no hazardous events that were classified as extreme. Although, eighteen (18) events were classified as having a high risk level, and are outlined below.



- 1. Construction phase flood effects on dredging (environmental);
- 2. Community infrastructure fire or explosion at service station (environmental, human health and property);
- 3. MIBA fire in warehouse or office (environmental, human health and property);
- 4. MIBA spill and stormwater contamination (environmental);
- 5. MIBA supply of untreated recycled water because of treatment plan failure (environmental and human health);
- 6. Marine Industries fire or explosion (environmental, human health and property);
- 7. Marine Industries spill into stormwater and tidal contamination (environmental);
- 8. Marina fire or explosion (environmental, human health and property);
- 9. Marina fuel spill (environmental);
- 10. Marina sewage release (environmental);
- 11. Boat entrance channel collision (human health and property);
- 12. Boat entrance channel release of fuel and/or chemicals (environmental);
- 13. Residential, commercial, retail and education activities fire (environmental, human health and property);
- 14. Residential, commercial, retail and education activities supply of untreated recycled water because of treatment plant failure (environmental and human health);
- 15. Golf course supply of untreated recycled water because of treatment plant failure (environmental and human health);
- 16. Disease vectors mosquito-borne diseases such as Ross River virus (human health);
- 17. Flooding (environmental, human health and property); and
- 18. Bushfire (environmental, human health and property).

The risk levels of all activities were reduced when the proposed control measures were included in the analysis. The highest determined risk level was medium and applied to the following cases:

- MIBA supply of untreated recycled water because of treatment plan failure (environmental and human health);
- Marine Industries fire or explosion (environmental, human health and property);
- Marine Industries spill into stormwater and tidal contamination (environmental);
- Marina fire or explosion (environmental, human health and property);
- Marina sewage release (environmental);
- Boat entrance channel collision (human health and property);
- Residential, commercial, retail and education activities supply of untreated recycled water because of treatment plant failure (environmental and human health); and
- Disease vectors mosquito-borne diseases such as Ross River virus (human health).



4.13.2 Potential Impacts and Mitigation Measures

Risk Assessment Approach

The objective of the hazard and risk analysis conducted by Simmonds and Bristow was to understand the nature of and determine the level of risk associated with the development, so that the development process incorporates risk reduction measures and response planning. The risk assessment process followed in this report was based on 'AS/NZS 4360:2004 Risk Management'.

The risk analysis involved consideration of the sources of risk, their consequences and the likelihood that those consequences may occur. Consequences and likelihood are combined to produce a level of risk. Where no reliable data was available, subjective estimates were made about the occurrence of a particular outcome or event.

The risk evaluation involved comparing the level of risk found during the analysis process with the risk criteria, which describes action priorities for different risk levels or categories. Risk levels are expressed qualitatively (e.g. low, medium, high and extreme) or quantitatively (e.g. fatality risk of 1 in a million per year). A qualitative approach was used for the NEBP to describe the relative risks associated with a large range of potential site activities.

The types of hazardous events that may occur during construction or operation phases of industrial developments are fires, explosions or releases of hazardous substances or other contaminants (e.g. sediment). The risk of a hazardous event is greatest where dangerous goods or hazardous substances are stored and used or where site activities are carried out in sensitive areas (e.g. protected fish reserve or near a school).

Natural events such as flooding and bushfire may also impact on the development. Developments near mangrove areas may present risks for mosquito-borne diseases, as well has wildlife hazards.

Dangerous Goods

There is limited information on the types of dangerous goods to be stored and used on site at this stage of the development. The types and quantities that are known are summarised in Table 73 below. The storage of fuel within the marina will trigger Large Dangerous Goods Location (LDGL) notification to the Chief Executive Officer of the Department of Emergency Services, in accordance with the *Dangerous Goods Safety Management Act 2001*. A list of all hazardous substances to be used, stored, processed, produced or transported is unknown at this stage of the development because the industry precinct will be rolled out over approximately five years.

Product Name	Proper Shipping Name (if DG)	UN Number (if DG)	Class/Type	PG	Quantity (Litres)
Construction P	Construction Phase				
Diesel fuel	Diesel fuel N.O.S.	1202	Combustible liquid C1 (flashpoint not greater than 150 [°] C)	N/A	50,000
Operational Phase - Marina					

Table 73 Known Dangerous Goods Stored within the Development



Unleaded petrol	Motor spirit	1203	Class 3 Flammable Liquids	PG11 (medium danger)	20,000
Diesel fuel	Diesel fuel N.O.S.	1202	Combustible liquid C1 (flashpoint not greater than 150 ^o C)	N/A	50,000

In the case of the construction phase, diesel fuel will be stored in an aboveground tank that will be bunded with a containment capacity of 110% of the total fuel volume (i.e. 55,000 litres). In the case of the marina, it is proposed to store the diesel and unleaded petrol in underground fuel storage tanks. These fuels should be managed in accordance with 'AS 1940: 2004 -The Storage and Handling of Flammable and Combustible Liquids'.

Fuel will be transported to the site using approved road tankers in accordance with the 'Australian Code for the Transportation of Dangerous Goods by Road and Rail'. Tankers would enter the NEBP site by the Buchanan Road/Bruce Highway interchange. The design intent for the internal road is to prevent heavy vehicles from the using local network.

Natural Hazards

No potential wildlife hazards have been identified on the site, with the exception of several species of snakes that may be encountered throughout Brisbane.

Mosquitoes however are likely to be a problem in terms of the spread of diseases such as Ross River virus and Barmah Forest virus. There is a very high risk of diseases for residences located within 1.5 kilometres of breeding sites and a significant risk of diseases for distances of 1.5 to 5 kilometres from breeding sites. It is recommended that a plan be developed to minimise public health risks from mosquitoes and possibly biting midges.

State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (SPP 1/03)

SPP 1/03 sets out the State's interest in ensuring that the natural hazards of flood, bushfire, and landslide are adequately considered when making decisions about a proposed development.

The SPP 1/03 states that a natural hazard management area (flood) is land inundated by a Defined Flood Event (DFE) and which is identified in particular planning scheme. The CSC Planning Scheme includes a flood management policy. The flooding assessment by Parsons Brinkerhoff complies with this policy except where stated.

Specific outcomes required of natural hazard management areas relevant to flood, bushfire, and landslide are detailed in the SPP Guideline 1/03 (DLGP *et al.*, 2003). These outcomes assist to determine the compatibility of the development proposal with the nature of applicable natural hazards.

Table 74 below provides the specific outcomes and solutions relevant to Natural Hazard Management Areas (Floods).



Table 74	Natural Hazard Management Areas (Flood) – Specific Outcomes and
Solutions	

Specific Outcome	Solution
1. Development maintains the safety of people on the development site from all floods up to and including the DFE (Defined Flood Event).	The design base height of all buildings within the development meets the requirement of the CSC Planning Scheme with residential levels planned at Q100 + 300mm. Access to the Bruce Highway provides adequate
	emergency evacuation.
2. Development does not result in adverse impacts on people's safety or the capacity to use land within the floodplain.	The development has been shown through flood modelling to not adversely impact people's safety or the capacity to use land within the floodplain. Refer to Appendix I for a full report.
3. Development minimises the potential damage from flooding to property on the development site.	The flood study has shown no adverse impact from flooding on property within to the development site.

These outcomes are relevant to the development proposal as the development will involve a material change of use and associated reconfigurations of a lot that increase the number of people living or working in the natural hazard management area (i.e. residential development, tourist facilities, industrial and commercial uses). The outcomes are also relevant as building works will be undertaken that involve physical alteration to a watercourse or floodway including vegetation clearing. Further, the project will require filling in excess of 50m³.

Storm Surge

Storm surge is an extreme climatic condition which generally occurs as a consequence of regional cyclonic conditions. A storm surge has the ability to destabilise land areas causing landslides. Moreover, the area impacted can be extensive if a storm surge occurs at the same time as a high tide, particularly along low-lying coastlines. More information on the relevance of storm surge in relation to the NEBP is provided in section 4.5.2.1 in response to State coastal policy 2.2.4 *Coastal hazards*.

Risk Management

The risk analysis shows the relative risks associated with the proposed activities of the Northeast Business Park. The primary risks were determined to be those associated with fire or explosion in the marine industries and Marina precincts, fire in residential areas (in terms of potential property damage), exposure to contaminated recycled water (e.g. in the case of treatment plant failure), sewage releases in the marina basin and boating collisions.

Proposed control measures to minimise the likelihood of a major accident within the NEBP cover:

- site design and layout, construction and operation of the facility;
- preventative measures;
- proactive maintenance;
- operator training in relevant industries, particularly the marine industries;
- organisation and systems measures, safety training, emergency response and evacuation plans, monitoring, incident and safety reporting; and



• community consultation and information.

The development provides a good buffer area for a large proportion of the Caboolture River frontage, on the southern side of the river. Approximately 48% (approximately 420 hectares) of the site has been designated environmental and open space.



5. ENVIRONMENTAL MANAGEMENT PLAN

Several environmental management plans have been prepared in line with the values and vision of the NEBP development. The environmental management plans that have been prepared to support the development are as follows:

- 1. Site Management Plan (Contamination) (Appendix R5).
- 2. Remediation Action Plan (included in the Construction Environmental Management Plan Appendix X2).
- 3. Construction Environmental Management Plan (Appendix X2).
- 4. Marina Construction Environmental Management Plan (included in the Construction Environmental Management Plan- Appendix X2).
- 5. Dredging Site Based Management Plan (Appendix R3).
- 6. Acid Sulfate Soil Management Plan (Appendix R4).
- 7. Stormwater Management Plan (Appendix H1).
- 8. Marina Site Based Management Plan (Appendix Y1).
- 9. Marina Water Quality Management Plan (included in the Marina Site Based Management Plan, Appendix Y1).
- 10. Waste Management Plan (part of the Waste Management Technical Report, Appendix Y2).
- 11. Transport Management Plan (part of the Traffic Impact Assessment report, Appendix K2).
- 12. Cultural Heritage Management Plan (Appendix T4).
- 13. Non-Indigenous Cultural Heritage Management Plan (Appendix T5).

The aforementioned plans have been developed based upon the findings and outcomes identified in Section 4 of the EIS. The management plans have also been developed to address the following items:

- Achieve the levels of environmental performance required by legislation, relevant guidelines and company policies.
- Preventing, minimising and controlling environmental impacts to the environment and surrounding community by providing environmental management strategies and mitigation measures.
- Providing opportunities for continual improvement by setting measurable targets and objectives.
- Identifying responsible parties.
- Outlining procedures for complaint handling and incident investigation, including corrective action and reporting procedures.
- Emergency response procedures.
- Establishing performance indicators.
- Developing a monitoring program.

Environmental audits are highly recommended during construction and operation of the development. The construction and operational environmental management plans will be reviewed not less than annually, or as required following an audit.



Environmental training, including site inductions will be provided to ensure best practice and due diligence is achieved by construction staff and contractors, and operational staff.

An overarching Emergency Response and Evacuation Plan will be developed. Individual premises may also be required to prepare an Emergency Response and Evacuation Plan.

A Safety Management System and Workplace Health and Safety Plan will also be produced for construction and operational phases of the development



Commitments and mitigation measures to protect the environment have been identified throughout the EIS. Key commitments and mitigation measures are outlined in the Table 75, below. In conjunction with the list provided in Table 75, the various environmental management plans listed above also document the commitments and mitigation measures to be implemented during construction and operation of the development.

Element	Commitment / Mitigation Measure	Timing
Project approvals (Section 1.6)	The proponent will obtain all permits necessary to comply with relevant federal, state and local laws applicable to the development.	Prior to commencement of construction and operation
Matters of National Environmental Significance (Section 1.7 and	Consideration of matters of National Environmental Significance into the design of the development.	Prior to lodging application
Appendix L3)	The provision of environmental off-sets to compensate for the clearance of some areas of existing vegetation and fauna habitat that will occur as a result of the NEBP development.	During construction and operation
	The establishment and on-going maintenance of substantial revegetation and habitat and enhancement works within the Open Space precincts.	Ongoing
Affordable Housing (Section 2.1.5)	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.	Prior to operation of the development
Construction (Section 3.4)	Staging construction to successfully manage impacts on areas of conservation significance surrounding the site by reducing the land disturbance at any one time and reducing the potential for erosion and sedimentation.	During construction
	Conducting regular monitoring and auditing of the site and the activities throughout the construction stages and implementing corrective actions as a result of these monitoring and auditing programs, in order to meet specified performance objectives.	During construction
Operation (Section 3.5)	Provide waste reception facilities for general refuse, bilge and sewage waste and other waste that are normally generated by activities at a Marina. Management strategies to be implemented at the marina include bunding, cut off valves, gross pollutant traps and other safety devices.	Prior to operation of the marina
	Provide refuelling facilities as part of the marina development that will be	Prior to operation of the marina

Table 75Statement of Commitments



Element	Commitment / Mitigation Measure	Timing
	constructed and managed in accordance with 'Australian Standard 1940-2004 The storage and handling of flammable and combustible liquids' and any other relevant standard(s).	
	Promote Industrial Ecology principles through the development.	Ongoing
	Encourage new businesses to conduct greenhouse gas emission reporting.	Ongoing
	Provision of an Environment Centre to develop educational opportunities.	Ongoing
	Develop and implement sustainable initiatives proposed as part of the design such as restoring degraded riparian vegetation and riverbank.	Ongoing
	Develop a monitoring and auditing program for the life of the project to determine if development emissions are exceeding critical load with regard to baseline data and if any unforeseen impacts are occurring that may require corrective action.	Monitoring program to be developed before operation, and monitoring and auditing ongoing throughout the life of the project
Climate (Section 4.1)	Flood mitigation measures designed into the proposed development.	Prior to commencement of construction
	Preparation of an evacuation plan and emergency response plan for the construction phase and for each development precinct.	Prior to commencement of construction
	Supply of fire fighting water during the construction phase and for the residential, MIBA, Marine Industry and education precincts.	Ongoing
	Establish fire breaks around the site that provide adequate set back from buildings and hazardous vegetation.	Prior to operation of the development
	Provide adequate fire trails and road access for emergency services vehicles and for safe evacuation.	At all times
	Ensure adequate insurance is obtained by the Body Corporate and occupants of the residential, MIBA, industrial, retail, commercial and education precincts within the development for protection against bushfires.	Prior to operation of the development
Land (Section 4.2)	Effluent irrigation of a Class A+ quality over a minimum 140 hectare irrigation with grass cover (e.g. kikuyu), and no irrigation to occur on wet weather days.	During operation of the development



Element	Commitment / Mitigation Measure	Timing
	Progressive stabilisation and rehabilitation of disturbed areas to protect exposed earthworks.	During construction
	Installation of engineer-designed temporary and permanent erosion protection measures in accordance with the Institution of Engineers (Qld Division) Manual for Erosion and Sediment Controls.	Prior to commencement of construction
	Screen temporary construction storage compounds and construction activities.	During construction
	Re-establish edge vegetation at property boundaries within MIBA and access roads.	Progressively
	Vegetate banks of the Caboolture River with endemic native species	Progressively
	Upgrade of Buchanan Road access and intersections with the Bruce Highway on and off-ramps.	During the initial stages of construction
	Minor upgrading to a dual lane roundabout at the Buchanan Road/Bruce Highway northbound. A further intersection upgrading to a signalised layout will be required prior to the completion of Stage 2 for further stages of the development.	Construction stage 2
	Minor upgrading to a dual lane roundabout of Buchanan Road/Bruce Highway southbound Intersection. A further upgrade to a signalised form, with additional turn and through lanes will be required prior to completion of Stage 2 to accommodate further development traffic.	Construction stage 2
	Upgrade to the Uhlmann Road/Buckley Road Intersection to a signalised layout with additional lanes on the eastern and northern approaches and slip lanes for left turns from the south and west.	Ву 2020
	Upgrade to the Uhlmann Road/Bruce Highway northbound Intersection to allow for additional through and turn lanes.	Ву 2020
	Upgrade to the Uhlmann Road/Bruce Highway southbound Intersection.	By 2020
	Provide a high quality recreational and commuter network with very convenient and safe connections to current and proposed future external attractions.	During operation of the development
	Provision of sustainable transport modes throughout the development,	During operation of the



Element	Commitment / Mitigation Measure	Timing
	such as public transport, bicycle and pedestrian networks.	development
Waste (Section 4.3)	Wastes to be managed in accordance with the <i>Environmental Protection</i> (Waste Management) Regulation 2000.	Ongoing
	Waste avoidance, minimisation, reuse and recycling principles to be utilised wherever possible.	Ongoing
	No disposal of solid or hazardous wastes on site.	Ongoing
	Design of marina waste facilities in accordance with 'Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand'.	Prior to commencement of construction
	Operation of the marina with regard to the Marina Industries Association of Australia (MIAA) 'Clean Marinas' accreditation programme.	During operation of the marina
Water Resources (Section 4.4)	 The following reduction targets have been adopted for the surface water quality objectives for the development: 80% reduction in total suspended solids; 60% reduction in total phosphorous; 45% reduction in total nitrogen; and 90% reduction in gross pollutants. 	Ongoing
	 Implementation of flood mitigation measures, such as earth diversion banks and additional land cuts in the following four areas: North by-pass channel; Wider north by-pass channel; Raff Creek; and Southern by-pass channel. 	During construction
	Effluent discharge from boats will be prohibited. A sewage and bilge waste pump out facility will be provided at the marina.	During operation of the marina
	Treatment of water runoff (if required) from marina excavation to acceptable levels prior to entry to the Caboolture River.	During excavation of the marina
	Establish a baseline quality monitoring program to determine long term trends in ecosystem health as a result of the proposed development.	Prior to commencement of construction
Coastal Environment (Section 4.5)	Coastal wetlands to be conserved and protected by a buffer zone.	Ongoing



Element	Commitment / Mitigation Measure	Timing
	Provision of open space with the objective of retaining, rehabilitating and conserving protected values including aquatic ecosystems, primary and secondary recreation and visual recreation identified in the 'Caboolture River Environmental Values and Water Quality Objectives; report by the EPA.	Ongoing
	Facilitate funding of a program of rehabilitation works in the Caboolture River corridor external to the site.	During operation of the development
	Management strategies will be implemented to enhance the poor water quality in the Caboolture River during construction and operation of the development.	During construction and operation
	Contribution to the stabilisation and rehabilitation of the erosion prone area by planting riparian vegetation at a density and composition to enhance ecological processes.	During construction and operation
	Retention and enhancement of areas of coastal wetland associated with Raff Creek.	During construction
	Implementation of education program for boat users	During operation of the development
Air (Section 4.6)	Implementation of the air pollution control strategies outlined in the Construction Environmental Management Plan.	During construction
	Provision of 420 hectare open space area as a buffer zone for dispersion of air pollutants.	Ongoing
Noise and Vibration (Section 4.7)	Provide acoustic treatments (such as noise barriers) having regard for land area, the character of the use relative to its setting and any prominent views.	As required
	Acoustically attenuate noisy equipment, such as air conditioning units and refrigeration equipment.	As required
	Comply with noise conditions of relevant approvals.	Ongoing
Nature Conservation (Section 4.8)	Establish a vegetation offset in accordance DNRW's 'Policy for Vegetation Management Offsets - 23 August 2007', in respect of the clearance of approximately 13 hectares of remnant vegetation in the south-western sector of the site.	During construction and operation.



Element	Commitment / Mitigation Measure	Timing
	Establish and maintain substantial revegetation and habitat enhancement works within the Open Space precincts.	During construction and operation.
	Control public access to areas designated as environmentally sensitive areas.	During construction and operation.
	Establish cooperative partnership arrangements and other opportunities for community based groups such as Caboolture Regional Environmental Education Centre (CREEC).	During construction and operation.
	Implement Water Sensitive design (WSUD) and Crime Prevention Through Environmental Design (CPTED) principles.	Prior to commencement of construction.
	Undertake extensive rehabilitation of degraded habitats within the site, including the Caboolture River riparian zone.	Operation
Cultural Heritage (Section 4.9)	Provision of a dedicated Heritage Park.	During operation of the development
	Nominate a staff member as the Cultural Heritage Coordinator. The Cultural Heritage Coordinator shall form a part of the Cultural Heritage Team and will maintain regular contact with the Gubbi Gubbi people.	Prior to the commencement of construction.
	The Cultural Heritage Team will undertake archaeological excavations of sites in areas A, B, C, Location 2 and selected areas of the high banks and terraces adjacent to the Caboolture River. Document all results and develop a management report based on the findings.	Prior to the commencement of construction.
	In the event of discovering cultural heritage material, all works will immediately cease and the area will be isolated from disturbance. The Cultural Heritage Coordinator will notify the Indigenous Coordinator and the Archaeologist, who will collectively find, analyse, document, record and salvage the material if it is located in the disturbance area.	As required
	In the event of discovering human remains, all works will immediately cease and the Cultural Heritage Coordinator will immediately contact the Police.	As required
	Prior to removal of the 1950's house complex it shall be documented, surveyed, photographed and plan drawings prepared according to the standards of the Australian Heritage Commission.	Prior to demolition



Element	Commitment / Mitigation Measure Timing	
	The memorial stone on the southern bank of the Caboolture River, shall be protected and preserved, and further historical research undertaken.	Ongoing
Social (Section 4.10)	Implement social infrastructure such as a Post Office, cycle and footpaths, walking trails and library, where appropriate.	On an as-needs basis.
	Contribute funding from each residential lot sale to a Housing trust for the provision of affordable housing in Caboolture.	Until all residential lots are sold.
	Establish a community association and development strategy to help blend existing and emerging communities.	On an as-needs basis.
Health and Safety (Section 4.11) & Hazard and Risk (Section 4.13)	Develop and implement a Workplace Management Plan which shall contain procedures to ensure that workplaces are managed in such a way that safety hazards are continually identified and reviewed.	Prior to commencement of construction works.
	Develop Safe Work Method Statements (SWMS) across the site to identify all potential hazards, the associated risks and the relevant control methods.	Prior to commencement of construction works.
	Ensure all hazardous substances brought onto the site are accompanied by a Material Safety Data Sheet and are entered in the Hazardous Substance Register.	Ongoing
	Store all flammable and combustible liquids in accordance with 'AS 1940-2004 The storage and handling of flammable and combustible liquids'.	Ongoing
	Pursuant to the requirements of the <i>Dangerous Goods Safety</i> <i>Management Act 2001,</i> notify the Chief Executive Officer of the Department of Emergency Services of a Large Dangerous Goods Location (LDGL) for the storage of unleaded petrol within the marina.	Prior to storage of flammable and combustible liquids
	Transport fuels to the site using approved road tankers in accordance with the 'Australian Code for the Transportation of Dangerous Goods by Road and Rail'.	Ongoing
	Monitor mosquito types and populations. Liaise with Council to develop and implement appropriate mosquito management programmes. In addition to Council spray programmes, utilise low impact insecticides to control mosquito populations.	On an as-needs basis.
	Effluent irrigation to be conducted in accordance with the Queensland	During effluent irrigation



Element	Commitment / Mitigation Measure	Timing
	'Water Recycling Guidelines'.	
	Develop and implement Emergency Response and Evacuation Plans which shall include a notification procedure and system in the event of a toxic substance or sewage release.	Ongoing.
	Provide induction training, quality assurance training, safety and emergency response training and site management and supervision training to all personnel, where relevant. Record details of all training programmes undertaken by each staff member.	Ongoing
	Conduct internal workplace health and safety audits of the management system, hazard information and records, shift processes, safety measures and staff personal protective equipment. Maintain records of all audits.	Bi-annually.
	Conduct external workplace health and safety audits of the management system, hazard information and records, shift processes, safety measures and staff personal protective equipment. Maintain records of all audits.	Annually
	Implement and provide detection and alarm systems, shut-down systems for gas release, fire protection systems, containment areas for spills and runoff, personnel protective equipment, first aid equipment and clean-up procedures at designated locations throughout the MIBA and Marine Industry precinct.	Ongoing
Economy (Section 4.12)	Provide employment and training opportunities to local and regional workforce.	During construction and operation
	Where possible, engage the services of existing local and regional businesses in place of interstate and overseas trade.	Ongoing
	Liaise with, and provide business and contracting opportunities to Indigenous people.	Ongoing



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