



# Riverside at Tea Gardens Concept Plan Application

Environmental Assessment

Volume 1A

for  
Crighton Properties Pty Ltd

January 2012

0043707 - Final

[www.erm.com](http://www.erm.com)

**PART 2b**

## 6.8.6

### *Additional Field Assessment 2009*

Following the comments and advice of the DECC additional fieldwork was undertaken to cover all landform units. On advice from the DECC the same registered groups were sent an updated methodology on 23 February 2009. A fax was received from KLALC on 2 March 2009 stating agreement with the methodology and interest in participating in the fieldwork. An email response was received on 12 March 2009 indicating that the group Interim Board of Management for Worimi Conservation Lands no longer existed. The private person was contacted by phone on 13 March 2009 and agreed with the methodology but was unable to attend fieldwork due to full time employment.

The additional fieldwork was undertaken on 18 March 2009 and included three representatives from KLALC.

The field survey aimed to inspect the previously identified sites and all the landforms within the study area. The survey methodology and project was discussed with the Aboriginal stakeholders prior to and on the day of the survey.

Again during the survey (18 March 2009), ERM archaeologists discussed local Aboriginal heritage values and patterning with the community representatives. This provided further understanding of the local perspective for Aboriginal habitation and subsistence patterns. When Aboriginal sites were identified, all participants were involved in recording the site, determining its extent and archaeological potential. At the completion of the survey an open discussion was held, where the sites recorded, the archaeological potential and required investigation was discussed and agreed upon by all present. The outcomes of this consultation underwrite this heritage assessment.

## 6.8.7

### *PAC Comments 2009*

The following was recommended by the PAC in relation to the previous Aboriginal Heritage Assessment (ERM, 2008) presented in the Environmental Assessment report:

- *the Proponent be requested to provide further details to confirm the adequacy of the survey sampling in relation to available areas of potential visibility and to further define the extent of Riverside\_01;*
- *the additional definition of the extent of Riverside\_01 and the adequacy of the buffer area to protect this site must be considered prior to approval of the concept plan;*
- *the proposed management plan in relation to Riverside\_01 must consider the potential for impacts to this site as a result of signage and interpretation for use as an educational resource, in consultation with DECC and the KLALC; and*

- the Proponent clarify the commitment or otherwise for KLALC to monitor construction activities and the mechanism to achieve long term protection of any keeping place established as part of this process.

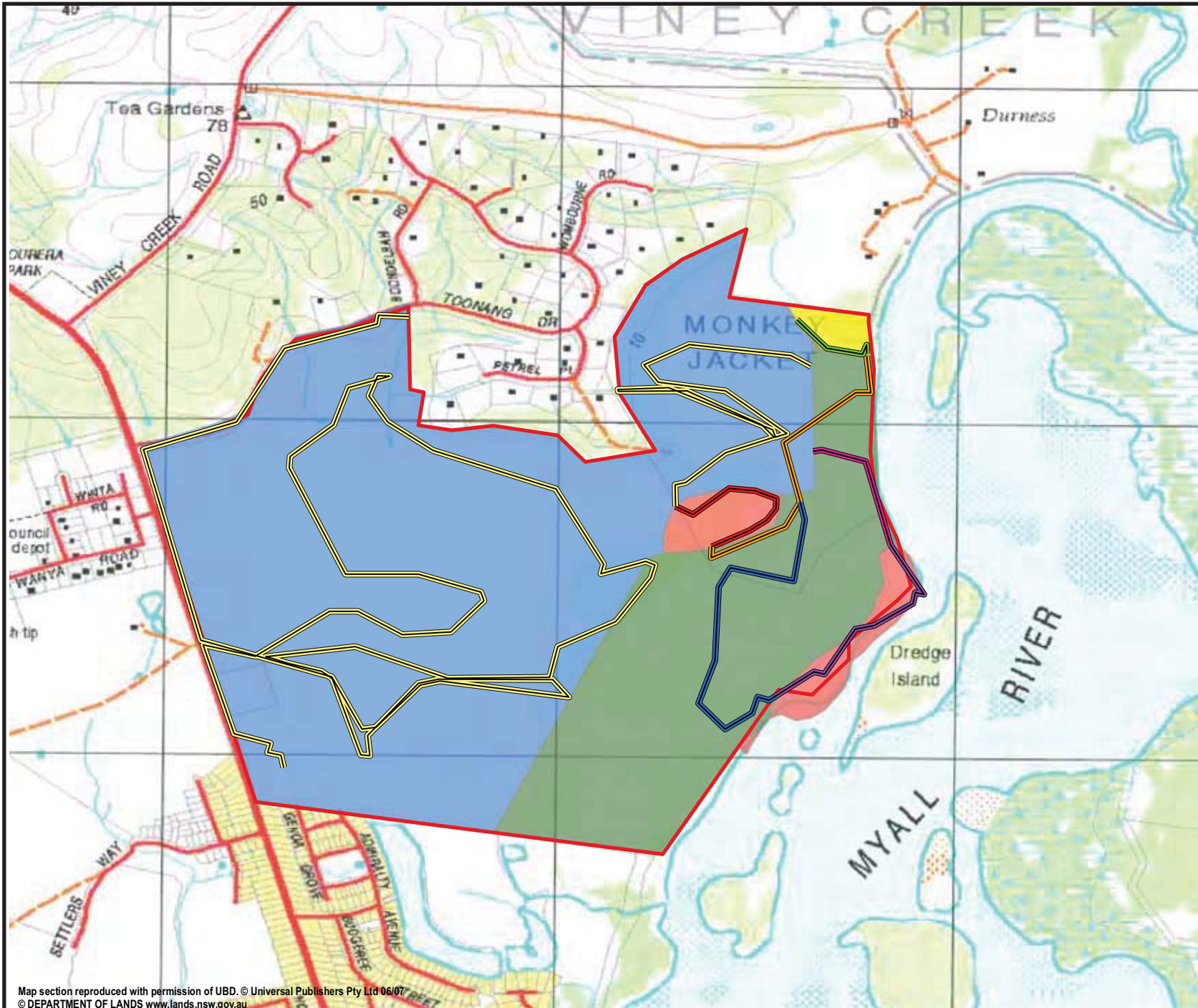
Following these recommendations the study area was re-surveyed by ERM Heritage consultant and Aboriginal representatives on 18 March 2009. The survey aimed to re-survey all landform units within the study area, relocate the site identified by Brayshaw in the 1980s and Riverside 01 identified by ERM in 2008. Areas of exposure were targeted during the survey.

The survey transects covered every landform and attempted to locate areas of visibility within the study area. The transects on sand dune, wetland and open depression were walked and the areas of flat were inspected using both walking and vehicular transects. Transects and landforms are shown in *Figure 6.8* and identified in *Table 6.18*. Identified Aboriginal heritage sites recorded are identified *Figure 6.9*.

Table 6.18 Description of Transects Surveyed

Transect	Landform	Description
T1	Flat	Area of flat not above 10m ASL.
T2	Sand Dune	Areas of sand dune raised above the 2 to 3 metre mark and therefore not inundated with water.
T3	Wetland	Low lying areas, less than 2 metres above sea level.
T4	Open Depression	Area of drainage line, small ephemeral drainage line.
T5	Wetland	Low lying areas, less than 2 metres above sea level.
T6	Sand Dune	Areas of sand dune raised above the 2 to 3 metre mark and therefore not inundated with water.
T7	Wetland	Low lying areas, less than 2 metres above

The 2009 survey was conducted according to the methodology discussed with all Aboriginal stakeholders. The survey focused on the identification of Aboriginal heritage values relating to archaeological sites, although discussion also included Aboriginal intangible values and the importance of Aboriginal sites to the local community. Field survey methods were adopted to pursue the discovery of new archaeological sites, ensure their accurate recording and provide sufficient background information to provide an assessment of cultural significance to the extent that surface survey allowed. Each of the different landforms identified in the study area were surveyed, namely wetland, sand dune, flat and open depressions.



**Legend**

- T01
- T02
- T03
- T04
- T05
- T06
- T07
- Study Area
- Creek Bank (Open Depression)
- Flat
- Wetland
- Raised Sand Dune

**Source:**  
Dept. Lands

Suffix	Revisions	Date	Init
R0	Preliminary Issue	09-01-12	JD

**Figure 6.8**  
**2009 Survey Aboriginal Transects and Landforms**

Client: Crighton Properties Pty Ltd

Project: Concept Plan 2011  
Environmental Assessment  
Riverside at Tea Gardens

Drawing No: 0043707h\_CP\_EA\_11\_C034\_R0.cdr

Date: 09/01/2012 Drawing size: A4

Drawn by: JD Reviewed by: SO'C

Scale: Refer to Scale Bar

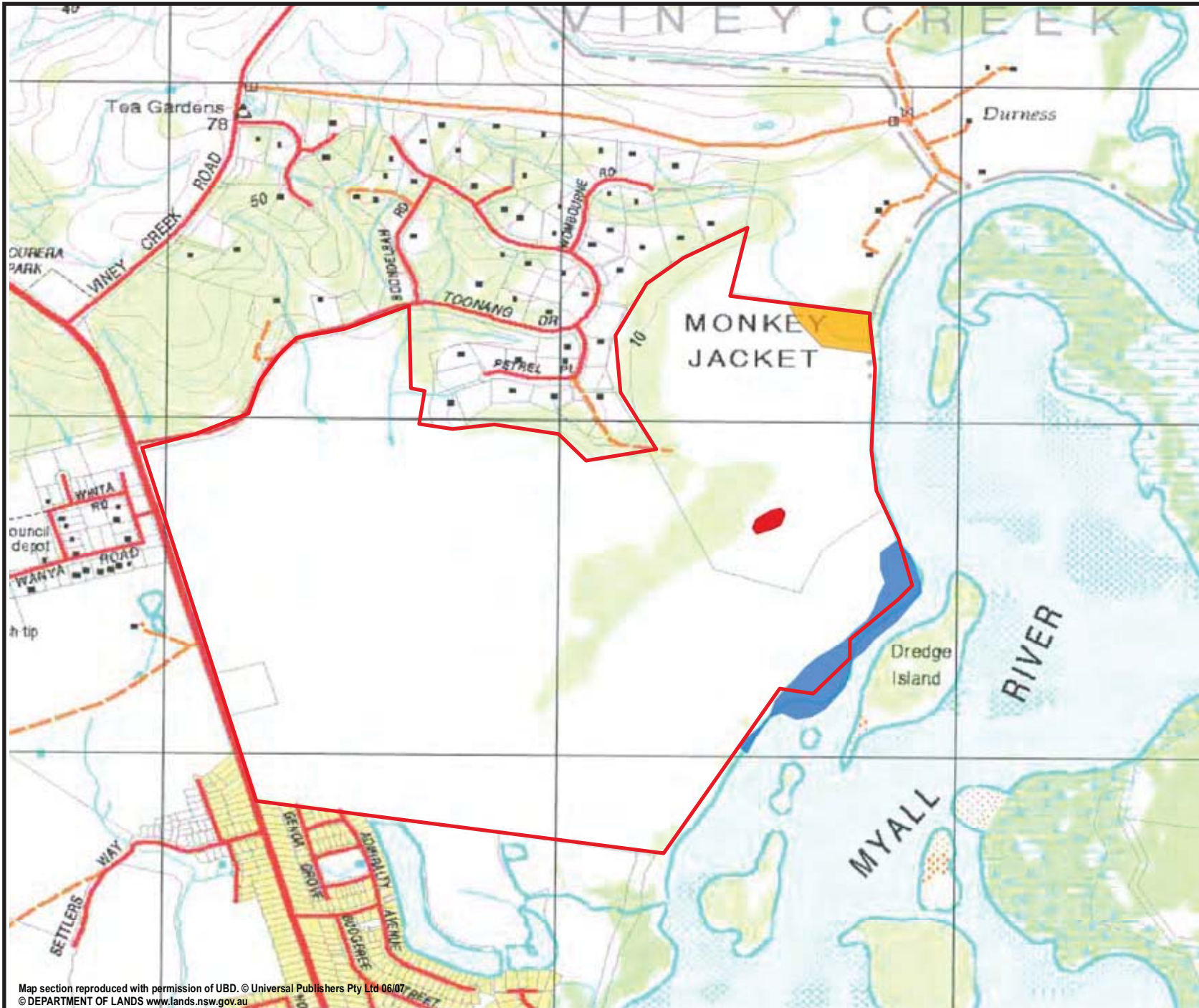
0 100 200 300m

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- Legend**
- Study Area
  - Midden 38-5-0148
  - Area of Aboriginal Heritage Sensitivity
  - Riverside 01 midden

**Source:**  
Dept. Lands

Suffix	Revisions	Date	Init
R0	Preliminary Issue	09-01-12	JD

**Figure 6.9**  
**Aboriginal Sites Recorded within the Study Area**

Client: Crighton Properties Pty Ltd  
 Project: Concept Plan 2011  
 Environmental Assessment  
 Riverside at Tea Gardens  
 Drawing No: 0043707h\_CP\_EA\_11\_C024\_R0.cdr  
 Date: 09/01/2012 Drawing size: A4  
 Drawn by: JD Reviewed by: SO'C  
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The ground visibility was limited across all the landform units as a result of the presence of vegetative cover and / or water. The wetland areas were able to be traversed but again offered very limited ground visibility. A photolog of the 2009 survey transects is detailed below and within *Volume 5*. The overall effective coverage of the site was 3% as detailed in *Table 6.19*.

The 2008 survey located a new Aboriginal midden site (Riverside 01). The site was located on sand dune, with shell material eroding out of the exposed sand. The site was revisited during the 2009 survey. The 2009 survey re-confirmed that the midden is located on a raised sand dune area close to the wetland. The midden was overgrown with grass and the full extent and nature of the deposit could not be fully determined. The midden deposit was not dense and most of what could be seen showed a sparse scattering of small shell fragments on the surface. The size of shell fragments may relate to the existing land use, where grazing cattle may have trampled the midden surface.



**Photograph 1**

2009 Transect 07.  
Facing South. Low grass in a  
portion of the wetland.



**Photograph 2**

2009 Transect 07.  
Showing ground visibility in areas  
of wetland.



**Photograph 3**

2009 Transect 07.  
Facing South. Wetland- looking at  
area considered to be possible PAD,  
sowing dense aquatic flora.

## Photographs



**Photograph 4**

2009 Transect 07.  
Facing South.  
Showing southern extent of study area, houses indicate the edge of the study area.  
Northern part of photo showing the area considered to be possible PAD and the dense aquatic flora.



**Photograph 5**

2009 Transect 01.  
Facing South. Central portion of study area on a flat.



**Photograph 6**

2009 Transect 01.  
Facing South.  
Eastern portion of study area on a flat.

## Photographs





**Photograph 7**

2009 Transect 01.  
Showing mixed ground cover.



**Photograph 8**

2009 Transect 01.  
Facing North.  
North eastern portion of study area in flat (no discernable slope seen here).



**Photograph 9**

2009 Transect 04.  
Facing North.  
Open depression of drainage line.

## Photographs



**Photograph 10**

2009 Transect 04.  
Facing North.  
Open depression of drainage line  
showing ground cover and deeply  
incised banks.



**Photograph 11**

2009 Transect 06.  
Facing South.  
Showing sandy bank of Myall River.

**Table 6.19** *Survey Data from 2009 Fieldwork*

Transect	Landform	Length (m)	Width (m)	Area (m <sup>2</sup> )	Visibility	Exposure	Visible area (m <sup>2</sup> )	Area available for detection (m <sup>2</sup> )	% Effective coverage
1	Flat	2480	5	12400	5%	30%	620	186.0	2%
2	Sand Dune	479	5	2395	10%	35%	239.5	83.8	4%
3	Wetland	867	5	4335	0%	0%	0	0.0	0%
4	Open Depression	315	5	1575	35%	35%	551.25	192.9	12%
5	Wetland	1073	5	5365	0%	0%	0	0.0	0%
6	Sand Dune	582	5	2910	10%	40%	291	116.4	4%
7	Wetland	354	5	1770	0%	0%	0	0.0	0%
<b>Total</b>									<b>3%</b>

The midden is spread along the south east edge of the sand dune ridge with commanding views of the Myall River. The dune system is currently stabilised by non-native grasses. While this is preventing erosion of the dune system and midden, it also obscured an accurate assessment of the midden extent. The maximum extent recorded during the survey was 80 metres in length (south westerly to north westerly direction) by 17 metres wide (north westerly to south easterly direction).

Riverside 01 is located within the 2(f) Mixed Use Residential zone but has been placed next to a minimum 10m wide buffer zone. The 10m wide buffer area is considered to be of sufficient width to protect the midden from the direct impact of the surrounding development. Riverside 01 midden is present on all the areas of raised sand dune. A 10m buffer around the raised sand dune area will ensure that the erosive processes from animal and human activities are not able to directly impact on the midden.

Middens are by nature soft sandy deposits that are easily disturbed and destroyed by simple activities such as walking and driving on them. Thus a buffer will ensure that the delicate deposit of the midden is protected from unintentional damage that can occur through increased use of this landscape. This recommended buffer zone was again confirmed in the field during the 2009 survey and agreed with the local Aboriginal community representatives.

Additional consultation was undertaken with the local Aboriginal community representatives in early 2011. KLALC confirm that they were satisfied with the outcomes and recommendations of the report (evidence of additional consultation is detailed in the Aboriginal Heritage Impact Assessment Report within *Volume 5*).

Given the abundance of vegetative cover during both the 2008 and 2009 surveys across the site, including in the vicinity of Riverside 01 midden site, and the low lying nature of many areas across the site, in particular the wetland, it is unlikely that additional survey efforts would result in greater effective coverage of the site.

During consultation undertaken in 2009, the Karuah Local Aboriginal Land Council requested that they be present during ground disturbing works at the site.

### **6.8.8** *Additional Consultation 2011*

Additional consultation undertaken in early 2011 identified that the KLALC is satisfied with the recommendations in the report, including the monitoring of ground disturbing works by the KLALC (as detailed in *Annex A* of the Aboriginal Heritage Assessment Report (*Volume 5*)).

The Aboriginal Heritage Assessment Report proposes the establishment of a keeping place for the possible containment of any cultural heritage material that is uncovered during the construction works. This dedicated keeping

place would only be required in the event that material is uncovered and would be under the care and control of the local Aboriginal community in accordance with a management plan to be prepared in consultation with the local Aboriginal community and OEH.

### 6.8.9 *Conclusion*

Two Aboriginal heritage sites, both middens, are located with the study area. The proposed development will not directly impact these Aboriginal heritage sites, however there is the potential for indirect impacts which should be mitigated. The area suggested to be a PAD in the southern part of the study area has been determined to contain no archaeological potential and therefore requires no further management or mitigation. The recommendations and commitments made in the heritage report (*Volume 5*) have been incorporated in the Statement of Commitments (see *Chapter 8*).

## 6.9 *FLORA AND FAUNA*

The biodiversity values of the study area have been re-assessed and re-mapped by Cumberland Ecology (December 2011) in accordance with the recommendations and feedback made by the PAC on the previous proposed concept plan and project application. A Biodiversity BioBanking assessment has also been undertaken by GHD (2012). The BioBanking assessment is a biodiversity impact assessment aimed at determining the quantum of biodiversity offsets that may be required to compensate for the impacts of the development. The Biodiversity BioBanking assessment demonstrates that the proposal can be implemented to achieve a no net loss outcome in accordance with the OEH (2011a) interim policy for assessment of biodiversity offsets for Part 3A Projects.

### 6.9.1 *Biodiversity Assessment*

An ecological survey in accordance with Part 3A of the *EP&A Act*, was undertaken by Cumberland Ecology (2011). The survey was undertaken to describe the biodiversity values of the subject land, particularly threatened species, populations and communities that are listed under the schedules of the *NSW Threatened Species Conservation Act 1995* (TSC Act) and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Methodology employed and key findings of the Cumberland Ecology report are summarised in the following pages. The full report is presented in *Volume 4*. Additional ecological reports incorporated in *Volume 4* include:

- Wetlands Assessment (Winning, 2009);
- Bushfire Protection Assessment Report (Conacher Environmental Group, 2011a);

- Koala Management Strategy (Conacher Environmental Group, 2011c);
- Ecological Site Management Strategy (Conacher Environmental Group, 2011d); and
- Soils Assessment (Whitehead and Associates 2011).

### *Methodology*

Preliminary background literature reviews and database searches were undertaken. Database analysis of flora and fauna records was also conducted for the surrounding locality using both the Department of Environment, Climate Change and Water (DECCW) Atlas of NSW Wildlife Database (DECCW) and the Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) Protected Matters Search Tool (DSEWPC 2010).

Several vegetation mapping studies have been conducted across the subject land and surrounds, including broad scale mapping across the Great Lakes LGA as well as fine scale mapping of the subject land. Cumberland Ecology conducted additional vegetation surveys to revise and update the vegetation mapping prepared by Conacher (2007), and ground-truthed the vegetation on the subject land to examine the condition and extent of different community types. For the purposes of this study, plant community names were determined by the dominant canopy species. Names of corresponding endangered ecological communities (EECs) and equivalent BioBanking community names have also been provided.

Cumberland Ecology conducted flora surveys in accordance with the standards provided in the (then) DEC Threatened Biodiversity Survey and Assessment Guidelines for Development and Activities (Working Draft) (DEC (NSW) 2004) and the BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECC 2009). These surveys involved the following:

- Vegetation sampling within quadrats (20m x 20m) to obtain information on floristic composition and community structure;
- Random meander surveys to detect additional flora species not recorded within the quadrats;
- Targeted searches for threatened flora known or considered likely to occur within the subject land; and
- Targeted searches for endangered ecological communities (EECs) known or considered likely to occur within the subject land.

Habitat assessments were undertaken in accordance with the methodology within the BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECC 2009). Fauna surveys have been conducted on the

subject land over the past two decades, most recently in 2007 and 2008 by Conacher. As these surveys were completed recently and were comprehensive, it was not considered necessary to undertake additional fauna surveys for the preparation of this report. Survey methods utilised by Conacher included:

- Amphibians: habitat searches, pitfall trapping, nocturnal habitat searches, opportunistic survey, call playback, spotlighting;
- Birds: opportunistic survey, winter bird survey, call playback, spotlighting;
- Mammals: trapping (ground and arboreal), pitfall trapping, hair tubes, diurnal observation, koala spot surveys, call playback, spotlighting, anabat detection, harp traps; and
- Reptiles: habitat searches, pitfall trapping, opportunistic survey, spotlighting.

#### *Existing Vegetation Communities*

Vegetation at the site is described by Cumberland Ecology (December 2011) as a mosaic of woodland, forest, heath, grassland and wetland and reflects topography, drainage and land use. The subject land is mostly low lying flat land, with slopes extending southwards from low ridgelines along the northern boundary. Nevertheless, vegetation communities on site appear to be strongly influenced by minor changes in elevation and drainage patterns that are associated with this flat landscape.


The assessment identifies three broad native vegetation groups and one exotic vegetation group as shown in *Figure 6.10*.

Within the three broad native vegetation types and the exotic vegetation group, Cumberland Ecology recognised a suite of vegetation communities that are readily distinguishable by the dominant canopy species present and these are mapped in *Figure 6.11*. Descriptions, distribution and areas of these communities are provided in the full technical report contained in *Volume 4*.

The vegetation communities occurring on the subject land vary in structure and condition as a result of previous and current land uses that include agriculture and forestry. A number of vegetation communities mapped have a structure ranging from open woodland to open forest. Previous clearing of the land has altered vegetation community structure primarily in the woodland and forest communities. Some of the original vegetation communities have been at least partially cleared and are now impacted by the current land use of cattle grazing.



**Legend**

-  Subject land
-  Dry Forest/Woodland Communities
-  Wet Forest Woodland/Scrub/Heath Communities
-  Wetland Communities
-  Exotic Communities

**Source:**  
 Riverside Tea Gardens Biodiversity Mapping  
 Report Cumberland Ecology December 2011  
 Fig 3.1

**Figure 6.10**

**Broad Community Types Recorded on the Subject Land**

Client:	Crighton Properties Pty Ltd	
Project:	Concept Plan 2011 Environmental Assessment Riverside at Tea Gardens	
Drawing No:	0043707h_CP_EA_11_C036_R0.cdr	
Date:	09/01/2012	Drawing size: A4
Drawn by:	JD	Reviewed by: SO'C
Scale:	Refer to Scale Bar	

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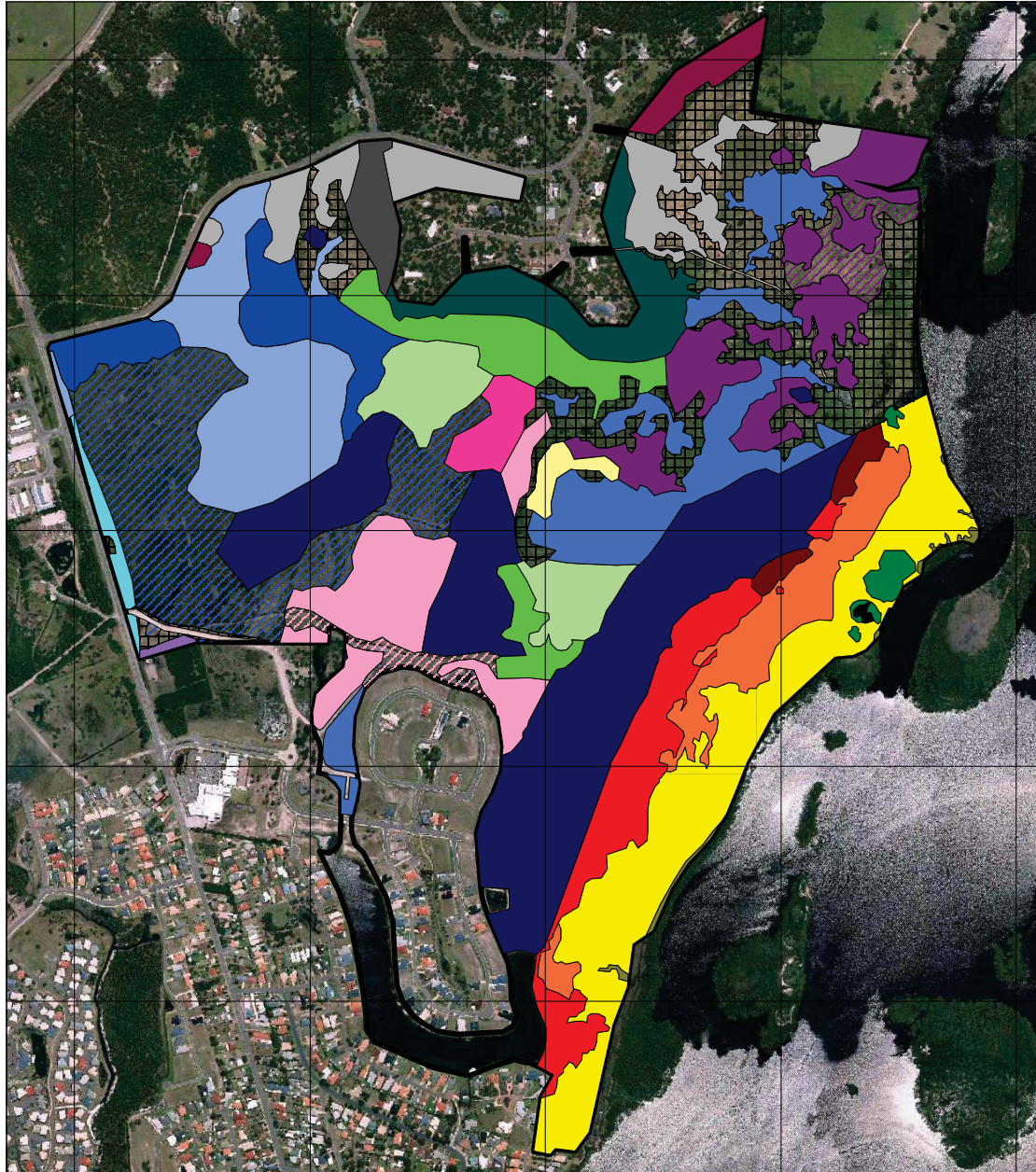


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**Legend**

Subject land

**Dry Forest/Woodland Communities**

- Eucalyptus pilularis* Open Forest
- Eucalyptus pilularis* Derived Grassland
- Corymbia maculata* - *Eucalyptus paniculata* Open Forest
- Eucalyptus umbra* Open Forest
- Eucalyptus microcorys* Open Forest
- Eucalyptus microcorys* Open Forest (*Melaleuca* regrowth)
- Eucalyptus signata* Woodland

**Wet Forest/Woodland/Scrub/Heath Communities**

- Corymbia gummiifera* Open Forest (*Corymbia gummiifera* - *Eucalyptus resinifera*)
- Corymbia gummiifera* Open Forest (*Corymbia gummiifera* - *Angophora costata*)
- Corymbia gummiifera* Derived Grassland
- Angophora costata* - *Eucalyptus resinifera* Woodland (*Angophora costata* - *Eucalyptus resinifera*)
- Angophora costata* - *Eucalyptus resinifera* Woodland (*Angophora costata*)
- Eucalyptus robusta* Woodland/Open Forest (*Eucalyptus robusta*)
- Eucalyptus robusta* Woodland/Open Forest (*Eucalyptus robusta* - *Angophora costata*)
- Eucalyptus robusta* Woodland/Open Forest (*Eucalyptus robusta* - *Eucalyptus resinifera*)
- Eucalyptus robusta* Woodland/Open Forest (*Eucalyptus robusta* - *Eucalyptus resinifera* - *Angophora costata*)
- Wet Heath
- Casuarina glauca* - *Melaleuca* Regrowth Forest
- Melaleuca quinquenervia* Forest
- Melaleuca ericifolia* Scrub

**Wetland Communities**

- Casuarina glauca* Forest
- Baumea juncea* Rushland
- Juncus kraussii* Saltmarsh
- Avicennia marina* Mangroves

**Exotic Communities**

- Pine Forest
- Exotic Grassland
- Disturbed Estuarine Vegetation

**Source:**

Riverside Tea Gardens Biodiversity Mapping  
Report Cumberland Ecology December 2011  
Fig 3.2

Suffix	Revisions	Date	Init
R0	Preliminary Issue	09-01-12	JD

**Figure 6.11**

**Vegetation Communities Recorded on the Subject Land**

Client:	Crighton Properties Pty Ltd		
Project:	Concept Plan 2011 Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707h_CP_EA_11_C037_R0.cdr		
Date:	09/01/2012	Drawing size:	A4
Drawn by:	JD	Reviewed by:	SO'C
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Of the vegetation communities recorded, several correspond floristically to the following endangered ecological communities (EECs) listed under the TSC Act:

- Swamp Sclerophyll Forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions;
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions; and
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions.

The species assemblage within Swamp Sclerophyll Forest on the subject land corresponds to the list provided within the final determination. However, in order to accurately identify all endangered ecological communities on site and determine the extent of the endangered Swamp Sclerophyll Forest community on site regard needs to be given to the NSW Scientific Committee's (2005) Final Determination for this community as directed by the PAC in their majority report.

The NSW Scientific Community Final determination on Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions identifies this EEC as associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains (Whitehead & Associates 2011).

In order to give full regard to this determination Whitehead and Associates were commissioned to assess the soil characteristics the site with respect to the classification of a vegetation community as an EEC.

Whitehead and Associates (2011) concluded that while the NSW Scientific Community Final determination on Swamp Sclerophyll Floodplain Forest identifies this EEC as associated with humic clay loams and sandy loams, the presence of these soils types does not indicate alluvial conditions. Indeed soil texture grade does not provide any indication of the origin of the soil. As such a clay loam may develop on a residual, colluvial or erosional landscape as well as an estuarine, alluvial or lacustrine environment.

The results of the soil assessment identified three soil landscape units on the site as follows:

- The southern and eastern part of the site comprises sandy soils of marine (beach barrier) or aeolian origin (Tea Gardens soil landscape). This soil landscape does not meet the conditions for the Swamp Sclerophyll Floodplain Forest EEC;

- The northern section of the site comprises clay and clay loam soils of erosional origin (Pindimar Road soil landscape) Soils of an erosional nature would not meet the edaphic and locational conditions for the Swamp Sclerophyll Floodplain Forest EEC; and
- The northwest portion of the site comprises sandy loam formed under estuarine conditions on a drained Holocene estuarine flat on a coastal sand plain. While the soils of this area have edaphic characteristics that meet the Swamp Sclerophyll Floodplain Forest EEC definition and this area is waterlogged at times the soils represent those of a distinctly different depositional setting to an alluvial environment.

Based on this soils assessment and a number of recent Land and Environment Court (LEC) decisions, Swamp Sclerophyll Forest is not considered as occurring above the 1-in-100 year flood line. Endangered Ecological Communities recorded on the subject lands, as mapped by Cumberland Ecology, are shown in *Figure 6.12*. Three EECs were determined by Cumberland Ecology to be present on the site. These are:

- Swamp Sclerophyll Floodplain Forest;
- Swamp Oak Floodplain Forest; and
- Coastal Saltmarsh.

The total area of EEC on site is 66 Ha, however, only 3.1 Ha of EEC is likely to be directly impacted by the proposed development.

#### *Flora*

Over 500 flora species have been recorded on the subject land, with approximately 85% of the species being native. The plant species that dominate the major forest and woodland types are relatively consistent between the earlier surveys. No threatened flora species have been detected within the subject land. A number of threatened flora species are known from the locality, however given the extensive flora surveys undertaken on the subject land, most of these species are considered as having a low potential to occur.

#### *Fauna*

Vegetation within the subject land provides potential habitat for a range of native vertebrate fauna species, including amphibians, birds, terrestrial and arboreal mammals, bats and reptiles. Key habitat features recorded during the current surveys included:

- Wetland and riparian environments which provide habitat for wetland birds, frogs and reptiles;






- Ground cover, leaf litter and fallen timber suitable as shelter for small terrestrial fauna species;
- Tree hollows suitable as shelter and nesting habitat for a range of hollow dependant fauna;
- Koala feed tree species; and
- Blossom-producing trees suitable for foraging for a range of nectivorous species.



**Figure 6.12**

**Endangered Ecological Communities Recorded on the Subject Land**

**Legend**

-  Subject Land
-  1-in-100 year Flood Line
-  Swamp Sclerophyll Floodplain Forest
-  Swamp Oak Floodplain Forest
-  Coastal Saltmarsh

**Source:**

Riverside Tea Gardens Biodiversity Mapping Report Cumberland Ecology December 2011 Fig 3.3

Client:	Crighton Properties Pty Ltd	
Project:	Concept Plan 2011 Environmental Assessment Riverside at Tea Gardens	
Drawing No:	0043707h_CP_EA_11_C038_R0.cdr	
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Fauna surveys of the subject land have resulted in the detection of over 200 vertebrate species. This includes 20 amphibian, 125 bird, 43 mammal and 15 reptile species. A number of threatened fauna species listed under the TSC Act and EPBC Act are known to occur within the locality. The following threatened fauna have been recorded on the subject land with the recorded locations shown in *Figure 6.13*:

- Wallum Froglet (*Crinia tinnula*);
- Varied Sitella (*Daphoenositta chrysoptera*);
- Little Lorikeet (*Glossopsitta pusilla*);
- Black Bittern (*Ixobrychus flavicollis*);
- Osprey (*Pandion haliaetus*);
- Barking Owl (*Ninox connivens*);
- Squirrel Glider (*Petaurus norfolcensis*);
- Koala (*Phascolarctos cinereus*);
- Grey-headed Flying-fox (*Pteropus poliocephalus*);
- Common Blossom-bat (*Syconycteris australis*);
- Little Bentwing-bat (*Miniopterus australis*);
- Eastern Bentwing-bat (*Miniopterus screibersii oceanensis*);
- Eastern Freetail-bat (*Mormopterus norfolkensis*); and
- Greater Broad-nosed Bat (*Scoteanax rueppellii*).

All these species are listed as Vulnerable under the TSC Act. The Koala also forms part of an endangered population in the Hawks Nest and Tea Gardens area. The Grey-headed Flying-fox is also listed as Vulnerable under the EPBC Act.

#### *Wildlife Corridors*













The subject land has been mapped as forming part of a regional corridor and as a key habitat area. The subject land forms part of the Nerong – Pindimar regional corridor, which provides a link between Nerong Waterholes and Kirks Knoll (Scotts 2003). The regional corridor extends from the west to north east and covers the central and northern thirds of the subject land. Detailed examination of the vegetation and landscape of the subject land indicates several potential local movement corridors for wildlife as shown in *Figure 6.14*.



**Figure 6.13**

**Locations of Threatened Fauna Species Recorded on the Subject Land**

**Legend**

-  Subject Land
-  Wallum Froglet Call Locations
-  Osprey 2007
-  Squirrel Glider 2002
-  Squirrel Glider 2004
-  Barking Owl Call Area 2008
-  Eastern Bentwing-bat 2002
-  Greater Broad-nosed Bat 2002
-  Eastern Freetail-bat 2004
-  Little Bentwing-bat 2004
-  Little Bentwing-bat 2008
-  Grey-headed Flying-fox 2008

**Source:**

Riverside Tea Gardens Biodiversity Mapping Report Cumberland Ecology December 2011 Fig 3.4

R0	Preliminary Issue	09-01-12	JD
Suffix	Revisions	Date	Init

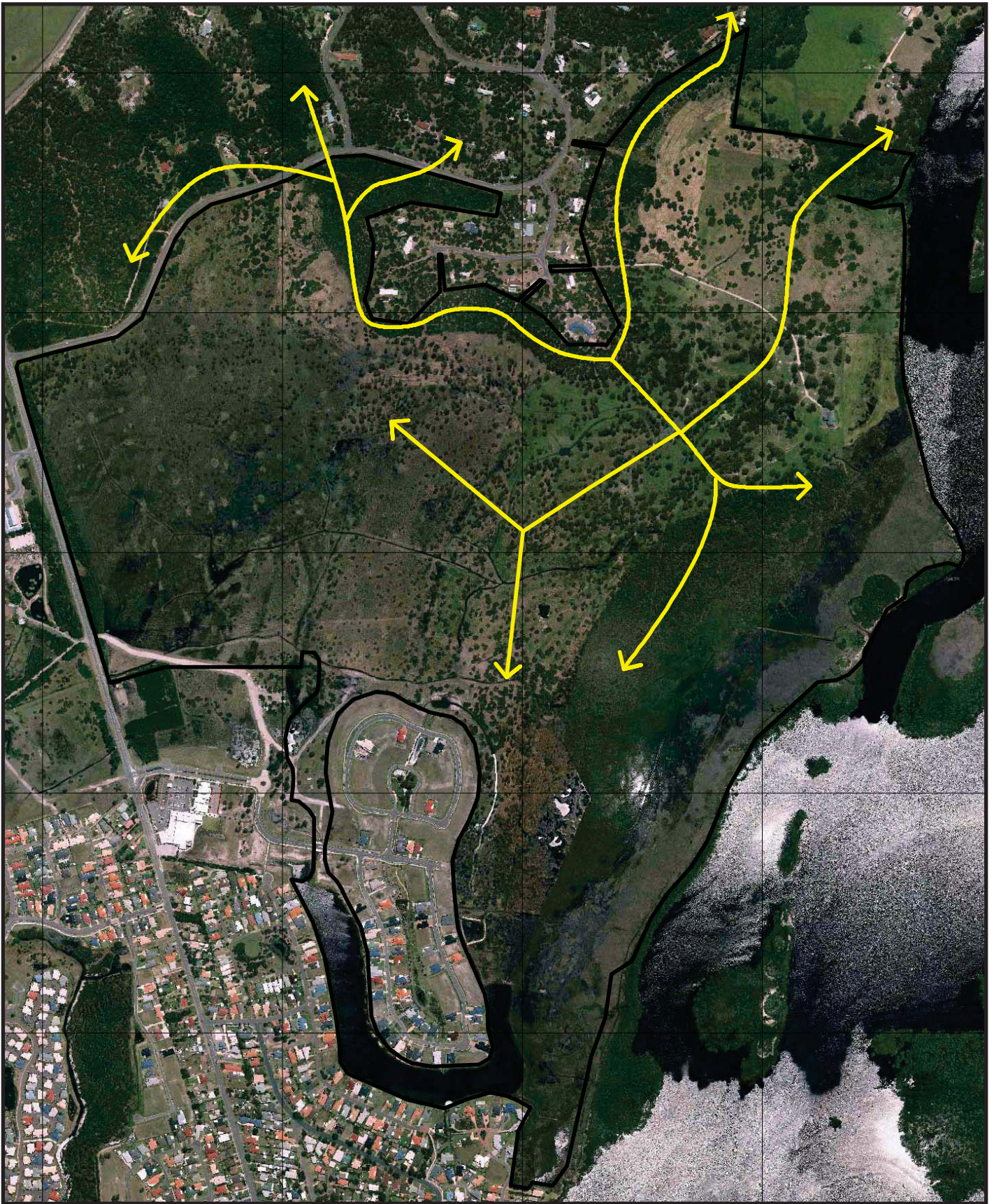
Client:	Crighton Properties Pty Ltd		
Project:	Concept Plan 2011 Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707h_CP_EA_11_C039_R0.cdr		
Date:	09/01/2012	Drawing size:	A4
Drawn by:	JD	Reviewed by:	SO'C
Scale:	Refer to Scale Bar		





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**Legend**

-  Subject Land
-  Local Movement Corridor A

**Source:**  
 Riverside Tea Gardens Biodiversity Mapping  
 Report Cumberland Ecology December 2011  
 Fig 3.6

R0	Preliminary Issue	09-01-12	JD
Suffix	Revisions	Date	Init

**Figure 6.14**

**Potential Local Movement Corridors for Wildlife Occurring on the Subject Land**

Client:	Crighton Properties Pty Ltd		
Project:	Concept Plan 2011 Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707h_CP_EA_11_C040_R0.cdr		
Date:	09/01/2012	Drawing size:	A4
Drawn by:	JD	Reviewed by:	SO'C
Scale:	Refer to Scale Bar		

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The biodiversity mapping assessment concludes that the subject land contains endangered ecological communities, known habitat for threatened fauna species and potential habitat for threatened flora and fauna and that future development of the site would be required to consider the impacts to biodiversity, including species, populations and communities listed under the TSC Act and EPBC Act.

#### *Wetland*

The subject land is located 150-610m east of the adjacent portions of the Myall Lakes National Park and 2.3km south west of the continuous portion of the National Park. The National Park was established in 1972 and encompasses an area of 47,593ha (DECCW 2011). Myall Lakes National Park extends from the towns of Tea Gardens and Hawks Nest in the south to Smiths Lake in the north. Activities permitted within the park include camping, cycling, fishing and sailing. Myall Lakes National Parks includes the Myall Lakes Ramsar Wetland.

The subject land is located immediately adjacent to portions of the Port Stephens – Great Lakes Marine Park. This Marine Park was established in 2005 and encompasses an area of approximately 98,000ha. The Marine Park extends from near Foster south to the northern end of Stockton Beach and includes offshore waters to the 3 nautical mile limit of state waters. Included within this area is the Karuah River, the Myall River, Myall and Smiths Lakes and all their creeks and tributaries to the tidal limit. The zoning for the Marine Park allows for multiple use and protects marine habitats and species while catering for a wide range of sustainable activities (Marine Parks Authority 2011). The portion of the Marine Park immediately adjacent to the subject land has been zoned General Use, and a small area to the south of this as Habitat Protection.

The subject land is located 1.7km north east and 2.3km south west of the Myall Lakes Ramsar Wetland (Australian Ramsar site number 52). The Myall Lakes Ramsar

Wetland was listed in 1999 and encompasses an area of 44,612ha. The wetlands are located between the villages of Hawks Nest and Tea Gardens to the south and Forster to the north (DSEWPC 2011). Of the nine criteria for identifying wetlands of international importance, Myall Lakes Ramsar Wetland meets the following:

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region;

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities; and

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Approximately 49ha of wetland / wetland buffer occurs on site, and which would be retained and protected in recognition of their local and State significance. More than half of the wetland reserve is covered by *State Environmental Planning Policy 14 - Coastal Wetlands* (SEPP 14), and virtually all of the wetland area supports ecological communities that are listed as endangered under the TSC Act (Winning, 2009) (refer to *Volume 4*).

The Wetland Assessment undertaken by Geoff Winning from Hunter River Wetlands Pty Ltd was prepared in 2009 and is included as Annex C of Cardno 2011. This report documents the results of investigations into the existing wetland on the Riverside at Tea Gardens site and makes appropriate recommendations having regard to the Concept Plan and Project Application which were in existence at that time.

The Concept Plan for Riverside was substantially modified in 2011. One of the most significant modifications was the decision to specifically exclude the construction of a new channel connecting the Myall Quays artificial waterbody and an existing drain leading to the Myall River. The current Concept Plan therefore does not include any works within the SEPP 14 wetland and as such the predicted drawdown is less than originally expected and reported by Geoff Winning.

Sadly Geoff Winning passed away during 2010 and Hunter River Wetlands Pty Ltd is no longer an operating consultancy. This report was thus unable to be updated by its author to reflect the modifications to the Concept Plan. However, the ecological and hydrological assessments undertaken by Cumberland Ecology (2011), GHD (2012), Cardno (2011) and Martens and Associates (2011) respectively have assessed the latest Concept Plan, including an assessment of impact on the SEPP 14 wetland vegetation communities. These communities have been based on the surveys and investigations documented in the Wetland Assessment prepared by Hunter River Wetlands Pty Ltd in 2009.

#### *Fishing and Aquaculture*

A number of studies have been undertaken to gauge the health and diversity of the fish community of the existing artificial lake. These studies include a survey which was undertaken in April 2007 and form part of a series of biological studies to record the aquatic ecological development of the lake (Harris Research, 2007) (refer to *Volume 4*). Survey results from 2007 indicate that the number of fish species and individual fish have increased from previous studies. In comparison, the distribution patterns and occurrence of aquatic plants in the lake were similar to those recorded in 2002.

The 2007 report found evidence of increasing biological diversity and abundance of fish activity which indicates that the lake is continuing to develop towards a sustainable aquatic system. The report indicated that habitat conditions, water quality and the food web are continuing to develop, indicating that the lake is supporting higher numbers of fish stock and is exhibiting increasing productivity.

The Department of Primary Industries' (DPI) Oyster Industry Sustainable Aquaculture Strategy (OISAS) (DPI, 2006) identifies current active oyster leases in close proximity to the Riverside development that need to be protected. Water discharge from the Riverside development needs to be managed in order to minimise potential impacts on the oyster leases. Active oyster leases in proximity to the Riverside site are due to be phased out by 2018, being the end of the current lease period. The leases may be active at any point in time between now and the end of the lease period and therefore the potential impact of the Riverside development on the oyster leases due to water discharge from the site needs to be assessed and mitigated.

The Riverside at Tea Gardens development incorporates a water treatment train, including the use of ponds and artificial wetlands to minimise water quality impacts from the proposed development. The IWCM identifies water quality objectives, as well as mitigation and monitoring measures to be implemented to manage stormwater at the site. Given these water management initiatives it is not anticipated that there will be any water quality impacts within the Myall River and therefore the oyster leases will not be negatively impacted in any way.

## 6.9.2 *Biodiversity BioBanking Assessment*

The Project will result in impacts on native biota. A Biodiversity BioBanking Assessment was undertaken by GHD (December 2012) in order to quantify the development impact following the detailed mapping undertaken by Cumberland Ecology (December 2011). The assessment has been prepared by GHD to assist with planning the layout of the development, to assess the biodiversity impacts and to estimate the quantum of biodiversity offsets that may be required to compensate for impacts arising from the development and to provide a biodiversity offset strategy.

This BioBanking assessment process has been applied to multiple development scenarios for the Project to optimise the balance between development and conservation footprints within the study area, including:

- The original development footprint, based on the original concept design for the study area in November 2009;
- The Planning Assessment Commission (PAC) footprint based on the results of site observations from relevant approval authorities;

- An amended development footprint (February 2011) based on the results of the Cumberland Ecology assessment (Feb 2011); and
- The proposed development footprint, developed with specific reference to the supplementary GHD site survey data and detailed mapping to minimise impacts on native biodiversity.

The assessed development footprints are shown in *Figure 6.15*.

### *BioBanking*

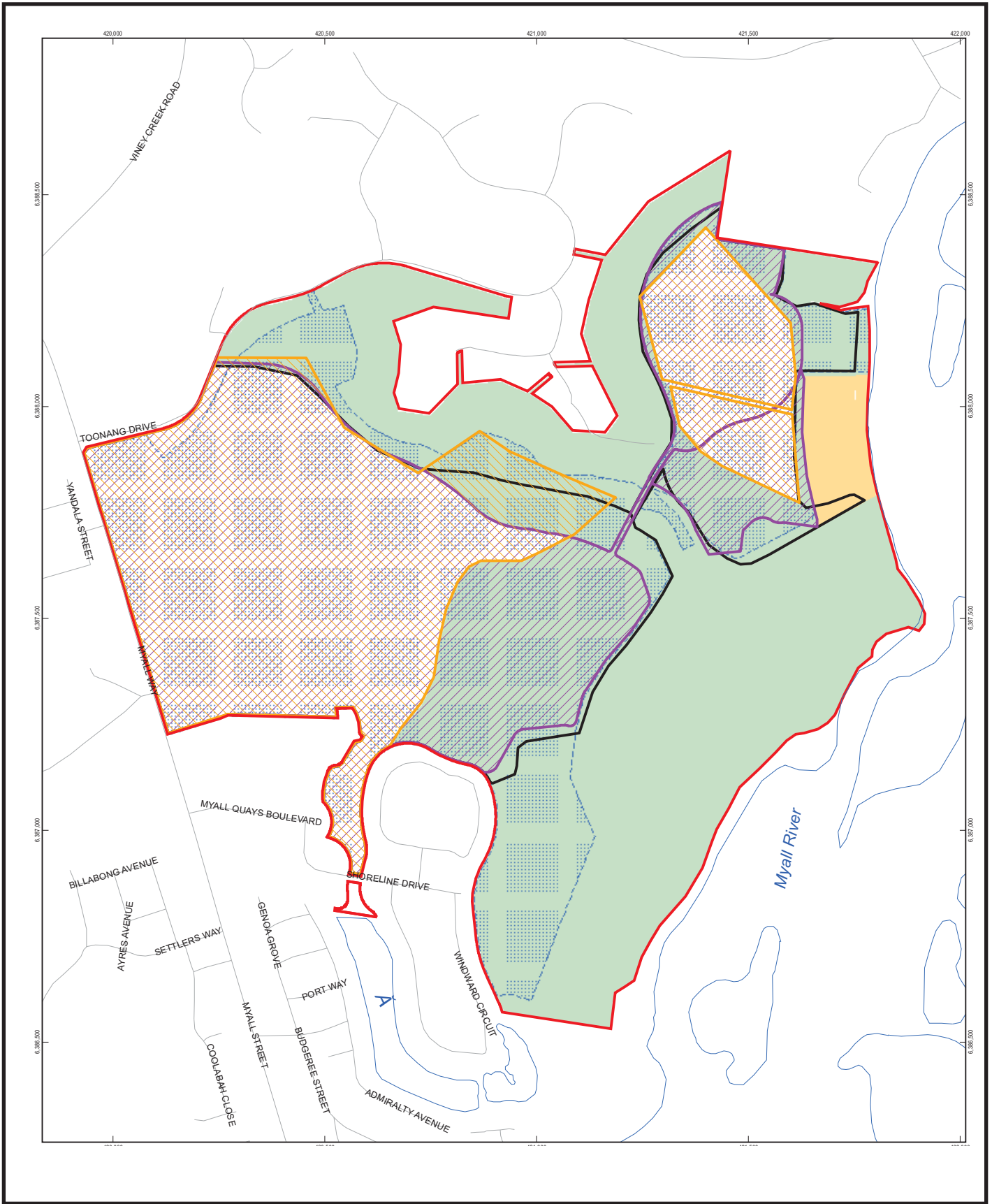
The NSW Biodiversity Banking and Offsets Scheme (BioBanking) has been established by the NSW Office of Environment and Heritage (OEH) to help address the loss of biodiversity and threatened species. BioBanking is a component of Part 7A of the *NSW Threatened Species Conservation Act 1995* (TSC Act) and is administered by OEH. To complete the legal framework, the *Threatened Species Conservation (Biodiversity Banking) Regulation 2008* establishes specific aspects of the scheme that are important for its smooth operation. The scheme attempts to create a market framework for the conservation of biodiversity values and the offsetting of development impacts. The scheme is currently voluntary.

BioBanking operates on an ‘*improve or maintain*’ principle and includes a methodology for calculating offset ratios, trading biodiversity values and protecting areas with higher conservation values. The BioBanking methodology is the preferred mechanism for determining biodiversity offsets of major projects assessed under the EPA Act (OEH, 2011a). The BioBanking methodology does not strictly apply to Part 3A Projects; however the OEH (2011a) interim policy provides a framework for determining biodiversity offsets for Part 3A Projects using a modified form of the BioBanking methodology.

### *BioBanking Assessment Methodology*

Cumberland Ecology (2011) vegetation mapping was reviewed by GHD through additional site survey. Vegetation types and extent were re-evaluated, described and matched to OEH (2011b) NSW Vegetation Types with BioBanking condition classes.

Vegetation condition was re-interpreted on the basis of the revised vegetation mapping and typing. Vegetation descriptions published by HCCREMS (2009) were used as the basis for defining cover for canopy, mid and ground cover strata.



- Legend**
- Study Area
  - Original Development Footprint
  - Proposed Development Footprint
  - Amended Development Footprint
  - Future Development
  - PAC Boundary
  - Potential Biobank Sites

**Source:**  
 GHD - Crighton Properties Pty Ltd  
 Biobanking Assessment December 2011  
 No.22-15960 B 22/12/2011 Fg 2

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Suffix	Revisions	Date	Init

**Figure 6.15**  
**Development and Biobank Options**

Client:	Crighton Properties Pty Ltd		
Project:	Concept Plan 2011 Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707h_CP_EA_11_C041_R0.cdr		
Date:	09/01/2012	Drawing size:	A4
Drawn by:	JD	Reviewed by:	SO'C
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*Biodiversity credits were estimated with reference to the methodology presented in the DECC (2009) BioBanking Assessment Methodology and Credit Calculator Operational Manual.*

The BioBanking assessment methodology has been used to estimate the quantum of biodiversity offsets required for the Project as follows:

- Review of Cumberland Ecology (2011) vegetation mapping and preliminary BioBanking Assessment;
- Preliminary site survey of the study area using the BioBanking plot/transect methodology to refine the mapping of vegetation condition across the site and to collect site value data for each vegetation type;
- Application of the BioBanking methodology to each of the four potential development footprint options to determine impacts of the development and associated offsetting requirements in terms of biodiversity credits;
- Application of the BioBanking methodology to the remaining portions of the study area outside of the four potential development footprint options that would be set aside as a biobank and managed for conservation;
- Comparison of the credit profiles of the development sites and biobank sites to assess whether the on-site biobanks are appropriate to offset biodiversity impacts of the Project;
- Comparison of four Development/Conservation Footprint Options to determine which would result in the optimum balance between development and conservation outcomes (i.e. a balance between development credits required and biobank credits generated); and
- Estimation of the size and type of additional biobank site(s) that would be required to generate appropriate biodiversity credits to offset residual impacts of the Project.

The main inputs to the BioBanking assessment are described in the GHD (2012) BioBanking Assessment contained in *Volume 4*.

### *Impacts*

GHD (2012) determined that development has been largely proposed over lands in low to moderate condition with vegetation in better condition largely present within the proposed biobank sites. The orientation of developments to biobanks would result in changes in the landscape through changes to the primary link, total vegetation cover and associated vegetation condition.

Changes in site biodiversity values through the development of a site is the basis for calculation of biodiversity credits required to offset impacts. For the purposes of this assessment it is assumed that vegetation and habitat would be completely removed within the development area. Complete clearing of

vegetation for a development reduces the site values to zero. There are certain circumstances where portions of a development are managed such that some site value is retained. These circumstances include asset protection zones where only partial vegetation removal may be required. As such the assessment is considered to be conservative.

Changes in site biodiversity values through management of a biobank site are the basis for calculation of biodiversity credits that would be available to offset the impacts of a development. The credit calculations include a default gain in site value based on the standard management of a biobank site. There are certain circumstances where a biobank is managed such that there would be a greater increase in site value, for example intensive bush regeneration and tree planting. For the purposes of this assessment it is assumed that the entire biobank sites will be subject to standard management.

The impacts resulting from the proposed development are presented in *Table 6.20*. GHD calculated that the proposed development would result in the clearing of up to 94.4 ha of vegetation within the development footprint. The proposal would also preserve 105.14 ha of native vegetation and result in a Biodiversity BioBanking deficit of 2820 credits that would require off site offsetting. A comparison of the biodiversity impacts of the proposed development with the PAC suggested developable area and previously proposed developments is provided in *Section 8.8*.

**Table 6.20 Biodiversity Credit Summary for Proposed Development Footprint and Biobanks**

Vegetation Type	Area Impacted	Credits required	Area retained (East and West combined)	Credits generated	Credit Balance
Saltmarsh in estuaries of the Sydney Basin and South East Corner			16.83	105	105
Coastal freshwater lagoons of the Sydney Basin and South East Corner	0.58	23	16.6	157	134
<i>Melaleuca sieberi</i> - Tall Saw-sedge closed shrubland in drainage lines on the Central Coast, Sydney Basin	33.15	1573	0.43	3	-1570
Swamp Mahogany swamp forest on coastal lowlands of the North Coast and northern Sydney Basin	17.4	648	23.94	207	-441
Blackbutt - Smooth-barked Apple shrubby open forest on coastal sands of the southern North Coast	40.06	1327	26.42	242	-1085
Blackbutt - Tallowwood dry grassy open forest of the southern North Coast	3.21	104	8.81	64	-40
Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin			9.33	58	58
Mangrove forest in estuaries of the Sydney Basin and South East Corner			0.23	1	1
Swamp Oak swamp forest fringing estuaries, Sydney Basin and South East Corner			1.22	7	7
Paperbark swamp forest of the coastal lowlands of the North Coast and Sydney Basin			1.33	11	11
<b>Totals</b>	94.4	3675	105.14	855	-2820
Koala population	50	602	33.5	201	-401
Wallum Froglet	8.8	117	42.5	255	138

1. Adapted from Table 8 of GHD 2012 Riverside at Tea Gardens BioBanking Assessment..



### *Wetland*

Developments adjacent to wetlands also have the potential to indirectly affect the wetland communities in a number of ways:

- changes in quantity and quality of surface and groundwater flows into the wetlands, assessed in *section 6.7*;
- human pedestrian and vehicular intrusion; and
- general 'edge effects', including:
  - predation of native fauna by domestic cats and dogs;
  - 'light spill' of street lights which can affect the behaviour of native animals;
  - dumping of rubbish and garden refuse;
  - 'weed creep' from lawn grasses, etc.; and
  - mowing of wetland margins (Winning, 2009).

### *Wildlife Corridors*

The Riverside project will reduce the widths of potential local movement corridors for wildlife, constituting dispersal, foraging and nesting habitat for a range of fauna groups, particularly birds and small-medium sized mammals. The local movement corridors most impacted by the Riverside project are those connecting the denser vegetation in the south eastern portion to the vegetation along the northern boundary.

The proposed development/conservation footprint provides an 'east-west corridor' of a minimum 200 m wide ensuring suitable connection of the conservation lands in the east of the development to areas of high conservation values to the north and west. The proposed development also provides a minimum 410 m wide corridor along the Myall River in the east of the site through until the cleared area of the north east corner.

The development/conservation footprint proposed for the north-eastern corner of the study area has been designed to consider the new zoning plan and proposed development under the comprehensive Great Lakes Council LEP including:

- providing vegetated corridors to the west and along the riparian zone of the Myall River that integrate with those proposed immediately to the north. This approach ensures the Riverside development will not reduce the width of these corridors to a distance less than that immediately north of the site.

- Conserving the large 'patch' of vegetation in the far north-eastern corner of the site. This 'patch' will be connected to a riparian corridor to the north of the site as proposed in the comprehensive LEP. Opportunities for connecting this vegetation with the conservation area to the south will be considered during the future development application associated with this area.

### 6.9.3 *Mitigation Measures and Offsets*

#### *Ecological Site Management Strategy and Integrated Water Management Plan*

An Ecological Site Management Strategy (Conacher Environmental, 2011d) (refer to *Volume 4*) has been developed for the site to mitigate the impacts of the Riverside project on biodiversity. This strategy includes the minimisation of impacts to retained communities and improvement of the biodiversity values of retained vegetation.

To address the potential impacts to the SEPP 14 Wetland and adjacent wetland buffer, an Integrated Water Management Strategy has been developed (Cardno, 2011) (refer to *Volume 3* of EA) to manage the groundwater and surface water flows. The management of the groundwater and surface water flows should mitigate any impacts on the wetlands resulting from the potential pollutants identified.

#### *Wetland Management Plan*

The Wetland Assessment prepared by Winning (2009) (provided in *Volume 4*) recommends the preparation of a Wetland Management Plan which would include:

- a description of measures to be adopted to protect the wetland during subdivision construction;
- measures to control human access into wetland areas;
- a monitoring program to confirm that the proposed development and associated works do not have adverse effects on the wetlands; and
- an adaptive management framework that can permit response to any unanticipated impacts on the wetlands.

#### *Koala Habitat Management*

The impacts on Koala habitat have been included in the credit calculations and the development will need to retire the appropriate number of species credits to adequately offset this impact. Both the onsite and offsite biobanks would need to provide suitable Koala habitat. Should both the onsite and

offsite biobank sites be conserved via a BioBanking agreement then the rehabilitation and management of these areas would be in accordance with a BioBanking Management Actions Plan (MAP).

If the on-site biobank is conserved via a different mechanism then the area would be managed in accordance with the Koala Management Study (Conacher, 2011) included in *Volume 4*. This study has been prepared considering the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (2003) and the Draft Recovery Plan for the Koala (2007). Similarly, if the off-site biobank is conserved via a different mechanism then similar management activities, as described in the Koala Management Study (Conacher, 2011), would need to be applied.

#### *Avoidance Measures*

The proposed development has been sited and designed to avoid, where possible, significant vegetation on the site. The design of the subdivision subsequently went through several layout changes as a greater understanding of the sites constraints was attained, these included:

- Reducing the extent of the development within the northern portion of the site to provide for a wider wildlife corridor in this area of the site. The proposed corridor will be a minimum 200 m wide;
- Removing development previously proposed in the south-eastern portion of the site creating a much larger conservation area in the east. This also creates a much wider and continuous corridor along the Myall River with a minimum width of 410 m;
- Reducing the extent of the proposed tourism development in the north-eastern corner of the site adding further lands for conservation and increasing the extent of the corridor adjacent to the Myall River; and
- Removing the previously proposed basin from the far north-eastern corner of the site and increasing the area of conservation. This vegetation will be connected to a riparian corridor to the north as proposed in the Great Lakes City Council comprehensive Local Environment Plan template.

#### *Mitigation Measures*

A number of mitigation measures are proposed for the Riverside project, including changes in land uses and ownership, maintenance and creation of habitat features, management of hydrology and management of retained vegetation. In addition to these measures, a Koala Plan of Management (refer to *Volume 4*) has been prepared for the subject land. Key mitigation measures include:

- Locating Asset Protection Zones (APZ) between the built form and areas of native vegetation to the west of the site. The APZs will provide a management buffer between these land uses;
- Minimising clearing within the APZ to maintain existing vegetation (as far as possible);
- Maintaining native vegetation within the APZs within fuel load requirements. This generally means maintaining these areas with a discontinuous canopy, a maximum of 25% of the lower storey with the remaining areas 'slashed';
- Utilising a 'ring road' network, integrated with the APZs, to help provide a management buffer between the development and conservation areas;
- Incorporating drainage line systems throughout the site that will be rehabilitated with native species. Tree retention will also be a priority for these areas;
- Preparation of a vegetation management plan (VMP) addressing weed management, rehabilitation and replanting of native vegetation throughout the drainage line network;
- Preparation of a detailed landscaping plan using endemic species;
- Preparation of a habitat tree management plan for the subject site that identifies important habitat trees to be retained, recruitment trees to provide long-term replacement hollows, possible tree replanting areas and management measures to protect habitat resources from future potential issues relating to human safety and senescent trees etc. This plan will apply to such areas as:
  - The drainage line network;
  - Proposed pocket parks;
  - The streetscape; and
  - Public recreation areas;
- Implementing appropriate stormwater and erosion control activities;
- management of the retained vegetation under community title;
- provision of feed trees within the development footprint;
- provision of nest boxes within retained vegetation;
- creation of alternate frog habitat within the development footprint;
- revegetation and management of corridor areas;

- implementation of an Integrated Water Management Plan;
- implementation of an Ecological Site Management Strategy; and
- implementation of a Koala Management Strategy.

*Compensatory Measures:*

Despite the aforementioned avoidance measures and mitigation measures, there would be a net loss of native vegetation as a result of the project. To offset this, compensatory measures are proposed on and off site so as to add to the conserved land in the locality and offset the ecological impacts of the proposed development.

A preliminary Biodiversity Offset Strategy has been prepared by GHD (2012) and is included as part of the Biodiversity Biobanking Assessment in *Volume 4*. This Offset Strategy outline the approach proposed to be taken to ensure a 'no net loss' of biodiversity outcome can be achieved. A commitment has been included in the draft statement of commitments to develop and implement the Biodiversity Offset Strategy in consultation OEH and DP&I subject to development approval.

Based on the GHD (2012) biodiversity credit estimates provided in *Table 6.20*, the proposed development footprint would require the following:

- The retirement of approximately 855 ecosystem credits associated with the conservation and management of approximately 104 ha within the study area;
- The purchase and retirement of approximately 2820 additional ecosystems credits associated with an offsite biobank anticipated to be between 260-360 ha in area;
- The retirement of approximately 201 Koala population species credits and approximately 117 Wallum froglet species credits; and
- The purchase and retirement of approximately 401 additional Koala population species credits associated with an offsite biobank.

The onsite biobanks would contribute a suitable 'like for like' contribution to the BioBanking assessment since it will achieve conservation outcomes within an area approximately equal in size to the development area and within the same overall patch of native vegetation and habitat. Local populations of native species, including threatened biota that will be affected by the Project will directly benefit from the regeneration of degraded land in the study area. Further, the most valuable wetland and estuarine habitats within the study area would be conserved via the conservation of a riparian corridor adjoining the Myall River.

The BioBanking methodology when applied using the OEH (2011a) interim guidelines dictates the required location and vegetation types that must be conserved off site to achieve the *maintain or improve* outcome. The results of the BioBanking assessment indicate two vegetation types, *Melaleuca sieberi - Tall Saw-sedge closed shrubland in drainage lines on the Central Coast, Sydney Basin* and *Blackbutt - Smooth-barked Apple shrubby open forest on coastal sands of the southern North Coast* are significantly in deficit and would be the focus of the offset site secured.

The major projects interim guidelines recognise the inherent difficulties in finding offset sites which include every vegetation type impacted by such a development. The guidelines allow the applicant to focus on the minimum number of credits required from habitats of similar ecological values. For those vegetation types where a shortfall remains, the OEH can request additional credits be 'retired' to compensate for any such shortfall. These matters will be discussed with OEH during detailed assessments of potential offset sites.

The offset sites secured will also need to provide enough suitable habitat for the Koala population to neutralise the current species credit deficit.

The methodology also dictates the general location of the offset site and in the case of the Tea Gardens development the site will need to be secured between the Hunter and Macleay River catchments.

A number of potential offset sites have been investigated by GHD and would be further assessed in consultation with the OEH and DP&I.

Approval is being sought for the biodiversity offsets to be delivered in a three stage approach as follows:

Stage 1 - Finalisation of Biodiversity BioBanking Offset Strategy which identifies the quantum of total offsets required within three months of Development Approval for stage 1 of the project. The strategy will determine the quantum of offsets to be delivered on site and off site with corresponding management actions (specific off site offset sites will not be identified at this stage).

Stage 2 - Implementation and delivery of on site biodiversity offsets including drafting and implementation of management plans and retirement of BioBanking credits prior to release of Construction Certificate for Stage 1.

Stage 3 - Implementation and delivery of off site biodiversity offsets including drafting and implementation of management plans and identification, purchase and retirement of BioBanking credits prior to release of Construction Certificate for Stage 5.

It is acknowledged that the timings proposed have been brought forward from those identified in the GHD (2012) BioBanking Assessment. This is a direct result of consultation with the DP&I and the need to ensure that offset

sites are secured prior to any construction impacts occurring in relation to the proposed development. A Statement of Commitments to implement the three stage approach to offsetting is included in the draft statement of commitments presented in *Chapter 9*.

It is anticipated that securing onsite conservation lands would allow approval of construction of stages 1, 2, 3 and 4 (in accordance with the Riverside Staging Plan, November 2011) of the development to commence. The estimated credit value of the onsite biobank would be sufficient to offset this initial impact.

The remaining development could then be approved for construction once the offsite conservation lands are secured.

This approach would:

- Ensures that onsite conservation lands and obligations are secured at the commencement of the project;
- Allows the initial stages of the development to commence quickly providing the project with immediate cash-flow which would assist funding off site biobanks;
- Allows the initial stages of the project to commence while investigations into suitable off site conservation lands are underway thereby not delaying the commencement of the project until all offsets required are secured; and
- Assist in providing the necessary resources to secure the required off site conservation lands.

#### *Fish Communities and Aquaculture*

The Fish Community report recommended that the previous recommendations contained within the Harris Report (2007), should be adopted. Previous recommendations include increasing the amount and quality of aquatic habitats with respect to increasing the extent, complexity and quality of near-shore habitats for fish, invertebrates and birds. These recommendations for optimising the quality of aquatic habitats, which are incorporated in current proposals to extend the lake area, include:

- influencing the water-quality regime to increase habitat diversity and stability;
- continuing effective management of the series of runoff-treatment ponds;
- increasing variability of depth profiles by introducing physical structures such as submerged logs, rockwork or other artificial reefs;
- experimentally introducing indigenous submerged and emergent aquatic plants and planting littoral trees, shrubs and grasses; and

- introducing shoreline complexity in newly created waterway areas.

The proposed development at Riverside will ensure that a high standard of water quality is maintained, thereby ensuring the attractiveness of the lake as a fish breeding area.

The Riverside development incorporates a water treatment train, including the use of ponds and artificial wetlands to minimise water quality impacts from the proposed development. The IWCM identifies water quality objectives, as well as mitigation and monitoring measures to be implemented to manage stormwater at the site. Given these water management initiatives it is not anticipated that there will be any water quality impacts within the Myall River and therefore the oyster leases will not be negatively impacted in any way.

#### 6.9.4 Conclusion

OEH and DP&I consider the merits of biodiversity offsets strategies against the DECC (2008) Principles for the use of biodiversity offsets in NSW. **Table 6.21** summarises the alignment of the BioBanking assessment approach to the offsets strategy with the DECC (2008) offsetting principles.

**Table 6.21 Comparison of the BioBanking assessment with the DECC (2008) Offsetting Principals**

DECC (2008) Principles for the use of biodiversity offsets in NSW	Attributes of offset package
<i>Impacts must be avoided first by using prevention and mitigation measures.</i>	The approach to avoidance and mitigation of impacts is presented in ERM (2011). There are unavoidable impacts on native vegetation as a result of the balance between a viable development footprint and conservation areas.
<i>All regulatory requirements must be met.</i>	An Environmental Assessment (ERM, 2011) incorporating an ecological impact assessment (Cumberland Ecology, 2011) was prepared for the Project in accordance with regulatory requirements and appropriate guidelines.
<i>Offsets must never reward ongoing poor performance.</i>	The proposed offset sites have not been deliberately degraded or mismanaged. The biobank site is undeveloped open space containing predominantly intact native vegetation. There has been some vegetation clearing and minor environmental degradation of the site through routine agricultural and recreational activities.
<i>Offsets will complement other government programs.</i>	The BioBanking assessment has been prepared using the BioBanking methodology and accordingly complements OEH and the NSW Governments' approach to biodiversity conservation. It complements other government programs and biodiversity conservation initiatives, in general, by contributing to regional habitat connectivity, managing weed and pest species and conservation of over cleared vegetation types and threatened species habitat.
<i>Offsets must be underpinned by sound ecological principles.</i>	The preparation of the BioBanking assessment, including identification of the proposed biobanks, was underpinned by



DECC (2008) Principles for the use of biodiversity offsets in NSW	Attributes of offset package
<i>Offsets should aim to result in a net improvement in biodiversity over time.</i>	the DECC (2009) BioBanking methodology and OEH (2011a) offsets policy. The proposed Offset Package would result in a net improvement in biodiversity values over time because it has been developed with the BioBanking methodology and associated management actions for biobank sites. Specifically improvements would result through assisted natural regeneration, revegetation and management of weed and pest species.
<i>Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.</i>	The BioBanking assessment provides the framework for conservation of two offset sites under BioBanking Agreements, which will ensure conservation in perpetuity.
<i>Offsets should be agreed prior to the impact occurring.</i>	The BioBanking assessment has been prepared and will be agreed with EPA and DPI and prior to vegetation clearing for construction of the Project.
<i>Offsets must be quantifiable - the impacts and benefits must be reliably estimated.</i>	Impacts and benefits were quantified using the BioBanking methodology.
<i>Offsets must be targeted.</i>	The biobank sites were targeted to achieve, as far as practicable: like for like conservation of vegetation types to be removed; conservation of threatened species habitat; conservation of remnant vegetation in the regional locality of the development site; and viable patches of habitat with good connectivity to other habitat in the locality.
<i>Offsets must be located appropriately.</i>	The biobank sites are in the same IBRA bioregion and CMA sub region as the development area. The biobank sites have very similar suites of vegetation types as the development site, including matching vegetation types. The biobank sites would support a very similar suite of native flora and fauna, including threatened biota. The biobank sites are part of a relatively large, viable patch of habitat with good connectivity to other habitat in the locality including frontage to the Myall River and associated wetland, saltmarsh and estuarine habitats.
<i>Offsets must be supplementary.</i>	Conservation of the eastern biobank site is currently achieved by land use zoning. Conservation of the western biobank site is not currently achieved by land use zoning, a Covenant or by any other restriction on title. Management of both biobank sites is not funded by any other scheme. The management actions that would be planned and funded under BioBanking agreements for the sites would be supplementary to the current situation.
<i>Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.</i>	Conservation and management of the offset sites would be enforced through BioBanking Agreements or other conservation mechanism approved by DPI and EPA.

1. GHD (2012)

Completing the proposed biodiversity strategy and package would see the proposed development and conservation footprint for the study area deliver biodiversity offsets as required by relevant legislation. There are unavoidable impacts on native vegetation as a result of the balance between a viable development footprint and conservation areas. The use of the BioBanking methodology provides a quantifiable ecological assessment and determination of biodiversity offsets considered adequate to offset the projects impacts rather than the more subjective approaches available under a negotiated offsets process. This provides certainty that the ecological impacts, including impacts to EECs, have been assessed and that outstanding impacts will be adequately compensated for via the proposed biodiversity offsets.

Whilst the acquisition and retirement of BioBanking credits has a financial cost to it, the per developed lot cost of credits is lower for the proposed development compared to that recommended by the PAC. The final number and cost of such credits will be determined in the preparation of the final biodiversity offsetting strategy to be prepared in discussions with OEH and DP&I.

## **6.10**            **SOCIO- ECONOMIC IMPACTS**

### **6.10.1**        ***Methodology***

A Social Impact Assessment (SIA) of the Riverside at Tea Gardens development was completed by Duo Consulting (Duo, 2010) (refer to *Volume 5*). It examined the capacity of services and facilities in the vicinity of Tea Gardens to accommodate the growth in population anticipated as a result of the proposed development. The assessment examined the current profile of

the population of Tea Gardens, existing access to key services, the likely impact of Riverside on those services and recommendations for enhancement of services where required to service the future Riverside population.

The SIA was based on statistical profiling and community consultation. The statistical data was mostly derived from the Australian Bureau of Statistics (ABS) 2006 Census, with supplementary data from local government and private developers. Information obtained from the Design Forum conducted in February 2006 and other community consultation programs were incorporated into the assessment to provide perspective and value to the analysis.

An assessment of housing issues relating to Riverside was also investigated by Duo (2010). It examined issues relating to housing choice, density and demand and supply in Tea Gardens to inform lot size and housing options for the Riverside development.

Parsons Brinkerhoff undertook an Economic Impact Assessment of the proposed development (2010).

The following sections set out the key findings of the SIA, housing issues and economic impact assessment reports.

### 6.10.2 *Existing Community Profile*

At the time of the 2006 Census the total population of Tea Gardens was 2,094 people. Between 1991 and the 2001 Census the population of Tea Gardens doubled from 684 people to 1,372, an average growth of 7.5% annually (around seven times the state average). Between 2001 and 2006 the population of Tea Gardens grew from 1,372 to 2,094, an average annual growth rate of around 8%, which was approximately seven times the NSW average growth rate. Between 1991 and 2006, the Tea Gardens population grew by 206%.

Numerous population projections for the future growth of the Tea Garden - Hawks Nest area have resulted in various projections. Although the projections vary they all show the population of the Tea Gardens - Hawks Nest area more than doubling over the next 25 years.

#### *Age Distribution*

The population of Tea Gardens is markedly older than the NSW average.

At the 2006 Census, 55 percent of the population of Tea Gardens was aged over 55 years, which is more than double the NSW average of 25 percent. This trend appears to have continued since the Census with recent house sales data from Crighton Properties indicating that only 8% of the purchasers since 2001 were under 40 years, whilst 43 percent were over 55 years. This is a strong indication that Tea Gardens continues to attract retirees (Duo, 2010).

There is reason to believe that recent upgrades to traffic infrastructure effecting access to employment opportunities contribute to offsetting the ageing trend. According to the Principal of the Tea Gardens Public School, enrolments in recent years have increased, which suggests that infrastructure changes may already be having some effect (Duo, 2010).

#### *Household Type and Size*

The population of Tea Gardens is likely to be or have been married and is more likely than the NSW average to have been widowed or divorced (Duo, 2010). Household sizes are predominantly one and two person households.

This profile can be expected, given the age profile of the community, which is largely characterised by people over 55 years.

### *Employment and Education*

At the time of the 2006 Census labour force participation in Tea Gardens was 35 percent of the population which is lower than the NSW average of 58 percent. The low participation rate can be attributed to the age profile of the population (Duo, 2010).

The 2006 Census data indicates that in the 2006 Census, 6.4 percent of the population attended primary school, four percent secondary school and two percent attended a tertiary institution or technical college. This data relates directly to the age profile of the population (Duo, 2010).

### *Ethnic Diversity, Religion and Language*

The population Tea Gardens is dominated by people with European and Australian heritage. There is limited ethnic diversity. At the time of the 2006 Census only 286 people (13 percent) in Tea Gardens were not born in Australia and there were only 47 Indigenous persons, representing 2.2 percent of the population. The population of Tea Gardens has a slightly higher than NSW average proportion of people of indigenous and Torres Strait Islander background (Duo, 2010).

More than 90 percent of the Tea Gardens population is either non religious or Christian (Duo, 2010). More than 90 percent of the Tea Gardens population also speaks English, which is reflective of the lack of ethnic diversity of the population.

### *Tea Gardens – Hawks Nest District*

The total population of Tea Gardens / Hawks Nest at the 2006 Census was 3,155. The population of Hawks Nest experienced a recent decline of 9% between 2001 and 2006 (from 1163 in 2001 to 1061 in 2006). In the context of the population growth of 8% in Tea Gardens during the same period, it is evident that population growth in the area is predominantly in Tea Gardens (Duo, 2010).

Assuming that the supply of housing is a key determinant of population growth in Tea Gardens, the estimated future population of Tea Gardens / Hawks Nest is 12,558 (Duo, 2010). This is based on the anticipated future dwelling supply of four major greenfield developments identified in the Hawks Nest Tea Gardens Housing Strategy, as well as growth from infill opportunities and the Shearwater development (refer to *Table 6.22*).

**Table 6.22** *Projected Population of Tea Gardens and Hawks Nest Based on Future Dwelling Supply*

Site	Dwellings	Estimated Population
2006 Population		3,155 (actual)
Riverside	980	2,077
Myall River Downs	1,500	3,300
Hermitage	281	506
North Hawks Nest	750	1,650**
North Shearwater	350	770
Estimated Other*	500	1,100
Total	4,361	12,558

\* Other dwellings based on combined infill dwellings based on the Hawks Nest Tea Gardens Housing Strategy.

\*\* Assumes a considerable higher permanent occupancy rate than is currently the case in Hawks Nest as a highest case scenario.

Source Duo, 2010.

### 6.10.3 *Future Estate Residents*

As indicated in *Table 5.1*, Riverside at Tea Gardens was expected to provide approximately 980 dwellings, adding around 2,077 people to the population of Tea Gardens. This is a generous projection as it assumes: occupancy rates of 1.3 persons for medium density houses and 2.2 for standard residences and duplexes; and that all houses will be occupied full time.

#### *Demographic Change*

Riverside will provide a mix of dwelling types which is anticipated to accommodate some 2,077 people. The anticipated age distribution of these residents, is set out in the Duo 2010 report which indicates that the greatest changes is likely to occur for the 25 to 54 years old and 65+ years age groups.

#### *Housing*

##### *Housing Type*

The 2006 Census data indicates that housing in Tea Gardens is dominated by separate houses (92 percent). Semi detached, row or terrace houses, townhouses comprised only five percent of the total housing stock and apartments and units comprised only two percent (Duo, 2010).

Since 2001 there has been a housing boom, which has seen an increase in townhouse and unit development. Detached dwelling developments have also continued to grow. Approval data provided by Great Lakes Council in the Tea Gardens - Hawks Nest Housing Strategy indicates that from 2000 to 2004, 315 dwelling approvals were granted, of which 65 (or 20 percent) were for units, duplexes or townhouses in Tea Gardens (PB, 2006).

The existing development at Riverside has commenced with 261 lots either on the market or sold with a substantial number of dwellings having been constructed. In total, 357 residential lots have been approved with 25 lots with Council for approval (Duo, 2010).

#### *Retirement Living and Aged Care*

Tea Gardens currently has 190 self care units and approval for a 80 bed hostel at Tea Gardens Grange (although only 30 beds currently have Government funding). There is a further 281 self care unit approved for the Hermitage site on the west side of Myall Street, adjacent to Myall River Downs. Another ten low care retirement units are located at Myall Lodge Aged Care facility in Hawks Nest with plans for an additional 20 units (Duo, 2010).

Commonwealth benchmarks suggest the need for one aged care bed for each ten residents aged over 70 years. At the time of the 2006 Census, Tea Gardens had 429 residents aged over 70 years, generating a requirement of 43 beds. Much of this demand will be provided for by the 30 beds available or to be constructed at Myall Lodge Aged Care facility. Riverside is estimated to result in a demand of approximately 30 additional aged care places once fully developed. These beds can be accommodated at Tea Gardens Grange (Duo, 2010). A licence for a future 30 beds at Tea Gardens Grange has been granted.

Myall River Downs will subsequently require a further 50 beds when fully developed. These can be provided by the Tea Gardens Grange Facility. Ultimately, it is estimated that Tea Gardens and Hawks Nest will grow to 12,558 residents with (assuming 2006 census age distributions) 8% of population aged over 70 or 1005 people. This will mean demand for 101 aged care beds, 80 of which will be provided with the funding of the additional beds at the Tea Gardens Grange facility and a further 30 beds will be available at Myall Lodge. These will be enough to service growth anticipated in the Tea Gardens Hawks Nest area.

There is sufficient aged care and retirement living services to accommodate the anticipated population growth in Tea Gardens.

In addition, the Riverside development includes a number of elements that suit an older population, outside of the purpose built aged care and retirement living developments. These include:

- small and duplex lots providing for future housing with smaller yards, and therefore less maintenance;
- community infrastructure including precinct based facilities;
- flat topography, facilitating easy non vehicular access through the site;
- proximity to commercial facilities, including a medical centre;
- a design layout that promotes passive surveillance of the street; and
- emphasis on home business allowing for economic activity and partial retirement.

### *Home Ownership*

Three bedroom houses in Tea Gardens are available from around \$300,000 with some smaller dwellings available for less.

Many of the people moving to the area are retirees. A standard assessment of affordability based on comparing income and mortgage payments is not relevant for retirees, as they tend to have low incomes but have equity in their houses. Retirees seeking to move to Tea Gardens will do so if they can afford it (Duo, 2010).

For younger people / families the standard assessment is applicable. The Westpac mortgage calculator shows that with an annual income of \$55,000, which is reflective of professions such as teachers and police people, a single income household with no children can borrow \$300,000. This is enough to enter the housing market in Tea Gardens. A similar calculation for dual income families also indicated that they can afford to enter the market at Tea Gardens. The exception is single income families, which would have difficulty entering the housing market in any coastal area (Duo, 2010).

### *Rental Market*

The rental market in Tea Gardens / Hawks Nest is very competitive and relatively cheap by almost any other comparison, with an average rent of \$195 per week. Crighton Properties are exploring house design solutions to provide for affordable rental housing.

### *Housing Stress and the Potential to Enhance Affordability*

Housing stress is typically defined in terms of more than 30 percent of gross income being spent on housing. For a \$300,000 dwelling with a 20 percent deposit at an interest rate of 7.5 percent, a household income of \$67,000 would be required to not be considered to be experiencing housing stress (Duo, 2010).

Average rental properties in Tea Gardens are accessible without stress to any household with combined incomes of \$34,000 or more.

Based on the above, housing is available in Tea Gardens to a range of income groups without resulting in household stress.

At Riverside, six approaches will be implemented to encourage the provision of affordable housing, namely:

- the inclusion of at least ten percent of lots less than 450 square metres, to provide housing options;
- encouraging shared use dwellings incorporating home office facilities to create affordable lifestyle opportunities;

- to allow for alternative dwelling types, such as 'dual key' dwellings where areas of a dwelling can be rented out as self contained units;
- allowing for an adequate supply of housing in the concept plan and project application;
- through a subdivision design that maximises opportunities for an affordable lifestyle by encouraging the use of non motorised transport modes, accessibility of services and facilities and energy and water efficiency; and
- encouraging a rental market.

#### 6.10.4 *Health*

The medical centre at Riverside provides a range of services, including three general practitioners, two dentists, pathology, radiology, pharmacy services and a number of visiting specialists. There are also two other doctors in Tea Gardens and Hawks Nest and a second pharmacy in Hawks Nest. Tea Gardens also has its own ambulance station.

The Hawks Nest – Tea Gardens Community Health Centre in Hawks Nest also offers a range of community based health services, and more acute medical facilities are provided in Newcastle.

The Department of Health and Ageing advised that the national average for hospital beds is 2.43 persons per 1000 population. Based on this average, the future population at Riverside will generate the requirement for an additional five hospital beds when the site is fully developed, assuming that the population does not already reside in the Hunter New England Health Service catchment (Duo, 2010). However, this needs to be seen in the context of the Lower Hunter Regional Strategy (DoP, 2006), which assumes population growth of 160,000 people over the next 25 years, and the Mid North Coast Regional Strategy (DoP, 2009) which sees growth of 90,000 people over the same time period. Hunter New England Health will plan their service provision to accommodate this growth of which Riverside is a part. The impact of the Riverside at Tea Gardens development is considered negligible as the full development of Riverside is anticipated to occur over a 15 year period.

In relation to general practitioners, the optimum ratio is generally one doctor per 1500 persons. The Myall Quays Medical Centre includes three general practitioners and room for a fourth. There is sufficient capacity within the Myall Quays medical centre to allow for the addition of Riverside and Myall River Downs to the population of Tea Gardens (Duo, 2010). The combination of these services and the other two general practitioners in tea gardens and hawks Nest means the population is very well served and can accommodate the envisaged expansion of the communities for the foreseeable future (Duo, 2010).



## 6.10.5

### *Education*

#### *General Targets*

There are 23 schools that can be accessed by bus from Tea Gardens, of which there are three high schools and four primary schools that have direct bus routes from Tea Gardens.

The Department of Education and Training (DET) has general guidelines for the provision of education facilities, which is based on the following ratios:

- primary school: one for each 2000 to 2500 dwellings;
- secondary school: one for every 6000 to 7500 dwellings;
- TAFE: one for every 100,000 dwellings; and
- special needs schools: one for every 20,000 dwellings (Duo, 2010).

Based on these ratios the proposed development on its own will not require additional schools in Tea Gardens. However, the ultimate development participated in the tea Gardens Community may lead to a requirement for additional school facilities, including the acquisition of additional land.

#### *Primary Schools*

Based on the demographic profile detailed above and the 2006 educational attendance rates, the Riverside development will generate a demand for 120 primary school places over the next 14 years, with half arriving in the first six years (Duo, 2010). There is capacity within the existing school facilities to accommodate this growth as follows:

- Tea Gardens Public School is approximately 1.6 kilometres from Riverside and currently has around 218 students, with the capacity to continue to grow through the provision of additional demountable facilities at the school;
- Irrawang Public School is in Raymond Terrace and currently has 305 students with the ability to accommodate an additional 130 students;
- Bulahdelah Central School currently has 155 primary school places and could accommodate 50 more;
- St Brigids Catholic School is in Raymond Terrace which has 420 students with the capacity for an additional 25 students;
- Meadowie Christian School has 302 students with plans in place to expand to be able to accommodate 800 students; and
- St Josephs Public School is in Bulahdelah and has 38 students with the capacity for up to 90 students (Duo, 2010).

To assist with facility planning, Crighton Properties will communicate directly with the Principal of the Tea Gardens Public School regarding the progress of the Riverside development.

### *Secondary Education*

Based on the demographic profile set out in *Section 5.4.1*, the Riverside development will generate a demand for an additional 98 secondary school places over the next 14 years, with half arriving in the first six years (Duo, 2010). There is capacity within the existing school facilities to accommodate this growth, indicated below:

- Bulahdelah Central School currently has 360 secondary school places and could accommodate 60 to 70 more without the need for more buildings;
- Medowie Christian School has 302 students with plans in place to expand to be able to accommodate 800 students; and
- Hunter River High School is located in Heatherbrae and has approximately 730 students and has the capacity to accommodate 100 more students.

Irrawang High School is located in Raymond Terrace and has around 1000 students. It does not have the capacity for further growth without the addition of more demountable units (Duo, 2010). Bulahdelah Central School however, has recently benefited by a \$14 million upgrade and is one of the most modern schools in the NSW. It is also the only school listed above that does not have other major growth areas in its catchment. Therefore it is likely to gain a significant proportion of students from Tea Gardens. To assist in the continued planning of the facilities of the school, Crighton Properties will advise the Principal of the school about the progress of the Riverside development.

### *Tertiary and Adult Education*

The University of Newcastle is an hour by road from Tea Gardens and offers a range of undergraduate and postgraduate studies. There is also a TAFE at Tighes Hill in Newcastle and the University of the Third Age offers courses in Tea Gardens.

The community and telecommunication facilities provided in the proposed home business precincts offer residents the opportunity for distance education. Crighton Properties will have discussions with TAFE and the University of Newcastle about the potential for accommodating facilities that would facilitate community learning. These could be located in the multi use community facility or the business precinct hub near the Riverside commercial centre.

## **6.10.6 Recreation Facilities**

Council acknowledged that to accommodate an expected population growth of the magnitude it predicted over the next 25 years, existing public services and facilities would need to be extended and other facilities may need to be provided (Great Lakes Council, 2003c). Council estimated that by 2011, all community facilities (such as community halls, centres and libraries) would

likely be used to capacity (Great Lakes Council, 2003a). Existing recreational facilities are described in *Section 2.9* of this report.

Table 4.1 of the Riverside at Tea Gardens Recreation Study (ERM, 2011) (refer to *Volume 5*) provides a summary of the projected population figures for the Tea Gardens / Hawks Nest area. The area of structured open space required to be provided by future development within Tea Gardens and Hawks Nest is detailed within Table 4.2 of the study.

The total area of structured open space required to support the existing and future population of Tea Gardens and Hawks Nest is 14.4 hectares. As identified in *Section 2.9.2*, there is a current oversupply of 1.5 hectares of structured open space.

All the structured open space required to be provided as a consequence of the development of the Riverside at Tea Gardens site (2.5 hectares) is proposed to be provided at the Myall River Downs site in accordance with the Voluntary Planning Agreement which Council and Crighton Properties have jointly prepared.

#### **6.10.7**      *Community Facilities*

There are a number of community facilities existing in the Tea Gardens - Hawks Nest.

##### *Community Halls*

The main community hall is the Hawks Nest Community Hall. It can seat approximately 200 people. The Department of Community Services guidelines recommend one community centre per 7,000 - 10,000 population. The Riverside development will not reach this threshold.

##### *Library*

Council has established a consolidated community facility and library at Tea Gardens. Council's s94 Report requires a branch library for 5000 persons. Given the other existing and future developments in the area, such as North Shearwater, Myall River Downs and North Hawks Nest, the SIA recommended that Crighton Properties consider a contribution to the upgrade of the library facilities.

##### *Preschool*

Hawks Nest / Tea Gardens Pre School is located in Hawks Nest and accommodates 20 children on each of the three days it is open. The Tea Gardens Childcare Centre offer long day care and preschool, five days a week. Council's s94 Report states that the current pre-school facilities are sufficient

to accommodate anticipated growth in the area. In addition the approved child care facility at the Riverside commercial centre, once constructed, will supplement this service.

#### *Other*

Other community facilities include the Rural Fire Service facility in the industrial area of Tea Gardens, four churches and a post office located within Tea Gardens – Hawks Nest.

### **6.10.8**      *Employment and Economics*

Riverside will contribute to attracting more jobs and working people to Tea Gardens. The development of Riverside will have the following effects on employment and the economy (Parsons Brinkerhoff (PB), 2010):

- the national benefits of the construction phase are significant totalling approximately \$640 million in output and supporting 3,893 equivalent full-time jobs. Of these, around 1,374 (EFT) jobs will be directly associated with the construction of the facilities;
- the local community will benefit significantly from the proposed development as outlined below:-
  - construction: conservative estimates suggest 40 percent of the aggregate total output benefit, or \$256 million, will flow directly to the local community. This translates to a local benefit of \$256 million supporting 1,557 local jobs across all sectors, spread across the anticipated 10 year life of the project;
  - residential consumption activities: will directly contribute \$19.0 million per annum to the local economy based on the increase in population of 2,612 residents. Normal consumer spending patterns would indicate that this level of spending will consequently support 113 jobs in the district upon completion of the project; and
  - associated activities: there will be an associated range of benefits which come from the infrastructure that the development will create, such as jobs associated with the day-to-day operation of the site and on-going capital maintenance. The industry estimate of these annual outgoings is in the range of 1-2% of the capital value of the development. For Riverside at Tea Gardens this would be \$2,290,000 to \$4,580,000. This would represent an additional 10 full-time direct jobs and an overall jobs (direct and indirect) of 53 (based on construction industry multipliers) (PB, 2010).

The economic benefits to the Tea Gardens/ Hawks Nest locality generated by the Riverside proposal will facilitate the growth anticipated by the *Mid North Coast Regional Strategy* as one of the fastest and most consistent growth areas

of NSW. The regional and local jobs created by the Riverside proposal will provide a range of employment opportunities both short term during construction and longer term.

#### 6.10.9 *Conclusions and Recommendations*

Riverside is well served by education and medical facilities and has access to public transport and employment areas. The development offers the opportunity to significantly enhance the community facilities in Tea Gardens.

To ensure that the community benefits from the development Crighton Properties commits to the recommendations of the SIA, namely:

- internal roads in Riverside will be sufficient to accommodate a bus route within walking distance of each dwelling (that is 400 metres);
- the development includes a comprehensive cycle network that connects all community facilities, the commercial centre and directly to Council planned cycle path network;
- contributing to the provision of a multipurpose community function / meeting facility, which will be delivered via a draft planning agreement with Council;
- keeping the Principals of both Tea Gardens Public School and Bulahdelah Central School informed of the growth of the school age population in Riverside. Crighton Properties will also discuss opportunities for courses run by TAFE and University of Newcastle to be conducted in the community facilities proposed as part of Riverside;
- provide a community building and telecommunications as part of the home business precincts;
- providing additional sporting and recreational facilities that will be consolidated on one site, as part of the Myall River Downs development. This will be a significant upgrade of current facilities and delivered via the draft planning agreement with Council;
- the existing commercial centre will be extended to provide the opportunity for a greater range of services and products to be provided to the Tea Gardens and Hawks Nest community; and
- Crighton Properties will provide the approved concept plan to the Population Health Unit of the Hunter New England Health Service, to assist them in the planning for preventative health.