NORTHEAST BUSINESS PARK
EPBCA Referral Submission

NOLAN DRIVE, BURPENGARY

21 JUNE 2006

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1.0 Contacts and Proponent

1.1 Person making the referral

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

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1.2 Person(s) proposing to take the action

As above.

1.3 Person(s) who will be the proponent for the application

As above.

2.0 Description of the Proposal

2.1 Summary description of the action

Northeast Business Park is to be a fully integrated business park, marina precinct and residential development, located on the Caboolture River, Queensland. The development will comprise of a range of business and industry uses integrated with commercial, retail, residential, golf course, and environmental areas. A marina and complementary marina facilities will underpin the eastern end of the precinct.

Development will be limited to approximately 40% of the site area. Other areas will contain rehabilitation works, a 100-metre buffer to the Caboolture River, stormwater treatment trains including construcuted wetlands and the protection of Raft Creek.

2.2 Details of the location of the project area

Locality:

The subject site is located on the southern banks of the Caboolture River, in the heart of the northern growth corridor of SouthEast Queensland (refer ***Figure 1 – Regional Locality Plan***). This plan has been sourced from the SouthEast Queensland Regional Plan 2005-2026 (SEQRP) and shows the relationship of the Urban Footprint to the areas of Regional Landscape and Open Space.

The site totals 762.267 hectares in area. The subject site has approximately 9 kilometres of direct river frontage and has direct road access to the Buchanan Road interchange on the Bruce Highway. The precinct is approximately 4.5 kilometres radially east of the Caboolture town centre and is approximately 9 kilometres west of the mouth of the Caboolture River. The subject land is depicted contextually on ***Figure 2 – Site Plan*** and the latitude and longitude information appears on the same plan.

The subject site is formally described as:

SITES	SITE AREA (HECTARES)
Lot 2 on RP 902075	28.83
Lot 10 on RP902079	515.244
Lot 24 on SP158298	160.379
Lot 7 on RP845326	55.903
Lot 15 on RP 902073	1.911
TOTAL	762.267

The subject land is contained within the Caboolture Shire Local Government Area.

2.3 Timeframe in which the action is to occur.

The Northeast Business Park project has a seven to ten year time frame. The current project construction time line identifies a commencement of works in March 2008 through to 2015.

2.4 Description of the action, including all activities proposed to be carried out

The proposal concerns a fully integrated business park, marina precinct and residential development. The proposal has been designed with a clear environmental focus, so that 'net benefits' in areas such as flood mitigation, improved stormwater quality, ecological rehabilitation, economic stimulation and increased social vitality will accrue to the community.

The proposal includes the following features: -

- Regional business park capable of attracting local, national and international businesses, incorporating clusters of mixed and complementary industry and businesses, residential development, lifestyle businesses and facilities, golf course, active and passive recreation areas, ecological gardens and providing public access to the Caboolture River, underpinned by a high class marina and marine industries precinct (refer *Figure 3 – Conceptual Masterplan*).

The following table represents approximate current estimates of land use precincts and areas:

Precinct	**Approximate Area Ha**
Business and Industry Precinct	
Business and Industry Park	153
Residential business	7
	160
Marina Precinct	
Marine Industry + shipyard	19
Commercial and Retail	5
Village residential hotel	5
Multi level residential	8
Low rise medium density res	6
Marina Basin & Access	27
	70
Golf course precinct	
Golf Course and golf club	82
Golf course residential	29
	111
Residential	56
	56
Environmental and open space	
Open space + stormwater retention	146
Rehabilitated riparian corridor and buffer	138
Wetland reserve	4
Public river access + public esplanade	14
Recreation / lakeland / environmental	41
Heritage precinct + gardens	22
	365
Total	**762**

Further details on the proposed marina lake are provided below:

- The proposed marina lake will have an area of approximately 27 hectares. The marina lake will be separated from the Caboolture River by a Navigation Lock and tidal exchange system.

- The marina lake is proposed to have a bed level of RL -4.0 m AHD. The marina lake system is proposed to have a tidal exchange system that consists of a gravity pipe connected to a tidal interchange chamber that will ensure an average 24 day turnover of the marina lake volume.

- The marina lake is not proposed to be utilised for water quality treatment. However, it provides considerable additional safeguards for the downstream receiving environment and will also provide final water quality polishing. The marina lake system is also proposed to include a pump circulation system to ensure appropriate mixing of the system and minimise the potential for stratification.

Whilst the detail comes with subsequent operational works applications, assessing agencies can draw great comfort from experiences to date with other similar brackish lake designs. On Emerald Lakes in Gold Coast City Council, for example, since completion of the lake in Christmas 2004, the water quality in the lake has been consistently to a higher standard than that of the adjacent river. The minor site lake has been operating for several years now with minimal maintenance.

Sovereign Waters in Redland Shire has been in operation for 5 years, and has had no significant operational management issues to date, with bonding on the project handed back to the developer earlier this year.

In order to complete the development, the following actions are relevant:

Dredging

Dredging is to be undertaken in order to provide access for 'tall mast' boats and in order to create the marina lake.

The construction of the proposed marina will require capital dredging works in the order of 1,500,000m^3.A proportion of the resultant fill is intended to be used on site, with some required to be exported to other properties in the proponent's portfolio. The management of such large-scale earthworks in close proximity to the Caboolture River - and the necessary disturbance associated with the break through of the marina into the Caboolture River - will require careful planning and management to prevent impacts on water quality. These potential impacts can be adequately defined at the assessment stage and management measures proposed for the prevention and control of impacts will need to be defined prior to the commencement of works.

Dredging is also required in the navigable section of the lower Caboolture River. This dredging achieves two primary purposes:

- Provision of a safe navigable entrance to the river at all tides, thereby facilitating marine traffic for the marina. In addition, it will address an existing safety concern whereby the safe passage of larger vessels (currently restricted to top of tide navigation) are not compromised in adverse weather conditions;

- Dredging of the river entrance increases the outfall of water flows in flood events, thus providing substantial flood mitigation upstream.

Proposed dredging of the existing navigation channel at the river entrance is likely to require a channel approximately 3.5km long and 70 metres wide at the base to adequately meet these objectives. Such dredging will occur within the defined navigation channel, and hence is outside the declared Fish Habitat Area. The environmental studies to be produced for the assessment of the proposal will define the areas and volume of dredging required within the navigation channel, and also the nature of the dredged material.

The operation of the proposed marina will also require periodic maintenance dredging of both the marina basin and the navigation channel. Detailed modelling of the expected siltation rates will be undertaken to define the expected frequency of dredging and the volume of material to be removed. The management of the resultant dredge spoil will be defined following the confirmation of expected volumes.

Earthworks – on site

Earthworks are to be undertaken on the site in order to provide for appropriate levels of flood immunity. The earthworks, which will be in the order of 3.3 million cubic metres (inclusive of marina dredging and excess but not including river-dredged spoil), will not result in detriment upstream or downstream in terms of afflux.

Marina Navigation Lock

As discussed above, the marina entrance is proposed to be regulated (ie boat and water movements) via a lock system.

The lock and turnover piping will provide a control on the marina lake, minimising tidal impacts in the receiving water environment and also ensuring water quality in the rver and in the marina are safeguarded in the event of poor water quality on either side. The lock and turnover pipe will be designed to be shut off in the unlikely event of accidental spill from a boat or industry in order to minimise harm to the external environment.

The Conceptual Masterplan represents a conceptual framework for the development. Whilst the extent and location of identified precincts have been carefully considered, the land use mix will be tailored to accommodate interest and demand, and further detailed design development.

2.5 Explanation of the context

2.5.1 Background

The proposal 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 under supply of marine facilities and associated uses.

The proposal will provide a logical adjunct to the broader residential development that has occurred to the west of the subject land in the past. It will also provide an effective transition from such development to the river and the vacant parcels beyond. In addition, the proposal will provide for more effective regulation of boating and boating storage as compared with the ageing and limited existing boat storage facilities in the area.

Two planning applications for Preliminary Approval have previously been lodged over the subject site:

SITES	APPLICATION	LODGED	STATUS
Lot 2 on RP 902075 (28.83Ha) and 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 24/01/07
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 21/01/07

Lensworth Ltd lodged the original application 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 preliminary application over that land for the marina precinct.

The proponents realised that substantial synergies were possible between the two developments. Consequently, they 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 subject land was subsequently purchased in 2005 after extended negotiations, which were lengthened by the intermediary sale of Lensworth to Stockland Ltd in late 2004.

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 IPA, leading to a fragmented approach.

Utilisation of the coordination process and EIS-based assessment provisions of the *State Development and Public Works Organisation Act 1971* (SDPWOA) has been 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.

Accordingly, the proponent has recently applied to the Coordinator General for the proposal to be declared a State Significant Development under the SDPWOA. The proponent has undertaken a suite of background studies as part of the submission to the Coordinator General. Subject to the declaration on the project being made, further studies will be prepared to provide a more detailed assessment as part of the Environmental Impact Statement (EIS) process.

The wider context, including the relevant planning framework and state and local approvals requirements are set out further below.

2.5.2 Integrated Planning Act

As noted above, two planning applications have previously been lodged over the subject land. Both applications seek Preliminary Approval under Section 3.1.6 of the *Integrated Planning Act 1997* (IPA) to override the planning scheme.

There are also two additional applications for Preliminary Approval that will need to be integrated with the current applications:

SITES	APPLICATION	LODGED	STATUS
Part of Lot 10 on RP902079 (515.244ha)	Residential	Pending	To be prepared.
Lot 15 on RP 902073 (1.911Ha)	Access	Pending	To be prepared

There is a number of planning documents that must be taken into account as part of the approvals process.

2.5.3 The Southeast Queensland Regional Plan

The Southeast Queensland Regional Plan (SEQRP) is the pre-eminent planning document and a 'blue print' for managing future change and growth in the region.

The subject site is strategically located in terms of the designations in the SEQRP. It is situated at an important interface between *Urban Footprint* and *Regional Landscape and Rural Production Area*. The business park located within the Urban Footprint and the land on which the marina is proposed located outside the Urban Footprint (refer ***Figure 4 – Regional Plan designations***).

The SEQRP contains regulatory provisions that are linked to the *IPA 1997*. The current Preliminary Applications are formally exempt from the Regulatory Provisions of the Regional Plan, as both Development Applications were properly made before the introduction of the draft SEQRP on 27 October 2004 (Division 1, 1(1)(a)). A Preliminary Application is a 'Development Application' under the *IPA 1997*.

Despite the formal exemption from the Regulatory Provisions of the SEQRP, nonetheless it is contended that the development proposal does satisfy the primary tests for development, namely:

- It has locational requirements necessitating its location outside the urban footprint; and
- There is an overriding need for the development in the public interest – the proposal can achieve net benefits to the community in economic, environmental and social terms.

The proponent asserts that achieving a net benefit in social, environmental and economic terms is a valid test for any major development proposal. Accordingly, it has adopted this approach as a core development objective. The proposal is considered consistent with the key objectives of the SEQRP.

2.5.3.1 Balancing urban and environmental needs

Land to the south and west of the subject land is predominantly included within the *Urban Footprint* designation under the SEQRP. Land to the north and east is predominantly *Regional Landscape and Rural Production Area.* As such, the site is at the northerly limit of the *Urban Footprint* before the large 'Inter-Urban break' between the Brisbane Metropolitan Area and the Sunshine Coast.

The interface between urban uses and regional landscape underscores the development philosophy of the development. Namely, fulfilling and balancing the aims of both regional landscape and urban designations. This approach is reflected in the development area occupying only approximately 40% of the site. Furthermore, the open space, stormwater polishing and rehabilitated corridors provide an important component of an ecological network, potentially stimulating further attention to the value of the ecological networks in the 'Inter-urban' break.

2.5.3.2 Principal Activity Centre

It is noted that the SEQRP denotes a 'Principal Activity Centre' at Caboolture/Morayfield. According to Chapter 8, section 8.6 of the SEQRP, such centres are to have the following attributes:

- Serve catchments of sub-regional significance and provide key focal points of regional and in-centre residential development outside of the Brisbane CBD;
- Serve business, major comparison and convenience retail and service uses;
- Provide a secondary administration focus (accommodating regional offices of government, regionally significant health and education and cultural facilities);
- Are typically serviced by multi-modal public transport systems and comprise key nodes in the regional transport system due to their high trip generation;
- Residential development densities of between 40 and 120 dwellings per hectare (net) or greater in proximity to Principal Activity Centres.

The Caboolture Town Centre and Morayfield Centre do not however provide sufficient land or an appropriate location to accommodate the proposed Industry/Business Park. In addition, they clearly cannot accommodate the marina and marine precinct. The subject site, which is located approximately 3.5 kilometres south east of Caboolture Town Centre and 3 kilometres east of Morayfield', is eminently suitable and can provide complimentary uses to Caboolture and Morayfield.

Together, these three centres can form a robust trio of activity centres, combining to meet the desired regional function of a 'Principal Activity Centre'. The development of the Northeast Business Park will act as a catalyst to strengthen the vitality of all three centres.

2.5.3.3 Master Planning Process

The proponent will initiate a master planning process in conjunction with Caboolture Shire Council and will include all key landholders and stakeholders. The master plan will be a comprehensive plan that maps and describes the overall development concept for the precinct. The master plan will include land uses, detailed urban design and built form, landscaping, infrastructure and service provision. It is intended that the master planning process be undertaken in parallel to the assessment process for the development under the SDPWOA, thereby forming an integral part of the design and approval process, and helping to provide context to the design of the project.

2.5.4 Caboolture Shire Planning Scheme

The Caboolture Shire Planning Scheme is also relevant to the proposal. The proposed Industry/Business Park is located in the 'District Industry' zone. This designation was proposed by Council and ratified and extended by the State government. The proposed marina is located in the 'Rural' zone (refer ***Figure 5 - Zoning***). As noted previously, preliminary applications for both components were lodged prior to the implementation of the SEQRP.

The mapping for the newly adopted planning scheme also indicates the various overlays (eg Acid Sulfate Soils Overlay) that apply to landholdings within the Shire. The overlays relate to codes of the same name. The overlay codes contain additional particular development requirements that are to be addressed by development. The following table sets out the zoning and overlays that are applicable to the respective lots that comprise the subject land.

RPD	Zoning	Acid Sulfate Soils Overlay	Bushfire Hazard Overlay	Catchment Protection Overlay	Nature Conservation Overlay	Scenic Amenity Overlay
Lot 7 RP845326	Rural	Yes	Yes	Yes	Yes	Yes
Lot 24 SP158298	Rural	Yes	Yes	Yes	Yes	Yes
Lot 2 RP902075	District Industry	Yes	Yes	Yes	Yes	Yes
Lot 15 RP902073	District Industry	Yes	Yes	No	Yes	No
Lot 10 RP902079	District Industry, Rural	Yes	Yes	Yes	Yes	Yes

It is noted that no other planning scheme overlays are applicable.

The Table of Assessment for the respective zonings set out the level of assessment for development, note whether uses are 'consistent' (generally supported by Council) or 'inconsistent' (generally not supported by Council) within the zone, and lists the applicable codes which development is to be assessed against.

The majority of the uses defined in the planning scheme are subject to code assessment in the Table of Assessment for the District Industry zone. Similarly, the majority of uses defined in the planning scheme are subject to code assessment in the Table of Assessment for the Rural zone.

The various uses (and development) proposed will need to address the respective uses codes and, in particular, the various applicable overlay codes (eg. Acid Sulfate Soils Overlay Code).

2.5.5 State Government Agency Requirements and Related Policy Issues

The subject site is situated on the southern banks of the Caboolture River and is affected by the following major environmental designations (Refer to *Figure 6 – Major Marine Designations*).

Designation	Boundaries	Legislation	Comments
Moreton Bay Marine Park	Deception Bay and the lower reaches of the Caboolture River (ie. along the length of frontage to the site).	*Marine Parks Act 1992*	Included within Habitat Zone.
Ramsar Wetlands	Caboolture River for part of the site and downstream	International Treaty, IPA. Likely to trigger EPBC	Likely to trigger EPBC. Commonwealth matters
Deception Bay Fish Habitat Area – Category A	FHA No. 013 - bed, banks and water column of Caboolture River along length of frontage to the site and a short way into Raft Creek.	*Fisheries Act 1994*	Excludes marked channel. Works or activities requiring the disturbance of habitats require a permit under *Fisheries Act 1994*.
JAMBA, CAMBA	No specific boundary defined.	International Treaties - likely to trigger EPBC.	Site is adjacent to wetlands that are likely to be used by birds protected under these agreements.
Erosion Prone Areas	Per EPA Plan No. SC3367 (adjacent Caboolture River), being 40 metres landward of Mean High Water Spring (MHWS) or Highest Astronomical Tide (HAT), whichever is the greater.	*Coastal Protection and Management Act 1995*	Part of the site is within an Erosion Prone Area, being 40 metres landward of HAT.
Areas of Coastal Biodiversity Significance – under the Draft Southeast Queensland Regional Coastal Management Plan	As per mapping (especially map 6).	*Coastal Protection and Management Act 1995*	Site is adjacent to Significant Coastal Wetlands.
Remnant Vegetation designations	As per RE mapping.	*Vegetation Management Act 1999*	Site contains some identified communities of concern.
Coastal Management District	As per mapping.	*Coastal Protection and Management Act 1995*	No Coastal Management Districts mapped in the locality. Refer Erosion Prone Area information.

Consequently (and further to) the above, the proposal will need to address the following:

- The *Coastal Protection and Management Act 1995* and *State Coastal Management Plan* in relation to works within a Coastal Management District and Erosion Prone Areas. Under the *Coastal Protection and Management Act 1995*, a number of key principles and objectives of the *State Coastal Management Plan* must be addressed (eg dredging, water quality management, coastal wetlands, biodiversity, etc);

- The *Fisheries Act 1994* regarding marine vegetation and development in or near declared Fish Habitat Areas;

- The *Environmental Protection Act 1994* with respect to operation of a marina and industrial development classed as Environmentally Relevant Activities;

- *Nature Conservation Act 1992*, which provides for the protection of native animals, plants (and ecosystems in which they live) which have been classified as threatened;

- The *Marine Parks Act 1992* concerning the Moreton Bay Marine Park;

- The *Aboriginal Cultural Heritage Act 2003* concerning matters of cultural significance;

- The *Vegetation Management Act 1999* regarding State significant vegetation;

- The *Dangerous Goods Safety Management Act 2001* concerning the storage of dangerous goods (eg fuel);

- The *Transport Operations (Marine Safety) Act 1994* and the *Transport Operations (Marine Pollution) Act 1995;*

- The *Water Act 2000* in respect of taking or interfering with water;

- The *Transport Operations (Public Transport) Act* regarding the provision of bus routes and passenger transport infrastructure; and

- The *draft Regional Coastal Management Plan 2004* (specifically policy 2.4.7 regarding algal bloom implications).

The proposal will also address the following State Planning Policies:

- *State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils*;

- *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.

The approval framework, regarding the above considerations, is outlined as follows.

2.5.6 Approval Framework

Future Approach

As noted previously, the utilisation of the 'significant project' status under the *SDPWOA*, the associated coordination process and the EIS-based assessment provisions provides for an integrated and holistic approach that will allow the full potential of the precinct to be realised.

Further to the above, it is to be noted that it is likely that numerous approvals will be required once the applications for Preliminary Approval are approved. These are summarised below.

Town Planning

- Preliminary Approvals to override the Planning Scheme for Material Change of Use to establish the structure plan and land use plan.
- Various Development Permits for Material Change of Use (particular uses).
- Various Development Permits for Reconfiguration of a Lot.
- Various Development Permits for Operational Works.

Resource Allocation

- Resource allocation notice would be required, before any dredging could be sought.
- Resource Allocation for works within Waterways.

Environmental Approvals (excluding end uses)

- ERA19 for dredging and ERA 22 for screening associated with the dredged material
- ERA73 for marina mooring
- ERA 20 – Extracting rock or other material
- Section 51 Permit for removal or disturbance of marine vegetation
- Other ERAs may be required for particular uses (eg. fuel storage, boat maintenance or repairing facility, etc).

The IDAS process under the IPA provides that many of the above uses can be combined into one application.

Resource allocations and Enrvironmentally Relevant Approvals will be considered in detail through the EIS process, with relevant applications included with the subsequent applications to Caboolture Shire Council.

2.5.7 *State Development and Public Works Organsiation Act 1971 (SDPWOA)*

The current Preliminary Applications for the Business Park and the Marina have been subject to Referral Coordination to relevant state agencies under the *IPA 1997*, with detailed Information Requests issued. On the basis of these Information Requests, substantial investigations and reporting have been undertaken, which has been used in the preparation of this submission. If declared as a State Significant Project, it is expected that the matters raised in the Information Requests will form the body and basis of the Terms of Reference to be issued for the EIS process.

Despite the above, many studies are preliminary only at this stage, with additional studies and/or adaptation of existing studies required for most aspects of the development.

2.5.8 *Environmental Protection Biodiversity and Conservation Act 1999 (EPBCA)*

The *EPBCA* places the onus on the proponent to assess the potential effect that development may have on sensitive environments and to refer the matter to the Commonwealth Department of Environment and Heritage (DEH) for assessment under the *EPBCA* if they believe that the development may cause significant impacts on matters protected by the Act.

In this instance, referral of the proposal to the DEH pursuant to the *EPBCA* is required as part of the SDPWOA process.

The *EPBCA* is therefore an integral component of the overall approval framework.

2.6 Referral of a stage or component

Not applicable. The entire proposal is being referred.

3.0 Description of the project area and the affected area

A map of the project area, indicating the location of the Ramsar wetland is provided as Figure 6.

3.1 Description

The subject site has been defined via the lot descriptions provided previously in Section 2.2.

It is to be noted that the subject site and area affected by the action are not:

- World Heritage properties;
- National heritage places;
- Commonwealth land;
- Listed Commonwealth Heritage places;
- Conservation reserves and parks.

Ramsar Wetlands

The site directly adjoins a Ramsar wetland, namely Moreton Bay and part of the Caboolture River, which is a matter of national environmental significance recognised by the *EPBC Act*. The Ramsar wetland boundary extends up the Caboolture River abutting the Caboolture River frontages of Lot 24, and part way along the frontage of Lot 10.

The main wetlands of significance are adjacent to the Caboolture River on land either side of the river downstream of the site towards the river mouth. These wetlands extend along land downstream of the site towards the coast. Such wetlands are also recognised as Significant Coastal Wetlands under the Draft SEQ Coastal Plan

Migratory Birds

Migratory birds covered by the Japan Australia Migratory Birds Agreement (JAMBA) and China Australia Migratory Birds Agreement (CAMBA) and the 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) may also use nearby habitats. These are addressed further below.

Listed threatened species

Cardno (2006) undertook a study of terrestrial ecology and noted that the subject site provides potential habitat resources for the Grey-headed Flying fox that is a listed threatened fauna species. The *EPBCA* provides for the 'conservation of critical habitat' of listed threatened species. Cardno considers that the habitat resources within the site (ie scattered clumps of eucalypts and the Swampy paperbark forest) do not constitute habitat *critical* to the survival of this species

The Ecology Lab (environmental consultants) undertook a preliminary study of the aquatic ecology. The Ecology Lab (2006:9) prepared a list of threatened and migratory species and Ramsar sites, listed under the *EPBCA* or scheduled of the *Nature Conservation Act 1992*, with potential to be affected by the action. The following species were considered relevant from the endangered, vulnerable, rare or migratory schedules:

- One species of bony fish (Honey blue-eye);
- Two species of shark (Grey nurse shark, Great white shark);
- Three species of marine mammals (Dugong, Irrawaddy river dolphin, Indo-pacific humpback dolphin);
- Five species of marine reptiles (Loggerhead turtle, Green turtle, Leathery turtle, Pacific ridley, Hawksbill turtle);
- Ten species of birds (White bellied sea-eagle, Curlew sandpiper, Lesser sand plover, Latham's snipe, Grey-tailer tattler, Bar-tailed godwit, eastern curlew, Beach stone-curlew, Whimbrel, Terek sandpiper)

It is however unlikely that some of these species would be encountered within the vicinity of the subject site. Subsequent site surveys and trawling of the aquatic environment did not reveal the presence of the abovementioned species.

In addition, Ecolab considered 'listed marine species' under the *EPBCA*. Such a list includes a diverse group of marine animals such as sea snakes, seahorses, pipefish and seals. Some of the species may occur in Moreton Bay but it is unlikely for them to occur in the Caboolture River.

Remnant Native Vegetation

The subject site and surrounds do contain pockets of remnant native vegetation.

'Not of Concern' and 'Endangered Regional Ecosystem' (RE) types are recorded across approximately half of Lot 2 and in the southwestern corner of Lot 10 on the 2003 Regional Ecosystem mapping. The remainder of the site is mapped as either non-remnant vegetation or plantation forest.

The riparian zone section of the site is largely clear of marine vegetation due to past farming practices. However, Cardno (2006) identified limited areas of riparian vegetation remaining such as mangroves (*Avicennia marina* and *Aegiceras corniculatum*) and Saltwater couch (*Sporobolus virginicus*). Downstream of the site (leading to Deception Bay) there are substantial areas of wetlands declared as 'Significant Coastal Wetlands' under the draft SEQ Coastal Management Plan on Map 6.

A preliminary assessment undertaken by Cardno (2006) notes that the extent of similar habitat within the vicinity includes protected habitats in Freshwater National Park, Bribie Island National Park and Nathan Road Wetlands Reserve. Cardno considers that the subject site does not contain habitat critical to the survival of migratory bird species. The mapped wetlands only note a small 'finger' of significant coastal wetlands on Lot 24. Cardno's site surveys have revealed that this consists of a very narrow channel supporting a narrow band of mangroves, with saltwater couch fringing both sides, partly traversed by a well established vehicle track.

Marine Designations

Figure 6 denotes the major marine designations relevant to the development. These include:

- The Moreton Bay Marine Park Habitat Zone which, ends at the north-eastern boundary of the site;
- Fish Habitat Area, Category A (Fisheries Act, 1994);
- Significant Coastal Wetlands (Draft SEQ Qld Regional Coastal Plan); and
- Wader Bird Sites.

The subject site abuts the Caboolture River. The river is part of a declared Fish Habitat Area (Deception Bay). It is noted that no works are proposed within the declared Fish Habitat Area (FHA), with the exception of the works required to break the bank of the Caboolture River in order to join the marina to the river. This will require a partial revocation of the declared Deception Bay FHA and will necessitate a permit under the Fisheries Act 1994. The entrance location for the proposed marina has been selected in an area that has very limited riparian or other vegetation. The marina itself is located outside the declared FHA, and will actually increase the Fish Habitat Area. The EIS will address such considerations in a detailed manner.

3.2 Description of important features in the project area

3.2.1 Overview

As noted above, there are a number of important features on the subject site and the affected area.

For the purposes of description, the subject site is defined as the terrestrial area (the landholding) and the banks of the site. The project area is the surrounding lands and aquatic ares upstream and downstream of the subject site.

3.2.2 Flooding

Substantial portions of the subject site are currently subject to flooding due to their low-lying nature and proximity to the Caboolture River and Raft Creek. The Caboolture Shire Council has been consulted in this regard by the proponent.

Parsons Brinkerhoff (2006) has undertaken preliminary flood modelling for the proposal, with the outcomes having been assessed against the Councils' two main floodplain management conditions, namely:

- No net loss of flood storage across the development site; and
- No resultant increase in flood levels over adjoining properties.

Parsons Brinkerhoff have presented two models as part of their preliminary reporting to date. These are:

- The Base Case – which determines the existing peak flood levels throughout the floodplain. Model verification was undertaken by comparing flood levels against Council's adopted 100 year flood and 10 and 50 year events; and

- The Development Case – which represents the proposal with flood mitigation works. The Development Case acknowledges that there are two main flood storage areas within the site boundaries that increase the conveyance of floodwater through the site. The largest of these is situated in the north of the site, whilst the other is located towards the eastern boundary. Both of the areas have dual purposes. The first is to provide increased flood conveyance and the second, to provide locations for stormwater treatment.

On the basis of the modelling thus far, it has been concluded that there was a good correlation between the base case and Councils' adopted flood levels and flood extents. In addition, the development case meets Councils' floodplain management conditions and it has been demonstrated that it is possible to meet Council's objectives. Overall, there will be a net benefit to the community.

That is, there will be a net increase in flood storage on the site and peak flood levels increases will occur only within the site boundary or at locations immediately adjoining the development where existing infrastructure will not be impacted.

Flooding matters are addressed briefly in section 5.0 of this response.

3.2.3 Stormwater and Water Quality

Caboolture is experiencing rapid urbanisation and as a result, increased stormwater and sewage discharges have boosted the sediment and nutrient loads flowing into the Caboolture River.

Caboolture Shire Council's Environmental Monitoring Program reviewed five sites within the section of the river adjacent to the site in 2001. The data indicates that the overall water quality of the site adjacent to the river is poor. The result is primarily due to a combination of poor concentrations of dissolved oxygen, turbidity and nutrient levels. The SEQ Environmental Health Monitoring Program has also produced a 'report card' for the river. Since 2001, the river has scored C, C- and most recently D+. This being the case, it is obvious that a prime objective of the subject proposal is to improve stormwater quality management and ultimately, reduce pollutant loads.

3.2.4 Fish Habitat Area

As noted previously, the subject site abuts the Caboolture River that is part of a declared Fish Habitat Area (Deception Bay).

The construction of the marina entrance would require revocation of a part of the declared Deception Bay FHA and permits would be required under the Fisheries Act 1994. This matter is addressed further in section 5.0.

3.2.5 Erosion

Erosion is currently prevalent in areas with limited riparian vegetation, whilst minimal erosion is evident where substantial vegetation is present.

The lack of significant riparian vegetation on the subject site has been identified as being a major impediment to the ecological health of the river and riparian ecology, particularly in terms of erosion, water quality and habitat.

3.2.6 Aquatic Ecology – Caboolture River

The Ecology Lab (2006) has undertaken preliminary 'desk top' investigations regarding the aquatic ecology of the Caboolture River. As noted in section 3.1, they have identified the following features:

- Three species of fish, three species of marine mammals, five species of marine reptiles and ten species of birds in the endangered, vulnerable, rare or migratory schedules of the *Nature Conservation Act 1992* and *EPBCA* may occur within the area (eg Moreton Bay Marine Park) but are unlikely within the site;

- The site comprises several areas of aquatic habitat. The most significant is Raft Creek and areas of mangroves and salt marshes fringing the site boundary and Caboolture River. The tidal portion of Raft Creek appears to be included in the Fish Habitat Area (Ecolab (2006:iii)).

- The proposed entrance to the marina is to be situated in a section of the river that is subject to erosion and which contains few aquatic plants. There are several small, mangrove-lined channels to the east of the proposed entrance;

- The weir on the Caboolture River (location approximately 19 kilometres from the mouth) forms a major barrier to fish passage and significantly effects the distribution of aquatic plants and water chemistry;

- Aside from the weir, the river has been altered by human activities (Monty's marina and slipway further downstream, near Goong Creek are foreshore and bank works, two Wastewater Treatment Plants discharging downstream of the weir and near the river entrance);

- Parts of the Caboolture River shoreline exhibit erosion and areas prone to erosion due to clearing of vegetation to the bank, unauthorised access (by vehicles) or from boating impacts;

- Water quality is poor due to supersaturation of oxygen in surface waters, depletion of oxygen at the bottom and high levels of turbidity. Nutrients and contaminant levels are also an issue.

3.2.7 Terrestrial Ecology – subject site

Cardno (2006) has undertaken initial investigations regarding the terrestrial ecology values of the site and the associated regulatory environment.

The subject site is largely clear of original vegetation and is generally in a highly disturbed state. This situation is due to previous land clearing on the site for the former uses, being plantation forestry purposes and previously, sugar cane farming over generations. There are only scattered remnants of these earlier activities on the subject site.

Much of the site is now dominated by large expanses of disturbed grassland, scattered groves of trees, paperbark forest and various types of marine vegetation in specific areas subject to periodic tidal inundation. There are also a number of significant weed species including prickly pear, groundsel bush, water hyacinth, lantana and others.

Most of the subject site is considered to have a limited capacity to provide suitable, functional habitat resources for native fauna species.

There are however, a number of areas of intact vegetation together with riparian and drainage lines, which provide the highest potential to provide habitat for native fauna species, as discussed briefly below.

3.2.7.1 Remnant Terrestrial Vegetation

As noted previously in this advice, 'Not of Concern' and 'Endangered Regional Ecosystem' (RE) types are recorded across approximately half of Lot 2 and in the southwestern corner of Lot 10 on the Regional Ecosystem mapping. The remainder of the site is mapped as either non-remnant vegetation or plantation forest.

An area in the south west corner of Lot 10 is identified as essential habitat for a species listed under the *Nature Conservation Act 1994*. This is addressed further below in 3.2.7.3.

3.2.7.2 Marine Vegetation

Marine plants are recorded in a number of limited areas of the site in Lots 24 and 10, including mangroves and saltwater couch (Cardno (2006)). Marine plants are identified as fisheries habitat pursuant to the *Fisheries Act 1994*, and an approval is therefore required from the Department of Primary Industries and Fisheries if disturbance of, harm to or removal of marine plants is proposed.

3.2.7.3 Endangered Species

According to Cardno (2006), given the highly disturbed nature of the majority of the site and the adjoining land, the availability of suitable terrestrial habitat for native fauna species is limited. The disturbed grasslands that dominate the site have a limited capacity to provide suitable, functional habitat resources for native fauna species. Areas with the highest potential to provide habitat for native fauna species are areas of intact vegetation together with riparian and drainage lines.

As noted above, an area in the southwest corner of Lot 10 is identified as essential habitat for a species listed under the *Nature Conservation Act 1994*. The site provides potential habitat resources for the Grey-headed Flying fox that is a listed threatened fauna species. The *EPBC Act* provides for the 'conservation of critical habitat' of listed threatened species. It is considered that the habitat resources within the site (ie. scattered clumps of eucalypts and the Swampy paperbark forest) do not constitute habitat *critical* to the survival of this species.

The site directly adjoins a Ramsar wetland, namely Moreton Bay, which extends along the frontage of Lot 24 onto the Caboolture River, and part way along the frontage of Lot 10. The site contains potential habitat for migratory bird species that are also defined as matters of national environmental significance.

It is recognised that the site contains potential habitat for migratory bird species listed in:

- the 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).

However, given the extent of similar habitat within the vicinity, including that which is protected in Freshwater National Park, Bribie Island National Park and Nathan Road Wetlands Reserve, it is not considered that the site contains habitat *critical* to the survival of these species.

In summary, the initial investigations undertaken by Cardno (2006) have revealed that the site does not provide habitat critical to the survival of any wildlife species of recognised conservation significance pursuant to the *Nature Conservation Act (NC Act)*. As such, development of the site would not be constrained by the provisions of the *NC Act.*

Detailed ecological assessments will be undertaken to confirm the presence or absence of flora or fauna species that are listed under the *NC Act* or otherwise ecologically significant. Such an assessment would also include an analysis of the potential impacts associated with the proposed plan of development, and recommended mitigation measures to avoid, minimise or manage potential impacts, as well as identifying opportunities for habitat rehabilitation.

3.2.8 Indigenous and other cultural heritage issues

Previous investigations on the site have revealed the presence of both indigenous and non-indigenous cultural heritage items and areas of significance.

A Cultural Heritage Investigation was undertaken over lots 10 and 2 by Davies Heritage Consulting Pty Ltd (2003) with assistance from SEQUITO North and the Gubbi Gubbi people, as part of the original Business Park application.

A small number of indigenous artefacts were located and sites of significance noted on the site of the study. However, the aforementioned study considered that the previous utilisation of the site as a pine plantation has limited the possibility of finding major indigenous artefacts.

This issue is addressed further at section 5.2.

3.3 Tenure of the project area

The subject land comprising the elements of the Northeast Business Park project is held in **freehold title** by Northeast Business Park Pty Ltd.

Land to the north, west and south of the subject land is predominantly freehold. Most of the land to directly to the east is also freehold, although a sizeable parcel of land (on the opposite bank of the Caboolture River) containing wetlands was purchased by EPA in the last few years.

3.4 The current and/or proposed land uses for the project area.

The subject land is currently vacant.

The proposed uses for the subject land are outlined in section 2.4 of this submission.

Land downstream of the subject land and abutting the Caboolture River is generally vacant rural land holdings in a mixture of public and private ownership (and part of the Regional Landscape and Rural Production Area under the SEQRP), with the exception of land at Beachmere.

4.0 Nature and extent of the likely impact of the action

4.1 Description of the nature and extent of likely impacts on matters of national environmental significance protected by the EPBC Act.

It appears that some direct and indirect aspects of the proposal may have potential to affect sensitive environments and be relevant to the *EPBCA*, if poorly designed and/or managed. Some of the potential effects include:

- potential for wash and erosion from increased boating activity affecting wetland environments:
- pollutants from boating activities and marine industries affecting water quality;
- risks arising from poorly managed acid sulphate soil disturbances; and
- issues associated with dredging and spoil.

These and other potential impacts arising from the development relevant to the *EPBCA* will be specifically investigated in order to make an assessment of any potential impacts, as well as identifying any opportunities where rehabilitation may improve habitat conditions.

4.1.1 (c) Ecological character of a declared Ramsar wetland

The excavation of the Marina has the potential to affect the hydrodynamics of the receiving waters by affecting the tidal prism. This can result in increased tidal velocities causing increased scour and suspended sediment concentrations, which can in turn affect the aquatic ecosystem and erode the riparian corridor.

Any dredging in the existing tidal areas can also introduce plumes of sediment into the water column and affect existing benthic communities.

Tidal prism impacts are to be minimised with the incorporation of a lock to control tidal flow in and out of the marina.

Excavation and dredging works are to be carefully planned and closely managed to minimise any impacts on the water quality of the receiving waters and the heath of the ecosystem. These measures include containment and diversion of any silt plumes in sensitive areas and treatment of any runoff from exposed earth areas using best practice stormwater management techniques.

During the operational phase of the development, best practise stormwater management techniques to fully treat runoff before it leaves the site will also assist in minimising sediments, nutrients and pollutants and potentially improving the quality of water in receiving water bodies and wetland areas.

The Ramsar wetland community will also be preserved and enhanced by means of the proposed 100 metre wide vegetated buffer to the river.

Additional detail on measures, such as stormwater quality management, flood mitigation and boating controls that will assist in the maintenance of the ecological character of the Ramsar area are dealt with in section 5 of this submission.

4.1.2 (d) the members of a listed threatened species (except a conservation-dependent species) or any threatened ecological community, or their habitat

As noted previously, Cardno (2006) identified that the subject site provides potential habitat resources for the Grey-headed Flying fox that is a listed threatened fauna species. The *EPBC Act* provides for the 'conservation of critical habitat' of listed threatened species. It is considered that the habitat resources within the site (ie. scattered clumps of eucalypts and the Swampy paperbark forest) do not constitute habitat *critical* to the survival of this species.

Issues such as stormwater quality management, flood mitigation and boating impacts will, if not appropriately managed, have the propensity to impact on aquatic species. Such matters are dealt with in section 5 of this submission.

4.1.3 the members of a listed migratory species or their habitat

As noted previously, Cardno (2006) recognised that the site contains potential habitat for migratory bird species listed in:

- the 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).

However, given the extent of similar habitat within the vicinity, including that which is protected in Freshwater National Park, Bribie Island National Park and Nathan Road Wetlands Reserve, it is not considered that the site contains habitat *critical* to the survival of these species. Impacts due to boats and dredging will be further considered in current studies.

4.2 The nature and extent of likely impacts on the environment

Items (a) to (d) are not applicable.

5.0 Measures aimed at avoiding or reducing significant impacts on matters protected under the EPBC Act.

5.1 Description of specific measures proposed as part of the action to avoid or lessen significant matters protected under the EPBC Act.

Various measures and approaches will be utilised in order to avoid or lessen significant matters. These are addressed as follows.

Stormwater and Water Quality

Water quality is of prime importance to aquatic habitats for marine plants and animals. A core objective is the protection of water quality and implementing means to improve water quality.

Given the stormwater and water quality situation identified in section 3.2.3, Parsons Brinkerhoff (2006) have undertaken preliminary Stormwater Management Reporting (via means of a MUSIC water quality model).

As a basis for the reporting, the environmental values for the waterway were determined and the Water Quality Objectives identified. The legislative basis for determining water quality management has accordingly, been reviewed. The *Environmental Protection (Water) Policy 1998*, the *Queensland Water Quality Guidelines* and particularly, the Queensland Water Quality Guidelines for the Caboolture River have been addressed. In particular, it is to be noted that Caboolture Shire Council seeks – by way of its Caboolture Shire Plan Stormwater Code (Specific Outcome 4) – to ensure that permanent water quality control measures achieve the following minimum reductions in annual mean load generated by the development site:

a.) 80% for suspended sediment;

b.) 45% for total phosphorus;

c.) 45% for total nitrogen.

The above has been utilised as the benchmark for preliminary stormwater treatment design for the proposal.

The Parsons Brinkerhoff investigations (2006) to date provide for two levels of management plans, being:

- An overarching framework for water quality management for the entire site; and
- Catchment water quality management plans for the first stage of development of each catchment (of which there are eight).

An important component of the above has been the adoption of design criteria (eg water harvesting, maintenance of buffers to waterways, contribution to and utilisation of open space areas) which mould the nature and form of the proposal.

A main theme from the design criteria is that the proposed development will protect and enhance riparian and wetland vegetation. As a result, a 100 metre wide buffer to the Caboolture River and 40 metre wide buffer to Raft Creek will be utilised, together with a large portion of the subject site being provided as open space. Moreover, the overall stormwater management objective is to preserve natural flows to the waterways and to decrease overall nutrient and pollutant loads in the Caboolture River.

Treatment trains (a series of stormwater treatment measures designed to remove stormwater pollutants) will be further researched and incorporated into the Stormwater Management planning.
The proposed North East Business Park Development will use a number of Water Sensitive Urban Design (WSUD) techniques to ensure that the development does not adversely impact on the quality of the adjacent Caboolture River receiving waters. Such treatment measures will include (but are not limited to) grass swales, bio-retention, gross pollutant traps and constructed wetlands in the low-lying flood plains.

To meet water quality objectives, substantial reductions in current pollutant loads are required. A reduction in nutrient and sediment loads will be of benefit to the health of the larger ecosystem and hence the incorporation of water sensitive urban design is integral to the design philosophy. Water entering the site from external catchments currently carries substantial sediment and nutrient loads, thereby providing scope for the stormwater treatment trains within the development to improve the quality of water entering the river.

The proposed Marina lake will not form part of the stormwater treatment train, but is recognised to provide additional treatment prior to discharge into the River. In addition, the Marina Lake lock and turnover system adds additional safety guards such as:

a) In times of poor water quality in the Caboolture River the lock and turnover system remain closed to preserve the quality of water in the marina lake.

b) In the event of unforseen poor water quality in the Marina Lake, such as from an accidental spill, the Marina Lake water can be contained preventing exposure of the receiving water environment.

The stormwater management regime will be reviewed in further detail as part of the design process.

Marina and Marine Industries

As noted previously in Section 2.4, the proposed marina will provide not only for boats but will also have allied uses. The marina will provide berths, dry storage and shipyard facilities as well as light industry, as addressed in the report prepared by Pacific Southwest Strategy Group (2006).

Given the nature of boating and boat-related uses, the issues of fuel storage, removal of human and general waste and grey water from craft when docked, and possible impacts from the associated light industry (eg runoff from boat cleaning, re-painting and the like) on water quality must be considered and appropriately addressed. Such matters will be addressed via appropriate siting of uses and the utilisation of best practice management (eg bunding, water quality management practices) in accordance with accepted environmental and boating and industry standards. The uses themselves will be subject to scrutiny by the Caboolture Shire Council and/ or the EPA depending upon the type of use proposed. It is envisaged that operational conditions would be put in place to govern operations, thereby avoiding possible impacts.

Dredging

Figure 7 below shows the navigable areas based on the most recent available bathymetric survey undertaken in November 1998 by the Department of Harbours and Marine. The dark blue shading shows areas that have a full 2.5 m of draught below Lowest Astronomical Tide (LAT). Whilst the survey did not continue upstream to the location of the Marina, site inspections indicate that the section of River from the Marina Site to just downstream of King John Creek is navigable as indicated in *Figure 7*. Additional, more recent bathymetric survey is proposed to confirm this.

Hence, as noted in section 2.4, the proposed dredging of the existing navigation channel within the Caboolture River is likely to require a channel approximately 3.5km long and 70 metres wide at the base with excavation down to a level of -3.76 m AHD to provide a provide 2.5 m draught below LAT, which will generate approximately 300,000 m^3 of spoil. This dredging will occur within the defined navigation channel - and hence outside the declared Fish Habitat Area.

Additional environmental studies produced for the assessment of the proposal will define the areas and volume of dredging required within the navigation channel in greater detail, and also the nature of the dredged material.

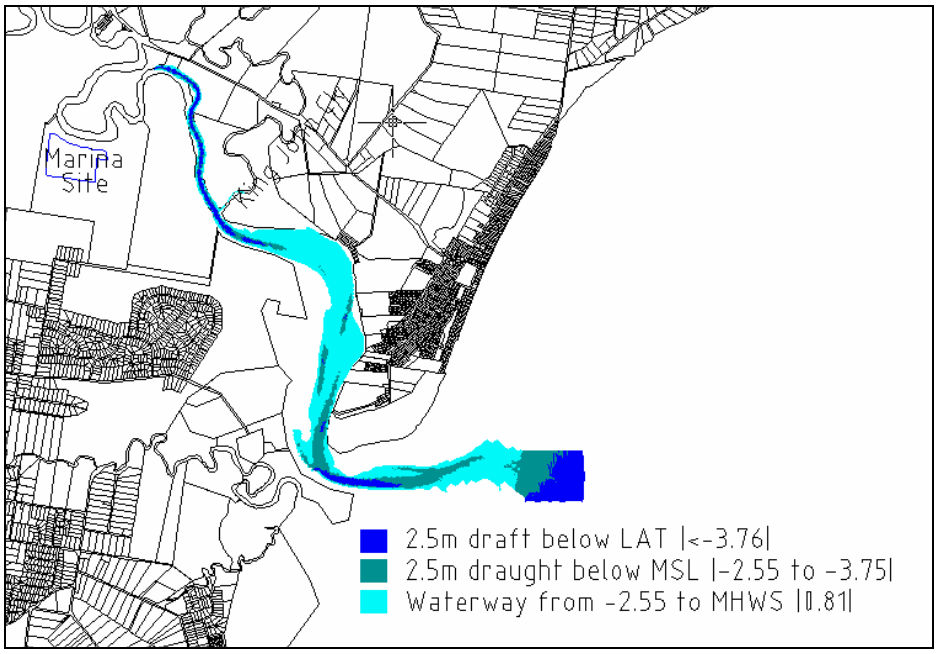


Figure 7 - Indicative Draught in Existing River

The proposed marina will also require periodic maintenance dredging. Detailed modelling of the expected siltation rates will be undertaken to define the expected frequency of dredging and the volume of material to be removed. With best practice Stormwater management source controls during construction and operation, deposition of suspended sediment into the Marina from the surrounding development will be minimised. It is also proposed that the Marina will be over excavated during construction to provide at least a 50 year timeframe until maintenance dredging is again required.

The management of the resultant dredge spoil will be defined following the confirmation of expected volumes, and relevant considerations are:

- spoil disposal locations;

- monitoring and testing of spoil for contaminants and acid sulfate materials; and
- handling and management of spoil, including spoil treatment if required.

In respect of the above, it is noted that a range of options have been investigated regarding the disposal of spoil, including disposal on-site and off-site at the proponents' other land holdings. The preference is for disposal at alternative locations owned by the proponent.

In addition, the provision of a 100m wide vegetated buffer - where none currently exists - will provide:

- long term protection of fish habitats by benefits and retains biological and physical processes, and protects habitat from human impacts;
- managed public access to fisheries resource, mitigating adverse effects from currently unmanaged public access;
- long term insurance against possible natural erosion processes and/or greenhouse impacts;
- improve water quality, increase food and habitat for fish species, and protect against vegetation loss, bank erosion, reduce nutrients and pollution, all aiding the increase of fish stocks.

Additionally, the provision of best practice environmental solutions for boat maintenance, harbouring and repair will replace less well managed or uncontrolled practices which may have adverse effects on aquatic environments and fish stocks.

Fish Habitat Area

As noted previously, no dredging is to be undertaken in the Fish Habitat Area, save for the 100 metre long area of the bank that is to be broken to provide for the marina.

In summary, the proposed development seeks to improve existing fish habitat conditions and increase the physical extent of potential fish habitats.

Erosion and related Boating

As noted in section 3.2.5, erosion is currently evident in areas along the Caboolture River with limited riparian vegetation. Minimal erosion is evident where substantial riparian vegetation is present.

The proposal will result in the creation of a marina complex a considerable distance from the mouth of the Caboolture River and a significant amount of boat traffic will be generated on the Caboolture River downstream of the site.

The wash created by boat traffic has the potential to impact on the integrity of the banks of the Caboolture River, in particular, where natural protection in the form of coastal vegetation is not present. Whilst it is proposed that vegetated buffering will be provided along the bank, an assessment of the potential erosion impacts resulting from the additional boat traffic generated from the proposal will be required. The study will consider any physical or operational mitigation measures that are proposed. These will include the proposed rehabilitation of foreshore areas on the site, the provision of wide vegetated riparian buffers, current and future boating control (eg speed limits, number of boat movements) and the like.

Flooding

For reasons of completeness, flooding is commented upon briefly. As noted in section 3.3.2, the subject site (and adjoining lands both upstream and downstream) currently floods. On the basis of the preliminary investigations undertaken by Parsons Brinkerhoff (2006), the proposed development and earthworks will have a net benefit in terms of flooding and no detrimental impacts on afflux.

Acid Sulfate Soils

The subject land includes land mapped below 5m AHD. *State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils* is applicable and is required to be addressed.

Preliminary reporting by J.E.Sieman Pty Ltd (2006) has indicated some level of Acid Sulphate Soils (ASS), either low or moderate. Potential for ASS was intermittent. However, it is likely that ASS will be encountered during the cut to fill earthworks. The issue of ASS has implications for the site and surrounds in terms of impacts on water quality. Therefore, the proposal will address State Planning Policy *2/02: Planning and Managing Development Involving Acid Sulfate Soils* (in conjunction with *SPP 2/02 Guideline: Acid Sulfate Soils*) given the extent of excavation and filling required. Details of the excavations including volumes, existing (and finished) ground levels, depth of excavations and fill will be provided.

Extensive testing of soils will be undertaken as part of the EIS and an Acid Sulfate Soil Management Plan (ASSMP) will be prepared to deal with these soils when encountered, based on current Queensland government and EPA guidelines. Such measures will mitigate possible impacts.

Riparian Zone Rehabilitation

As noted previously in this advice, the riparian zone of the site is largely clear of marine vegetation due to past farming practices. The lack of significant riparian vegetation on the subject site has been identified as being a major impediment to the ecological health of the river and riparian ecology, particularly in terms of erosion, water quality and habitat. Accordingly, the proposal has indicated that a 100 metre wide riparian zone will be rehabilitated for approximately the 9-kilometre length of the site's river frontage. The proposed buffer is intended to provide the following key benefits:

- The creation of significant habitat areas enhancing wildlife corridors on site and to adjoining habitat areas;
- Bank stabilisation, reducing erosion potential and providing a buffer for any natural physical processes which may occur such as erosion and accretion, flood mitigation, climate change and the greenhouse effect;
- A physical separation distance and/or barrier between adjacent uses;
- Filtration of pollutants from terrestrial stormwater as well as river flows, improving water quality; and
- Provision of appropriate human access and economic benefit.

Tidal Prism

The construction of a 27-hectare marina on the site has the potential to affect the regime of the tidal waterways of the Caboolture River and its tributaries.

The impact of the proposed marina on the Caboolture River tidal prism has been investigated using a one dimensional MIKE 11 tidal prism model of the Caboolture River.

The Mike 11 model is based on Caboolture Shire Council's Caboolture River EXTRAN flood model (Caboolture Flood Study, April 1994) and has been calibrated to water level and discharge information obtained from the August 1990 and April 2006 field measurements.

The assessment of the impact of the proposed marina on the Caboolture River tidal prism has been based on statistical analysis of one (1) full year of simulation.

The following cases have been analysed:

- Base Case – proposed marina not incorporated;
- Developed Case 1 – incorporates the proposed marina with an open, fully tidal connection to the Caboolture River, i.e. no lock connection; and
- Developed Case 2 – incorporates the proposed marina with a lock type connection to Caboolture River. A 24 day turnover period by tidal flushing has been assumed. An allowance has also been made for an inlet area to the proposed lock system which will be fully open to the Caboolture River. The adopted area for this inlet is approximately 1 hectare.

Model results indicate that the proposed marina will have the greatest impact on the Caboolture River tidal prism immediately downstream of the marina. The tidal prism at this location for each of the above three cases has been averaged over one (1) full year of simulation with results being tabulated below.

Table 1 – Tidal Prism Results

Case	Average Tidal Prism Immediately D/S of Marina (Ml / tide cycle)	Marina Impact (Ml)	Marina Impact (%)
Base Case – No Marina	990	N/A	N/A
Dev Case 1 – No Lock	1377	(+) 387	(+) 39%
Dev Case 2 – Includes Lock	1024	(+) 34	(+) 3.5%

The model results show that without a lock, a direct connection to the Caboolture River from the proposed marina is expected to cause an increase in tidal prism of up to 39%. With the incorporation of the lock the impact is greatly reduced down to a maximum level of 3.5%.

Based on these results a lock has now been incorporated into the design of the Marina.

Of the 3.5% impact predicted for Development Case 2 around 1.5% is a result of the fully tidal inlet area to the marina. The remaining 2% impact is caused by tidal flushing to allow for a 24 day turn over period in the marina.

With the incorporated of the lock connection, the marina's minor impact on Caboolture River tidal prism is expected to have a negligible affect on the tidal dynamics within the river and Deception Bay.

On site vegetation

Significant vegetation is to be protected and maintained on the site. Such vegetation is referred to in the Cardno report (2006).

Rehabilitation works will also be undertaken, particularly along the bank of the Caboolture River and Raft Creek. A 100 metre wide riparian buffer will be provided along the bank of the Caboolture River for the entire length of the subject site, except for the entrance to the marina. A 40 metre wide buffer will be provided along the banks of Raft Creek also. The buffers will provide important vegetated corridors and links to the other identified vegetated areas. They will also provide an important means of stabilising the banks from the effects of erosion.

5.2 Consultation undertaken with Indigenous stakeholders regarding the action.

As noted previously, past investigations on the site have revealed the presence of a small number of indigenous cultural heritage items and areas of significance.

It is to be noted that the Information Request for the Caboolture City Marina site requires the preparation of a Cultural Heritage Management Plan. The plan will proceed along similar lines to the one previously completed by Davies Heritage consultants for the Business Park site. s. 47F(1) is the Gubbi Gubbi representative for the area, and under the *Aboriginal Cultural Heritage Act 2003*, is the key party for consultation. s. 47F(1) was consulted for the previous study and is a Burpengary resident. s. 47F(1) has subsequently been contacted regarding the preparation of this further study.

It is also noted that the marina application includes use of the bed and banks of Caboolture River that is owned by the Crown, and therefore has some potential to invoke native title interest, which cannot occur over freehold land. This is to be addressed as part of the cultural heritage study.

6.0 Information sources

6.1 List of relevant references

Refer to *Appendix A*.

6.2 Information justification

Information for the reports referenced as part of this referral was sourced from the most up to date references and studies undertaken by the consultants involved. The individual consultants whom prepared the reports provide qualifications regarding the information, as required in their reports.

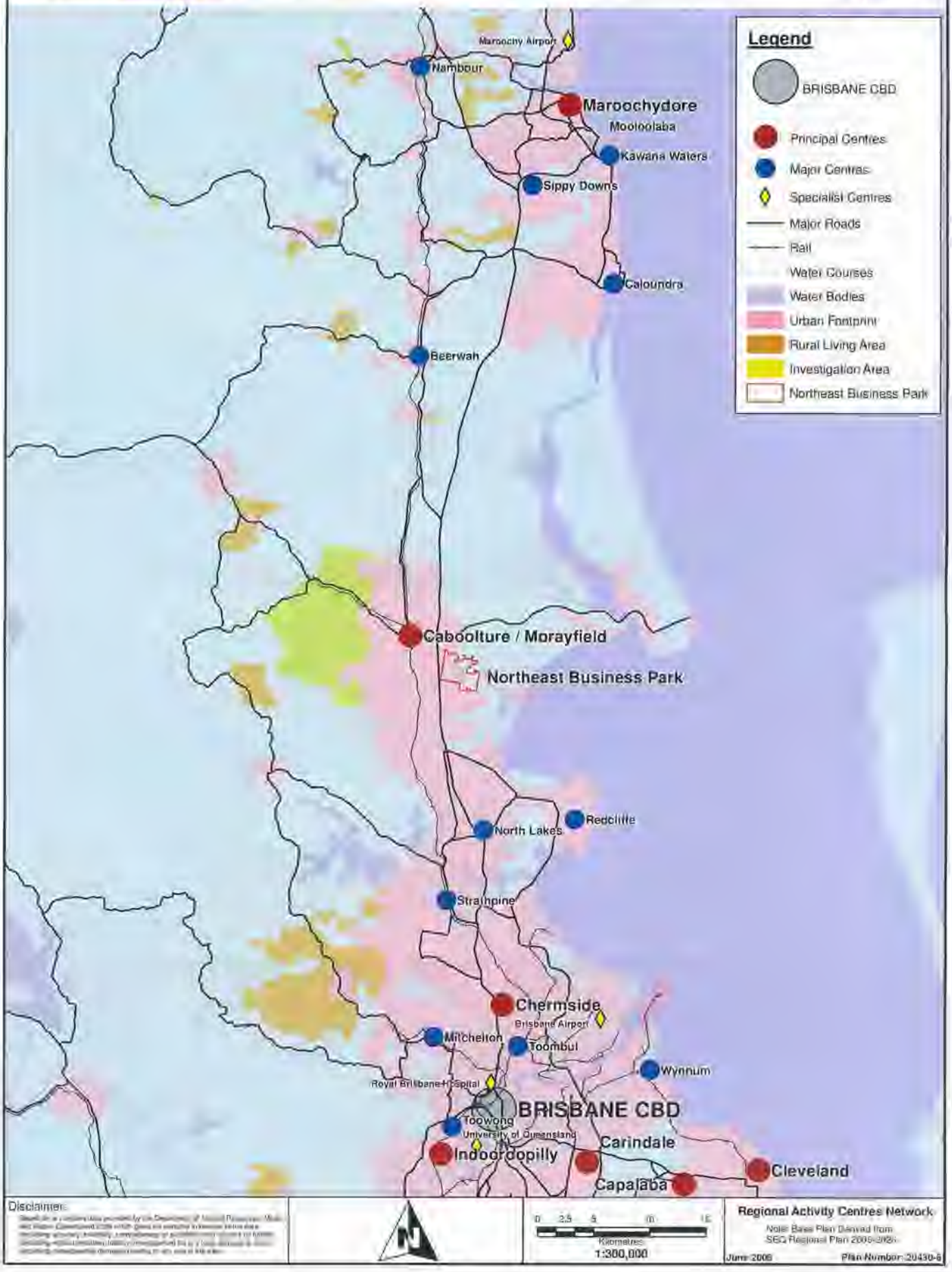
7.0 Signatures and Declarations

7.1 -7.4 Refer to attached application form

7.5 Reasons why the proposed action is believed to be a controlled action

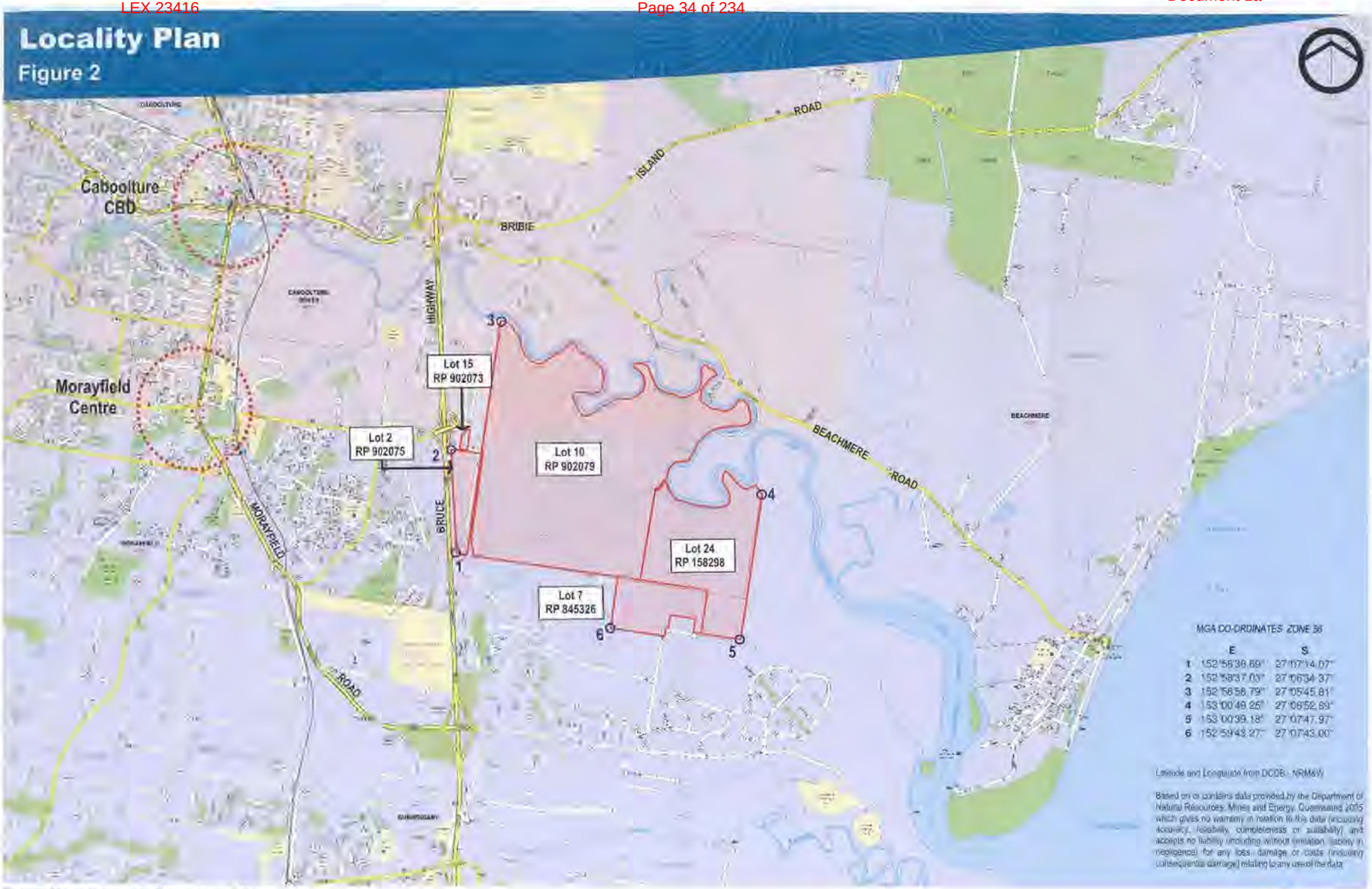
The proposed action is believed to be a controlled action as it may impact on matters relevant to the EPBCA. It is reiterated that the proponent has recently applied to the Coordinator General to be declared a State Significant Development under the SDPWOA. Background studies have been undertaken as a part of this process but not to the level required for the EPBCA process. The matters will be fully investigated – as part of the EIS process (and subsequent assessment process) – subject to the declaration being made on the project under the SDPWOA.

Regional Locality Plan - Northeast Business Park
Figure 1



Locality Plan

Figure 2



MGA CO-ORDINATES ZONE 56

	E	S
1	152°58'38.69"	27°07'14.07"
2	152°58'37.03"	27°06'34.37"
3	152°58'58.79"	27°05'45.81"
4	153°00'49.25"	27°06'52.89"
5	153°00'39.18"	27°07'47.97"
6	152°59'43.27"	27°07'43.00"

Latitude and Longitude from DCDB - NRM&W

Based on or contains data provided by the Department of Natural Resources, Mines and Energy, Queensland 2005 which gives no warranty in relation to this data (including accuracy, reliability, completeness or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data

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20430-04 May 2006 NTS

pmr BRISBANE

Conceptual Master Plan
Figure 3

Land Use Plan

Buffer Zones Plan

Road Network Base Plan

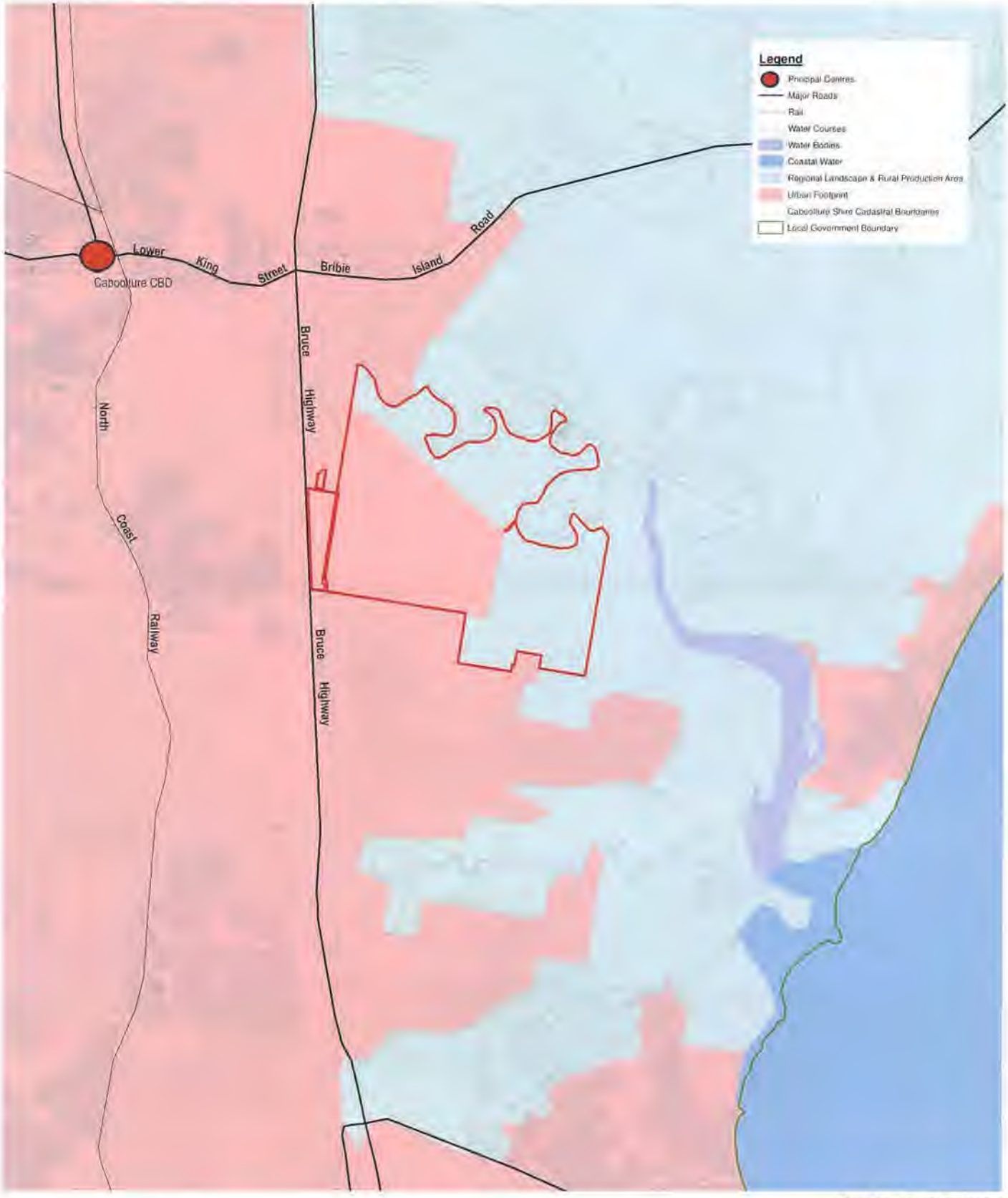
The contents of this plan are conceptual only, for discussion purposes. All areas and dimensions are approximate, subject to relevant studies, Survey, Engineering, and Council approvals.

20430 - 07 date: May 2006 scale: NTS

pmm BRISBANE

Regional Plan Designations

Northeast Business Park - Figure 4



Source: South East Qld Regional Plan

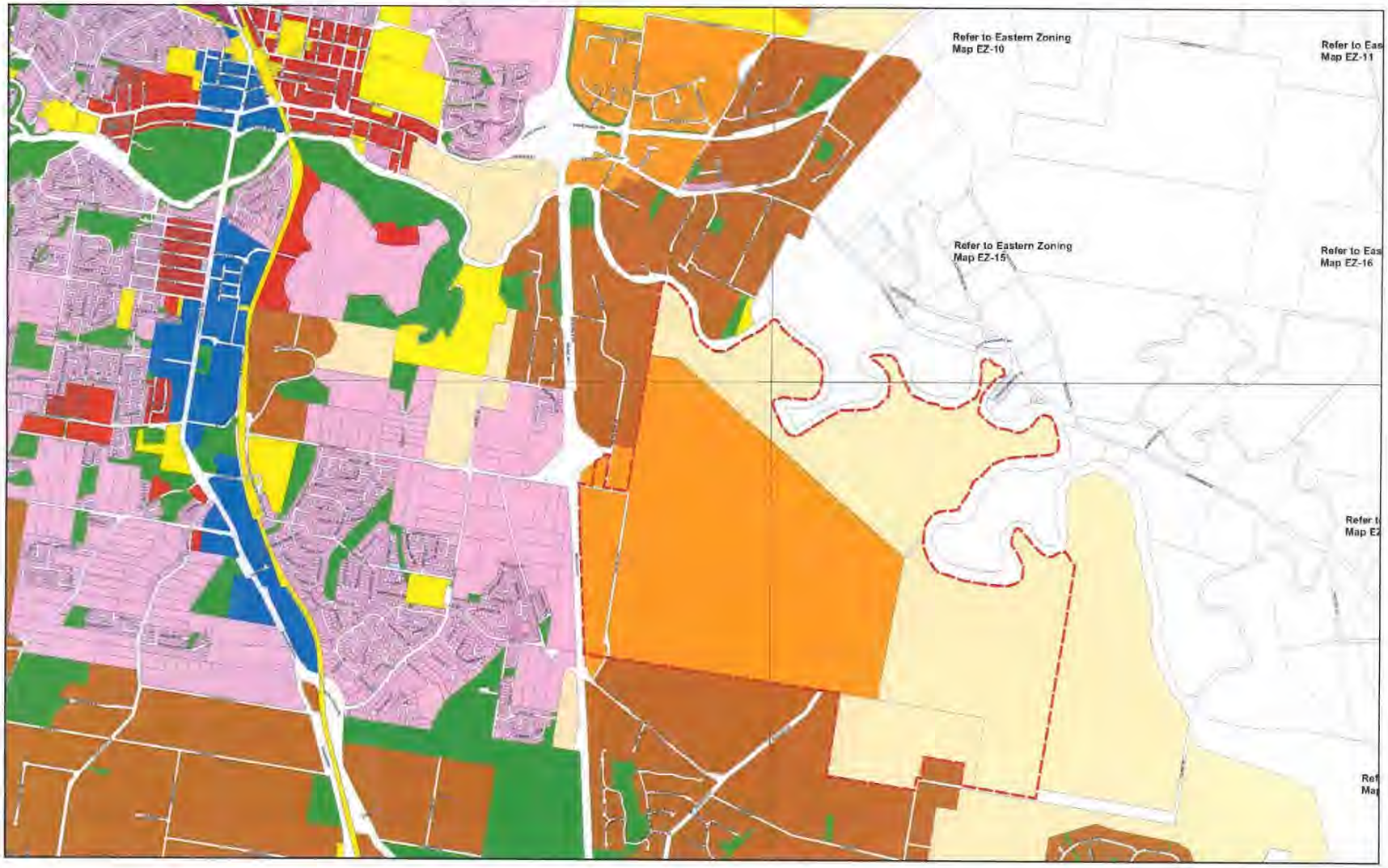
The contents of this plan are conceptual only for discussion purposes. All areas and dimensions are approximate, subject to relevant studies, Survey, Engineering, and Council approvals.

pmm BRISBANE

20430 - 02a date: May 2006 scale: NTS

Zoning Plan - Caboolture Shire Council

Figure 5



pmm BRISBANE

20430-03a May 2006 NTS

Major Marine Designations

Northeast Business Park - Figure 6

Legend

- Site Boundary
- Fish Habitat Areas Category A
- Ramsar Wetlands
- Wader Bird Sites S.E.Q
- Moreton Bay Marine Park Boundary

Notes: 1. [illegible]

2. Refer also to Maps 6, 7 & 8 of Draft SEQ Regional Coastal Plan - Significant coastal wetlands to east of site to Deception Bay

20430 - 05a date: June 2006 scale: NTS

Appendix A – Report Bibliography

- Australian Government – Department of Industry, Tourism and Resources, *New Horizons – Marine Industry Action Paper,* Commonwealth of Australia, 2005.
- Caboolture Shire Council, *Caboolture Shire Plan,* Caboolture shire council, 2005.
- Cardno QLD Pty Ltd, *Draft Terrestrial Ecological Assessment Report,* a technical paper prepared for North East Business Park, 5 May 2006.
- Core Economics, *Economic Benefit Assessment,* a technical report prepared for North East Business Park, 22 March 2006.
- Davies Heritage Consulting Pty Ltd, *Cultural Heritage Assessment – Lot 10 RP902079 and Lot 2 RP902075*, a technical paper prepared for the Lensworth Group, October 2003.
- J. E. Sieman Pty Ltd, *Geological Report on Caboolture Marina Site*, technical report prepared for Port Binnli Pty Ltd, September 2005.
- Pacific Southwest Strategy Group Pty Ltd, *Caboolture City Marina Study*, a technical report prepared for North East Business Park Pty Ltd, 14 March 2006, North East Business Park.
- Parsons Brinkerhoff, *Caboolture River MIKE21 Flood Study*, a technical report prepared for North East Business Park, April 2006.
- Parson Brinkerhoff, *Stormwater Management Plan North East Business Park,* a technical report prepared for North East Business Park, May 2006.
- Queensland Government – Office of Urban Management, *South East Queensland Regional Plan 2005-2026*, Queensland Government, 2005.
- The Ecology Lab Pty Ltd, *Preliminary Assessment of Aquatic Ecology,* a technical report prepared for North East Business Park, April 2006.

Appendix B – Application Form

21 June 2006

s. 22(1)(a)(ii)
Director - EPBC Act Referrals Section
Approvals and Wildlife Section
Department of the Environment and Heritage
GPO Box 787
CANBERRA ACT 2601

Dear s. 22(1)(a)(ii)

EPBC ACT REFERRAL - NORTHEAST BUSINESS PARK
NOLAN DRIVE, BURPENGARY, Q, 4505.

We write regarding the proposed Northeast Business Park, which is a proposal for a fully integrated business park, marina precinct and residential development, located on the Caboolture River in South East Queensland. The proposal is to be undertaken by Northeast Business Park Pty Ltd, a Queensland registered company.

Northeast Business Park Pty Ltd is the proponent undertaking the referral. The proposed action is believed to be a controlled action as it may impact on matters relevant to the EPBCA, if not designed and constructed in a comprehensive manner.

The proposal has recently been submitted to the Queensland Coordinator General for consideration for declaration as a 'Significant Project' under the *State Development and Public Works Organisation Act 1971* (SDPWOA).

A suite of background studies have been undertaken as a part of the submission process but not to the level required for the *EPBCA* process to fully substantiate that any impacts of the action will not be significant. Subject to the Significant Project declaration being made by the Coordinator General, further studies will be prepared to provide a more detailed assessment as part of the Environmental Impact Statement (EIS) process, which we believe will be able to demonstrate that any potential impacts will be able to be avoided or mitigated to acceptable levels.

Owing to the comprehensive nature of the EIS process, we respectfully suggest that it would be most appropriate for the assessment to be undertaken under the Bilateral agreement with the Queensland Government, with the conditions arising from the Department of Environment and Heritage's review to be included as part of the Terms of Reference for the EIS.

Two (2) copies of the Referral are **attached** for your consideration.

Please contact the writer on if your have any queries concerning the abovementioned.

Yours faithfully

s. 47F(1)

CEO
Northeast Business Park Pty Ltd

Registered Office & Administration
PO Box 1001, 292 Water Street, Spring Hill, QLD 4004 Phone: s. 47F(1) Fax: s. 47F(1) A.C.N. 101 569 457
Email: s. 47F(1)

Environment Protection and Biodiversity Conservation Act 1999

Referral Form

Important Note:

Please read the Referral Guide and associated Fact Sheets (available at http://www.deh.gov.au/epbc) carefully. The guide and Fact Sheets will help you to complete the form correctly and ensure that your referral is in a form that can be processed. The completed form, together with the required maps and any other information you may wish to submit, should be sent to the EPBC Act Referrals Section, Approvals and Wildlife Division, Department of the Environment and Heritage, GPO Box 787, Canberra, ACT, 2601 and/or by email to epbc.referrals@deh.gov.au (see Referral Guide for allowable electronic formats).

1. Contacts and proponent

1.1 Person making the referral

(Note: The term "person" can refer to an individual or a corporation)

The person making the referral can be either the person proposing to take the action, an agent acting on their behalf (eg, a consultant), or a government agency making the referral in relation to an action to be taken by another person. *(Include name, postal address, telephone, fax, email.)*

Refer attached report.

1.2 Person(s) proposing to take the action

This is the person who proposes to carry out the action, or who is otherwise responsible for the action. If approval is necessary, this is the person to whom the approval will be granted, and they will be responsible for meeting any conditions of approval. *(Include name postal address, telephone, fax, email – if same as person making the referral, write "as above".)*

Refer attached report.

If a corporation is proposing to take the action, please ensure you provide the name of a contact officer for this matter.

1.3 Person(s) who will be the proponent for the action

The proponent is responsible for preparing all documentation for the assessment process, if the action requires approval. If the proponent is the same as the person proposing to take the action, write 'as above'. If the proponent is different from the person proposing to take the action, the signature of both is required (at Section 7.3). *(Include name(s), postal address, telephone, fax, email)*

Refer attached report.

If a corporation is the proponent for the action, please also provide the name of a contact officer for this matter.

2. Description of the proposal

2.1 Provide a *summary description* of the action (two or three sentences)

Refer attached report.

2.2 Details of the *location* of the project area
Where the project is of less than 1 km^2 in size, provide the location as a single pair of latitude and longitude references. Latitude and longitude references should be used instead of AMG and/or digital coordinates.

Refer attached report.

Locality:

Latitude:	degrees:	minutes:	seconds:
Longitude:	degrees:	minutes	seconds:

Where the project area is greater than 1 km^2, or any dimension is greater than 1 km, provide additional coordinates to enable accurate identification of the location of the project area.

Please provide a brief physical description of the project area, including the size of the development footprint or work area in hectares (a more detailed description is required at Part 3 of this form). The street address and cadastral description of the proposed action (if relevant) should also be provided. Identify the Local Government Area in which the development will occur, if relevant.

Attach an A4/A3 size map/plan(s) showing the location and approximate boundaries of the area in which the project is to occur (this map, or a second attached map, should also show features mentioned in responses to questions in Part 3 of this referral, for example, conservation reserves, areas of remnant native vegetation, streams and roads).

2.3 Provide the *timeframe* in which the action is proposed to occur. Include start and finish dates where applicable.

Refer attached report.

2.4 Provide a *description* of the action, including *all activities* proposed to be carried out as part of the proposed action.

Refer attached report.

2.5 Provide an *explanation of the context* in which the action is proposed to take place, including any relevant planning framework (for example, relevant management plans or State or Local Government approvals). Indicate whether, and in what way, the action is *related to other actions or proposals* that may have already occurred, are occurring, or are likely to occur, at a future date. You should also provide the name(s) of the Local Council and/or Local Government Area the action will take place in, if relevant.

Refer attached report.

2.6 If you are considering making a referral of a stage or component of a larger action, you must provide information about the larger action and details of any interdependency between the stages/components and the larger action. If appropriate, you may also provide justification as to why you believe it is reasonable for the proposed action, that is the subject of this referral, to be considered separately from the larger proposal (see the Referral Guide).

Section 74A of the EPBC Act provides that the Environment Minister may not accept a referred action that is a component of a larger action. If the Environment Minister does not accept the referral, he or she is not permitted to make a decision on whether the action is a controlled action. The Environment Minister may request the person proposing to take the action to refer the larger action for consideration under the EPBC Act (see also Fact Sheet).

Refer attached report.

3. Description of the project area and the affected area

Note: You must include a *map(s)/plan(s)* clearly showing the location of the action, and any relevant features referred to in 3.1. (A general location map (eg, 1:250 000 scale) and a more detailed map/*plan* showing the elements of the proposal may be appropriate. If available, an aerial photograph or other photograph of the site can be included.)

3.1 Describe the affected area referring, as appropriate, to attached maps, plans and aerial photos. In particular, indicate on the map the location of any of the following features: World Heritage properties, National Heritage places, Ramsar wetlands, listed threatened species or communities and/or known habitat for these species or communities, listed migratory species and/or known habitat for these species, Commonwealth marine areas and Commonwealth land, listed Commonwealth Heritage places, conservation reserves/parks, and areas of remnant native vegetation.

Refer attached report.

3.2 Provide a *description of important features* of the project area and the affected area and show these on the attached map, including (if relevant to the project area or affected area) information about:

(a) soil and vegetation characteristics;
(b) water flows, including rivers, creeks and impoundments;
(c) the presence of outstanding natural features, including caves;
(d) gradient;
(e) any buildings or other infrastructure;
(f) any marine areas;
(g) kinds of fauna in the area;
(h) the current state of the environment in the area, including information about the extent of erosion, whether the area is infested with weeds or feral animals and whether the area is covered by native vegetation or crops;
(i) known Indigenous heritage values; and
(j) any other characteristics or important features of the receiving environment if the action is by a Commonwealth agency or may affect Commonwealth land.

The description of important features should highlight any attributes of the environment if the action is being undertaken by a Commonwealth agency or will occur on, or potentially affect, Commonwealth land. Important features may include physical, natural, cultural, indigenous or other human attributes and values (see *Principal Significance Guidelines 1.2 for Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* at http://www.deh.gov.au/epbc).

Refer attached report.

3.3 What is the *tenure* of the project area (for example is it freehold, leasehold or some other tenure)? If practicable, show on the attached map.

Refer attached report.

3.4 What are the current and/or proposed *land uses* for the project area?

Refer attached report.

4. Nature and extent of the likely impacts of the action

4.1 Describe, as relevant to your project, the nature and extent of *likely impacts* on the following matters of national environmental significance protected by the EPBC Act:

(a) the world heritage values of a declared World Heritage property; or
(b) the heritage values of a listed National Heritage place; or
(c) the ecological character of a declared Ramsar wetland; or
(d) the members of a listed threatened species (except a conservation-dependent species) or any threatened ecological community, or their habitat, or
(e) the members of a listed migratory species or their habitat; or
(f) the environment in part of the Commonwealth marine area.

Refer attached report.

4.2 Describe, as relevant to your project, the nature and extent of likely impacts on the environment for the following category of proposed actions (in addition to the specific matters addressed above in 4.1):

(a) a nuclear action; or
(b) an action by the Commonwealth or by a Commonwealth agency; or
(c) an action that will be taken on Commonwealth land or that may affect Commonwealth land; or
(d) an action taken by the Commonwealth or by a Commonwealth agency that may affect a listed Commonwealth Heritage place or a place listed on the Register of the National Estate.

Refer attached report.

5. Measures aimed at avoiding or reducing significant impacts on matters protected under the EPBC Act

5.1 Describe any specific measures proposed as part of the action to avoid or lessen significant impacts on matters protected under the EPBC Act. Include a timeframe or workplan for implementation of any relevant measures.

Examples of relevant measures may include the timing of works to avoid critical periods for listed species, avoidance of habitat important for listed species from direct and indirect impacts, application of specific design measures to avoid or reduce impacts, or adoption of specific work practices to reduce or avoid impacts (see Referral Guide, Fact Sheet and 'Particular Manner' Guideline at http://www.deh.gov.au/epbc).

Refer attached report.

5.2 Describe any consultations undertaken with Indigenous stakeholders regarding the action, if relevant. Identify relevant stakeholders and the status of consultations at the time of referral.

Refer attached report.

6. Information sources

6.1 List relevant references

You should also attach a copy of any relevant reports or documents that support the arguments and conclusions made in this referral. For example, any flora and fauna surveys or desktop investigations should be provided.

Refer attached report.

6.2 For information given in sections 3 and 4 of this referral, please indicate:

(a) the source of the information; and
(b) how recent the information is; and
(c) how the reliability of the information was tested; and
(d) any uncertainties in the information.

Refer attached report.

7. Signatures and Declarations

Section 489 of the EPBC Act states that the provision of false or misleading information is an offence punishable on conviction by imprisonment and fine.

7.1. Signature of person making the referral

I, s. 47F(1) .....(*full name*), declare that the information contained in this form is, to my knowledge, true and not misleading.

Signature s. 47F(1)

Date 21 June 2006.

7.2. Signature of person proposing to take the action

I, s. 47F(1) .....(*full name*), declare that the information contained in this form is ~~to my~~ knowledge, true and not misleading.

Signature s. 47F(1)

Date 21 June 2006.

7.3. Declaration of person nominated as proponent in Section 1.3, if different from person proposing to take the action

I, ...(*full name*), being (or agent acting on behalf of) the person nominated in Section 1.3 of this referral form as the nominated proponent agree to be designated as the proponent for the action described above if it is decided that the action requires approval under Part 9 of the EPBC Act.

Signature

Date

Signature of person proposing to take the action

Date

Fill in Section 7.4 if you believe that the proposal is not likely to have a significant impact on matters protected by the EPBC Act and that the proposal is therefore not a controlled action. Fill in Section 7.5 if you believe that the proposal is likely to have a significant impact on a protected matter and that the proposal is therefore a controlled action. (Note: This Section must be completed in *all cases* except where the referral is made by a State or Territory or a Commonwealth agency in relation to an action to be taken by another person.)

7.4. If you think your proposed action is not likely to have a significant impact on any of the matters listed in the table below, then you should select and complete the following statement and you should not mark any of the boxes in the table below.

I .....*(full name)*, being the person making this referral and the person proposing to take the action (or agent acting on behalf of the person) believe that the action described in this referral **is not a controlled action.**

Briefly provide reasons why you believe your proposed action is not a controlled action:
(Note: For an explanation of the term "controlled action", see the Referral Guide.)

OR

7.5. If you think that your proposed action is likely to have a significant impact on any of the matters listed in the table below, then you should select and complete the following statement. You must then mark 'Yes' against those matters on which you think it will have a significant impact, in the table below.

I s. 47F(1) ..*(full name)*, being the person making this referral and the person proposing to take the action (or agent acting on behalf of the person) believe that the action described in this referral **is a controlled action because of the following provisions of the Act**:

Significant Impact Likely	Controlling Provision
	World Heritage property (Sections 12 and 15A - significant impacts on the values of a World Heritage property)
	National Heritage places (Sections 15B and 15C – significant impacts on the values of a National Heritage place)
[redacted]	**Ramsar Wetland** (Sections 16 and 17B - significant impacts on the ecological character of a Ramsar wetland)
	Threatened species or ecological communities (Section 18 and Section 18A - significant impacts on a listed threatened species or a listed threatened ecological community)
	Migratory species (Sections 20 and 20A - significant impacts on a listed migratory species)
	Nuclear action (Sections 21 and 22A - nuclear actions)
	Commonwealth marine area

	(Sections 23, 24 and 24A - actions relating to the Commonwealth marine area and fishing in coastal waters managed by the Commonwealth)
	Commonwealth land (Sections 26 and 27A - actions relating to Commonwealth land)
	Commonwealth action (Section 28 - actions by the Commonwealth having a significant impact on the environment)

Briefly provide reasons why you believe your proposed action is a controlled action:
(Note: For an explanation of the term "controlled action", see the Referral Guide.)

● **Refer attached report.**

If the person making this referral is, or is representing, a *small business* (a business having fewer than 20 employees), please provide an estimate of the time taken to complete this form.

Please Include

- The time spent reading the instructions, working on the questions and obtaining the information; and
- The time spent by all employees in collecting and providing this information.

hours minutes

END OF FORM

●

Ecological Assessment Report

at

(a) Lot 10 on RP 902079, &
(b) Lot 2 on RP 902075

Nolan Drive & Buckley Road, Morayfield

for

Lensworth Group Limited

Author: s. 47F(1) , e-mail: s. 47F(1)
Project: 0210116/2-1/EAR
Issue: 002
Purpose of Issue: For Information
Issue Date: June 2004

by
yurrah pty ltd
PO Box 2070
Windsor Q 4070
Tel 07 3857 8477
Fax 07 3857 8399

CONTENTS

1.0 INTRODUCTION

The subject sites of this report comprise two separate lots, being **part a,** Lot 10 on RP902079, and **part b**, Lot 2 on RP902075, Parish of Caboolture, in Caboolture Shire. The sites are located to the East of the Bruce Highway, on Nolan Drive, and are bounded to the North by the Caboolture River.

Site **a** contains two low ridges to RL 12-17 in the West and central Southern portions, and falls to mainly low-lying land (RL 1.0-5.0) in the form of alluvial flats along Caboolture River. The site was recently used for pine plantations, but has been cleared and is currently vacant land, more or less covered by a mosaic of remnant bushland and re-growth (some of which is regenerating slash pine, see **Photograph 1** below).

Photograph 1 Cleared land after removal of pine plantation, showing introduced grasses and weeds and some re-growth of slash pine.

Re-growth indigenous riparian vegetation occurs in patches along the Caboolture River and in lower-lying tidal drains and associated freshwater swamps.

Site **b** falls from a ridgeline at RL16 in the centre to a northern swale, at RL 6.0, and to a waterway in the south at RL4.0. It is currently vacant land, and is more or less covered by remnant bushland and re-growth.

Both sites are the subject of a planned Development Application to Caboolture Shire Council for the construction of an Industrial Estate and Employment Centre. The proposed plans of development have been designed by Pike Mirls McKnoulty Pty Limited, and are submitted under separate cover. The details of the proposed plans are subject to design development and Council approvals.

Yurrah Pty Limited has been commissioned to undertake an ecological assessment of the site, to accompany the Development Application. The objectives of this assessment in relation to the ecological and landscape issues for the proposed development are to provide:

- a description of the existing flora and vegetation,
- a preliminary assessment of observed fauna and wildlife habitat values,
- a report on the presence of any rare, threatened or otherwise endangered species,
- a discussion of the ecological significance of the site and its vegetation at the local and bioregional levels, and
- recommendations for environmental management of the proposed developed site.

The subject sites were traversed for this survey between September 2002 and June 2004. The sites were visited on nine separate occasions. The presence of all higher plants (flowering plants and ferns) and macro-fauna observed was noted, together with a life-form or habitat designation and assessment of relative abundance.

Parts of the subject sites, especially site **a**, were cleared of indigenous vegetation in the past and used for pine plantations, and are affected to some extent by environmental weeds and weeds of untended places.

All plant species listed below are classified as either indigenous to the area, or introduced, cultivated and/or naturalised weeds. Plants were recognized on site, and botanical keys and descriptions used were those of Stanley and Ross (1983), Kleinschmidt (1991), Andrews (1990), Brooker and Kleinig (1983), Sainty and Jacobs (1994), and Tothill and Hacker (1983). Nomenclature is that of the above publications, except where most recent revisions are known to have been published.

Observations were made on the structure and condition of the plant communities, and an assessment also made of their ecological and visual values with particular respect to potential wildlife habitat and corridor.

General observations were also made of fauna and habitat. Bird sightings and calls were listed, and searches made by skink rake for reptiles and amphibians, and by turning logs and rocks. Scratch marks, feeding traces, scats and tracks were observed and recorded. Bird feathers were recorded as evidence that these species had visited the site. Spot-lighting was undertaken on four nights to detect nocturnal species. Birds were targeted in early morning and late afternoon when they are most active.

Further, for site **a,** 80 type-A Elliott traps were set on each of five nights spaced over the first half of May 2003, for a total of 400 trap-nights. Foror site **b,** 40 type-A Elliott traps were set over four nights, between September and October 2002, for a total of 160 trap-nights. Traps were baited with the usual mix of treacle, rolled oats and peanut butter. Trap locations were chosen according to the presence of the most natural habitat, or best cover for small mammals, and were distributed across the site in order to sample each of the observed vegetation types and hence habitats. The locations for site **a** are shown in **Figure 1**, and a captured Yellow-footed Antechinus specimen is shown in **Photograph 2** below:

Photograph 2 Yellow-footed Antechinus caught in Type A Elliott trap and released.

Part a – Lot 10 on RP 902079

2.0 FLORA

2.1 Indigenous Flora

Table 1 lists the plant species presumed to be indigenous to lot 10 on RP902079 on the basis of their situation and abundance. Eighty-eight species were recorded, nineteen species being recorded as canopy trees, and thirteen species as small trees or large shrubs. A further thirteen species were recorded as small and medium shrubs, and five herbaceous species were also listed. Fifteen species were observed in the clumping plant class, including mainly grasses and sedges. There were nine climbers, three ferns, and eleven aquatic species.

None of the species recorded is regarded as endangered at the National level (Leigh, Boden and Briggs, 1984), or is considered to be rare and/or endangered at the State level (Thomas and McDonald, 1989). In addition, none of the species is listed in the Schedules 2, 3, and 4 of the Nature Conservation Act (1992-94) as extinct, endangered, vulnerable, rare, and are not therefore covered by the Declared Management Intent under those Schedules.

Schedule 5 of the same Act lists a further number of 'Common' plant species for which the management intent is to monitor and review the conservation status, prepare and implement conservation plans, encourage research and inventory programs, and incorporate such information into educational material and programs. None of the species from this site is included in the Schedule 5 list.

The number and abundance of indigenous species naturally occurring on the subject site indicates that the site is of medium species richness and, and as the majority of the site has been disturbed or cleared in the past, the overall degree of naturalness is regarded as low. The remnant vegetation on the site is not well connected to other remnant bushland, except for the riparian and tidal vegetation along the Caboolture River corridor.

Table 1 Indigenous Plants recorded from the Subject Site, all arranged alphabetically within groups of similar growth form.

Genus	species	Common name	Occurrence on site, Lot 10 on RP902079
Canopy Trees			
Aegiceras	*corniculata*	river mangrove	occasional
Allocasuarina	*glauca*	swamp oak	common
Avicennia	*marina*	grey mangrove	common
Archontophoenix	*cunninghamiana*	bangalow palm	occasional
Castanospermum	*australe*	moreton bay chestnut	rare
Corymbia	*intermedia*	Pink bloodwood	common
Corymbia	*tessellaris*	moreton bay ash	occasional
Cupaniopsis	*anacardioides*	tuckeroo	occasional
Cryptocarya	*triplinervis*	3-veined laurel	occasional
Eucalyptus	*propinqua*	grey gum	occasional
Eucalyptus	*siderophlioa*	grey ironbark	occasional
Eucalyptus	*tereticornis*	blue gum	common
Excaecaria	*agallocha*	milky mangrove	occasional
Ficus	*macrophylla*	moreton bay fig	occasional
Lophostemon	*confertus*	brushbox	occasional
Lophostemon	*suaveolens*	swamp box	common
Melaleuca	*quinquenervia*	paperbarrk	common
Neolitsea	*dealbata*	white bolly gum	occasional
Rapanea	*variabilis*	muttonwood	occasional
Sub-Totals			**19**
Small Trees and Large Shrubs			
Acacia	*concurrens*	black wattle	common
Acacia	*fimbriata*	Brisbane wattle	occasional
Acacia	*leiocalyx*	black wattle	abundant
Acacia	*melanoxylon*	blackwood	occasional
Acacia	*maidenii*	maidens wattle	occasional
Alphitonia	*excelsa*	soapwood	occasional
Allocasuarina	*littoralis*	she-oak	occasional
Commersomia	*bartramii*	brush kurrajong	occasional
Ficus	*coronata*	creek sandpaper fig	occasional
Glochidion	*ferdinandii*	cheese tree	occasional
Glochidion	*sumatranum*	glochidion	occasional
Melaleuca	*linariifolia*	flax leaf paperbark	occasional
Melia	*azedarach*	white cedar	occasional
Sub-Total	8		**13**

Table 1 continued

Shrubs			
Amyema	*cambagei*	a mistletoe	occasional
Callistemon	*pachyphyllus*	wallum bottlebrush	occasional
Capparis	*arborea*	brush caper berry	occasional
Cordyline	*stricta*	cordyline	occasional
Einodia	*hastata*	red-berry saltbush	occasional
Enchylaena	*tomentosa*	ruby saltbush	occasional
Leptospermum	*polygalifolium*	lemon-scented tea-tree	occasional
Melaleuca	*nodosa*	prickly leaved paperbark	occasional
Pipturus	*argenteus*	native mulberry	occasional
Pultenea	*myrtoides*	bush pea	occasional
Plutenea	*retusa*	bush pea	occasional
Rubus	*hillii*	raspberry	occasional
Trema	*aspera*	poison peach	occasional
Sub-Total			**13**
Herbs			
Goodenia	*rotundifolia*		occasional
Chrysocephalum	*ramossisimum*	yellow buttons	occasional
Glossocardia	*bidens*	native cobblers peg	occasional
Pimelea	*linifolia*	riceflower	occasional
Sesuvium	*portulacastrum*	sea purslane	occasional
Sub-Total			**5**
Clumping Plants			
Aristida	*benthamii*	wire grass	common
Crinum	*pedunculatum*	river lily	occasional
Cymbopogon	*refractus*	barbed wire grass	common
Entolasia	*stricta*	wiry panic	occasional
Eremochloa	*bimaculata*	poverty grass	occasional
Fimbristylis	*polytrichoides*	fuzzy rush	occasional
Gahnia	*aspera*	swordsedge	occasional
Imperata	*cylindrica*	blady grass	occasional
Lepidosperma	*laterale*	variable swordsedge	occasional
Lomandra	*hystrix*	matrush	occasional
Lomandra	*longifolia*	tall matrush	common
Lomandra	*multiflora*	many flowered matrush	common
Oplismenus	*aemulus*	shadegrass	occasional
Sporobolus	*virginicus*	saltwater couch	common
Themeda	*triandra*	kangaroo grass	common
Sub-Total			**15**
Ferns			
Acrostichum	*speciosum*	bungwall fern	common
Blechnum	*indicum*	swamp water fern	common
Pteridium	*esculentum*	bracken fern	common
Sub-Totals			**3**
Aquatics			
Baumea	*articulata*	jointed twigrush	common
Cyperus	*exaltatus*	giant sedge	occasional
Cyperus	*javanicus*	sedge	occasional
Cyperus	*pilosus*	sedge	occasional
Cyperus	*vaginatus*	sedge	occasional
Juncus	*usitatus*	common rush	common

Lepironia	*articulata*	grey rush	occasional
Ludwigia	*peploides*	water primrose	occasional
Phragmites	*australis*	common reed	occasional
Phylidrum	*lanuginosum*	frogsmouth	common
Typha	*orientalis*	bulrush	common
Sub-total			**11**
Climbers			
Calamus	australis	lawyer vine	occasional
Cissus	hypoglauca	native grape	occasional
Derris	involuta	beach bean	occasional
Geitonoplesium	cymosum	lily vine	occasional
Eustrephus	latifolius	wombat berry	occasional
Hardenbergia	violacea	false sarsparilla	occasional
Mucuna	gigantea	giant bean	occasional
Parsonsia	straminea	monkey vine	common
Stephania	japonica	tape vine	occasional
Sub-total			**9**
Totals			**88**

2.2 Introduced Flora

The plant species introduced to the site are listed in **Table 2** below, classified mostly as either environmental weeds or chance introductions to disturbed areas. Parts of the site have been cleared in recent times, and many weeds have invaded the untended areas.

The major environmental weeds are slash pine (*Pinus elliottii*), lantana (*Lantana camara*), camphor laurel (*Cinnamomum camphorae*) and groundsel (*Baccharis halimifolia*), with a patchy distribution among many other weeds throughout the remnant vegetation on the site, particularly in the more moist parts. The long-term management of these species needs attention throughout the site, especially in areas to be retained as Open Space.

A number of cultivated trees occur along the banks of the Caboolture River where homesteads existed in the past. These include the camphor laurel (see **Photograph 3** below), bunya pine (**Photograph 4**) and Moreton Bay fig (**Photograph 5**).

Photograph 3 Set of stairs marking previous homestead site near Caboolture River. Note mature size of camphor laurel growing behind stair where the homestead once stood.

Photograph 4 Stand of Bunya pines naturalised after initial planting around old homestead.

Photograph 5 Large Moreton Bay fig on the banks of the Caboolture river near an old homestead.

Table 2 List of selected Introduced weeds observed naturalised on the subject site

Species	Common Name	Abundance on this site	Life-form
Cultivated Species			
Araucaria bidwillii	bunya pine	occasional	tree
Agathis robusta	kauri pine	occasional	tree
Bambusa arundinacea	Giant Bamboo	occasional	giant grass
Brassaia actinophylla	umbrella tree	occasional	tree
Cinnamomum camphorae	camphor laurel	occasional	tree
Ficus macrophylla	moreton bay fig	occasional	tree
Pinus elliottii	slash pine	abundant	tree
Weeds			
Ageratum houstonianum	blue billygoat weed	common	herb
Asparagus africanus	asparagus fern	occasional	herb
Baccharis halimifolia	groundsel bush	occasional	shrub
Bidens pilosa	cobbler's peg	common	herb
Bryophyllum species	mother-of-millions	occasional	succulent
Celtis sinensis	chinese elm	occasional	tree
Cestrum parqui	green cestrum	common	shrub
Chloris gayana	rhodes grass	occasional	grass
Cirsium vulgare	scotch thistle	occasional	herb
Commelina diffusa	wandering jew	occasional	herb
Conyza species	fleabanes	occasional	herb
Crassocephalum crepidioides	thickhead	occasional	herb
Crotolaria species	rattlepod	occasional	shrub
Desmodium uncinatum	silver leaf desmodium	common	vine
Ipomoea cairica	mile-a-minute	common	vine
Ipomoea indica	mil-a-minute	common	vine
Lantana camara	lantana	abundant	shrub
Leucaena leucocephala	leucaena	abundant	shrub
Ligustrum sinensis	chinese privet	common	shrub
Ludwigia peruviana	ludwigia	occasional	aquatic
Macroptilium atropurpureum	siratro	common	vine
Melinus repens	red natal grass	common	grass
Ochna serrulata	ochna	occasional	shrub
Panicum maximum	guinea grass	common	grass
Passiflora foetida	stinking passion vine	common	vine
Passiflora suberosa	corky passion vine	common	vine
Physalis minima	wild gooseberry	occasional	shrub
Phytolacca octandra	ink weed	occasional	herb
Protasaparagus africanus	climbing asparagus	occasional	vine
Ricinus communis	castor oil plant	occasional	shrub
Rumex brownii	swamp dock	occasional	herb
Rumex crispus	curled dock	occasional	herb
Salvinia molesta	salvinia	common	aquatic
Schinus trebinthifolia	broadleaf pepper tree	occasional	tree
Senna pendula	easter cassia	occasional	shrub
sida rhombifolia	sida	common	shrub
Solanum seaforthianum	brazilian nightshade	occasional	shrub
Solanum americanum	blackberry nightshade	occasional	shrub
Solanum hispidum	giant devil's fig	occasional	shrub

Solanum mauritianum	wild tobacco	occasional	shrub
Sonchus oleraceus	milk thistle	occasional	herb
Tagetes minuta	stinking roger	occasional	herb
Verbena bonariensis	purple top	common	herb
Verbena officinalis	common verbena	common	herb
Total			**51**

2.3 Vegetation Structure and Condition

At the time of the survey, the vegetation of the subject site was mapped as containing *Pinus elliottii* (slash pine) plantation forest on the relevant certified Regional Ecosystem Maps – Caboolture RE9443 version 3.1 and Brisbane RE9543 Version 3.1. However, Caboolture Shire Council has noted (March 2001) four small areas of remnant vegetation on their Map 22 classed as Significant Flora and Fauna, and these were regarded as a constraint to the site development.

The four patches comprised approximately 4 hectares in two patches along the Caboolture River, a separate portion in the South-western corner of the site (contiguous with remnant vegetation on Lot 2 on RP902075), and a narrow strip along the Southern boundary in the south-east of the site near the Buckley Road entry. These patches are likely to have been interpreted from older aerial photographs taken before the slash pine was harvested, when the latter plantation type dominated the site.

The current site observations indicated that a larger portion of the site is covered by an early re-growth phase of vegetation since the removal of the slash pines. An aerial photograph was commissioned to be flown by Geometrex Pty Ltd in March 2003. This was used as a base to draw a Vegetation Map of the current vegetation, together with more recent site observations (see **drawing attached** below).

Boundaries between perceived mapping units have been drawn from aerial photographic interpretation and ground-truthing. However, it should be noted that changes between units are often subtle, where the environment changes gradually, and intermediate types occur in these areas of change that are known as ecotones. The latter have not been mapped for convenience, and therefore the boundaries themselves should be regarded only as an approximation.

The Vegetation Map utilises eight different mapping units representing perceived vegetation communities. Of these, one is regarded as Cultivated, four are relatively natural, and three represent different scenarios of re-growth or regeneration. Two of the natural units (tidal mangroves and saltmarsh) are mapped together due to their complexity and small scale. The

units are summarised in **Table 3**, showing the symbol used in the map, a short description, an estimate of the area covered by each unit, and the corresponding Regional Ecosystem number and Vegetation Management Status, where applicable. Fuller descriptions are provided below.

Table 3 List of Vegetation Mapping Units, with map symbol, short description and estimated area.

Symbol	**Mapping Unit**	**Area (ha)**	**Regional Ecosystem/ Vegetation Management Status**
CLigw	Cleared land with introduced grasses and pasture weeds	389.07	not remnant
CLsp	Cleared land with Slash Pine re-growth	8.854	not remnant
CLerg	Cleared land with early indigenous species re-growth (including *Acacia* species)	16.94	not remnant (land zone 5)
PBK	Paperbark swamp communities (*Melaleuca quinquenervia*)	17.35	12.3. 5 Of concern
Tman	Tidal – Mangrove/Swamp Oak communities	78.785	12.1.3 Not of concern
Tsal	Tidal - Saltmarsh communities	included above	12.1.2 Not of concern
Bipw	Bribie Island Pine Woodland (*Callitris columellaris*)	0.334	12.2.5 Of concern
Cul	Cultivated communities (mixed species including *Araucaria*, *Ficus*, *Cinnamomum*) with remnant bluegums (*E tereticornis*)	3.953	not remnant
	Totals	**515.244**	

From **Table 4** it can be seen that approximately 96 hectares, or 18.7% of the site, is covered by more or less natural indigenous vegetation. This vegetation generally covers the lowest-lying parts of the site including drainage lines, freshwater swamps (mostly dominated by paperbark), tidal creeks and the banks of the Caboolture River. The tidal vegetation is generally limited to narrow fringing banks where the grey, river and milky mangroves and

swamp oak occur, except where low-lying flat areas contain areas of bare mud flats, marine couch and saltmarsh species (see **Photograph 6** below).

In many parts of the site the terrestrial vegetation has been cleared down to the Highest Astronomical Tide level, leaving the intertidal vegetation more or less intact. Occasional mature blue gums (*Eucalyptus tereticornis*) have been retained, and these provide habitat for both perching and nesting along the riparian corridor. Some parts of the Caboolture River banks show signs of erosion through undercutting, possibly due to boat wash (**Photograph 7)**.

Photograph 6 Tidal vegetation with fringing mangroves along Caboolture River, marine couch and occasional blue gums.

Photograph 7 Undercut portion of Caboolture Riverbank, with fringing mangrove and swamp oak vegetation

In the central southern portion of the site an area of freshwater swamp with dominant paperbark (*Melaleuca quinquenervia*) has been retained, representing the largest indigenous remnant of vegetation (see **Photograph 8** below). This remnant has been partially drained, but has survived and now flourishes in this part of the site.

Photograph 8 Paperbark with sedge understorey in the central southern part of the site.

The final indigenous mapping unit is Bipw, the Bribie Island Pine Woodland (**Photograph 9**), occurring as a small remnant in the North-east corner of the site. This unit covers only 0.334 hectares, but continues into the adjacent property to the East.

Photograph 9 Bribie Island Pine Woodland vegetation in the North-eastern corner of the site

The clearing of the pine forest has resulted in three different scenarios of re-growth of regeneration on the site. The first of these (CLsp) is approximately 8.854 hectares where the slash pine itself has regenerated with a very high density that excludes almost all other species.

The second scenario recognised is where the pine has not dominated the re-growth, but introduced grasses and weeds have formed a low canopy (CLigw). This scenario is the most widespread on the subject site (389.07 hectares, or 75.5% of the site), and includes area of low paperbark re-growth where the latter species may dominate over time.

The third scenario includes the relatively early stages of re-growth of mixed wattles (CLerg), and includes some eucalypts and she-oaks, and consists of 16.94 hectares (3.3%).

Land Zone and Bioregional Ecosystem Status

The 1:100,000 Geological Maps covering the site (both Brisbane and Caboolture Sheets) indicate three mapping units. These are Qe, being Estuarine deposits (corresponding to Land Zone 1 in the Regional Ecosystem classification), Qa and Qha2, being Undifferentiated Alluvium (corresponding to Land Zone 3), and Rjl and Ll, being Landsborough sandstone with deeply weathered Laterite (Land Zone 5). Although not shown on the 1:100,000 maps, a small area of Qpch – Beach ridges – occurs on the North-eastern part of the site, supporting the Bribie Island Pine Woodland, and this corresponds to Land Zone 2. The land zone designation is used to classify the vegetation mapping units into Regional Ecosystem numbers in **Table 4** above.

The Vegetation Management Status of remnant vegetation as defined under the Queensland *Vegetation Management Act* and *The Vegetation Management and other Legislation Amendment Bill 2004* is also shown in **Table 4** above, where the corresponding Bioregional Ecosystem number and VMA Status are listed for each mapping unit. If an area is designated Future Industry or Future Residential under a Town Plan (ie is regarded as an 'Urban' area), it is generally exempt from the provisions of the above *Act* unless it contains 'Endangered' regional ecosystems.

3.0 FAUNA AND HABITAT

Lists of the major groups of fauna, either observed on site during the searches, or regarded from experience in the general area as being likely to visit the site, are presented below in **Tables 4 to 8**. In these lists, the following symbols have specific meanings:

= observed on site during this survey
* = could be expected to visit the site from time to time
^ = an Introduced species

Birds The group with the highest species richness is clearly the bird fauna, with sixty-three indigenous species being recorded. This is regarded as a medium-to-high bird count, by 'average Southeast Queensland' standards, and reflects the relatively large site, diversity of habitat, and extent of cover for smaller species.

A number of other birds are regarded as possibly visiting the site from time to time, based on the proximity of remnant bushland in the Morayfield area and the Caboolture River corridor. None of the species recorded is regarded as rare or threatened.

Table 4 - List of Avifauna directly observed or considered likely to occur on the Subject Site

Australasian Grebe	Tachybaptus novaehollandiae	*
Little Pied Cormorant	Phalacrocorax melanoleucos	*
Little Black Cormorant	Phalacrocorax sulcirostris	*
Great Cormorant	Phalacrocorax carbo	*
Australian Pelican	Pelecanus conspicillatus	*
Great Egret	Egretta alba	*
Intermediate Egret	Egretta intermedia	*
Little Egret	Egretta garzetta	*
Cattle Egret	**Ardeola ibis**	#
White-faced Heron	**Adea novaehollandiae**	#
Pacific Heron	Ardea pacifica	*
Nankeen night heron	**Nyctocorax caledonicus**	#
Royal Spoonbill	**Platalea regia**	#
Yellow-billed Spoonbill	Platalea flavipes	*
Straw-necked Ibis	**Threskiornis spinicollis**	#
Pied Cormorant	**Phalacrocorax varius**	#
Australian Darter	**Anhinga melanogaster**	#
Glossy Ibis	Plegadis falcinellus	*
Wood Duck	**Chenonetta jubata**	#
Pacific Black Duck	**Anas superciliosa**	#

Collared Sparrowhawk	Accipiter cirrhocephalus		*	
Brown Goshawk	**Accipiter fasciatus**		*****	
Grey Goshawk	Accipiter novaehollandiae		*	
Crested Hawk	Aviceda subcristata		*	
Whistling Kite	Haliastur sphenurus		*	
Brahminy Kite	Haliastur indus		*	
White breasted sea eagle	**Halieetus leocgaster**		#	
Brown Quail	**Coturnix australis**		#	
Purple Swamphen	**Porphyrio porphyrio**		#	
Eurasian Coot	**Fulica atra**		#	
Dusky Moorhen	Gallinula tenebrosa		*	
Black-naped Tern	**Sterna sumatrana**		#	
Masked Lapwing	**Vanellus miles**		#	
Black-fronted Dotterel	Charadrius melanops		*	
Scrub turkey	**Alectura lathami**		#	
Bush Curlew	**Burhinus magnirostris**		#	
Crested Pigeon	**Ocyphaps lophotes**		#	
Common Bronzewing	**Phaps Chalcoptera**		#	
Peaceful Dove	**Geopelia striata**		#	
Bar-shouldered Dove	**Geopelia humeralis**		#	
Spotted Turtle Dove	**Streptopelia chinensis**		#	
Emerald Dove	Chalcophaps indica		*	
Brown Pigeon	**Macropygia amboinensis**		#	
White-headed Pigeon	**Columba leucomela**		#	
Starling	**Sternus vulgaris**	^	#	
Indian Miner	**Acridotheres tristis**	^	#	
Galah	**Cacatua roseicapilla**		#	
Sulphur-crested Cockatoo	**Cacatua galerita**		#	
Yellow-tailed Black Cockatoo	Calyptorhynchus funereus		*	
Red-tailed Black Cockatoo	Calyptorhynchus magnificus		*	
Rainbow Lorikeet	**Trichoglossus haematodus**		#	
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus		*	
Pale-headed Rosella	**Platycercus adscitus**		#	
Fan-tailed Cuckoo	Cuculus pyrrhophanus		*	
Shining Bronze-Cuckoo	Chrysococcyx lucidus			*
Pheasant Coucal	**Centropus phasianinus**		#	
Common Koel	Eudynamis scolopacea		*	
Laughing Kookaburra	**Dacelo novaeguineae**		#	
Sacred Kingfisher	**Halcyon sancta**		#	
Azure Kingfisher	Ceyx azurea		*	
Rainbow Bee-eater	**Merops ornatus**		#	
Dollarbird	Eurystomus orientalis		*	
Southern Boobook	Ninox novaeseelandiae		*	
Tawny Frogmouth	Podargus strigoides		*	
Welcome Swallow	**Hirundo neoxena**		#	
Fairy Martin	Cecropis ariel		*	
Black-faced Cuckoo-shrike	**Coracina novaehollandiae**		#	
White-bellied Cuckoo-shrike	Coracina papuensis		*	
Varied Triller	Lalage leucomela		*	
Cicadabird	Coracina tenuirostris		*	
Rose Robin	Petroica rosea		*	

Yellow Robin	**Eopsaltria australis**	#	
Golden Whistler	Pachycephala pectoralis	*	
Rufous Whistler	**Pachycephala rufiventris**	#	
Grey Thrush	**Colluricincla harmonica**	#	
Black-faced Monarch	Monarcha melanopsis	*	
Leaden Flycatcher	Myiagra rubecula	*	
Grey Fantail	**Rhipidura fuliginosa**	#	
Rufous Fantail	Rhipidura rufifrons	*	
Willy Wagtail	**Rhipidura leucophrys**	#	
Eastern Whipbird	Psophodes nigrogularis	*	
Golden-headed Cisticola	Cisticola exilis	*	
Variegated Wren	Malurus assimilis	*	
Red-backed Wren	**Malurus melanocephalus**	#	
White-browed Scrub Wren	Sericornis frontalis	*	
Brown Warbler	Gerygone mouki	*	
White-throated Warbler	Gerygone olivacea	*	
Striated Thornbill	Acanthiza lineata	*	
Brown Thornbill	**Acanthiza pusilla**	#	
White-throated Treecreeper	Cormobates leucophaea	*	
Little Wattlebird	Anthocha chrysoptera	*	
Noisy Friarbird	**Philemon corniculatus**	#	
Noisy Miner	**Manorina melanocephala**	#	
White-throated Honeyeater	Melithreptus albogularis	*	
White-naped Honeyeater	**Melithreptus lunatus**	#	
Lewin's Honeyeater	**Meliphaga lewinii**	#	
Yellow-faced Honeyeater	Lichenostomus chrysops	*	
Mangrove Honeyeater	**Lichenostromus versicolor**	#	
Scarlet Honeyeater	Myzomela sanguinolenta	*	
Eastern Spinebill	Acanthorhynchus tenuirostris		*
Brown Honeyeater	**Lichmera indistincta**	#	
Silvereye	**Zosterops lateralis**	#	
Mistletoebird	**Dicaeum hirundinaceum**	#	
Spotted Pardalote	Pardalotus punctatus	*	
Striated Pardalote	**Pardalotus striatus**	#	
Red-browed Firetail	**Aegintha temporalis**	#	
Double-barred Finch	**Poephila bichenovii**	#	
Olive-backed Oriole	Oriolus sagittatus	*	
Figbird	Sphecotheres viridis	*	
Spangled Drongo	**Dicrurus megarhynchus**	#	
Magpie-lark	**Grallina cyanoleuca**	#	
White-breasted Woodswallow	**Artamus leucorhynchus**	#	
Pied Butcherbird	**Cracticus nigrogularis**	#	
Grey Butcherbird	**Cracticus torquatus**	#	
Australian Magpie	**Gymnorhina tibicen**	#	
Pied Currawong	**Strepera graculina**	#	
Torresian Crow	**Corvus orru**	#	

The site is regarded as being of significance for avifauna, and will, when rehabilitated, provide core habitat for several common species.

Mammals

Spotlighting - Four nights by two hours of hand-held spotlight were undertaken. A large group of Grey kangaroos were commonly observed in the cleared areas dominated by introduced grasses and weeds. Swamp wallabies were also observed occasionally among the paperbark woodland. While both the ring-tailed and brush-tailed possums were sighted, no gliders were seen nor scratch marks observed. No Koala scratches were noted on the bark of smooth-barked gums, and no scats found, despite extensive searches.

A single fox was observed on the site, and occasional hares. Although no feral pigs were seen, signs of their typical rooting activity were noted in areas along the Caboolture River (see **Photograph 11** below). The presence of the fox and pigs will have a negative impact on the indigenous fauna habitat.

Photograph 11 View of area near the Caboolture River among Camphor Laurel tree that has been recently disturbed by feral pigs

Small-mammal Trapping - The trapping program resulted in the capture of 56 small mammals in Elliott Type A traps. Some traps set along the River banks were baited with pilchards, targeting the false water mouse, but none were caught and no nests were observed. The species and their location in each of the vegetation types or habitats are listed below.

Table 5 List of captured small mammals with numbers and vegetation type/habitats.

Species	No Trapped	Vegetation Type/Habitat
Marsupial		
Antechinus flavipes	24	Paperbark, Eucalypt woodland, Riparian, Cleared Land,
Melomys cervinipes	6	Paperbark, Eucalypt woodland
Placental		
Rattus fuscipes	4	Paperbark, Riparian
Rattus lutreolus	4	Creeks and Caboolture River, Paperbark
Mus musculus	18	All types
Total	**56**	

Table 6 lists all of the mammal species that may be expected to utilise the site at some time, given the existing habitat. Feral animals such as cats are also expected to visit the site, and have been previously observed nearby.

Table 6 List of Mammals observed or likely to occur on the subject site.

Common name	Species	Presence on site
Echidna	*Tachyglossus aculeatus*	*
Yellow-footed Antechinus	***Antechinus flavipes***	#
Fawn-footed Melomys	***Melomys cervinibes***	#
Northern Brown Bandicoot	***Isoodon macrurus***	#
Swamp wallaby	***Wallabia bicolour***	#
Grey Kangaroo	***Macropus giganteus***	#
Koala	*Phascolarctos cinereus*	*
Common Ring-tail Possum	***Pseudichierus peregrinus***	#
Common Brush-tail Possum	***Trchosurus vulpecular***	#
Sugar Glider	*Petaurus breviceps*	*
Bush Rat	***Rattus fuscipes***	#
Swamp Rat	***Rattus lutreolus***	#
Ship Rat	*Rattus rattus* ^	*
House Mouse	***Mus musculus*** ^	#
Black Flying Fox	*Pteropus alecto*	*
Hare	***Lepus capensis***	#
Domestic cat	*Felis catus*	*
Fox	***Vulpes vulpes***	#
Feral Pig	***Sus scrofa***	#

Reptiles Five common reptiles were observed on the site, and this small number was possibly due to the cool weather. **Table 7** lists the other species that are likely to occur from time to time, but none of these is considered by McDonald et al. (1991) to be threatened.

Table 7 List of Reptiles observed or likely to occur on the subject site

Keelback	Tropidonophis mairii	*
Common Tree Snake	**Dendrelapis punctulatus**	#
Red-bellied Black Snake	Pseudechis porphyriacus	*
Yellow-faced Whip Snake	Demansia psammophis	*
Marsh Snake	Hemiaspis signata	*
White-crowned Snake	Cacophis harriettae	*
Brown Tree Snake	Boiga irregularis	*
Carpet Python	Morelia spilota	*
Eastern Water Dragon	Physignathus lesuerii	*
Bearded Dragon	**Pogona barbata**	#
Saw-shelled Turtle	Elseya latisternum	*
Short-necked turtle	Emydura signata	*
Wall Skink	**Cryptoblepharus virgatus**	#
Pink-tongued Skink	Cyclodomorphus gerrardii	*
Blue-tongued skink	Tiliqua scincoides	*
Grass Skink	**Lampropholis delicata**	#
Fire-tailed Skink	**Morethia taeniopleura**	#
Bar-sided Skink	Eulamprus tenuis	*

Amphibians Four species (one the introduced cane toad) were observed on the subject site, although it should be noted that there had been an extended period of dry weather prior to and during the survey. However, given the general nature of the site habitat, a number of other relatively common amphibian species, and one Vulnerable species (the wallum froglet) may be expected to occur during wet weather on the site, as indicated in **Table 8**.

Table 8 List of Amphibians observed or likely to occur on the subject site

Green Treefrog	**Litoria caerulea**		*****
Graceful Treefrog	Litoria gracilenta		*
Eastern Sedgefrog	Litoria fallax		#
Striped Rocketfrog	Litoria nasuta		*
Striped Marshfrog	**Limnodynastes peronii**		**#**
Spotted Marshfrog	Limnodynastes tasmaniensis		*
Beeping Froglet	Crinia parinsignifera		*
Wallum Froglet	Crinia tinnula		*
Tusk Frog	**Adelotus brevis**		**#**
Cane Toad	**Bufo marinus**	^	**#**

4.0 ECOLOGICAL VALUES

Flora and Vegetation - Intrinsic Values The species richness of the indigenous flora is medium, including eighty-eight species of flowering plants and ferns. This is quite a high number considering the degree of previous disturbance to the site from agricultural and forestry activities, and reflects both the size of the site and diversity of vegetation types and habitats. None of the species is regarded as rare or endangered, and all are regarded as common and widespread in South-east Queensland.

The vegetation types do not display any particular intrinsic values in the sense that they comprise common and widespread plant species, but the Regional Ecosystem classification combines the flora and vegetation data with soils, geomorphology and geology as a surrogate for the entire ecosystem (that is, the flora, fauna and abiotic environment). The purpose of this is to include the fauna and microbial communities that inhabit the vegetation types, and that which may otherwise not be included in any consideration of ecological values.

The examination of the relevant 1:100,000 Geological Maps has determined that part of the site lies in Land Zone 1, part in Land Zone 2 (actually unmapped), part in Land Zone 3, and part in Land Zone 5. As a result of this, the (Bio)Regional Ecosystems in these areas are classified as having Vegetation Management Status as shown in **Table 4**

The tidal vegetation comprising mangroves and saltmarsh along the various un-named creeks and Caboolture River is regarded as being 'Not of concern'. The paperbark vegetation of the freshwater swamps is classified as being 'Of concern', as is small remnant of Bribie Island Pine beach forest. The balance of site vegetation is regarded as being non-remnant, and is therefore not classified unde this system. Because the tidal and freshwater areas are below the Q_{100} flood level, they will not be able to be developed, and are likely to be included within Open Space. Their ecological values are therefore to be conserved. They are also protected under State Legislation and Planning Policies.

Vegetation Naturalness and Ecological Condition The previous land uses of agricultural and forestry operations mean that most of the site is more or less disturbed. The current land use of vacant land has led to an increase in re-growth of both introduced and indigenous

species, with the former dominating the largest area. The site is therefore regarded as being of low naturalness generally, but is of medium naturalness where remnant indigenous vegetation occurs, and is in medium ecological condition in the latter areas.

The likely future condition and naturalness of the vegetation will depend on changes in land use on the site, and various other impacts from human intervention. The existing land use of vacant land provides a very low level of management for the indigenous vegetation, which is specially threatened by the edge effects of weed infestation, and uncontrolled frequent fire incidence. The latter is sufficient to both cause and maintain significant changes to the vegetation type, and hence the overall ecosystem values.

Fauna and Habitat Values The remnant flora is of medium species richness, but provides mainly refuge habitat quality for indigenous fauna. The presence of some vegetated cover provides habitat for smaller mammals, which are quite common, although their tenure may be less than secure due to the presence of feral predators and competition from introduced species.

The most secure and therefore significant parts of the site for habitat are the Caboolture River corridor, which has connections both upstream and downstream, and the area of paperbark woodland in the central southern portion of the site.

The subject site in isolation is large enough to support a viable population of small mammals in terms of inherent viability, and this is supported by connections to other nearby remnants.

The presence of some tall trees on site, particularly along the river corridor and the Southern boundary, provides roosting and nesting habitat for birds and possibly gliders, although few hollows were observed. Some of the isolated remnant eucalypt trees are of the stage where hollows may form in the not-too-distant future, and their utility for wildlife will then be enhanced. In this regard, the likely edge effects from feral predator or competitor penetration on any ground fauna would be high, although the occasional cover does offer some protection for small species. Feral species need to be subject to long-term control measures on this site.

Waterway Values The ecological values of the subject site are dependent to a great extent on the habitat associated with the drainage corridors, both freshwater and saline, that dissect

the site. The Caboolture River and its tributaries dominate the landscape in the North and East of the site, and the freshwater swamps formed in the overland flow-paths dominate the Southern portion.

These areas should be retained within Open Space and managed with appropriate buffer zones to ensure their ecological values are sustained over the long term. Their values lie in not only the intrinsic habitat provided, but they also act as a buffer for water quality entering Moreton Bay, an important RAMSAR wetland.

Major threats to the ecological values on the site include continuing human impacts, especially an uncontrolled fire regime, and the increasing dominance of environmental weeds and feral fauna. Each of these has the potential to interfere with the natural vegetation and habitat regeneration, possibly leading to a dysfunctional ecosystem (possibly a dysclimax).

5.0 DISCUSSION AND RECOMMENDATIONS

The Ecological Assessment of the site has found that the intrinsic flora and faunal values are low to medium, as is the species richness, naturalness and degree of connectivity with other nearby remnant vegetation. Nevertheless, the relatively large size and habitat diversity on the site mean that it does contain significant ecological values for habitats and regional ecosystems. The majority of these are located along the Caboolture River corridor, and in the drainage paths over the site. The disturbed areas of regenerating grassland are also being used by a group of grey kangaroos.

The ecological values of the site have been drastically affected by the previous land uses of agriculture and forestry, and the recent removal of the slash pine crop has resulted in vacant land that is subject to relatively uncontrolled fire, and on-going impacts from environmental weeds and feral pests.

Although the site is subject to a Development Application, the presence of the Q_{100} flood-line incorporates most of the freshwater and tidal wetland vegetation. This means that the vegetation and habitat values will be incorporated into an Open Space system that allows for their ongoing management and rehabilitation. It is recommended that the protection and enhancement of ecological values be the main consideration in the management of this system. In particular, the following recommendations are made:

1. Develop an integrated approach to protection of site ecological values in the Open Space through a program of rehabilitation. By way of commencement (stage 1), fence off selected portions of the site for intensive rehabilitation, being those areas that are generally natural but only require a minimum of intervention to remove introduced species, or areas that are currently under threat. Allow stock to graze over the balance of the disturbed areas to control weed growth, while periodically introducing nodes of tree planting that will act as a seed source for future rehabilitation stages.

The rehabilitation plan should incorporate fauna habitat requirements for both those species known on the site and others that may visit from time to time.

2. Incorporate any requirements for stormwater detention and/or quality treatment into the rehabilitation design of the disturbed areas of the site. The construction of basins or wetlands in the overland flow-paths or low lying areas can be planted with locally indigenous plan species to stabilise and assist in maximising habitat values. These areas can be used as rehabilitation nodes to also act as seed sources for the on-going regeneration of indigenous vegetation over the balance of the disturbed site.

3. Provide Integrated Landscape Buffers around the site boundaries, especially between the developed part of the site and the Open Space, to protect the ecological values of the latter from future incremental impacts. Design these buffers by utilising the methodology outlined for fisheries habitat protection by the Queensland Department of Primary Industries (DPI, 1998).

These guidelines were applied to the subject site, and the main objectives for the buffer are:

- *the long term protection of habitat and integrity of the natural resource, including the Of concern Regional Ecosystems and the enhancement of waterway corridors,*
- *provision of a physical separation distance and/or barrier between adjacent industrial or residential development and the natural resource, and clarification of real property boundaries for property owners,*
- *accommodation within the buffer of natural physical processes including land stability, erosion and accretion, flood mitigation, climate change and the greenhouse effect,*
- *filtration of pollutants and competition from potentially invasive species, and*
- *provision of appropriate human access and economic benefit.*

The Buffer functions, priorities for the subject site, and their appropriate buffer widths in the following **Table 9** are a synthesis derived by DPI from both Australian and international examples in the scientific literature:

Table 9 Assessment of required buffer functions – extracted and adapted from DPI(2000)

Buffer Function	Priority Low	Med	High	Minimum buffer width range required for function (m)
1. Protection of species diversity and distribution • continuity of vegetation • connectivity with other remnants • migration/movement corridors			X	5-106
2. Protection of Ecological Buffer • creek bank/floodplain/tidal vegetation • habitat structure, carbon cycling • productivity			X	5-100
3. Filtration of nutrients, pesticides, and/or heavy metals • Sediment bound • soluble • spray drift			X	9-61 5-262 40-300
4. Water Quality • Sediment filter/control • Stormwater run-off filter/control • provision of shading effects		X		30-90 30-90 15-30
5. Stabilisation of bank erosion	X			5-125
6. Pedestrian access to resource	X			5-10
7. Provision of other wildlife habitat • Wildlife corridors • Protection of remnant vegetation		X		15-45 5-100
8. Mosquito and midge control	X			

It is proposed that the buffers provided to the boundaries will satisfy each of these functions through an integrated landscape design approach that provides the appropriate structures and distance parameters. For example, the proposed development may provide in some places for a road reserve between the industrial or residential lots and the Open Space, which also allows for an efficient physical separation and firebreak function.

4. A detailed Vegetation Management, Landscaping and Water Quality Management Plan should be prepared for the proposed development. This plan should address the

treatment of the interface between Development and Open Space, with special reference to human access and recreation facilities, fire management, long-term weed control, and stormwater quality management.

The landscape management of the remnant vegetation should include two major strategies, being exclusion from frequent fire, and weed control. The management of fire will need to be coordinated with the Caboolture Shire Council, and will depend on the overlooking of the area by tenants/owners, the provision of town water for fire fighting, and access for fire fighting equipment.

5. It is also recommended that the proposed development proceed in accordance with best practice environmental planning, design and construction principles, through the implementation of an Environment Management Plan (EMP). There are a number of environmental issues that need to be addressed, and it is most efficient for them to be integrated within a documented framework that allows a clear method of reporting and review.

This EMP, which is recommended to be written at the Operational works stage for incorporation into each works specification. A typical Table of Contents for such an EMP is provided in the **Table 10** below:

1.0 GENERAL INTRODUCTION

- 1.1 EMP Structure and Process
  - 1.1.1 Development Construction Works
  - 1.1.2 Management Structure
  - 1.1.3 Monitoring, Audit and Review
  - 1.1.4 Non-conformance Procedure
  - 1.1.5 External Complaint Procedure
  - 1.1.6 Staff Training
- 1.2 The Site and Proposed Development

2.0 VEGETATION MANAGEMENT

- 2.1 Introduction
- 2.2 Relevant Plans and Specifications
- 2.3 Retention and Protection of Existing Vegetation
- 2.4 Vegetation Clearing
- 2.5 Green Waste Management

3.0 FAUNA MANAGEMENT

3.1 Mitigation of clearing impacts on Terrestrial and Avi-Fauna
3.2 Protection of Habitat Trees

4.0 EARTHWORKS, STORMWATER AND WATER QUALITY MANAGEMENT

4.1 Objectives - Design Mitigation, Construction and Maintenance
4.2 Water sensitive urban design
4.3 Site-based Water Quality Management
4.4 Erosion and Sediment Controls
4.5 Topsoil and Fill Material Management

5.0 OPEN SPACE LANDSCAPE MANAGEMENT

5.1 Design intent
5.2 Planting Plans
5.3 Weed control
5.4 Maintenance Issues

6.0 CHEMICAL AND WASTE MANAGEMENT

6.1 Objectives
6.2 Fuel, Oil and Grease Wastes
6.3 Used and Excess Building Materials
6.4 Sanitary Waste
6.5 Agricultural and other Chemicals
6.6 Waste Containers and Servicing

7.0 ACOUSTIC ENVIRONMENT

8.0 AIR QUALITY

9.0 DEVELOPMENT CONSTRUCTION SUB-PLANS FOR MONITORING AND REPORTING

9.1 Water quality management
9.2 Management of pollutant input to the waterway system
9.3 Fauna habitat protection and conservation
9.4 Erosion and sediment controls
9.5 Chemical and Waste management

This EMP will become the document referred to for all activities on the subject site, and will clearly indicate respective responsibilities for management of environmental issues.

Part b – Lot 2 on RP 902075

6.0 FLORA

6.1 Indigenous Flora

Table 11 lists the plant species presumed to be indigenous to the subject site on the basis of their situation and abundance. Forty species were recorded, six species being recorded as canopy trees, and eight species as small trees or large shrubs. A further four species were recorded as small and medium shrubs, and three herbaceous species were also listed. Ten species were observed in the clumping plant class, including mainly grasses and sedges. There were no climbers, one fern, and eight aquatic species.

None of the species recorded is regarded as endangered at the National level (Leigh, Boden and Briggs, 1984), or is considered to be rare and/or endangered at the State level (Thomas and McDonald, 1989). In addition, none of the species is listed in the Schedules 2, 3, and 4 of the Nature Conservation Act (1992-94) as extinct, endangered, vulnerable, rare, and are not therefore covered by the Declared Management Intent under those Schedules.

Schedule 5 of the same Act lists a further number of 'Common' plant species for which the management intent is to monitor and review the conservation status, prepare and implement conservation plans, encourage research and inventory programs, and incorporate such information into educational material and programs. None of the species from this site is included in the Schedule 5 list.

The number and abundance of indigenous species naturally occurring on the subject site indicates that the site is of medium species richness and, and as some parts of the site have been disturbed or cleared in the past, the degree of naturalness is also regarded as medium. The site is not well connected to other remnant bushland, as the Bruce Highway lies to the immediate West, and the areas to the East have recently been cleared of pins forest vegetation. The area to the North has also been cleared, although there is some limited connectivity to the South and southeast via a small waterway. The bushland to the immediate South of the site contains *Eucalyptus bancrofti*, a rare occurrence for Caboolture Shire. The latter species was not located on the subject site.

Table 11 Indigenous Plants recorded from the Subject Site, all arranged alphabetically within groups of similar growth form.

Genus	species	Common name	Occurrence on site, Lot 2 on RP902075
Canopy Trees			
Angophora	*leiocarpa*	smooth apple	common
Corymbia	*intermedia*	Pink bloodwood	common
Eucalyptus	*racemosa*	scribbly gum	common
Eucalyptus	*siderophlioa*	grey ironbark	common
Lophostemon	*suaveolens*	swamp box	common
Melaleuca	*quinquenervia*	paperbarrk	common
Sub-Totals	6		
Small Trees and Large Shrubs			
Acacia	*concurrens*	black wattle	common
Acacia	*fimbriata*	Brisbane wattle	occasional
Acacia	*leiocalyx*	black wattle	common
Acacia	*podalyriifolia*	Silver wattle	occasional
Alphitonia	*excelsa*	soapwood	occasional
Allocasuarina	*littoralis*	she-oak	occasional
Glochidion	*ferdinandii*	cheese tree	occasional
Glochidion	*sumatranum*	glochidion	occasional
Sub-Total	8		
Shrubs			
Hibbertia	*vestita*	hibbertia	occasional
Leptospermum	*polygalifolium*	teatree	occasional
Melaleuca	*nodosa*	prickly leaved paperbark	occasional
Trema	*aspera*	poison peach	occasional
Sub-Total	4		
Herbs			
Goodenia	*rotundifolia*		occasional
Chrysocephalum	*ramossisimum*	yellow buttons	occasional
Pimelea	*linifolia*	riceflower	occasional
Sub-Total	3		
Clumping Plants			
Aristida	*benthamii*	wire grass	common
Cymbopogon	*refractus*	barbed wire grass	common
Entolasia	*stricta*	wiry panic	occasional
Imperata	*cylindrica*	blady grass	occasional
Lepidosperma	*laterale*	variable swordsedge	occasional
Lomandra	*longifolia*	tall matrush	common
Lomandra	*multiflora*	many flowered matrush	common
Themeda	*triandra*	kangaroo grass	common
Thysanotus	*tuberosus*	native iris	occasional
Tricoryne	*elatior*	tircoryne	occasional
Sub-Total	10		

Table 11 continued

Genus	Species	Common name	Abundance on subject site
Ferns			
Pteridium	*esculentum*	bracken fern	common
Sub-Totals	1		
Aquatics			
Baumea	articulata	jointed twigrush	common
Cyperus	exaltatus	giant sedge	occasional
Juncus	usitatus	common rush	common
Lepironia	articulata	grey rush	occasional
Ludwigia	peploides	water primrose	occasional
Phragmites	australis	common reed	occasional
Phylidrum	lanuginosum	frogsmouth	common
Typha	orientalis	bulrush	common
Sub-total	8		
Totals	**40**		

6.2 Introduced Flora

Some of the plant species introduced to the site are listed in **Table 12** below, classified mostly as either environmental weeds or chance introductions to disturbed areas. Parts of the site have been cleared in historical times, and some weeds have invaded the untended areas.

The major environmental weeds are lantana (*Lantana camara*), camphor laurel (*Cinnamomum camphorae*) and groundsel (*Baccharis halimifolia*), with a patchy distribution throughout the remnant vegetation on the site, particularly in the more moist parts. These species should be removed as part of the long-term management throughout the site, especially in areas to be retained as bushland and not developed, should there be any such areas.

Table 12 List of selected Introduced weeds observed naturalised on the subject site

Species	Common Name	Abundance on this site	Life-form
Ageratum houstonianum	blue billygoat weed	occasional	herb
Baccharis halimifolia	groundsel bush	common	shrub
Cinnamomum camphorae	camphor laurel	occasional	tree
Gomphocarpus physocarpus	balloon cotton	occasional	shrub
Lantana camara	lantana	common	shrub
Ludwigia peruviana	ludwigia	occasional	aquatic weed
Melinis minutiflora	molasses grass	common	grass
Pinus elliottii	slash pine	occasional	tree
Salvinia molesta	salvinia	common	aquatic weed
Urochloa mutica	para grass	common	grass

6.3 Vegetation Structure and Condition

Two major vegetation types were observed on the subject site. These were a Eucalypt woodland (dominated by scribbly gum, grey ironbark and pink bloodwood) on the higher slopes and ridge, and a Paperbark open forest, part of which was in an early stage of regeneration, on the lower slopes and drainage paths. A hot fire had recently passed through the site prior to the survey, and further species may regenerate with time. Blady grass and swamp box are common in the lower layers of the Eucalypt forest, and blady grass and bracken fern in those of the paperbark forest.

At the time of the survey, the vegetation of the subject site was not mapped as containing Remnant Vegetation on the certified Regional Ecosystem Map – Caboolture RE9443 version 3.1. However, the site is mapped on the 1:100,000 Geological Series Sheet 9443 as belonging to the Landsborough Sandstone unit RJI, and is shown partly with a stippling that refers to Tertiary "Duricrust; mainly laterite". The latter is considered to be an indicator of Land Zone 5 in the classification of Sattler and Williams (1999), and this part of the site is located on the mid and upper slopes, and the ridge. The balance of the site, on the lower slopes and drainage paths, is mostly alluvial material, and belongs to Land Zone 3 (mapping unit Qa).

As there was evidence of remnant vegetation on the site, a site survey was undertaken of the perceived vegetation boundaries with Pike Mirls McKnoulty Pty Ltd (PMM), using a Trimble PRO XRS (Wide Area Differential Real time) GPS. An inquiry was then made with the Queensland Herbarium, a branch of the Environment Protection Agency (EPA), with respect to a possible review of the Regional Ecosystem (RE) mapping, and a copy of the vegetation map forwarded to the relevant EPA officer.

The EPA undertook a site inspection, and accordingly made an amendment to the RE map, which was forwarded to the Department of Natural Resources and Mines (DNRM), who are responsible for certifying and issuing the official maps. A copy of the revised map was forwarded to the author and to PMM by DNRM, with the resulting changes being as follows:

1. An area of approximately 15 hectares in the North of the site, probably Land Zone 3, was recognised as being of an early stage of regeneration, and therefore not classified as Remnant Vegetation.

2. A second area of approximately 8 hectares was mapped as Land Zone 5, RE 12.5.3, which is regarded by the EPA as having a Conservation Status of "Endangered". This RE is described as:

> '*Eucalyptus tindaliae, Corymbia intermedia, E siderophloia, E racemosa* tall shrubby open forest … on complex of remnant tertiary surfaces and Cainozoic to Proterozoic sediments. *E racemosa* is predominant in places…13% remains of an estimated preclearing are of approximately 40,000 hectares.'

3. A third area of approximately 5.6 hectares in the south of the site was mapped as Land Zone 3, RE 12.3.5, which is regarded by the EPA as having a Conservation Status of "Of Concern". This RE is described as being:

> '*Melaleuca quinquenervia* tall open forest to woodland on Cainozoic alluvial plains in coastal areas….36% remains of a preclearing area of about 60,000 hectares'.

The detailed implications of these changes for the proposed development of the site are discussed in more detail in Sections 4 and 5 below.

7.0 FAUNA AND HABITAT

Lists of the major groups of fauna, either observed on site during the searches, or regarded from experience in the general area as being likely to visit the site, are presented below in **Tables 13 to 15**. In these lists, the following symbols have specific meanings:

= observed on site during this survey
* = could be expected to visit the site from time to time
^ = an Introduced species

Birds The group with the highest species richness is clearly the bird fauna, with twenty-three indigenous species being recorded. This is regarded as a medium bird count, by 'average Southeast Queensland' standards, and probably reflects the restricted diversity of habitat on the site, and lack of cover for smaller species.

A large number of other birds are regarded as possibly visiting the site from time to time, based on the proximity of remnant bushland in the Morayfield area and the Caboolture River corridor. None of the species recorded is regarded as rare or threatened.

Table 13 List of Avifauna directly observed or considered likely to visit the site

Common name	Species	Presence
Spurwing Plover	Vanellus miles	*
Intermediate Egret	Egretta intermedia	*
Royal Spoonbill	**Platalea regia**	#
Cattle Egret	Ardeola ibis	*
Sacred Ibis	Threskiornis aethiopica	*
Wood Duck	Chenonetta jubata	*
Pacific Black Duck	**Anas Superciliosa**	#
Whistling Kite	Haliastur spenurus	*
Brown Goshawk	Accipiter fasciatus	*
Crested Hawk	Aviceda subcristata	*
Bush Curlew	Burhinus magnirostris	*
Brown Quail	Coturnix australis	*
Crested Pigeon	Ocyphaps lophotes	*
Peaceful dove	Geopelia striata	*
Common Bronzewing	Phaps calcoptera	*

Bar-shouldered Dove	**Geopelia humeralis**	#	
Galah	Cacatua roseicapilla	*	
Sulphur-crested Cockatoo	Cacatua galerita	*	
Rainbow Lorikeet	**Trichoglossus haematodus**	#	
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	*	
Little lorikeet	Trochglossus pusilla	*	
Pale-headed Rosella	**Platycercus adscitus**	#	
Pheasant Coucal	Centropus phasianinus	*	
Channel-billed cuckoo	Scythrops novaehollandiae	*	
Common Koel	Eudynamis scolopacea	*	
Laughing Kookaburra	**Dacelo novaeguineae**	#	
Dollarbird	Eurystomus orientalis	*	
Southern Boobook	Ninox novaeseelandiae	*	
Tawny Frogmouth	Podargus strigoides	*	
Welcome Swallow	Hirundo neoxena	*	
Fairy Martin	Cecropis ariel	*	
Black-faced Cuckoo-shrike	**Coracina novaehollandiae**	#	
Varied Triller	Lalage leucomela	*	
Cicadabird	Coracina tenuirostris	*	
Rose Robin	Petroica rosea	*	
Yellow Robin	Eopsaltria australis	*	
Golden Whistler	**Pachycephala pectoralis**	#	
Rufous Whistler	**Pachycephala rufiventris**	#	
Grey Thrush	Colluricincla harmonica	*	
Black-faced Monarch	Monarcha melanopsis	*	
Leaden Flycatcher	Myiagra rubecula	*	
Grey Fantail	**Rhipidura fuliginosa**	#	
Rufous Fantail	Rhipidura rufifrons	*	
Willy Wagtail	**Rhipidura leucophrys**	#	
Variegated Wren	**Malurus assimilis**	#	
Red-backed Wren	**Malurus melanocephalus**	#	
White-browed Scrub Wren	**Sericornis frontalis**	#	
Brown Warbler	Gerygone mouki	*	
White-throated Warbler	**Gerygone olivacea**	#	
Striated Thornbill	Acanthiza lineata	*	
Brown Thornbill	Acanthiza pusilla	*	
White-throated Treecreeper	**Cormobates leucophaea**	#	
Little Wattlebird	Anthocha chrysoptera	*	
Noisy Friarbird	Philemon corniculatus	*	
Noisy Miner	**Manorina melanocephala**	#	
White-throated Honeyeater	Melithreptus albogularis	*	
White-naped Honeyeater	Melithreptus lunatus	*	
Lewinís Honeyeater	Meliphaga lewinii	*	
Yellow-faced Honeyeater	**Lichenostomus chrysops**	#	
Scarlet Honeyeater	**Myzomela sanguinolenta**	#	
Eastern Spinebill	Acanthorhynchus tenuirostris		*
Brown Honeyeater	**Lichmera indistincta**	#	
Silvereye	Zosterops lateralis	*	
Mistletoebird	Dicaeum hirundinaceum	*	
Spotted Pardalote	Pardalotus punctatus	*	
Striated Pardalote	**Pardalotus striatus**	#	

Red-browed Firetail	Aegintha temporalis	*	
Olive-backed Oriole	Oriolus sagittatus	*	
Figbird	Sphecotheres viridis	*	
Spangled Drongo	**Dicrurus megarhynchus**	#	
Magpie-lark	Grallina cyanoleuca	*	
Pied Butcherbird	Cracticus nigrogularis		*
Grey Butcherbird	Cracticus torquatus	*	
Australian Magpie	Gymnorhina tibicen	*	
Pied Currawong	Strepera graculina	*	
Torresian Crow	**Corvus orru**	#	

The site is regarded as being too small to be of great significance for avifauna, and will not provide core habitat for any species.

Mammals Grey kangaroos were commonly observed on the site during the diurnal search. Two dead koalas were noted during the course of the survey, on the side of the Bruce Highway to the immediate South of the site. Koala and possum scratches were observed on the bark of smooth-barked gums, and one koala was observed in a pink bloodwood tree.

A fox den was also discovered on the site, together with evidence of recent use including recent digging, scats and tracks. The presence of this predator is expected to have a negative impact on the indigenous fauna. Nocturnal searches did not reveal any arboreal mammals.

The trapping program resulted in the capture of 17 Yellow-footed Antechinus, a significant number that indicates a significant presence by this species on the site. There is some shelter for small mammals on the site from fallen logs, although many of these were burnt by the recent fire. No other species were captured or seen.

Table 14 lists species that may be expected to utilise the site at some time, given the existing habitat. Other feral animals such as hares and cats are also expected to visit the site, and have been previously observed nearby.

Table 14 List of Mammals observed or likely to occur on the subject site.

Common name	Species	Presence on site
Echidna	Tachyglossus aculeatus	*
Yellow-footed Antechinus	**Antechinus flavipes**	#
Northern Brown Bandicoot	Isoodon macrurus	*
Swamp wallaby	Wallabia bicolour	*
Grey Kangaroo	**Macropus giganteus**	#
Koala	**Phascolarctos cinereus**	#
Common Ring-tail Possum	Pseudichierus peregrinus	*
Common Brush-tail Possum	Trchosurus vulpecular	*
Squirrel glider	Petaurus norfolcensis	*
Sugar Glider	Petaurus breviceps	*
Bush Rat	Rattus fuscipes	*
Swamp Rat	Rattus lutreolus	*
Ship Rat	Rattus rattus ^	*
House Mouse	Mus musculus ^	*
Black Flying Fox	Pteropus alecto	*
Hare	Lepus capensis	*
Domestic cat	Felis catus	*
Fox	**Vulpes vulpes**	#

Reptiles One small Carpet Python was observed, having been killed on Nolan Drive outside the site, and this is a common and widespread species. No other reptiles were observed despite the litter raking and turning of logs and rocks. **Table 15** lists the other species that are likely to occur from time to time, but none of these is considered by McDonald et al. (1991) to be threatened.

Table 15 List of Reptiles observed or likely to occur on the subject site

Keelback	Tropidonophis mairii	*
Common Tree Snake	Dendrelapis punctulatus	*
Eastern Brown Snake	Pseudonaja textilis	*
Yellow-faced Whip Snake	Demansia psammophis	*
Brown Tree Snake	Boiga irregularis	*
Carpet Python	**Morelia spilota**	#
Wall Skink	Cryptoblepharus virgatus	*
Grass Skink	Lampropholis delicata	*
Bar-sided Skink	Eulamprus tenuis	*

Amphibians and Aquatics No frogs were seen on the subject site, although it should be noted that there had been an extended period of dry weather prior to and during the survey. However, given the general nature of the site habitat, four relatively common amphibian species (one introduced) may be expected to occur during wet weather on the site, as indicated in **Table 16**.

Table 16 List of Amphibians observed or likely to occur on the subject site

Green Treefrog	Litoria caerulea		*
Eastern Sedgefrog	Litoria fallax		*
Striped Marshfrog	Limnodynastes peroni		*
Cane Toad	Bufo marinus	^	*

8.0 ECOLOGICAL VALUES

Flora and Vegetation - Intrinsic Values The species richness of the indigenous flora is relatively low, including only forty species of flowering plants. This is a reasonable number given the small size of the remnant bushland, and the likely high incidence of fire. None of the species is regarded as rare or endangered, and all are regarded as common and widespread in South-east Queensland.

The vegetation types do not display any particular intrinsic values in the sense that they comprise common and widespread plant species, but the Regional Ecosystem classification combines the flora and vegetation data with soils, geomorphology and geology as a surrogate for the entire ecosystem (that is, the flora, fauna and abiotic environment). The purpose of this is to include the fauna and microbial communities that inhabit the vegetation types, and that which may otherwise not be included in any consideration of ecological values.

The resultant mapping exercise by EPA has determined that part of the site lies in Land Zone 5, and part in Land Zone 3. As a result of this, the Regional Ecosystems in these areas are classified as having a Conservation Status of 'endangered' and 'of concern' respectively.

The Conservation Status 'of concern' is normally applied to REs where less than 30% of the preclearing (ie pre-European settlement) area remains intact as remnant vegetation. In this case, the RE 12.3.5 has 36% of the preclearing area remaining, being 3600 hectares over the threshold 30%. The area of this RE on the subject site is approximately 5.6 hectares, or 0.026% of the remaining 21,600 hectares – a very small percentage.

Similarly, the Conservation Status 'endangered' is normally applied to REs where less than 10% of the preclearing area is intact. However, RE12.5.3, some of which is now mapped on the subject site, was originally classified as being 'of concern' in Sattler and Williams (1999). This RE has subsequently been re-rated as 'endangered' by the EPA. The basis of the re-rating is not clear, as no explanation has been forthcoming, and the facts on which this re-rating took place are not known to the author.

The original mapping was carried out by the EPA using a minimum 20-hectare polygon size. The subsequent discovery of smaller areas of REs during further surveys such as the present report may in fact increase the known intact area of this RE, and this will in turn affect the Conservation Status. For example, if a further 400 hectares of this RE was mapped, this would result in another 1% being added to the known intact area of 5200 hectares, bringing this to 14% of the original (4% above the published 10% threshold). It should be noted that the approximately 8 hectares mapped on the subject site represents only 0.15% of the 5,200 hectares of intact area.

Notwithstanding the above discussion concerning the difficulties of the RE classification, the ecological values of land containing 'endangered' REs are regarded as of high significance in the Common Nature Conservation Classification System of Chenoweth EPLA (2001). Therefore it is concluded that the ecological values of this site are of medium to high significance.

Vegetation Naturalness and Ecological Condition The observations on the site in relation to evidence of recent impacts and invasion of weed species are reported above. The site is regarded as of medium naturalness generally, and of medium naturalness where the remnant vegetation occurs, and being in medium ecological condition in the latter area.

The likely future condition and naturalness of the vegetation will depend on changes in land use on the site, and various other impacts from human intervention. The existing land use of vacant land provides a very low level of management for the indigenous vegetation, which is specially threatened by the edge effects of weed infestation, and uncontrolled frequent fire incidence. The latter is sufficient to both cause and maintain significant changes to the vegetation type, and hence the overall ecosystem values.

Fauna and Habitat Values The remnant flora is of medium species richness, and provides only refugial habitat quality for indigenous fauna. The presence of some cover provides limited habitat for the smaller mamals, although their tenure is considered to be insecure due to the presence of feral predators.

The subject site in isolation is too small to support a viable population in terms of its inherent viability, and depends on being connected with a larger portion. Unfortunately, connections

are largely severed by surrounding clearing, and the close presence of the Bruce Highway is a major hazard for terrestrial species, as evidenced by the large number of road-kill observed during the survey period.

The presence of tall trees on site provides roosting and nesting habitat for birds and possibly gliders, although few hollows were observed. Many of the eucalypt trees are of the stage where hollows may form in the not-too-distant future, and their utility for wildlife will then be enhanced. In this regard, the likely edge effects from feral predator penetration on any ground fauna would be high, although the occasional cover does offer some protection for small species.

Waterway Values The ecological values of the subject site are dependent to a great extent on the waterway corridors along the site overland flow-path/ waterway in the Southern end. The latter is an ephemeral overland flow-path that could, at most, be regarded as a first order waterway. Accordingly a corridor width of approximately 30 metres would be appropriate for a reserve (that is, a development set-back of 15 metres each side of the invert).

9.0 DISCUSSION AND RECOMMENDATIONS

The Ecological Assessment of the site has found that the intrinsic flora and faunal values are low to medium, as is the species richness, naturalness and degree of connectivity with other nearby remnant vegetation. Nevertheless, the recent re-mapping of the Regional Ecosystems has resulted in the recognition of one 'Endangered' and one 'of concern' Re on the site.

Given the Conservation Status of these REs, an application to the Department of Natural Resources and Mining for clearance under the *Vegetation Management Act* will be required at the Operational Works stage of the proposed development. In the case of the 'Endangered' RE12.5.3, it is most unlikely that permission will be given to clear the vegetation, and this portion of the site will therefore be effectively quarantined from development, and possibly dedicated as a Reserve.

Although it is highly unlikely that 8 hectares is sufficient to provide a sustainable Reserve (a minimum 10,000 hectares is usually required for a National Park), It may be possible to provide an integrated landscape buffer between the RE and the developed portion of the site, based on the methodology outlined for fisheries habitat protection by the Queensland Department of Primary Industries (DPI, 1998).

Using this methodology, a comprehensive assessment is made of the functions and parameters of the buffer in each individual case. The guidelines state that "the appropriate buffer zone width will vary according to the natural composition of the buffer zone, it's functions, it's geographic and geomorphic location, and the nature of the conflicting resource use issues".

These guidelines were applied to the subject site, and the main objectives for the buffer are:

- *the long term protection of habitat and integrity of the natural resource, including the Endangered Regional Ecosystem and the enhancement of wildlife movement corridors,*
- *provision of a physical separation distance and/or barrier between adjacent industrial development and the natural resource, and clarification of real property boundaries for property owners,*

- *accommodation within the buffer of natural physical processes including land stability, erosion and accretion, flood mitigation, climate change and the greenhouse effect,*
- *filtration of pollutants and competition from potentially invasive species, and*
- *provision of appropriate human access and economic benefit.*

The Buffer functions, priorities for the subject site, and their appropriate buffer widths in the following **Table 17** are a synthesis derived by DPI from both Australian and international examples in the scientific literature:

Table 17 Assessment of required buffer functions – extracted and adapted from DPI(2000)

Buffer Function	Priority Low	Med	High	Minimum buffer width range required for function (m)
1. Protection of species diversity and distribution • continuity of vegetation • connectivity with other remnants • migration/movement corridors			X	5-106
2. Protection of Ecological Buffer • creek bank/floodplain/tidal vegetation • habitat structure, carbon cycling • productivity			X	5-100
3. Filtration of nutrients, pesticides, and/or heavy metals • Sediment bound • soluble • spray drift			X	9-61 5-262 40-300
4. Water Quality • Sediment filter/control • Stormwater run-off filter/control • provision of shading effects		X		30-90 30-90 15-30
5. Stabilisation of bank erosion	X			5-125
6. Pedestrian access to resource	X			5-10
7. Provision of other wildlife habitat • Wildlife corridors • Protection of remnant vegetation		X		15-45 5-100
8. Mosquito and midge control	X			

It is proposed that the buffer provided to the Reserve will satisfy each of these functions through an integrated landscape design approach that provides the appropriate structures and distance parameters. For example, the proposed development may provide in some places for a road reserve between the industrial lots and the Reserve, which also allows for an efficient physical separation and firebreak function.

It is recommended that a similar designation of Reserve be applied to a 30-metre wide corridor along the Southern waterway, to assist with water quality management, and for provision of a wildlife corridor through the site.

A detailed Vegetation Management, Landscaping and Water Quality Management Plan should be prepared for the proposed development. This plan should address the treatment of the interface between Industrial and Reserve, with special reference to fire management, long-term weed control, and stormwater quality management.

The landscape management of the bushland should include two major strategies, being exclusion from frequent fire, and weed control. The management of fire will need to be coordinated with the owners of the adjacent industrial land, and will depend on the overlooking of the area by tenants/owners, the provision of town water for fire fighting, and access for fire fighting equipment.

The removal of environmental weeds and re-planting with locally indigenous species around the edge of the remnant vegetation will assist in weed control.

It is recommended that the development of the site should proceed in accordance with best practice environmental planning, design and construction principles. There are a number of environmental issues that need to be addressed, and it is most efficient for them to be integrated within a documented framework that allows a clear method of reporting and review.

This document is the environment Management Plan (EMP), which is recommended to be written at the Operational works stage for incorporation into each works specification. A typical Table of Contents for such an EMP is provided in the **Table 18** below:

TABLE 18 Table of Contents

7.0 ACOUSTIC ENVIRONMENT

8.0 AIR QUALITY

9.0 DEVELOPMENT CONSTRUCTION SUB-PLANS FOR MONITORING AND REPORTING

9.1 Water quality management
9.2 Management of pollutant input to the waterway system
9.3 Fauna habitat protection and conservation
9.4 Erosion and sediment controls
9.5 Chemical and Waste management

This EMP will become the document referred to for all activities on the subject site, and will clearly indicate respective responsibilities for management of environmental issues.

10.0 REFERENCES

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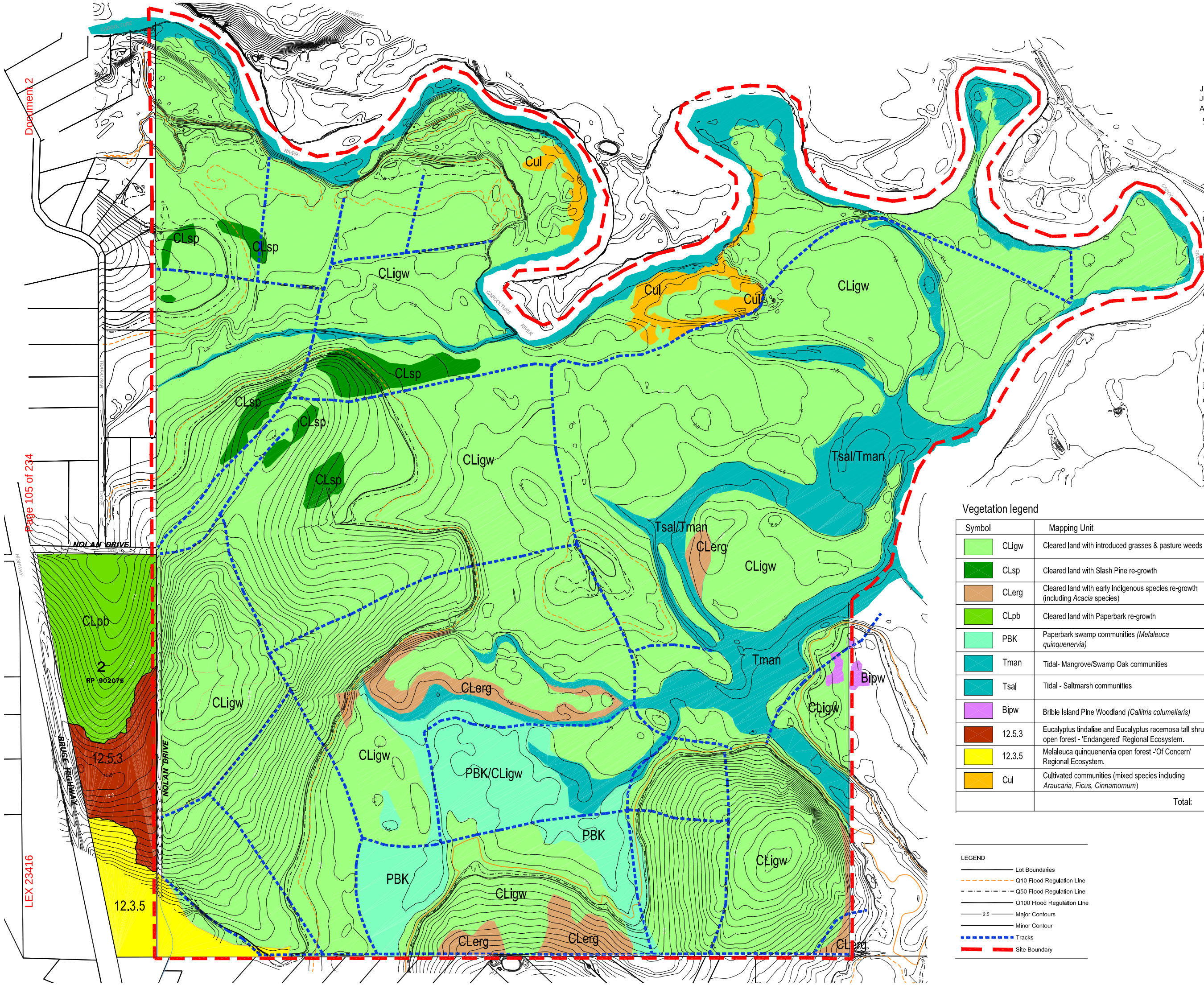

date	amendment	issue
JUL, 04	Add Lot 2	C
JUN, 04	For Development Approval	B
AUG, 03	For Information	A

Integrated Landscape Solutions
landscape design and documentation
recreation and open space planng
environmental management
biodiversity survey
urban design
Yurrah Pty Ltd abn 26 067 601 683
14 Cox Rd Windsor
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project
INDUSTRIAL DEVELOPMENT

for
LENSWORTH LTD

at
PARCEL 62, CABOOLTURE (LOT 10 ON RP 90207 & LOT 2 ON RP 902075)

drawing
VEGETATION MAP

dwn SR chk DH north
job # 0210116-1
date AUG 2003
scale 1:5000 at A1
1:10000 at A3
dwg # WD.01-C

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0 50 100 150 200 250 metres
Scale 1:5000 at A1

Vegetation legend

Symbol	Mapping Unit	Area (ha)
CLigw	Cleared land with introduced grasses & pasture weeds	389.07
CLsp	Cleared land with Slash Pine re-growth	8.854
CLerg	Cleared land with early indigenous species re-growth (including *Acacia* species)	13.892
CLpb	Cleared land with Paperbark re-growth	15.133
PBK	Paperbark swamp communities *(Melaleuca quinquenervia)*	17.35
Tman	Tidal- Mangrove/Swamp Oak communities	78.743
Tsal	Tidal - Saltmarsh communities	
Bipw	Bribie Island Pine Woodland *(Callitris columellaris)*	.334
12.5.3	Eucalyptus tindaliae and Eucalyptus racemosa tall shrubby open forest - 'Endangered' Regional Ecosystem.	8.075
12.3.5	Melaleuca quinquenervia open forest -'Of Concern' Regional Ecosystem.	8.670
Cul	Cultivated communities (mixed species including *Araucaria, Ficus, Cinnamomum*)	3.953
	Total:	544.074

LEGEND
- Lot Boundaries
- Q10 Flood Regulation Line
- Q50 Flood Regulation Line
- Q100 Flood Regulation Line
- 2.5 Major Contours
- Minor Contour
- Tracks
- Site Boundary

TERRESTRIAL ECOLOGY ASSESSMENT REPORT

NORTH EAST BUSINESS PARK

10 July 2006
Job No. 7900-33

North East Business Park Pty Ltd

Cardno (Qld) Pty Ltd

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Document Control

Version	Date	Author		Reviewer	
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1	10 July 2006	s. 47F(1)	s. 47F(1)	s. 47F(1)	s. 47F(1)

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NORTH EAST BUSINESS PARK

TERRESTRIAL ECOLOGY ASSESSMENT REPORT

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1. INTRODUCTION

This Terrestrial Ecological Assessment Report has been prepared by Cardno on behalf of North East Business Park Pty Ltd in respect to Lot 7 on RP845326 and Lot 24 on SP158298, Farry Road, Burpengary ("the site"). This report addresses the Information Request issued on the 21st of January 2005 by the Department of Local Government, Planning, Sport and Recreation (Reference RCU 1666). The site locality is illustrated in Figure 1.

The objectives of this report are to provide an analysis of the nature conservation values of the site and the potential constraints to development of the site, or parts thereof, which may arise.

The report is based on field surveys, examination of aerial photography, and a review of relevant literature resources.

This assessment report provides the following:

1. In Section 2.0, information concerning the general characteristics of the site.

2. In Section 3.0, information on the assessment methodology and field survey techniques.

3. In Section 4.0, a description of the terrestrial vegetation occurring at the site with reference to the relevant Regional Ecosystem vegetation types and significant flora species.

4. In Section 5.0, information concerning fauna species observed at the site and other species of conservation significance that may potentially utilise the site or adjacent land.

5. In Section 6.0, a description of the proposed plan of development and proposed management of mosquitos and biting midges.

6. In Section 7.0, an assessment of the degree of compliance the proposed plan of development achieves with the requirements of the local planning scheme and relevant Commonwealth and State government legislation with a biodiversity conservation focus.

2. SITE DESCRIPTION

The site is comprised of Lot 7 on RP845326 and Lot 24 on SP158298, Farry Road, Burpengary and encompasses a total area of approximately 216.28 ha. The site was previously supported exotic pine plantations and was utilised for forestry purposes. An aerial photograph of the site, taken in 2005, is presented in Figure 2.

The site is bound:

- to the north by the Caboolture River;
- to the east by cleared rural land;
- to the south by Farry Road, existing rural residential development and cleared rural land; and
- to the west by partially cleared rural land.

The site has a "Rural" designation pursuant to the Caboolture Shire Plan: Zoning Map CZ-14.

The northern sectors of the site:

- contribute to an Area of State Significance (Natural Resources) - Significant Coastal Wetlands pursuant to the draft South East Queensland Regional Coastal Plan ("draft SEQ Coastal Plan");
- adjoin the Deception Bay Declared Fish Habitat Area pursuant to the *Fisheries Act 1994*;
- are adjacent to the Moreton Bay Marine Park Habitat Zone which ends at the north-eastern boundary of the site; and
- support Nature Conservation Areas of State and Regional significance pursuant to the *Central Planning Area Overlay Map CO10: Nature Conservation* contained within Caboolture Shire Council's *Caboolture Shire Plan*.

The south-western sectors of the site are identified as supporting a Nature Conservation Area of State significance pursuant to the *Central Planning Area Overlay Map CO10: Nature Conservation* contained within Caboolture Shire Council's *Caboolture Shire Plan*.

3. ASSESSMENT METHODOLOGY

3.1 Overview

To assess the biodiversity and conservation values of the site and the potential impacts of the proposed plan of development on these natural values, the following was conducted.

1. An initial review of background information on the flora and fauna of the site and adjacent properties from relevant sources.

2. A field survey to collate information on the:

    - terrestrial vegetation communities and flora species that occur on the site and on adjacent properties;

    - vertebrate fauna observed on the site, or those that are considered likely to utilise the site or adjacent properties due to the presence of suitable habitat; and

    - areas or aspects of the site identified as having functional wildlife conservation values or a high conservation status.

3. Evaluation of the potential impacts of the proposed plan of development on the ecological values of the site locality with particular attention given to those aspects which are of recognised conservation significance.

4. Evaluation of the degree of compliance the proposed plan of development achieves with the requirements of the local planning scheme and relevant State and Commonwealth legislation with a biodiversity conservation focus.

3.2 Field Survey Techniques

A preliminary field survey was conducted on site on the 12th of April 2006. An aim of the survey was to collate site-specific information on the flora species and terrestrial vegetation communities that occur across the site. The survey effort also focused on detecting and assessing the presence of suitable habitat areas for flora species of formally recognised conservation significance that have been previously recorded, or are considered likely to occur, in the locality of the site.

The survey effort also focused on detecting and assessing the presence of suitable habitat areas and resources for fauna species, with particular emphasis on those species of formally recognised conservation significance that have been previously recorded, or considered likely to occur, in the locality of the site. In this respect, a search of the Queensland Environmental Protection Agency's (EPA) Wildnet database and the Commonwealth Department of Environment & Heritage's (DEH) online *Environment Protection and Biodiversity Conservation 1999* ("*EPBC Act*") database were used to assess records of species occurring, or likely to occur, within a 5 km radius of the site. The habitat requirements and the functional contribution that specific areas or aspects of the site may make towards the preservation of populations of these species in the site locality were then assessed.

4. FLORA HABITAT VALUES

4.1 Overview

The vast majority of the site is highly disturbed and has been the subject of previous land clearing and plantation forest activities. The site is characterised by large expanses of disturbed grassland, some scattered trees, a Swampy paperbark (*Melaleuca quinquenervia*) forest, areas of marine vegetation which fringe the Caboolture River and associated waterways and constructed drainage channels that are tidally influenced. Major vegetation communities and their location within the site are illustrated in Figure 3. These include:

1. Mixed marine vegetation;
2. Swampy paperbark (*Melaleuca quinquenervia*) forest;
3. Disturbed grassland;
4. Cypress pine (*Callitris columellaris*) woodland;
5. Disturbed Saltwater couch (*Sporobolus virginicus*) grassland;
6. Swamp oak (*Casuarina glauca*) woodland;
7. Disturbed mixed species woodland;
8. Swampy heathland; and
9. Riparian vegetation.

The current and certified Regional Ecosystem (RE) Map generated for the site locality identifies “Plantation Forest” as occurring across the site. The Department of Natural Resources, Mines and Water (DNRMW) has not mapped any areas of remnant vegetation as occurring within or directly adjacent to the site.

It is relevant to note that the aquatic ecology values of the site have been previously assessed by The Ecology Lab Pty Ltd, as part of a broader study which also incorporated land west of the site. The findings of this assessment are presented in their 2005 report entitled *Proposed Redevelopment of Land at Caboolture – Preliminary Assessment of Aquatic Ecology*. Areas of marine vegetation within the site were also assessed and mapped by Cardno during the terrestrial vegetation survey.

4.2 Vegetation Types

4.2.1 Mixed marine vegetation

This vegetation community was situated in the north-eastern sector of the site as illustrated in Figure 3. The eastern section of this community is dominated by Grey mangrove (*Avicennia marina*) of a height of 6-7m with a River mangrove (*Aegiceras corniculatum*) understorey. The mangroves are fringed by Saltwater couch (*Sporobolus virginicus*) and Swamp oak (*Casuarina glauca*) and other scattered species such as *Suaeda* sp., Ruby saltbush (*Enchylaena tomentosa*), Lantana (*Lantana camara*), Brazilian nightshade (*Solanum seaforthianum*), Balloon cotton bush (*Gomphocarpus physocarpus*), Broad-leaved pepper tree (*Schinus terebinthifolius*), Mile-a-minute (*Ipomoea cairica*), Monkey rope vine (*Parsonsia straminea*), Wild tobacco (*Solanum mauritianum*), *Passiflora* sp., Rhodes grass (*Chloris gayana*), Fleabane (*Conzya* sp.), *Emilia sonchifolia* and Groundsel bush (*Baccharis halimifolia*).

The central section of this vegetation community is quite open and is dominated by Saltwater couch and sparsely scattered mangroves.

Mangroves in the western extent of this community are fringed, to the east, by small patch of Swamp oak open forest to a height of approximately 15m, which overtops a patchy Saltwater couch grassland.

The community is bordered to the south by a disturbed mixture of species, located on slightly elevated land. This mix of species is characterised by Swamp oak to a height of approximately 15m, Pink bloodwood (*Corymbia intermedia*), Red ash (*Alphitonia excelsa*), Foambark (*Jagera pseudorhus*), Tuckeroo (*Cupaniosis anacardioides*), *Acacia* sp., *Acacia concurrens*, Wombat berry (*Eustrephus latifolius*), Resurrection weed (*Bryophyllum pinnatum*), Stinking roger (*Tagetes minuta*), Blady grass (*Imperata cylindrica*) and *Sida cordifolia* with dense thickets of Lantana (*Lantana camara*) in the understorey.

4.2.2 Swampy paperbark (*Melaleuca quinquenervia*) forest

This vegetation community is situated in the south-western sector of the site as illustrated in Figure 3. A disturbed watercourse traverses the western sectors of this community. This community is dominated by Broad-leaved paperbark (*Melaleuca quinquenervia*) to a height of approximately 20m with scattered Queensland blue gum (*Eucalyptus tereticornis*), Grey ironbark (*Eucalyptus siderophloia*) and Swamp box (*Lophostemon suaveolons*). The upper canopy of this vegetation community is relatively intact although there is evidence of the recent passage of fire, in the form of scorching on the Paperbark tree trunks to a height of 7-8m.

The understorey is characterised by a dense patch of *Phragmites australis* and *Blechnum indicum* in the northern sectors of this community. The understorey in the southern sectors is dominated by a combination of native species, exotic grasses and other introduced plants. Species that occur within this section of the community include Poison peach (*Trema tomentosa*), Monkey rope vine, *Melaleuca linariifolia*, White passion flower (*Passiflora subpeltata*), Groundsel bush, Pink euodia (*Melicope elleryana*), *Glochidium sumatranum*, *Stephania japonica*, Red ash, *Pittosporum revolutum*, *Kennedia rubicunda*, Frogsmouth (*Philydrum lanuginosum*), Smartweed (*Persicaria* sp.), Water hyacinth (*Eichhornia crassipes*), Wild tobacco, Soft bracken (*Calochlaena dubia*), *Lomandra longifolia*, *Ludwigia peploides*, Camphor laurel (*Cinnamomum camphora*), Mile-a-minute, Fleabane (*Conzya* sp.) and *Passiflora* sp.

This vegetation community is considered to be analogous to the *Not Of Concern* RE 12.3.5 which is briefly described as "*Melaleuca quinquenervia* open forest on coastal alluvium", as the community appears to satisfy the definable criteria of remnant vegetation described within the *Vegetation Management Act 1999* ("*VM Act*"). In this respect, it is considered that the predominant canopy of this vegetation community:

- covers more than 50% of the undisturbed predominant canopy; and
- averages more than 70% of the vegetation's undisturbed height; and
- is composed of species characteristic of the vegetation's undisturbed predominant canopy.

It is relevant to note that this vegetation community is included within the section of the site mapped as a "State Nature Conservation Area" on the *Central Planning Area Overlay Map CO10: Nature Conservation* of the Caboolture Shire Plan.

4.2.3 Disturbed grassland

This community dominates most of the site and has colonised those areas previously cleared during the site's previous land-use (i.e. a plantation forest). The extent of this community within the site is illustrated in Figure 3. This community is characterised by species such as Pigeon grass (*Setaria* spp.), Rhodes grass (*Chloris gayana*), *Paspalum* sp., Guinea grass (*Panicum maximum*), Wild tobacco, Balloon cotton bush (*Gomphocarpus physocarpus*), Silverleaf desmodium (*Desmodium uncinatum*), Phasey bean (*Macroptilium lathyroides*), Siratro (*Macroptilium atropurpureum*), Blady grass, Cobblers peg (*Bidens pilosa*), Blue billygoat weed (*Ageratum houstonianum*), *Callistemon viminalis*, Fleabane (*Conyza* sp.), Scotch thistle (*Cirsium vulgare*), *Passiflora* sp., Groundsel, Devils fig (*Solanum torvum*), *Cyperus* sp., *Emilia sonchifolia,* Mile-a-minute, Lantana, *Ludwigia peploides*, Red ash, *Phragmites australis* and some scattered Slash pine (*Pinus elliottii*) regrowth and Acacia regrowth.

The portion of this community that occurs to the west of the Swampy paperbark forest community (i.e. vegetation community 2 on Figure 3), is dominated by dense Acacia regrowth, which has emerged following past land clearance events.

In the north-west of the site (between vegetation communities 4 and 5 on Figure 3) this community supports a small clump of Queensland blue gum consisting of approximately 10 trees to a maximum height of approximately 22m. The understorey surrounding these trees is dominated by exotic grasses, is weed infested and highly disturbed. Adjacent to the Queensland blue gums are two small waterbodies, one of which, to the south, is dominated by exotic grasses with the other, to the east, dominated by rushes and fringed with scattered Swamp oak and Broad-leaved paperbark.

4.2.4 Cypress pine (*Callitris columellaris*) woodland

This community is situated in the western sector of the site as illustrated in Figure 3. It is dominated by Cypress pine (*Callitris columellaris*) to a height of approximately 16-17m with a few scattered Broad-leaved paperbark (*Melalueca quinquenervia*) and Slash pine. This vegetation community has an open understorey with sparse, scattered species such as Lantana, Wild tobacco, Bracken (*Pteridium esculentum*), Prickly pear (*Opuntia* sp.), *Dianella* sp. and *Leptospermum* sp.

4.2.5 Disturbed Saltwater couch (*Sporobolus virginicus*) grassland

This vegetation community is situated in the northern sectors of the site, as illustrated in Figure 3, to the north of a constructed drainage channel. This community is almost solely dominated by Saltwater couch and its extent appears to be determined by the level of saltwater intrusion along the constructed drainage channel during high tide events. It is relevant to note that an established vehicular track traverses the band of Saltwater couch. This track appears to be regularly utilised by members of the public.

The drainage channel itself supports a thin band (2-3m wide) of Grey mangroves to a height of 6-8m with an understorey of scattered River mangrove.

4.2.6 Swamp oak (*Casuarina glauca*) woodland

This vegetation community is situated in the north-eastern sector of the site along a highly disturbed drainage channel. The canopy is dominated by Swamp oak to a height of 15m with scattered Slash pine and Grey ironbark. The midstorey consists of Grey mangroves and River mangroves which are generally confined to the edges of the drainage channel. Other species present include Lantana, Groundsel bush, *Passiflora* sp., Fleabane and *Phragmites australis.* Saltwater couch fringes the drainage channel and extends out to established vehicle tracks, which traverse either side of the drainage channel.

4.2.7 Disturbed mixed species woodland

This vegetation community is situated in the western sector of the site. This community consists of scattered canopy species such as Queensland blue gum, Slash pine, *Acacia* sp. and Broad-leaved paperbark (*Melaleuca quinquenervia*) and supports many of the exotic plant species described for the disturbed grassland community.

4.2.8 Swampy heathland

This vegetation community occurs in the western sectors of the site as illustrated in Figure 3. This community consists of low-lying heath regrowth dominated by species such as *Blechnum indicum* and *Baloskion tetraphyllum*. Other species include scattered Slash pine regrowth, Broad-leaved paperbark seedlings, Prickly moses (*Acacia ulicifolia*), *Acacia leiocalyx*, Blady grass and other exotic grasses also present in the disturbed grassland community. This community is recovering from a slashing event that appears, with reference to Figure 2, to have been undertaken in mid 2005.

4.2.9 Riparian vegetation

This vegetation community is situated on the northern boundary of the site fringing the Caboolture River. This community is characterised by Grey and River mangroves which line the banks of the river with scattered trees such as Swamp oak, Slash pine, Grey ironbark, Pink bloodwood, Moreton Bay Ash (*Corymbia tessellaris*) and Tuckeroo on the elevated and landward extent of these mangroves. Other species include *Acacia* sp., Red ash, Lantana, Broad-leaved pepper tree, Wild tobacco, Bracken, Groundsel bush, Blady grass, Kangaroo grass (*Themeda triandra*), Cypress pine (*Callitris* sp.), *Dianella* sp., and Yellow button (*Chrysocephalum apiculatum*).

4.3 Flora Species of Significance

A review of flora records from the site locality was undertaken to assess the occurrence or likely occurrence of significant flora species pursuant to the *Nature Conservation Act 1992* ("*NC Act*"), the *EPBC Act* and the *Land Protection (Pest and Stock Route Management) Act 2002* ("*LP Act*"). Records utilised included records held within the *EPBC Act* Online Database (2006) and the Queensland EPA's Wildnet database.

4.4 Threatened Species

A review of flora records from the site locality indicated 5 species of conservation significance that may potentially occur on the site based upon the availability of suitable habitat in the locality. These species, and their relevant status under the *EPBC Act* and *NC Act* are provided in Table 1.

Table 1 Significant flora species likely to occur in the site locality

Species Name	Common Name	Status*
Macadamia ternifolia	Bopple nut	CV, QV
Brasenia schreberi	-	QR
Bosistoa selwynii	Heart-leaved Bosistoa	CV
Bosistoa transversa	Three-leaved Bosistoa	CV
Phaius australis	Lesser swamp-orchid	CE, QE

* CE, CV = Commonwealth (*Endangered, Vulnerable*) – *EPBC Act*
QE, QV, QR = Queensland (*Endangered*, *Vulnerable, Rare*) – *NC Act*

None of the above listed threatened flora species were recorded on the site.

It is recognised that the Swampy paperbark forest community provides potential habitat for the Lesser Swamp orchid (*Phaius australis*). However, given the disturbed nature of this community's understorey caused by the recent passage of fire and the vigorous invasion of various weed species, it is considered unlikely that this species is represented within this community.

4.5 Weed Species

Surveys within the site have identified a number of significant weed species pursuant to the *LP Act* and its related Regulation. The main purpose of the *LP Act* is to provide for pest management for land and stock route network management. The main policy objectives are to protect land and water from the adverse impacts of weeds and pest animals and to manage the stock route network in a sustainable manner for travelling stock and other purposes. Pursuant to the *LP Act* it is suggested that significant species be treated under three classes:

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.

A list of significant weed species is presented below and provides an indication of their occurrence within the site and current classification under the regulation.

- Groundsel bush (*Baccharis halimifolia*) – this species is a declared Class 2 pest plant pursuant to the *LP Act* and is scattered in its distribution across the site;

- Prickly pear (*Opuntia* sp.) – This species is a declared Class 2 pest plant pursuant to the *LP Act*. This species was recorded within disturbed cleared areas and within the Cypress pine woodland;

- Water hyacinth (*Eichhornia crassipes*) – this species is a declared Class 2 pest plant pursuant to the *LP Act*. This weed occurs within the Swampy paperbark forest;

- Camphor laurel (*Cinnamomum camphora*) – this species is a declared Class 3 pest plant pursuant to the *LP Act*. Only a few specimens of this weed were recorded within the disturbed areas of the site;

- Lantana (*Lantana camara*) – this species is a declared Class 3 pest plant pursuant to the *LP Act* and is scattered in its distribution across the site; and

- Broad-leaved pepper tree (*Schinus terebinthifolius*) – this species is a Class 3 declared pest plant pursuant to the *LP Act* and is scattered in its distribution across the site.

5. FAUNA HABITAT VALUES

5.1 Fauna Habitat Assessment

A fauna habitat assessment of the site was conducted using the methodology described in Section 3.0. The majority of the site is characterised by a disturbed grassland community that is of limited habitat value to native fauna species. The swampy paperbark forest in the south-western sector of the site and the marine vegetation communities within the north of the site are the considered to be the areas of greatest value in respect to providing habitat resources for native fauna. A summary of the fauna species recorded and considered likely to occur within the site locality are described below.

5.2 Birds

The swampy paperbark forest in the south-western part of the site is likely to provide temporary and permanent roosting and foraging habitat for a range of avian species including the Tawny frogmouth (*Podargus strigoides*), Laughing kookaburra (*Dacelo novaeguineae*), Pied butcherbird (*Cracticus nigrogularis*) and Black faced cuckoo shrike (*Coracina novaehollandiae*). The balance of the site is dominated by a disturbed grassland community which, although it does support patches of acacia regrowth and isolated clumps of trees, is characterised by exotic grasses weeds, and a relatively low diversity of native plants. The open and exposed nature of this community is likely to exclude the more cryptic and/or secretive avian species and the relatively low native plant diversity and high contribution by exotic species is likely to limit the utilisation of these areas by specialist foragers and species that require a range of forage resources. It is considered that a number of cosmopolitan bird species, in addition to species such as the Australian magpie (*Gymnorhina tibicen*), White-faced heron (*Ardea novaehollandiae*), Australian white ibis (*Threskiornis molucca*), Straw-necked ibis (*Threskiornis spinicollis*), Willie wagtail (*Rhipidura leucophrys*), Torresian crow (*Corvus orru*), Red-backed fairy-wren (*Malurus melanocephalus*) and Bar shouldered dove (*Geopelia humeralis*), which are known to utilise and frequent disturbed grassland habitats close to the coast are likely to occur within this community.

A number of avian predators, such as the Black-shouldered Kite (*Elanus axillaris*), Whistling kite (*Haliastur sphenurus*) and Pacific baza (*Aviceda subcrisata*) were observed foraging over the disturbed grassland community. It is considered that this community is likely to provide these predatory species with food resources in the form of common snakes, amphibians and introduced, ground dwelling mammals (e.g. the Black rat).

5.3 Terrestrial Mammals

Large species, such as Eastern grey kangaroo (*Macropus giganteus*) and Black wallaby (*Wallabia bicolour*) are likely to forage within the disturbed grassland and disperse through the site during border movements within the locality. The disturbed nature of this community and others within the site and its proximity to existing residential development is likely to limit the abundance and diversity of smaller, native, ground-dwelling fauna. Whilst it is recognised that the site is likely support a small number of common species such as Northern brown bandicoot (*Isoodon macrourus*) and the Yellow footed antechinus (*Antechinus flavipes*), it is expected that habitat within the site is regularly utilised by introduced fauna such as the Black rat (*Rattus*

rattus), Brown hare (*Lepus capensis*), Red fox (*Vulpes vulpes*), Dog (*Canis familaris*) and Cat (*Felis catus*).

Although the northern portions of the site support limited mangrove and other marine vegetation, it is considered that it does not provide functional or critical habitat resources for the Water mouse (*Xeromys myoides*). This species is sensitive to impacts associated with human-induced disturbances (e.g. weed invasion, predation by introduced predators, rubbish deposition, vehicular activities) and, as such, is not considered a likely or potential occurrence within the site.

5.4 Arboreal Mammals

Habitat availability for arboreal species within the site has been significantly reduced as a consequence of past land clearance events and the dominance of the disturbed grassland community. The Swampy paperbark community in the site's south-west represents the one of the few remaining areas of the site that likely to be utilised by native arboreal fauna. Species likely to utilise this habitat include the Koala (*Phascolarctos cinereus*), Common brushtail possum (*Trichosurus vulpecular*), Common ringtail possum (*Pseudocheirus peregrinus*) and Squirrel glider (*Petaurus norfolcensis*).

It is relevant to note that a few scratch marks, of indeterminate age and source, were observed on the trunks of a few Queensland blue gums (*Eucalyptus tereticornis*) in the north-western portion of the disturbed grassland community. Although it the most likely source of these scratch marks are possums, it is noted that, during ecological surveys on adjoining land to the west of the site, Yurrah Pty Ltd, reported a sighting of a single Koala within a pink bloodwood (*Corymbia intermedia*). It is likely that Koalas occasionally move into and through the site during broader movements within the locality, but it is noted that such movements, over large, open areas would expose them to risk of predation and attach by introduced predators such as dogs, red foxes and cats. Smaller arboreal mammals, such as Squirrel gliders, would be unlikely to disperse through the site due to absence of established trees in which they could temporarily den or shelter to avoid predator detection.

5.5 Flying Mammals

The presence of the Broad-leaved paperbark with shedding bark provides suitable sheltering habitat for a variety of common microchiropteran bats, such as the Gould's longeared bat (*Nyctophilus gouldi*), Large bentwing bat (Miniopterus schreibersii) and the Northern longeared bat (*Nyctophilus bifax*). These species are likely to forage for insects above and below the canopy of the site's swampy paperbark forest and over the disturbed grassland community.

A limited range of megachiropteran species, including the Grey-headed flying-fox (*Pteropus poliocephalus*), Black flying-fox (*Pteropus alecto*) and Little red flying-fox (*Pteropus scapulatus*) may occasionally forage within the site during the flowering period of its dominant tree species. However, given the limited distribution of these trees within the site and their isolation from other areas of suitable habitat, it is considered unlikely that the site provides megachiropteran species with significant foraging habitat.

5.6 Reptiles

The swampy paperbark forest and its associated waterways provide habitat resources for common species such as the Eastern water dragon (*Physignathus lesueurii*) which was observed within this vegetation community. Other common species which are likely to utilise this community include the Carpet python (*Morelia spilota*), Common tree snake (*Dendrelaphis punctuata*), Bearded dragon (*Pogona barbata*), *Lampropholis delicata* and the Eastern blue-tongued lizard (*Tiliqua scinoides*). A limited range of common snakes and lizards are also likely to utilise habitat associated with the disturbed grassland community, including the Red bellied black snake (*Pseudechis porphyriacus*), Brown snake (*Pseudechis australis*) and the Yellow-faced whip snake *(Demansia psammophis*).

5.7 Amphibians

The Swampy paperbark forest community and fresh waterbodies situated within this community and elsewhere within the site provide suitable habitat for the Wallum froglet (*Crinia tinnula*), Tusked frog (*Adelotus brevis*), Striped marshfrog (*Limnodynastes peronii*), Eastern sedgefrog (*Litoria fallax*), the Green tree frog (*Litoria caerulea*) and a limited range of other common amphibians. The introduced Cane toad (*Bufo marinus*) is expected to occur throughout the site.

5.8 Corridor Values

With respect to the corridor values of the site it is relevant to note the following.

1. The majority of the site is not identified as supporting or contributing to an "Ecological Corridor" pursuant to the *Central Planning Area Overlay Map CO10: Nature Conservation* of the Caboolture Shire Plan.

2. The site does not provide a connection between any protected reserves (i.e. National Park, State Forest etc.) or a connection between any two large expanses of remnant vegetation as mapped by the Department of Natural Resources and Mines.

The site has limited values in respect to providing a movement corridor for native fauna due to its highly disturbed nature. It is considered that smaller, ground dwelling and arboreal fauna moving across the site between scattered clumps of covering vegetation would be exposed to a high risk of predation by avian predators and introduced terrestrial animals. Although it is mapped as forming part of an "Ecological Corridor" pursuant to the *Central Planning Area Overlay Map CO10: Nature Conservation* of the Caboolture Shire Plan, the thin band of vegetation lining the Caboolture River in the north of the site is unlikely to provide any functional benefit to native fauna, apart from those highly mobile species (e.g. birds and bats) which move over large distances and utilise "stepping-stone" habitats. The vegetation fringing the Caboolture River is 5-10m wide at most and is comprised of a few larger trees (e.g. Moreton Bay ash, Grey ironbark, Pink bloodwood) and an open understorey comprised of regenerating vegetation and introduced plants. This community would provide dispersing fauna with limited sheltering habitat and it is considered that as a consequence of its narrow width and open nature, caused by considerable edge effects, most small ground dwelling

fauna within this community would be as vulnerable to predation as those within the disturbed grassland.

The Swampy paperbark forest community and disturbed mixed species woodland provide a fragmented corridor through the south-western extent of the site. However, in this respect, it is noted that this "corridor" does not link any two patches of extensive or remnant vegetation, with land to the south of the site principally developed for rural residential purposes and land to the north-west of the site largely cleared of native standing vegetation. It is considered that these two communities are likely to be utilised for limited movements within the site by resident fauna and may provide temporary sheltering habitat for larger mammalian species and highly mobile species that traverse the site during broader movements within the locality.

5.9 Fauna Species of Significance

Field surveys and the EPA and DEH databases indicated that several fauna species of conservation significance have been recorded within the site locality, or are likely to occur within the site locality. Previous distribution records and habitat requirements for these species have been examined to identify the likelihood of occurrence within the site. Each species has been allocated a rating of Very High, High, Moderate or Low according to the following criteria:

Very High: species observed on the site.

High: no site observations but both the EPA and DEH database records for the species in the site locality, with substantial areas of suitable habitat on the site.

Moderate: no site observations, but EPA records for the species in the site locality, with suitable habitat at the site.

Low: no site observations, but either EPA records or DEH records for the species in the site locality, with little or no suitable habitat at the site.

In respect of the above categories it is noted that the EPA database is based on actual recorded sightings of a species whilst the DEH *EPBC Act* online database also includes species for which there are no actual sighting records. In this respect the EPA database records provides a more reliable indication that the species occurs in the survey area.

A summary of the significant fauna species which have a Very High, High or Moderate likelihood of occurrence within the site, based on the availability of suitable habitat, are listed in Table 2.

Table 2 Significant fauna species likely to occur on the site

Common Name	Species Name	Status*	Habitat Requirements	Likelihood of Occurrence on Site
Wallum froglet	*Crinia tinnula*	QV	Paperbark swamps	Moderate
Tusked frog	*Adelotus brevis*	QV	Wet sclerophyll and open grazing country besides streams and puddles	Moderate
Grey goshawk	*Accipiter novaehollandiae*	QR	Tall mangroves and eucalypt forests,	Moderate

Common Name	Species Name	Status*	Habitat Requirements	Likelihood of Occurrence on Site
			woodlands, forests at river edge	
Black-necked stork	*Ephippiorhynchus asiaticus*	QR	Wetlands, adjacent grasslands	Moderate
Koala	*Phascolarctos cinereus*	QV	Sclerophyll forest and woodland	Moderate to High
Grey-headed flying-fox	*Pteropus poliocephalus*	CV	Wet and dry sclerophyll forests	High

* CV, CMi, CMa = Commonwealth (*Vulnerable, Migratory, Marine*) - *EPBC Act*
QE, QV, QR = Queensland (*Endangered, Vulnerable, Rare*) – *NC Act*

5.10 Overview

Given the highly disturbed nature of the majority of the site and adjoining land, the availability of suitable terrestrial habitat for native fauna species is limited. The disturbed grasslands which dominate the site have a limited capacity to provide suitable, functional habitat resources for native fauna species. The swampy paperbark forest community in the south-west of the site provides the most important and largest area of intact fauna habitat within the site. However, given that it is bordered by cleared land and rural residential development it is considered not to represent habitat critical to the survival of the threatened species listed in Table 2.

6. PROPOSED DEVELOPMENT

6.1 Summary

North East Business Park Pty Ltd proposes the development of the site for the purposes of constructing the following:

- marina basin;
- a dryland residential area;
- a golf course residential area;
- a championship golf course and wetland;
- flood and storm water retention spaces;
- a low rise medium density area;
- a multilevel residential area;
- a wetland reserve;
- a shipyard;
- a commercial/retail area;
- a village residential and hotel area;
- public river access;
- a public esplanade; and
- environmental buffer zones.

The proposed master plan is presented in Figure 4.

From an ecological perspective key elements of the proposed development include the following.

1. The provision of environmental buffer zones in the north-eastern section of the site and along the site's eastern and southern boundaries. These areas would conserve and protect existing marine vegetation communities, recognised as "significant coastal wetlands" and provide opportunities to:

   a. rehabilitate the existing disturbed grassland communities; and

   b. support the establishment of compensatory habitat which would offset habitat losses incurred elsewhere within the site as a consequence of the proposed plan of development.

2. The provision of flood and stormwater retention basin spaces and a wetland reserve. In addition to conserving existing marine vegetation communities, these areas have the potential to be rehabilitated to enhance and expand the current, limited extent of wetland resources within the site. In this respect, active rehabilitation efforts could be undertaken within these areas to increase the coverage of wetland resources in the north-eastern portion of the site and provide additional buffering and protection to the "significant coastal wetlands" protected within the environmental buffer zone.

3. The championship golf course and wetland area provides opportunities to further rehabilitate disturbed sections of the site, to compensate for habitat loss, to provide additional wetland and terrestrial habitat resources for wildlife and to facilitate wildlife dispersal in an east-west direction across the site.

4. No remnant vegetation would be removed as a consequence of the proposed development.

5. Local species would be used for landscaping and rehabilitation works to compliment the functional value of areas of non-remnant native vegetation. Where practicable, existing native trees would be incorporated into the landscaping of the proposed development.

6. A commitment to undertake works necessary to control declared and environmental weed species infestations within the site.

6.2 Mosquitoes and Biting Midge Management

Mosquito and biting midge occur on all continents except Antarctica and are commonly encountered along the entire length of the Australian coastline. The site and the balance of Caboolture Shire are no exceptions to this rule and owing to the their close relationship with the Caboolture River and surrounding wetlands, the area is host to a number of mosquito and biting midge species that have a potential to adversely affect residential amenity and human health. Some information concerning mosquitoes and biting midge and potential habitats that occur in the site locality is provided below.

6.2.1 Mosquitoes

The 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 km 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 Encephailits, 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.

6.2.2 Biting Midge

Biting midges are small, 1-2 mm long, mosquito like insects that breed in range of environments, ranging from rainforests to coastal foreshores and estuarine systems. Biting midges are short-lived animals that are mostly active during the period from September to April each year. During this period of the year each species exhibits fluctuations in its abundance that are linked to the lunar cycle. For example the biting midge species *Culicoides subimmaculatus* is most abundant in the week following a half moon and lowest in the weeks following a full or new moon. During periods of abundance biting midge are most likely to be encountered around dawn and dusk or

occasionally throughout the day and night if conditions are still, humid and overcast. Biting midge are generally less active in winds greater than 10km/hr, during which times they seek shelter in densely vegetated areas or other locations protected from the wind (i.e. the lee-ward side of buildings).

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 Caboolture Shire provides habitat for two main pestiferous species of biting midge species, namely *Culicoides subimmaculatus* and *C. molestus.* Other species likely to occur in lower densities, and which are thought to pose less of a problem, are *C. marmoratus*, *C. longior*, *Styloconops australiensis* and *S. moolooabaensis*. Mud substrates associated with the mangroves and tidal flats to the east of the site, provide suitable breeding habitat for biting midge species.

6.2.3 Overview

The site is located adjacent to the Caboolture River and associated wetlands which contain substantial areas of suitable breeding habitat for biting midges and mosquitoes. It is recognised that:

1. the appropriate control and management of mosquito and biting midge incursions from naturally occurring habitats is a public health matter and addressed by Caboolture Shire Council or other relevant governing agency; and

2. at present, Caboolture Shire Council manages mosquito and biting midge incursions 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 Code is not mandatory.

Development of the site for residential purposes would generate a higher population density in the area. However, residents of the existing development to the south and south-west and in the surrounding locality are periodically exposed to pest incursions from the breeding areas and other wetlands and waterbodies in the area. These residents live in similar proximity to potential mosquito and biting midge breeding habitat as would future residents of the proposed development. Future residents of the site would not be exposed to any greater level of incursion than is currently experienced by existing residents.

Given the intent to develop the majority of the site, the area of available mosquito breeding habitat will be reduced through the removal of some waterbodies and constructed drainage channels. Although the proposed development may result in the creation of new breeding habitats for mosquitoes (i.e. through the creation and rehabilitation of environmental buffer zones and wetland reserves) these areas would largely constitute compensatory habitats which would offset the loss of existing breeding habitats. As such, it is not expected that the creation of these areas would result in a net increase to breeding habitats within the site locality.

The proposed plan of development would result in the removal of disturbed non-remnant saltwater couch grasslands for the purposes of establishing a marina and the Swampy paperbark forest for the purposes of establishing the championship golf

course and residential areas. Both of these areas currently provides ideal breeding habitat for mosquitoes, and their removal would represent a reduction in the overall extent of suitable breeding habitat for biting insects. The proposed marina would be designed to achieve compliance with the design specifications detailed within *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* by:

1. being more than 60cm deep across the majority of its extent and therefore unsuitable for mosquito breeding;

2. being too deep across most of its extent to support the dense growth of emergent aquatic vegetation;

3. providing only a narrow fringing area along its perimeter in which emergent aquatic vegetation could potentially establish;

4. being saline, which would restrict the type of aquatic vegetation capable of establishing around its perimeter;

5. having its banks suitably reinforced with rock-wall or other suitable material to prevent the potential risk of bank erosion; and

6. incorporating responsive surface water runoff control measures (i.e. bioretention systems, detention basins etc.) to ameliorate potential impacts associated with nutrient runoff from the proposed development.

It is also noted that during the construction phase of site development, any temporary breeding habitats that are created (i.e. water filled excavations, depressions or temporary sedimentation basins) would have no discernible influence on the prevalence of mosquitoes or midges in the locality due to extent of natural breeding habitats in the locality.

It is also noted that any buildings constructed as part of the proposed development could be fitted with screens on windows and doorways to minimise the potential for adverse amenity and/or health impacts.

In summary the proposed development of the site would:

- not result in a net increase in the extent and suitability of habitat for the biting insects in the locality; and
- not expose future residents to any greater level of exposure to biting insects than that to which existing residents of the site locality are exposed.

7. COMPLIANCE WITH BIODIVERSITY CONSERVATION REGULATIONS

7.1 Environment Protection and Biodiversity Conservation Act 1999

The *EPBC Act* requires that a person must receive Commonwealth approval for any action that has, will have, or is likely to have a significant impact on matters of national environmental significance. Matters of national environmental significance that are recognised by the *EPBC Act* and which can act as a trigger for the Commonwealth assessment and approval process include:

- World Heritage properties;
- National Heritage Places;
- Ramsar wetlands of international significance;
- Threatened species and ecological communities;
- Migratory species;
- Nuclear actions, including uranium mining; and
- The Commonwealth marine environment.

7.1.1 Recognised Values

In respect of the matters of national environmental significance recognised by the *EPBC Act* it is noted that the site directly adjoins a Ramsar wetland, namely Moreton Bay.

It is recognised that the site contains potential habitat for migratory bird species listed in the:

- 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).

However, given the extent of similar habitat within the vicinity, including that which is protected in Freshwater National Park, Bribie Island National Park and Nathan Road Wetlands Reserve, it is not considered that the site contains habitat *critical* to the survival of these species.

It is noted that the site provides potential habitat resources for the Grey-headed Flying-fox which is a listed threatened fauna species. The *EPBC Act* provides for the 'conservation of critical habitat' of listed threatened species. It is considered that the habitat resources within the site (i.e. scattered clumps of eucalypts and the Swampy paperbark forest) do not constitute habitat *critical* to the survival of this species.

No other matters of national environmental significance have been recognised on the site.

7.1.2 Compliance Assessment

As the site directly adjoins a Ramsar wetland, any development or use of the site will be constrained by the *EPBC Act* if that development or use will have, or is likely to have a significant impact on this matter of national environmental significance. With reference to the DEH's *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* it is noted that, in order to achieve compliance with the purpose and intent of the *EPBC Act* as it relates to **wetlands of international significance**, development or use of the site would be constrained to the extent that such development or use does not have, or would be unlikely to have a significant impact upon the Ramsar values of Moreton Bay. In this respect development or use of the site should not result in:

- areas of the wetland being destroyed or substantially modified; or
- a substantial measurable change in the hydrological regime of the wetland – for example a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland; or
- the habitat or lifecycle of native species dependent upon the wetland being seriously affected; or
- a substantial and measurable change in the physico-chemical status of the wetland – for example a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health; or
- an invasive species that is harmful to the ecological character of the wetland being established in the wetland.

With respect to the above, it is considered that there exists the potential for the proposed plan of the development to have a significant impact upon the Ramsar values of Moreton Bay. As such, it is recommended that the proposed plan of development be referred to the Commonwealth Minister for the Environment for assessment under the provisions of the *EPBC Act*.

It is relevant to note that development or use of the sections of the site that directly adjoin the Ramsar wetland will be highly constrained by the provisions of the *EPBC Act* (i.e. the proposed construction of the marina). As such, it will be necessary to effectively demonstrate to the Minister that the proposed plan of development will not result in or adversely impact upon any of the above listed points.

Although development or use of those sections of the site which do not adjoin the Ramsar wetlands of Moreton Bay are not directly constrained by the provisions of the *EPBC Act*, the development or use of such areas needs to be of a form that does not adversely affect the adjacent downstream sectors of the Moreton Bay Ramsar wetland. In this respect, the following matters will be of particular importance:

- the manner in which any excavated acid sulphate soils are managed to avoid any adverse impacts upon the adjacent receiving waters of the Moreton Bay Ramsar wetlands;

- the manner in which the quantity and quality of stormwater run-off into the Ramsar wetland is to be managed to avoid any adverse impacts upon the adjacent receiving waters of the Moreton Bay Ramsar wetlands; and

- the manner in which the potential occurrence and impact of erosion and sedimentation is to be managed to avoid any adverse impacts upon the adjacent receiving waters of the Moreton Bay Ramsar wetlands.

7.2 Nature Conservation Act 1992

The *NC Act* and associated *Nature Conservation (Wildlife) Regulation 1994* provide a framework for the conservation of nature. One of the primary mechanisms by which this objective is to be achieved is through the declaration of and the specification of management principles and intents for wildlife species of particular conservation significance. The site possesses values recognised by the *NC Act* and associated Regulation and therefore development or use of the site is subject to constraints derived therefrom.

7.2.1 Recognised Values

Wildlife species that are recognised as being of formal conservation significance pursuant to the *Nature Conservation Act 1992* and *Nature Conservation (Wildlife) Regulation 1994* and which are considered to have a high to moderate probability of occurring on the site include:

- **Vulnerable –** Wallum froglet (*Crinia tinnula*), Tusked frog (*Adelotus brevis*) and Koala (*Phascolarctos cinereus*); and

- **Rare -** Black-necked stork (*Ephippiorhynchus asiaticus*) and Grey goshawk (*Accipiter novaehollandiae*).

The swampy paperbark forest provides potential habitat resources for the Wallum froglet, Tusked frog and Grey goshawk. It is, however, considered that this community does not constitute habitat critical to the survival of these species given the relatively small size and disturbed nature of this vegetation community and its physical isolation from other larger, contiguous and more intact areas of suitable habitat.

The Black-necked stork and Tusked frog may utilise habitat provided by the disturbed grassland community. It is considered, however, that given the Black-necked stork has a large range and that large areas of more suitable habitat exist within the locality, the site is most likely to be utilised as a temporary or transitory shelter during border movements within the locality and, as such, is not considered to represent habitat critical to the survival this species.

No flora species of formally recognised conservation significance pursuant to the *NC Act* were recorded on the site or directly adjacent to the site during the preliminary survey conducted on the 12th April 2006.

7.2.2 Compliance Assessment

Specific constraints to the proposed plan of development, associated with the *NC Act* and the associated *Nature Conservation (Wildlife) Regulation 1994*, include a requirement that the development is consistent with the Declared Management Intent for Endangered, Vulnerable and Rare wildlife species.

Relevant aspects of the *Nature Conservation (Wildlife) Regulation 1994* Declared Management Intents for Endangered, Vulnerable or Rare wildlife species are as follows:

- *to take action to ensure viable populations of the wildlife in the wild are preserved or re-established;*
- *to recognise that the habitat of endangered, vulnerable and rare wildlife is likely to be a critical habitat or area of major interest; and*
- *to monitor and review the adequacy of environmental impact assessment procedures to ensure that they take into account the need to accurately assess the extent of the impact on endangered, vulnerable and rare wildlife and develop effective mitigation measures.*

Pursuant to the *Nature Conservation (Wildlife) Regulation 1994* governments should, when dealing with land use planning issues, have regard to the occurrence of significant species and the management requirements needed to conserve existing populations of such wildlife.

It is considered that the site does not provide habitat critical to the survival of any wildlife species of recognised conservation significance pursuant to the *NC Act*. As such, development of the site would not be constrained by the provisions of the *NC Act.*

7.3 Vegetation Management Act 1999

The *VM Act* and associated State Policy for Vegetation Management on Freehold Land 2004 ("VM Policy") provide a formal framework for the recognition and management of the biodiversity values of vegetation in Queensland.

7.3.1 Recognised Values

The current and certified Regional Ecosystem Map generated for the site indicates that the site is mapped as a non-remnant "Plantation Forest".

7.3.2 Compliance Assessment

The development of the site is not constrained by the provisions of the *VM Act* as it is not mapped on the Certified RE Map as supporting any remnant vegetation.

7.4 Fisheries Act 1994

The objective of *the Fisheries Act 1994* and its Regulation 1995 is to sustain the important contribution that Queensland's commercial and recreational fisheries make to the State's economy. The Act provides for the management and protection of fish habitats and fisheries resources. One important and relevant mechanism by which this is achieved is the protection of all marine plants (i.e. plants growing within an area that is regularly inundated by tidal waters including mangroves, salt-couch, seagrass etc) from unauthorised disturbance, damage or removal.

7.4.1 Recognised Values

The site supports various species of marine vegetation such as mangroves (*Avicennia marina* and *Aegiceras corniculatum*) and Saltwater couch (*Sporobolus virginicus*). The marine plants that occur within the site and their distribution is detailed in The Ecology Lab Report, 2005 and within Section 4.2 herein.

The northern boundary of the site adjoins the Caboolture River which is recognised as forming part of the Deception Bay Declared Fish Habitat Area which has a "Management A" classification pursuant to the *Fisheries Act 1994*.

7.4.2 Compliance Assessment

Under the *Fisheries Act 1994* and its *Regulation 1995*, the primary mechanisms by which protection of fisheries habitat is achieved includes:

- the establishment of declared Fish Habitat Areas, which encompasses over 600,000 hectares of tidal wetlands, within which areas stringent controls are imposed in order to preserve ecological processes upon which the fisheries productivity of the habitats depend; and

- the protection of all marine plants (i.e. mangroves, salt-couch, seagrass etc) from unauthorised disturbance, damage or removal.

In addition, the Queensland Fisheries Service (QFS) Department of Primary Industries, has adopted the *Fish Habitat Guideline FHG 003 (2000) Fisheries Guidelines for Fish Habitat Buffer Zones* ("*FHG 003*") which provide a suite of recommended minimum setback distance from the level of Highest Astronomical Tide ("HAT") required to enable the continuation of specific functions adjacent to fish habitat areas. These functions include:

- protection of fisheries species diversity and distribution;
- protection of ecological buffers;
- filtration of nutrients/pesticides/heavy metals;
- water quality;
- stabilisation of bank erosion;
- pedestrian access to fisheries resources;
- provision of other wildlife habitat; and
- mosquito and midge control.

Issues relevant to the Deception Bay Declared Fish Habitat Area and the level of compliance with which the proposed plan of development (particularly the proposed

construction of the marina) achieves with the provisions of the *Fisheries Act 1994* and its associated policies and guidelines, are addressed in the report prepared by The Ecology Lab Pty Ltd entitled *Proposed Redevelopment of Land at Caboolture Preliminary Assessment of Aquatic Ecology*.

Irrespective of the above, it is noted that development of the terrestrial sections of the site will also be constrained by the *Fisheries Act 1994* in terms of:

- the requirement to gain approval to disturb marine plants; and
- the requirement to achieve compliance with *FHG 003*.

With regard to the above, the following is noted.

1. The constructed drainage channels in the central-northern portions of the site support marine vegetation (e.g. a disturbed Saltwater couch grassland, scattered mangroves, and Swamp oaks). Although it will be necessary to obtain an approval from the Department of Primary Industries and Fisheries to remove these plants for the purposes of establishing the marina and its adjoining residential precincts the following is also noted.

    a. Marine vegetation associated with the disturbed drainage channels is not mapped as remnant vegetation pursuant to the *VM Act*.

    b. The disturbed drainage channels occur outside of the Deception Bay Declared Fish Habitat Area and, given their disturbed state and occurrence within a site which was once used for forestry plantation activities, it is considered to have a low value in terms of fisheries productivity.

    c. The marine vegetation that has established within the drainage channels has done so within an area of the site that was formerly used for forestry activities and, since the conclusion of these activities, has been invaded by a variety of exotic flora species and declared pest plants and appears to be frequently utilised by the public for recreational off-road pursuits. As a consequence, the drainage channels are regularly subject to direct (e.g. vehicular activity) and indirect (e.g. weed invasion) disturbances.

2. The more intact marine communities within the site (i.e. the mixed marine vegetation community in the site's north-west and the thin band of mangroves along the site's northern boundary) are to be wholly conserved within the proposed environmental buffer zone, the wetland reserve and the public river access area. These communities are considered to have a moderate to high value in terms of fisheries productivity and would be predominantly protected and conserved under the proposed plan of development.

3. The minimum buffer width, stipulated in the *FHG 003* guidelines for functions relevant to the development of adjoining land for urban purposes, is 30m. As such, those sections of the site identified as occurring at, below or (based on *FHG 003* recommendations) within 30m of HAT or the boundaries of the Deception Bay Declared Fish Habitat Area are considered to be areas of "high constraint" pursuant to the *Fisheries Act 1994* and its *Regulation 1995*. It is relevant to note that, with the exception of the proposed entrance to the marina, land within 30m of the boundaries of the Deception Bay Declared Fish Habitat Area would be incorporated into and protected within the proposed environmental buffer zone, the wetland reserve or the public river access area. It is recommended that, at a minimum, a program of revegetation works be undertaken within the 30m buffer, with a focus on the removal of pest plant species listed under the provisions of the *LP Act* and the re-

establishment of native marine and other coastal species. No development infrastructure, including any proposed stormwater quality/quantity control devices, should be located within this 30m buffer.

7.5 Coastal Protection and Management Act 1995

The *Coastal Protection and Management Act 1995* ("*CPM Act*") and the associated State Coastal Management Plan 2001 ("State Coastal Plan") provides for the management and protection of the state's coastal zone and its economic, social and ecological resources. One of the primary objectives of the State Coastal Plan is to provide a set of key management topics with an associated framework of principles and policies for the achievement of sustainable management of the zone.

The site is also subject to the provisions of the draft South East Queensland Regional Coastal Management Plan 2004 ("draft SEQ Coastal Management Plan"). This plan is used in conjunction with the State Coastal Plan to provide a regional framework to manage and regulate future development in the area whilst protecting the coastal zone. The draft SEQ Coastal Management Plan includes policies to help implement and achieve the coastal management outcomes, principles and policies of the State Coastal Plan.

7.5.1 Recognised Values

Whilst it is acknowledged that issues relevant to the site's aquatic ecological values, including relevant constraints pursuant to the *CPM Act* are to be addressed in the report prepared by The Ecology Lab Pty Ltd entitled *Proposed Redevelopment of Land at Caboolture Preliminary Assessment of Aquatic Ecology*, it is relevant to note that this regulation will also constrain development of the site's terrestrial areas. In this respect, consideration has been given to the following specific principles and associated policies of the *SCMP*.

This section of the report requires the determination of the Mean High Water Springs (MHWS) tide level. The *Official Tide Tables and Boating Safety Guide 2006* lists MHWS at Beachmere (Mouth Caboolture River) as being approximately 0.81m AHD and, for the purposes of this report, this value will be used to represent MHWS.

Topic 2.2 – Physical Coastal Processes

This Topic stipulates the need for the protection of Erosion Prone Areas. The relevant principles of this topic are detailed below.

Principle 2B Erosion prone areas which exist on open coasts and along tidal waterways are secured and maintained largely free from development.

Principle 2C The consequences of physical coast processes are recognised and such processes generally are allowed to occur naturally.

Principle 2D Risks associated with all relevant hazards including storm tide inundation and cyclone effects are minimised.

Principle 2E The natural topography and physical features of coastal dune systems which provide adjacent areas with protection from inland

erosion are to be protected and managed on an ecologically sustainable basis.

Topic 2.8 – Conserving Nature

This Topic stipulates the need for the maintenance, enhancement and restoration of coastal ecosystems. The relevant principles of this topic are detailed below.

Principle 8A The biological diversity of marine, freshwater and terrestrial systems and the ecological processes essential for their continued existence are conserved.

Principle 8B Further loss or degradation of native vegetation on the coast, particularly of endangered regional ecosystems, is avoided wherever possible.

Principle 8C Further loss or degradation of coastal wetlands, including the loss of biological diversity and abundance of wetland-dependent wildlife, is avoided wherever possible.

Principle 8D Further loss or degradation of coastal habitats, particularly habitats for rare, threatened and migratory species, is avoided wherever possible.

Principle 8E The biophysical values of coastal dunes are conserved.

Principle 8F Opportunities for rehabilitation of degraded coastal resources are included in evaluating management options for those resources.

With respect to the above, the following features of the site are noted.

- The site adjoins marine ecosystems associated with the Moreton Bay Ramsar wetlands.
- The site is not mapped as supporting areas of remnant coastal vegetation.
- The northern sector of the site is mapped as supporting two areas of "Significant Coastal Wetlands" pursuant to *Map 6: Areas of State Significance (Natural Resources)* of the draft SEQ Coastal Management Plan. These areas are broadly mapped over the areas of the site identified as supporting the mixed marine vegetation and central disturbed saltwater couch grassland communities. However, during the preliminary site survey the areas mapped as "Significant Coastal Wetlands" in the central northern portions of the site was observed to consist of a very narrow constructed channel 2-3m in width (refer Section 4.2.5) that supported a narrow band of mangroves that were fringed by a disturbed Saltwater couch grassland. A well established and frequently utilised vehicular track traverses the band of disturbed Saltwater couch grassland to the north of the constructed channel.
- As noted in Section 7.1.1 herein the site provides potential habitat resources for a number of significant and migratory wildlife species.
- The site does not contain any coastal dune system.

- 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.

7.5.2 Compliance Assessment

With respect to *Topic 2.2 – Physical Coastal Processes*, the *SCMP* provides a relevant policy that may potentially constrain development of the site. A brief description of this policy and its potential to constrain the form of site development is provided below.

Policy 2.2.2 – Erosion Prone Areas

This Policy states that "*to the extent practicable, erosion prone areas are to remain undeveloped apart from acceptable temporary or relocatable structures for safety and recreational purposes".*

Mapping of Erosion Prone Areas in Caboolture (SC 3367E) states:

(2) On land adjacent to coastal waters the landward boundary of the erosion prone area shall be defined as:

(i) a line measured 40 metres landward of the plan position of the mean high water springs (MHWS) tide level except where approved revetments exist, in which case the line is measured 10 metres landward of the upper seaward edge of the revetment, irrespective of the presence of outcropping bedrock; or

(ii) a line located by the linear distance (in metres) specified on this plan measured, unless specified otherwise, inland from:

(a) the seaward toe of the frontal dune. (The seaward toe of the frontal dune is normally approximated on aerial photography by the seaward limit of terrestrial vegetation); or

(b) a straight line drawn across the mouth of a waterway between the alignment of the seaward toe of the frontal dune on either side of the mouth; or

(iii) the plan position of Highest Astronomical Tide (HAT); whichever provides the greater erosion prone area width except:

(a) where the linear distance specified on this plan is less than 40 metres, in which case note (2)(i) does not apply, however notes (2)(ii) and (2)(iii) do apply;

(b) where outcropping bedrock is present and no approved revetments exist, in which case the line is defined as being coincident with the most seaward bedrock outcrop within these defined boundaries but not seaward of the line of HAT;

(c) in approved canals in which case the line of HAT applies, irrespective of the presence of approved revetments or outcropping bedrock…

(4) Coastal waters, as referred to in note (2), are defined to be Queensland waters to the limit of HAT.

With respect to the above, portions of the site that occur within 40m of the landward boundary of the MHWS tide level, or, if not incorporated in the 40m MHWS buffer, below HAT, are considered to be Erosion Prone Areas which are highly constrained pursuant to the *CPM Act* and the associated *SCMP*. In this respect, it is relevant to note that generally and with the exception of the proposed entrance to the marina, land

within 40m of MHWS would be incorporated into and protected within the proposed environmental buffer zone, the wetland reserve or the public river access area.

Those portions of the site that do not occur within 40 metres of the MHWS tide level or below HAT are not considered to be Erosion Prone Areas and hence, are not constrained by the provisions of the *CPM Act* and the associated *SCMP*.

With respect to *Topic 2.8 – Conserving Nature*, the *SCMP* provides a number of relevant policies that may potentially constrain development of the site. Brief descriptions of these policies and their potential to constrain the form of site development are provided below.

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 *Nature Conservation Act 1992*.

This Policy constrains development of the site due to the fact that the northern sector of the site adjoins a significant coastal wetland (i.e. Moreton Bay) and because the site is mapped as containing two Areas of State Significance identified as "Significant Coastal Wetlands" on *Map 6: Areas of State Significance (Natural Resources)* of the draft SEQ Coastal Management Plan as illustrated in Figure 5.

With respect to the two areas that are mapped as supporting "Significant Coastal Wetlands" within the site, it is relevant to note that the area in the north-eastern sector of the site will be wholly conserved within the proposed environmental buffer zone. The preliminary field survey indicated that the centrally mapped "Significant Coastal Wetland" area consists of a narrow constructed channel supporting a thin band of mangroves with saltwater couch fringing this channel. Given its disturbed state, relatively small size, occurrence amidst a disturbed and exotic plant dominated grassland and the fact that it is associated with a tidally influenced and constructed drainage channel this "coastal wetland" is considered not to be of state significance.

Policy 2.8.2 - Coastal Wetlands

This policy states, "*further loss or degradation of coastal wetlands is to be avoided and impacts on coastal wetlands prevented, minimised or mitigated (in order of preference)*".

This Policy may constrain the nature of development on the site due to the fact that the site drains into tidally influenced waters that adjoin the coastal wetlands associated with Moreton Bay. Development of the site would need to address the appropriate management of acid sulphate soils, stormwater run-off and other potential impacts that could have an adverse effect upon the Ramsar wetlands of

Moreton Bay. These issues are addressed in The Ecology Lab Pty Ltd's report entitled *Proposed Redevelopment of Land at Caboolture Preliminary Assessment of Aquatic Ecology*.

The site is currently in a highly degraded state and is infested with exotic weed species. The majority of the marine vegetation and coastal wetland habitats associated with the Caboolture River will be conserved within the proposed environmental buffer zones, wetland reserve and public river access area. Under the proposed plan of development, the potential exists for these areas to be rehabilitated for the purposes of enhancing their ecological values (e.g. through the removal of weeds, planting out of native species, reduction in the through passage of vehicles).

It is recognised that the proposed plan of development would result in the loss of an area mapped as a Significant Coastal Wetland pursuant to *Map 6: Areas of State Significance (Natural Resources)* of the draft SEQ Coastal Management Plan. In this respect, it is noted that:

1. the area in question supports a disturbed Saltwater couch grassland which fringes a narrow band of non-remnant mangroves associated with a constructed drainage channel;

2. the area has been disturbed through processes associated with past and ongoing land uses, including weed invasion, vehicular damage and land clearance and, as such, is considered to provide quite low functional fisheries habitat and general ecological values; and

3. the potential exists for any habitat loss that results from the proposed development to be offset by active and compensatory rehabilitation efforts within:

    a. the proposed flood and stormwater retention spaces;
    b. the proposed wetland reserve; and
    c. the proposed buffer zones that adjoin the Caboolture River.

At present, the ecological values of land that would occur within these proposed zones is limited due to the impacts of past land use activities (i.e. land clearance associated with forestry practices) which have led to a widespread dominance of weeds and other introduced plants. Under the proposed plan of development, the potential exists for these zones to be rehabilitated and for the existing vegetative cover and ecological values of the more intact marine vegetation communities in the north-eastern corner of the site to be enhanced and expanded.

Policy 2.8.3 - Biodiversity

This policy states that "*biodiversity on the coast is to be safeguarded through conserving and appropriately managing the diverse range of habitats including coral reefs, seagrass, soft bottom (benthic) communities, dune systems, saltflats, coastal wetlands and riparian vegetation*".

The site's existing aquatic ecological values and the manner in which the plan of development proposes to safeguard and conserve these values is addressed within The Ecology Lab Pty Ltd's report entitled *Proposed Redevelopment of Land at Caboolture Preliminary Assessment of Aquatic Ecology*.

It is relevant to note that the terrestrial sections of the site are not mapped by DNRMW as supporting remnant vegetation. The majority of the site is highly degraded as a consequence of previous land clearing activities and currently supports various exotic weed species. The majority of the site's limited marine vegetation and riparian vegetation communities would be conserved within the proposed environmental buffer zones, wetland reserve and public river access areas. The potential also exists for rehabilitation efforts undertaken within the proposed flood and stormwater retention spaces and the championship golf course and wetland area to be undertaken to further enhance and expand the site's existing coastal habitat values.

It is relevant to note that this Policy, like Policy 2.8.1, would constrain any development that is likely to have an impact upon the adjoining Moreton Bay Ramsar wetlands and the two areas identified as "Significant Coastal Wetlands" on *Map 6: Areas of State Significance (Natural Resources)* of the draft SEQ Coastal Management Plan. The existing values of the areas mapped as "Significant Coastal Wetlands" and the intent for these two areas under the proposed plan of development have been previously discussed.

Policy 2.8.4 - Rehabilitation of Coastal Resources

This 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.

It is noted that this policy would not specifically constrain site development. However any provisions that are made in the plan of development for the rehabilitation of degraded coastal resources that occur on the site (i.e. around the fringes of existing marine communities that border the Caboolture River) would be generally consistent with the objective of this policy.

Policy 2.8.5 - Pest Species Management

The focus of this policy is to minimise the risk of introducing new pest species and reducing or at least controlling the impact of pest species infestations.

This policy would not specifically constrain site development. Nevertheless as part of any development of the site, provision should be made for:

- the management of existing infestations of invasive non-native plant (e.g. Groundsel bush, Lantana etc.) and animal species; and
- minimising the potential for the introduction and establishment of new aquatic and terrestrial pest species.

7.6 State Planning Policy 1/03 - Bushfire

The *State Planning Policy 1/03 - Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* ("*SPP 1/03*") addresses development issues associated with minimising the potential adverse impacts of flood, bushfire and landslide. Inappropriate development in areas susceptible to natural hazards significantly increases the risks (and associated costs) to the community. *SPP 1/03* aims to minimise these risks by ensuring that the potential adverse impacts of natural hazards are adequately considered when

development applications are assessed, when planning schemes are made or amended and when land is designated for community infrastructure.

With respect to the above, a bushfire hazard analysis has been completed for the site and its immediate surrounds and is presented in Appendix A. In summary:

- the majority of the site has a Medium Bushfire Hazard rating, with the exception of the marine vegetation communities which adjoin the Caboolture River which have a Low Bushfire Hazard rating;
- land to the east, west and south-east of the site 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, with the exception of the Swampy paperbark forest community to the site's south-west which supports a clump of paperbark forest and which, even following development of the site, 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 and, as such, is considered to have a Low Bushfire Hazard rating.

The bushfire hazard analysis contains a number of bushfire mitigation recommendations, including:

- appropriate lot design and the siting of buildings;
- the provision of firebreaks and fire protection zones that provide adequate setbacks between buildings/structures and hazardous vegetation, and access for fire-fighting/other emergency vehicles;
- the provision of adequate road access for firefighting/other emergency vehicles and safe evacuation; and
- the provisions of adequate and accessible water supply for fire-fighting purposes.

Further detail in this respect is provided in Appendix A.

7.7 Caboolture Shire Planning Scheme

The Caboolture Shire Plan has been prepared in accordance with the *Integrated Planning Act 1997* and came into effect on the 12th December 2005. The Caboolture Shire Plan provides a framework for managing development whilst addressing key issues, such as the environment, which may require protection or which may constrain development. In this respect, key attributes are identified on the Overlay Maps contained within the Caboolture Shire Plan. The presence of an important attribute within a site triggers assessment of the development against the relevant Overlay Codes.

7.7.1 Recognised Values

The Overlay Maps contained within the Caboolture Shire Plan identify the following ecological attributes within the site.

1. The northern sectors of the site are mapped as supporting Nature Conservation Areas of State and Regional significance and the south-western sector of the site is mapped as supporting a larger area of State significance pursuant to the *Central Planning Area Overlay Map CO10: Nature Conservation* as illustrated in Figure 6. In this respect, it is relevant to note that the mapped area of State significance in the south-western portion of the site does not accurately represent the actual extent of the Swampy paperbark forest community. Figure 3 shows the actual distribution of this community and it is relevant to note that it is bordered on its eastern and western sides by a disturbed grassland community dominated by dense acacia regrowth. It is noted that development of the actual extent of the Swampy paperbark forest would be highly constrained by the provisions of the Nature Conservation Overlay Code and, in this respect, it is recommended that the proposed plan of development be revised to incorporate and preserve this community. An alternative approach, which may be considered appropriate by Caboolture Shire Council would be to compensate for any loss of this community, as a consequence of works associated with the proposed plan of development (i.e. the establishment of the golf course residential area and golf course), by undertaking active rehabilitation efforts within:

   a. the proposed flood and stormwater retention spaces;
   b. the championship golf course and wetland area; and/or
   c. the wetland reserve.

   This is further addressed in Section 7.7.2.

2. The *Central Planning Area Overlay Map CO10: Nature Conservation* also identifies the northern sectors of the site as contributing to an "Ecological Corridor".

3. The *Central Planning Area Map CO3: Catchment Protection* also identifies a "Wetland Protection Area", "Catchment Protection Major Waterway" and "Catchment Protection Minor Waterway" within the site.

4. It is relevant to note that although Koalas have been recorded within its vicinity, the site does not contain a "Koala Conservation Area" pursuant to the Central Planning Area Overlay Map CO8: Koala Conservation.

According to the Caboolture Shire Atlas of Natural Assets, the site forms part of the Gympie Creek Catchment area and contains an area in the south-western sector of the site which is mapped as "Predominantly *Melaleuca quinquenervia* forest with associated species including *Lophostemon suaveolens, Eucalyptus tereticornis, Melalueca linariifolia, Callistemon pachyphyllus, Glochidion sumatranum, Blechnum indicum, Phragmites australis, Baccharis halimifolia* (introduced species)" with a conservation rating of moderate. It is possible that outdated mapping or aerial photography used in the preparation of the Shire Atlas has been to some extent, relied upon in the preparation of mapping associated with the Shire Plan.

7.7.2 Compliance Assessment

The above listed features identified on the Overlay Maps of the Caboolture Shire Plan trigger assessment against the Nature Conservation Overlay Code, the Catchment Protection Overlay Code respectively. The degree of compliance that the proposed plan of development achieves with each of these Codes is detailed below. With respect to the Bushfire Hazard Overlay, a Bushfire Hazard Analysis Report which provides details on the site's bushfire hazard potential and recommended means and methods of bushfire hazard mitigation is provided as Appendix A.

Table 3 Assessment of compliance with the Nature Conservation Overlay Code

Specific Outcomes	Probable Solutions	Compliance Assessment
Assessment and Retention of Nature Conservation Areas and Ecological Corridors		
SO1 Development does not adversely affect Significant Vegetation, Wetlands, ecological corridors or habitat for endangered, vulnerable or rare species and other values of biodiversity significance. ***Note:*** *An ecological assessment may be required in accordance with the Planning Scheme Policy 6 Ecological Assessment.* ***Note:*** *Applicants should consult with the relevant State Agency regarding vegetation clearing.*	**S1.1** Development is sited on existing cleared land and is not located within an ecological corridor.	The northern sectors of the site are mapped as forming part of an ecological corridor pursuant to Overlay Map CO10. The majority of the land within this ecological corridor is highly disturbed and dominated by exotic grasses and weeds. The majority of the marine vegetation and riparian vegetation within this corridor is to be conserved and protected within the proposed environmental buffer zone, wetland reserve and public river access area. Although the proposed entrance to the marina will fragment the continuity of the mapped "corridor", it is relevant to note that, at present and owing to its disturbed state, narrow width and open nature, this "corridor" is likely to be utilised by a limited range of native fauna. The majority of the species that utilise this corridor are likely to be highly mobile (e.g. birds and bats) and, as such, their movement along the "corridor" would not be significantly impeded by the creation of the marina entrance.
	S1.2 Significant Vegetation, Wetlands, habitats for endangered, vulnerable and rare species within nature conservation areas and ecological corridors indicated on the overlay map, are not disturbed.	The site supports three areas of significant vegetation pursuant to the administrative definition in Part 2 of the Caboolture Shire Plan. These areas are: • the swampy paperbark forest in the south-west of the site which is mapped as a State Nature Conservation Area; • the mixed marine communities in the site's north-east which are mapped as State and Regional Nature Conservation Areas; and • the disturbed Saltwater couch grassland, which is mapped as a Regional Nature Conservation Area.

		Under the proposed plan of development, the marine communities in the north-east of the site would be conserved and protected within the environmental buffer zones and wetland reserve. The Swampy paperbark forest and the disturbed Saltwater couch grassland would be removed. The potential exists for these losses to be compensated for by active rehabilitation efforts within: • the proposed flood and stormwater retention spaces; • the championship golf course and wetland area; and/or • the wetland reserve.
SO2 Development layout and planning maximises the functioning of ecological corridors which: (a) Ensures low intensity land uses are situated directly adjacent to the corridor; (b) Ensures viability and functionality of the corridor; (c) Maximises connectivity to neighbouring ecological corridors; (d) Maximises connectivity to other large areas of habitat retained on-site or on neighbouring sites; (e) Ensures retained vegetation is configured to provide low edge to area ratios and avoid narrowing or bottlenecks within the corridor; and (f) Ensure road infrastructure avoids core corridor vegetation, or where not possible, provides for wildlife under / overpasses and minimises the intrusion, length and width. ***Note:*** *Revegetation should be undertaken progressively during construction and be completed within one (1) month after construction is completed.*	**S2.1** A core ecological corridor of at least 100.0 metres in width is provided.	Due to its highly disturbed state and the prevalence of the disturbed grassland community across the majority of its extent, it is considered that, at present, the site does not support a functional or core ecological corridor of 100m in width. The Environmental Buffer Zones, Public River Access, Wetland Reserve, Championship Golf Course and Wetland and Flood and Storm Water Retention Spaces proposed under the development layout (refer Figure 4) would, with the exception of the proposed marina entrance, provide a continuous riparian corridor that is 100m in width and which would represent a significant improvement to the limited corridor values that the site possesses in its current state.
	S2.2 Revegetation or rehabilitation occurs in degraded or weed infested areas.	There is the potential for areas such as the environmental buffer zones contained within the ecological corridor to be rehabilitated thereby ensuring the connectivity and viability of the corridor.

	S2.3 Local native species that reflect the structural and floristic diversity of vegetation on the site or surrounds are used to rehabilitate and revegetate ecological corridors and Nature Conservation Areas.	Local native species that are endemic to the locality will be used in any rehabilitation or revegetation works that are undertaken.
	S2.4 Revegetation assists in consolidating and linking existing Significant Vegetation. ***Note:*** *Revegetation should be undertaken progressively during construction and be completed within one (1) month after construction is completed.*	The potential exists for the north-eastern corner of the site to be revegetated through active rehabilitation efforts undertaken within the environmental buffer zones, wetland reserve, flood and Stormwater retention spaces and, where practicable, championship golf course. The revegetation of these areas would consolidate existing significant wetland habitats in the north-east of the site and provide opportunities for east-west movement through the site by resident wildlife.
SO3 Ecological corridors are retained and protected from development to facilitate wildlife movement and link significant vegetation, wetlands, habitat for endangered, vulnerable or rare species and other values of biodiversity significance.	**S3.1** No solution provided.	As previously discussed, the majority of vegetation that contributes to the "corridor" mapped across the northern sections of the site would be retained within the environmental buffer zones, wetland reserve and public river access areas. Some fragmentation of this "corridor" would be required in order to establish the entry point to the proposed marina. However, as previously discussed, the majority of species that currently utilise this corridor are likely to be highly mobile (e.g. birds and bats) and, as such, their movement along the "corridor" would not be significantly impeded by the creation of the marina entrance.
Buffering of Nature Conservation Areas		
SO4 Separation buffers are provided to protect Nature Conservation Areas, ecological corridors and areas of coastal hazard from the edge effects of development.	**S4.1** Developed areas should be separated from Nature Conservation Areas by a vegetated access way or park of at least 20.0 metres.	The current proposed plan of development, as illustrated in Figure 4, does not allow for the protection and conservation of the swampy paperbark forest ("State Nature Conservation Area") or disturbed saltwater couch grassland ("Regional Nature Conservation Area"). As such, the Specific Outcome 4 of the Nature Conservation Overlay Code is not achieved. It is relevant to note that the potential exists for these losses to be compensated for by active rehabilitation efforts within:

		• the proposed flood and stormwater retention spaces; • the championship golf course and wetland area; and/or • the wetland reserve.
	S4.2 Developed areas should be separated from the Conservation Estate by a vegetated access way or park of at least 100.0 metres.	No Conservation Estates occur within or directly adjacent to the site.
	S4.3 Ecological corridors are separated from development by a vegetated access way or park of at least 20.0 metres.	It is considered that, given the current limited functional corridor values of the site that it would not be necessary to provide an arbitrary development setback of 20m from the disturbed areas currently mapped as forming part of the "ecological corridor". The feasibility of establishing access ways between potential rehabilitation areas which would enhance and expand the site's current ecological values (e.g. the environmental buffers, wetland reserve and flood/stormwater retention spaces should be investigated.
Works associated with the development		
SO5 The location of infrastructure does not disturb Significant Vegetation and Wetlands.	**S5.1** Infrastructure does not traverse Significant Vegetation and Wetlands.	Infrastructure within the proposed plan of development would traverse the swampy paperbark forest in the south-western sectors of the site and the disturbed saltwater couch grassland in the site's central northern sectors. As such, Specific Outcome 5 of this Code would not be achieved. It is relevant to note that the potential exists for these losses to be compensated for by active rehabilitation efforts within: • the proposed flood and stormwater retention spaces; • the championship golf course and wetland area; and/or • the wetland reserve. Where practicable, the siting of infrastructure within these potential rehabilitation areas should be avoided.
	S5.2 Roads adjacent to Significant Vegetation and Wetlands incorporate traffic calming devices to minimise disturbance to wildlife.	The feasibility of incorporating traffic calming devices on roads adjacent to retained areas of significant vegetation would be investigated and addressed in the relevant traffic

		report submitted in support of the development application.
	S5.3 Wildlife under/overpasses are provided to facilitate wildlife movement.	The site does not support or contain an ecological or movement corridor that is likely to support or contribute to significant fauna movements within the locality. Furthermore, the site does not occur adjacent to or within the locality of a major transport corridor. As such, it is considered that it would not be necessary to incorporate wildlife under or overpasses within the development to facilitate wildlife movement.

Table 4 Assessment of compliance with the Catchment Protection Overlay Code

Specific Outcomes	Probable Solution	Compliance Assessment
Assessment of Retention of Significant Vegetation		
SO1 Significant Vegetation is retained and consolidated so as to: (a) Protect the Shire's nature conservation and aesthetic values; (b) Maintain a healthy and productive agricultural environment including protection from salinity, erosion and land degradation; (c) Maintain and enhance water quality, in-stream and riparian habitat, to protect Potable Water Catchments; (d) Maintain and enhance water quality and riparian vegetation in order to protect freshwater aquatic ecosystems and receiving systems, particularly estuarine and marine environments; (e) Provide a linkage with existing Nature Conservation areas; and (f) Maintain natural ecosystem functions and assist in the control of weeds and pests. ***Note:*** *To fulfil the vegetation retention solutions, a Property Vegetation Management Plan, prepared in accordance with Planning Scheme Policy 6 Ecological Assessment may be required.*	**S1.1** No solution provided.	The riparian vegetation within the site, with the exception of the entrance to the marina basin is to be retained and conserved. The swampy paperbark forest vegetation community in the south-western sector of the site and the disturbed saltwater couch grassland in the site's central northern sections would be removed as a consequence of the proposed plan of development. It is relevant to note that the potential exists for these losses to be compensated for by active rehabilitation efforts within: • the proposed flood and stormwater retention spaces; • the championship golf course and wetland area; and/or • the wetland reserve. A Property Vegetation Management Plan detailing the means by which these potential rehabilitation areas would be managed to ensure adequate conservation and protection measures were adopted, would be prepared and submitted in support of a relevant Operational Works application.
SO2 The environmental values of Significant Vegetation, Wetlands and Waterways are maintained by: (a) Retention of Significant Vegetation and vegetation associated with Wetlands and Waterways; (b) Consolidating and linking existing Significant Vegetation.	**S2.1** Revegetation utilises local native species that reflect the structural and floristic diversity of Significant Vegetation, Waterway or Wetland vegetation on the site or surrounds and assists in consolidating and linking existing Significant Vegetation. ***Note:*** *Revegetation should be undertaken progressively during construction and completed one (1) month after construction is completed.*	The majority of the riparian vegetation associated with the Caboolture River is to be retained within the proposed plan of development. As previously discussed, the potential exists for the site's existing wetland values to be enhanced and expanded through the rehabilitation of: • the proposed flood and stormwater retention spaces; • the championship golf course and wetland area; and/or • the wetland reserve. Local native species, endemic to the locality, would be used for any

		rehabilitation or revegetation works that are undertaken.
Bank Stability and In-Stream Habitat		
SO3 Bank stability and in-stream habitat is protected from degradation and maintained or improved at a standard commensurate with pre-development environmental conditions.	**S3.1** No solution provided.	The proposed plan of development incorporates environmental buffer zones, a wetland reserve and public river access area along the northern boundary of the site adjoining the Caboolture River. These areas would serve to protect the riparian vegetation and bank stability of the Caboolture River. The construction and establishment of the marina basin will be designed in a manner that protects these ecological values and that is consistent with the purpose and intent of the relevant provisions of the *CPM Act*, the *Fisheries Act 1994* and the *Environmental Protection Act 1994*.
Buffering of Waterways and Wetlands		
S04 Protect and maintain waterway corridors and their hydrologic, water quality and ecological function by: (a) Providing adequate buffers to waterways; and (b) Protecting natural drainage channels and riparian habitat; and (c) Providing adequate habitat connectivity between waterways.	**S4.1** Development is set back from the edge of the top of the bank or HAT level (whatever is greater) of a Waterway or Wetland a distance of: (a) At least forty (40) metres to all Catchment Protection Minor Waterways; (b) At least one hundred (100) metres to Wetland Protection Areas. (c) At least one hundred (100) metres to Catchment Protection Major Waterways.	This issue has been previously addressed within Section 7.5.2 of this report.
	S4.2 Constructed or artificial waterways that are to discharge into existing waterways should have a minimum vegetated buffer width of: (a) 10.0 metres for a constructed freshwater, marine, estuarine or brackish waterway. (b) 40.0 metres for freshwater constructed waterways greater than 1.0 metre excavation depth. (c) 100.0 metres for marine or estuarine constructed waterways greater than 1.0 metre excavation depth. ***Note:*** *It may be appropriate for the setback to incorporate vegetated areas or areas to be rehabilitated. Refer to Planning Scheme Policy 14 Landscaping for details to include in*	The proposed plan of development does not contain provisions for the incorporation of constructed or artificial waterways.

	revegetation plans. ***Note*:** *Classification of a constructed waterway, with regard to determining buffer width, is dependant upon the type of waterway that the constructed waterway discharge will be received by (i.e. if a constructed waterway discharges directly into a marine or estuarine waterway the constructed waterway will be considered a marine/estuarine waterway (regardless of water quality attributes of the constructed waterway)).* *When a constructed waterway is to discharge into another currently unmapped constructed waterway the buffer width is determined by the buffer width of the receiving constructed waterway.*	
SO5 Protect and maintain the environmental values of receiving environments by: (a) Reducing the cumulative impact of pollutant transport and deposition; (b) Protecting higher order streams and ephemeral waterways; and (c) Providing successive buffering of waterways between freshwater, estuarine and marine environments.	**S5.1** No solution provided.	This issue is to be addressed within the Hydrology Report and the Environmental Management Plan prepared and submitted in support of the Operational Works development application.
Drainage and Other Works		
SO6 The natural hydrological regimes of Waterways and Wetlands, are maintained. ***Note:*** *Natural hydrological regimes include natural water quality, quantity and groundwater conditions including sub-surface drainage paths. The purpose of maintaining these regimes is to protect and encourage natural recharge rates to aquifers and contributions to base flow in streams (environmental flows).* ***Note:*** *Development should be carried out in accordance with an approved hydrological assessment report that ensures any changes to overland flow or groundwater do not adversely affect the hydrological conditions or water quality within a waterway or receiving waterway. A site based*	**S6.1** The height of groundwater tables is not altered and natural seasonal height fluctuations maintained.	This Specific Outcome is addressed in the Hydrology Report prepared as a supporting document to the development application.

stormwater management plan may be required in accordance with Planning Scheme Policy 19 Stormwater.		
SO7 Development does not increase the discharge or movement of groundwater and associated contaminants, such as iron, aluminium, nutrients or total organic carbon, to a waterway or to a place where contaminants may be transported to a waterway.	**S7.1** Development works maintain or enhance groundwater aquifer interactions with waterways to a standard commensurate with pre-development environmental conditions.	This Specific Outcome is to be addressed in the Hydrology Report prepared for the site.
SO8 The natural water quality of specific waterway types is protected. ***Note:*** *The natural water quality characteristics of individual waterways vary between waterway types. In order to protect and maintain the environmental values of individual waterways, these characteristics need to be considered when determining water quality management solutions.*	**S8.1** No solution provided.	This Specific Outcome is to be addressed in the Hydrology Report prepared for the site.
SO9 Significant Vegetation and Wetlands are retained.	**S9.1** Infrastructure does not traverse Significant Vegetation.	Infrastructure within the proposed plan of development would traverse the swampy paperbark forest in the south-western sectors of the site and the disturbed saltwater couch grassland in the site's central northern sectors, the latter of which is mapped as a "wetland protection area". As such, Specific Outcome 5 of this Code would not be achieved. It is relevant to note that the potential exists for these losses to be compensated for by active rehabilitation efforts within: • the proposed flood and stormwater retention spaces; • the championship golf course and wetland area; and/or • the wetland reserve. Where practicable, the siting of infrastructure within these potential rehabilitation areas should be avoided.
	S9.2 Roads adjacent to Significant Vegetation and Wetlands incorporate traffic calming devices to minimize disturbance	The feasibility of incorporating traffic calming devices on roads adjacent to retained areas of significant vegetation and wetlands would be

	to wildlife.	investigated and addressed in the relevant traffic report submitted in support of the development application.
	S9.3 Wildlife under/overpasses are provided to facilitate wildlife movement. ***Note:*** *Refer to the Planning Scheme Policy 6 Ecological Assessment which contains information about designing infrastructure to facilitate wildlife movement.*	The site does not support or contain an ecological corridor or movement that is likely to support or contribute to significant fauna movements within the locality. Furthermore, the site does not occur adjacent to or within the locality of a major transport corridor. As such, it is considered that it would not be necessary to incorporate wildlife under or overpasses within the development to facilitate wildlife movement.
SO10 The biodiversity of specific vegetation types associated habitat values, in particular endangered, vulnerable or rare species is protected or enhanced.	**S10.1** Vegetation corridors between significant vegetation and other vegetation are maintained or provided.	At present, the site does not support vegetation corridors between areas of significant vegetation. As previously stated, the potential exists for by active rehabilitation efforts to be undertaken within: • the proposed flood and stormwater retention spaces; • the championship golf course and wetland area; and/or • the wetland reserve. Such efforts would enhance and expand existing areas of conservation significance within the site and provide potential movement opportunities for wildlife in an east-west direction across the site.
Erosion Prone Areas		
SO11 Natural coastal processes are able to be managed and life and property are protected from development by ensuring that: (a) Development does not occur within Erosion Prone Areas, except for temporary or relocatable structures for safety or recreational purposes (eg. picnic tables, barbeques, walking trails, bikeways, lookouts and elevated decks) associated with a development can be located within erosion prone areas; (b) Existing intensities of development are not exceeded; and (c) Existing building alignments of neighbouring properties are not exceeded.	**S11.1** No solution provided.	This issue has been addressed in Section 7.5.2 of this report.

Note: *Statutory erosion prone area plans made under the Coastal Protection and Management Act 1995 can be viewed at Council.*		
Protection of Potable Water Catchments		
SO12 Development within a Potable Water Catchment (as identified in Schedule 3) maintains or enhances the water quality and integrity of water resources by: (a) minimising land degradation and disturbance to dispersive soils; (b) preventing the release of sediment and nutrients into waterways; (c) maximising groundcover retention and retaining and where possible consolidating and linking significant vegetation adjoining waterway buffers, on ridge lines, vegetated slopes and in stormwater recharge areas.	**S12.1** No solution provided.	Issues relevant to water quality and water resources are to be addressed within the Hydrology Report and the Stormwater Management Plan prepared for the site.

8. CONCLUSIONS

This assessment of the ecological values of the site for the proposed residential development has been carried out for a number of purposes including:

- to document the ecological values of the site and specific areas thereof;
- to identify constraints to site development associated with the presence of areas and aspects of ecological significance as defined by reference to relevant State and Commonwealth government regulations; and
- to assess the degree of compliance that the proposed plan of development achieves with the requirements of the local planning scheme and relevant Commonwealth and State government legislation with a biodiversity conservation focus.

The conclusions of this assessment are as follows.

1. The majority of the site is highly degraded and is dominated by disturbed grasslands. The site does support areas of marine vegetation and an area of relatively intact vegetation, namely the swampy paperbark forest, in the south-western sector of the site.

2. There are several matters of national environmental significance within the site locality pursuant to the *EPBC Act*. A referral to the DEH will be necessary to determine whether the proposed plan of development is deemed likely to have any significant impact on any such matters.

3. No flora or fauna species of recognised conservation significance were recorded on the site. It is considered that the site does not represent habitat critical to the survival of any rare or threatened species pursuant to the *NC Act.*

4. The development will require specific management requirements to ensure that the values of the adjoining Declared Fish Habitat Area are upheld. Approvals are also required for any disturbance to marine plants that occur within the site boundaries under the provisions of the *Fisheries Act 1994.*

5. The *CPM Act,* and the associated *SCMP*, would constrain development of the site within 40 metres of the landward boundary of the MHWS tide level, or, if not incorporated in the 40m MHWS buffer, below HAT, as these areas are considered to be Erosion Prone Areas pursuant to Policy 2.2.2 of the *SCMP*. Additional constraints to the potential development of land below HAT are also provided by Policies 2.8.1 and 2.8.3 of the *SCMP* which respectively relate to areas of State significance and biodiversity. Additional constraints to site development may be provided by the *SCMP*'s Policy 2.8.2 due to the fact that the site drains into tidally waters that adjoin the coastal wetlands associated with Moreton Bay. In this regard development of the site needs to address the appropriate management of stormwater run-off and other potential impacts that could have an adverse effect upon the Ramsar wetlands of Moreton Bay.

6. The current plan of development does not achieve compliance with the all of the requirements of the Nature Conservation Overlay Code and the Catchment Protection Overlay Code of the Caboolture Shire Plan. In this respect, it is recommended that the proposed plan of development be revised to incorporate and preserve the Swampy paperbark forest community in the site's south-west.

Alternatively Caboolture Shire Council may consider that it is appropriate for any loss of this community to be compensated for the completion of active rehabilitation efforts within:

a. the proposed flood and stormwater retention spaces;
b. the championship golf course and wetland area; and/or
c. the wetland reserve.

FIGURES

APPENDIX A

Bushfire Hazard Analysis Report

INTRODUCTION

This Bushfire Hazard Analysis has been prepared by Cardno (Qld) Pty Ltd in support of a proposed development of land described as Lot 7 on RP845326 and Lot 24 on SP158298, Farry Road, Burpengary ("the site'). This Bushfire Hazard Analysis has been prepared in accordance with the requirements of *State Planning Policy 1/03 - Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* ("*SPP 1/03*").

Bushfire Hazard Analysis

The site has been identified by the Queensland Rural Fire Service ("QFRS") as being situated in a Medium Bushfire Hazard area and in such an area *SPP 1/03* 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.

The *State Planning Policy 1/03 Guideline – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* ("*SPP 1/03* Guideline") can be used to determine appropriate bushfire hazard classifications for different sectors of the site and its immediate vicinity ("the site locality"). The guideline identifies three features of the landscape that strongly contribute towards the behaviour of bushfires: vegetation community structure/ composition, slope and aspect.

The structure and composition of vegetation communities determine the rate at which dry fuel accumulates. Some vegetation communities protect fuel from drying out in all but extreme bushfire seasons, making the vegetation susceptible to very destructive bushfires, whilst other vegetation communities may expose fuels to drying and therefore be frequently available for burning.

As a general rule, bushfire intensity and the rate of spread of bushfires rises in proportion to slope, with bushfires burning faster uphill and slower downhill. Steeper slopes also increase the difficulty of constructing ring roads and firebreaks and limit the access for emergency crews.

Aspect affects bushfire hazard due to the effects that exposure to direct sunlight has on different vegetation communities, including the drying rates of fuels. Aspect also correlates closely with exposure to low humidity winds that increase bushfire intensity. The intensity and rate of spread of bushfires tends to be greater on slopes with north to westerly aspects, although this influence is not considered to be significant on land with a slope less than 5%.

The *SPP 1/03* Guideline provides hazard scores for a range of vegetation communities, slopes and aspects, with higher scores reflecting greater potential hazard. The scores

for these individual factors are then added together to give a total hazard score as follows:

Total hazard score = vegetation community hazard score + slope hazard score + aspect hazard score.

The total hazard score determines the severity of bushfire hazard as set out below:

Total Hazard Score	Severity of Bushfire Hazard
13 or greater	High
6 to 12.5	Medium
1 to 5.5	Low

In order to accurately assess the bushfire risk for a given site locality, the area of interest is divided into a number of sub-units, based on variances in vegetation communities, slope or aspect. Total hazard scores are then determined for each sub-unit and a bushfire hazard analysis can be undertaken to identify areas of High, Medium and Low bushfire hazard within the site locality.

Site Inspection

An inspection of the site was completed on the 12th of April 2006 in order to assess and classify the site's vegetation, slope and aspect in accordance with the classification system detailed in the *SPP 1/03 Guideline*. A summary of the assessment is provided in Table A.

Table A. Summary of the bushfire hazard assessment conducted for the site

Sub-Unit	Brief Description	Hazard Score
Vegetation	Native grasslands (ungrazed), open woodlands, canefields. Fast moving fires, available to fire annually to 4 years. Usually no ember attack, radiant heat for >10 m, duration <2 minutes.	5
	Paperbark heath and swamps, eucalypt forest with dry-shrub ladder fuels. Fire intensity depends on fuel accumulation, but can be severe, with flame lengths to 20m, spot fires frequent across firebreaks, radiant heat and direct flame for 15 minutes.	6
	Intact rainforest, mangrove forest, intact riverine rainforest. Virtually fireproof.	0
Slope	Plain (0% to 5%)	1
Aspect	East to South and all land under 5% slope	0
	Total	0, 6 & 7

With respect to the above, the following is noted.

1. The entire site is characterised by slopes under 5%.

2. The majority of the site is dominated by a disturbed grassland community. This community is not subject to regularly slashing or grazing and supports scattered woodland clumps and patches of acacia regrowth. As such, it is considered that the majority of the site has an equivalent bushfire hazard score of 6. It is

considered that land adjoining the site to the east, west and south-east generally has a similar equivalent bushfire hazard score.

3. At present, the Swampy paperbark forest community in the site's south-western sector has an equivalent vegetation hazard score of 8, as it is situated amidst an unmanaged disturbed grassland community and does not represent an isolated unit of vegetation. The total bushfire hazard score for this community is 9.

4. The marine communities which border the Caboolture River have an equivalent vegetation hazard score of 0 and, pursuant to the *SPP 1/03* Guideline "[where] *the vegetation community is assessed as having a vegetation community hazard score of zero, no other factors need to be taken into account and the relevant sub-units should be given a Low severity of overall bushfire hazard. No further action is required*."

Based on the above the majority of the site has a total hazard score of 6, 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, west 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-western sector, 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 and, as such, is considered to have a Low Bushfire Hazard rating.

BUSHFIRE HAZARD MANAGEMENT RECOMMENDATIONS

The proposed development of the site is likely to increase the number of people living in or adjacent to an area that the Queensland Rural Fire Service have mapped as being a Medium Bushfire Hazard 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 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.

With respect to the above, the following is noted.

1. Under the proposed plan of development, the majority of vegetation within the site and on land adjoining the site's western boundary would be removed due to the establishment of buildings, roads and other infrastructure (refer Figure 4). As such, the current bushfire rating within the site and on land west of the site would be reduced to that of a Low Bushfire Hazard.

2. The eastern, south-eastern and part of the southern sections of the site would occur within the 50 metre wide "safety buffer" that forms part of the Medium Bushfire Hazard Management Area associated with the north-eastern extent of the site. It is, however, relevant to note that, in general, the residential precincts proposed for the site would be established outside the 50m safety buffer and would be physically separated from land to the east and south-east by the proposed environmental buffer zones and the championship golf course and wetland and, in the north-east of the site, by the flood and stormwater retention spaces. As such, the proposed development will generally 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).

   The exception to the above is the southern section of the site which adjoins the off-site clump of paperbark forest currently connected to the Swampy paperbark forest community. Within this section of the site, a residential area is proposed within the 50 metre wide "safety buffer" that forms part of the Medium Bushfire Hazard Management Area associated with this off-site clump of paperbark forest. In this section 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 *State Planning Policy 1/03 Guideline – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* ("*SPP 1/03* Guideline") to objective b) of *SPP 1/03* is detailed in the following sections.

Buildings and Structures

The *SPP 1/03* Guideline states that, for all development, buildings and structures on lots greater than 2,500 m^2:

a) are sited in locations of lowest hazard within the lot; and
b) achieve setbacks from hazardous vegetation of 1.5 times the predominant mature canopy tree height or 10 metres, whichever is the greater; and
c) 10 metres from any retained vegetation strips or small areas of vegetation; and
d) are sited so that elements of the development least susceptible to fire are sited closest to the bushfire hazard.

As previously discussed, part of the southern portion of the development envelope is situated within the 50 metre wide "safety buffer" that forms part of a Medium Bushfire Hazard Management Area associated with an off-site clump of paperbark forest. It is also recognised that this unit of bushland would, following development of the site, have an equivalent vegetation sub-unit hazard score of 6. The *SPP 1/03* Guideline defines "vegetation communities with a hazard score of 6 or more" as hazardous vegetation. As such, the clump of paperbark forest that adjoins the development envelope's southern boundary constitutes 'hazardous vegetation' pursuant to *SPP 1/03*. Trees within this community characteristically grow to 18-20m in height and, as such, a maximum development setback of 30m from the edge of this paperbark community would be required.

Under the proposed plan of development, it will not be possible to achieve a setback of 30m from the paperbark community. It would be appropriate for any roadway established within the relevant section of the residential area to be located such that it physically separates the paperbark community from adjacent dwellings within the site. Furthermore any dwellings or structures that are to be established within the 30m wide "hazardous vegetation setback" should be designed and constructed to an appropriate standard consistent with the fact that they are to be located within and adjacent to an area of medium bushfire hazard. The following three standards of building construction for bushfire prone areas are set out in *Australian Standard AS 3959 – 1999 Construction of buildings in bushfire-prone areas* ("*AS 3959 – 1999*"):

- Level 1 construction – for the category of medium bushfire attack;
- Level 2 construction – for the category of high bushfire attack; and
- Level 3 construction – for the category of extreme bushfire attack.

With respect to the above, the applicable level of construction required for a building constructed within the 30m wide "hazardous vegetation setback" would be the Level 1 requirements of *AS 3959 – 1999*.

Water Supplies

The *SPP 1/03* Guideline states that, for all development, involving new or existing buildings with a gross floor area greater than 50 m^2 each lot has:

a. a reliable reticulated water supply that has sufficient flow and pressure characteristics for fire fighting purposes at all times (minimum pressure and flow is 10 litres a second at 200 kPa); or

b. an on-site water storage of not less than 5,000 litres (e.g. accessible dam or tank with fire brigade tank fittings, swimming pool).

The proposed development will be serviced by a reticulated water supply and, as such, residents and workers will not be reliant upon on-site water storage to meet their domestic, including fire fighting/suppression, requirements.

In the event that a reticulated water supply is not available during the construction phase of the development for fire-fighting/suppression requirements, a portable diesel pump (approx. 3 HP) will also be maintained on site by the site manager to facilitate access to water stored within existing waterbodies (i.e. in the north-western and central portions of the site) for fire suppression purposes.

Lot Design and Siting

It is a requirement of *SPP 1/03* for lots that contain a residential dwelling to be designed so that their size and shape allow for the following.

1. *Efficient emergency access to buildings for fire-fighting appliances (e.g. by avoiding long narrow lots with long access drives to buildings).*

   In this respect the following is noted that the proposed development avoids the creation of long narrow allotments. Direct access to each dwelling within the site would be provided in the form of a sealed roadway.

2. *Setbacks and building siting such that buildings can be situated in locations of lowest hazard within the lot and appropriate setbacks from hazardous areas can be established and maintained.*

   Establishment of the proposed development would result in a decrease in the current bushfire hazard rating of vegetation within the site due to the fragmentation caused by the establishment of roadways, building pads and other built infrastructure. In this respect it is considered that, within most areas of the development envelope, there is no requirement to establish building setbacks.

   However, it is noted that part of the site's southern extent is situated within the 50 metre wide "safety buffer" that forms part of the Medium Bushfire Hazard Management Area associated with an off-site paperbark community and that this Medium Bushfire Hazard Management Area supports "hazardous vegetation" pursuant to *SPP 1/03*. Any dwellings or structures established within the 30m wide "hazardous vegetation setback" should be constructed in accordance with the Level 1 construction standards pursuant to *AS 3959 – 1999*.

Firebreaks

The *SPP 1/03* Guideline states that, for development that will result in multiple buildings or lots, firebreaks are provided by:

a) a perimeter road that separates lots from areas of bushfire hazard and that road has:

   - a minimum cleared width of 20 metres; and
   - a constructed road width and weather standard complying with local government standards.

   OR

b) where it is not practicable to comply with the above, fire maintenance trails are located as close as possible to the boundaries of the lots and the adjoining bushland hazard, and the fire/maintenance trails:

   - have a minimum cleared width of 6 metres; and
   - have a formed width and gradient, and erosion control devices to local government standards; and
   - have vehicular access at each end; and
   - provide passing bays and turning areas for fire-fighting appliances; and

- are either located on public land, or within an access easement that is granted in favour of the local government and QFRS.

AND

c) sufficient cleared breaks of 6 metres minimum width in retained bushland within the development (e.g. creek corridors and other retained vegetation) to allow burning of sections and access for bushfire response.

Firebreaks

Firebreaks can take a variety of forms depending on their purpose. They are basically any area cleared of standing vegetation, or maintained below 100mm in height (grasses etc.). They effectively separate areas of fuel and can also take the form of tracks, trails, fence lines and driveways. Firebreaks should also be of a form that will provide vehicular access to facilitate the deployment of fire suppression equipment if required.

In all but the most extreme conditions, firebreaks inhibit and contain the spread of fires, but in high wind conditions, no firebreak will be effective against the spread of fire by wind-borne embers. This is why the establishment and maintenance of fire protection zones around buildings is important.

It is recommended that a minimum 6m wide firebreak be established within the environmental buffer zones along the eastern and, where applicable, southern boundaries of the site. The provision of this firebreak will assist in physically separating vegetation with a Medium Bushfire Hazard rating that adjoins the site from its eastern and southern sections and will enable fire-fighting units to directly access fire-fronts that approach the site from these directions.

The 6m firebreak should be constructed in a manner responsive to site topography and, where practicable, in accordance with the following *SPP 1/03* recommendations.

a. The firebreak is to have a formed width and gradient.

b. The firebreak is to have erosion control devices to local government standards.

c. Provisions are to be made along the firebreak for passing bays and turning areas for fire-fighting appliances.

The responsibility for the establishment, management and maintenance of this firebreak lies with the developer. Responsibility for the ongoing maintenance and management of this firebreak would be transferred to the managing authority responsible for the golf course.

As previously stated, it is recommended that, within the residential area that adjoins the off-site paperbark community, a sealed roadway be established such that it physically separates this off-site vegetation and any dwellings and other structures associated with the residential area.

Fire Protection Zones

Management of fuels within the environmental buffer zone, golf course and, possible, the flood and water retention spaces would require the establishment of a Fire Protection Zone comprised of a fuel reduced zone (FRZ) in which fuels are maintained at a level that will inhibit the spread of fire and reduce direct contact and heat radiation to structures. Avoiding direct contact with flame is vital in reducing property losses to fires.

Fuels within these areas can be managed by either mechanical removal (raking) or slashing, or through a more intensive controlled burning program. This will depend on the management objectives relating to the site and the resources and time available to the landowner. Where slashing is undertaken, grass should be kept below a height of 100mm to inhibit the spread of ground fire.

Alternatively, the FRZ could be landscaped in a manner consistent with the 'Green Firebreak' principles described below.

Green Firebreaks

The concept of green firebreaks follows the knowledge that species less adapted to drier conditions, and subsequently less frequent fire, have a generally higher moisture content, and require larger amounts of energy to dry and ignite. This presents a less flammable barrier to the spread of fire, and can trap burning embers long enough for them to burn-out in the moister vegetation. Conversely, these green firebreaks are usually killed by the fire and may require replacement, depending upon species selected.

While the list of potential species and their most effective arrangement can vary with location, the following general points should be followed.

a. Generally, rainforest or scrub species provide the most effective heat-shield.

b. Avoid the use of exotic species or species with a potential for escape and infestation unless they are to be well maintained and controlled.

c. Species endemic to the area should be used as they will not only grow better in local conditions but also may add to the habitat value of the property.

d. When planting, avoid creating gaps and tunnels in the break that allow embers to pass through.

e. Maintain fuels at ground level to a minimum level to increase the effectiveness of the break.

Access/Egress Arrangements

The *SPP 1/03* Guideline states that, for development that will result in multiple buildings or lots, roads are designed and constructed in accordance with applicable local government and State government standards and:

a) have a maximum gradient of 12.5%; and

b) exclude culs-de-sac, except where a perimeter road isolates the development from hazardous vegetation or the culs-de-sac are provided with an alternative access linking the cul-de-sac to other through roads.

Access within the built up areas of the site would be provided by a network of access roadways. Further detail in this respect, including the alignment of roadways and entry/exist points, would be provided following completion of the detailed design phase of the development. Emergency access to approaching fire fronts from either the east or south-east would be available along the fairways of the proposed golf course fairways or along the 6m wide cleared firebreaks established within the outer-most sections of the environmental buffer zones. Further detail regarding the alignment of the fairways would be provided following completion of the detailed design phase of the development.

General Maintenance

Prior to the onset of the normal bushfire season, which usually extends from September to February, there are a number of general property maintenance actions that residents whose properties occur within the 30m wide setback from hazardous vegetation in the southern section of the site should undertake to further reduce the potential for fires to spread within their property. These maintenance actions include:

1. Ensuring that any firebreaks are in an appropriate condition.

2. Cleaning all gutters and eves regularly, and removing debris from roofs.

3. Keeping yards tidy and regularly raking beds and landscaping close to structures clear of fine fuel.

4. Checking that any sprinkler or irrigation sprays are working correctly.

5. Checking that window shutters and screens fitted to openings are in good repair.

6. Making sure that adequate protective clothing (i.e. sturdy boots, overalls, and face-masks to filter heavy smoke) is at hand for use in the event of a fire.

7. Ensuring all sheets are securely in place, if the roof is made of sheet metal. If the roof is tiled, ensuring there are no loose tiles and that embers cannot be driven between them.

8. Carefully considering the storage of dangerous and flammable materials around the property to guard against ignition during a fire. This includes materials under kitchen and laundry sinks and in cupboards.

9. Preparing a list of contingency procedures in the event of a fire and ensuring all household members are familiar with them.

Combined, attention to all of the actions recommended above will provide the best available protection against damage from bushfires.

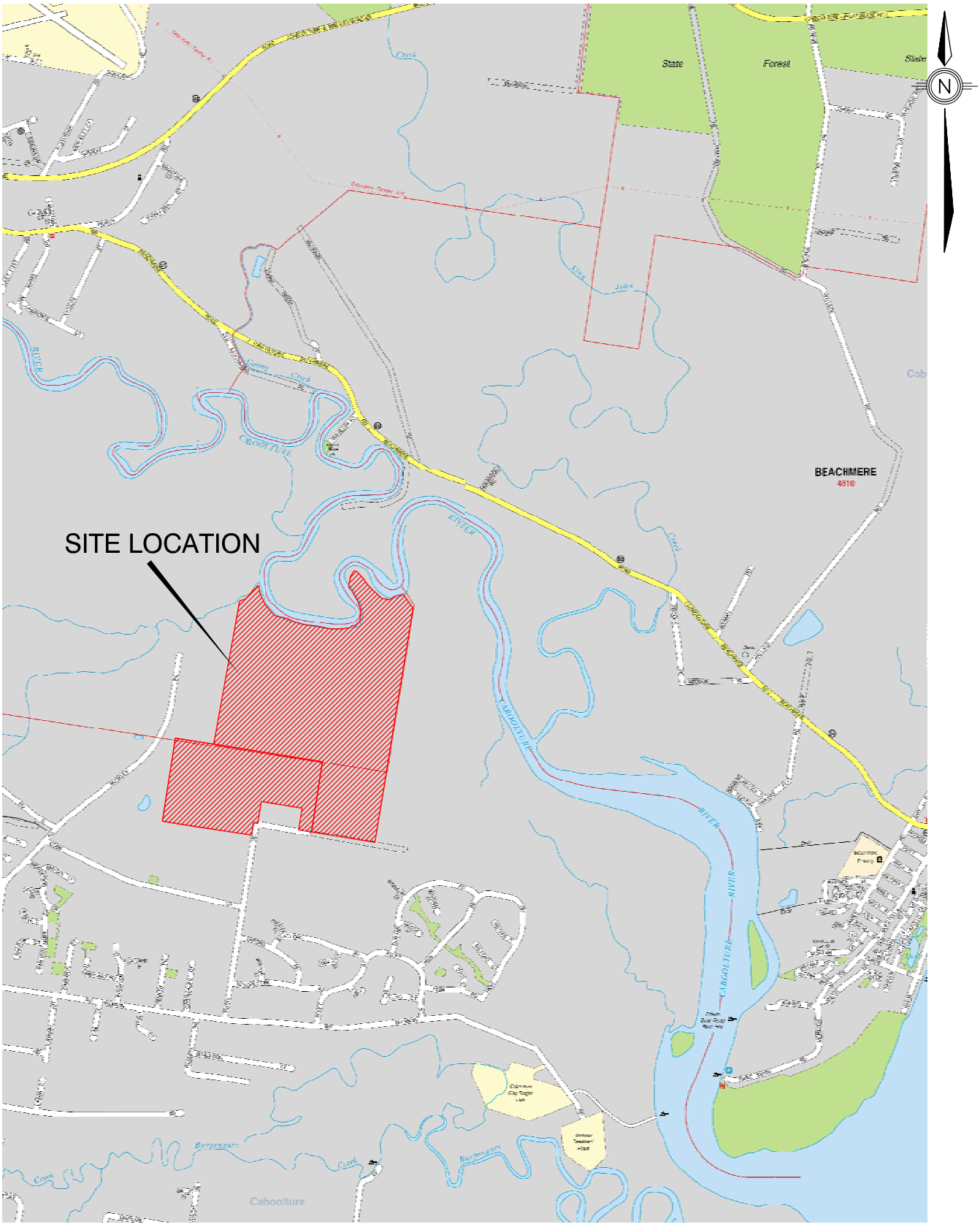
SUMMARY

This report provides a bushfire hazard assessment of a proposed development of land on Lot 7 on RP845326 and Lot 24 on SP158298, Farry Road, Burpengary. The site has been identified by the QRFS as being situated in a Medium Bushfire Hazard area and in such an area *SPP 1/03* 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.

To satisfy the above requirements of *SPP 1/03*, bushfire management measures that should be carried out as part of the development and implemented by future residents of the site are provided within this report.

In summary the proposed plan of development is of an appropriate form in respect of achieving Outcome 1 of *SPP 1/03* as it relates to bushfire hazard management issues. Nevertheless the developer and future residents of individual allotments, particularly those that occur within the 30m wide 'hazardous vegetation setback' should implement and maintain appropriate bushfire hazard management strategies, based on the recommendations presented herein.



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4 0 4 8 1.2 1.6 2km
1:40,000

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Scale 1:40,000 (A4)

FIGURE 1
LOCALITY PLAN

Rev: Orig. Date: 10 July 2006

Project No.: 7900/33

North East Business Park Pty Ltd

CAD FILE: I:\7900-33\ACAD\Terrestrial Ecology Assessment Report\Figure 1 - Locality Plan.dwg
XREF's:

PRINT DATE: 10 July, 2006 - 3:15pm

Date of Aerial Photograph: 28/05/05

125 0 125 250 375 500 625m
1:12,500

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Scale 1:12500 (A4)

FIGURE 2
AERIAL PHOTOGRAPH

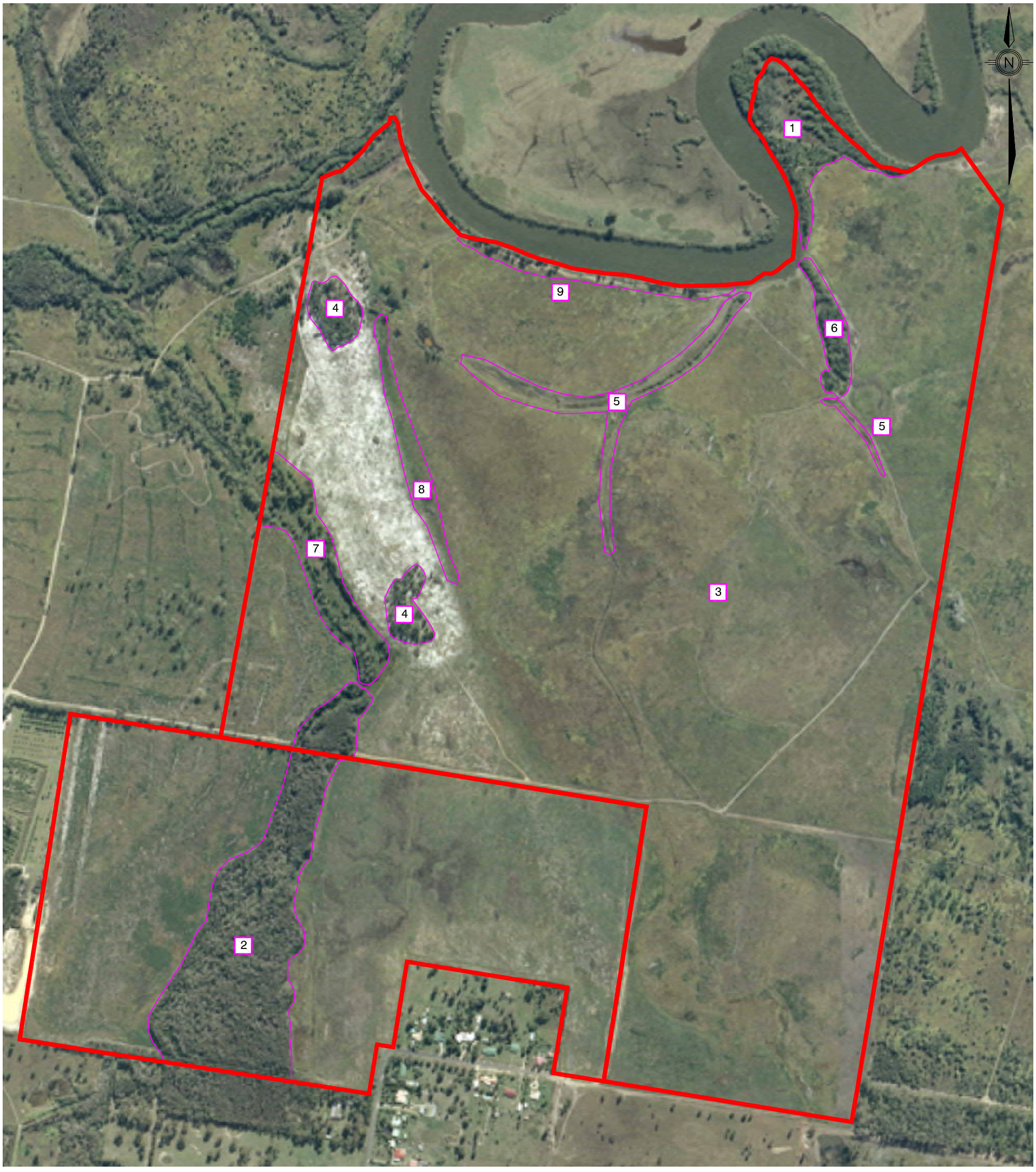
Rev: Orig. Date: 10 July 2006

Project No.: 7900/33

North East Business Park Pty Ltd

CAD FILE: I:\7900-33\ACAD\Terrestrial Ecology Assessment Report\Figure 2 - Aerial Photograph.dwg
XREF's:

PRINT DATE: 10 July, 2006 - 3:11pm



Date of Aerial Photograph: 28/05/05

LEGEND

75 0 75 150 225 300 375m
1:7500

- Site Boundary
- 1 Mixed marine vegetation
- 2 Swampy paperbark (*Melaleuca quinquenervia*) forest
- 3 Disturbed grassland
- 4 Cypress pine (*Callitris columellaris*) woodland
- 5 Disturbed Saltwater couch (*Sporobolus virginicus*) grassland
- 6 Swamp oak (*Casuarina glauca*) woodland
- 7 Disturbed mixed species woodland
- 8 Swampy heathland
- 9 Riparian vegetation

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Scale 1:7500 (A3)

FIGURE 3
VEGETATION COMMUNITIES

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North East Business Park Pty Ltd

CAD FILE: I:\7900-33\ACAD\Terrestrial Ecology Assessment Report\Figure 3 - Vegetation Communities.dwg
XREF's:

PRINT DATE: 10 July, 2006 - 3:09pm

Document 3

Page 171 of 234

Proposed plan of development sourced from
"Northeast Business Park, Caboolture"
Drawing Number 0304 SK30,
Studio Tekton, March 2006.

LEGEND

SUBJECT SITE

Scale N.T.S

FIGURE 4
PROPOSED PLAN OF DEVELOPMENT

LEX 23416

Rev: Orig. Date: 10 July 2006

Project No.: 7900/33

North East Business Park Pty Ltd

CAD FILE: I:\7900-33\ACAD\Terrestrial Ecology Assessment Report\Figure 4 - Proposed Plan of Development.dwg
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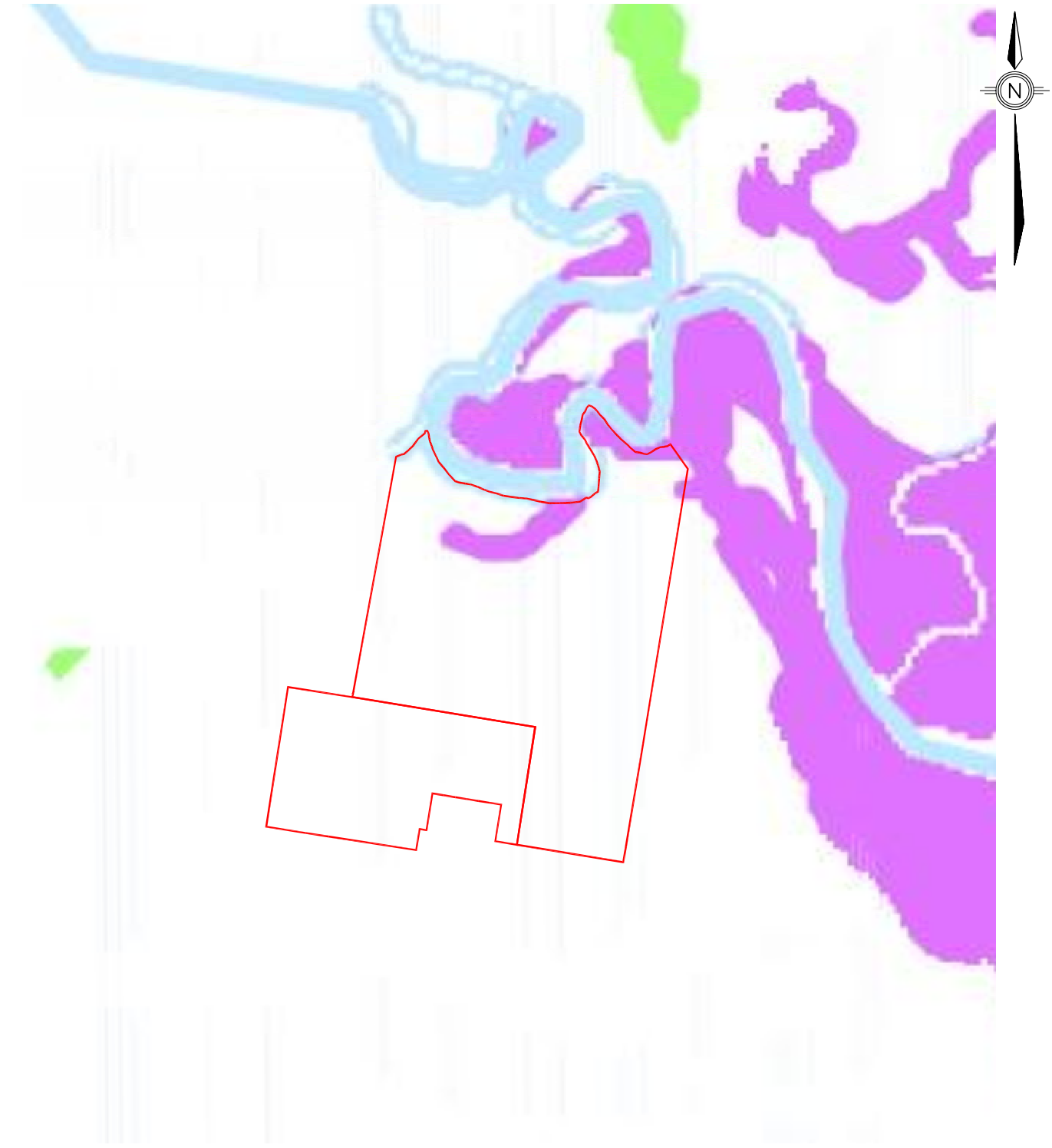

Image sourced from: Queensland Government EPA

LEGEND

- Site Boundary
- Significant Coastal Wetlands
- Endangered Regional Ecosystems

Scale N.T.S

FIGURE 5

EXCERPT OF MAP 6: AREAS OF STATE SIGNIFICANCE (NATURAL RESOURCES) OF THE DRAFT SEQ REGIONAL COASTAL PLAN

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PRINT DATE: 10 July, 2006 - 3:18pm

CAD FILE: I:\7900-33\ACAD\Terrestrial Ecology Assessment Report\Figure 5 - Excerpt of Map6 Areas of State Significance (Natural Resources) of the Draft SEQ Regional Coastal Plan.dwg
XREF's:

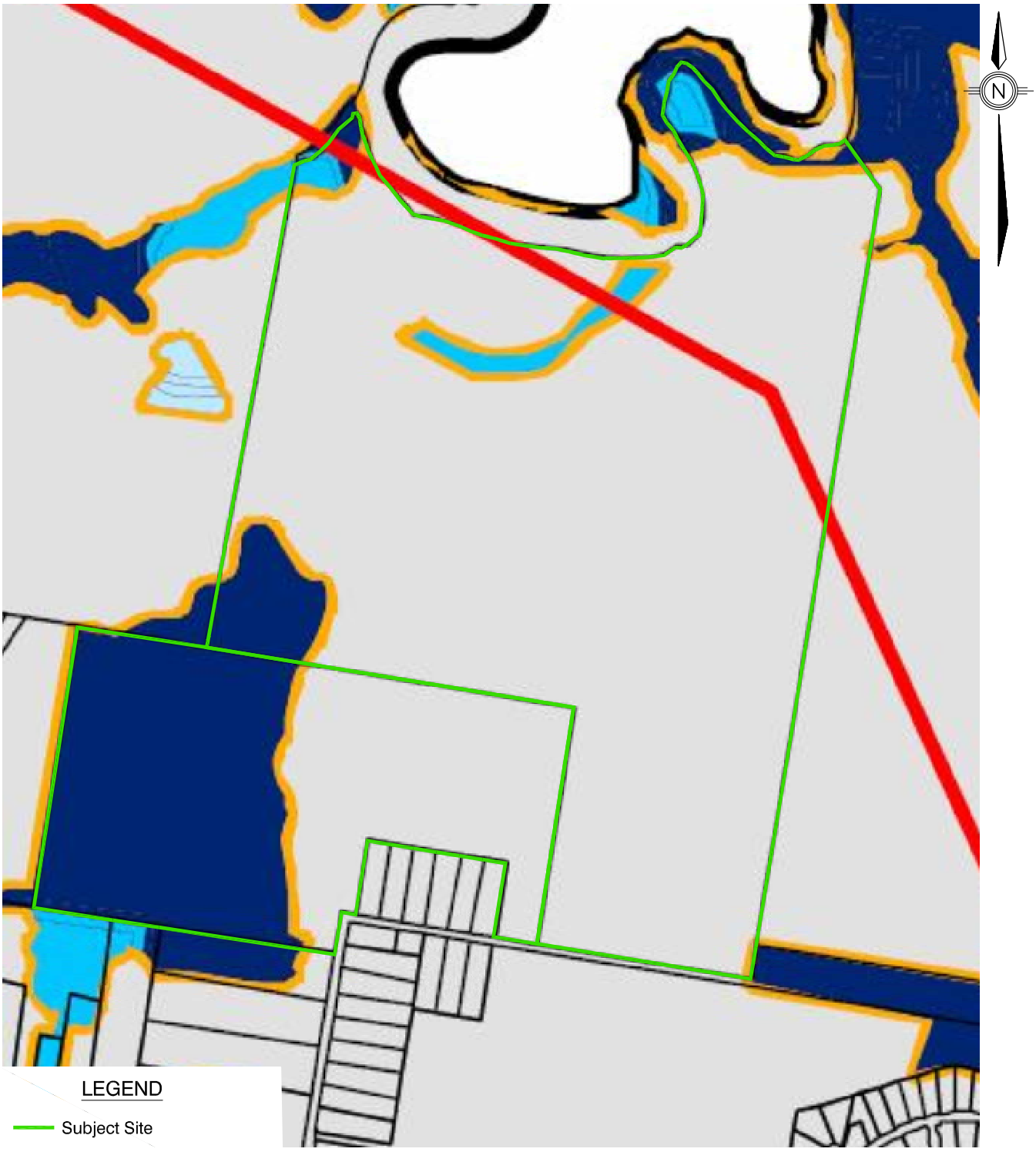

Image sourced from: Caboolture ShirePlan

Scale N.T.S

FIGURE 6

EXCERPT OF CENTRAL PLANNING AREA OVERLAY MAP CO10: NATURE CONSERVATION

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CAD FILE: I:\7900-33\ACAD\Terrestrial Ecology Assessment Report\Figure 6 - Excerpt of central planning area overlay map co10 nature conservation.dwg
XREF's:

INITIAL ADVICE STATEMENT

NORTHEAST BUSINESS PARK

NOLAN DRIVE, BURPENGARY
MAY 2006

CONTENTS

EXECUTIVE SUMMARY

The proposal for the Northeast Business Park on a strategically significant 762 hectare landholding on the southern banks of the Caboolture River at Burpengary, in the heart of the northern corridor of South East Queensland is visionary, bold, exciting and challenging. It represents a rare confluence of vision, need and opportunity.

The proposal is a unique opportunity in the region. It combines the need for a quality mixed-use business and industry employment hub in the Caboolture region with the most responsible and appropriate potential marina location in the northern corridor of South East Queensland. In addition, it will assist in helping to address a substantial and growing unmet demand for marina berths and associated marina industries and facilities. Approximately only 40% of the site will be developed.

Northeast Business Park encapsulates much of the vision underpinning the principles of the South East Queensland Regional Plan – a mixed-use precinct with distinct character allowing people to live, work and play in the same locality, in an environmentally responsible and socially productive manner.

The synergistic combination of these two core land use precincts is enhanced and underpinned by the approach of creating a complete, robust and attractive business community. The development will incorporate a wide mix of other complementary land uses including commercial, clean industrial, local retail, restaurants, golf course, heritage garden, education, child care and a range of residential and accommodation options. The combination of land uses makes the precinct more vital and sustainable.

The proposed development is considered to have local, regional and state significance. It will strengthen the role of Caboolture and Morayfield as a Principal Activity Centre and help to vitalise the region by the injection of substantial and sustained funds into the local economy. The initial investment to develop the proposal is estimated at $872.4 million to $887.4 million. This investment, combined with resultant output in the local economy will generate an economic benefit to Caboolture and the broader area economy of $1.429 billion to $1.461 billion. Moreover, it will generate an estimated 6,950 to 7,110 full time equivalent (FTE) jobs during construction (14,405 to 14,745 FTE jobs including subsequent secondary flow on effects) and 6,137 to 8997 FTE jobs during the operations. The local employment and economic injection is a critical component of meeting Caboolture Shire Council's *Corporate Plan 2005-2009* target of achieving 2 out of 3 workers living and working within the Shire within the next 20 years.

The proponent has adopted a 'net benefit' approach as a central tenet of the development philosophy, seeking to achieve important demonstrable net benefits to the community in social, environmental and economic terms, on a sustainable basis. The development presents the opportunity to transform a heavily degraded former pine plantation into an integrated, holistic, landmark development – thereby changing the face and advancing the identity, ecological health and prosperity of the Caboolture region.

Significant infrastructure is required to be built to cater for the development. It will be designed to be as efficient as possible, thereby minimising the extent of infrastructure and resources used.

The development design faces a series of environmental challenges consistent with any significant marine-based project. Such matters are particularly related to necessary components such as dredging of the marina (and marina entrance) and at the river mouth to enhance the safety of the navigation channel and to improve flood mitigation.

A comprehensive analysis and detailed consultation and design process will be required through the EIS process to respond to the sensitivities of a number of environmental attributes within the site and

related to the development. Such attributes include some limited but important vegetation and habitat communities, and more particularly, ecologies in and adjacent the Caboolture River downstream of the site to the river mouth and Deception Bay. Other attributes include significant coastal wetland communities listed under the Ramsar convention, potential migratory bird and endangered species habitats and Fish Habitat Areas.

A 'net benefit' approach has been adopted by the proponents, resulting in proposed key benefits:

- Substantial and sustainable injection of funding into the local, regional and state economy and the creation of approximately 7,000 FTE jobs in the construction phase, with a similar number of permanent jobs expected in operations of the completed project;
- Rehabilitation of a 100 metre wide riparian zone along the site's 9 kilometre river frontage, providing a important habitat connection, improving water quality, decreasing erosion and creating a pleasant backdrop to the development;
- Helping to address a substantial and growing unmet demand for marina berths and facilities; and the introduction of additional marine related industries, increasing competitiveness in national and international markets;
- Utilising innovative best practice Water Sensitive Urban Design and stormwater management processes aimed at improving water quality in the Caboolture River;
- Use of 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 principles;
- Catalysing the creation of a strengthened public transport system linking the development with the established centres of Caboolture and Morayfield, increasing the vitality of all three centres, whilst strengthening the combined role as a Principal Centre under the SEQRP;
- Use of Community Title in order 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 privately fund maintenance costs in perpetuity; and
- Creating a vibrant social heart for Burpengary and a valuable addition to the business and social fabric of the region.

Separate preliminary applications were lodged for the Business Park and Marina precinct prior to the adoption of the draft South East Queensland Regional Plan (SEQRP). Further applications are required to be incorporated, along with a wide range of environmentally based approvals and processes. The strength of the vision of Northeast Business Park is the synergies possible in the complimentary combination of uses. Integration of four disparate applications of this nature would be cumbersome under the IPA. It is considered essential that the development is designed, assessed and constructed as an integrated, master planned development precinct.

The proponents have the experience and ability to realise the vision and potential of the Northeast Business Park proposal. They and are committed to working in partnership with all layers of Government and other stakeholders with consultation as a central 'plank' of the approach, to achieve mutual benefits.

The size, scope, location and strategic significance of the landholding and the proposal are considered to be clearly of substantial interest to the region and the state, on economic, social and environmental terms. The development will be a landmark project, increasing the prosperity and strengthening the regional role of the Caboolture region.

1.0 INTRODUCTION

1.1 Background

Northeast Business Park is proposed on a strategically-significant landholding, occupying approximately 762 hectares on the southern banks of the Caboolture River. The site enjoys approximately nine kilometres of Caboolture River frontage and is proximate to Deception Bay, being approximately eight kilometres from the river mouth.

Northeast Business Park Pty Ltd 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.

Two planning applications for Preliminary Approval have previously been lodged over the subject site:

SITES	APPLICATION	LODGED	STATUS
Lot 2 on RP 902075 (28.83Ha) and 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 24/01/07
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 21/01/07

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 preliminary application over that land for the marina precinct.

The proponents realised that substantial synergies were possible between the two developments. Consequently, they 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 subject land was 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 IPA, leading to a fragmented approach.

Utilisation of the coordination process and EIS-based assessment provisions of the *State Development and Public Works Organisation Act 1971* (SDPWOA) is 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.

1.2 The Proponent

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

Introduction to Port Binnli Pty Ltd (and Mackay Marina Village)

Port Binnli Pty Ltd is a fully Queensland owned company incorporated in 1993 to develop a marina precinct at Raby Bay in Cleveland. The precinct was successfully completed in 1997/1998 and led to the company embarking on similar projects around Queensland.

The company is the proud developer of the Mackay Marina Village and Shipyard precinct, a project similar in scope to the Gold Coast Marine Development. The Mackay Marina Village is a major marina, residential, commercial, recreation and tourism development located on the foreshore at Mackay in Queensland's North. The precinct features extensive public access and walkways throughout. The incorporation of parkland areas is an integral part of the development.

Since the Mackay Marina Village project began in 1998, almost 1,500 people have worked on site to construct the precinct. The project has generated over 600 jobs in the local Mackay area, excluding the 126 current permanent positions within the precinct.

The $150 million project was implemented with extensive consultation and working partnerships. In less than 10 years it has gone from unallocated port land to one of the most impressive facilities on the East Coast. The development has provided significant employment, commercial and tourism opportunities enhancing the community that supports it. The Mackay Marina and Shipyard (pictured below) won the 2005 Australian Property Institute award for Environmental Excellence, and is a finalist in the UDIA Queensland Environmental awards.

In short, Port Binnli has a proven track record in producing environmentally sustainable projects helping to raise regional and state profiles, both nationally and internationally. Port Binnli is dedicated to creating new opportunities, building for the future and helping to develop Queensland responsibly.

Introduction to Laing O'Rourke Pty Ltd

Laing O'Rourke Pty Ltd is the largest privately owned construction firm in the UK. Laing O'Rourke is committed to sustainable development and has a truly integrated capability, with a directly-employed internal supply chain allowing an holistic view of construction.

Laing O'Rourke specialises in delivering ambitious yet achievable construction projects. The company is responsible for some of the most innovative construction solutions anywhere in the world. Recent projects include Dubai International Airport and London's Heathrow Terminal 5 (pictured below).

Port Binnli Pty Ltd was responsible for introducing Laing O'Rourke to Queensland and the project.

1.3 Purpose and Scope

In view of the size and strategic significance of the subject site, the needs of the Caboolture region and the development proposal, and the natural attributes of parts of the site and surrounding areas, this IAS seeks to provide for and accommodates the requirements Section 27 (a) of the *State Development and Public Works Organisation Act 1971* (SDPWOA). That is, it presents and provides the relevant information for the project to the public and advising agencies at the local, state and federal levels. This will allow such stakeholders to determine the nature and level of their interest in the proposal and accordingly:

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

2.0 THE PROPOSAL

2.1 Location

The subject site is located on the southern banks of the Caboolture River in the Caboolture Shire, in the heart of the northern corridor of South East Queensland.

The site totals 762.267 hectares in area. The site has approximately 9 kilometres of direct river frontage and has direct road access to the Buchanan Road interchange on the Bruce Highway. The precinct is approximately 4.5 kilometres radially east of the Caboolture town centre and is approximately 8 kilometres west of the mouth of the Caboolture River (refer *Figure 1 and 2 – Locality Plan and Regional Locality Plan*).

The subject land is largely cleared and substantially degraded, having previously been used for pine forestry activities. A small cluster of buildings and outbuildings are contained on Lot 10, previously used as part of the forestry operations.

The subject site is formally described as:

SITES	Site Area (Hectares)
Lot 2 on RP 902075	28.83
Lot 10 on RP902079	515.244
Lot 24 on SP158298	160.379
Lot 7 on RP845326	55.903
Lot 15 on RP 902073	1.911
TOTAL	762.267

The site is in freehold title and owned by Northeast Business Park Pty Ltd.

Access from the Bruce Highway is via Nolan Drive, along which Lots 2 and 10 each have approximately 1 kilometre of frontage. Alternative access to Lot 10 is from the end of Buckley Road. The Bruce Highway forms the western boundary of Lot 2.

Development immediately to the south of the subject site consists of Rural/Rural Residential development on lots ranging in size from 1-18 hectares. Development further to the southeast consists of Rural Residential lots, generally either 3,000m^2 or 8,000m^2 in area.

Land on the opposite side of the Caboolture River consists predominantly of large rural allotments that link to forestry and large environmental areas to the north. The site effectively forms the interface of urban development and extensive environmental and open space areas and corridors - particularly to the east and north - thereby creating a nexus between the two. This has become part of the design philosophy of the development.

It is the site's strategic location that underpins its importance. This is addressed in the underlying approach and objectives for the proposal, below.

2.2 Overarching Approach

The proposal is strategically located and has the ability to be a landmark development in terms of net benefits provided to the economy, the environment and the community. The following provides an overview of the approach.

The Vision

An integrated, holistic, landmark development changing the face and advancing the identity, ecological health and prosperity of the Caboolture region.

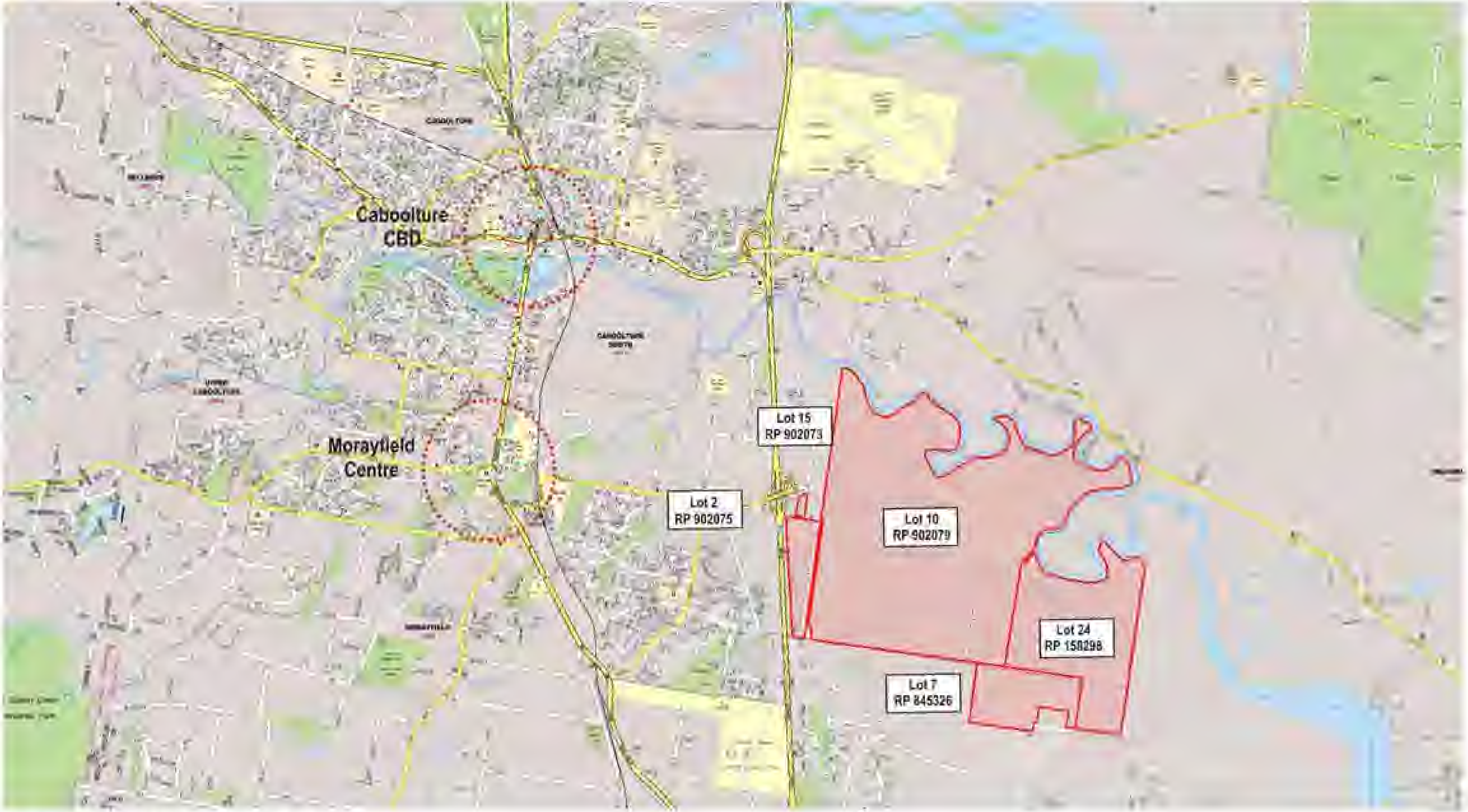
Objectives

The development objectives of the proposal include:-

- Significant strengthening of the regional economy through development of a regional business park;
- 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, 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;
- 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;
- A vital 'heart' for Burpengary and a regional destination;
- Facilitate enhancement of the local public transport network; and
- Provide a valuable and unique addition to the economic, social and recreational fabric of the region.

Locality Plan

Figure 1



The contents of this plan are conceptual only, for discussion purposes. [illegible]

20430-04 May 2006 NTS

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2.3 Proposal

Northeast Business Park is to be a fully integrated business park, marina precinct and residential development. The proposal has been designed with a clear environmental focus, so that 'net benefits' in such as flood mitigation, improved stormwater quality, ecological rehabilitation, economic stimulation and increased social vitality will accrue to the community.

The proposal includes the following features:-

- Regional business park capable of attracting local, national and international businesses, incorporating clusters of mixed and complementary industry and businesses, residential development, lifestyle businesses and facilities, golf course, active and passive recreation areas, ecological gardens and providing public access to the Caboolture River, underpinned by a high class marina and marine industries precinct (refer *Figure 3 – Concept Plan*).

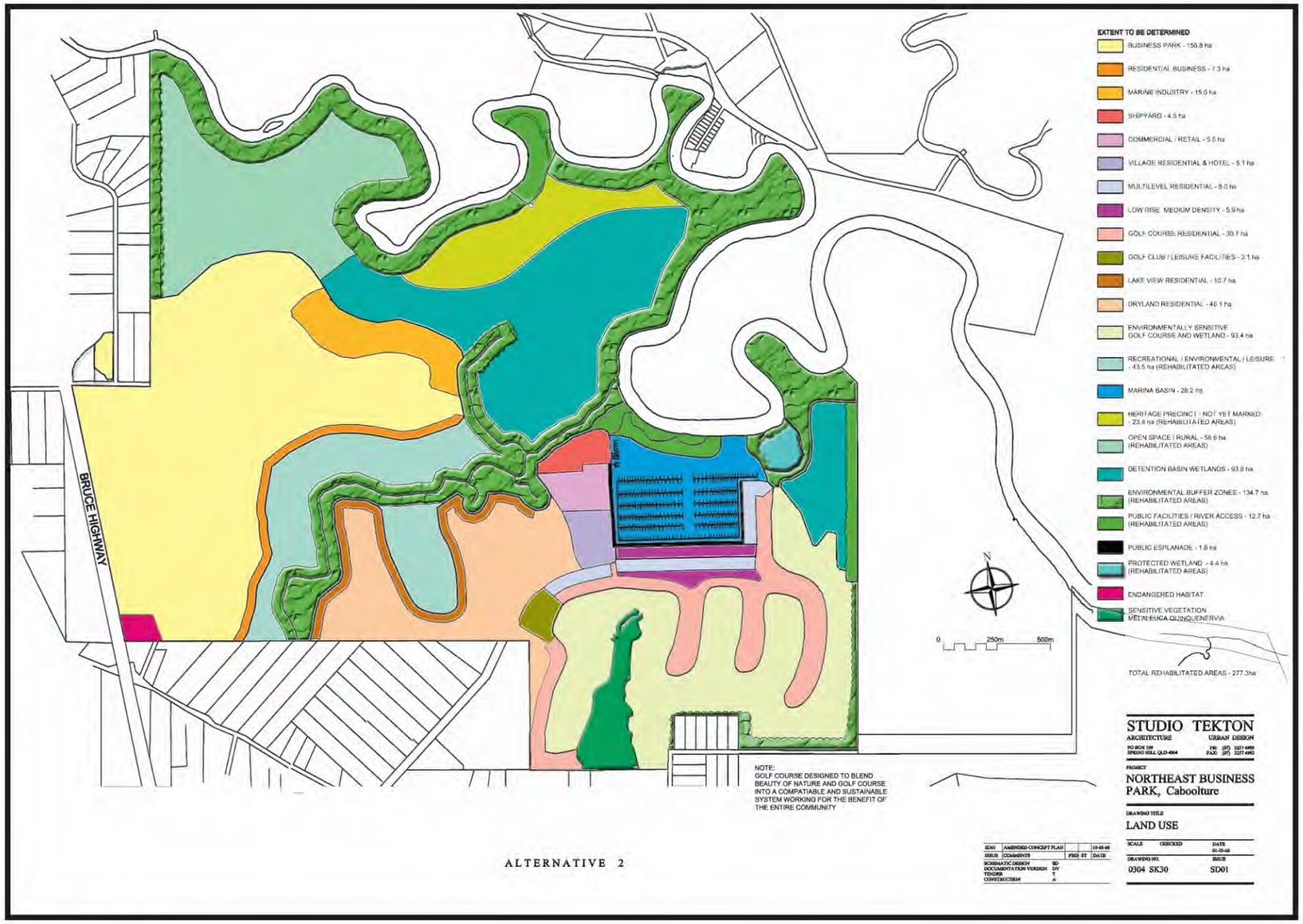
Only approximately 40% of the site is to be developed. The following table represents approximate current estimates of land use precincts and approximate areas:

Precinct	**Approximate Area Ha**
Business and Industry Precinct	
Business and Industry Park	153
Residential business	7
	160
Marina Precinct	
Marine Industry + shipyard	19
Commercial and Retail	5
Village residential hotel	5
Multi level residential	8
Low rise medium density res	6
Marina Basin & Access	27
	70
Golf course precinct	
Golf Course and golf club	82
Golf course residential	29
	111
Residential	56
	56
Environmental and open space	
Open space + stormwater retention	146
Rehabilitated riparian corridor and buffer	138
Wetland reserve	4
Public river access + public esplanade	14
Recreation / lakeland / environmental	41
Heritage precinct + gardens	22
	365
Total	**762**

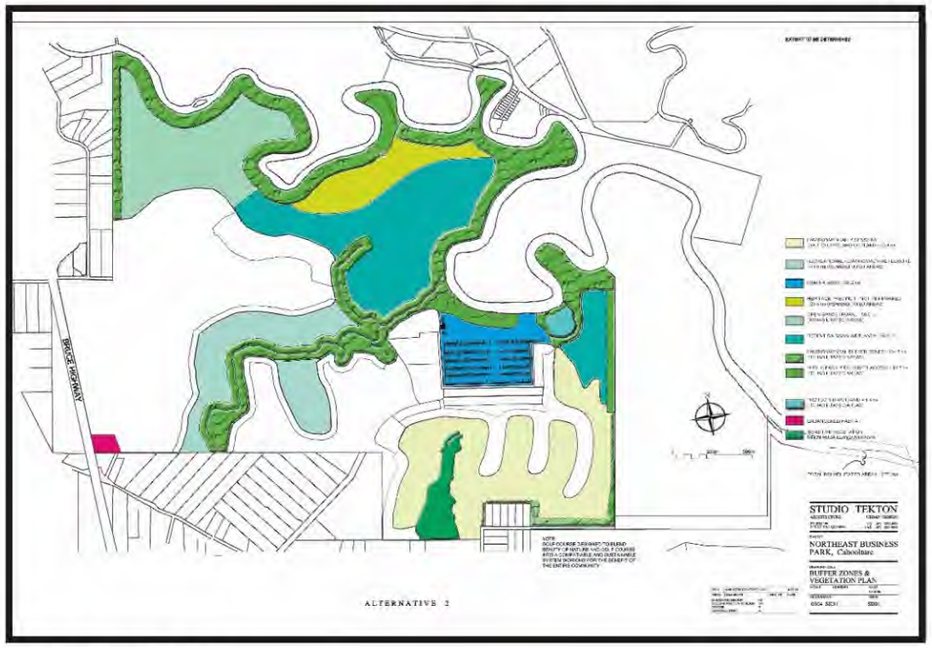
The concept master plan represents a conceptual framework for the development. Whilst the extent and location of identified precincts have been carefully considered, the land use mix will be tailored to accommodate interest and demand, and further detailed design development. As such, the proponents will be interested in receiving feedback from stakeholders in order to best match the opportunities

Conceptual Master Plan

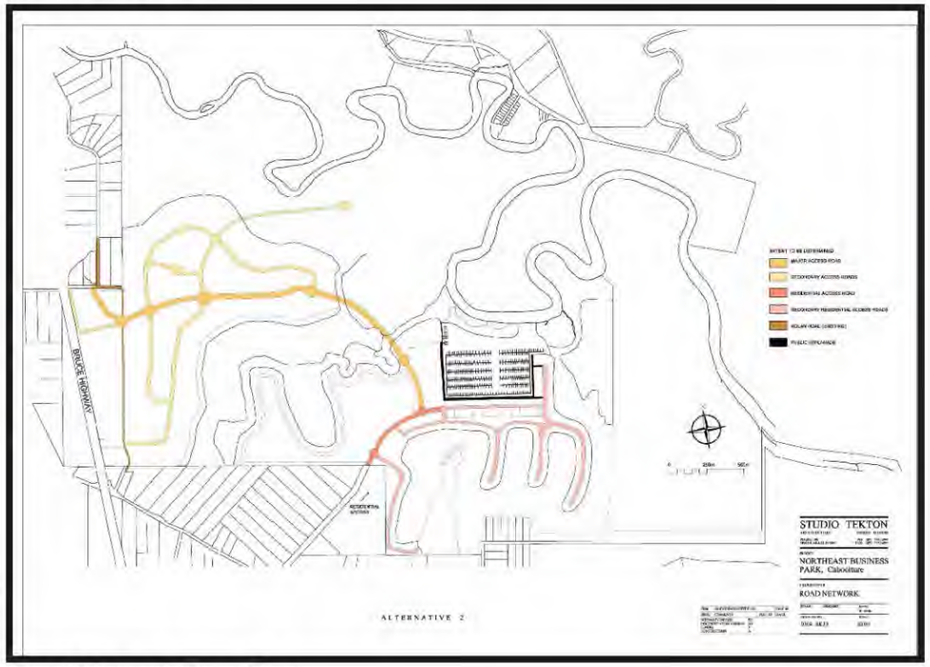
Figure 3



Land Use Plan



Buffer Zones Plan



Road Network Base Plan

The contents of this plan are conceptual only, for discussion purposes. All areas and dimensions are approximate, subject to relevant studies, Survey, Engineering, and Council approvals.

20430 - 06 date: May 2006 scale: NTS

pmm BRISBANE
urban designers
townplanners
land surveyors

afforded by the development to business and community needs. The consultation plan will be designed to maximise the potential for stakeholder input to be put to constructive use.

2.4 Project Justification and Alternatives Considered

The proposal 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 proposal will provide a fully integrated business, industry, residential and recreational development, combining a complementary array of uses. All of the uses will integrate with and benefit from the association with the marina and associated marine industry and related uses. The proposal has been conceived in order to provide net environmental benefits through the adoption of sustainable development principles and practices.

The availability of sites to accommodate such uses has been considered by Core Economics and Pacific Southwest Strategy Group.

2.4.1 Business and Industry Development

Core Economics have identified that 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 Beerburrum 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).

Core Economics identified three main existing industrial precincts in the Pine Rivers Shire, being:

- Petrie – 269 hectares (no room for expansion);
- Lawnton – 82 hectares (approximately 60 hectares taken up);
- Brendale – 356 hectares (approximately 181 hectares taken up).

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 (DLGPSR) prior to gazettal.

2.4.2 Marina and Marine Facilities

An integral component of the aforementioned node will be the proposed marine uses. Pacific Southwest Strategy Group 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. These factors have been identified by Pacific Southwest Strategy Group (as noted in section 7.1 of this IAS). 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 (eg 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.

2.4.3 Alternative Marina Sites

The site proposed by Northeast Business Park at Caboolture is unique. 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 Government-funded 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 (RFGM) 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 (Caboolture City Marina Study, Pacific South West, 2006)

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.

2.4.4 Unique Development opportunity

The proposal for the Northeast Business Park 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 co-locating 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 proposal 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.

2.4.5 Support for proposal

The need for the development and particularly the marina has been recognised by many parties. Letters of support have been received from the following parties, and are included as *Appendix A:*

- Caboolture Shire Council
- Boating Industry Association
- Royal Queensland Yacht Squadron
- Realway Property Consultants
- Blackline Shipping Pty Ltd
- Savannah Yachts

3.0 INFRASTRUCTURE

The proposed development of Northeast Business Park will require upgrades and (in some cases) extensions to all supporting infrastructure. Information and reports currently being prepared will be used in negotiations and the subsequent development of an Infrastructure Agreement between the State and Northeast Business Park, in conjunction with Caboolture Shire Council. The agreement would identify both the required improvements and the cost apportionment between Stakeholders.

3.1 Transport

The development intends to gain access to the external road network via a primary access point at the Buchanan Road/Bruce Highway interchange. Secondary access to the development is proposed via Buckley Road and Coach Road, which provide connection to Uhlmann Road and its interchange at the Bruce Highway.

Preliminary assessment of the access arrangements suggest that with development-generated traffic, it would be suitable to realign Nolan Drive to connect to the Buchanan Road/Bruce Highway interchange in a more direct manner. In order to achieve sufficient capacity at the main access, it will likely be required to upgrade both the eastern and western Buchanan Road/Bruce Highway interchange intersections. It may also be necessary to widen the Buchanan Road overpass to achieve satisfactory operation of the interchange intersections.

Further work is also underway to determine the future interchange form and to assess the appropriate configuration and spacing of the Bruce Highway on and off ramps. Discussions between Cardno Eppel Olsen and the Department of Main Roads are in progress in an effort to understand other background growth requirements at this location, along with the Department's current planning for six laning of the Bruce Highway past the site.

The southern interchange at Uhlmann Road is less impacted by the development traffic. Growth in background traffic volumes is expected to necessitate upgrades at this location, although development traffic may impact on the timing of such upgrades. Again, the future form of this interchange is the subject of current further investigation.

It is proposed that the necessary improvements required to the State controlled road network will be identified and resolved in the near future.

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. Accordingly, in relation to Caboolture Shire Council controlled roads, traffic volumes at the Buckley Road access are expected to remain at relatively low levels and no significant upgrades are proposed on Council controlled links. The Buckley Road/Uhlmann Road intersection may require signal or roundabout control at the later stages of the development.

Internal road network infrastructure is currently under development. However, basic structure planning is in place which depicts the proposed nature of connections within the development and between the different land use types.

Options are being considered for the provision of public transport. There is currently limited public transport available to Burpengary and the provision of effective public transport options is recognised as being essential for a development of this nature. It is important for the development and the region that

the key centres of Caboolture, Morayfield and the Northeast Business Park are effectively linked. Such a system would be likely to use a bus connection between the site and the key locations of Morayfield, particularly the Morayfield Rail Station, existing education, shopping and employment, and the facilities and population base of the Caboolture CBD. Such a system would strengthen the accessibility and vitality of all three centres.

A master plan for the provision of pedestrian and cycle networks within the development will be prepared to identify appropriate connections to improve amenity and reduce the dependence on private automobile travel.

3.2 Water Supply

The total service population for the development is estimated to be 12,700 Equivalent Persons (EPs), based on the current typical local consumption of 353L/EP/day. This figure can vary seasonally with peak maximum daily consumptions nearly double that. Based on these figures, on completion, the proposed development would have an average daily requirement in the order of 4.5 ML.

Northeast Business Park however, intends to set new benchmarks in terms of Water Cycle Management and Water Sensitive Urban Design. These are intended to maximize the development's water efficiency and reduce the development's water consumption substantially below that estimate. The final demand will also vary considerably depending on the development's 'appetite' for the use of recycled water.

Approximately 50% of current treated potable water supply for Caboolture Shire is produced locally with the remainder originating from the North Pine Water Treatment Plant (WTP). Following discussions with Caboolture Water, the existing water supply infrastructure will not be able to cater for the proposed development and its projected peak demands, based on current local average water use. Previous planning studies have recommended major water supply augmentation to the Shire. However, none of these will have a significant impact on performance of this area of the network.

The strategy for future water supply to Caboolture currently has a number of options, which depend on the availability of local water sources - including off line storage and additional bore fields. The increase in daily Shire consumption due to the development may affect the planned future works by Caboolture Shire Council (CSC) to augment supply to the Shire from North Pine WTP. This will depend on the water supply strategy of CSC as well as the SEQ Regional Water Supply Strategy, currently underway.

Further discussions by Northeast Business Park with the Caboolture Shire Council through the EIS process will identify potential options for further augmentation supply. Water saving strategies including use of recycled water, on-site treatment, roof water harvesting and water efficiency measures for all land uses will also be encouraged from end users of the development.

3.3 Recycled Water.

Caboolture water currently produces approximately 9ML/day of tertiary treated recycled water from its South Caboolture Waste Water Treatment Plant (WWTP). Only a small percentage of this water is currently used with the remainder being pumped into the Caboolture River.

The proposed development lends itself to utilization of the recycled water resource due to its close proximity to the treatment plant. New infrastructure would be required to access this resource.

The direct benefits that this would bring include:

- Reduced demands on potable water supply from residential, commercial and industrial use.
- Open space irrigation
- Reduced pollutant and nutrient loads on Caboolture River
- Consistent with sustainability objectives with the overall development.

Further treatment of recycled water may be necessary for some industrial and commercial uses.

It is difficult to assess the current requirement for recycled water. However, the golf course alone may supplement their potable water requirement by up to 1.5 ML/day. Other possible uses include landscape irrigation, industrial process water and wash down, and toilet flushing.

The development, to a certain extent, will contribute to a cyclical or self-perpetuating water regime. That is, where recycled waste water is used for appropriate non-potable uses within the development, returned to the WWTP for recycling and returned to be used again for appropriate uses.

3.4 Sewerage

Sewerage flows from the development will need to be fed to the South Caboolture WWTP. Planning for the WWTP shows that it will need upgrading in 2009 and these plans take into consideration the 158 hectares of Business Park that form part of this development.

Based on a total EP of 12,700, the additional loads imposed by the remainder of the development will require further upgrade works and may require the WWTP to apply for an increased licensed capacity with the Environment Protection Agency.

The existing pipe network is not considered sufficient to accommodate the increased sewer flows generated by the development. The most practical connection of the proposed development to the South Caboolture WWTP is via direct discharge with the use of a pumped rising main. It is envisaged that this would run along Weier Road and beside the treatment plant access road. The trenching work required to lay the sewerage pipe would be likely to be combined with the placement of the pipe carrying the recycled water, in order to minimize the extent of disturbance and set up the recycling network.

3.5 Power

A detailed lot layout information is not yet available for the development and will be required prior to a detailed design for power supply. As the development is to be rolled out in stages, each stage will require an agreement with the local energy supplier, Energex.

For a project of this scale, an area is likely to be required for an Energex zone substation. Discussions between Lectel and Energex have revealed that Energex have already conceptualised a 33kV zone substation in the vicinity of Buchanan Rd, based on Council zoning forecasts. It will more than likely take the opportunity of this development to implement it.

The nearest existing zoned substation is located at Morayfield South (southern end of Morayfield Road). A new 33 kV distribution feed will be required from this location to the new zone substation site. Additional conduits will need to be installed for the purpose of transferring loads from surrounding substations.

A new zone substation requires a minimum 2 years to be operational, so depending on staging alternatives, 11kV may need to be installed to supply the initial stages. The development has 3 possible

available points for 11kV supply, namely at Nolan Drive, Buckley Road and Farry Road. Each of these will require minimal external works to bring them 'on line'. The industrial precinct can be fed off Nolan Drive with virtually no requirement for external works. Buckley Road will require approximately 400 metres of overhead and underground network extension and will serve the golf facilities and mixed-used commercial and residential precincts. The most likely point of supply is the existing 11 kV to the north west of the development.

Once staging and lot layouts are better identified, a detailed concept plan will be created which will address load progressions (i.e. how many lots will be developed where and at what time). This information will be critical for the zone substation planning and delivery. Internal works will include pad-mount transformers at intervals throughout the development.

Building design guidelines and incentives for energy efficient design and construction and operation of all uses will be encouraged to minimize total loads.

3.6 Gas

The Caboolture Shire lies within Origin Energy's gas network infrastructure. Discussions have occurred between Lectel and Origin Energy and no current gas network exists in the area. The nearest connection point is located adjacent to Narangba Industrial Estate, near Helium St (approximately 7.5 kilometres to the development). Origin Energy has previously explored extending their network mains further north to pick up other industries along the way. This project may provide the necessary trigger for that work to occur.

3.7 Telecommunications

There appears to be no problem with the existing Telstra infrastructure. Telstra is able to provide an underground cable network to the development upon application.

3.8 Construction and Operational Processes

Northeast Business Park proposes to create a mixed use development including the following precincts.

- Business Park
- Marine Industry
- Marina
- Residential
- Heritage
- Recreational Areas
- Open Space and Buffer zones.

The roll out of each of these precincts will be staged over a 10 to 15 year period in accordance with approvals and commercial requirements.

The general sequence of works for each stage will include installation of environmental controls and site establishment, site clearing, earthworks, infrastructure and construction.

Earthworks modelling has been carried out with due consideration of best land use, floodplain and stormwater management. The development, where possible, will be designed around a balanced cut to fill approach which may include the handling of approximately 3.2 million m^3 of material. The type of equipment used will be similar to any major infrastructure and construction project and include the use of bulldozers, scrapers, excavators, cranes, concrete pumps, etc.

Infrastructure will consist of stormwater drainage and services and construction of a road network.

A Stormwater Management plan has been developed which provides a conceptual framework for water quality management and the stormwater system, swale systems, in ground drainage, overland flow paths, gross pollutant traps, bioretention and other water quality and stormwater control devices.

Each of the precincts will be serviced by gas, water, sewer, power and a communication system. These services will generally be installed in trenches running parallel to the road network.

With the basic infrastructure in place, more detailed construction activities will take place in each of the precincts. In the Heritage, Recreational, Open Space and Buffer Zones an integrated landscape design approach will be adopted that provides appropriate structures, buffer distances and revegetation. A private maintenance programme will be implemented to ensure the long term health and enhancement of these areas.

Marina construction and operation

The marina basin will require more specialized excavation techniques as part of its construction including associated extensive environmental controls. 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.

Port Binnli propose to build, install operate and maintain their own world class infrastructure. Port Binnli Pty Ltd (Mackay Marina) have a strong track record in marina design and operation and have worked with the Department of State Development in developing the first ever environmental efficiency guidelines for marine facilities. The Mackay Marina exceeds current Australian design standards and sets the environmental benchmark for marinas in Australia.

The Marina Shipyard will feature the latest in environmental protection systems for the catchment and treatment of all wastewater and pollutants. Environmental considerations are key to its design. A sophisticated drainage network will provide filtration and treatment for wastewater. Waste oil is to be collected and recycled by a licensed waste removalist. Environmental plans will manage surface coating activities; vessel surfaced cleaning, water quality, dust and particle dispersion, noise and waste.

In keeping with world's best management practices, all containments, including stormwater run-off, are contained in underground holding tanks. Pollutants and solids are filtered and separated. Treated clean fluids are then automatically discharged to sewer under controlled conditions. No contaminated water will be released into the environment.

3.9 Waste Management

Northeast Business Park understands that a fundamental requirement of ecological sustainable development is the effective management of waste. The intention is to reduce waste, either by encouraging material efficiency, reducing the generation of waste, or the creation or use of recycled products. The strategy is to research ways in which waste can be managed effectively - both during the

construction and operational phases - to minimize or avoid adverse impacts on the environment, while at the same time facilitating economic development.

A Waste Management Plan will be implemented during the construction phase of the development with best practice being used during the operational phase.

The objectives of the Waste Management Plan are based on the hierarchy of avoidance/reduce, re-use, recycle, treat and dispose as outlined in the National Waste Minimisation and Recycling Strategy. Best Practice will be adopted wherever possible, to achieve waste minimisation and reduction. Key areas that will be targeted in the Waste Management Plan are to avoid, whenever possible the generation of wastes including:

- Demolition Materials (including hazardous building materials i.e. asbestos)
- Construction Materials
- Excavated Fill Materials
- Domestic & Human Waste
- Wastewater
- Litter generation due to construction activities

Contaminated waste will be treated in accordance with a separate management plan with further investigation required.

3.10 Hazard and Risk and Health and Safety Issues

Northeast Business Park 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. The greatest risk of this development is associated with the contamination of adjoining waterways and risks associated with construction works in general.

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 stake holders 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.

Ongoing Risk Assessments (after the project commences) are to be undertaken on site. 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.

4.0 PLANNING AND POLICY FRAMEWORK

4.1 Integrated Planning Act

Two planning applications have previously been lodged over the subject land. Both applications seek Preliminary Approval under Section 3.1.6 of the *Integrated Planning Act 1997* (IPA) to override the planning scheme.

The status of the two planning applications (which are currently 'live') is outlined below:

SITES	APPLICATION	LODGED	STATUS
Lot 2 on RP 902075 (28.83Ha) and Part of Lot 10 on RP902079 (515.244ha)	Preliminary Approval for Material Change of Use (Section 3.1.6) (Business Park)	18/06/2002	Decision Phase extended by applicant until 24/01/07
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 21/01/07

There are also two additional applications that will need to be prepared and lodged:

SITES	APPLICATION	LODGED	STATUS
Part of Lot 10 on RP902079 (515.244ha)	Residential	Pending	To be prepared.
Lot 15 on RP 902073 (1.911Ha)	Access	Pending	To be prepared

4.2 The Southeast Queensland Regional Plan

The Southeast Queensland Regional Plan (SEQRP) is the pre-eminent planning document and a 'blue print' for managing future change and growth in the region.

The subject site is strategically located in terms of the designations in the SEQRP. It is situated at an important interface between *Urban Footprint* and *Regional Landscape and Rural Production Area,* with the business park located within the Urban Footprint, and the land on which the marina is proposed located outside the Urban Footprint (refer ***Figure 4 – SEQRP excerpt***)

The SEQRP contains regulatory provisions that are linked to the IPA 1997. The current Preliminary Applications are exempt from the Regulatory Provisions of the Regional Plan, as both Development Applications were properly made before the introduction of the draft SEQRP on 27 October 2004 (Division 1, 1(1)(a)). A Preliminary Application is a 'Development Application' under the *IPA 1997*.

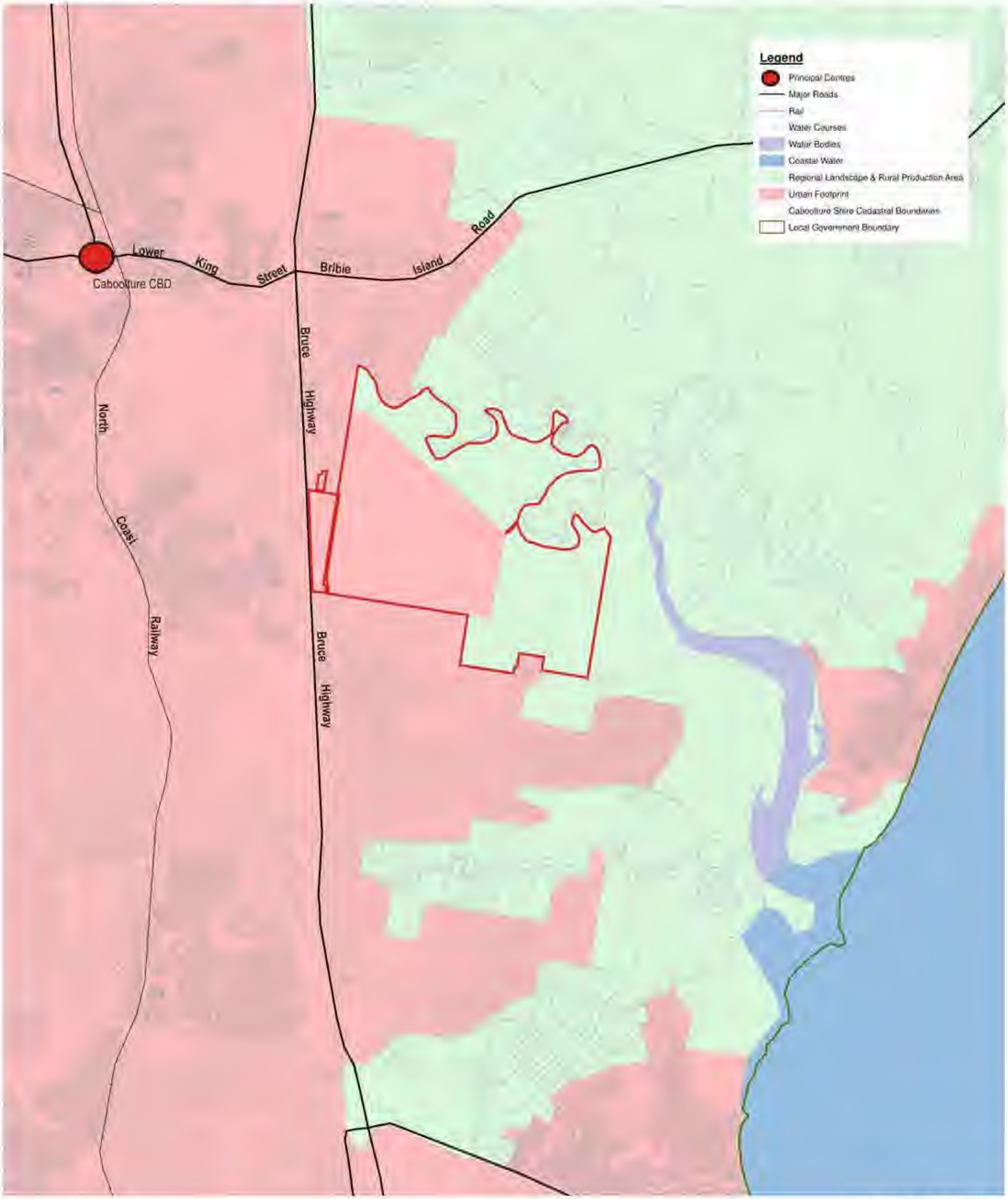
Despite the formal exemption from the Regulatory Provisions of the SEQRP, and the current Preliminary Applications not subject to the provisions of Part H, it is contended that the development proposal can satisfy the primary tests for development namely:

- It has locational requirements necessitating its location outside the urban footprint; and
- There is an overriding need for the development in the public interest – the proposal can achieve net benefits to the community in economic, environmental and social terms.

The proponent asserts that achieving a net benefit in social, environmental and economic terms is a valid test for any major development proposal. Accordingly, it has adopted this approach as a core

Regional Plan Designations

Northeast Business Park - Figure 4



Source: South East Qld Regional Plan

The contents of this plan are conceptual only, for discussion purposes. All areas and dimensions are approximate, subject to relevant studies, Survey, Engineering, and Council approvals.

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20430 - 02a date: May 2006 scale: NTS

development objective. Similarly, the proponents look forward to adopting a partnership approach with all levels and sectors of government and other key stakeholders in order to achieve mutual benefits.

The proposal is considered consistent with the following key objective of the SEQRP:

- Ensuring that future growth and change in the region is managed in the most sustainable way possible (Part D, SEQRP).

In addition, the proposal is consistent with and supportive of the following Desired Regional Outcomes (and their related regional policies):

- Sustainability – Desired Regional Outcome 1 – 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;
- Natural Environment - Desired Regional Outcome 2 – 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;
- Regional Landscape – Desired Regional Outcome 3 – The key environmental, economic, social and cultural resources of the regional landscape are identified and secured to meet community needs and achieve ecological sustainability.
- Natural Resources – Desired Regional Outcome 4 – Regional natural resource and rural protection areas are protected, enhanced and used sustainably.
- Strong Communities – Desired Regional Outcome 6 – 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.
- Engaging Aboriginal and Torres Strait Islander Peoples – Desired Regional Outcome 7 – 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.
- Urban Development – Desired Regional Outcome 8 – 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.
- Economic Development – Desired Regional Outcome 9 – 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.
- Infrastructure – Desired Regional Outcome 10 – Regional infrastructure and services are planned, coordinated and delivered in a timely manner to support existing and future settlement patterns and desired community outcomes.
- Water Management – Desired Regional Outcome 11 – Water in the region is managed on a sustainable and integrated basis to provide adequate supplies for human and environmental uses.
- Integrated Transport – Desired Regional Outcome 12 – 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.

4.2.1 Balancing urban and environmental needs

Land to the south and west of the subject land is predominantly included within the *Urban Footprint* designation under the SEQRP. Land to the north and east is predominantly *Regional Landscape and Rural Production Area.* As such, the site is at the northerly limit of the *Urban Footprint* before the large 'Inter-Urban break' between the Brisbane Metropolitan Area and the Sunshine Coast.

The interface between urban uses and regional landscape underscores the development philosophy of the development fulfilling and balancing the aims of both regional landscape and urban designations. This is recognized by the development area occupying approximately 40% of the site. Furthermore, the open space, stormwater polishing and rehabilitated corridors provide an important component of an ecological network, potentially stimulating further attention to the value of the ecological networks in the 'Inter-urban' break.

4.2.2 Principal Activity Centre

It is noted that the SEQRP denotes a 'Principal Activity Centre' at Caboolture/Morayfield. According to Chapter 8, section 8.6 of the SEQRP, such centres are to have the following attributes:

- Serve catchments of sub-regional significance and provide key focal points of regional and in-centre residential development outside of the Brisbane CBD;
- Serve business, major comparison and convenience retail and service uses;
- Provide a secondary administration focus (accommodating regional offices of government, regionally significant health and education and cultural facilities);
- Are typically serviced by multimodal public transport systems and comprise key nodes in the regional transport system due to their high trip generation;
- Residential development densities of between 40 and 120 dwellings per hectare (net) or greater in proximity to Principal Activity Centres.

The Caboolture Town Centre and Morayfield centre do not however provide sufficient land or an appropriate location to accommodate the proposed Industry/Business Park. In addition, they clearly cannot accommodate the marina and marine precinct. The subject site, which is located approximately 3.5 kilometres south east of Caboolture Town Centre and 3 kilometres east of Morayfield', is eminently suitable and can provide complimentary uses to Caboolture and Morayfield.

Together, these three centres can form a robust trio of activity centres, combining to meet the desired regional function of a 'Principal Activity Centre'. The development of the Northeast Business Park will be the catalyst to strengthen the vitality of all three centres.

4.2.3 Structure Planning Process

Principle 8.9 of the SEQRP requires that all major new urban developments undergo a structure planning process. The structure planning process is to be managed by Caboolture Shire Council and include all key landholders and stakeholders. It is intended that the Structure Planning process be undertaken in parallel to the assessment process for the development under the SDPWOA, thereby forming an integral part of the process and helping to provide context to the design of the project.

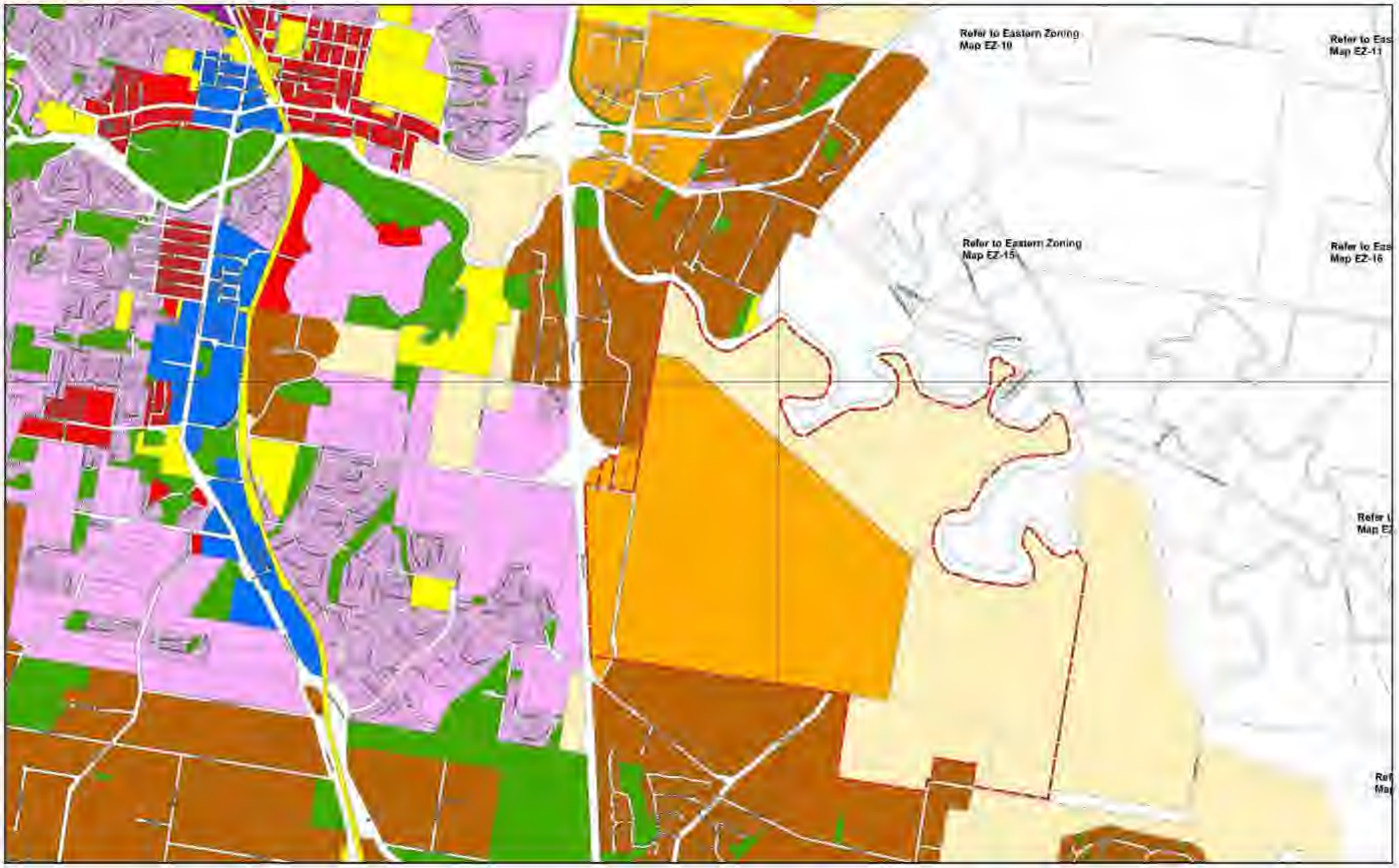
4.3 Caboolture Shire Planning Scheme

The Caboolture Shire Planning Scheme is also relevant to the proposal. The proposed Industry/Business Park is located in the 'District Industry' zone. This is a significant point in that the designation was the result of a State and Council initiative. The proposed marina is located in the 'Rural' zone (refer ***Figure 5 - Zoning***). As noted previously, applications for both components were lodged prior to the implementation of the SEQRP.

The mapping for the newly adopted planning scheme also indicates the various overlays (eg Acid Sulfate Soils Overlay) that apply to landholdings within the Shire. The overlays relate to codes of the same name. The overlay codes contain additional particular development requirements that are to be

Zoning Plan - Caboolture Shire Council

Figure 5



District centre
Metropolitan centre
Residential B
Local centre
Regional Industry
Rural residential
Subject site
District Industry
Open space
Rural
Local Industry
Residential A
Special use

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addressed by development. The table below sets out the zoning and overlays that are applicable to the respective lots that comprise the subject land.

RPD	Zoning	Acid Sulfate Soils Overlay	Bushfire Hazard Overlay	Catchment Protection Overlay	Nature Conservation Overlay	Scenic Amenity Overlay
Lot 7 RP845326	Rural	Yes	Yes	Yes	Yes	Yes
Lot 24 SP158298	Rural	Yes	Yes	Yes	Yes	Yes
Lot 2 RP902075	District Industry	Yes	Yes	Yes	Yes	Yes
Lot 15 RP902073	District Industry	Yes	Yes	No	Yes	No
Lot 10 RP902079	Multiple Zones	Yes	Yes	Yes	Yes	Yes

It is to be noted that there are no other planning scheme overlays that are applicable.

The Table of Assessment for the respective zonings set out the level of assessment for development, note whether uses are 'consistent' (generally supported by Council) or 'inconsistent' (generally not supported by Council) within the zone, and lists the applicable codes which development is to be assessed against.

The majority of the uses defined in the planning scheme are subject to code assessment in the Table of Assessment for the District Industry zone. Similarly, the majority of uses defined in the planning scheme are subject to code assessment in the Table of Assessment for the Rural zone.

The various uses (and development) proposed will need to address the respective uses codes and, in particular, the various applicable overlay codes (eg. Acid Sulfate Soils Overlay Code).

4.4 State Government Agency Requirements and Related Policy Issues

The subject site is situated on the southern banks of the Caboolture River and is affected by the following major environmental designations (Refer to Figure 6 – Designations):

Designation	Boundaries	Legislation	Comments
Moreton Bay Marine Park	Deception Bay and the lower reaches of the Caboolture River (i.e. along the length of frontage to the site).	*Marine Parks Act 1992*	Included within Habitat Zone.
Ramsar Wetlands	Caboolture River for part of the site and downstream	International Treaty, IPA. Likely to trigger EPBC	Likely to trigger EPBC. Commonwealth matters
Deception Bay Fish Habitat Area – Category A	FHA No. 013 - bed, banks and water column of Caboolture River along length of frontage to the site and a short way into Raft Creek.	*Fisheries Act 1994*	Excludes marked channel. Works or activities requiring the disturbance of habitats require a permit under *Fisheries Act 1994*.
JAMBA, CAMBA	No specific boundary defined.	International Treaties - likely to trigger EPBC.	Site is adjacent to wetlands which are likely to be used by birds protected under these agreements.
Erosion Prone Areas	As per EPA Plan No. SC3367 (adjacent Caboolture River), being 40 metres landward of Mean High Water Spring (MHWS) or Highest Astronomical Tide (HAT), whichever is the greater.	*Coastal Protection and Management Act 1995*	Part of the site is within an Erosion Prone Area, being 40 metres landward of HAT.
Areas of Coastal Biodiversity Significance – under the Draft Southeast Queensland Regional	As per mapping (especially maps 6-8).	*Coastal Protection and Management Act 1995*	Site is adjacent to Significant Coastal Wetlands.

Designation	Boundaries	Legislation	Comments
Coastal Management Plan			
Remnant Vegetation designations	As per RE mapping.	*Vegetation Management Act 1999*	Site contains some identified communities of concern.
Coastal Management District	As per mapping.	*Coastal Protection and Management Act 1995*	No Coastal Management Districts mapped in the locality. Refer Erosion Prone Area information.

Consequently (and further to) the above, the proposal will need to address the following:

- The *Coastal Protection and Management Act 1995* and *State Coastal Management Plan* in relation to works within a Coastal Management District and Erosion Prone Areas. Under the *Coastal Protection and Management Act 1995*, a number of key principles and objectives of the *State Coastal Management Plan* must be addressed (eg dredging, water quality management, coastal wetlands, biodiversity, etc);

- The *Fisheries Act 1994* regarding marine vegetation and development in or near declared Fish Habitat Areas;

- The Environmental Protection Act 1994 with respect to operation of a marina and industrial development classed as Environmentally Relevant Activities;

- Nature Conservation Act 1992, which provides for the protection of native animals, plants (and ecosystems in which they live) which have been classified as threatened;

- The *Marine Parks Act 1992* concerning the Moreton Bay Marine Park;

- The *Aboriginal Cultural Heritage Act 2003* concerning matters of cultural significance;

- The *Vegetation Management Act 1999* regarding State significant vegetation;

- The *Dangerous Goods Safety Management Act 2001* concerning the storage of dangerous goods (eg fuel);

- The *Transport Operations (Marine Safety) Act 1994* and the *Transport Operations (Marine Pollution) Act 1995;*

- The *Water Act 2000* in respect of taking or interfering with water;

- The *Transport Operations (Public Transport) Act* regarding the provision of bus routes and passenger transport infrastructure; and

- The *draft Regional Coastal Management Plan 2004* (specifically policy 2.4.7 regarding algal bloom implications).

Notwithstanding this, the proposal will also address the following State Planning Policies:

- *State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils*;

- *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.

The approval framework, regarding the above considerations, is outlined as follows.

4.5 Approval Framework

As noted previously in this IAS, the approval process for such a development is complex. The utilisation of the 'significant project' status under the SDPWOA, the associated coordination process and the EIS-based assessment provisions provides for an integrated and holistic approach that will allow the full potential of the precinct to be realised.

Further to the above, it is to be noted that it is likely that numerous approvals will be required once the applications for Preliminary Approval are approved. These are summarised below.

Town Planning

- Preliminary Approvals to override the Planning Scheme for Material Change of Use to establish the structure plan and land use plan.
- Various Development Permits for Material Change of Use (particular uses).
- Various Development Permits for Reconfiguration of a Lot.
- Various Development Permits for Operational Works.

Resource Allocation

- Resource allocation notice would be required, before any dredging could be sought.
- Resource Allocation for works within Waterways.

Environmental Approvals (excluding end uses)

- ERA19 for dredging
- ERA73 for marina mooring
- ERA 20 – Extracting rock or other material
- ERA 22 screening or separating material
- Creation of a dry land marina
- Tidal Works
- Section 51 Permit for removal or disturbance of marine vegetation
- Other ERAs where required for particular uses eg. fuel storage, etc.

The IDAS process under IPA provides that many of the above uses can be combined into one application.

Resource allocations and Enrvironmentally Relevant Approvals will be considered in detail through the EIS process, with relevant applications included with the subsequent applications to Caboolture Shire Council.

4.6 Environmental Protection Biodiversity and Conservation Act 1999 (EPBCA)

The EPBCA places the onus on the proponent to assess the potential effect that development may have on sensitive environments and to refer the matter to the Commonwealth Department of Environment and Heritage (DEH) for assessment under the EPBCA if they believe that the development may cause significant impacts on matters protected by the Act.

The subject site is proximate to groups of wetland communities which are listed under the Ramsar convention. Additionally, migratory birds covered by the Japan Australia Migratory Birds Agreement (JAMBA) and China Australia Migratory Birds Agreement (CAMBA) and the 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); may also use nearby habitats, as may other threatened species.

It is likely that the proposal constitutes a 'controlled action' and will be referred to the Commonwealth Department of Environment and Heritage (DEH) pursuant the *EPBCA*. The DEH will confirm its status under the *EPBCA* and the method of assessment. It is believed that the EIS process required under the *SDPWOA* be used as the accredited assessment process for matters relevant to the *EPBCA*, under the bilateral agreement between the Commonwealth and Queensland governments.

It appears that some direct and indirect aspects of the proposal may have potential to affect sensitive environments and be relevant to the EPBCA, if poorly designed and/or managed. Some of the potential effects include:

- potential for wash and erosion from increased boating activity affecting wetland environments:
- pollutants from boating activities and marine industries affecting water quality;
- risks arising from poorly managed acid sulphate soil disturbances; and
- issues associated with dredging and spoil.

It is noted that a preliminary assessment indicates that the extent of similar habitat within the vicinity, including protected habitats in Freshwater National Park, Bribie Island National Park and Nathan Road Wetlands Reserve. It is not considered that the site contains habitat *critical* to the survival of migratory bird species.

It is also noted that the site provides potential habitat resources for the Grey-headed Flying-fox which is a listed threatened fauna species. The EPBCA provides for the 'conservation of critical habitat' of listed threatened species. It is considered that the habitat resources within the site (i.e. scattered clumps of eucalypts and the Swampy paperbark forest) do not constitute habitat *critical* to the survival of this species.

These and other potential impacts arising from the development relevant to the EPBCA will be specifically investigated in order to make an assessment of any potential impacts, as well as identifying any opportunities where rehabilitation may improve habitat conditions.

6.5 Terms of Reference and Reporting

The current Preliminary Applications for the Business Park and the Marina have been subject to referral coordination to relevant state agencies under the IPA, with detailed information requests issued. On the basis of these information requests, substantial investigations and reporting have been undertaken, which has been used to inform the preparation of this IAS. If declared as a significant project it is expected that the matters raised in the Information Requests will form the body and basis of the Terms of Reference to be issued for the EIS process.

Despite the above, many studies are preliminary only at this stage, with additional studies and/or adaptation of existing studies required for most aspects of the development. Studies undertaken to date and used as references for this IAS are listed at ***Appendix B***.

5.0 ENVIRONMENTAL ISSUES AND BENEFITS

5.1 Overview

As noted above, there are a number of significant environmental and other issues concerned with the project. This section deals with the opportunities and constraints of the project and builds upon matter raised in the previous Information Request. It considers the existing situation, what will occur, and the resultant issues and benefits for each issue.

5.2 Flooding

Substantial portions of the subject site are currently subject to flooding. The Caboolture Shire Council has been consulted in this regard by the proponent and Parsons Brinkerhoff. The latter has subsequently undertaken preliminary flood modelling for the proposal, with the outcomes having been assessed against the Councils' two main floodplain management conditions, namely:

- No net loss of flood storage across the development site; and
- No resultant increase in flood levels over adjoining properties.

Parsons Brinkerhoff have presented two models as part of their preliminary reporting to date. These are:

- The Base Case – which determines the existing peak flood levels throughout the floodplain. Model verification was undertaken by comparing flood levels against Council's adopted 100 year flood and 10 and 50 year events; and

- The Development Case – which represents the proposal with flood mitigation works. The Development Case acknowledges that there are two main flood storage areas within the site boundaries that increase the conveyance of flood water through the site. The largest of these is situated in the north of the site, whilst the other is located towards the eastern boundary. Both of the areas have dual purposes. The first is to provide increased flood conveyance and the second, to provide locations for stormwater treatment.

On the basis of the modelling thus far, it has been concluded that there was a good correlation between the base case and Councils' adopted flood levels and flood extents. In addition, the development case meets Councils' floodplain management conditions and it has been demonstrated that it is possible to meet Council's objectives. Overall, there will be a net benefit to the community.

That is, there will be a net increase in flood storage on the site and peak flood levels increases will occur only within the site boundary or at locations immediately adjoining the development where existing infrastructure will not be impacted. A concept plan of development showing the Q100 line is included as *Appendix C*.

5.3 Stormwater and Water Quality

Caboolture is experiencing rapid urbanisation and as a result, increased stormwater and sewage discharges have boosted the sediment and nutrient loads flowing into the Caboolture River.

Caboolture Shire Councils' Environmental Monitoring Program reviewed five sites within the section of the river adjacent to the site in 2001. The data indicates that the overall water quality of the site adjacent to the river is poor. The result is primarily due to a combination of poor concentrations of

dissolved oxygen, turbidity and nutrient levels. The SEQ Environmental Health Monitoring Program has also produced a 'report card' for the river. Since 2001, the river has scored C, C- and most recently D+. This being the case, it is obvious that a prime objective of the subject proposal is to improve stormwater quality management and ultimately, reduce pollutant loads.

With this background in mind, Parsons Brinkerhoff have undertaken preliminary Stormwater Management Reporting (via means of a MUSIC water quality model). As a basis for the reporting, the environmental values for the waterway were determined and the Water Quality Objectives identified. The legislative basis for determining water quality management has accordingly, been reviewed. The *Environmental Protection (Water) Policy 1998*, the *Queensland Water Quality Guidelines* and particularly, the Queensland Water Quality Guidelines for the Caboolture River have been addressed. In particular, it is to be noted that Caboolture Shire Council seeks – by way of its Caboolture Shire Plan Stormwater Code (Specific Outcome 4) – to ensure that permanent water quality control measures achieve the following minimum reductions in annual mean load generated by the development site:

a.) 80% for suspended sediment;

b.) 45% for total phosphorus;

c.) 45% for total nitrogen.

The above have been utilised as the benchmark for preliminary stormwater treatment design for the proposal.

The Parsons Brinkerhoff investigations to date provide for two levels of management plans, being:

- An overarching framework for water quality management for the entire site; and
- Catchment water quality management plans for the first stage of development of each catchment (of which there are eight).

An important component of the above has been the adoption of design criteria (eg water harvesting, maintenance of buffers to waterways, contribution to and utilisation of open space areas) which mould the nature and form of the proposal. The main theme from the design criteria is that the proposed development will protect and enhance riparian and wetland vegetation. As a result, a 100 metre wide buffer to the Caboolture River and 40 metre wide buffer to Raft Creek will be utilised, together with a large portion of the subject site being provided as open space. Moreover, the overall stormwater management objective is to preserve natural flows to the waterways and to decrease overall nutrient and pollutant loads in the Caboolture River.

Treatment trains (a series of stormwater treatment measures designed to remove stormwater pollutants) will be further researched and incorporated into the Stormwater Management planning. Such measures will include (but are not limited to) grass swales, bio-retention, gross pollutant traps and constructed wetlands in the low-lying flood plains. The incorporation of water sensitive urban design is integral to the design philosophy. The impact of treatment measures on heavy metals, faecal coliforms, hydrocarbons and litter in runoff will also be assessed.

To meet water quality objectives, substantial reductions in current pollutant loads are therefore required. A reduction in nutrient and sediment loads will be of benefit to the health of the larger ecosystem. These will be reviewed in further detail as part of the design process.

5.4 Acid Sulfate Soils

The subject land includes land mapped below 5m AHD. *State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils* is applicable and is required to be addressed.

Preliminary reports have indicated some level of Acid Sulphate Soils (ASS), either low or moderate. Potential for ASS was intermittent; however it is likely that ASS will be encountered during the cut to fill earthworks.

The proposal will address the SPP (in conjunction with *SPP 2/02 Guideline: Acid Sulfate Soils*) given the extent of excavation and filling required. Details of the excavations including volumes, existing (and finished) ground levels, depth of excavations and fill will be provided.

Extensive testing of soils will be undertaken as part of the EIS and an Acid Sulfate Soil Management Plan (ASSMP) will be prepared to deal with these soils when encountered, based on current Queensland government and EPA guidelines.

5.5 Coastal Designations

The riparian zone of the site is largely clear of marine vegetation due to past farming practices. However, there are limited areas of riparian vegetation remaining such as mangroves and saltwater couch. Downstream of the site (leading to Deception Bay) there are substantial areas of wetlands declared as 'Significant Coastal Wetlands' under the draft SEQ Coastal Management Plan on Maps 6,7 and 8.

The mapped wetlands only note a small 'finger' of significant coastal wetlands on Lot 24. Site surveys have revealed that this consists of a very narrow channel supporting a narrow band of mangroves, with saltwater couch fringing both sides, partly traversed by a well established vehicle track.

Figure 6 denotes the major marine designations relevant to the development. These include:

- The Moreton Bay Marine Park Habitat Zone which, ends at the north-eastern boundary of the site;
- Fish Habitat Area, Category A (Fisheries Act, 1994)
- Ramsar Wetlands
- Significant Coastal Wetlands (Draft SEQ Qld Regional Coastal Plan)
- Wader Bird Sites

The lack of significant riparian vegetation on the subject site has been identified as being a major impediment to the ecological health of the river and riparian ecology, particularly in terms of erosion, water quality and habitat. Accordingly, the proposal has indicated that a 100 metre wide riparian zone will be rehabilitated for approximately the 8 kilometre length of the site's river frontage. This program is intended to provide the following key benefits:

- The creation of significant habitat areas enhancing wildlife corridors on site and to adjoining habitat areas;
- Bank stabilisation, reducing erosion potential and providing a buffer for any natural physical processes which may occur such as erosion and accretion, flood mitigation, climate change and the greenhouse effect;
- A physical separation distance and/or barrier between adjacent uses;
- Filtration of pollutants from terrestrial stormwater as well as river flows, improving water quality; and
- Provision of appropriate human access and economic benefit.

5.6 Dredging

The construction of the proposed marina will require capital dredging works in the order of 1,500,000m^3. A proportion of the resultant fill is intended to be used on site, with some required to be exported to other properties in the proponent's portfolio. The management of such large-scale earthworks in close proximity to the Caboolture River - and the necessary disturbance associated with the break through of the marina into the Caboolture River - will require careful planning and management to prevent impacts on water quality. These potential impacts can be adequately defined at the assessment stage and management measures proposed for the prevention and control of impacts will need to be defined prior to the commencement of works.

Dredging is also required in the navigable section of the lower Caboolture River. This dredging achieves two primary purposes:

- Provision of a safe navigable entrance to the river at all tides facilitating marine traffic for the marina, and addressing an existing safety concern whereby the safe passage of larger vessels currently restricted to top of tide navigation are not compromised in adverse weather conditions;
- Dredging of the river entrance increases the outfall of water flows in flood events, providing substantial flood mitigation upstream.

Proposed dredging of the existing navigation channel at the river entrance is likely to require a channel approximately 3.4km long and 70 metres wide at the base to adequately meet these objectives. Such dredging will occur within the defined navigation channel, and hence is outside the declared Fish Habitat Area. The environmental studies produced for the assessment of the proposal will define the areas and volume of dredging required within the navigation channel, and also the nature of the dredged material.

The operation of the proposed marina will also require periodic maintenance dredging of both the marina basin and the navigation channel. Detailed modelling of the expected siltation rates will be undertaken to define the expected frequency of dredging and the volume of material to be removed. The management of the resultant dredge spoil will be defined following the confirmation of expected volumes, and relevant considerations are:

- spoil disposal locations;
- monitoring and testing of spoil for contaminants and acid sulfate materials; and
- handling and management of spoil, including spoil treatment if required.

5.7 Fish Habitat Area

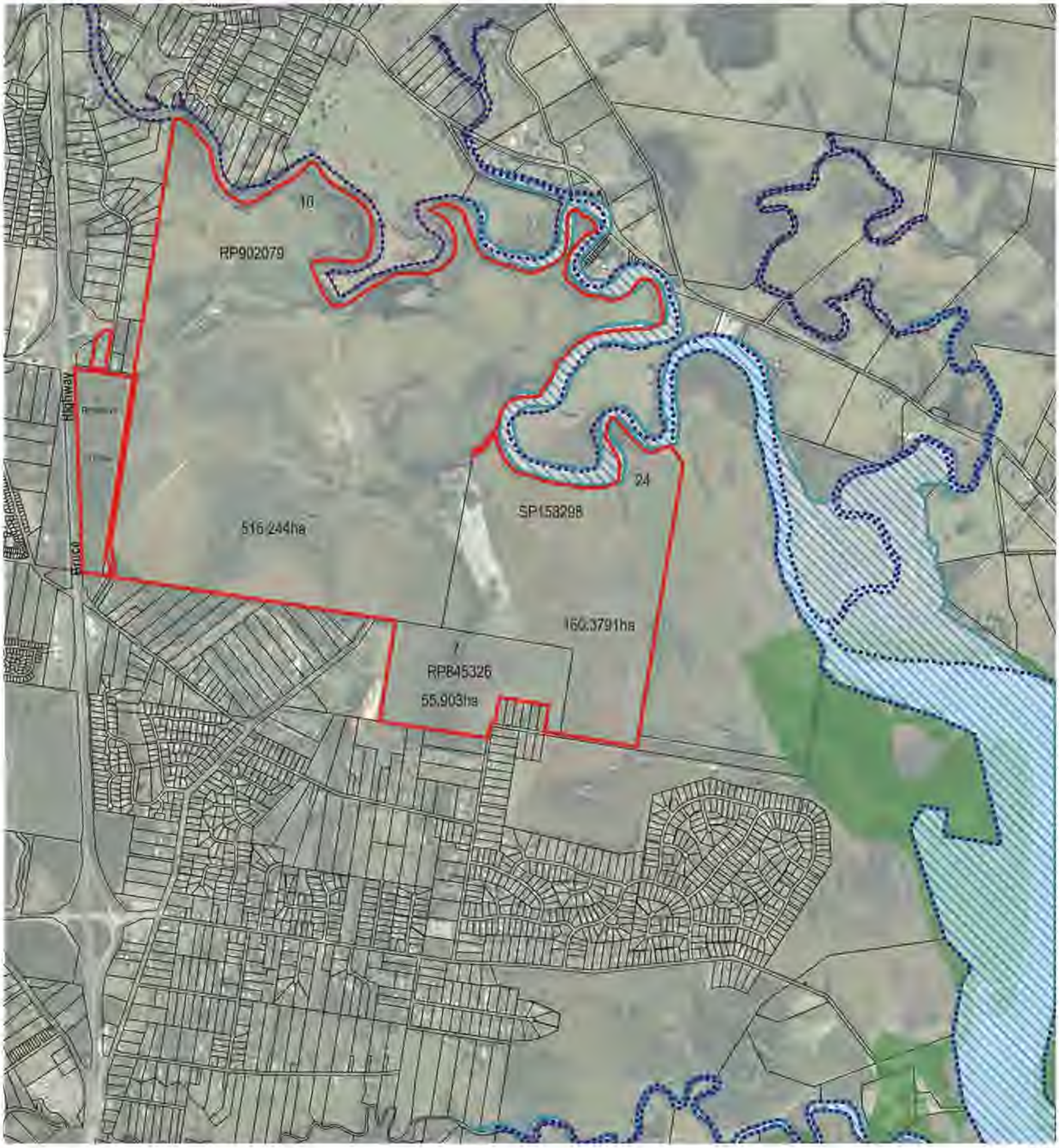
The subject site abuts the Caboolture River which is part of a declared Fish Habitat Area (Deception Bay). Within the subject site, a 100 metre rehabilitated riparian buffer would be provided to the Fish Habitat Area (FHA) along the site's frontage to the Caboolture River, except for a 100 metre break in the section of the bank, required to facilitate the entrance to the marina.

It is noted that the proposal would require revocation of a part of the declared Deception Bay FHA and that permits would be required under the Fisheries Act 1994. The EIS will address such considerations in a detailed manner.

The marina entrance location has been selected in an area which has very limited riparian or other vegetation. The marina itself is located outside the declared FHA, and will actually increase the Fish Habitat area.

Major Marine Designations

Northeast Business Park - Figure 6



Legend

- Site Boundary
- Fish Habitat Areas Category A (Source: DPI)
- Ramsar Wetlands (Source: DEH)
- Wader Bird Sites S.E.Q. (Source: DPI)
- Moreton Bay Marine Park Boundary (Source: QLD Government)

Designation boundaries are approximate only

Notes: 1. Coastal management district & erosion prone area are not mapped in the locality, however are defined as 40m landward of mean high water spring tide or highest astronomical tide , whichever is greater.

2. Refer also to Maps 6, 7 & 8 of Draft SEQ Regional Coastal Plan - Significant coastal wetlands to east of site to Deception Bay.

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The provision of riparian vegetation along such a massive river frontage comprehensively compensates the minimal loss of habitat required for the marina entrance. Moreover the provision of 100m wide vegetated buffer where none currently exist will provide:

- long term protection of fish habitats by benefits and retains biological and physical processes, and protects habitat from human impacts;
- managed public access to fisheries resource, mitigating adverse effects from currently unmanaged public access;
- long term insurance against possible natural erosion processes and/or greenhouse impacts; and
- improve water quality, increase food and habitat for fish species, and protect against vegetation loss, bank erosion, reduce nutrients and pollution, all aiding the increase of fish stocks

Additionally, the provision of best practice environmental solutions for boat maintenance, harbouring and repair will replace less well managed or uncontrolled practices which may have adverse effects on aquatic environments and fish stocks.

In summary, the proposed development offers significant potential to improve existing fish habitat conditions and increase the physical extent of potential fish habitats.

5.7.1 Tidal Prism

The construction of a 27 hectare marina on the site has the potential to affect the tidal regime of the upper tidal reaches of the Caboolture River and tidal tributaries of the Caboolture River that flow through the site. Namely, by slightly altering the flow characteristics and amplitude of tidal flows of these watercourses. Alterations in the tidal prism could potentially impact on estuarine communities in these areas.

It will need to be demonstrated that tidal communities, in particular the tidal creeks within the site, will not be unduly impacted by any changes in tidal prism resulting from the proposal.

5.7.2 Erosion

The proposal will result in the creation of a marina complex a considerable distance from the mouth of the Caboolture River. A significant amount of boat traffic will be generated on the Caboolture River downstream of the site.

The wash created by boat traffic has the potential to impact on the integrity of the banks of the Caboolture River, in particular, where natural protection in the form of coastal vegetation is not present. Currently, erosion is prevalent in areas with limited riparian vegetation, whilst minimal erosion can be expected where substantial vegetation is present.

An assessment of the potential erosion impacts resulting from the additional boat traffic generated from the proposal will be required. This study will consider any physical or operational mitigation measures that are proposed. These will include the proposed rehabilitation of foreshore areas on the site, boating speed limits, number of boat movements and the like.

5.8 Aquatic Ecology

The Ecology Lab (ecological consultants) has undertaken preliminary investigations in this regard. They have identified the following features:

- Three species of fish, three species of marine mammals, five species of marine reptiles and ten species of birds in the endangered, vulnerable, rare or migratory schedules of the Nature Conservation Act 1992 and EPBC Act 1999 may occur within the area (eg Moreton Bay Marine Park) but are unlikely within the site;

- The site comprises several areas of aquatic habitat. The most significant is Raft Creek and areas of mangroves and salt marshes fringing the site boundary and Caboolture River. The tidal portion of Raft Creek is included in the Fish Habitat Area;

- The proposed entrance to the marina is to be situated in a section of the river that is subject to erosion and which contains few aquatic plants. There are several small, mangrove-lined channels to the east of the proposed entrance;

- The weir on the Caboolture River (location approximately 19 kilometres from the mouth) forms a major barrier to fish passage and significantly effects the distribution of aquatic plants and water chemistry;

- Aside from the weir, the river has been altered by human activities (Monty's marina and slipway further downstream, near Goong Creek are foreshore and bank works, two Wastewater Treatment Plants discharging downstream of the weir and near the river entrance);

- Parts of the Caboolture River shoreline exhibit erosion and areas prone to erosion due to clearing of vegetation to the bank, unauthorised access (by vehicles) or from boating impacts;

- Water quality is poor due to supersaturation of oxygen in surface waters, depletion of oxygen at the bottom and high levels of turbidity. Nutrients and contaminant levels are also an issue.

- The proposal will provide for foreshore buffering – aside from the marina basin (which will be constructed on the disused farmland).

5.9 Terrestrial Ecology

Initial investigations regarding the terrestrial ecology values of the site and the associated regulatory environment have been undertaken by Cardno.

The subject site is largely clear of original vegetation and is generally in a highly disturbed state. This situation is due to previous land clearing on the site for the former uses, being plantation forestry purposes and previously, sugar cane farming over generations.

Much of the site is now dominated by large expanses of disturbed grassland, scattered groves of trees, paperbark forest and various types of marine vegetation in specific areas subject to periodic tidal inundation. There are also a number of significant weed species including prickly pear, groundsel bush, water hyacinth, lantana and others.

Most of the subject is considered to have a limited capacity to provide suitable, functional habitat resources for native fauna species.

There are however, a number of areas of intact vegetation together with riparian and drainage lines, which provide the highest potential to provide habitat for native fauna species, discussed briefly below.

5.9.1 Remnant Vegetation

Not of Concern and Endangered Regional Ecosystem (RE) types are recorded across approximately half of Lot 2 and in the south western corner of Lot 10 on the 2003 Regional Ecosystem mapping. The remainder of the site is mapped as either non-remnant vegetation or plantation forest. This area provides potential habitat resources for the Grey-headed Flying-fox which is a listed threatened fauna species pursuant to the EPBC Act. The relevant Regional Ecosytem Map is included as ***Appendix D***.

5.9.2 Marine Vegetation

Marine plants are recorded in various areas of the site in Lots 24 and 10, including mangroves and saltwater couch. Marine plants are identified as fisheries habitat pursuant to the *Fisheries Act 1994*, and an approval is therefore required from the Department of Primary Industries and Fisheries if disturbance of, harm to or removal of marine plants is proposed.

5.9.3 Endangered Species

Initial investigations reveal the site does not provide habitat critical to the survival of any wildlife species of recognised conservation significance pursuant to the *Nature Conservation Act (NC Act)*. As such, development of the site would not be constrained by the provisions of the *NC Act.*

Detailed ecological assessments will be undertaken as part of the EIS process to confirm the presence or absence of flora or fauna species that are listed under the *NC Act* or otherwise ecologically significant. Such an assessment would also include an analysis of the potential impacts associated with the proposed plan of development, and recommended mitigation measures to avoid, minimise or manage potential impacts, as well as identifying opportunities for habitat rehabilitation.

6.0 SOCIAL AND CULTURAL ISSUES

6.1 Social Characterisation

The research undertaken by Core Economics has revealed that residents within the Caboolture Shire have relatively low disposable incomes based on a comparison of average weekly household incomes ($894, compared with $1,080 for the Brisbane SD). The Shire contains predominantly low density housing and has a higher than average number of persons per dwelling (2.75, as compared with the Brisbane SD average of 2.61). This is reflective of a higher concentration of families. In addition, approximately 68.3% of dwellings in Caboolture Shire are being purchased or fully owned – as compared with the Brisbane SD average of 64.6%. Accordingly, this reflects that Caboolture Shire is a 'mortgage area' where residents are working to pay off their homes.

In short, Caboolture Shire is a 'family area' with residents residing in the area based on affordability in terms of housing and living costs.

6.2 Urban Design

Quality urban design is integral to the vision of Northeast Business Park. Leading mixed-use employment precincts such as Norwest Business Park in Sydney and Metroplex on Gateway have demonstrated the value of urban design in attracting substantial businesses, trending to a growing prevalence of clean, efficient industries, and relying on an increasing knowledge base in order to gain competitive advantage.

The creation of a functional and attractive employment precinct is seen as fundamental to attracting owners, tenants, employees and visitors, all of which are essential to the vitality and viability of the precinct. The rehabilitated natural riverfront setting, marina precinct, golf course and open spaces afforded by Northeast Business Park provides a desirable context for the setting of progressive design standards throughout all aspects of the development.

Precincts based on compatible and complementary land uses will be created, matched to topography, location and demand for uses. Clustering of complementary uses will be encouraged and facilitated to increase knowledge and/or resource flows between businesses. A range of commercial uses will cluster in activity centres.

Substantial landscaping is proposed throughout the development, with activity centres and parkland and open space areas linked by pedestrian and cycle paths.

6.2.1 Built environment

A clear focus on requiring and facilitating high quality built form is essential in achieving the urban design vision for Northeast Business Park. Examples of some indicative design approaches are included at *Figure 7*.

Progressive and functional design guidelines tailored to uses and underpinned by sustainability principles will be provided to purchasers for incorporation into building concepts. These will be subject to a design review process to encourage and facilitate quality, efficient design.

Core sustainability principles will include:

- Energy efficiency;
- Water efficiency including use of recycled water;
- Material and construction efficiency:
- Attractive and functional aesthetic;
- Building location and streetscapes
- Landscaping and Water Sensitive Urban Design.

6.2.2 Tenure

The land comprising the elements of the Northeast Business Park project is held in freehold title by Northeast Business Park Pty Ltd.

It is proposed that the Northeast Business Park development will utilise the Body Corporate Community Management Act 1997 to produce various land interests for sale over the life of the development period. The *Body Corporate Community Management Act 1997* will enable the creation of various interests in a controlled development program.

The Act 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.

Indicative Images

Northeast Business Park - Figure 7













The contents of this plan are conceptual only, for discussion purposes. All areas and dimensions are approximate, subject to relevant studies, Survey, Engineering, and Council approvals.

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- Ensure the ongoing maintenance of all open space, environmental areas, environmental infrastructure and public precincts across the development are maintained to a standard of excellence in keeping with the expectation of the community who live work and enjoy the natural environment at no cost to Government or the community of Caboolture.

All too often the cost of ongoing maintenance of the natural environmental elements of this type of development is transferred to Local Government or the State. In this instance, the Northeast Business Park project intends to break new ground, ensuring that the natural environmental components so important to the "clean, green, serene" theme of the development are not only preserved, but also nurtured for the life of the community.

6.3 Cultural Heritage

Previous investigations on the site have revealed the presence of both indigenous and non-indigenous cultural heritage items and areas of significance.

A Cultural Heritage Investigation was undertaken over lots 10 and 2 with assistance from SEQUITO North and the Gubbi Gubbi people, as part of the original Business Park application. A number of non-indigenous artefacts were located on the site including remnants of the 'Morayfield' farm complex (eg, homestead staircase, steam boiler, exotic plantings and a headstone). The previous utilisation of the site as a pine plantation has limited the possibility of finding major indigenous artefacts, although some artefacts were located during investigations – and sites of significance noted.

It is to be noted that the Information Request for the Caboolture City Marina site requires the preparation of a Cultural Heritage Management Plan. The plan will proceed along similar lines to the one previously completed by Davies Heritage consultants for the Business Park site. s. 47F(1) is the Gubbi Gubbi representative for the area, and, particularly under the *Aboriginal Cultural Heritage Act 2003*, is the key party for consultation. s. 47F(1) was consulted for the previous study and is a Burpengary resident. s. 47F(1) has subsequently been contacted regarding the preparation of this further study.

It is also noted that the marina application includes use of the bed and banks of Caboolture River which is owned by the Crown, and therefore has some potential to invoke native title interest, which cannot occur over freehold land. This is to be addressed as part of the cultural heritage study.

As noted above, that site also has some significant western site history which was largely reported in the previous study undertaken for the Business Park. This can be built upon to add richness to the potential historical precinct and interpretation centre within the proposed rehabilitated parklands and garden precinct. An interpretive centre could also increase cultural and environmental awareness.

6.4 Communications Strategy

The community and stakeholder engagement process is integral to the proponent's approach to the development. A respected community relations firm, Three Plus has been engaged to provide the Community Engagement Plan (CEP) methodology for Northeast Business Park. The basic methodology is intended to the same as that used successfully by Three Plus for the Westgate precinct project and Gold Coast National Seaway project, both managed by the Office of Coordinator-General.
The community consultation program will include:

- development and implementation of a public consultation program

- effective community engagement and management during the public consultation, including public display of the EIS
- production and distribution of documentation
- advice on emerging issues
- assistance with negotiations with interested parties
- provision of a consultation report

Three Plus proposes a consultation method that provides opportunities for presenting the project to local communities, identifies community and environmental issues, seeks input and advice from interested/affected locals, and enables the proponent and project team to design a sustainable project model.

The CEP will identify the stakeholders who comprise the community of interest for the development:

- geographic (residential, commercial, business clients)
- local interest groups
- elected representatives (federal, state and council)
- relevant government agencies
- the media

The CEP will identify potential issues and key messages for each stakeholder group including:

- local community attitudes assessment
- media and political issues identification
- environmental impacts/flora and fauna and aquatic habitat implications

The plan will identify engagement techniques appropriate for each stakeholder group and the timing of implementation of those techniques or tools, including a community information day/s. Information gathered at the community information day/s will be fed back to the community and the Project Team as a matrix of issues/concerns. The matrix will be investigated by the Project Team, which will respond to each issue raised by the community.

A community feedback meeting is then proposed, to enable the project team to speak to the issues and their responses. This will provide a clear demonstration that the Project Team has taken seriously its engagement with the community, and has informed the project through the community raising issues and concerns.

7.0 BENEFITS SUMMARY

7.1 Potential benefits to local, state and national economies

Core Economics has undertaken an assessment of the overall development proposal whilst the Pacific Southwest Strategy Group has assessed the marina and related components (for Lot 24 on SP158298 and Lot 7 on RP 845326). The findings of Core Economics are addressed first, below.

The Core Economics assessment has indicated that an initial investment of $872.4 to $887.4 million to develop the overall proposal will generate an economic benefit to Caboolture and the broader area economy of approximately $1.429 billion to $1.461 billion. This includes the initial investments and output in the local economy.

Caboolture Shire Council aims to have two out of three workers living and working in the Shire within 20 years. In order to do so, an additional 30,100 jobs need to be created in the Shire over this period. The proposal has the ability to provide almost one third of these jobs within a specialised and integrated marine and related cluster.

The overall future workforce of 6,700 to 9,550 people (based on a rate of 40 to 60 workers per hectare) will collect between $450 million and $500 million per year in wages and salaries. The majority of this will be diverted into the local economy in the form of housing payments, retail expenditure and leisure activities.

Given that wages and salaries will represent in the order of 50% of the expenditure of businesses in the area, it is estimated that the combined turnover of businesses located on site at completion will be approximately $900 million to $1 billion per annum. As a comparison, Caboolture Shire currently contributes an estimated $2.6 billion (or 3%) to the region's Gross Domestic Product of $86 billion.

The proposal has the potential to increase the Shire's current economy by over one third.

7.1.1 Marina and Marine Industries

Pacific Southwest Strategy Groups' (PSSG) assessment of the marina and related components only has addressed matters such as boat registration, marina and berth requirements, undersupply, population growth and opportunities for industry.

The review of boat registrations and marina and berth places has demonstrated that there is a clear demand for further facilities. For 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. The market undersupply will continue unless addressed.

Following consideration of the above and issues affecting the Queensland marine industry, PSSG considered that the marine precinct provides opportunities in:

- Marina berths;
- Dry boat storage;
- Boat building (a prime focus of the project);
- Aviation (due to the proximity of the nearby airport); and
- General marine business.

PSSG also considered the Southeast Queensland marine industry and concluded there is:

- Strong demand for marina berths and storage;
- Major shortage of marina berths/dry storage;
- Competition for boat builders/manufacturers and suppliers from existing precincts on the Gold Coast, Brisbane (big industrial, commercial and recreational), Redcliffe and the Sunshine Coast (for small/medium enterprises);
- Increasing competition from manufacturers from China for mould and partial fit out; and
- Potential for more imports from the USA resulting from the Free Trade Agreement.

It was also noted that the Caboolture region has:

- Little industrial land available;
- A limited supply of commercial land; and
- Very high demand for all types of land and built sites.

In view of the above, PSSG considered a precinct demand model. Whilst the marine precinct may have a manufacturing element, it is considered that the major focus should be a consumer/retail precinct with the following elements:

- Moorings and dry boat storage;
- Cafes and bars;
- Boat sales and service;
- Residential;
- Hotel;
- Offices and associated commercial;
- Sports/health, business/clubs; and
- Option of industry.

The above model, based on current national and employment trends, will provide more jobs and benefits for Caboolture than manufacturing alone. When translated to elements within the marine precinct (based on typical site coverage requirements), a total development area of approximately 292 hectares was estimated to be required. The marine precinct would be undertaken in six stages.

Based on the above elements for the marine-based precinct only, PSSG estimated the preliminary capital expenditure budget (i.e. land development and building construction) based on industry average unit costs. The total capital cost for the component is therefore $687.4 million (exclusive of GST and land value).

In addition, PSSG determined an indicative operating income. Once fully operational, the estimated operating income for the project will be $68.8 million. An assessment of the likely impact of the marine precinct on the local and regional economy was also undertaken by PSSG based on an 'input-output' methodology (or multiplier calculation). This information is tabulated below for ease of understanding:

a.) During the construction phase

Input	Value (millions)
Local value add from the construction	$165.9
Total flow-on effect resulting from the initial construction cost	$187.7
Total value add to the regional economy (Gross Regional Product) during the total construction period, including the second-round flow-on effects.	$353.6

There will be a multiplier of 2.1.

b.) Once fully operational

Input	Value (millions)
Likely initial benefit to the Caboolture economy from the continued operation	$27.02
Likely flow-on benefit to the Caboolture economy from the continued operation	$31.36
Total in value-add terms	$58.38

There will be a multiplier of 2.2.

7.2 Potential costs and benefits to natural and social environments

The key potential 'net benefits' are described below:

7.3 Environmental

- Provision and rehabilitation of large areas of Open Space within the development, both on the river and connecting inland.
- Catalyse connection and potential rehabilitation of important habitat areas, particularly to the east and northwest (across the river).
- Use of treated water from Caboolture River Sewage Treatment Plant.
- Alternatively, catalyse upgrade of Uhlmann Road Sewerage Treatment Plant and use its treated water (potentially greater impact on net water quality improvement in Fish Habitat and Moreton Bay – however would require significant State and Council investment).
- Use of Water Sensitive Design methods to polish and denitrify stormwater flowing through site from external catchments, contributing to better river water quality.
- Contribute to increased biodiversity and fauna populations, particularly fish and birdlife – via improved water quality and vegetation rehabilitation.
- Dedication of a large conservation and nature-based recreation precinct based around the rehabilitated riparian zone, heritage park and open space areas.

- In succinct terms, the proposal aims to safeguard the existing environmental values and improve the existing environment.

7.4 Potential Employment benefits

Core Economics have determined that the following are the key employment multiplier effects that will accrue during the construction phase of the Industry/Business Park only:

- The initial investment in the construction of the Industry/Business Park will generate approximately 1,800 to 1,960 jobs. The jobs will be generated from Caboolture and the surrounding area.
- Industrial support effect will generate approximately 888 to 960 jobs for Caboolture and the broader area.
- Consumption induced effect will generate approximately 851 to 920 jobs in Caboolture and the broader area.
- The construction of the Industry/Business Park only will generate an overall effect (initial and flow-on) of approximately 3,500 to 3,840 jobs in Caboolture and the broader area.

Pacific Southwest Strategy Group (PSSG) have determined that an estimated 10,905 'full time equivalent' positions will be created during the construction phase of the marina precinct. This represents 5,154 initially and 5,751 as a flow on. There is a multiplier of 2.1. PSSG have also calculated that there will be approximately 1,021 'full time equivalent' positions created during the operations phase (i.e. approximately 437 initially and a further 584 as a flow on). There will be a multiplier of 2.3. The employment multipliers are based on the construction of the Industry/Business Park and marine precinct. It does not include jobs created by businesses locating on-site, nor flow-on employment created from those businesses hiring suppliers and other related workers.

In summary, the proposal will generate an estimated 6,950 to 7,110 full time equivalent (FTE) jobs during construction (14,405 to 14,745 FTE jobs including subsequent secondary flow on effects) and 6,137 to 8997 FTE jobs during the operations. The local employment and economic injection is a critical component of meeting Caboolture Shire Council's *Corporate Plan 2005-2009* target of achieving 2 out of 3 workers living and working within the Shire within the next 20 years.

In all, the employment impacts will be positive as there will be additional jobs, a broadened skills base and most importantly, Caboolture-based employment in line with Council's long term goals. In addition, the project addresses and supports State Government initiatives for broadening the employment base and strengthening the economy (as enunciated in policy documents such as the SEQRP).

7.5 Social Environment

In short, the proposed Industry/Business Park, marine precinct and marina will enhance the local residents' way of life. It will create local and regional employment through the construction phase and the ongoing operation of businesses that locate to the site, as well as the marina.

The proposed marina on the site and the supporting amenities and facilities will enhance community interaction and cohesion. The proposal will provide opportunities to better (and appropriately) access the waterway and environmental areas, whilst also providing a marine-based hub for businesses and local and regional recreational opportunities for residents and tourists.

The development, along with Caboolture and Morayfield, will create a robust trio of centres collectively fulfilling the regional role of Principal Activity Centre. Moreover, it will create additional vitality and

prosperity for the region and all three centres, whilst enhancing recreational and housing choice. This trio of centres will be underpinned by the creation of a public transport route efficiently linking the centres and connecting to existing rail and bus networks.

The development unlocks extensive frontages to the Caboolture River, previously inaccessible to Caboolture residents due to private ownership. It also creates a recreational and leisure precinct centred around the river, marina, golf course and open spaces providing a desirable addition to the social fabric, leisure choices and identity of the region.

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

This approach is considered to encapsulate the SEQRP's core philosophy of co-locating business, recreational and residential uses in order to 'live work and play' in discrete precincts with an individual character, separated by green, open spaces.

8.0 CONCLUSION

The development of the Northeast Business Park is seen as a landmark development, providing a unique opportunity to provide and stimulate substantial economic, environmental and social benefits to Caboolture and South East Queensland. The development will herald a new phase in the strengthening regional role of Caboolture as a Principal Centre in the northern corridor of South East Queensland.

The proponent's 'net benefit' approach and commitment to stakeholder engagement and mutual benefit provides a sound basis to approach the design, approval and development of a project of this nature. Such an approach is an intrinsic component necessary to achieve the sustainability and design objectives of the development including; water quality improvements, energy and resource efficiency, accessibility, ecological rehabilitation, flood mitigation, social vitality and economic prosperity. The addition of highly desirable social and recreational opportunities will be of clear benefit to the region.

The development provides for the co-location of two key development precincts. Namely, the mixed industry business park, and a marina and marine industries precinct (complemented by an array of other uses). The construction of the marina precinct in particular will help address a substantial unmet demand for marine facilities, thereby relieving the subsequent restriction on related economic investment opportunities. Collectively, the development will generate an estimated 6,950 to 7,110 full time equivalent (FTE) jobs during construction (14,405 to 14,745 FTE jobs including subsequent secondary flow on effects) and 6,137 to 8997 FTE jobs during the operations.

The economic injection and employment benefits are consistent with state government priorities of broadening the economic and employment base, as enunciated in the SEQRP. The local employment and economic injection is also a critical component of meeting Caboolture Shire Council's *Corporate Plan 2005-2009* target of achieving 2 out of 3 workers living and working within the Shire within the next 20 years.

The extent of environmental issues relevant to the proposal are significant in areas and detailed studies and measures will be incorporated into the design, construction and operation of the development in order to protect sensitive areas.

Some common environmental issues however, are mitigated by the current degraded state of the landholding, relatively poor water quality in the Caboolture River, and limited riparian zone vegetation. Accordingly, core environmental concern for the locality has to focus on effective means of achieving rehabilitation and improvement of environmental conditions, in addition to protection of sensitive ecologies. The Northeast Business Park proposal has accordingly been framed to provide net environmental benefits.

Northeast Business Park presents an opportunity for private industry to demonstrate proactive stewardship of the natural and aquatic environment, whilst improving social and economic conditions. Northeast Business Park aims to be a benchmark development for future globally competitive business parks and/or marinas in environmentally sensitive locations.

The confluence of visionary need and opportunity resulting in a proposal of this magnitude and strategic significance is considered unique in the region, and addresses a multitude of initiatives of the Caboolture Shire Council, State Government policy documents and the SEQRP. The Northeast Business Park proposal is of strategic significance to the Caboolture Shire and to the State of Queensland.

Appendix A

Letters of Support

TO WHOM IT MAY CONCERN

"Expression of Support"

Northeast Business Park Pty Ltd. proposal to construct a world class Business Park and Marine Industry precinct on freehold land adjoining the Caboolture River.

On behalf of the Directors of the Boating Industry Association Queensland, I write to record an "Expression of Support" for the proposed development by Northeast Business Park Pty Ltd, which is a current financial member of this association.

The Boating Industry Association Queensland (BIAQ) regularly surveys its Marina Division members in relation to waiting lists for marina berths. Over the past eighteen months the waiting list has varied between 1500 x 1600 throughout Queensland, heavily weighted to the south-east corner.

With net migration into south-east Queensland predicted to average 60,000 people per annum, a strong desire for on water lifestyle will continue to increase demand for the limited number of berths currently available.

The BIAQ therefore commends the proponents North East Business Park Pty Ltd for its development concept, the estimated $353 million contribution to the Caboolture economy & the planned creation of more than 10,000 jobs during the course of the construction period.

Building the Marine Industry precinct incorporating some 600 to 800 marina berths will go a long way to alleviating part of the paucity of marina berths in the south-east corner.

The marine industry in Queensland has been experiencing unprecedented, experiencing 5-6% growth each year over the past 10 years, which is approximately twice the population growth.

As at 31 March 2006 there were 201,157 registered vessels in Queensland and the prediction is that by 2015, assuming the growth rate is maintained, there will be 300,000 registered vessels.

Another Milestone for recreational boating in Queensland is that there is now in excess of 500,000 licences on issue.

To summarise, BIAQ would like to offer the highest level of support to Northeast Business Park Pty Ltd in its pursuit for development approval for this particular project which will inject wealth into the local community, create additional employment and go some way to easing the demand on marina berth which currently has become a roadblock for further development of the Marine Industry in this state.

Yours sincerely

s. 47F(1)

s. 47F(1)

General Manager
Boating Industry Association of Queensland

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- Australian Marine Industry Federation (AMIF)

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- Queensland Marina Association
- Queensland Marine Brokers Association
- Queensland Small Craft Council
- Marine Retailers Division
- Manufacturers Division

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9th May 2006

The Manager
Port Binnli Pty Ltd
Water Street
FORTITUDE VALLEY QLD 4006

Facsimile: s. 47F(1)
Attention: s. 47F(1)

Dear Sir

This organisation is involved in all facets of marine related recreational activities and our, almost, three thousand members own and operate all type of water craft, from small dinghies up to vessels of twenty five metres and more in length and both power and sail.

There is an increasing lack of berthing and hardstand facilities in SE Queensland for recreational and commercial vessels. This is having a noticeable effect on an ever widening range of activities in recreational, business and commercial areas.

We have a waiting list of people who want to buy or rent berths in our Marina. For in excess of three years we have, so far unsuccessfully, been attempting to establish further berths at our Marina in the Manly Boat Harbour.

On 21st February 2006 we hosted a seminar organised by the Department of State Development Trade and Innovation titled "Marina Needs and Understanding the Marina Approval Processes" which was attended by 48 people from Government (State and Federal) and Industry. The need for marine infrastructure was graphically evident from what transpired at the Seminar.

We wish you every success with your Northeast Business Park and Marina project on the Caboolture River. If anyone wishes to contact me, please invite them to do so on s. 47F(1) or s. 47F(1).

Yours faithfully

s. 47F(1)

RealWay
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CABOOLTURE

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Port Binnli's vision for North West Business Park I know will rival anything in the country.

The Proposed Marine Industry Precinct will rival that of Coomera Waters and allow for the development and containment of a burgeoning industry that is overflowing from aircraft hangers at the Aerodrome to construction in sheds kilometres from the water, and two marinas that are already overflowing and cannot accommodate storage, repairs and manufacturing facilities.

As the President of the Caboolture C.B.D. retailers and traders association, naturally I am in favour of any plans for retention and expansion of our industry base.

As a Real Estate agent who has lived for 50 years in Melbourne and 10 years in Sydney, I see the potential for development, and the need to provide work for young families moving into our area at a rate that defies reality, is an obligation that we have to meet to realize this State's promise.

As a resident of the area, I believe:

- A development of this nature will give Caboolture Shire the identity it needs and deserves. The care with which this company has proceeded in regards to environment has been exemplary.
- The consensus of council and the community is empowering.
- The promise of involvement for professionals like myself to participate from planning to fruition with this company in view of their "Far Northern" successes proves that this Shire has come of age and is more than capable of ensuring the success of this proposal.

This gives Queensland the chance to take a northern suburb that has been a "sleeper" and perceived as a "high welfare area", and turn it into the jewel of South East Queensland.

RealWay
PROPERTY CONSULTANTS
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Our marketing slogan for Caboolture:

THE GATEWAY TO PARADISE - HALF WAY BETWEEN THE MOUNTAINS AND THE SEA.

This project allows the shire to run with a dream that grows from a vision to a project to a reality, allowing workers, visitors and residents alike the opportunity to work live and play in the underutilised reaches of Moreton Bay and the Pumicestone Passage, our greatest attraction.

s. 47F(1)
Principal RealWay Property Consultants Caboolture
President C.B.D.Traders and Retailers Association Caboolture

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PTY LTD ABN 73 086 764 070
BLS

RE: MARINE INDUSTRY SOUTH EAST QUEENSLAND

The Marine Industry in South East Queensland is an example of a specialist "Smart" Industry, progressing and emerging as a major contributor to exports for Australia. The Industry sees the "clustering" of new manufacturers in the region as an essential ingredient to sustained innovation and hence survival long term.

The Industry thrives on the emerging skills of its neighbours. It does not see the business next door as a competitor but as a colleague who will also attract International customers to the region.

The Industry needs to "Showcase" to its customers.

South East Queensland is also a beautiful destination so customers and agents tend to stay a little longer. But more importantly they want to return on a regular basis. This activity drives local tourism.

One of the major problems facing the Industry is this critical shortage of marina facilities and new areas to encourage other boat builders and other service Industry to emerge in areas adjacent to the water.

We have examined the proposals put forward by Northeast Business Park Pty Ltd for the Caboolture Marine Industry Park and associated Marina and would like to make it known that we wholly support them with their endeavors.

Regards,

s. 47F(1)

s. 47F(1)
(Managing Director)

Shed G45 Gold Coast City Marina, Waterways Drive, Coomera, Qld, 4209 * Email: blackship@bigpond.com * Tel: 07 5502 7500 * Fax: 07 5502 6589

Savannah Yachts

A division of :-
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Noosa Heads,
Queensland, 4567
AUSTRALIA

ABN 20 104 593 535

s. 47F(1)

10th May 2006

Executive Manager

Port Binnli Pty Ltd

PO Box 1001, Spring Hill, QLD 4004

Dear s. 47F(1)

This letter is to offer you my full support in your endeavour to develop the North Eastern Business Park on the Caboolture River. I understand that the focus of this development is to establish a marine precinct for the boating industry of SE Qld and a service centre for boats cruising the South Pacific. There are few remaining sites with ocean access available for large boats such as the modern wide catamaran. I have searched the Sunshine Coast as far as Tin Can Bay and there are virtually no boat ramps with street access clear enough to take a boat similar to the Savannah 1650, a boat that Savannah Yachts launched in 2005.

I am looking for premises to continue building this type of large modern sailing and motor catamaran as I have clients wishing to have boats built. The problem, however, is the transport and launching of these vessels. Your proposed development has the potential to supply boat building facilities which would have good access to open water.

The Caboolture River is navigable well past your site with navigation marks already in place. The site is protected from strong storm or cyclonic events.

The proposed site is close enough to Brisbane and Gold Coast suppliers that no excess freight costs would be incurred. It is also close enough to the labour pool in the northern suburbs of Brisbane.

SE Queensland has been developing as a major manufacturing area for the new type of ocean going sailing and motor vessel, however it is restricted in respect to the wide bodied catamaran that is becoming popular. Your site has the potential to provide facilities for these boats. I look forward to your development going ahead.

Yours faithfully,

s. 47F(1)

Managing Director, Savannah Yachts.

Appendix B

List of major sources

- Australian Government – Department of Industry, Tourism and Resources, *New Horizons – Marine Industry Action Paper,* Commonwealth of Australia, 2005.
- Caboolture Shire Council, *Caboolture Shire Plan,* Caboolture shire council, 2005.
- Cardno QLD Pty Ltd, *Draft Terrestrial Ecological Assessment Report,* a technical paper prepared for North East Business Park, 5 May 2006.
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- Davies Heritage Consulting Pty Ltd, *Cultural Heritage Assessment – Lot 10 RP902079 and Lot 2 RP902075*, a technical paper prepared for the Lensworth Group, October 2003.
- J. E. Sieman Pty Ltd, *Geological Report on Caboolture Marina Site*, technical report prepared for Port Binnli Pty Ltd, September 2005.
- Pacific Southwest Strategy Group Pty Ltd, *Caboolture City Marina Study*, a technical report prepared for North East Business Park Pty Ltd, 14 March 2006, North East Business Park.
- Parsons Brinkerhoff, *Caboolture River MIKE21 Flood Study*, a technical report prepared for North East Business Park, April 2006.
- Parson Brinkerhoff, *Stormwater Management Plan North East Business Park,* a technical report prepared for North East Business Park, May 2006.
- Queensland Government – Office of Urban Management, *South East Queensland Regional Plan 2005-2026*, Queensland Government, 2005.
- The Ecology Lab Pty Ltd, *Preliminary Assessment of Aquatic Ecology,* a technical report prepared for North East Business Park, April 2006.

Appendix C

Q100 map

Appendix D

Regional Ecosytem Map