

**PLANNING AND NATURAL SYSTEMS**

**ATTACHMENT A**

**PLANNING PROPOSAL FOR LOT 612  
BLACKHEAD ROAD, HALLIDAYS POINT**

**STRATEGIC MEETING**

**14 FEBRUARY 2018**

# Planning Proposal

Amendment to the Greater Taree Local Environmental Plan 2010

**Lot 612 DP 1160096, Blackhead Road, Hallidays Point**



**December 2017**

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## 1.0 Introduction

This planning proposal seeks to amend the *Greater Taree Local Environmental Plan 2010* (LEP 2010) to provide for residential development adjoining the Tallwoods Village.

Lot 612 Blackhead Road, Hallidays Point has been identified as an extension of the Tallwoods Village in local strategies since 2000 and is consistent with the *Mid North Coast Regional Strategy 2006-2031* and subsequently the *Hunter Regional Plan 2036*. In 2006, the process to rezone the land for residential purposes commenced, however given the changing legislative requirements, the applicant was advised that they would need to lodge a planning proposal under the Gateway planning process. This planning proposal was lodged in December 2015.

To facilitate the development of the land, changes are required to the *Greater Taree Local Environmental Plan 2010* (LEP 2010). This planning proposal outlines the characteristics of the site, how the proposed development is consistent with the planning controls, and the amendments that are proposed to the LEP. In summary, the changes involve including the site in the R1 General Residential zone which would provide for conventional residential development of the land, with a small portion of the site being included in the E2 Environmental Conservation zone to protect an area with ecological value.

### 1.1 Site details

The subject land is located in Hallidays Point, which is south east of the regional centre of Taree and north of Forster. Hallidays Point is approximately 250km north east of Sydney within the Mid North Coast region.

The subject site adjoins the Tallwoods Village and is located south west of the existing developed areas. Tallwoods is located in the Hallidays Point area which is comprised of four (4) village areas and rural residential estates as shown in Figure 1.

The following table provides the specific details of the site.

<b>Site Address</b>	Lot 612 Blackhead Road, Hallidays Point
<b>Real Property description</b>	Lot 612 DP 1160096
<b>Site Area</b>	Approximately 17.02 hectares
<b>Current zone</b>	RU1 Primary Production

The site is currently used for small scale low intensity grazing activities and contains agricultural infrastructure, fencing, dams and feed bins.

The topography of the land is described as undulating with gradual slopes between 3-4 degrees grading down from the north-west corner of the site to the south and east.

There are no creeks or major watercourses within the site. Small ephemeral gullies drain the land and cross the north eastern corner of the site and drain the southern part of the site to Blackhead Road.

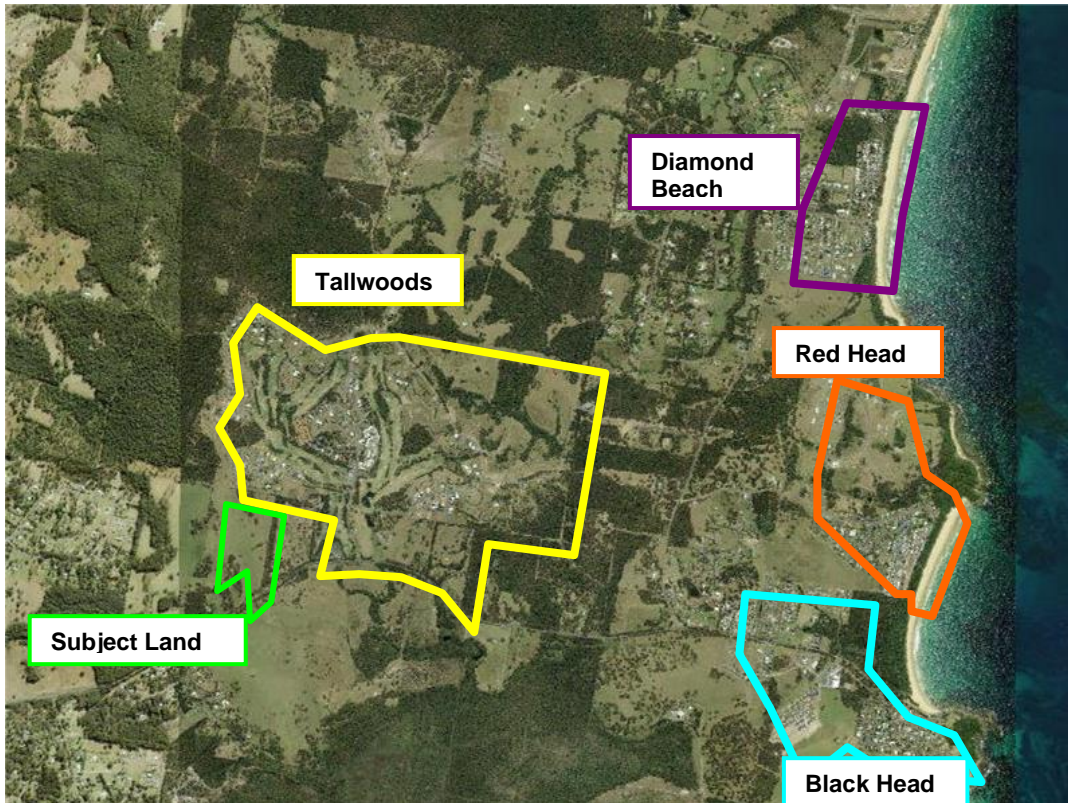


Figure 1 – Local context of Tallwoods in Hallidays Point [Source: LPMA SIX Maps]

The subject site has cleared grassland areas with small areas of highly disturbed woodland/forest. Vegetation is almost entirely modified from the indigenous vegetation community that would have existed over the land, other than small remnants of native trees comprising the disturbed woodland/forest areas. Ecological investigations identified that there is a small area of freshwater wetlands located in the small ephemeral gully crossing the north east corner of the site.

Figure 2 shows the existing RU1 Primary Production zone that applies over the site and an aerial view of the site.

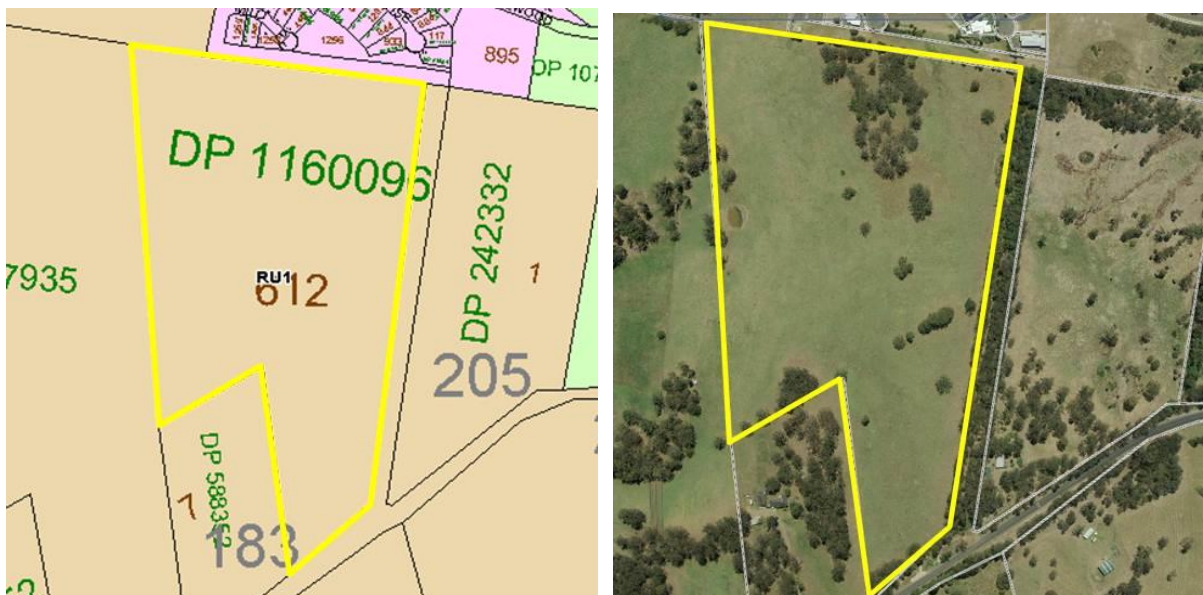


Figure 2 – Site zone and aerial photograph

## 2.0 Objectives

The key objective of the planning proposal is to extend the residential area of the Tallwoods Village. This site provides a more gentle sloping landscape than that provided elsewhere in the village and will enable a more conventional residential development. In addition, parts of the site with ecological values (containing Freshwater Wetlands Endangered Ecological Communities) will be protected within an E2 Environmental Conservation zone.

## 3.0 Explanation of Provisions

To enable the development, the following amendments to LEP 2010 are required. The proposed changes have been determined on the basis of constraints identified for the land, and the needs of future residential development lands.

### 3.1 Zoning Changes

The following zone changes will apply:

- R1 General Residential zone (approx. 15.8 Ha) will apply to all of the capable land identified for future growth. The areas which form drainage corridors have been kept in the General Residential zone as the layout of the future residential development will be determined when more detailed planning applications are undertaken.
- E2 Environmental Conservation zone (approx. 1.2 Ha) has been placed over the north eastern corner of the site which includes the small wetland area identified as EEC in the ecological assessment for the site. This portion of the site includes all of the drainage corridor which will buffer the area and provide an area for rehabilitation of the wetland in the future.

#### Zone:

Existing – RU1 Primary Production  
Proposed – R1 General Residential and E2 Environmental Conservation



### 3.2 Lot Size Controls

To facilitate subdivision of the land in a manner consistent with the proposed residential zone, the lot size controls over the land will be modified as follows:

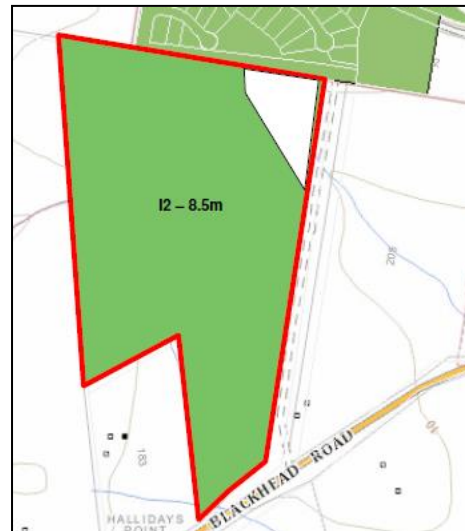
- R1 General Residential zoned areas – 450m<sup>2</sup>
- E2 Environmental Conservation zoned areas – 40 hectares



### 3.3 Height of Buildings

The land is not currently subject to height of building controls. To facilitate building development on the land in a manner consistent with the proposed zonings the controls will be added as follows:

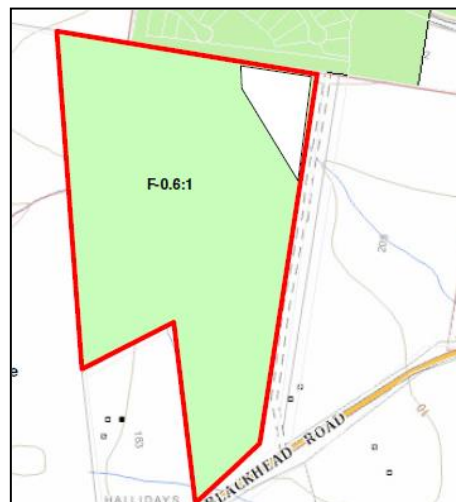
- R1 General Residential zoned areas – 8.5 metres
- E2 Environmental Conservation zoned areas – no control



### 3.4 Floor Space Ratio

The land is not currently subject to floor space ratio controls. To facilitate building development on the land in a manner consistent with the proposed zonings the controls will be added as follows:

- R1 General Residential zoned areas – 0.6:1
- E2 Environmental Conservation zoned areas – no control.



### 3.5 Development Control Plan

A Development Control Plan (DCP) has been prepared for the land which was exhibited concurrently with the planning proposal. The DCP provides controls for future development to ensure certain matters are addressed. The DCP provides controls for:

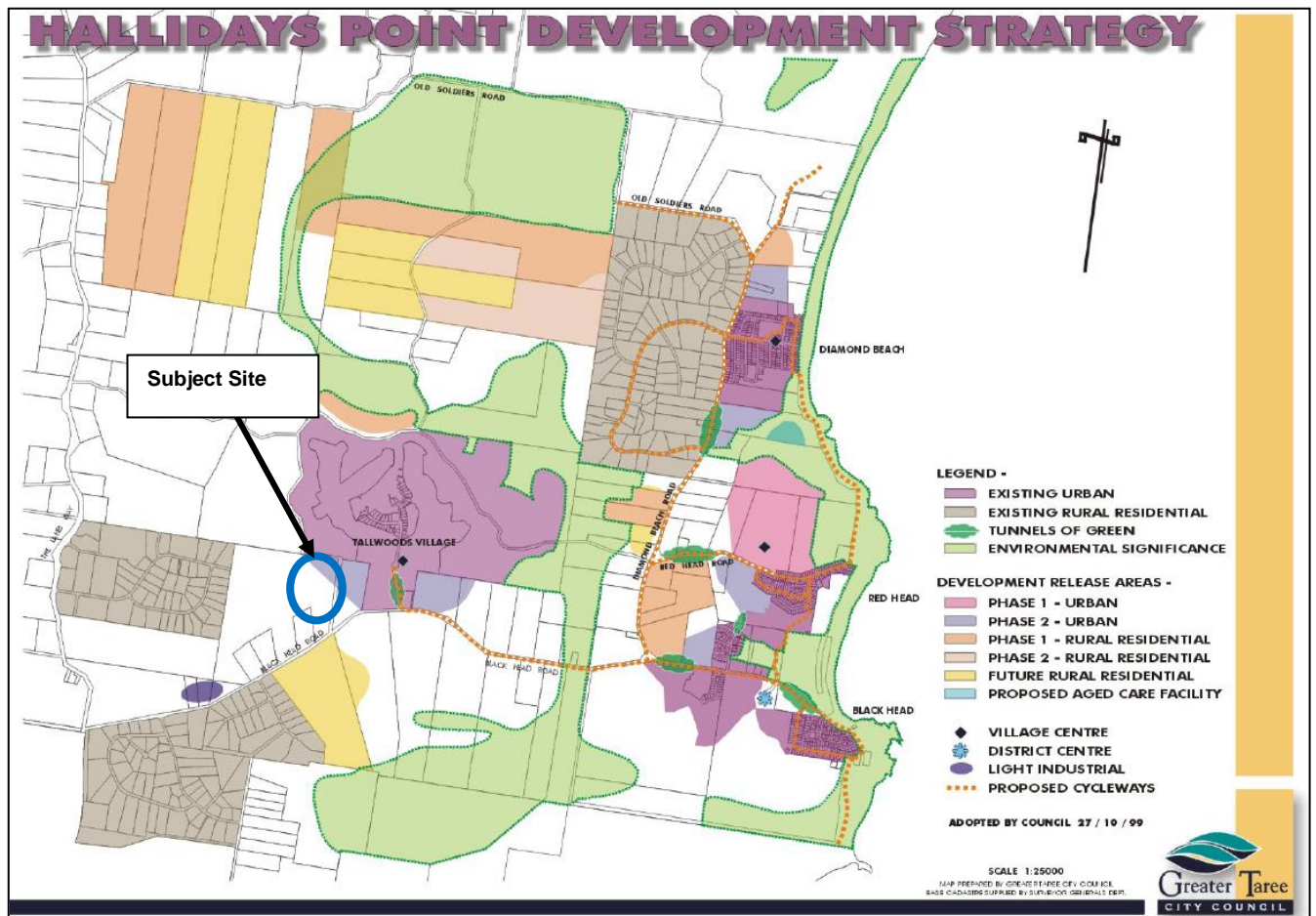
- rehabilitation of Environmental Conservation zone
- offset planting for loss of native trees within the site
- retention/enhancement of vegetation screening along Blackhead Road frontage
- controls for vehicular access to/from the site, including restriction of access to Blackhead Road (other than for emergency access) and provision of access linkage to the east and west.

### 4.0 Justification of Provisions

#### 4.1 Need for the planning proposal

##### 4.1.1 Is the planning proposal a result of any strategic study or report?

Planning for the urban expansion at Tallwoods has been the subject of Council strategies since 2000 when it was identified in the *Hallidays Point Development Strategy* (map below). Part of this site was identified as Phase 2 urban which could commence rezoning following the release of Phase 1 urban areas. The Phase 1 areas in the strategy have been rezoned for residential purposes. Including this proposal, approximately 50% of the Phase 2 areas will be rezoned for residential purposes.





In 2005, Council prepared the *Greater Taree Draft Conservation and Development Strategy* for the local government area. The Strategy identified the subject land as 'Urban Expansion' consistent with the Hallidays Point Strategy. While this Strategy was not endorsed by the NSW Department of Planning and Environment, many of the future development areas were included in the *Mid North Coast Regional Strategy 2006-2031* and subsequently the *Hunter Regional Plan 2036*. At this time, the majority of the site was identified as a proposed urban area.

Consistently over the last 16 years, the site has been identified as being suitable for the residential expansion of the Tallwoods Village.

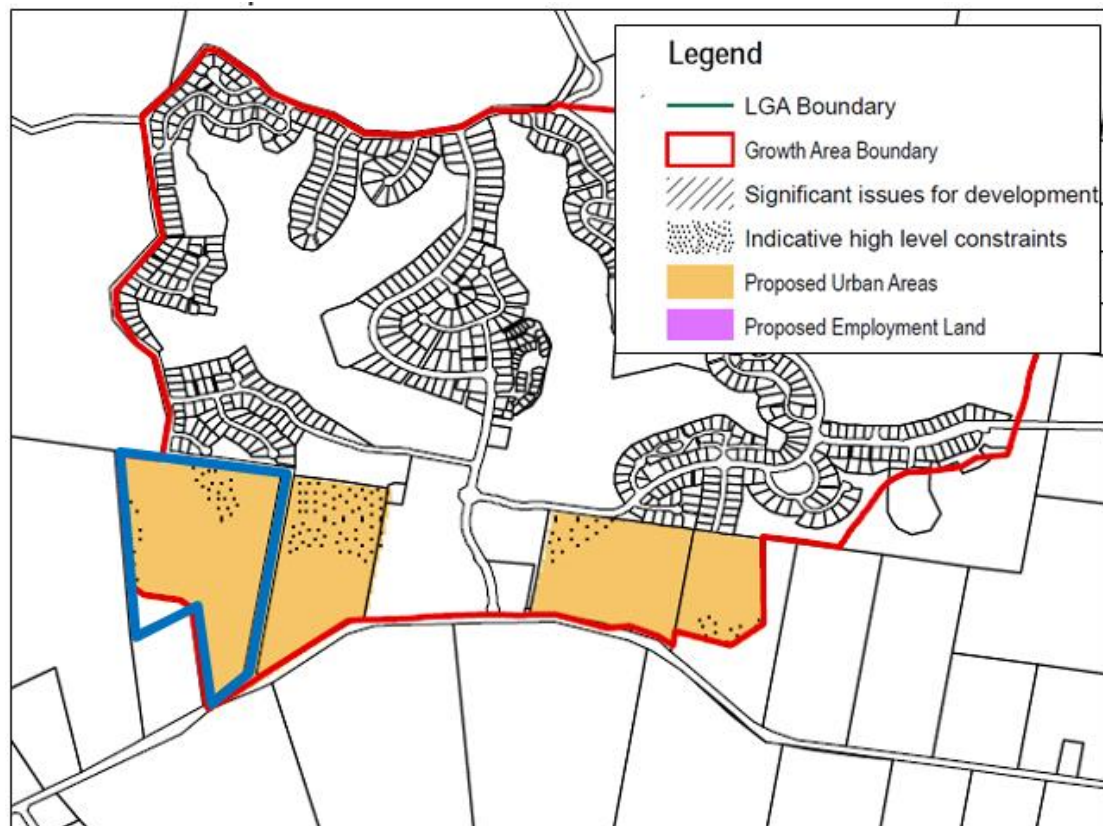
#### **4.1.2 Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?**

The planning proposal is the appropriate and most transparent means of achieving the objectives for this site. The existing zoning and lot size controls do not enable the development of residential development opportunities and therefore changes to the planning controls are necessary to achieve the desired residential development outcome.

## **4.2 Relationship to Strategic Planning Framework**

### **4.2.1 Is the planning proposal consistent with the objectives and actions of the applicable regional strategy?**

The *Mid North Coast Regional Strategy 2006-31* identifies the majority of the site as a proposed urban area as shown in the map below.



The environmental constraints identified in the Strategy have been assessed and the results provided in this planning proposal. The residential zoning of the land will

provide for conventional housing development that is consistent with the character of the surrounding area, and is consistent with the objectives of the Strategy.

A large portion of the Tallwoods Village is comprised of residential lots with steep slopes, which provide a range of constraints for buildings and their access. As a result, lands within the Village that are not constrained by steep slopes have been developed rapidly and are in short supply. The rezoning of this site will provide more affordable sites for conventional housing to meet this market demand. In this regard, the proposal is consistent with a key challenge and principle of the Regional Strategy by providing an increased range of housing choices in the Tallwoods Village to meet local demand.

In October 2016 the *Hunter Regional Plan 2036* was adopted and covers this region. MidCoast regional actions refer to delivering:

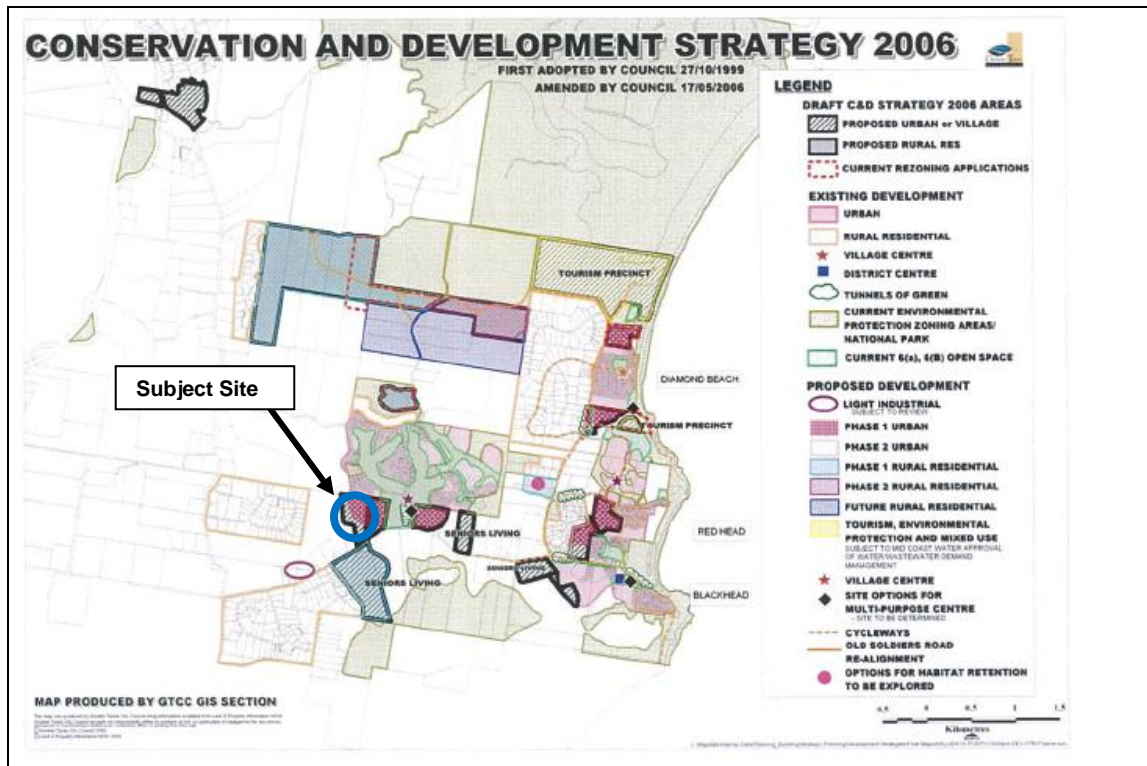
*existing Urban Release Areas at Figtrees on the Manning, Brimbin, Hallidays Point, Old Bar, Manning River Drive Business Park (employment), Tea Gardens and South Forster*

This planning proposal is consistent with the action as outlined above.

#### 4.2.2 Is the planning proposal consistent with Council’s local strategy or other local strategic plan?

As mentioned in sections 4.1.1 and 4.2.1, the land is identified in the following local strategies:

- *Hallidays Point Development Strategy 2000*
- *Draft Hallidays Point Conservation and Development Strategy Review 2006* (shown below)
- *Draft Greater Taree Conservation and Development Strategy 2006*.



#### 4.2.3 Is the planning proposal consistent with applicable State Environmental Planning Policies?

##### Koala Habitat Protection (SEPP 44)

This policy requires that the site be surveyed to determine if land constitutes potential or core koala habitat. Investigations by Conacher Travers in 2003 revealed that there were koala feed tree species on the site that may constitute potential koala habitat (in the woodland vegetation communities). The investigations concluded that vegetation on this site would be unlikely to constitute core koala habitat. Further investigation was undertaken in October 2015 by Naturecall Environmental (see Attachment A) which included a targeted search for koalas and koala activity using diurnal searches, spotlighting and spot assessment techniques. No koala activity was detected on the land by the surveys and the land does not constitute core koala habitat.

##### Remediation of Land (SEPP 55)

State Environmental Planning Policy Number 55 (SEPP 55) deals with land that is contaminated and the requirements for remediation of that land. Clause 6 of SEPP 55 requires that when Council is considering zoning changes it must consider if the land is contaminated, and if contaminated, will it be suitable for the use or will it need to be remediated.

In relation to the subject land, it has been used for generally low intensity agricultural uses. There is no evidence of past uses being significantly contaminating. A Site Contamination Assessment has been undertaken by Regional Geotechnical Solutions which included targeted soils sampling and testing. It has been identified that the land is suitable for development in its uncontaminated state as identified in the report done by Regional Geotechnical Solutions. A copy of the Site Contamination Assessment is provided in Attachment B.

##### State Environmental Planning Policy (Rural Lands) 2008 [SEPP (Rural Lands)]

The aim of this policy is to facilitate the orderly and economic use of rural lands. The SEPP requires consistency with the Rural Planning Principles outlined in the SEPP, which is provided in the following table.

<b>Clause 7 Principles</b>	<b>Comment</b>
<b>(a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas</b>	The site is not highly productive agricultural land, and only supports low scale hobby farming type activities. The change of these lands from agricultural use will not result in significant loss of productive agricultural land or of opportunity for sustainable rural activities.
<b>(b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State</b>	The subject land is not highly productive agricultural land and is not important for agricultural production in the locality.
<b>(c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development</b>	The planning proposal does not result in the loss of rural land uses which are important for the social and economic benefits or rural communities. The planning proposal supports local growth in accordance with the local and regional strategy and provides for maintenance and enhancement of services for the local community.

Clause 7 Principles	Comment
<b>(d) in planning for rural lands, to balance the social, economic and environmental interests of the community</b>	The proposal is balanced and provides social and economic benefits for the community. The local and regional strategies provide for a balanced approach for development and include urban growth over the subject land.
<b>(e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land</b>	The planning proposal affects land which has been modified from past activities and has minimal biodiversity values. A small area of wetland EEC located in the north eastern corner of the site will be protected by an Environmental Management zone.
<b>(f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities</b>	The planning proposal provides for development in a manner identified in local and regional development strategies for the area which adds to the social and economic welfare of the community.
<b>(g) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing</b>	Relevant service providers will be consulted. The proposal will have access to reticulated water, sewer, power and telecommunications, which may need to be augmented to support the future development.
<b>(h) ensuring consistency with any applicable regional strategy or any applicable local strategy endorsed by the Director-General</b>	The planning proposal is consistent with the <i>Hunter Regional Plan 2036</i> and local strategies.

While the site is included in the Primary Production (RU1) zone, it is not highly productive agricultural land. In addition, this site has been identified for residential development in local and regional development strategies for over 16 years. The proposal provides residential land in a manner consistent with the Council's strategies and plans for the area.

#### 4.2.4 Is the planning proposal consistent with applicable Ministerial Directions (Section 117 directions)?

The following Ministerial Directions are applicable to the planning proposal:

Direction	Comment	Consistency with direction
1.2 Rural Zones	This direction requires that land zoned rural must not be rezoned to a residential, business, industrial, village or tourist zone unless it is supported by a local or regional strategy	The proposal is consistent with the future urban growth areas identified in the <i>Hunter Regional Plan 2036</i> .
1.5 Rural Lands	This direction requires that a rezoning must be consistent with the Rural Planning Principles and Subdivision Principles contained in <i>State Environmental Planning Policy (Rural Lands) 2008</i> .	An assessment of the Rural Planning Principles is provided in Section 4.2.3 and concluded that the planning proposal is consistent with the principles. In addition, the proposal is consistent with the <i>Hunter Regional Plan 2036</i> .
2.1 Environmental Protection	This direction requires the protection of environmentally sensitive areas.	The ecological investigations by Naturecall Environmental (see Attachment A) identified a small area of freshwater wetland in the north

Direction	Comment	Consistency with direction
Zones		<p>eastern corner of the site which, based on the precautionary principle, was found to be an Endangered Ecological Community (EEC). The planning proposal requires that part of the site is to be included in the E2 Environmental Conservation zone.</p> <p>A DCP has been prepared which also provides controls for the rehabilitation of the Environmental Conservation zone and offset planting for the loss of native trees on the site to occur within the conservation zone.</p>
2.3 Heritage Conservation	This direction aims to consider the conservation and protection of items of heritage and Aboriginal cultural significance.	<p>The site does not contain any potential or listed heritage items.</p> <p>In regard to Aboriginal cultural significance, an Aboriginal Heritage Assessment was undertaken by Myall Coast Archaeological Services. OEH were satisfied with the assessment which did not identify any Aboriginal objects on the site, and based on landscape attributes found that subsurface objects were unlikely.</p>
3.1 Residential Zones	<p>This direction requires that the planning proposal should broaden the choice of building types and locations, make more efficient use of existing infrastructure and services, reduce the consumption of land for housing and associated urban development on the urban fringe and be of good design.</p> <p>A planning proposal must ensure that residential development is not permitted until land is adequately serviced and not contain provisions which will reduce the permissible residential density of land.</p>	<p>The General Residential zone allows for a range of residential uses that can provide housing choice in the Hallidays Point area. The type, density and design will be determined through the subsequent development applications.</p> <p>Relevant service providers will be consulted. The proposal will have access to reticulated water, sewer, power and telecommunications, which may need to be augmented to support this future development.</p> <p>The proposal is also consistent with the <i>Hunter Regional Plan 2036</i>.</p>
3.4 Integrating Land Use and Transport	This direction requires the planning proposal to give effect to policies aimed at improving transport oriented design in urban areas.	This site is located in a coastal village with limited access to public transport. A bus service connects the Village with Taree and Forster and runs four (4) times a day Monday-Friday and two times a day on Saturday. The bus route passes the subject site, providing an alternative to cars for transport.
4.4 Planning for Bushfire Protection	This direction applies given the site is mapped as bushfire prone land. The direction requires consultation with the NSW Rural Fire Service for proposals on land that is mapped as Bushfire Prone Land.	Following consultation with the NSW Rural Fire Service (RFS) a Bushfire Assessment was undertaken addressing further matters raised. A copy of this bushfire assessment has been included at Attachment C showing that development of the land can be undertaken in a manner compliant with <i>Planning for Bush Fire Protection 2006</i> . RFS reviewed the report and advised no objection to the planning proposal. A copy of the RFS correspondence is provided in Attachment E.

Direction	Comment	Consistency with direction
5.10 Implementation Regional Plans	This direction requires that the proposal be consistent with the <i>Hunter Regional Plan 2036</i> .	The proposal is consistent with the future urban growth areas identified in the <i>Hunter Regional Plan 2036</i> .
6.1 Approval and Referral Requirements	This direction ensures the proposal encourages the efficient and appropriate assessment of development by minimising the need for concurrence with or referral to the Minister or a public authority.	The planning proposal does not create any additional requirements for concurrence with or referral to the Minister or public authority beyond existing planning requirements.

## 5.0 Environmental Social and Economic Impact

### 5.1 *Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?*

The site is highly disturbed and modified. It has been cleared for past activities and contains only remnant native trees scattered amongst the grasslands. An ecological assessment of the land was undertaken in October 2015 by Naturecall Environmental (see Attachment A) which involved a survey of the flora and fauna present on the land and the likely ecological values as habitat or corridors.

The ecological assessment found that the only constraint to development was a small area of freshwater wetland located in an ephemeral drainage line in the north eastern corner of the site. This wetland has been identified as having high ecological value as it is considered to be representative of the Endangered Ecological Community 'Freshwater Wetlands on Coastal Floodplains' listed under the NSW *Threatened Species Conservation Act 1995*. In recognition of the conservation significance of this wetland, this area is to be retained within the development layout and rezoned to Environmental Conservation (E2). In accordance with the DCP, the rehabilitation and ongoing management of the EEC will be assured through the preparation of a Vegetation Management Plan, which will be registered on the title of the land as a S88B instrument.

### 5.2 *Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?*

Given the disturbed nature of the land, few significant environmental constraints have been identified. The following environmental issues have been examined based on review of the previous reports and available information for the land.

#### 5.2.1 Visual

The site is not highly visible in the surrounding visual catchment. The development outcomes that could result from the planning proposal are consistent with the existing Tallwoods development. There is an existing tree lined frontage along the Blackhead Road frontage (see photograph) which should be retained/enhanced as sought in the local strategies.



**Google Street view of Blackhead Road frontage**

This existing vegetation will be retained and enhanced through development of the land. The DCP prepared for the site provides for the protection and enhancement of a 10 metre wide vegetation screen along the sites frontage to Blackhead Road.

### **5.2.2 Ecological**

As mentioned previously, Naturecall Environmental was engaged to undertake an ecological assessment of the site (see Attachment A). The assessment identified that there is a freshwater wetland located in the small ephemeral gully crossing the north east corner of the site. It is important to retain the wetland, but also ensure drainage to the wetland is maintained. To address this issue the area is proposed to be included in the E2 Environmental Conservation zone for protection.

There are no significant ecological values on the remainder of the site, being comprised primarily of disturbed pasture areas, and a small area of highly disturbed dry sclerophyll woodland. To ensure existing ecological values of the site are maintained or improved, the DCP for the site provides for the protection and rehabilitation of the environmental conservation area, the provision of vegetation management over the site that includes offset planting for any native trees removed. The DCP also ensures that existing natural drainage regime is maintained to protect and improve the EEC.

### **5.2.3 Soils**

Soils over the land are generally comprised of consolidated materials. The slopes over the land are not considered steep and there is no evidence of slope instability over the land.

The site is not mapped as having potential for Acid Sulfate Soils to be present. As discussed in relation to SEPP 55, a Site Contamination Assessment has been undertaken for the site. It has been identified that the land is suitable for development in its uncontaminated state as identified in the report prepared by Regional Geotechnical Solutions.

### **5.2.4 Stormwater**

The subject site is elevated and would not be identified as flood prone land.

The site is drained via existing ephemeral gullies and freely drains to the south and south west. The gully through the north eastern corner of the site also conveys flows

from a small area of residential developed land in Tallwoods. This gully has been included in an environmental zone to maintain the flows through the gully.

The site drains to Frogalla Swamp and any future subdivision layout would need to provide large drainage reserves for water detention and install water quality structures to treat drainage from the site. Stormwater from the site would be controlled to meet Council's requirements of consistency in water quality and quantity with predevelopment storm water patterns ie, neutral or no net increase on water quality and quantity as stated in Council's DCP.

### 5.2.5 Traffic

Vehicular access to the site is available from The Pulpit which is a perimeter collector road for the Tallwoods Village that carries traffic from the western parts of the village to the main entrance at Blackhead Road. Traffic from the site will travel along The Pulpit to Grange Avenue, and then to The Boulevard, which connects with Blackhead Road as the main entrance to the Tallwoods Village. All these roads are constructed as wide roads with high capacities that carry large volumes of traffic from the existing Tallwoods Village areas and would be capable of taking the additional traffic loads. Some treatment of intersections may be required as a result of additional traffic assessment for future development applications.

To ensure that appropriate provision is made for future traffic connections and control of access, the DCP for the land includes controls in relation to access to the site. The controls provide for:

- restriction of access to Blackhead Road, other than for emergency purposes (fire trail).
- provision of future access connection for land to the east and west.

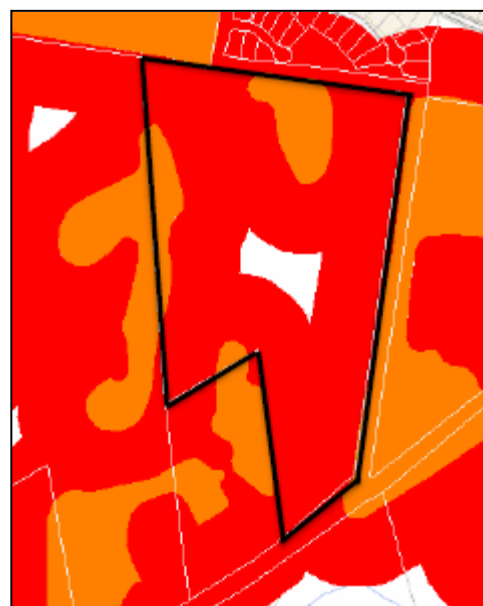
A traffic impact assessment was undertaken by Better Transport Future (Attachment F) following public exhibition in response to submissions regarding the suitability of the road infrastructure in the Hallidays Point area and in Tallwoods Village. This assessment demonstrates that any potential increased traffic from this development can be catered for within the existing road network.

### 5.2.6 Bushfire

The subject land is partly identified as Bushfire Prone Lands. The Bushfire Prone Lands map (right) shows:

- minimal Bushfire Prone vegetation on site
- limited to small woodland pockets on site and along western boundary
- narrow remnants of forest vegetation in road reserve and private land to the east
- buffer areas from this vegetation cover much of the site.

Compliance with the NSW Rural Fire Service Guideline *Planning for Bush Fire Protection 2006* has been examined in the Bushfire Assessment prepared for the site (Attachment C). This assessment has been prepared following initial consultation with the NSW Rural Fire Service.





The assessment has concluded that future development on site is capable of providing compliance with the planning principles of *PBP* and *Community Resilience Practice Note 2/12 – Planning Instruments and Policies*.

As outlined in section 4.2.4, consultation with the NSW Rural Fire Service has been undertaken. A copy of their response is provided in Attachment E, and they have advised that they have no objection to the planning proposal.

### **5.2.7 Heritage**

There are no items of European heritage identified on the land or on adjoining lands or on any land. The land does not contain any buildings or structures which would be considered to have heritage values.

Aboriginal cultural heritage has been investigated by Myall Coast Archaeological Services and included consultation with the Aboriginal community. The cultural heritage assessment did not identify any Aboriginal Cultural Heritage materials at the site or identify that the site was likely to contain such materials. The report concluded that the rezoning could proceed. The report has been refined following consultations with the NSW Office of Environment and Heritage (OEH). OEH have advised that they have no objection to the planning proposal as detail in their correspondence in Attachment E.

### **5.2.8 Land Supply**

The availability of developable land in Tallwoods has been examined in some detail. While there are undeveloped lots in the existing village area and areas of land zoned for residential use which have not yet been subdivided, only a small portion of this land can be developed without a higher level of site-specific structural design engineering solutions to accommodate slope constraints.

When Tallwoods was first developed, there was a rapid take-up of land in the first releases which were located in the southern parts of the site over the areas with gentler slopes where conventional housing forms could be constructed. These southern areas have been largely developed and there are few vacant lots in this area.

Other areas of the village are comprised of steeply sloping lots which do not facilitate conventional building forms and require site specific design solutions with significant allowance for the steep slopes as can be seen in the following photographs:





These lots are difficult to build on and have a limited market. There are very few lots left in the Tallwoods Village that provide opportunities for more affordable conventional housing options.

Land in the north eastern parts of the village area are zoned for standard residential development, however due to development costs on steeply sloping land and the limited market for such lots, the owner is currently developing the residential zoned land as large rural residential sized lots.

Given the limited supply of small residential lots which are suitable for more conventional housing, there is a demand for such lots and the subject site can supply such lots to meet this demand.

### **5.3 *Has the planning proposal adequately addressed any social and economic effects?***

The subject land is currently utilised for limited low scale grazing purposes and there would be no loss of significant agricultural production as a result of the proposal.

The proposal provides growth in the area consistent with the local strategies which promotes social and economic benefits for the area. The proposal will provide land suitable for conventional residential development which is not well supplied in the Tallwoods Village and will provide a broader range for the local market. Once approved the development will support the local construction industry and maintain/increase employment in this industry.

The site does not contain any items of European Heritage and would be unlikely to contain any items of significance. Aboriginal cultural heritage has been investigated by Myall Coast Archaeological Services and has included consultation with the Aboriginal community. The cultural heritage assessment did not identify any Aboriginal Cultural Heritage materials at the site or identify that the site was likely to contain such materials. The report concluded that the rezoning could proceed. This assessment has been reviewed by OEH who have raised no objection to the planning proposal.

## 6.0 State and Commonwealth Interests

### 6.1 Is there adequate public infrastructure for the planning proposal?

The proposal provides for a small amount of village expansion and does not involve a significant population increase. Servicing for the area is provided on the basis of the local growth strategies.

Service infrastructure required for the proposed subdivision will be for water, sewer, electricity and telecommunications. Water and sewer will be provided by MidCoast Water's reticulated water and sewerage systems. The site adjoins existing electricity services and will have access to electricity services, subject to necessary augmentation and reticulation in construction. Telephone services are available in the area and can be extended to future subdivision on the land. Public infrastructure is considered adequate for the proposal.

Consultation with MidCoast Water has been undertaken, and a copy of their correspondence is provided in Attachment E. MidCoast Water has advised that the site is located within water and sewer service areas and that there is sufficient capacity for development of the land.

### 6.2 What are the views of State and Commonwealth public authorities consulted in accordance with the Gateway determination?

The Gateway determination required consultation with the following authorities:

- Department of Planning and Environment;
- NSW Rural Fire Service; and
- MidCoast Water.

All required consultations have now occurred and the following table details the outcomes of these consultations. A copy of the correspondence received is provided in Attachment E.

Agency	Comment
Office of Environment and Heritage <b>29 March 2016</b>	Preliminary consultation and to seek advice on investigations for cultural heritage. Advice as follows: <ul style="list-style-type: none"><li>• OEH prefers application of the E2 zone to the area identified as E3 in the planning proposal</li><li>• providing requirements for the Aboriginal Cultural Heritage Assessments.</li></ul>
Office of Environment and Heritage <b>15 November 2016</b>	Response to information provided with the following noted: <ul style="list-style-type: none"><li>• object to planning proposal based on concerns with the Aboriginal Cultural Heritage Assessment</li><li>• request further consideration of biodiversity considerations including offset to provide for an "improve or maintain" outcome.</li></ul>
Office of Environment and Heritage <b>19 June 2017</b>	Advising that Aboriginal Cultural Heritage Assessment as revised addresses concerns raised and that OEH have no objections on the basis of Aboriginal Cultural Heritage.
NSW Rural Fire Service <b>24 March 2017</b>	RFS had no objection and provided the following comment: <ul style="list-style-type: none"><li>• any future residential subdivision development applications under S100B of the Rural Fires Act 1979 shall comply with the specifications and requirements of Planning for Bushfire Protection 2006</li></ul>

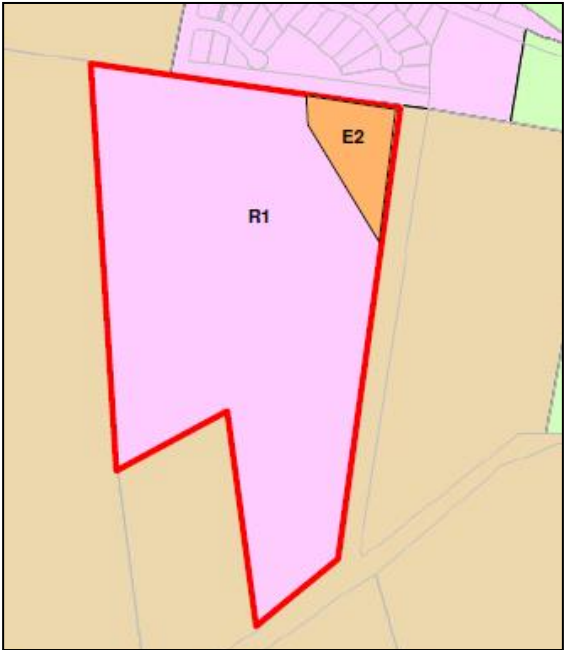

	<ul style="list-style-type: none"> <li>the future residential subdivision layout shall include public road linkages to existing lands immediately to the east and west of the subject land</li> <li>the future residential subdivision shall include an emergency road access from the proposed public road system to Blackhead Road.</li> </ul>
Mid Coast Water <b>25 November 2016</b>	The site is located within MidCoast Water's servicing area and can be serviced through an extension of both water and sewerage reticulation networks. No objection was raised with the following noted: <ul style="list-style-type: none"> <li>a water and sewer strategy will be required for future development</li> <li>all infrastructure shall be at the developers cost</li> <li>the developer will be required to obtain certificates of compliance and attainment from MidCoast water during development of the site.</li> </ul>

These matters have been addressed in the following manner:

- the area proposed to be zoned E3 - Environmental Management has been updated to the E2 - Environmental Conservation zone
- maintenance and improvement of ecological values have been included in a draft DCP which was exhibited concurrently with the planning proposal.
- an Aboriginal Heritage Assessment was been undertaken which satisfies OEH. A copy of this assessment is included in Attachment D. This planning proposal has been updated from the findings of this assessment.
- the DCP for the land included provisions for access provision/control consistent with the recommendations of the NSW Rural Fire Service.

## 7.0 Mapping

The proposed map changes are below.

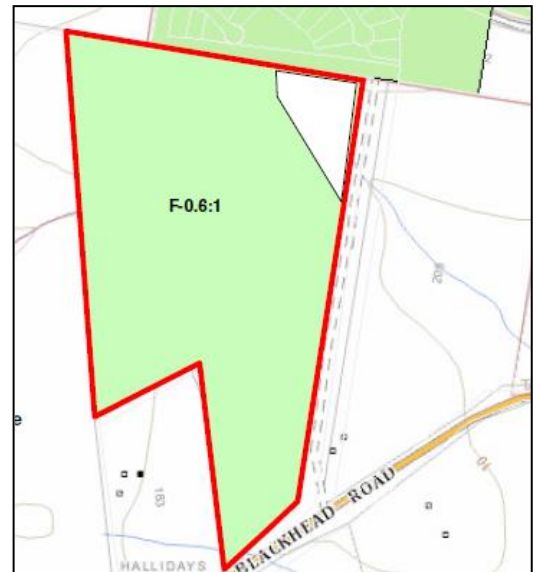
<p><b>Zone:</b>  Existing – RU1 Primary Production  Proposed – R1 General Residential and E2 Environmental Conservation</p> 	<p><b>Lot size:</b>  Existing – 40Ha for RU1 Primary Production  Proposed – 450m<sup>2</sup> for R1 General Residential and 40 Ha for E2 Environmental Conservation</p> 
---	--

**Height of buildings:**

Existing – not applicable  
Proposed – 8.5 metres for R1 General Residential  
and not applicable for E2 Environmental  
Conservation

**Floor Space Ratio:**

Existing – not applicable  
Proposed – 0.6:1 for R1 General Residential  
and not applicable for E2 Environmental  
Conservation



## 8.0 Community Consultation

The Gateway determination specified the community consultation required for the planning proposal.

Community consultation was undertaken from 30 August 2017 until 29 September 2017 (31 days) and involved:

- letters being sent to all neighbouring land owners
- letters sent to a number of potentially impacted residents along Grangewood Avenue
- notices in the Manning River Times, Wingham Chronicle and Great Lakes Advocate on 30 August 2017, 6 September 2017, 13 September 2017, 20 September 2017 and 27 September 2017;
- making the planning proposal available on Council's website, in the Taree and Forster Administration Buildings, and the Taree and Hallidays Point Libraries;
- an ABC radio interview about the proposal during the first week of exhibition; and
- a drop-in session between 3:30 pm and 5:30 pm on 20 September 2017 attended by approximately 60 people.

There were 9 submissions received which have been summarised and are included in Attachment G. The three main issues raised in submissions and during the drop-in session were:

- traffic – a traffic study was undertaken to consider the points raised in the submissions. The study confirmed the ability of the roads to support any potential increase in population resulting from the future development of the site
- concerns about the potential impact and suitability of the site for manufactured homes estates (raised by five submitters). While the applicant has not expressed a desire to develop the site for a manufactured home estate, it is a use that would be permitted with consent in the proposed R1 General Residential zone. The purpose of this planning proposal is to determine whether the land is suitable to be included in a residential zone, which is the case for this site. Any

decision to establish a residential use on the site, including a manufactured home estate, will be determined through a future development application. As a result of this it is recommended that Council continue with the proposed R1 zoning of this site

- the potential impacts of a population increase in this locality (raised by three submitters). This planning proposal is consistent with strategies developed for the Tallwoods Village since 2000. Steps have been taken to protect the environmental values on the site and ensure water and sewer is available. There are also mechanisms such as Section 94 contributions which are established to ensure the provision of necessary infrastructure and services as the population increases. The planning proposal is consistent with the strategic intent for the Tallwoods Village and any potential impacts will be considered through future development applications.

Based on these submissions, no changes were proposed to the planning proposal, apart from the inclusion of the traffic report.

## 9.0 Project timeline

The following timeline is anticipated for the planning proposal:

Task	Responsibility	Timeframe	Date (approx)
Draft planning proposal reported to Council for consideration	Greater Taree City Council		January 2016
Lodgement of planning proposal for Gateway determination	Greater Taree City Council		February 2016
Gateway determination	Department of Planning and Environment	4 weeks	February 2016
Additional investigations and assessments prepared	Proponent/MidCoast Council	24 weeks	November 2016
Consult with Agencies, refine planning proposal and draft DCP	Proponent/MidCoast Council	30 weeks	June 2017
Exhibition of planning proposal	MidCoast Council	Minimum 28 days	September 2017
Planning proposal reported to Council	MidCoast Council	4 weeks	February 2018
Making of Local Environmental Plan	MidCoast Council/Minister for Planning and Environment	6-8 weeks	February – April 2018

## **10.0 Attachments**

- A - Ecological Assessment
- B - Contamination Assessment
- C - Bushfire Assessment
- D - Cultural Heritage Assessment
- E - Correspondence from agencies following consultation
- F – Traffic report
- G – Summary of submissions

## ***Attachment A – Ecological Assessment***





**NATURECALL**  
ENVIRONMENTAL

# Statutory Ecological Assessment:

## **Project:**

Proposed Residential Development  
on Lot 612 DP 1160096, Blackhead Road,  
Halliday's Point.

## **Client:**

Coastplan Group Pty Ltd

September 2015



## Document Status

Version	Purpose	Author	Reviewed By	Approved By	Date
Rev 1	Draft	Karl Robertson	Jason Berrigan	Luke Bowden	29/9/2015

## Document Control

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Project Number: EC1089

Our Document Reference: EC1089-BEC-REP-0001-BlackheadRdSEA-rev1.0

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## Executive Summary

The study site is approximately 16.78ha in area and is located on Blackhead Road west of Tallwoods Village, near Hallidays Point. Blackhead Road runs to the south of the site and the Tallwoods estate entrance and golf course dams are located approximately 400m to the east. To the north, lies the western arm of the Tallwoods estate with access to the site gained from The Pulpit Rd. The remainder of the local landscape is largely cleared rural to rural-residential land, with a large body of forest to the northwest comprising the nearest locally significant body of habitat.

The proposal is to seek rezoning to allow a future residential development over the entire site, and as only a generic concept layout has been provided, it has been assumed that all vegetation outside the nominated drainage reserves on the property will be removed. This will result in the removal of approximately 2.4ha of disturbed woodland as well as the pastoral grassland on site.

The site's limited remaining forest vegetation simply consists of modified dry sclerophyll open forest dominated by Tallowwood, Forest Red Gum, Grey Ironbark, Spotted Gum and Small-fruited Grey Gum. It was characterised by no understorey, with groundcover dominated by Blady Grass, Kangaroo Grass, White Clover and Fireweed. The remainder of the site is essentially improved pasture apart from waterlogged area in the northeast drainage line which was dominated by sedges and wetland plants; and 3 dams dominated by wetland plants. An undeveloped Crown road reserve adjoins the east, and contains a strip of intact dry sclerophyll forest, which probably reflects the pre-European vegetation types which may have occurred on site.

The small patch of remnant sedges and wetland plants above the dam in the northeast drainage was considered to be a low quality example of a derived *Freshwater Wetland on Coastal Floodplains* EEC. This area occurred on alluvial soils (according to 1:25 000 mapping), contained floristics which matched the Final Determination, and its extent would be within the 1:100 ARI (not mapped). This EEC appears to have been derived from the EEC – *Subtropical Floodplain Forest on Coastal Floodplains*, which occurs as two small patches in the study area: one in the Crown road reserve in the northeast drainage depression, and the other in the Blackhead Rd reserve to the south. The local occurrence of these EECs appears to be essentially restricted to the study area due to clearing, pastoralism and road construction on adjacent lands. It is recommended to retain the EEC on site, and protect it with vegetated buffers and appropriate stormwater management (latter will also benefit the off-site EECs).

A fauna survey was undertaken over the site and used a range of techniques fauna such as spotlighting, habitat assessment and scat searched. This resulted in the detection of a single threatened fauna species– the Grey-headed Flying Fox. Common woodland and fauna such as Magpies, Kookaburras and Rainbow Lorikeets were the main species detected, as expected given the habitat and its landscape context. A handful of mostly wide-ranging threatened species were also considered to have limited potential to at best use the site and/or the study area as a small part of their home range depending on factors such as season and lifecycle stage.

It is acknowledged that the proposed development will have the generic negative effect of removal of some potential foraging habitat, loss of 2 hollow-bearing trees (incrementally contributing to Key Threatening Processes), and reduced carrying capacity. However, in context of the ecology of the known



and potentially occurring threatened species, and the site and study area's limitations: the proposal is not considered likely to have an impact of sufficient order of magnitude to place a local population at risk of extinction, provided the local occurrence of the EECs is retained.

Hence no referral to DotE or a Species Impact Statement is considered required.

## 1.0 Introduction

Biodiversity Australia Pty Ltd Trading as Naturecall Environmental (hereafter referred to as 'Naturecall') was requested by Coastplan Group Pty Ltd on behalf of the proponent to undertake the required ecological and statutory assessments for a proposed residential development on Blackhead Rd, Halliday's Point. This will form part of a planning proposal for a rezoning application that will be submitted to Greater Taree City Council (GTCC) to allow future residential development of the site.

The impact assessment for this development proposal has been undertaken in accordance with Section 5A of the *Environmental Planning and Assessment Act 1979*, as amended by the *Threatened Species Conservation (TSCA) Act 1995* which in turn has been amended by the *Threatened Species Conservation Legislation Amendments Act 2002* (Seven Part Test for Significance); NSW SEPP 44-Koala Habitat Protection (SEPP 44 assessment); and the Commonwealth *Environment Protection and Biodiversity Conservation (EPBCA) Act 1999* - Matters of National Environmental Significance. The objective of this assessment was to demonstrate that rezoning to allow residential development can be achieved with these statutory provisions.

The survey and assessment was performed in consideration of the draft *Threatened Species Survey and Assessment – Guidelines for Developments and Activities* (DEC 2004), and the *Threatened Species Assessment Guidelines – Assessment of Significance* (DECC 2007). The assessment has also been undertaken in accordance with the Ecological Consultants Association of NSW – Code of Ethics (2002) available at [www.ecansw.org.au](http://www.ecansw.org.au).

## 2.0 Background Information

### 2.1. Key Definitions

The **study site** is defined as Lot 612 DP1160096 which is the land subject to the proposed future development, and is approximately 16.8ha in area.

The **study area** is generally defined as land within 100m of the study site (approximate extent of detectable influence of most indirect impacts eg edge effects). The locality is defined as land within 10km radius of the site. These definitions are in line with DECC (2007).





## 2.2. Location of the Study Site

The site located on Blackhead Road, approximately 4.2km west of Halliday's Point (see Figure 1). It occurs directly south of the western section of the Tallwoods Village, a larger developing residential estate (approximately 150ha) which comprises a golf course and club encircled by Tallwoods estate.

Blackhead Rd serves as the southern border to the site.

## 2.3. Development Proposal

The proponent has engaged Coastplan to prepare a planning proposal to allow rezoning of the land to allow a future residential development. A preliminary concept have been provided for this assessment, and is shown in Figure 2.

This plan is conceptual only, and can be modified to have regard for various constraints (Mr Gavin Maberly-Smith, pers. comm.), but the general extent and orientation is expected to be similar to that proposed.

## 2.4. Soils, Topography and Geology

The site falls over a low ridgeline running roughly north-south, with an elevation of 30m along the northwestern boundary, falling to 10m in the southeastern boundary. The upper limits of three drainage depressions occur on site – one on the southern end, one in the west-northwest, and one in the northeast. All three have had a small dam (<10m wide) constructed within them near the boundary fence. These do not have defined channels on site, hence are considered open drainage depressions.

As shown in Figure 3, the southern and northeastern drainage depressions contains areas mapped as alluvial formations described as 'high-level terrace' and 'valley fill'. These formations are reportedly comprised of silt, gravel, clay and fluvial sand, and are elevated well above the nearest active alluvial plain formations to the south associated with Darawank Creek and Frogalla Swamp (Troedson & Hashimoto 2008). Soils encountered throughout the site consist of grey silty-clay loams. Surface rocks were found to be generally scarce and no rock outcrops were observed.

## 2.5. Landuse and Disturbance History

The subject land has clearly been long mostly cleared and converted to beef cattle grazing on improved pastures, and is currently maintained for this use. Remnant native vegetation is limited to two main clumps of regrowth forest, some scattered paddock trees, and some remnant wetland vegetation in the northeast drainage depression. Regeneration is minimal due to cattle grazing and routine maintenance.

The vegetation in the forested road reserve was also noted to be predominantly even-aged regrowth with limited mature trees. Habitat here is subject to the extremes of edge effects due to its extremely high edge to volume ratio.



Figure 1: Site location

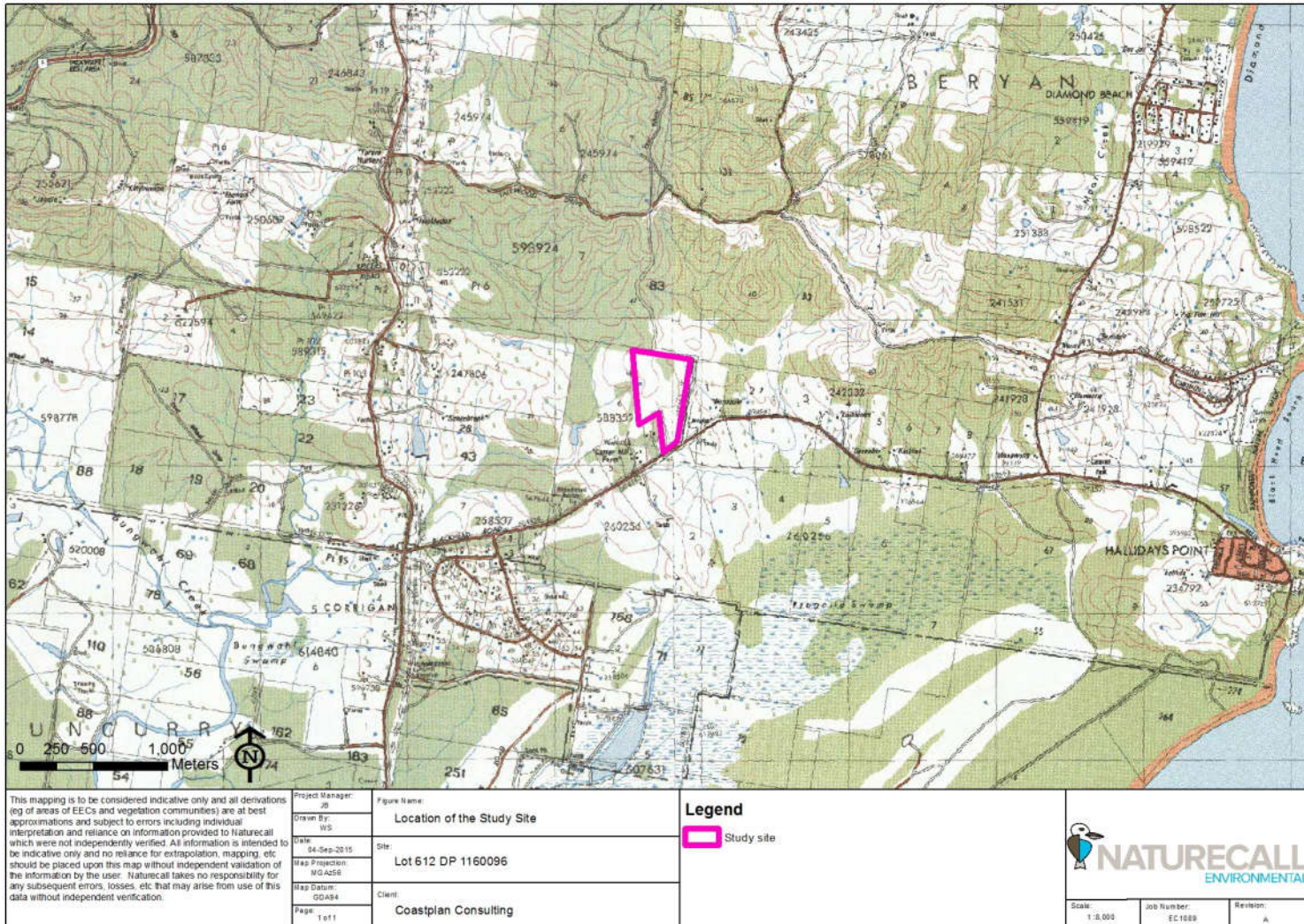
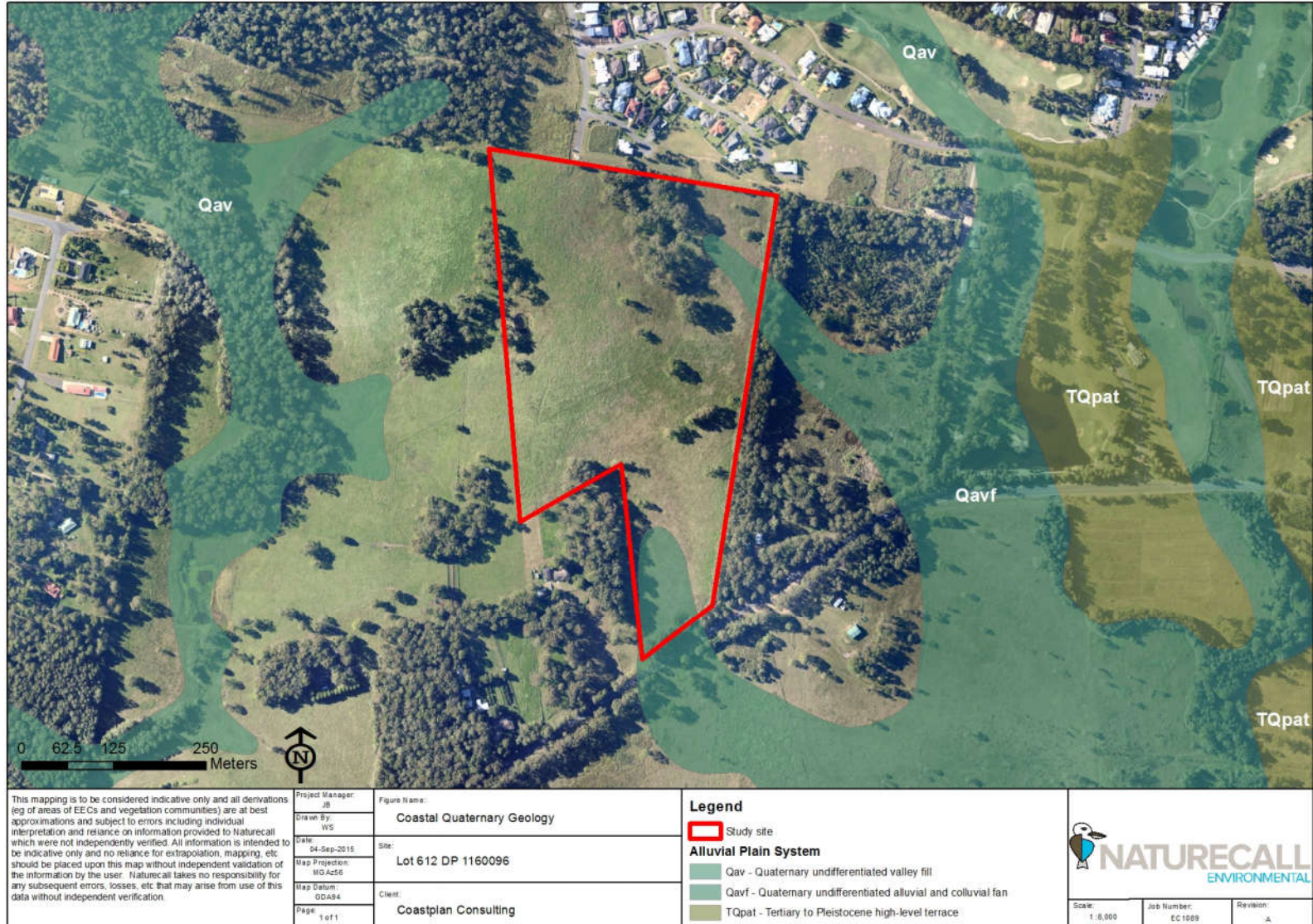






Figure 3: Coastal quaternary geology





## 2.6. Adjacent Developments and Activities

In the wider study area, historic disturbances such as logging and agriculture and more recently, clearing associated with the Tallwoods Village and golf course have resulted in fragmentation, simplification of species and structural diversity, reduction of potential fauna habitat, weed invasion and increased pressure from predation by dogs and cats.

The site adjoins the western side of Tallwoods village to the north, and will form a southwest extension if residential development is approved. A large lot development occurs approximately 500m to the west. Mostly cleared rural properties occur on adjoining land to the south, west and immediately east.

Beyond here, the local landscape consists of a mosaic of rural-residential areas, partially cleared rural properties, and native forest on private land and Mid Coast Water holdings. Frogalla Swamp and Darawank Nature Reserve occur to the south, and extensive forest (evidencing intensive logging) contained within Kiwarrak State Forest, Talawahl Nature Reserve and Khappinghat Nature Reserve occurs further to the north and northwest

## 3.0 Survey Methods

### 3.1. Flora

Previous survey has been undertaken by Travers Bushfire and Ecology (2014), hence the flora survey was limited to:

- Review of potential occurrence of any Endangered Ecological Communities
- Searches for threatened species.

#### 3.1.1. Known Threatened Flora Records

A search of the OEH Atlas of Wildlife (OEH 2015) indicated that 5 threatened species occur within 10km of the site. These are shown in the following table.

**Table 1: Threatened Flora recorded species in the locality**

Common Name	Species	Legal Status	Distance from Study Site/General Location
Dwarf Heath Casuarina	<i>Allocasuarina defungens</i>	E-TSCA, E-EPBCA	Nabiac sand plains, Aerodrome Road, Khappinghat Creek area
Trailing Woodruff	<i>Asperula asthenes</i>	V-TSCA, V-EPBCA	Darawank, Frogalla Swamp
White-Flowered Wax Plant	<i>Cynanchum elegans</i>	E-TSCA, E-EPBCA	Saltwater Reserve, Black Head
Noah's False Chickweed	<i>Lindernia alsinoides</i>	E-TSCA	Failford, Wallamba River
Rainforest Cassia	<i>Senna acclinis</i>	E-TSCA	Red Head, Hallidays Point, Black Head,



### 3.1.2. Survey Methods

The flora survey essentially routinely consists of two components:

- Identification, mapping and condition assessment of any Endangered Ecological Communities listed under the *Threatened Species Conservation Act 1995* (TSC Act), and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Searches for and (if found) mapping of threatened species listed under the *Threatened Species Conservation Act 1995* (TSCA), and *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA).

#### 3.1.2.1. Vegetation Communities

##### **Species Identification:**

Species identification was made with the assistance of PlantNET, GTCC (2007), Bale (1993), Beadle (1982), Harden (1990, 91, 92, 93, 2000), Williams and Harden (1984), Williams and Harden (1980), Robinson (1994), and Brooker and Kleinig (1999). Plant species were identified to species or subspecies level and nomenclature conforms to that currently recognized by the Royal Botanic Gardens and follows Harden and PlantNET for changes since Harden (1990-1992, 2000).

##### **Conservation Status Assessment:**

Identification of possible Threatened Ecological Communities (TECs) was based on the data collected by the survey and review of the relevant listings on the OEH website ([www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)) and Department of Environment – MNES SPRAT website (DoE 2014a)

#### 3.1.2.2. Threatened Flora

##### **Searches:**

Searches for the locally recorded threatened flora recorded in the LGA and regionally (OEH 2015a, DoE 2015b) in similar habitats to those occurring on the site (see Appendix 1), were carried out over the survey period.

The site was intensively searched over one day by two ecologists, consisting of undertaking random meanders and targeted habitat searches over the entire site.

##### **Potential Occurrence Assessment:**

Potential occurrence assessment of threatened flora species is provided in Appendix 1. This section assesses all considered threatened species listed under the TSCA 1995 and EPBCA 1999 for their potential to occur on site based on the following factors (DEC 2004, Forest Fauna Surveys 1997, DECC 2007):

- Presence/absence of suitable habitat.
- Condition and disturbance history of habitat.
- Local and regional records.



- Location of site within known distribution of the species.
- Connectivity with habitat where species is known to occur.

## 3.2. Fauna

### 3.2.1. Survey Methods

All field surveying was conducted as per the conditions of the consultant's Animal Research Authority and Section 120 Scientific License.

#### 3.2.1.1. Habitat Evaluation and Fauna Survey Methodology

The site was surveyed to determine the available potential habitats, and the support value of these habitats for threatened species. Habitats were defined according to parameters such as:

- Structural and floristic characteristics of the vegetation e.g. understorey type and development, crown depth, groundcover density, etc.
- Degree and extent of disturbance e.g. fire, logging, weed invasion, modification to structure and diversity, etc.
- Soil type and suitability e.g. for digging and burrowing.
- Presence of water in any form e.g. dams, creeks, drainage lines, soaks.
- Size and abundance of hollows and fallen timber.
- Availability of shelter e.g. rocks, logs, hollows, undergrowth.
- Wildlife corridors, refuges and proximate habitat types.
- Presence of mistletoe, nectar, gum, seed, sap, etc. sources.

Species identification was assisted by Morcombe and Stewart (2010), Pizzey and Knight (2003), Tyler and Knight (2009), Wilson and Knowles (1992), Strahan (2008), Triggs (1996), Robinson (1996), Swan *et al* (2004) and Schodde and Tideman (1990).

#### 3.2.1.2. Spotlighting and Stag Watching

Spotlighting was conducted for 1 hour by 2 ecologists for 1 night. This was more than sufficient to completely cover the small site and the adjacent Crown Road reserve, inspect the crown of every tree on site, and minimise disturbance to surrounding residents caused by barking dogs. The procedure involved walking with a hand held 50 watt spotlight over the site, targeting the trunks and branches of canopy trees and understorey.

Stag watching involved observing hollow-bearing trees on dusk with binoculars to watch for signs of fauna emerging from the hollows. Only one tree per night was watched and this was conducted for a total of 0.75 hours by 2 ecologists for 1 night giving a total of 1.5 hours spent on the activity during the survey. Stag watching coincided with call playback surveys on and after dusk.

Conditions varied from clear to partially overcast. Wind was very light to placid.



### 3.2.1.3. Diurnal Bird Survey

Birds were generally surveyed by detecting calls and searching by binoculars during area searches over the whole site and actively listening/searching for birds. A total of 5 hours was spent on this activity. Birds were also surveyed opportunistically during other activities eg flora survey and spotlighting.

This information provided short-term data on bird occurrences in the area for the particular season (DEC 2004).

### 3.2.1.4. Herpetofauna and Secondary Evidence Searches

Physical habitat searches of the site were undertaken each day during the survey in early January. Survey involved:

- Lifting up of debris to search for reptiles and frogs.
- Inspection of dense vegetation for bird nests.
- Raking of leaf litter for frogs and reptiles.
- Observation of likely basking sites (ie reptiles and frogs).
- Searches for scats, tracks, digging and scratches (eg Koala, gliders, etc) over the site.
- Searches for scats, owl regurgitation pellets and guano deposits under every tree.
- Census and binocular inspection of tree hollows within the study area for signs of use eg worn edges.

A total of 4hrs was specifically spent on general habitat searches by two ecologists.

### 3.2.1.5. Koala Survey

Survey for Koalas over the site consisted of diurnal searches, scat surveys as per the Spot Assessment Technique (SAT) and spotlighting for 1 night. This is detailed further in Appendix 4.

### 3.2.1.6. Habitat Tree Survey

All hollow-bearing trees on site were located and recorded using an Ipad with GIS Kit Pro (Garafa Inc). Each tree was quantified (number of hollows, location in tree and aperture diameter),

This collated information is provided in Appendix 3 and location is shown in Figure 6.

## 3.3. Survey Limitations

### 3.3.1. Flora

The study site was intensively traversed by foot during specific flora surveys and during other survey activities during the survey period. The survey was undertaken in spring when many plants are in a high growth or flowering phase. This, and the extremely high accessibility of the site and limited diversity, resulted in a very high detection rate of plants present.





Regardless, any short-term survey will only provide a list of plants detected during a brief interval of time (DEC 2004). The total species list of an area is usually much greater than can be detected in such a short time and it can be influenced by factors such as: size of the property, fire history, time since disturbance, flowering season (particularly orchids), and presence of reproductive material (DEC 2004).

### 3.3.2. Fauna

Fauna detectability is limited by seasonal, behavioural or lifecycle characteristics of each species, and even by habitat variations (e.g. flowering periods), which can occur within a year, between years, decades, etc (DEC 2004).

The site was only subject to a field survey over 1 day, however has been previously surveyed by Travers Bushfire & Ecology (2004, 2104) over a collectively longer period. This thus provides a range of seasons and weather conditions over which the site has been surveyed.

To counter these limitations, qualitative and quantitative habitat evaluation was used as well as a suite of standard ecological field survey techniques to assess the site's significance to threatened species. Habitat evaluation conservatively assesses the potential occurrence of threatened species based on potentially suitable habitat and local records, providing a prediction of the likelihood of a particular threatened species occurring in the study area (DEC 2004, DECC 2007, Forest Fauna Surveys 1997). It relies on the ecologist's knowledge, literature review and observation skills, and hence any assessment must be objective and justified.

## 4.0 Survey Results

### 4.1. Overview of Site Vegetation Communities

The vegetation on site predominantly consists of two main patches of regrowth dry sclerophyll forest with scattered paddock trees over introduced pasture. These remnants are highly modified due to grazing as demonstrated in photo 1.

The northeast drainage depression above the dam contains the vestigial remnants of what was probably swamp forest ie common sedges and herbs. The 3 dams in each of the drainage depression also contains wetland vegetation in these artificial habitats which may have colonised from former on-site populations, or more likely introduced via waterfowl.



**Photo 1: Area of disturbed open woodland in the north of the site.**



## 4.2. Threatened Ecological Communities and Populations

### 4.2.1. Study Area EECs

As summarised below, the study area contains areas of vegetation that appears likely to be qualify as an Endangered Ecological Community (EEC) listed under the TSCA 1995:

#### 4.2.1.1. Site Evaluation - Subtropical Coastal Floodplain Forest EEC

##### Final Determination Listing Criteria

“*Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion*” is a characteristic ecological community associated with clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. *Subtropical Coastal Floodplain Forest* (SCFF) generally occurs below 50 m, but may occur on localised river flats up to 250 m elevation in the NSW North Coast bioregion. While the composition of the SCFF tree stratum varies considerably, the most widespread and abundant dominant canopy trees include *Eucalyptus tereticornis*, *E. siderophloia*, *Corymbia intermedia*, and *Lophostemon suaveolens* (latter only north of the Macleay floodplain).

##### a) Geomorphological Criteria:

Figure 3 shows that at the 1:25 000 scale, the southern and northeastern drainage depressions are mapped as containing alluvial soil landscapes (Troedson *et al* 2008). On-site soil tests have not been undertaken to verify this mapping (eg these soils could be colluvial), or that these soils dominate the root zone and hence influence the supporting vegetation. Hence in the absence of this site-specific



information, the Precautionary Principle applies and it is assumed that the soil horizon is dominated by alluvial soils.

Hence this key criterion is considered satisfied for these two areas.

b) Floristic Criteria:

There are two areas within the study area which have the floristic characteristics of the *Subtropical Coastal Floodplain of the NSW North Coast* EEC. These areas occur immediately outside the eastern site boundary directly east of the dam in the northeast drainage line, and immediately south of the site's southern boundary.

The assemblage of flora species which appear to occur on the alluvial soil landscape in these areas is considered to readily meet the floristic criteria of this EEC as listed under the Final Determination (see floristic list in Appendix 2). This includes dominance by the canopy/understorey species *Eucalyptus tereticornis* and *Corymbia intermedia*; along with understorey and groundcover species such as *Callistemon saligna*, *Breynia oblongifolia*, *Entolasia marginata*, *Echinopogon caespitosus*, *Notelaea longifolia* and *Lomandra longifolia*.

c) Conclusion:

Based on legal precedents and the Precautionary Principle (*CBD Prestige Holdings Pty Ltd v Lake Macquarie City Council [2005] NSWLEC 367*, *Gales Holdings Pty Limited v Tweed Shire Council [2008] NSWLEC 209*, *Motorplex (Australia) Pty Limited v Port Stephens Council [2007] NSWLEC 74*, *NSWSC 2004a*), the open forest occurring on the outside of the eastern and southern site boundaries of the site on alluvial soils qualifies as part of the "*Subtropical Coastal Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC*" as it matches the key floristic descriptors, soil type, habitat and ecological process indicators described by the NSW Scientific Committee's Final Determination (NSWSC 2004a).

This EEC is in poor condition however as a result of historical clearing, road construction and current agricultural practices. This has resulted in high edge effects and weed invasion of the understorey and groundcover



**Photo 2: *Subtropical Coastal Floodplain Forest* EEC in the eastern road reserve.**



**Photo 3: *Subtropical Coastal Floodplain Forest* EEC in the south of the study area.**





#### 4.2.1.2. Freshwater Wetlands on Coastal Floodplains of the NSW North Coast

##### Final Determination Listing Criteria

“*Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*” has been listed as an Endangered Ecological Community under the TSC Act 2004. This EEC is associated with periodic or semi-permanent inundation by freshwater, (including areas with minor saline influence). They typically occur on silts, muds or humic loams in depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains ie habitats where flooding is periodic and standing fresh water persists for at least part of the year in most years. *Freshwater Wetlands on Coastal Floodplains* (FWCF) generally occur below 20m elevations, and the structure of the community varies from sedgeland and reedlands to herbfields. Woody species of plants are generally scarce. The structure and composition of the community varies both spatially and temporally depending on the water regime (Yen and Myerscough 1989, Boulton and Brock 1999).

##### a) Geomorphological and Habitat Criteria:

Figure 4 shows that at the 1:25 000 scale, the southern and northeastern drainage depressions are mapped as containing alluvial soil landscapes (Troedson *et al* 2008). On-site soil tests have not been undertaken to verify this mapping (eg the soils could be colluvial), or that these soils dominate the root zone. Hence in the absence of this site-specific information, the Precautionary Principle applies and it is assumed that the soil horizon is dominated by alluvial soils. The Final Determination also states that this EEC generally occurs below 20m elevation and in depressions: both criteria are met on site in these areas mapped as containing alluvial soils.

Dams occur on both drainage depressions mapped to contain alluvial soils. These have artificially created permanent water conditions. These do not form part of the EEC habitat as the Final Determination states “*artificial wetlands created on previously dry land specifically for purposes such as sewerage treatment, stormwater management, and farm production, are not regarded as part of the community*” (NSWSC 2004a). Dr David Keith, whose paper led to the Final Determinations for these EECs, confirmed via email that artificial dams on floodplains were encapsulated within this exclusion (Dr David Keith, pers. comm.).

##### b) Floristic Criteria:

The two dams in the foot of the on-site extent of the drainage depressions contain vegetation indicative of this EEC, but their habitat is excluded from the Final Determination. Hence the dam vegetation are not examples of this EEC.

The vegetation in the remainder of the drainage depressions have both been highly modified by pasture improvement, with native species completely displaced in the southern drainage line. Outside the dam, this area was also noted to be dry and hence not subject to waterlogging and hence conditions conducive to supporting vegetation indicative of this EEC. Hence ecological processes defining this EEC are considered ineffective, and no viable seedbank is likely to be present. The EEC is thus considered extinct site in this area.

Conversely, above the dam in the northeast drainage is a localised area of highly waterlogged soil. The site visit occurred after a relatively prolonged dry period (as indicated by low water levels in the dams),



yet this area was boggy. The soils were noted to be muddy, and while pasture species were co-dominant, several indicative wetland species (eg *Carex appressa*, *Ludwigia peploides*, *Persicaria lapathifolia*, *Persicaria strigosa*, *Philydrum lanuginosum*, and *Ranunculus inundatus*) listed in the Final Determination were present in localised abundance in this area. Given wide ranges in hydrological conditions are typical of Australian wetlands (as acknowledged in the Final Determination), the species assemblage of both native and pasture species here is expected to vary with conditions, hence actual diversity could vary. Legal precedents have also clarified that to qualify as an EEC, a given area does not have to contain a threshold proportion of the species listed: it needs only to demonstrate the underlying processes are active and that a viable seedbank is present (eg *Dazdon Pty Ltd v Ku-ring-gai Council [2009] NSWLEC 1147*, *Murlan Consulting Pty Limited v Ku-ring-gai Council [2007] NSWLEC 374*). This area is thus considered to be a degraded example of this EEC, subject to confirmation of soil geomorphological origins.

This area of EEC is probably the vestigial remnants of the original occurrence of the EEC – Subtropical Coastal Floodplain Forest, prior to clearing. This is evidenced by the dominance of several ground layer species in both EECs on site and in the study area; and that the Final Determinations accounts for such derivations.

c) Conclusion:

Based on legal precedents and the Precautionary Principle (*CBD Prestige Holdings Pty Ltd v Lake Macquarie City Council [2005] NSWLEC 367*, *Gales Holdings Pty Limited v Tweed Shire Council [2008] NSWLEC 209*, *Motorplex (Australia) Pty Limited v Port Stephens Council [2007] NSWLEC 74*, *NSWSC 2004a*), a localised area above the dam in the northeast drainage depression qualifies as part of the “*Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*”, as it matches the key floristic descriptors, soil type, habitat and ecological process indicators described by the NSW Scientific Committee’s Final Determination (NSWSC 2004a)

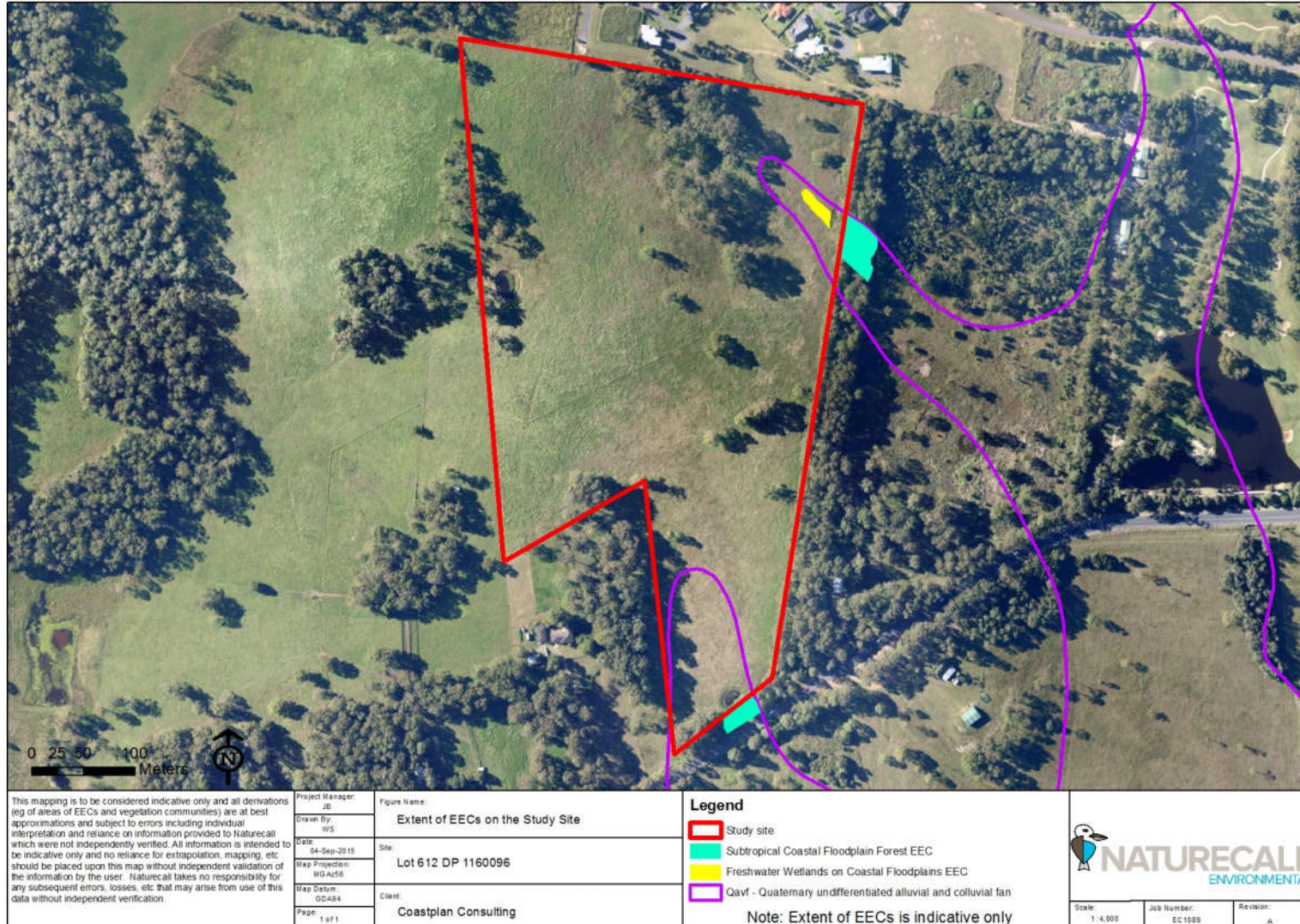


**Photo 4:** *Freshwater Wetland EEC* in the northeast of the site





Figure 4: EEC locations on site







#### 4.2.2. Other listed TECs and Endangered Populations

The following table reviews other TSCA and EPBCA listed TECs and Endangered Populations for occurrence:

**Table 2: Review of TECs and Endangered Populations**

Act	Literature Review	Significance
TSC Act	<p>“River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions” is an EEC associated with silts, clay-loams and sandy loams on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. River-flat Eucalypt Forest on Coastal Floodplains (RfEF) generally occurs below 50m elevations, but may occur on localised river flats up to 250m above sea level. In the North Coast, the most widespread and abundant dominant trees include <i>Eucalyptus tereticornis</i>, <i>E. amplifolia</i>, <i>Angophora floribunda</i>, <i>A. subvelutina</i>, <i>E. saligna</i> and <i>E. grandis</i></p>	<p>Vegetation meeting the floristic and geomorphological criteria of this EEC does not occur on the site or in the study area.</p>
TSC Act	<p>“Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions” is a characteristic ecological community listed as Endangered under the TSC Act 2004. This EEC is associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Swamp Sclerophyll Forest on Coastal Floodplains (SSFCF) generally occurs below 20 m (though sometimes up to 50 m) elevation, often on small floodplains or where the larger floodplains adjoin lithic substrates or coastal sand plains. The structure of the community is typically open forest (but may be reduced to scattered trees via disturbance), and in some areas the tree stratum is low and dense ie a scrub. The community also includes some areas of fernland and tall reedland or sedgeland where trees are very sparse or absent. The most widespread and abundant dominant trees include <i>Eucalyptus robusta</i> and <i>Melaleuca quinquenervia</i>.</p>	<p>Vegetation meeting the floristic and geomorphological criteria of this EEC does not occur on the site or in the study area</p>



Act	Literature Review	Significance
TSC Act	<p>“Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions” is an EEC associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. Swamp Oak Floodplain Forest (SOFF) generally occurs below 20 m (rarely above 10 m) elevation. The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees. SOFF has a dense to sparse tree layer in which Swamp Oak (<i>Casuarina glauca</i>) is the dominant species. Other trees including <i>Acmena smithii</i>, <i>Glochidion</i> spp. and <i>Melaleuca</i> spp. may be present as subordinate species. The understorey is characterised by frequent occurrences of vines ie <i>Parsonsia straminea</i>, <i>Geitonoplesium cymosum</i> and <i>Stephania japonica</i> var. <i>discolor</i>, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter.</p>	<p>Vegetation meeting the floristic and geomorphological criteria of this EEC does not occur on the site or in the study area.</p>
TSC Act	<p>“Lowland Rainforest on Floodplains on the NSW North Coast Bioregion” generally occupies riverine corridors and alluvial flats with rich, moist silts often in sub-catchments dominated by basic volcanic substrates. Small, scattered remnants remain on the floodplains of the Tweed, Richmond, Clarence, Bellinger, Macleay, Hastings, Manning, and Hunter Rivers. In its natural state, this community supports a rich diversity of flora and fauna. Tree species often present include Figs, (<i>Ficus</i> spp.), Palms (<i>Archontophoenix cunninghamiana</i>, <i>Livistona australis</i>), Lilly Pilly’s (<i>Syzygium</i> spp.) and vines (<i>Cissus</i> spp., <i>Pandorea pandorana</i>, <i>Flagellaria indica</i>).</p>	<p>Vegetation meeting the floristic and geomorphological criteria of this EEC does not occur on the site or in the study area.</p>
TSC Act	<p>“Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregion” has been listed as an Endangered Ecological Community since December 2006 on Schedule 1 – Part 3 of the TSC Act 1995. Lowland Rainforest, in a relatively undisturbed state, has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous and encompass a wide variety of shapes and sizes. Typically, the trees form three major strata: emergents, canopy and sub-canopy which, combined with variations in crown shapes and sizes, give the canopy an irregular appearance (Floyd 1990). The trees are taxonomically diverse at the genus and family levels, and some may have buttressed roots. A range of plant growth forms are present in Lowland Rainforest, including palms, vines and vascular epiphytes. Scattered eucalypt emergents may occasionally be present. In disturbed stands the canopy continuity may be broken, or the canopy may be smothered by exotic vines.</p>	<p>Vegetation meeting the floristic criteria of this EEC does not occur on the site or in the study area.</p>



Act	Literature Review	Significance
EPBC Act	<p>“<i>Lowland Rainforest of Subtropical Australia</i>” is found from Maryborough to the Hunter. Predominantly occurs on basalt and alluvial soils, or enriched rhyolitic and metasediments. Generally occurs &lt;300m above sea level but may occur &gt;300m on north-facing slopes, and only in areas with annual rainfall &gt;1300mm. May intergrade with Littoral Rainforest and Coastal Vine Thickets but usually occurs &gt;2km from ocean. Typically tall (20-30m) closed forest often with multiple tree layers dominated by diversity of rainforest species with emergent non-rainforest species constituting &lt;30%. Emergents are typically figs, Hoop Pine and Brushbox.</p>	<p>Vegetation meeting the floristic criteria of this EEC does not occur on the site or in the study area.</p>
TSC Act	<p>“<i>Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions</i>” is typically a closed forest, the structure and composition of which is strongly influenced by its proximity to the ocean. The plant species of this community are predominantly rainforest species while emergent Eucalypts or Lophostemons are present in some stands. This community grows only in coastal areas within maritime influence on sand dunes and soil derived from underlying rocks.</p>	<p>Vegetation meeting the floristic and geomorphological criteria of this EEC does not occur on the site or in the study area.</p>
EPBC Act	<p>“<i>Littoral Rainforest and Coastal Vine Thickets of Eastern Australia</i>” is a Critically Endangered Ecological Community listed under the EPBC Act 1999, which is generally identical to the TSC Act listing.</p>	<p>Vegetation meeting the floristic and geomorphological criteria of this EEC does not occur on the site or in the study area.</p>
TSC Act	<p>A localised population of a distinctive variation of <i>Glycine clandestina</i>, identified as <i>Glycine</i> sp. “Scotts Head”, has been listed as an Endangered Population. This population is restricted to part of the headland complex at Scotts Head.</p>	<p>The site is well beyond the range of this population.</p>
TSC Act	<p>“<i>Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregion</i>” has been listed as an Endangered Ecological Community under the TSC Act 1995. Coastal Saltmarsh is the ecological community occurring in the intertidal zone on the shores of estuaries and lagoons along the NSW coast. Characteristic species include: <i>Baumea juncea</i>, <i>Juncus kraussii</i>, <i>Sarcocornia quinqueflora</i>, <i>Sporobolus virginicus</i>, <i>Triglochin striata</i>, <i>Isolepis nodosa</i>, <i>Samolus repens</i>, <i>Selliera radicans</i>, <i>Suaeda australis</i>, <i>Zoysia macrantha</i>.</p>	<p>Vegetation meeting the floristic and geomorphological criteria of this EEC does not occur on the site or in the study area.</p>



Act	Literature Review	Significance
TSC Act	<p>“<i>White Box Yellow Box Blakely’s Red Gum Woodland</i>” is an EEC predicted to occur in Macksville, Dorrigo, Grafton, Kempsey, Korogoro Part, Nambucca, Coffs Harbour and Bare Part Atlas of Wildlife databases. This community is generally restricted to the tablelands and western slopes.</p>	<p>The site does not meet the floristic requirements of this EEC, hence it does not occur.</p>
	<p>“<i>Hunter Lowland Red Gum Forest in the Sydney Basin and North Coast Bioregions</i>” is an EEC found on gentle slopes arising from depressions and drainage flats on Permian sediments of the Hunter Valley floor in the Sydney Basin and NSW North Coast Bioregions.</p>	<p>The site vegetation does not meet the floristic criteria of this EEC and is located well beyond the range of this EEC.</p>
TSC Act	<p>The “<i>Population of Eucalyptus seeana in the Greater Taree Local Government Area</i>” has been listed as an Endangered Population.</p>	<p><i>E. seeana</i> does not occur on the site, and there are no records within 10km of the site.</p>
TSC Act	<p>“<i>White Gum Moist Forest in the NSW North Coast Bioregion</i>” is an ECC characteristically dominated by White Gum (<i>Eucalyptus dunnii</i>) either in pure stands or with <i>E. saligna</i>, <i>E. microcorys</i> and/or <i>Lophostemon confertus</i> (NSWSC 2008a). White Gum Moist Forest typically occurs on the escarpment slopes and foothills of the north-east NSW, most commonly between 400 and 650 m elevation, where mean annual rainfall exceeds approximately 1000 mm and has a summer maximum (DECC 2007) on fertile soils. It is currently known from the local government areas of Clarence Valley, Coffs Harbour, Kyogle and Tenterfield.</p>	<p>White Gum does not occur on the site, thus the EEC does not occur.</p>
TSC Act	<p>“<i>Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions</i>” is a Critically Endangered Ecological Community (CEEC). This CEEC occurs on Carboniferous sediments (often on limestone) mainly on rocky slopes. The community typically forms a low closed forest dominated by low trees, shrubs and vines. The canopy is dominated by both varieties of <i>Elaeodendron australe</i> (Red Olive Plum), <i>Geijera parviflora</i> (Wilga), <i>Notelaea microcarpa</i> var. <i>microcarpa</i> (Native olive), and <i>Alectryon oleifolius</i> subsp. <i>elongatus</i> (Western Rosewood). Emergent eucalypts are common and include <i>Eucalyptus albens</i> (White Box), <i>E. dawsonii</i> (Slaty Box), and <i>E. crebra</i> (Narrow-leaved Ironbark). Hunter Valley Vine Thicket has been recorded from the local government areas of Muswellbrook, Singleton, and Upper Hunter (NSWSC 2007b).</p>	<p>This community does not occur on the site which is located outside the prescribed range, thus the EEC does not occur.</p>



Act	Literature Review	Significance
TSC Act	<p>"<i>Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions</i>" is an EEC which occurs on Carboniferous sediments of the Barrington footslopes along the northern rim of the Hunter Valley Floor, where it occupies gullies and steep hill slopes with south facing aspects. The community usually forms a closed forest 15-20m high with emergent trees 20-30m high. Vines are abundant and there is a dense shrub and ground layer (NSWSC 2007c).</p>	<p>This community does not occur on the site which is located outside the prescribed range, thus the EEC does not occur.</p>
TSC Act	<p>"<i>Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions</i>" is an that belongs to the Maritime Grasslands vegetation class of Keith (2004) and its structure is typically closed tussock grassland, but may be open shrubland or open heath with a grassy matrix between the shrubs.</p>	<p>Vegetation meeting the floristic and geomorphological criteria of this EEC does not occur on the site or in the study area.</p>
TSC Act	<p>"<i>Carex Sedgelands of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions</i>" is a preliminarily listed EEC in marshy regions dominated by sedges, grasses and semi-aquatic herbs. The species dominants are <i>Carex appressa</i>, <i>Stellaria angustifolia</i>, <i>Scirpus polystachyus</i>, <i>Carex gaudichaudiana</i>, <i>Carex sp. Bendemeer</i>, <i>Carex tereticaulis</i> and <i>Isachne globosa</i>, either as single species or in combinations. Other common species include <i>Geranium solanderi</i> var. <i>solanderi</i>, <i>Haloragis heterophylla</i>, <i>Lythrum salicaria</i>, <i>Epilobium billardierianum</i> subsp. <i>hydrophilum</i> and <i>Persicaria hydropiper</i> (Hunter and Bell 2009).</p>	<p>Vegetation meeting the floristic and location criteria of this EEC does not occur on site or in the study area.</p>
TSC Act	<p>'<i>Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions</i>' is an EEC that generally occurs on floodplains and on floodplains and associated floodplain rises along the Hunter River and tributaries.</p>	<p>This community does not occur on the site or in the study area, which is located outside the prescribed range, thus the EEC does not occur.</p>
TSC Act	<p>'<i>Coastal Cypress Pine Forest in the NSW North Coast Bioregion</i>' is a distinctive vegetation community dominated by Coastal Cypress Pine (<i>Callitris columellaris</i>) and is typically found on coastal sand plains, north from the Angourie area on the far north coast of NSW.</p>	<p>The site/study area is far beyond the known range of this EEC and the Coastal Pine does not occur, thus the EEC does not occur.</p>



## 4.3. Threatened Flora

### 4.3.1. Result of Threatened Flora Survey

No threatened plants were recorded on the study site during the survey.

### 4.3.2. Potential Occurrence Assessment

Searches of relevant literature and databases (OEH 2015a) found records of 5 threatened flora species in the locality. This and other species recorded in the region and/or in broadly similar habitats are reviewed for potential occurrence in Appendix 1.

In regards to potential occurrence of these and most threatened flora, it should be noted that threatened plants often occur in habitats with a precise mix of essential ecological requirements, and not randomly in the landscape or a broad structural form of vegetation (eg dry sclerophyll forest). Such essential requirements may be a complex nexus of position, soil type (which affects fertility, acidity, etc) and climate, but may also include specific (sometimes symbiotic) association with fungi and bacteria (eg Proteaceae), dispersal vectors (eg bats) and disturbance regimes eg *Acacia aprica* will not recruit without a suitable fire regime (Vallee *et al* 2004). Absence of such essential habitat variables or their modification (eg by disturbance such as frequent fire) can thus reduce or negate a site's potential for such plants to occur. These often poorly understood ecological factors are also a major contributor in the reason that many translocations of threatened plants fail (Vallee *et al* 2004).

A long history of disturbance within the study area (e.g. extensive clearing, underscrubbing, slashing, pastoralism etc.) has resulted in major habitat changes that may have effectively precluded threatened flora species from occurring due to competition, habitat changes, isolation, etc.

Given this and that no threatened flora species were detected during the survey or have been recorded in the Tallwoods estate by previous studies (eg Naturecall 2014, Travers 2014, 2004), it is considered highly unlikely that any such species would occur within the study area (see Appendix 1). Thus no threatened flora species are considered in the subsequent statutory assessments.



## 4.4. Fauna Survey Results

### 4.4.1. Habitat Evaluation

The following table summarises the results of the habitat evaluation survey:

**Table 3: Habitat Evaluation Summary**

Habitat Attribute/Type	Site	Study Area	Potential Values to Threatened Species Occurrence
<b>Groundcover</b>	The site has been continuously grazed, hence current groundcover values are minimal. Composition ranges from native to exotic dominated areas and grasses are most common.	The area around the study site mostly consists of similar groundcover values to the west. East of the site there is a road reserve which was cleared approximately 20-30 years ago and has since been left to regenerate. Ground cover in this area is mainly typical of dry sclerophyll forest, with sedges locally dominant in the section of the drainage depression which crosses it. This habitat overall offers some	On site: Nil Study area: Insufficient extent, isolation and edge effects displaces potential occurrence of threatened small terrestrials eg Common Planigale.
<b>Leaf litter</b>	Very shallow patchy layer of leaf litter throughout two small patches of remnant forest.	Some leaf litter found in the road reserve to the east but no significant depth.	On Site: Nil. Study Area: Insufficient extent, isolation and edge effects displaces potential occurrence of threatened fauna which may use this habitat eg Three-toed Snake-toothed Skink.
<b>Logs and debris</b>	Only very small fallen timber with little habitat value ie no hollows.	Very limited – collected for firewood. No hollows.	On Site: Nil. Study Area: Nil



Habitat Attribute/Type	Site	Study Area	Potential Values to Threatened Species Occurrence
<p><b>Hollows</b></p>	<p>Only 2 hollow-bearing trees containing small hollows were identified on the site (eg Photo 6). See table in Appendix 3 for details and Figure 5 for location on site.</p>	<p>Few small hollows occur in a few trees in the road reserve to the east of the study site as limited age.</p>	<p>On Site: Limited potential to provide some limited habitat value for threatened species such as Yangochiropteran bats and small arboreal mammals. However, competition with common and woodland species would be high and a key limitation.</p> <p>Study Area: A small amount of marginal habitat exists for Yangochiropteran bat species and perhaps Squirrel Glider and Brushtailed Phascogale, however Insufficient extent, isolation and edge effects severely constrains potential occurrence.</p>
<p><b>Flowering canopy and understorey trees</b></p>	<p>A variety of myrtaceous tree species including Pink Bloodwood, Forest Red Gum, Tallowwood, Spotted Gum and Grey Ironbark, Several of these are winter-spring flowering, providing a diverse but still annually variable foraging resource for nectivorous bird species and arboreal mammals..</p>	<p>A variety of myrtaceous tree species including Pink Bloodwood, Forest Red Gum, Tallowwood, Spotted Gum and Grey Ironbark. Weeping Bottlebrush also present. Several of these are winter-spring flowering, providing a diverse but still annually variable foraging resource for nectivorous bird species and arboreal mammals.</p>	<p>On Site and Study Area: Grey-headed Flying Fox highly likely to use trees when flowering as part of local resource. Squirrel Glider unlikely due to Insufficient extent, isolation and edge effects.</p> <p>Likelihood of threatened birds using site trees very limited given competition with common woodland birds such as Noisy Miner and Rainbow Lorikeets, and other edge effects.</p> <p>Study Area: As for site and more abundant, Squirrel Glider unlikely due to Insufficient extent, isolation and edge effects.</p>





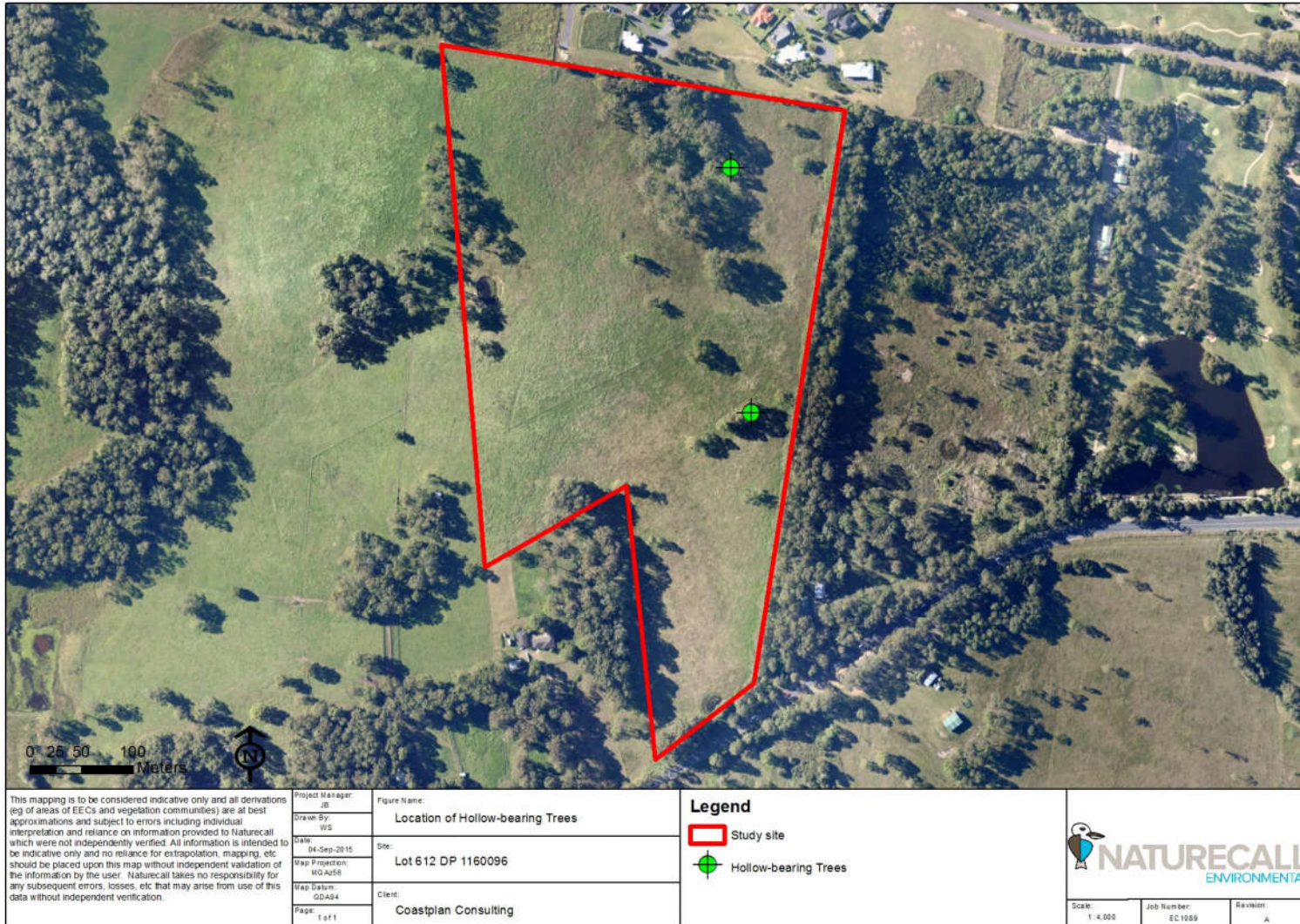
Habitat Attribute/Type	Site	Study Area	Potential Values to Threatened Species Occurrence
<b>Sap and gum sources</b>	Bloodwood, Small-fruited Grey Gum, Forest Red Gum, Grey Ironbark and less preferred Spotted Gum and Tallowwood are potential sap sources for Yellow Bellied Gliders (NPWS 2003a) and Squirrel Gliders.	As for site.	On Site and Study Area: A few small and quite old sap incisions noted. Isolation of site from forest precludes Yellow-bellied Glider; and edge effects (eg predator exposure), limited carrying capacity, poor connectivity and limited understorey are major limitations on the occurrence of Squirrel Glider.
<b>Primary preferred Koala browse trees</b>	Tallowwood, Forest Red Gum, and Small-fruited Grey Gum are preferred Koala food tree species (DECC 2008).	As for site.	On Site and Study Area: No evidence of the Koala was recorded on site. Site only provides minor foraging values due to its limited extent.
<b>Allocasuarinas</b>	No Allocasuarina or Casuarina species were found on site.	A number of Black Oak in the road reserve to the east of the site.	On Site: Nil Study Area: Potential to provide a minor foraging resource for the Glossy Black Cockatoo, however no evidence of foraging found during survey and is isolated from other habitat.
<b>Aquatic</b>	Three separate dams occur on site. The dams are relatively small in size, with the largest measuring approximately 0.3ha in the west, with the eastern and southern <0.1ha. All have good cover of aquatic vegetation including <i>Persicaria spp</i> , <i>Lomandra spp</i> , <i>Typha orientalis</i> , <i>Ludwigia peploides</i> etc.  Plague Minnow noted in two of the 3 dams (third too heavily vegetated).	Drainage depression was dry and lacked any defined scours or pools.	On Site: The on-site dams have no value for threatened frogs due to isolation from source habitat and non-breeding habitat.  The dams are not considered large enough to support even occasional foraging from the Black-necked Stalk.



Habitat Attribute/Type	Site	Study Area	Potential Values to Threatened Species Occurrence
<b>Fruiting species</b>	Absent.	Limited to Cheese Trees.	On Site: Nil. Study Area: No preferred forage species for threatened rainforest birds and no preferred sources for Grey-headed Flying Fox.
<b>Passerine bird habitat</b>	Poor habitat potential due to isolation, exposure, and lack of understorey and shrub layer. Area dominated by medium to large passerines typical of urban woodland habitats.	Some good structure but extreme edge to volume ratio and isolation from other habitat exposes nests and birds to extreme edge effects eg predation.	Poor prey potential for raptors dependant on smaller passerines. Very marginal to unsuitable for threatened passerines.
<b>Caves, cliffs, overhangs, culverts, bridges</b>	Absent.	Absent.	Nil
<b>Small terrestrial prey</b>	Minimal natural habitat for common terrestrial mammals, and very high predation risk (eg foxes).	Habitat potential in the road reserve to the east of the site is marginally better due to the presents of an understorey; however extreme edge to volume ratio and isolation from other habitat renders low diversity and abundance.	Minimal prey for forest owls, Quoll and diurnal raptors



Figure 5: Location of hollow-bearing trees on site





**Photo 5: Hollow-bearing tree in paddock**



**Photo 6: Hollow-bearing tree with old sap incisions in remnant forest**





## 4.4.2. Observed/Detected Fauna

### 4.4.2.1. Direct Sightings and Secondary Evidence

Only common medium small woodland birds were observed on and adjacent to the survey area. These included Laughing Kookaburra, Pied Butcherbird, Eastern Rosella, Magpie, Magpie Lark, Scaly-breasted Lorikeet and Noisy Miners.

The three dams on the site attracted common waterbirds such as the Wood Duck, and a Long-necked turtle was also observed in the larger western dam. These results were expected given the exposure of the site and high level of modification in the general area.

Only a small number of mammal species were opportunistically detected during the survey, a number of Red-necked wallabies, Eastern Grey Kangaroos and hares were observed during spotlighting.

A few small and old incisions indicative of gliders were observed on the Small-fruited Grey Gums on site. These were hypothesised to be from an old population of Sugar Gliders as no fresh marking were found and the low carrying capacity of the stand would exclude larger gliders.

### 4.4.2.2. Spotlighting and Stag Watching

In general, only a small number of common species were detected ie a number of Red-necked wallabies, Eastern Grey Kangaroos, hares and a number of sleeping birds. The Grey-headed Flying Fox was recorded as 3 animals foraging in flowering Grey Ironbarks in the road reserve.

### 4.4.2.3. Total Fauna Observed

The following table lists all fauna recorded by this survey

**Table 4: Fauna recorded on and adjacent to the site**

\* Indicates introduced species.

Observation Key: Obs – Observation; HC – heard calling

Group	Common Name	Species	Detection Method
Mammals	Red-necked Wallaby	<i>Macropus rufogriseus</i>	Obs, Scat
	Eastern Grey Kangaroo	<i>Macropus giganteus</i>	Obs, Scat
	European Hare*	<i>Lepus europaeus</i>	Obs, Scat
	Grey-headed Flying Fox	<i>Pteropus poliocephalus</i>	HC, Obs
Birds	Australian Raven	<i>Corvus coronoides</i>	Obs, HC
	Masked Lapwing	<i>Vanellus miles</i>	Obs
	Welcome Swallow	<i>Hirundo neoxena</i>	Obs
	Wood Duck	<i>Chenonetta jubata</i>	Obs
	Australian Magpie	<i>Cracticus tibicen</i>	Obs, HC



Group	Common Name	Species	Detection Method
	Magpie Lark	<i>Grallina cyanoleuca</i>	Obs
	Noisy Miner	<i>Manorina melanocephala</i>	Obs, HC
	Crested Pigeon	<i>Ocyphaps lophotes</i>	HC
	Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	Obs, HC
	Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>	Obs
	Southern Boobook	<i>Ninox boobook</i>	HC
	Galah	<i>Eolophus roseicapilla</i>	Obs
	Eastern Rosella	<i>Platycercus eximius</i>	Obs, HC
	Laughing Kookaburra	<i>Dacelo novaeguineae</i>	Obs
	Red Wattlebird	<i>Anthochaera carunculata</i>	Obs
	Willie Wagtail	<i>Rhipidura leucophrys</i>	Obs
Reptiles	Eastern long-necked turtle	<i>Chelodina longicollis</i>	Obs

## 4.5. Corridors and Key Habitats

Refer to Figure 6.

### 4.5.1. Regional and Sub-Regional Corridors

Regional corridors are typically >500m wide and provide a link between major and/or significant areas of habitat in the region. Ideally they are of sufficient size to provide habitat in their own right and at least twice the width of the average home range area of fauna species identified as likely to use the corridor (OEH 2015c, Scotts 2002). Sub-regional corridors connect larger landscaped features and are of sufficient width to allow movement and dispersal (generally >300m), but may not provide substantial species habitat (OEH 2015c, Scotts 2002).

The site and adjacent land within this section of the corridor are characterised by a mosaic of dry sclerophyll forest and cleared agricultural land. The western part of the site is currently mapped as part of a regional corridor and this section of land will be developed into residential dwellings and will retain very little to no value as a regional corridor post-development. While a negative effect, the section of corridor which the proposal will impact has very little value to the function of the overall corridor given:

- The small size of the land to be developed in comparison to the overall width of the corridor
- The lack of natural habitat within the corridor over the site overlap.



- The proposal does not create a barrier, restricting the movement of fauna along the overall corridor

Overall, the impacts which the proposed development will have on the Froggalla swamp, regional corridor are expected to be minimal.

#### 4.5.2. Local Corridors and Habitat Links

Local corridors provide connections between remnant patches of habitat and landscape features. Due to their relatively small area and width (they may be <50m), these corridors are subject to edge effects (OEH 2015c, Scotts 2002). Habitat links are evaluated in this report as links from habitat on site directly to similar habitat on adjacent land (Lindenmayer and Fisher 2006). These would be used by fauna, which depend solely or at least partially on the site for all of their lifecycle requirements, and/or dispersal (Lindenmayer and Fisher 2006).

The study area falls within a highly fragmented landscape due to a history of pastoralism. In this context, the site has only marginal connectivity to the extensive forest to the northwest, broken by pasture. The main patch of forest in the north offers some low value as a stepping stone from the forested road reserve on the eastern boundary to the southern limit of the large body of forest to the northwest, but the gap is >100m of open ground. These distances are in the upper limits of the range in which Squirrel Gliders and Brushtailed Phascogales will travel across fragmented landscapes (Gleeson and Gleeson 2012, van der Ree *et al* 2008, Goldingay *et al* 2011, van der Ree *et al* 2001), however it is not unknown for Koala's to travel these distances for foraging and dispersal purposes albeit at risk of predation or dog attack (McAlpine *et al* 2006, Wilkes and Snowden 1998).

The forested road reserve provides some local linkage from similar linear remnants in Tallwoods and adjacent land to the partially wooded road reserve along Blackhead Rd, but edge effects and narrow width severely limit its functional effectiveness. Furthermore, it only links to similar small linear remnants with limited carrying capacity, hence has minimal potential to be a likely corridor for threatened arboreals other than the Koala.

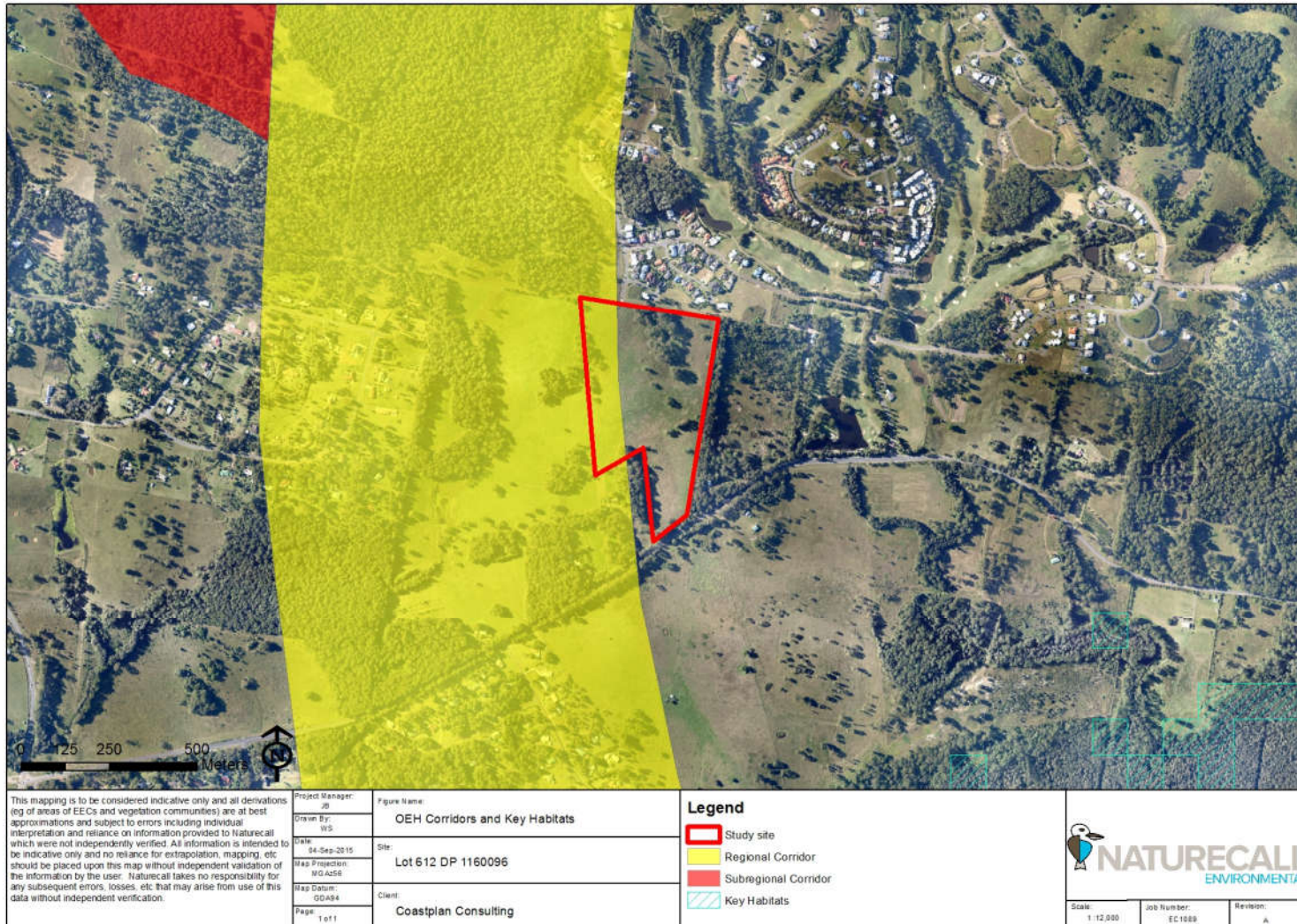
#### 4.5.3. Key Habitat

Key Habitats are areas of predicted high conservation value for forest faunal assemblages, endemic forest vertebrates or endemic invertebrates; spatially depicted as a merging of mapped assemblage hubs, assemblage hot spots and centres of endemism (OEH 2015c, Scotts 2002).

The site is not mapped as Key Habitat.



Figure 6: OEH corridors and key habitats







## 4.6. Locally Recorded Threatened Fauna

The following table lists threatened species known to occur in the locality (OEH 2015a). The study area is located on land and does not encompass any ocean or estuarine areas, thus sea birds, etc, are not considered in this assessment.

**Table 5: Locally recorded threatened fauna**

Group	Common Name	Species	Legal Status	Distance from Study Site
Frogs	Wallum Froglet	<i>Crinia tinnula</i>	V-TSCA	Failford, Darawank, Nabiac sandplains, Hallidays Point
Birds	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	E-TSCA	Darawank Swamp, Rainbow Flat, Khappinghat Nature Reserve, Hallidays Point,
	Black Bittern	<i>Ixobrychus flavicollis</i>	V-TSCA	Failford
	Square-tailed Kite	<i>Lophoictinia isura</i>	V-TSCA	Tallwoods Drive, Diamond Beach, Khappinghat Nature Reserve
	Eastern Osprey	<i>Pandion cristatus</i>	V-TSCA	Saltwater National Park, Diamond Beach, Black Head
	Pied Oystercatcher	<i>Haematopus longirostris</i>	E-TSCA	Darawank Nature Reserve
	Little Tern	<i>Sternula albifrons</i>	E-TSCA	Diamond Beach
	Glossy Black Cockatoo	<i>Calyptorhynchus lathami</i>	V-TSCA	Diamond Beach, Kiwarrak State Forest
	Little Lorikeet	<i>Glossopsitta pusilla</i>	V-TSCA	Failford, Rainbow Flat, Wallabi Point
	Powerful Owl	<i>Ninox strenua</i>	V-TSCA	Tallwoods reservoir, Hallidays Point, Wallabi Point
	Masked Owl	<i>Tyto novaehollandiae</i>	V-TSCA	Tallwoods area, Old Soldiers Rd, Black Head, North of Tuncurry
	Sooty Owl	<i>Tyto tenebricosa</i>	V-TSCA	Kiwarrak State Forest
	Varied Sittella	<i>Daphoenositta chrysoptera</i>	V-TSCA	Failford, Rainbow Flat
Mammals	Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V-TSCA, E-EPBCA	Rainbow Flat, northeast of Nabiac, Talawahl Nature Reserve,
	Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	V-TSCA	North Tuncurry, Tallwoods reservoir, Rainbow Flat, Diamond Beach, Kiwarrak State Forest, Talawahl Nature Reserve
	New Holland Mouse	<i>Pseudomys novaehollandiae</i>	V-EPBCA	Kiwarrak State Forest, Talawahl Nature Reserve
	Squirrel Glider	<i>Petaurus norfolcensis</i>	V-TSCA	Possum Brush, Failford, North Tuncurry, Hallidays Point, Diamond Beach, Black Head



Group	Common Name	Species	Legal Status	Distance from Study Site
	Koala	<i>Phascolarctos cinereus</i>	V-TSCA, V-EPBCA	Tallwoods area, Red Head, Hallidays Point, Khappinghat Nature Reserve, Kiwarrak State Forest, Talawahl Nature Reserve
	Grey-headed Flying Fox	<i>Pteropus poliocephalus</i>	V-TSCA, V-EPBCA	Failford, Hallidays Point, Diamond Beach, Tallwoods area, Kiwarrak State Forest, Rainbow Flat
	Little Bentwing Bat	<i>Miniopterus australis</i>	V-TSCA	Hallidays Point, Black Head, Failford
	Eastern Bentwing Bat	<i>Miniopterus schreibersii oceanensis</i>	V-TSCA	Tallwoods, Failford, Nabiac, Black Head
	Southern Myotis	<i>Myotis macropus</i>	V-TSCA	Failford Rd, Joes Cutting Rd
	Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V-TSCA	Failford, North Tuncurry
	East-coast Freetail Bat	<i>Mormopterus norfolcensis</i>	V-TSCA	Black Head, Failford, North Tuncurry, Hallidays Point,
	Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V-TSCA	Failford

The following species are considered likely to occur in the locality (excluding sea birds, etc.) due to suitable habitat and regional records (some have been recorded within 20km).

**Table 6: Regional threatened fauna potentially occurring in the locality**

\* listed under EPBC Act 1999.

Animal Group	Potentially Occurring Species
Mammals	Yellow-bellied Glider, Eastern Pygmy Possum, Common Planigale, Eastern Chestnut Mouse, *Long-nosed Potoroo, Rufous Bettong, *Dwyer's Bat, Eastern Cave Bat, Golden-tipped Bat, Yellow-bellied Sheath-tailed-bat, Common Blossom Bat.
Birds	*Red Goshawk, Barking Owl, Bush-stone Curlew, Barred Cuckoo Shrike, Rose-crowned Fruit Dove, Flame Robin, Scarlet Robin, Brown Treecreeper, Diamond Firetail, Grey-crowned Babbler, Hooded Robin, Speckled Warbler, *Australasian Bittern, Brolga, *Regent Honeyeater, Painted Honeyeater, *Eastern Bristlebird, Eastern Grass Owl, Wompoo Fruit Dove, Swift Parrot, Little Eagle.
Reptiles	*Three-toed Snake-tooth Skink, Pale Headed Snake, Stephens Banded Snake
Frogs	*Wallum Sedge Frog, *Giant Barred Frog, *Stuttering Frog, *Green and Golden Bell Frog, Green-thighed Frog

## 4.7. Potential Occurrence Assessment

### 4.7.1. New South Wales

Each of the species listed in the above two tables have been evaluated for their potential to occur on the study site/area, as well as for the likely significance of the proposal and thus their eligibility for Seven Part Test assessment, in Appendix 1.



From this assessment, threatened species considered to potentially use the site (at best as a small part of a wider foraging range) are listed in the following table:

**Table 7: Threatened fauna potentially occurring on or near the site**

Species	Occurrence Type	Occurrence Likelihood
Powerful Owl	Minute portion of large foraging territory, no suitable nesting hollows present.	At best very low chance foraging in study area.
Masked Owl	Minute portion of large foraging territory, no suitable nesting hollows present.	Low chance foraging in study area. Recorded nearby to east.
Square-tailed Kite	Site offers some generic foraging opportunities as minute part of large foraging territory. Generic nest potential.	Moderate to high chance foraging over study area as small part of range. Historical records in study area from 2003.
Glossy Black Cockatoo	Small area of potential foraging habitat in road reserve adjacent to site. At most used as minute fraction of local range centred in larger remnants to northwest and beyond. No potential nest trees in study area.	Low as seasonal opportunist depending on fruit abundance.
Little Lorikeet	Potential seasonal nectar source and a few potential nesting hollows although subject to high competition.	Low to unlikely chance of occurrence on site as small part of foraging range.
Squirrel Glider	A few potential sap trees however lack of understorey over most of site, lack of hollows and isolation are key limitations. Small area of potential habitat in Crown road reserve may offer marginal dispersal linkage. Unlikely to be resident in study area due to edge effects and insufficient carrying capacity.	Very low to unlikely chance of occurrence. Recorded in loosely connected habitat to southeast.
Brushtailed Phascogale	Small area of potential habitat in Crown road reserve may offer marginal dispersal linkage. Unlikely to be resident in study area due to edge effects and insufficient carrying capacity.	Low to very low chance of occurrence. Recorded in loosely connected habitat to northeast.
Koala	Site offers some generic foraging opportunities as a minute part of a large foraging territory	Low chance of occurrence. Recorded immediately north of the site as well as in loosely connected habitat to the north east
Little Bentwing Bat, Eastern Bentwing Bat	Generic overfly and foraging as part of large range. Potential roost in hollow bearing trees	Moderate chance of foraging on site.
Greater Broad-nosed Bat	Potential foraging on site. Potential roosts in tree hollows.	Fair chance of foraging and roosting.
East-Coast Freetail Bat	Potential foraging in canopy and cleared grassland on site. Potential roosts in tree hollows.	Fair chance of foraging and roosting.
Yellow-bellied Sheath-tailed Bat	The woodland which is situated along the eastern site boundary provides a windbreak which would be favourable to the Yellow-bellied Sheath-tail Bat.	Low chance of foraging in study area.



## 4.7.2. Commonwealth

The following species are considered by the DotE (2015a) Matters of National Environmental Significance search tool as potential occurrences in the locality. Marine birds, mammals and reptiles and all fish listed in the search are irrelevant as the site/study area does not contain habitat and the proposal has no potential to impact these species.

### Threatened Species:

The potential for these species to occur on the site is reviewed in Appendix 1.

**Table 8: EPBC Act threatened fauna species potential occurrence assessment**

Note: Likelihood of occurrence derived from opinions of consultants in consideration of known ecology of each species (see Appendix 1); and quality of habitat on-site. \* indicates listed on DotE website search.

Group	Common Name	Scientific Name	Listing Status	Recorded In Locality	Suitable Habitat On Site	Likelihood Of Occurrence On Site
Birds	*Regent Honeyeater	<i>Xanthomyza phrygia</i>	CE	N	Limited preferred forage species. Unlikely to occur.	Due to extreme rarity and lack of significant extent of preferred habitat, unlikely to occur.
	*Australian Painted Snipe	<i>Rostratula australis</i>	V	N	No suitable habitat.	Unlikely to occur.
	*Red Goshawk	<i>Erythroriorchis radiatus</i>	E	N	Generic potential habitat forming minute fraction of such habitat.	Unlikely as not seen south of Clarence River.
	*Eastern Bristlebird	<i>Dasyornis brachypterus</i>	E	N	No suitable habitat.	Unlikely to occur.
	*Australasian Bittern	<i>Botaurus poiciloptilus</i>	E	N	No suitable habitat.	Unlikely to occur.



Group	Common Name	Scientific Name	Listing Status	Recorded In Locality	Suitable Habitat On Site	Likelihood Of Occurrence On Site
	*Swift Parrot	<i>Lathamus discolor</i>	E	N	Limited preferred forage species. Unlikely to occur.	Due to extreme rarity and lack of significant extent of preferred habitat, unlikely to occur.
Mammals	*Long-nosed Potoroo	<i>Potorous tridactylus</i>	V	N	No suitable habitat.	Unlikely potential to occur – no local records and patchy coastal records throughout its distribution.
	*Koala	<i>Phascolarctos cinereus</i>	V	Y	Site and adjacent forest has some preferred forage species.	Low potential perhaps as transient.
	*Spotted-tail Quoll	<i>Dasyurus maculatus</i>	E	Y	Small area of potential habitat but surrounded by farmland. No proximate records.	Unlikely to occur.
	*Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	Y	Seasonally suitable for nectar foraging in study area.	<b>Recorded in study area</b>
	*Dwyer's/Large Pied Bat	<i>Chalinolobus dwyeri</i>	V	N	Generic forage habitat over forest. No potential roosts in study area.	Unlikely chance of occurrence.
	*Brushtailed Rock Wallaby	<i>Petrogale penicillata</i>	V	N	No suitable habitat in locality.	Extremely unlikely
	*New Holland Mouse	<i>Pseudomys novaehollandiae</i>	E	Y	Poor habitat on site due to disturbance.	Unlikely to occur.



Group	Common Name	Scientific Name	Listing Status	Recorded In Locality	Suitable Habitat On Site	Likelihood Of Occurrence On Site
Frogs	*Green and Golden Bell Frog	<i>Litoria aurea</i>	V	N	No potential habitat – dams too small and isolated from source habitat.	Unlikely to occur.
	*Stuttering Frog	<i>Mixophyes balbus</i>	V	N	No suitable habitat and no local records.	Unlikely to occur.
	Wallum Sedge Frog	<i>Litoria olongburensis</i>	V	N	No suitable habitat and no local records.	Unlikely to occur.
	*Giant Barred Frog	<i>M. iteratus</i>	E	N	No suitable habitat and no local records.	Unlikely to occur.

### Migratory Species

No EPBC Act 1999 migratory species were recorded on the site by the survey. A significant number of EPBC Act 1999 listed migratory bird species are known (OEH 2015a) or considered potential occurrences in the locality (DoE 2015a). A search of the MNES website and literature review (Readers Digest 1990, DoE 2015b) also produced a list of likely occurrences. All of these species plus some considered by the consultant as potential occurrences in the LGA in similar habitat to that on the property are also shown in the following table, with an evaluation made on likelihood of occurrence based on cited ecology. Note this list excludes seabirds, etc as detailed above.



**Table 9: EPBC Act migratory species potential occurrence assessment**

Common Name	Scientific Name	Predicted Type of Occurrence	Recorded In Locality (10km Radius)	Suitable Habitat On Site	Likelihood Of Occurrence On Site
*White-Bellied Sea-Eagle	<i>Haliaeetus benghalensis</i>	Species and/or habitat likely to occur within area	Y	No suitable foraging habitat on site	Unlikely
Osprey	<i>Pandion cristatus</i>	-	Y	As for White-Bellied Sea-Eagle.	As for Sea Eagle.
Latham's Snipe	<i>Gallinago hardwickii</i>	Species or habitat may occur in area	N	No suitable foraging habitat on site	Unlikely
Painted Snipe	<i>Rostratula benghalensis (australis)</i>	Species and/or habitat may occur in area	N	No suitable foraging habitat on site	Unlikely
Cattle Egret	<i>Egretta ibis</i>	Species/habitat may occur in area	Y	Some foraging habitat on site and stock present.	High
Great Egret	<i>Egretta alba</i>	Species/habitat may occur in area	Y	Very small area of foraging habitat in dams.	Low
Rainbow Bee-eater	<i>Merops ornatus</i>	Species/habitat may occur in area	Y	Suitable habitat in dry sclerophyll in reserve.	Low chance of occurrence
Regent Honeyeater	<i>Xanthomyza phrygia</i>	Species/habitat may occur in area	N	Limited preferred forage species. Unlikely to occur.	Due to extreme rarity and lack of significant extent of preferred habitat, unlikely to occur.



Common Name	Scientific Name	Predicted Type of Occurrence	Recorded In Locality (10km Radius)	Suitable Habitat On Site	Likelihood Of Occurrence On Site
Swift Parrot	<i>Lathumus discolor</i>	Species/habitat may occur in area	N	Limited preferred forage species.	Insufficient in study area – unlikely to occur.
Rufous Fantail	<i>Rhipidura rufifrons</i>	Breeding or breeding habitat may occur in area	N	Too open	Unlikely
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	Breeding or breeding habitat likely in area	Y	Too open	Unlikely
Black Faced Monarch	<i>Monarcha melanopsis</i>	Breeding or breeding habitat may occur in area	Y	Too open	Unlikely
Spectacled Monarch	<i>M. trivirgatus</i>	Breeding or breeding habitat likely in area	Y	Too open	Unlikely
White-throated Needletail	<i>Hirundapus caudacutus</i>	Species/habitat likely to occur in area	Y	Yes as part of a broader area	Moderate-high, as transient
Fork-tailed Swift	<i>Apus pacificus</i>	Species/habitat may occur in area	Y	Yes as part of a broader area	Fair as transient





## 5.0 SEPP 44 - Koala Habitat Assessment

### 5.1. Potential Koala Habitat Assessment

#### 5.1.1. Introduction

The identification of an area of land as Potential Koala habitat is determined by the presence of Primary Preferred Koala Browse tree species. These species are listed under Schedule 2 of SEPP 44: *Koala Habitat Protection* (DoP 1995).

Potential Koala Habitat is defined as areas where the tree species listed under Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. Primary preferred food species occurring in the Local Government Area (LGA) are: Tallowwood (*E. microcorys*), Scribbly Gum (*E. signata*), Grey Gum (*E. punctata*), Swamp Mahogany (*E. robusta*) and Forest Red Gum (*E. tereticornis*).

An area of land to which the policy applies to must be at least 1ha (and may include adjoining land in the same ownership).

#### 5.1.2. Assessment

The site is greater than 1ha in area, and Tallowwood, Forest Red Gum and Small-fruited Grey Gum comprises greater than 15% of the canopy trees over at least 1ha (eg the northern forest remnant). Thus the site meets the definition of Potential Koala Habitat and a Core Koala Habitat Assessment is required.

### 5.2. Core Koala Habitat Assessment

As detailed in Appendix 4, the site failed to qualify as Core Koala Habitat as:

- Lack of recent or historical sightings of Koalas on site.
- Failure to identify an Area of Major Activity.

Consequently, a Koala Plan of Management is not required.

## 6.0 Impact Assessment

### 6.1. Direct Impacts

As previously mentioned, the proposal is to eventually construct a residential estate over the entire site. A preliminary concept is provided in Figure 2.

As a minimum, the proposal will require the removal of all the remaining forest and woodland vegetation over the site, including up to 2 potential/actual hollow-bearing trees, and a number of primary preferred Koala browse species. Overall it is estimated that 2.4ha of disturbed open woodland as well as open pasture throughout the 16.5ha site will be removed. A road may also pass at least once through the eastern Crown road reserve, removing a small area of forest here.



The drainage depressions are to become drainage reserves, with stormwater directed to appropriate treatment facilities in these areas before offsite discharge. The existing dams may be retained here or form part of this system. The *Freshwater Wetland* EEC in the northeast drainage line is to be retained, rehabilitated and buffered within the drainage reserve in this area (see section 7.1.1).

The establishment of the development and associated services will have the following direct potential impacts:

- Reduction of the site's carrying capacity due to loss of forest vegetation which offers foraging habitat eg nectar sources.
- Partial loss of around 4.8ha of land mapped as a regional corridor for the Froggalla swamp regional corridor
- Loss of most if not all of the site's preferred Koala browse species (Tallowwoods, Forest Red Gum, Small-fruited Grey Gum)
- Loss of a number of potential sap species for gliders.
- Loss of 2 hollow-bearing trees including a termitaria.
- Permanent prevention of recovery of native vegetation.
- Drainage modification via landform changes and establishment of hard surfaces.

## 6.2. Indirect Impacts

The following is an assessment of indirect impacts typically associated with developments of this nature:

**Table 10: Indirect impacts of the proposal**

Threat	Literature Review	Assessment Of Proposal
<b>Direct mortality via clearing</b>	Animals within hollows and fallen logs, as well as dense vegetation and leaf litter may be killed during clearing of these structures. This risk increases during breeding seasons (generally spring to late autumn), and cooler season when mammals and reptiles enter torpor.	As detailed above, up to 2 actual/potential hollow bearing trees will be removed. Any fauna potentially within these hollows thus will be at risk of direct mortality during felling, or increased predation risk after felling until they can locate alternative shelter.  Appropriate hollow-bearing tree removal protocol and clearing supervision by an ecologist is recommended to be implemented to minimise this risk.
<b>Erosion and Sedimentation</b>	Sedimentation and erosion impacts can occur at both the construction and establishment phases. Erosion/sedimentation may occur via erosion of fill material and disturbed soils, scouring of exposed soil, earthen banks and habitats adjacent to the development area via directed flow (eg stormwater), or where runoff is concentrated.	Standard mechanisms and controls should ensure the prevention of erosion and sedimentation during construction and post-development and such impacts do not extend beyond the development footprint.  There is potential for the development to bring increased flow rates into the EEC habitat in the northeast due to the increase in hard surfaces. Unmitigated, this has the potential to damage the EECs found in the study area through erosion and sedimentation. This is to be mitigated via vegetated buffer zones, and standard erosion and stormwater management.



Threat	Literature Review	Assessment Of Proposal
<b>Fencing</b>	Fences have potential to obstruct the movement of threatened fauna across the site. Some threatened fauna can be injured by collision with wire fences, particularly barbed wire eg the Yellow-Bellied Glider, owls and Squirrel Glider have been recorded being injured by barbed wire fences (Lindenmayer 2002, Berrigan 2001c, Woodford 1999).	Aside from EEC in the northeast drainage depression and dams in other reserves, no habitat is expected to remain on site to which any likely fencing may pose a barrier or injury risk. As these habitats will at most be separated via indicative fencing such as bollards, barriers to habitat or injury threats are unlikely to increase.
<b>Road Kills</b>	Wildlife and particularly Koala road kills and injuries predominantly occur on high volume, high speed (60-100km/hr) streets and roads with poor visibility through sight interference (eg crests and corners) or poor visibility (eg inadequate street lighting) (Wilkes and Snowden 1998, Connell Wagner 2000, Port Stephens Council 2001, Lunney et al 1999, DECC 2008, AKF 2007).	The proposal introduce road traffic to the area with the construction of over 100 new homes, as well as the potential construction of access roads from the east. Should access roads be developed through the Crown road reserve to the east of the site, it will further increase potential for wildlife-vehicle collisions. To minimise risk of this impact, it is recommended that low speed limits are encouraged through the use of engineering controls, combined with strategic lighting.
<b>Edge Effects</b>	The fragmentation and/or isolation of currently intact vegetation via partial/mosaic clearing and establishment of pastures, fences, buildings, trails, roads, etc, can have the following effects which are generally referred to as edge effects (Lindenmayer and Fisher 2006, Andrews 1990, Goosem 2002, May and Norton 1996, Catterall 2004, Dickman 1996, NPWS 2001, Kelly <i>et al</i> 2003, Cropper 1993, Downy 2003, Brown et al 2003):	Edge effects such as weed invasion and predation by cats and dogs have the potential to impact on retained EEC, but these effects are already a major threat to local biodiversity. Proposal will thus see an incremental increase in existing threats, and increase potential new ones eg weed invasion of the EEC due to elevated nutrients from runoff if stormwater is inadequately treated. This risk is proposed to be mitigated via appropriate stormwater management and a vegetated buffer zone.
<b>Alteration to Bushfire Regimes</b>	Altered fire frequency can also ultimately simplify or alter the character of vegetation communities by removing fire sensitive species (eg convert wet sclerophyll to dry, or eliminate Allocasuarinas), and even develop fire-prone communities (eg promote development of a grassy groundcover). This has consequences for the fauna assemblage as well as species dependant on specific resources eg Glossy Black Cockatoo, Common Planigale and Green Thighed Frog (NSWSC 2000d).	No change to current fire risk as forest on site will be removed, and road reserve is not likely to be perceived as fire threat needing regular burning.
<b>Eutrophication and pollution</b>	Eutrophication and pollution of waterbodies can occur at both the construction and establishment phases, from on site effluent for dwellings, and from exudates and residues on bitumen roads which contaminate soil and water. Contaminants and nutrients can escape via improper storage of petrochemicals and other chemicals, refuelling areas, surface runoff from on-site sewerage treatment areas and improper effluent disposal design, runoff from car washing and cement washdowns, and use of fertilisers	The construction over 100 dwellings will bring with it an increase in the amount of nutrient load from the site in stormwater. There will also be a dramatic decrease in the infiltration area of the site as a majority will contain roads, houses pavements etc. This has the potential to cause eutrophic conditions in the EEC's found in the study area, if stormwater controls are not adequate.



Threat	Literature Review	Assessment Of Proposal
	and herbicides on gardens.	
<b>Noise, Vibration and Anthropogenic Disturbances</b>	Noise effects on fauna in Australia are relatively poorly studied (Clancy 2001, Berrigan 2001d). Most evidence presented is anecdotal, but suggests most fauna have at least a fair degree of tolerance and adaptation at least to residential noise depending on species, situation, habitat/lifecycle stage affected, habitat significance, etc.	Noise generated by the proposal is unlikely to disturb fauna occurring on the site, with species expected to have a substantial tolerance to the current level of anthropogenic noise in the area from roads, agricultural activities and adjacent residential areas.
<b>Weed Invasion</b>	Disturbance of soil provides the opportunity for weed invasion. Weeds may also be transported to the site from vehicle, people (eg on clothing), etc, who visit the development area, and via introduced fill material.	<p>Potential for weed propagules to be introduced on vehicles and earthmoving equipment. Exposed soil from earthworks will also be prone to weed invasion.</p> <p>This is not considered a significant risk given the current level of weed invasion throughout the site and conversion to a residential area.</p> <p>Remaining EEC and drainage reserves may be at risk of elevated weed inputs from additional nutrient-rich water flows and propagules from residential area. This is to be mitigated by rehabilitation of the onsite EEC, a vegetated buffer zone and adequate stormwater management.</p>

## 7.0 Recommendations

### 7.1. Primary Recommendations

The following are recommended to be included as conditions of consent if the proposal is approved in order to mitigate the major potential ecological impacts of the proposal. The conclusions of this assessment assume these measures are implemented and effective in mitigating impacts.

#### 7.1.1. Protection and Rehabilitation of the Freshwater Coastal Wetland EEC

The final layout of the proposed development is to be designed to retain the small area of *Freshwater Wetland* EEC in the northeast drainage line within the designated drainage reserve. This area is the local occurrence of this EEC, hence its removal would require a Species Impact Statement.

This area is to be subject to rehabilitation under a Vegetation Management Plan to remove pasture weeds and increase biodiversity. Rehabilitation should also include planting of sedges, herbs, grasses, trees and shrubs (in areas with suitable edaphic conditions) indicative of the original EEC which is likely to have been *Subtropical Coastal Floodplain Forest* EEC. A vegetated buffer comprising an ecotone of the two EECs and the current nearby dry sclerophyll forest species should be planted and extend upslope for at least 30m either side and upstream of the EEC: exclusive of APZs, services and road infrastructure. This vegetation will provide a buffer to edge effects as well as a filter strip for runoff.

The extent of the EEC to be buffered should be that area on site which contains remnant species characteristics of a Coastal Floodplain EEC, falls within the 1:100 ARI of the drainage depression, and



occurs on alluvial soils ie the extent of EEC habitat. Further investigations may be required to determine the extent of this area, and hence the extent of the buffer zone.

Stormwater is to be filtered through appropriate engineered structures before discharge into the EEC area, but should not be completely directed around the area as this will adversely alter the hydrological regime.

The reserve containing the EEC may be used for passive recreation including elevated walkways, but the outer edges should be planted with pungent-leaved plants to discourage track making and other intrusions. Rear yards should also not adjoin the reserve directly to discourage impacts such as encroachment via lawn extensions; storage of trailers, boats and caravans; and dumping of green wastes.

### **7.1.2. Crown Road Reserve Crossing**

If roads are required to cross the Crown road reserve, the following is to be implemented:

- Engineering design is to include structures which reduce safe maximum speed to 40kph where the road passes through the vegetation to minimise risk of vehicle collision with wildlife.
- Artificial lighting is provided to maximise driver detection. Such lighting should include shielding to minimise light spillage into the adjacent vegetation and focus light direction to the crossing.

### **7.1.3. Tree Protection During Clearing**

Any trees/habitat to be retained is to be clearly marked prior to commencement of construction eg temporary fencing, flagging tape and/or spray paint to clearly identify what trees/habitat are to be retained.

This will be critical to ensure protection of the EEC in the northeast drainage line.

### **7.1.4. Pre-Clearing Survey and Clearing Monitoring**

The following ameliorative measures should be carried out to minimise the risk of injury or stress to Koalas and other fauna during clearing works on site.

1. The area of work is to be inspected for Koalas and other fauna by an approved ecologist immediately prior to commencement of any vegetation removal involving machinery and/or tree-felling.
2. If a Koala is present in an area subject to vegetation removal/modification, it is preferred works are suspended until the Koala moves along on its own volition. If the Koala is located in a position that a 25m buffer may be established, works may proceed outside this buffer.
3. Pre-clearing checks should be undertaken in the vegetation to be removed and include searches of habitat eg lifting and destruction of logs, searching of termitaria mounds, searches for bird nests, and raking of leaf litter. Other than Koalas, any detected fauna is to be relocated off-site to nearby suitable areas (preferably within their natural home range) prior to clearing commencement.
4. Until all ground habitat components and hollow-bearing trees are removed, the ecologist is to remain on site to supervise clearing to retrieve any fauna detected during works, undertake appropriate action (eg euthanize severely injured animals).



### 7.1.5. Hollow-bearing Tree Felling and Animal Welfare Protocol

The hollow-bearing trees proposed to be removed may contain fauna at the time of clearing. Such fauna may be placed under stress, injured or killed during tree felling via:

- Being nocturnal or in torpor, and unable to escape prior to the tree falling.
- Collapse of the hollow when it impacts the ground.
- Collision with internal walls or via being thrown out when the tree falls.
- Being present as young eg. eggs.

In general, any hollow bearing tree removal must be undertaken via a method that will minimise the risk of injury/mortality of potentially denning/roosting fauna within the limitations of Occupational Health and Safety (OH&S) Guidelines. Undertaken with due care, this practice can demonstrably avoid mortality of common and threatened species during felling of hollow-bearing trees, thereby substantially reducing the potential significance of development impacts. The following general guidelines are recommended:

1. Hollow-bearing trees should be removed via a method that does not require traditional tree felling methods i.e. clear-drop chainsaw cut or bulldozer/excavator “rip and push” methods undesirable due to the violence of tree-ground impact and associated high risk of injury/mortality to fauna (e.g. via hollow collapse, collision with walls, etc). Options include:
  - The use of an excavator or similar machine with a harvester head or similar attachment, which can hold the trunk while the tree base is sawn, and then the lowers the tree to the ground for inspection (preferred method, but limited in practicality to small to medium sized trees).
  - Use of a crane to hold the tree while the base is sawn, and then lower the tree to the ground for inspection (preferred method).
  - An arborist is to remove the tree via a top-down process. During this process, the arborist is to inspect the hollows for signs of fauna using a torch and/or snake-eye inspection camera. If fauna are present, the arborist is to follow the ecologist’s instructions to minimise risk of fauna mortality/stress.
2. An ecologist must be present during felling of the hollow bearing trees to monitor clearing, capture any resident animals injured or not evacuating, and undertake appropriate emergency actions if required e.g. euthanasia or transport animal to veterinary treatment (care at proponent’s cost) or care by FAWNA (with a donation by proponent to cover all carer and treatment costs).
3. Hollows are to be immediately inspected once the tree is felled (within OH&S guidelines) for injured individuals or abandoned offspring, and appropriate measures undertaken. All rehabilitated animals are to be released in the retained habitat directly on/or adjacent to the site.
4. If hollows cannot be cleared of fauna, the fallen tree must either be allowed to sit overnight, or may be sectioned by chainsaw to clear hollows of fauna. It may then be destroyed/stacked for destruction.

The ecologist is to provide a brief report to GTCC within 14 days of works detailing the methods used, details of the hollows (aperture width, depth, evidence of use) and outcomes of any fauna rescue.



### 7.1.6. Replacement Nest Boxes

The hollows to be removed in the hollow-bearing trees removed for the proposal are to be offset with replacement nest boxes at a ratio of one per observed hollow (potential or actual). Nesting boxes specifically catering to gliders, small parrots and Yangochiropteran bats are recommended given current hollow size. These are recommended to be mounted in the patch of trees to remain in the southern drainage reserve.

The boxes are to be sourced by a reputable supplier and installed by an ecologist on retained mature trees before clearing commences.

### 7.1.7. Erosion and Sediment Control

Council's standard sediment and erosion control measures will be required during construction to ensure on site and nearby watercourses are not impacted upon, and most importantly the *Freshwater Wetland* EEC.

## 7.2. Secondary Recommendations

### 7.2.1. Specifications for Landscape Plantings

Any landscaping proposed as part of the development should give due consideration to the establishment of native plants as ornamental species to maintain and/or increase biodiversity, provide replacement habitat, and maximise water efficiency.

Recommended species for planting should include locally indigenous *Eucalypts*, *Angophoras*, *Grevilleas*, *Banksias*, *Melaleucas*, *Acacias*, *Allocasuarinas* and *Callistemons* (especially Winter-flowering species which are useful for the Little Lorikeet, gliders, honeyeaters and Grey-headed Flying Fox e.g. *Banksia integrifolia*); and fruiting rainforest species such as Brush Cherry (*Syzygium australe*), figs, *Acronychia spp*, *Cryptocarya spp*, etc.

Where possible, plantings should preferably not be in parkland style or isolated trees as this minimises their effectiveness to provide habitat to all but common medium sized species (e.g. Currawongs and Indian Mynahs) and may become detrimental to the presence of other species (Catterall 2004). Rather, plantings should be planned to recreate a natural structure (i.e. layered). Such plantings thus would consist of at least one or two canopy trees, underlain by a few understorey trees, and finally a number of shrubby species. This multi-layered planting can provide effective aesthetics while supporting passerine birds (who depend on the lower strata and structural complexity), Yangochiropteran bats, and canopy species such as birds, arboreal mammals and Yinpterochiropteran bats (Catterall 2004).

Planting out of the southern drainage reserve with native species to offset the loss of Koala food trees and other habitat on site is encouraged provided it does not compromise water quality treatment facilities and objectives.



## 7.2.2. Artificial Lighting

To ensure anthropogenic impacts are minimised, it is recommended that artificial lighting be kept to a minimum and be of a localised and low luminosity, with light directed to the ground and not onto retained trees/adjacent vegetation.

# 8.0 Seven Part Test Assessment

## 8.1. General Overview

The 7 Part Test is used to determine whether a proposed development is likely to have a significant effect on threatened species, Endangered Ecological Communities, Endangered Populations and Critical Habitat listed under schedules of the *Threatened Species Conservation Act 1995* known or considered reasonably likely to occur in the area influenced by a development proposal. Considerations must be given to the possible significant impacts a proposed development may have on threatened species, populations, ecological communities, and their habitats (DECC 2007).

The content of the 7 Part Test is specified by Section 5A of the *Environmental Planning and Assessment Act 1979*, as amended by the *Threatened Species Act 1995*, which in turn has been amended by the *Threatened Species Conservation Amendments Act 2002*.

### 8.1.1. Entities to be assessed

No threatened flora species were detected on site or are considered potential occurrences, hence none are subject to assessment.

A low quality example of probably derived *Freshwater Coastal Wetland* EEC occurs on site, and small remnants of the EEC - *Subtropical Floodplain Forest on Coastal Floodplains* also occur in the study area. Both of these EECs are to be assessed.

The Grey-headed Flying Fox was the only threatened species recorded by survey in the study area, and is automatically subject to assessment.

The following species are subject to the 7 Part Tests, as on the basis of habitat evaluation (see Appendix 1), they are conservatively considered likely to at least periodically use some habitat on the site or in the study area at some time (eg now or if they were to potentially recover and expand):

- **Mammals:** Brushtailed Phascogale, Squirrel Glider, Koala, Little Bentwing Bat, Eastern Bentwing Bat, East Coast Freetail Bat, Greater Broad-nosed Bat Yellow-bellied Sheathtailed Bat,
- **Birds:** Powerful Owl, Masked Owl, Square-tailed Kite, Little Lorikeet, Glossy Black Cockatoo.

Brief ecological profiles are provided in Appendix 1 for these species. More complete profiles can be found online (DoE 2015b, OEH 2015b), and these and the references listed in this assessment were used in combination with personal knowledge when undertaking the impact assessment.





### 8.1.2. Local Populations Occurrence

The guidelines associated with the revised factors have provided definitions for key terms with the most significant being that of the “*local population*” and “*local occurrence*” as follows (DECC 2007):

**“Local population:** the population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions.

- The *local population* of a threatened *plant* species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.
- The *local population* of *resident fauna* species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.
- The *local population* of *migratory or nomadic fauna* species comprises those individuals that are likely to occur in the study area from time to time....”

The local population of the potentially occurring threatened species is thus defined as follows:

**Table 11: Definition of Local Population**

Species	Local Population
Forest Owls	Local pair of birds which may include site/study area as small portion of large foraging territory. Local population thus requires much more habitat that found within study area to meet lifecycle requirements.
Square-tailed Kite	The local breeding pair for which the study area may constitute a minute portion of larger potential foraging territory. Local population thus requires much more habitat that found within study area to meet lifecycle requirements.
Glossy Black Cockatoo	Local individual/ pair/ flight of bird/s which may include site/study area as small portion of large foraging territory due to the presents of Black Oak. Local population thus requires much more habitat that found within study area to meet lifecycle requirements.
Little Lorikeet	Any individuals potentially using habitat within the site/study area depending on flowering incidences and competition with common con-specifics. Local population requires much more habitat that found within study area to meet lifecycle requirements.
Koala	Any individual potentially using site/study area for occasional foraging or during dispersal from habitats outside the study area.
Squirrel Glider	All potentially occurring individuals, probably transient and dispersing from adjacent habitats outside the study area, given ecology of the species and habitat limitations of the site and study area.
Brushtailed Phascogale	All potentially occurring individuals potentially occurring in the study area, most likely as transients from habitats outside the study area, given ecology of the species and habitat limitations of the study area.



Species	Local Population
Yangochiropteran bats	Any individuals potentially using habitat within site/study area depending on lifecycle stage/seasonal range and time of year (ie season) and con-specific competition. Due to the ecology of these species, the local population requires much more habitat that found within study area to meet lifecycle requirements.
Grey-headed Flying Fox	Any individuals using foraging habitat within study area depending on seasonal flowering incidences. Local population thus requires much more habitat that found within study area to meet lifecycle requirements.

The local occurrence of the EECs as per the DECC (2007) definition is that within the study area. Due to extensive modification within the drainage depression on adjacent land, the local occurrence of the *Freshwater Wetlands* EEC appears to be restricted to the small area in the lower section of the northeast drainage line on site. The local occurrence of the *Subtropical Floodplain Forest on Coastal Floodplains* EEC in the study area appears to be limited to the two small patches just off site in the Crown road reserve to the east, and the Blackhead Road reserve to the south.

## 8.2. Seven Part Test Assessment

### 8.2.1. Seven Part Test Structure

To minimise repetition and superfluous information, the responses to the 7 Part Tests are structured as follows:

- Part (a) is generally answered per species in a dedicated section if impacts are more acute and require more detailed evaluation. For less affected species, species are grouped together based on broadly common ecology (i.e. mobile bird species such as the owls or species with similar habitats such as the Yangochiropteran bats) or similar impacts, and subject to a common 7 Part Test response to part (a).
- Parts (d) and (f) are answered per species or collectively depending on the nature of impacts. Part (b) deals with Endangered Populations Part (c) applies specifically to EECs, which is not relevant to this proposal. Part (e) deals with Critical Habitat, which is not relevant to the proposed works.

### 8.2.2. Seven Part Test Responses

**(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

#### Yangochiropteran bats:

All of the subject bat species require home ranges or seasonably variable ranges that far exceed the site/study area at least seasonally depending on lifecycle stage or due to their ecology e.g. summer migrants in the south of the bioregion eg Dwyer 1966, 1968, OEH 2015b, ABS 2013, Smith *et al* 1995, Churchill 2009, etc). Hence ecologically, while an individual/s may use the site/study area for foraging or possibly roosting in tree hollows at some time, any potentially occurring local population of these species would extend well beyond the site/study area to meet all their full lifecycle requirements.



The site and study area provides only a relatively small area of potential foraging habitat for the subject Yangochiropteran bats (the frontage with the Crown road reserve provides the best structure for bats which forage along forest-pasture interfaces), with the presence of a few hollow-bearing trees offering potential roosts. The latter would however be subject to high competition with common species of birds, bats and other mammals (eg lorikeets, rosellas and common bats). Habitats in the study area are in a similar state of disturbance to those on site, however higher quality habitat exists within 1km of the site and tentative linkages occur to large expanses of State Forest and Nature Reserves to the north and south. Occurrence in the study area is thus likely to be short and term for non-critical lifecycle stages.

The proposal will require the removal of approximately 2.4ha of disturbed open woodland over the site including 2 hollow-bearing trees which may offer potential roosts. In the context of the extensive habitat available to these bats in the locality however, this only represents only a minor fraction of potential habitat and its loss is not likely to significantly impact on their foraging success or ability to raise young. Further, critical life stages are unlikely to occur on site due to exposure to edge effects (eg elevated predation and competition). Nest boxes are recommended to be installed to offset the loss of hollows on site.

Given the above, and that no new threat or barrier will be established, it is considered that the proposal has no potential to place a local viable population at risk of extinction.

### **Grey-headed Flying Fox**

The *Eucalyptus* and *Corymbia spp.* on site offer generic seasonal foraging habitat for this species, and the species was recorded during the surveys.

The site and study area are not suitable roosting habitat and the nearest known areas are at Diamond Beach and Khappinghat Nature Reserve to the north (OEH 2015a).

Due to the ecology of the species, the site/study area only has potential to form a small to minute part of a local breeding colony's seasonal range, and consequently, a local population needs to fulfil the majority of its lifecycle requirements well beyond the site/study area.

The proposal will result in the loss of up to 2.4ha of disturbed open woodland with some scattered trees over the site which offers a potential nectar source. This loss is only considered a very minor negative effect on the Grey-headed Flying Fox and is highly unlikely to impact this species given that no potential roosting habitat is affected and that extensive areas of higher quality habitat occur in the locality which would support the local population.

Overall, given the ecology of the species, that no barrier to connectivity will be created; and that the local population of the subject species would extend well beyond the confines of the site/study area to meet the majority of its life cycle requirements: the order of magnitude of the proposal's sum negative effect is not considered sufficient to result in a direct decline (i.e. reduce viability) of the local population of any of the subject species.

### **Square-tailed Kite and Forest Owls**

These species require very large territories that far exceed the site/study area (OEH 2015b, Debus 2012, DECC 2006). Hence the site only has potential to form a small to minute part of their range, and



consequently, a local population needs to fulfil its lifecycle requirements well beyond the site and study area.

The site and study area offers some low value generic potential foraging opportunities for these species but prey diversity and abundance is expected to be limited due to the fragmentation, low carrying capacity, and edge effects.

There are no nest trees for the owls, and the forest and woodland trees offer only generic nest sites for the Square-tailed Kite. No raptor nests were found, and the local landscape has an abundance of similar habitat.

The proposal will remove an estimated 2.4ha of disturbed open woodland which represents only a fraction of the habitat required by these species to fulfil their lifecycle requirements. Further, no new barriers will be created and the extent of higher quality habitat in the locality is relatively extensive.

Thus it is evident that the proposal will not result in a direct decline of the local population of these birds.

### **Glossy Black Cockatoo**

The Glossy Black Cockatoo was not recorded on site during the survey, with the nearest record approximately 2km south (OEH 2015a).

The Glossy Black Cockatoo feeds exclusively on *Allocasuarinas* such as *A. littoralis* and *A. torulosa* in the North Coast bioregion. Due to variable fruiting, it requires very large home ranges (Clout 1989, Smith *et al* 1995, OEH 2015b).

*Allocasuarinas* are scattered throughout the Crown road reserve along the site's eastern boundary, but insufficient to provide any more than a few days seasonal foraging. There are no potential nest sites in the study area. Hence a local population would need to fulfil its lifecycle requirements well beyond the site/study area.

The proposal has only very minor potential to impact this species due to the development of access roads to the east which may remove a few potential food trees. Increased human presence could potentially discourage the bird from foraging, but it has been recorded foraging in peri-urban remnants and rural-residential areas. Even if displaced, the Crown reserve road habitat is incapable of providing a significant proportion of the local population's sustenance, hence is highly unlikely to disrupt the bird's lifecycle.

Given this; that no new barriers or significant increases in secondary impacts to the species will be created; and that the local population would not be reliant on habitat in the study area to fulfil lifecycle requirements: the order of magnitude of the proposal's sum negative effect is not considered sufficient to result in a direct decline (i.e. reduce viability) of the local population of the Glossy Black Cockatoo.

### **Little Lorikeet:**

The proposal will see loss of up to an estimated 2.4ha of disturbed open woodland offering generic potential foraging resources for the Little Lorikeet. Associated with this is the potential loss of up to 2 hollow-bearing trees, although the hollows are considered to be used by the Little Lorikeet due to local competition from rosellas, bats, Sugar Gliders and lorikeets.



Given the ecology of the species, and limitations of the study area, the extent of loss in terms of local habitat extent is clearly minimal and foraging success of this bird is unlikely to be disrupted; and known or likely nesting habitat is not affected. Therefore it is considered that the impacts of the proposal are unlikely to compromise the viability of a local population

**Koala:**

The Koala was not recorded on site during the field surveys. Records occur within 100m and there is a known Koala population in the Halliday's Point area (AKF 2002).

Scat surveys as per Philips and Callaghan (2011) and AKF (2002) were conducted, with all potential browse species on site searched for any signs of Koalas in anticipation of applying the SAT method. However, no signs of Koalas were found on site and activity levels were recorded as 0. Hence it seems likely that any possible occurrence on site would at most be transient individuals dispersing throughout the landscape.

The proposal will result in the loss of approximately 2.4ha of disturbed open woodland which includes some Tallowwoods, Forest Red Gums and Small-fruited Grey Gums (preferred/primary browse species/secondary browse species). In context of habitat in the wider area and known records, this represents a minor contraction but also an incremental and cumulative contraction of the local potential foraging resource. While acknowledge as contributing to the primary cause of decline for this species, the potential impact on breeding and persistence of the local population of Koalas is expected to be significant given the following:

- The site does not constitute Core Koala Habitat;
- No area of activity was identified;
- Koalas are unlikely to permanently occupy the study site or breed there due to the limited extent of habitat, presence of higher quality habitat on surrounding lands and poor nutrient status of the site's soils; and
- No barrier is likely to be put in place to prevent access to the remaining vegetation in the study area and hence the study area should retain the capability to support occasional foraging or dispersing Koalas.

The potential for indirect impacts from vehicle strikes, dog attacks are expected to be moderately increased by the proposed works. The addition over 100 dwellings on the site will result in an increase in traffic and dogs in the area particularly if access roads are developed through the road reserve to the east of the site. As the Koala has only low potential to occur, this is considered a low threat. However, if roads pass through the Crown road reserve, artificial lighting and speed inhibition structures are to be provided to reduce safe effective speed to 40kph to minimise vehicle strike risk.

Overall it is considered that the impact on the local Koala population is only in terms of removal of potential forage and refuge trees, as well as an increase in indirect impacts through added traffic and dog pressure in an area which is not evidently significant to the local population. Given this, neither breeding nor foraging success of Koalas in the local population is likely to be significantly affected, and consequently the proposed development is unlikely to affect the life cycle such that a viable population of Koala is likely to be placed at risk of extinction.



### **Squirrel Glider and Brushtailed Phascogale:**

Neither of these species have been recorded in the study area, however records exist in tentatively interconnected habitat in the locality (OEH 2015a).

The habitat on site and more so in the Crown road reserve represents (in only very broad terms) generic potential foraging habitat for these species. The lack of a flowering understorey over most of the site and canopy gaps >100m from the nearest area of substantial forest is however a key limitation for the Squirrel Glider; and the Crown road reserve also offers only low quality habitat as it lacks preferred species and is subject to extreme edge effects, and does not directly interlink to any other significant habitat capable of independently supporting local viable populations.

Hollow-bearing trees are present on site only as 2 trees (one isolated in the paddock) with a few more in the adjacent road reserve, however these few potentially suitable hollows would be subject to very high competition with the Sugar Glider, lorikeets, etc. Given both species also require multiple hollows within their range (Gibbons and Lindenmayer 2002), this is a key limitation on their potential occurrence.

Overall thus, the site and Crown road reserve contains only a small remnant of low value habitat within a highly fragmented local landscape. Both are insufficient in extent to meet the full lifecycle requirements of a minimum breeding unit of either species, and hence would incur a reliance on nearby minor fragments, which are also low quality and poorly connected to any refuge habitat. This would predispose any animals in the study area to elevated risks of predation and other edge effects, and limit key lifecycle stages such as dispersal, as well as constrain fecundity (Lindenmayer and Fisher 2006).

Given the above, the subject species are considered highly unlikely to have a viable population in the study area, and occurrence would probably only at best be as rare incidental transients dispersing across the broader landscape from higher quality habitat to the northwest.

The proposal will mainly impact these species via a small but incremental and cumulative loss of potential carrying capacity as a number of trees offering nectar, sap and pollen sources and an insect foraging substrate will be removed. Given these trees form only a small portion of the local abundance of this resource, are concentrated within a relatively isolated and highly modified remnant, and are not currently or likely to form part of the home range of the local population: while a negative effect, this is not considered sufficient to undermine the local population's ability to obtain sufficient sustenance and raise young.

The likely loss of hollow-bearing trees on site is unlikely to impact these species given that they are likely to be occupied by common species and unlikely to be used due to their relative isolation. Notwithstanding, replacement nest boxes are proposed to be installed to offset any that are removed and measures are recommended to minimise mortality risk during tree felling.

The proposal may also impact these species via vehicle strikes and creation of a gap in the Crown road reserve. The gap will be at most 20m wide, and is considered crossable by the Squirrel Glider via gliding, and occurrence of Phascogales in rural-residential estates and rural isolates suggests capability to cross small gaps. With provision of engineering speed control and suitable lighting, this fragmentation thus should not prevent potential use of the Crown road reserve for dispersal.

The introduction of >100 dwellings will also elevate the local abundance of cats, which may potentially roam the Crown road reserve and increase predation risk. Given current extreme edge effects of the



area, while a negative effect, the current threat is already considered extreme by native and feral predators. Hence the current threat status of the study area are not expected to significantly change.

Overall thus, while the proposal will have a net negative impact on the current carrying capacity and habitat quality of the site/study area; the impact is not considered likely to be of sufficient order of magnitude to adversely affect the local population's life cycle to the point that it would be at significant risk of loss of viability.

**(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

No Endangered Population occurs on site or in the study area, hence none are affected by the proposal.

**(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

- i. **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
- ii. **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

A small, possibly derived and low quality example of the EEC – *Freshwater Wetlands on Coastal Floodplains* was found above the dam in the northeastern drainage line. This EEC appears likely to be the last vestiges of a formerly larger occurrence of the EEC – *Subtropical Floodplain Forest on Coastal Floodplains*, which now occurs as very small patch where the drainage line remains vegetated in the Crown road reserve; and similarly in the outer edge of the Blackhead Road reserve adjacent to the dam in the southern drainage depression. Habitat for both EECs occurs beyond these areas, but appears to have been effectively displaced by previous pastoralism, road construction and development. Hence both EECs now have a very limited local occurrence.

The proposal has been recommended to retain the EEC occurrence on site within a protected area which is to be rehabilitated and buffered by planted native vegetation. Stormwater management measures are also to be designed to ensure water discharged over the stormwater treatment chain to the area does not lead to degradation (eg eutrophication) or adverse alterations to the hydrological regime. The latter will also benefit the off-site occurrences of the EEC.

Given the above, the proposal is not likely to place the local extent of these EECs at risk of extinction.

**(d) in relation to the habitat of a threatened species, population or ecological community:**

- i. **the extent to which habitat is likely to be removed or modified as a result of the action proposed,**

The proposal will see removal of 2.4ha of modified dry sclerophyll forest, with the remainder being pasture with some scattered trees. The on-site EEC and all 3 dams are expected to be retained within drainage reserves.



**ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

The study area falls within a highly fragmented landscape with at best marginal connectivity to a large body of forest to the northwest, and some tentative local corridors which run along the bottom and eastern boundaries of the site. Further east north and south, cleared pastoral land and Tallwoods village pose major barriers to many fauna groups due to lack of forest connectivity.

The proposal will see the removal of the patch of disturbed woodland located in the north of the site. This patch of disturbed woodland is separated from habitat to the northwest by approximately 140m, and to marginal habitat to the east in the narrow Crown road reserve by approximately 100m. These distances are at the upper limits of the range in which Sugar Gliders and Brushtailed Phascogales will travel across open ground (eg Rhind 1996, van der Ree *et al* X, Smith and Murray 2003), however it is not unknown for Koala's to travel these distances for dispersal (AKF 2007, Wilkes and Snowden 1998).

The loss of the northern remnant will increase fragmentation by removing the stepping stone provided by modified woodland in the central north to the northwest, however given the minimal source habitat for forest fauna to the east and south, this is considered insignificant. The linkage provided by the Crown road reserve on the east will essentially remain, at most crossed by 1-2 roads which will have fauna crossing mitigation measures implemented ie speed reduction and lighting, and gap width limited to about 20m at most.

Thus the extent of fragmentation created by the proposal will be limited, and will not result in the isolation of any areas of habitat significantly greater than current isolation. As such, the proposal is highly unlikely to disrupt the current local movements of the subject species.

**iii. the importance of the habitat to be removed, modified fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;**

The vegetation on site and in the study area evidently has a significant disturbance history and has a number of major habitat limitations. For most of the subject species, the vegetation on the site only represents at best a minute area of generic potential foraging habitat and seasonal foraging resources eg flowering eucalypts.

Overall, the site is unlikely to constitute an important area of habitat for any of the subject species and none would be reliant on the habitat resources provided by the site or study area alone. The proposal will therefore not impact on the long term survival of any of the subject species in the locality.

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

No relevant areas of critical habitat have been declared, as yet, under Part 3 of the TSCA.





**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

Draft/final recovery plans have only been prepared for the Forest Owls (DEC 2006), Grey-headed Flying Fox (DECCW 2009) and Koala (DECC 2008). Priority actions have been identified for all of the other species (OEH 2015b).

For these and all the other species: as the proposal will remove or modify habitat, and contribute to secondary impacts, it will not be considered strictly consistent with objectives of a recovery plan, threat abatement plan or priority action now or in the future, as it will slightly cumulatively contribute to the primary cause of the decline of these entities. However, as this habitat is of low value and common in the study area and locality, its loss will have minimal consequence for their viability in the short or long term.

**(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

The TSCA defines a “threatening process” as “a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities”.

The proposal will or may contribute (to varying extents) to the following Key Threatening Processes (KTP):

**Table 12: Contribution to Key Threatening Processes**

KTP	Extent/Manner Which Proposal Affects KTP
Human induced climate change (NSWSC 2000d).	Removal of vegetation and use of fossil-fuelled vehicles and machinery to carry out works. Relative to other sources, this incremental contribution is however minimal.
Clearing of native vegetation (NSWSC 2001).	Proposal will see removal of up to 2.4ha of modified forest/woodland. Some of this will be offset via rehabilitation of the EEC on site and establishment of a vegetated buffer.
Removal of dead trees and dead wood	Loss of minor woody debris in small patch of forest considered insignificant.
Loss of hollow-bearing trees (NSWSC 2007)	Up to 2 trees with hollows will be required to be removed. Protocol recommended to minimise risk of fauna mortality during clearing and replacement nest boxes proposed.
Aggressive exclusion of birds by noisy miners (NSWSC 2013)	Currently present and dominant. Future landscaping will also support this species.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	The increase in residences in in the study area may introduce new species of garden plants which have the potential to escape and become established.



## 9.0 EPBC Act - MNES Assessment

### 9.1. General Assessment Overview

The provisions of the EPBCA 1999 require determination of whether the proposal has, will or is likely to have a significant impact on a “*matter of national environmental significance*”. These matters are listed and addressed in summary as follows:

- 1) **World Heritage Properties:** The site is not listed as a World Heritage area nor does the proposal affect any such area.
- 2) **National Heritage Places:** The site is not listed as a National Heritage Place nor does the proposal affect any such area
- 3) **Ramsar Wetlands of International Significance:** A Ramsar wetland does not occur on the site, nor does the proposal affect a Ramsar Wetland.
- 4) **EPBCA listed Threatened Species and Communities:** The Grey-Headed Flying Fox (Vulnerable) and Koala (Vulnerable) are known or considered potential occurrences on the site. As detailed in section 9.1 and 9.2, these species are not considered at risk of a significant impact.
- 5) **Migratory Species Protected under International Agreements:** No Migratory species is likely to be significantly affected by the proposal as assessed below.
- 6) **The Commonwealth Marine Environment (CME):** The site is not within the CME nor does it affect such.
- 7) **The Great Barrier Reef Marine Park:** The proposal does not affect the Great barrier Reef Marine Park.
- 8) **Nuclear Actions:** The proposal is not a nuclear action.
- 9) **A water resource, in relation to coal seam gas development and large coal mining development:** The proposal is not a mining development.

The proposal thus is not considered to require referral to Department of the Environment (DotE) for approval under the EPBCA.

### 9.2. Koala Referral Assessment

The habitat in the study area has been assessed using the Koala habitat assessment tool from the EPBC Act Referral Guidelines (DotE 2014). To qualify as critical habitat, it must score 5 or more. This is shown in the following table:



**Table 13: Koala habitat assessment**

Attribute	Score*	Reason	
Koala occurrence	1	Desktop	OEH Bionet database shows a number of the species occurring within a 2km radius of the site. EPBCA PMST report identified the Koala as 'known to occur' in the study area/locality.
		On-ground	Diurnal search conducted on the site over two non-consecutive days. No signs of Koalas found.
Vegetation structure and composition	2	Desktop	AKF (2002) maps northern patch as Secondary Habitat (Class C)
		On-ground	Northern patch readily qualifies as Potential Koala Habitat.
Habitat connectivity	0	Site is not part of a contiguous landscape	
Key existing threats	1	Desktop	Koala road kill recorded in locality.
		On-ground	No evidence of Koala road kill. Generic risk of dog attack but very low risk.
Recovery value	0	Site has located in low value habitat with no evidence of a Koala population.	
Total	4	<b>Site does not qualify as critical habitat</b>	

\* Based upon criteria for Coastal Habitat Context.

As per the Koala habitat assessment tool, the site does not qualify as critical habitat. No further assessment is thus required, and the proposal does not require referral to the Minister.

## 9.3. Protected Species Assessments

### 9.3.1. Grey-headed Flying Fox (Vulnerable – EPBCA)

#### 9.3.1.1. Factors to Be Considered for Vulnerable Species

The guidelines to assessment of significance to this Matter, define an action as likely to have a significant impact on a Vulnerable species, if it will:

- a) Lead to a long-term decrease in the size of an important population of a species, or:
- b) Reduce the area of occupancy of an important population, or:
- c) Fragment an existing important population into two or more populations, or:
- d) Adversely affect habitat critical to the survival of a species, or:
- e) Disrupt the breeding cycle of an important population, or:
- f) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or:



- g) Result in invasive species, that are harmful (by competition, modification of habitat, or predation) to a Vulnerable species, becoming established in the Vulnerable species' habitat, or:
- h) Introduce disease that may cause a species to decline, or:
- i) Interferes substantially with the recovery of the species.

An important population is one that is necessary for a species' long-term recovery. This includes such populations as:

- Key populations either for breeding or dispersal.
- Populations that are necessary for maintaining genetic diversity, and or:
- Populations that are near the limit of the species range:

#### 9.3.1.2. Assessment of Significance

This section addresses each of the previous points listed.

For the purposes of discussion, the “*important population*” of Grey-headed Flying Foxes is defined as that population of the species likely to depend on colonial roosts in the locality.

##### **a) Lead to a long-term decrease in the size of an important population (Vulnerable) or population (Endangered) of a species, or:**

The proposal will result in the loss of about 2.4ha of foraging habitat for the Grey-headed Flying Fox. While this will contribute incrementally and cumulatively to the threatening processes responsible for the decline of this species, it only represents a minute fraction of foraging resources available within the range of the subject species range (eg. Khappinghat Nature Reserve). Hence given that; the site has only low carrying capacity for the Grey-headed Flying Fox; the site is not breeding habitat; and considering the ecology of the species: the impact of the loss of vegetation on site is considered insignificant to the viability of the important population.

Thus the proposal will not lead to a long-term decrease in the size of an important population of the Grey-headed Flying Fox.

##### **b) Reduce the area of occupancy of an important population (Vulnerable) or population (Endangered), or:**

The proposal will not result in the loss of any Grey-headed Flying Fox roosting habitat, as the site is not known to be or likely to be suitable as a roost site. Foraging habitat of this species is measured in terms of hundreds of thousands of hectares (Eby 2000a, 2000b, OEH 2015b), hence the loss of the site vegetation is minimal relative to the area of occupancy.

##### **c) Fragment an existing important population (Vulnerable) or population (Endangered) into two or more populations, or:**

The Grey-headed Flying Fox is highly mobile and known to be capable of crossing human-modified habitat. The proposal will offer no barrier to movement. Thus it will not fragment an existing important population.

Hence, the proposal will not fragment an important population.



**d) Adversely affect habitat critical to the survival of a species, or:**

“*Critical habitat*” refers to areas critical to the survival of a species or ecological community may include areas that are necessary for/to:

- Activities such as foraging, breeding, roosting or dispersal.
- Succession.
- Maintain genetic diversity and long term evolutionary development, or
- Reintroduction of populations or recovery of the species/community.

The vegetation on site is not considered critical habitat for the Grey-headed Flying Fox due to its limited extent, ecology of the species, and the massive extent of potential habitat in nearby State Forests and OEH estate. Post-development, the remainder of the adjacent vegetation will retain the potential to support local foraging, etc, of this species, hence helping support the viability of the local population.

**e) Disrupt the breeding cycle of an important population (Vulnerable) or population (Endangered or:**

The proposal is unlikely to disrupt the breeding cycle of an important population/population given that:

- The site does not represent potential breeding habitat for the subject species;
- These species have very large ranges which far exceed the site, or are unlikely to depend on the site for breeding.
- The potential for these species to occur within the study area will be retained post development; and
- Alternative potential habitat in the locality is extensive.

**f) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or:**

As detailed previously, the low value of the site and the degree of vegetation/habitat loss is not significant enough to affect the local population of the subject species to the point it could cause a decline of the species.

**g) Result in invasive species, that are harmful (by competition, modification of habitat, or predation) to a Vulnerable and/or Endangered species, becoming established in the Vulnerable and/or Endangered species' habitat, or:**

No new species that affects the Grey-headed Flying Fox is likely to be introduced as a direct result of the proposed works.

**h) Introduce disease that may cause a species to decline; or**

No disease that affects the subject species is likely to be introduced as a direct result of the proposed works.



### **i) Interferes substantially with the recovery of the species.**

Ideally, the goal in threatened species recovery is to increase the number and extent of the threatened species, so that it is not in risk of becoming extinct. As detailed previously, the proposal will result in the modification of a relatively minute area of potential foraging habitat that is not significant enough to interfere with the recovery of the subject species.

#### **9.3.1.3. Conclusion**

The proposal is not considered likely to have a significant impact on the Grey-headed Flying Fox

### **9.3.2. Migratory Species**

No migratory bird species were recorded during the survey. The habitats present across the site provide marginal potential habitat for a few listed migratory species such as the Cattle Egret, Great Egret, Satin Flycatcher, Rainbow Bee-eater, White-throated Needletail and Fork-tailed Swift.

These species are collectively assessed below.

#### **9.3.2.1. Factors To Be Considered**

The guidelines to assessment of significance to this Matter, define an action as likely to have a significant impact on a migratory species, if it will:

- a) Substantially modify (including fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species, or;
- b) Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat of the migratory species, or;
- c) Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.

An *important area of habitat* is:

- 1) Habitat used by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, or;
- 2) Habitat utilised by a migratory species which is at the limit of the species range, or;
- 3) Habitat within an area where the species is declining.

#### **9.3.2.2. Assessment of Significance**

This section addresses each of the previous points listed.

The site is not considered likely to constitute an *important area of habitat* on the basis of the following:

- 1) The site is not of sufficient extent to support an ecologically significant proportion of any of the above listed species (at most, only a small group or transient individuals). This value of the habitat is as a fraction of a significant extent of similar habitat not only in the LGA, but the North Coast Bioregion.



- 2) While some migratory species occurring in the locality may be at the limits of their range, no such species were recorded in the survey area. Additionally, similar habitat is known to occur both north and south of the LGA.
- 3) If the site was located at the limits of a species whose abundance and range is declining, it would not be considered significant as such habitat is locally abundant in the area, and habitat with greater capability occurs within 10km eg State Forest, conservation reserves, etc.

In regards to point (a): The proposal does not affect important habitat (as detailed above).

In regards to point (b): An invasive species is one that may become established in the habitat, and harm the migratory species by direct competition, modification of habitat, or predation. The proposal will not introduce any such invasive species, given they are currently known or likely to occur ie fox and feral cat.

In regards to point (c): No disruption of the lifecycle of any migratory bird is likely as:

- Habitat affected is either only marginally suitable, and/or locally abundant.
- No significant extent of potential or known nesting/breeding habitat is affected.
- No significant extent of potential or known foraging habitat will be affected.

In view of the above, no migratory bird is considered likely to be significantly affected by the proposal.

## 10.0 Conclusion

This survey and assessment has identified that the site and wider study area is generally in a modified condition due a number of past disturbances, however still retains some known and potential values for a number threatened fauna species. These values are however limited by the condition of the site and study area habitats, and the high level of local fragmentation.

The latter is also evident in the current extent and status of EECs on site and the study area ie small remnants with low diversity due to historical clearing and pastoralism. These areas will be retained and protected within the final design of the future residential development, with appropriate stormwater treatment to minimise the risk of degradation.

The proposal will see loss of most of the habitat on site for potentially occurring threatened fauna, with habitat retained in most of the adjacent Crown road reserve and a small patch in the southern drainage reserve. Given the low value of this habitat, this is insignificant to the long term viability of any local population, and current connectivity will also largely remain as is.

Consequently, the proposal is not considered to require a Species Impact Statement, or referral to the DotE for approval under the EPBC Act 1999.



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#### **Land and Environment Court Citations:**

CBD Prestige Holdings Pty Ltd v Lake Macquarie City Council [2005] NSWLEC 367

Dazdon Pty Ltd v Ku-ring-gai Council [2009] NSWLEC 1147

Gales Holdings Pty Limited v Tweed Shire Council [2008] NSWLEC 209

Motorplex (Australia) Pty Limited v Port Stephens Council [2007] NSWLEC 74.

Murlan Consulting Pty Limited v Ku-ring-gai Council [2007] NSWLEC 374





# Appendix 1: TSC Act – Seven Part Test Eligibility

## A1.0 Potential Occurrence Assessment

The following tables are used as a summary to address threatened species (as detailed below) in terms of potential occurrence, and likelihood of being significantly affected by the proposal, and hence requiring formal 7 Part Test assessments. Threatened species have been assessed if it is:

- Recorded on-site;
- Not recorded on site, but recorded within a 10km radius (the locality), and may occur to some degree on-site or in the study area (land within 100m of site) due to potential habitat, key habitat component, etc;
- Not recorded in the locality as yet, but recorded in the bioregion, and thus may occur in the locality, and possibly to some extent, may occur on the site, due to potential habitat.

The “*habitat requirements*” column is derived from the previously listed references. Likelihood of occurrence is based on the probability of occurrence in terms of:

- Habitat extent (eg sufficient to support an individual or the local population; comprises all of home range; forms part of larger territory, etc); quality (ie condition, including an assessment of threats, historical land uses on and off-site, and future pressures); interconnectivity to other habitat; and ability to provide all the species life-cycle requirements (either the site alone, or other habitat within its range);
- Occurrence frequency (ie on-site resident; portion of larger territory; seasonal migrant or transitory opportunist and thus when and how often, etc)
- Usage ie breeding or non-breeding; opportunistic foraging (eg seasonal, migratory or opportunistic); marginal fringe of core range; refuge; roosts; etc.

An indicative 1-5 scale used by the author to indicate the likelihood of the species to potentially occur in the habitat on the study sites (if they have not been recorded in the locality) is as follows:

- 0: *Unlikely* (<1% probability) - no potentially suitable habitat; too disturbed; or habitat is very poor. No or few records in region or records/site very isolated eg by pastoral land, urbanisation, etc.
- 1: *Low* (1-10%)- few minor areas of potential habitat; highly modified site/habitat; or few habitat parameters present, but others absent or relatively insignificant (sub-optimum habitat). Usually very few records in locality.
- 2: *Fair* (11-25%) - some significant areas of potential habitat, but some habitat parameters limited. Potential for occasional foraging eg from nearby more optimal areas or known habitat. Records at least within 10-15km radius of site.
- 3: *Good* (26-50%) - significant abundance of habitat parameters/areas of habitat, and more locally eg adjacent. Potential part of larger territory, but probably unable to support breeding in isolation. Recorded within 10km in similar habitat/environs.
- 4: *Moderate* (51-75%) - quite good potentially suitable habitat on and adjacent to the site, and/or good quality and abundance of some vital habitat parameters. Records within <10km, or



adjacent to site, or adjacent to high quality habitat where species likely to occur.

- 5: *High* (>75%) - very good to optimum habitat occurring on or adjacent to the site (support breeding pair or population). Recorded within 5-10km of site in same or similar habitat.

The “*Assessment of Significance*” column is based on consideration of the habitat on-site, likelihood of occurrence, and consideration of the DECC guidelines for assessment under the 7 Part Tests (DECC 2007). Recognising that some species with very large ranges or varying tolerances to habitat modification, some species which may have low potential to occur in the study area and will obviously not be significantly affected by the proposal will not be formally assessed to avoid production of superfluous information. Rather these species are assessed in the final column with justification for this assessment. However, recognising that significance is open to interpretation, the decision on whether a species is formally assessed or not by the 7 Part Tests in this assessment is based on the following rules:

- a) If there is *any* justifiable risk, based on consideration, of a significant impact as a result of direct or indirect impacts, a 7 Part Test is required (ie the Principle of Uncertainty is applied).
- b) Any threatened species recorded on-site or in the study area, or of at least fair chance of occurrence on-site in terms of potential habitat, is automatically selected for the 7 part Tests, unless the proposal has no effect (justification provided).



## A1.1 Flora

Searches of relevant literature and databases (OEH Bionet 2014a) found records of 8 threatened flora species in the locality. In the table below, these species are evaluated for their potential to occur on the site; significance of the proposal to this potential occurrence; and thus eligibility/requirement for Seven Part Test assessment.

**Table 14: Eligibility for Seven Part Test Assessment - Flora**

Species	TSC Act	EPBC Act	Habitat Requirement	No. of records	Likelihood of Occurrence and Impact Significance	7 Part Test Required?
<i>Allocasuarina defungens</i>	E	E	A straggly oak about 2m high with blue-green foliage found in heath on sand (sometimes clay and sandstone soils), and swamp sclerophyll forest margins. This plant has been recorded in at Limeburners Creek Nature Reserve. Recorded on Hastings LGA, Kempsey, Bare Point, Coffs Harbour, Greater Taree City Council LGA, Bulahdelah and Camden Haven databases	22	Recorded in the locality, however the site/study area did not contain suitable habitat for this species and it was not found. It is not considered a potential occurrence.	NO
<i>Asperula asthenes</i>	V	V	A herb found in damp sites along riverbanks and similar areas, typically from Taree to Bulahdelah, but has been recently found in the Kempsey LGA.	4	Recorded in the locality. Thorough search of dams failed to detect. Given habitat modification and disturbances, , however the site/study area did it is not considered a potential occurrence.	NO
<i>Cynanchum elegans</i>	E	E	A twiner occurring predominately in dry rainforest, littoral rainforest and the ecotone between dry rainforest and open forest, however it has been found in the Manning Valley and Hastings in Open Forest types on specific geologies eg limestone and serpentine respectively (Garry Germon pers. comm. 2004, personal observations). It occurs on a variety of lithology's and soil types. It has been found between the altitudinal ranges of 0 to 600 metres ASL and rainfall >760mm annually (NPWS 1999).	9	Recorded in the locality, however the site/study area did not contain suitable habitat for this species and it was not found. It is not considered a potential occurrence.	NO



Species	TSC Act	EPBC Act	Habitat Requirement	No. of records	Likelihood of Occurrence and Impact Significance	7 Part Test Required?
<i>Lindernia alsinoides</i>	E	-	Diffuse or erect annual herb to 15 cm high growing in swampy sites in sclerophyll forest and coastal heath. Distributed north from Bulahdelah. LGA records include Great Lakes, Taree, Coffs Harbour, Clarence Valley and Richmond Valley.	3	Recorded in the locality, however the site/study area did not contain suitable habitat for this species and it was not found. It is not considered a potential occurrence.	NO
<i>Senna acclinis</i>	E	-	Grows on the margins of subtropical, littoral and dry rainforests.	2	Recorded in the locality, however the site/study area did not contain suitable habitat for this species and it was not found. It is not considered a potential occurrence.	NO

A number of other species (see table below) are known or considered potential occurrences within the locality. However due to a number of factors, these species were not considered potential occurrences on site. Thus the proposal is not considered to have a significant impact on the viability of any local population of the subject species and Seven Part Test evaluation was not required.



**Table 15: Threatened flora unlikely to occur**

Preferred Habitat	Species	Site considered unsuitable habitat	Disturbance history likely to have excluded this species	Lack of local records
Dry Sclerophyll Open Forest Woodland	<i>Acacia ruppia</i>	X	X	X
	<i>Ancistrachne maidenii</i>	X		X
	<i>Angophora inopina</i>	X		X
	<i>Angophora robur</i>	X		X
	<i>Babingtonia prominens</i>	X		X
	<i>Banksia conferta</i> subsp. <i>Conferta</i>	X		X
	<i>Bertya</i> sp.(Chambigne NR, M Fatemi 24)	X		X
	<i>Bertya ingramii</i>	X		X
	<i>Bertya</i> sp. <i>Cobar-Coolabah</i>	X		X
	<i>Boronia hapalophylla</i>	X		X
	<i>Caesia parviflora</i> var. <i>minor</i>	X	X	X
	<i>Chiloglottis anatriceps</i>	X		X
	<i>Diuris venosa</i>	X	X	X
	<i>Diuris disposita</i>	X		X



Preferred Habitat	Species	Site considered unsuitable habitat	Disturbance history likely to have excluded this species	Lack of local records
	<i>Diuris pedunculata</i>	X	X	X
	<i>Diuris praecox</i>	X	X	X
	<i>Dillwynia tenuiflora</i>		X	X
	<i>Eucalyptus glaucina</i>	X		X
	<i>Eucalyptus tetrapleura</i>	X	X	X
	<i>Grevillea banyabba</i>	X		X
	<i>Grevillea beadleana</i>	X		X
	<i>Grevillea caleyi</i>	X	X	X
	<i>Grevillea quadricuada</i>	X		X
	<i>Hakea trineura</i>	X		X
	<i>Hibbertia superans</i>	X		X
	<i>Leucopogon confertus</i>	X		X
	<i>Lindsaea incisa</i>	X		X
	<i>Macrozamia johnsonii</i>	X		X
	<i>Melichrus hirsutus</i>	X		X



Preferred Habitat	Species	Site considered unsuitable habitat	Disturbance history likely to have excluded this species	Lack of local records
Rainforest Wet Sclerophyll Forest Riparian	<i>Olax angulata</i>	X		X
	<i>Philotheca obovatifolia</i>	X		X
	<i>Polygala linariifolia</i>	X		X
	<i>Corybas dowlingii</i>	X		X
	<i>Dracophyllum macranthum</i>	X		X
	<i>Acacia chrysotricha</i>	X	X	X
	<i>Acronychia littoralis</i>	X		X
	<i>Acalypha eremorum</i>	X	X	X
	<i>Amorphospermum whitei</i>	X		X
	<i>Archidendron hendersonii</i>	X		X
	<i>Arthraxon hispidus</i>	X		X
	<i>Arthropteris palisotii</i>	X		X
	<i>Boronia umbellata</i>	X		X
	<i>Calophanoides hygrophiloides</i>	X		X
	<i>Corynocarpus rupestris</i> subsp. <i>rupestris</i>	X		X



Preferred Habitat	Species	Site considered unsuitable habitat	Disturbance history likely to have excluded this species	Lack of local records
	<i>Dendrocnide moroides</i>	X		X
	<i>Desmodium acanthocladum</i>	X		X
	<i>Diospyros mabacea</i>	X		X
	<i>Diploglottis cambelli</i>	X		X
	<i>Eidothea hardeniana</i>	X		X
	<i>Endiandra floydii</i>	X		X
	<i>Endiandra hayesii</i>	X		X
	<i>Eucalyptus tetrapleura</i>	X	X	X
	<i>Gingidia montana</i>	X		X
	<i>Grammitis stenophylla</i>	X		X
	<i>Grevillea guthrieana</i>	X	X	X
	<i>Haloragis exalata subsp. velutina.</i>	X		X
	<i>Harnieria hygrophiloides</i>	X		X
	<i>Lindsaea brachypoda</i>	X		X
	<i>Macadamia tetraphylla</i>	X		X





Preferred Habitat	Species	Site considered unsuitable habitat	Disturbance history likely to have excluded this species	Lack of local records	
	<i>Marsdenia longiloba</i>	X	X	X	
	<i>Melaleuca groveana</i>		X	X	
	<i>Olearia flocktoniae</i>	X	X	X	
	<i>Peristeranthus hillii</i>	X	X	X	
	<i>Phyllanthus microcladus</i>	X		X	
	<i>Plectranthus nitidus</i>	X		X	
	<i>Psilotum complanatum</i>	X		X	
	<i>Quassia sp. Moonee Creek</i>	X		X	
	<i>Sarcophilus dilatatus</i>	X		X	
	<i>Sarcophilus fitzgeraldii</i>	X		X	
	<i>Sarcophilus hartmannii</i>	X		X	
	<i>Siah's Backbone (Streblus pendulinus/brunonianus)</i>			X	X
	<i>Syzygium paniculatum</i>	X		X	
	<i>Tinospora smilacina</i>	X			X
	<i>Tinospora tinosporoides</i>	X			X



Preferred Habitat	Species	Site considered unsuitable habitat	Disturbance history likely to have excluded this species	Lack of local records	
	<i>Triplarina imbricata</i> (formerly <i>Baeckea camphorata</i> )	X	X	X	
Swamp Forest Aquatic Freshwater Wetland Estuarine	<i>Tylophora woolsii</i>	X		X	
	<i>Typhonium sp. aff. brownii</i>	X		X	
	<i>Oberonia titania</i>	X		X	
	<i>Dendrobium melaleucaphilum</i>	X	X	X	
	<i>Uromyrtus australis</i>	X		X	
	<i>Maundia triglochinosides</i>	X		X	
	<i>Alexfloydia repens</i>	X		X	
	<i>Cyperus aquatilis</i>	X		X	
	<i>Eleocharis tetraquetra</i>	X		X	
	<i>Melaleuca biconvexa</i>	X	X	X	
	<i>Melaleuca tamariscina ssp irbyana</i>	X		X	
	Heathland Shrubland Grasslands	<i>Sophora tomentosa</i> subsp. <i>australis</i>	X		X
		<i>Allocasuarina simulans</i>	X	X	



Preferred Habitat	Species	Site considered unsuitable habitat	Disturbance history likely to have excluded this species	Lack of local records
	<i>Babingtonia silvestris</i>	X		X
	<i>Centranthera cochinchinensis</i>	X		X
	<i>Chamaesyce psammogeton</i>	X		X
	<i>Diuris sp. aff. chrysantha</i>	X		X
	<i>Genoplesium littorale</i>	X	X	
	<i>Phaius australis</i>	X		X
	<i>Rotala tripartita</i>	X		X
	<i>Elyonurus citreus</i>	X		X
	<i>Eucalyptus approximans</i>	X		X
	<i>Glycine clandestina</i> (Broad leaf form)	X		X
	<i>Pimelea spicata</i>	X	X	X
	<i>Rutidosia heterogama</i>	X		X
	<i>Zieria prostrata</i>	X		X
Various Habitats, Miscellaneous, Other	<i>Pultenaea maritima</i>	X		X
	<i>Cryptostylis hunteriana</i>	X	X	



Preferred Habitat	Species	Site considered unsuitable habitat	Disturbance history likely to have excluded this species	Lack of local records
	<i>(Leafless Tongue Orchid)</i>			
	<i>Galium australe</i> <i>(Tangled Bedstraw)</i>	X	X	X
	<i>Zieria prostrata</i>	X		X
	<i>Hibbertia hexandra</i>		X	X
	<i>Neostelia spectabilis</i>	X		X
	<i>Zieria lasiocaulis</i>	X		X
	<i>Kennedia retrorsa</i>	X		X
	<i>Tetradlea juncea</i>	X	X	X
	<i>Prostanthera spinosa</i>	X		X
	<i>Senecio spathulatus</i>	X		X
	<i>Styphelia perileuca</i>	X		X



## A1.2 Fauna

As previously noted, a number of threatened fauna have been recorded in the locality, and a number of others are considered potential occurrences. In the table below, these species are evaluated for their potential to occur on the site; significance of the proposal to this potential occurrence; and thus their eligibility/requirement for Seven Part Test assessment.

**Table 16: Eligibility for Seven Part Test Assessment – Fauna**

Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
BIRDS	Glossy Black Cockatoo ( <i>Calyptorhynchus lathamii</i> )	13	V-TSC Act	Dry sclerophyll forest and woodland containing Allocasuarina and Casuarina, and large tree hollows. Preferred regional forage species are <i>A. littoralis</i> and <i>A. torulosa</i> . Requires sufficient extent of forage within home range to support breeding. Breeds Mar-Aug, takes 90 days to hatch and fledge (Lindsey 1992).	No Allocasuarina onsite – limited in adjacent road reserve, offering only short term forage as minute part of local range which would be centred in larger forest remnants. Only low potential to occur for short term foraging – no potential to nest. No risk of significant impact, but could be deterred by human presence - <b>7 part test required</b> to evaluate.
	Brown Treecreeper ( <i>Climacteris picumnus</i> ) eastern subspecies	0	V-TSC Act	Medium-sized insectivorous bird occupying eucalypt woodlands, particularly open woodland lacking a dense understorey. Sedentary and nests in tree hollows within permanent territories, breeding in pairs or communally in small groups (Noske 1991). Birds forage on tree trunks and on the ground amongst leaf litter and on fallen logs for ants, beetles and larvae (Noske 1979). Distributed through central NSW on the western side of the Great Dividing Range and sparsely scattered to the east of the Divide in drier areas such as the Cumberland Plain of Western Sydney, and in parts of the Hunter,	Site and study habitat is largely unsuitable due fragmentation, and not recorded in locality. Unlikely to occur.  No risk of impact, hence 7 Part Test not required.



Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
				Clarence, Richmond and Snowy River valleys, Coffs Harbour and Great Lakes Shire.	
	Powerful Owl <i>(Ninox strenua)</i>	5	V-TSC Act	Wet and dry sclerophyll forests. Nests in tree hollows. Requires high diversity and abundance of medium-sized arboreal prey. Very large territory (500-5000ha).	Site and adjacent land contains only very marginal potential foraging habitat limited to small area of woodland and forest with likely low potential prey species abundance and diversity, within a semi-urbanised context. No nesting hollows in study area. At best very low chance of occurrence in study area using as marginal fringe of territory based in large body of forest to the northwest, or moving across wider fragmented landscape.  Proposal unlikely to impact given limited habitat loss and extent of higher quality habitat in locality. No loss of potential nest trees or risk of prey impacts. <b>Seven Part Test undertaken</b> as low chance of occurrence.
	Masked Owl <i>(Tyto novaehollandiae)</i>	3	V-TSC Act	Eucalypt forest and woodlands with sparse understorey. Nests in tree hollows. Requires high diversity and abundance of prey 200-600g weight. Large territory.	As for Powerful Owl. <b>Seven Part Test required.</b>
	Barking Owl <i>(Ninox connivens)</i>	0	V-TSC Act	Well-forested hills and flats, eucalypt savannah (especially), and riverine woodland in coastal and subcoastal areas. Prefers hunting in more open country for mammals (rabbits, rats, mice, small bats and small marsupials) and birds (small up to Frogmouths and	Potential habitat in study area but not recorded locally, and very sparse distribution, hence unlikely to occur.  No risk of impact, hence 7 Part Test not required.



Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
				Magpies). Large territories. Nest in hollows.	
	Sooty Owl ( <i>Tyto tenebricosa</i> )	1	V-TSC Act	Rainforest and tall, moist, diverse eucalypt forest. Roosts in dense foliage, tree hollows & caves/overhangs. Nests in hollow in tall forest tree. Requires high diversity and abundance of medium-sized arboreal and/or terrestrial prey. Large territory.	Suitable habitat for this species does not occur in the study area. Recorded in the locality however unlikely to occur on site.  No risk of impact, hence 7 Part Test not required.
	Little Lorikeet ( <i>Glossopsitta pusilla</i> )	3	V-TSC Act	Gregarious, usually foraging in small flocks, often with other species of lorikeet feeding primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including, melaleucas and mistletoes. Mostly occurs in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes.	The site and study area may offer some broadly suitable foraging habitat for the species, along with a couple of suitable nesting hollows. Considered at best low chance of occurrence as part of a wider foraging range, with competition for hollows likely to prevent breeding.  Proposal will see some removal of potential habitat and nesting hollows, however this loss is negligible in the context of the remaining higher quality habitat in the locality. <b>7 Part Test required</b> as potential to occur.
	Swift Parrot ( <i>Lathamus discolor</i> )	0	E-TSC Act, E-EPBC Act	Breeds in Tasmania and winters on mainland, from Victoria to southern Queensland. Feeds mostly on pollen and nectar of winter flowering eucalypts and banksias, but also on fruit, seeds, lerps and insect larvae (Schodde and Tideman 1990). Favoured species are <i>E. robusta</i> , <i>Corymbia gummifera</i> , <i>E. globulus</i> , <i>E. sideroxylon</i> , <i>E. leucoxylon</i> , <i>E. labens</i> , <i>E.</i>	Some preferred forage species present but only single local record in locality. Considered unlikely chance of occurrence due to extreme rarity and competition with common and aggressive native conspecifics.  No risk of impact and unlikely to occur, hence 7 Part



Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
				<i>ovata</i> , <i>E. tereticornis</i> , <i>C. maculata</i> , <i>Banksia serrata</i> and <i>B. integrifolia</i> . In coastal NSW, Swamp Mahogany, Spotted Gum and Bloodwood forests are important foraging habitats and larger trees may be selected. Disperse according to changing local food resources.	Test not required
	Varied Sittella ( <i>Daphoenositta chrysoptera</i> )	2	V-TSC Act	Sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west (Higgins and Peter 2002; Barrett et al. 2003). It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. It builds a cup-shaped nest of plant fibres and cobweb in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	Unlikely to occur due to isolation, lack of understorey cover and site exposure.  Proposal will not affect potential habitat in study area and species unlikely to occur on site. No risk of impact, hence 7 Part Test not required.
	Square-tailed Kite ( <i>Lophoictinia isura</i> )	4	V-TSC Act	Open forests and woodlands in coastal and sub-coastal areas. Forages low over, or in, canopy for eggs, nestlings, passerines, small vertebrates and invertebrates. Large home range (>100km <sup>2</sup> ). Observed foraging in residential areas of Port Macquarie. Large stick nest in high fork of living tree. Breeds July-December. Lays 2-3 eggs with 1-2 birds fledging after	Site and study offers some generic potential foraging habitat and potential nest trees. Considered moderate to high chance of occurrence foraging at some stage in study area as recorded within 1km.  Proposal will see given limited foraging habitat loss considered low significance given extent of higher





Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
				100days. Appears to be adapting to an abundance of passerines in well-vegetated outer fringes of cities. Probably migrates to northern Australia in winter. (Debus 1998, NSW NPWS 2000).	quality habitat in nearby forest. Impact clearly insignificant but <b>7 Part Test required as potential to occur.</b>
	Little Eagle ( <i>Hieraaetus morphnoides</i> )	0	V-TSC Act	Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland, sheoak or acacia woodlands and riparian woodlands of interior NSW are also used (Marchant and Higgins 1993; Aumann 2001a). For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring. It eats birds, reptiles and mammals, occasionally adding large insects and carrion (Marchant and Higgins 1993; Aumann 2001b; Debus et al. 2007). It is distributed throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment (Marchant and Higgins 1993). It occurs as a single population throughout NSW.	As for Square-tailed Kite however no records in the locality. Occurrence considered unlikely, or at best very low. Given minimal impacts on prey and no nest sites impacted, impact clearly incapable of being insignificant hence 7 part test not required to qualify.
	Spotted Harrier ( <i>Circus assimilis</i> )	0	V-TSC Act	Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe (e.g. chenopods) (Marchant and Higgins 1993). It is found mostly commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. The species builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining	Some broadly generic potential habitat but low prey abundance and no local records – more likely to occur in upper hinterland. Unlikely to occur.  No risk of impact, hence 7 Part Test not required.



Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
				in the nest for several months. Diet includes terrestrial mammals, birds and reptiles, occasionally large insects and rarely carrion (Marchant and Higgins 1993). Many of the remaining key prey species (e.g. terrestrial grassland birds such as quail, button-quail, pipits, larks and songlarks) require ground cover and are sensitive to habitat degradation from grazing (Marchant and Higgins 1993).	
MAMMALS	Spotted-tail Quoll ( <i>Dasyurus maculatus</i> )	1	V-TSC Act, E-EPBC Act	Various forested habitats with preference for dense forests. Requires tree hollows, hollow logs or caves for nesting. Large home range (>500ha) and may move over several kilometres in a few days. Tends to follow drainage lines.	Site and study area habitat too disturbed, fragmented and no potential denning habitat. Considered unlikely chance of occurrence. No risk of significant impact hence 7 Part Tests not undertaken.
	Brushtailed Phascogale ( <i>Phascogale tapoatafa</i> )	10	V-TSC Act	Range of forest habitats but prefers drier sclerophyll forest with sparse ground cover. Forages on large rough-barked trees for small fauna, also utilises eucalypt nectar. Rests in tree hollows, stumps, bird nests. Requires tree hollows for nesting. (NPWS, 2000) Breeds May-July. Occupies territory of 20-100ha. Has been recorded in swamp forest.	Study area has some generically suitable habitat for this species however is highly exposed and isolated. Recorded in loosely connected habitat <1.5km east though and considered at best a low chance of occurrence foraging in study area.  Proposal has only limited impact however low potential to occur hence <b>Seven Part Test required.</b>
	Yellow-bellied Glider ( <i>Petaurus australis</i> )	0	V-TSC Act	Moist and dry tall mature eucalypt forest and woodland. Requires mature hollow-bearing trees, winter-flowering eucalypts, suitable sap-feeding eucalypt species and a mosaic of forest types (NPWS 1999). Sap trees utilised	Study area too modified and isolated from large stands of forest. No proximate records. Unlikely to occur hence 7 Part Test not required.



Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
				include: <i>E. propinqua</i> , <i>E. tereticornis</i> , <i>E. microcorys</i> , & <i>E. resinifera</i> (NPWS 2000). Home range of 30-65ha (NPWS 1999).	
	Squirrel Glider ( <i>P. norfolcensis</i> )	7	V-TSC Act	Dry, open forest and woodland, and occasionally wet eucalypt and rainforest. Most common in floriferous sub-coastal and coastal forests with winter flowering trees and shrubs and some smooth barked eucalypts. Most commonly recorded along the coastal margin where Banksias dominate the understorey. Home range 0.6-9ha, family groups of 2-10 (NSW NPWS 1999).	Study area has some generically suitable habitat for this species however is highly exposed and isolated. Lack of preferred understorey and poor local connectivity to source habitat. Recorded in loosely connected habitat to the southwest and considered at best a very low potential to occur on the site.  Proposal has only limited impact however low potential to occur and some further fragmentation, hence <b>Seven Part Test required</b> .
	Grey-headed Flying Fox ( <i>Pteropus poliocephalus</i> )	21	V-TSC Act, V-EPBC Act	Nomadic frugivore and nectivores on rainforest, eucalypt, <i>Melaleuca</i> and <i>Banksia</i> . Recorded flying up to 45km from roost (generally max. of 20km). Roosts colonially with short term individual or small groups. Spring or Summer roosts are maternity sites. Dependent on winter flowering species eg <i>E. robusta</i> and <i>E. tereticornis</i> .	Eucalypts and other trees on site offer generic foraging habitat. Very high change of occurrence.  Minor loss of habitat considered insignificant relative to range. No risk of significant impact, however <b>Seven Part Test required</b> as potential to occur.
	Yellow-bellied Sheath-tail Bat ( <i>Saccolaimus flaviventris</i> )	0	V-TSC Act	Ecology poorly known. Found in almost all habitats, particularly wet and dry sclerophyll forests and woodlands below 500m altitude, and also open woodland, Acacia shrubland, mallee, grasslands and desert. Roosts mainly in tree hollows, but also under	Site/study area has some generically suitable structure for foraging, but is somewhat isolated from larger tracts of forest and limited in extent. Not recorded in locality. Roosting would be limited by



Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
				bark, under roof eaves and in other artificial structures. Fast flying species, believed to forage above the canopy or closer to the ground in open areas. Insectivorous. May be Summer migrant.	competition with conspecific bats and birds.  Proposal has only limited impact however low potential to occur and some further fragmentation, hence <b>Seven Part Test required</b> .
	Eastern False Pipistrelle ( <i>Falsistrellus tasmaniensis</i> )	1	V-TSC Act	Occupies sclerophyll forest from the Great Dividing Range to the coast, typically wet tall forest at high elevations and is more common in northern NSW. It may migrate to coastal areas in Winter. Roosts typically in tree hollows, but also in caves, buildings. Roosts as single sex colonies of 3-36 bats. Forages in and below tree canopy on moths, beetles, bugs, flies & ants, up to 12km from roost site. Breeds in Summer (Churchill 1998, Smith et al 1995).	Study area is not preferred habitat for this species – prefers more extensive tracts of forest. Only single record in locality.  Proposal will have negligible impact and unlikely to occur, hence 7 Part Tests not required.
	Eastern Cave Bat ( <i>Vespadelus troughtoni</i> )	0	V-TSC Act	Rare and poorly known bat. Cave dwelling bat roosting in small (5-50) to large (500) groups in sandstone overhang caves, boulder piles, mines, tunnels and sometimes buildings. Tend to roost in well lit portions of caves in avons, domes, cracks and crevices. Occasionally found along cliff lines in wet eucalypt forest and rainforest on the coast and dividing range, but extend into drier forest on western slopes.	Study area contains some generic potentially suitable foraging habitat however not recorded locally and no potential roosting habitat in study area which is a key limitation. Unlikely chance of occurrence.  No risk of impact and unlikely to occur. Seven Part Test not required.
	Little Bent-wing Bat ( <i>Miniopterus</i> )	2	V-TSC Act	Forages above and below canopy of well-forested areas. Roosts in old buildings, caves, mines etc.	Site/study area may provide generic foraging habitat and non-breeding roosts in hollow-bearing trees. Moderate chance of occurrence most likely foraging



Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
	<i>australis</i> )			Dependent on nursery caves and communal roosts.	as small part of local seasonal range.  Proposal has only limited impact however moderate potential to occur and some further fragmentation, hence <b>Seven Part Test required.</b>
	Eastern Bent-wing Bat ( <i>M. schreibersii oceanensis</i> )	4	V-TSC Act	Habitat generalist - forages above well-forested areas. Roosts in old buildings, caves, mines etc. Dependent on nursery caves and communal roosts.	As for Little Bent-wing Bat. <b>Seven Part Test required.</b>
	Greater Broad-nosed Bat ( <i>Scoteanax rueppellii</i> )	1	V-TSC Act	Forages over range of habitats including rainforests and moist forests, but prefers ecotones between riparian forest, woodland and cleared land. Requires sparse understorey and will forage over water. Roosts in tree hollows. Feeds on larger insects, small vertebrates and perhaps other bats.	Site and study area overall has generically suitable structure for foraging and suitable roosting habitats present in hollow trees. Considered fair potential occurrence foraging over site and study area as part of wider foraging range.  Proposal has only limited impact however fair potential to occur and some further fragmentation, hence <b>Seven Part Test required.</b>
	East-coast Freetail Bat ( <i>Micronomus norfolkensis</i> )	7	V-TSC Act	Specific habitat requirements of this species are poorly known. Has been recorded in habitats ranging from rainforest to dry sclerophyll and woodland, with most recorded in the latter (State Forests 1994). Roosts in small colonies under tree hollows and under loose bark; has been found under house eaves, in roofs and metal caps on telegraph poles. Recorded roosting in roof of	As for Greater Broad-nosed Bat and fair potential to occur. <b>Seven Part Test required.</b>



Animal Group	Common Name (Scientific Name)	Local Records	Legal Status	Habitat/Ecology Profile	Likelihood Of Occurrence? Risk of Significant Impact? Seven Part Test Required?
				churches and schools. Probably forages above forest or woodland canopy, and in clearings adjacent to forest. Most records are of single individuals, and it is likely to occur at low densities over its range.	
	Southern Myotis ( <i>Myotis macropus</i> )	3	V-TSC Act	Tunnel, cave, bridges, old buildings, tree hollow and dense foliage roosting bat which prefers riparian habitat over 500m long with nearby roosting habitat. Key habitats are streams, rivers, creeks, lagoons, lakes and other water bodies. Feeds on aquatic insects and small fish. Has recently been observed foraging in small bodies of water.	Nearest records occur over 6km to the west. Dams on site too small and unlikely to be used for foraging. Unlikely to occur on site and no risk of significant impact hence 7 Part Tests not undertaken.

A number of other species (see table below) are known or considered potential occurrences within the locality. However due to a number of factors, these species were not considered potential occurrences on site. Thus the proposal is not considered to have a significant impact on the viability of any local population of the subject species and Seven Part Test evaluation was not required.

**Table 17: Fauna species unlikely to occur**

Preferred Habitat	Species	Site considered unsuitable habitat	Presence of predators likely to have excluded the species	Disturbance history likely to have excluded this species	Lack of local records
Dry Sclerophyll/Open Forest/ Woodland	Hoary Bat ( <i>Chalinolobus nigrogriseus</i> )	X			X
	Regent Honeyeater ( <i>Xanthomyza phrygia</i> )	X		X	X



Preferred Habitat	Species	Site considered unsuitable habitat	Presence of predators likely to have excluded the species	Disturbance history likely to have excluded this species	Lack of local records
	Painted Honeyeater ( <i>Grantiella picta</i> )	X		X	X
	Black-chinned Honeyeater ( <i>Melithreptus gularis gularis</i> ) eastern subspecies				X
	Scarlet Robin ( <i>Petroica boodang</i> )	X		X	X
	Flame Robin ( <i>Petroica phoenicea</i> )	X		X	X
	Hooded Robin ( <i>Melanodryas cucullata cucullata</i> ) southeastern form	X			X
	Bush-stone Curlew ( <i>Burchinus grallaris</i> )	X			X
	Diamond Firetail ( <i>Stagonopleura guttata</i> )	X			X
	Grey-crowned Babbler ( <i>Pomatostomus temporalis temporalis</i> ) eastern subspecies	X		X	X
Rainforest/ Wet Sclerophyll Forest	White-eared Monarch ( <i>Carterornis leucotis</i> )	X		X	X
	Superb Fruit Dove ( <i>P. superbus</i> )	X			X
	Wompoo Fruit Dove ( <i>Ptilinopus magnificus</i> )	X			X
	Barred Cuckoo Shrike ( <i>Coracina lineata</i> )	X			X



Preferred Habitat	Species	Site considered unsuitable habitat	Presence of predators likely to have excluded the species	Disturbance history likely to have excluded this species	Lack of local records
	Parma Wallaby ( <i>Macropus parma</i> )	X	X	X	X
	Red-legged Pademelon ( <i>Thylogale stigmatica</i> )	X			X
	<b>Long-Nosed Potoroo</b> ( <i>Potorous tridactylus</i> )	X	X	X	X
	Olive Whistler ( <i>Pachycephala olivacea</i> )	X			X
	Three-toed Snake-tooth Skink ( <i>Coeranoscincus reticulatus</i> )	X		X	X
	Pale-Headed Snake ( <i>Hoplocephalus bitorquatus</i> )	X		X	X
	Stephen's Banded Snake ( <i>H. stephensii</i> )	X		X	X
	White-crowned Snake ( <i>Cacophis harriettae</i> )	X			X
Swamp/ Aquatic/ Freshwater Wetland/ Estuarine/ Marine	Osprey ( <i>Pandion haliaetus</i> )	X			X
	Blue-billed Duck ( <i>Oxyura australis</i> )	X			X
	Freckled Duck ( <i>Stictonetta naevosa</i> )	X			X
	Brolga ( <i>Grus rubicunda</i> )	X			X
	Magpie Goose ( <i>Anseranas semipalmata</i> )	X			X





Preferred Habitat	Species	Site considered unsuitable habitat	Presence of predators likely to have excluded the species	Disturbance history likely to have excluded this species	Lack of local records
	Black-necked Stork <i>(Ephippiorhynchus asiaticus)</i>	X			X
	Comb-crested Jacana <i>(Irediparra gallinacea)</i>	X			X
	Black Bittern <i>(Dupetor flavicollis)</i>	X		X	
	<b>Australasian Bittern</b> <b><i>(Botaurus poiciloptilus)</i></b>	X		X	X
	<b>Painted Snipe</b> <b><i>(Rostratula benghalensis)</i></b>	X		X	X
	White-fronted Chat <i>(Epthianura albifrons)</i>	X			X
	Wallum Froglet <i>(Crinia tinnula)</i>	X		X	
	Green and Golden Bell Frog <i>(Litoria aurea)</i>	X		X	X
	Olongburra Sedge Frog <i>(Litoria olongburensis)</i>	X		X	X
	Glandular Frog <i>(Litoria subglandulosa)</i>	X		X	X
	Booroolong Frog <i>(Litoria booroolongensis)</i>	X		X	X
	Pouched Frog <i>(Assa darlingtoni)</i>	X		X	X
	<b>Stuttering Frog</b> <b><i>(Mixophyes balbus)</i></b>	X			X



Preferred Habitat	Species	Site considered unsuitable habitat	Presence of predators likely to have excluded the species	Disturbance history likely to have excluded this species	Lack of local records
	<b>Giant barred Frog</b> <i>(Mixophyes iteratus)</i>	X			X
	Green-thighed Frog <i>(Litoria brevipalmata)</i>	X			X
Shrubland/Heathland/ Grassland	Sphagnum Frog <i>(Philoria sphagnicolus)</i>	X	X	X	X
	Eastern Pygmy Possum <i>(Certatetus nanus)</i>	X	X		X
	Common Planigale <i>(Planigale maculata)</i>	X	X	X	X
	Eastern Chestnut Mouse <i>(Pseudomys gracilicaudatus)</i>	X		X	X
	New Holland Mouse <i>(Pseudomys novaehollandiae)</i>	X	X	X	
	Eastern Blossom Bat <i>(Syconycteris australis)</i>	X			
	Grass Owl <i>(Tyto capensis)</i>	X			X
	Ground Parrot <i>(Pezoporus wallicus wallicus)</i>	X	X	X	X



## Appendix 2: Site flora species list

Frequency: C Common,  
 D Dominant at least in some areas,  
 C Common,  
 U Uncommon,  
 R Rare on site, few specimens.

\* Denotes an introduced species

Common Name	Scientific Name	Frequency
<b>Canopy trees</b>		
Pink Bloodwood	<i>Corymbia intermedia</i>	O
Spotted Gum	<i>Corymbia maculata</i>	O
Tallowwood	<i>Eucalyptus microcorys</i>	D
Forest Red Gum	<i>Eucalyptus tereticornis</i>	O
Grey Ironbark	<i>Eucalyptus siderophloia</i>	D
Small-fruited Grey Gum	<i>Eucalyptus propinqua</i>	D
<b>Understorey trees</b>		
Prickly-leaved Paperbark	<i>Melaleuca stypheliodes</i>	O
Mock Olive	<i>Notelia longifolia</i>	O
<b>Shrubs</b>		
*Lantana	<i>Lantana camara</i>	O
Coffee Bush	<i>Breynia oblongifolia</i>	C
<b>Grasses</b>		
Threeawn Speargrass	<i>Aristida vagans</i>	U
Bushy Hedge-hog Grass	<i>Echinopogon caespitosus</i>	C
	<i>Entolasia marginata</i>	U
Blady Grass	<i>Imperata cylindrical</i>	D
Weeping Grass	<i>Microlaena stipoides</i>	O
Basket Grass	<i>Oplismenus aemulus</i>	C
	<i>Panicum simile</i>	O
Kangaroo Grass	<i>Themeda australis</i>	D
*Caratao Grass	<i>Axonopus fissifolius</i>	C



*Common Crab-grass	<i>Digitaria ciliaris</i>	C
*Panic Veld-grass	<i>Ehrharta erecta</i> ,	U
*Sticky Head Grass	<i>Paspalum dilatatum</i>	U
*Kikuyu	<i>Pennisetum clandestinum</i>	C
*Pigeon Grass	<i>Setaria sphacelata</i>	D
<b>Groundcovers</b>		
Kidney Weed	<i>Dichondra repens</i>	O
Twining Glycine	<i>Glycine clandestina</i>	O
Prickly Beard-heath	<i>Leucopogon juniperinus</i>	C
White-root	<i>Pratia purpurascens</i>	C
Bracken	<i>Pteridium esculentum</i>	O
*Farmers Friend	<i>Bidens pilosa</i>	O
*Flatweed	<i>Hypochaeris radicata</i>	C
*Lambs Tongue	<i>Plantago lanceolata</i> <i>lanceolata</i>	C
*Ragwort	<i>Senecio madagascariensis</i>	C
*Arrow-leaf Sida	<i>Sida rhombifolia</i>	C
*White Clover	<i>Trifolium repens</i>	D
<b>Lianas, Scramblers and Twiners</b>		
Monkey Rope	<i>Parsonsia straminea</i>	C
<b>Sedges, Rushes and Aquatics</b>		
Common Maidenhair	<i>Adiantum aethiopicum</i>	R
Bergalia Tussock	<i>Carex longebrachiata</i>	C
Water Velvet	<i>Azolla pinnata</i>	O
Tall Spike Rush	<i>Eleocharis sphacelata</i>	C
Common Enhydra	<i>Enhydra fluctuans</i>	O
Ground Fern	<i>Hypolepis muelleri</i>	C
Common Rush	<i>Juncus usitatus</i>	C
Creeping Water Pimrose	<i>Ludwigia peploides</i>	O
Swamp Lily	<i>Ottelia ovalifolia</i>	O
Pale Persicaria	<i>Persicaria lapathifolia</i>	O



Spotted Knot-weed	<i>Persicaria strigosa</i>	C
Frogmouth	<i>Philydrum lanuginosum</i>	O
River Buttercup	<i>Ranunculus inundatus</i>	U
Forest Buttercup	<i>Ranunculus plebius</i>	O
	<i>Ranunculus inundatus</i>	C
Rough-seed Bulrush	<i>Schoenoplectus mucronatus</i>	C
	<i>Sparganium subglobosum</i>	O
Cumbungi	<i>Typha orientalis</i>	U
Spiny-headed Matrush	<i>Lomandra longifolia</i>	C
-	<i>Lomandra sp.</i>	U
-	<i>Lepidosperma laterale</i>	O



## Appendix 3: Hollow Bearing Tree Data

Table 18: Hollow-bearing tree data

Number	Species	Height	DBH	Latitude	Longitude	Hollows					
						Trunk			Limbs		
						Small (<5cm)	Medium (5-15cm)	Large (>15cm)	Small (<5cm)	Medium (5-15cm)	Large (>15cm)
H1	Small-fruited Grey Gum	20-23	60	-32.05913	152.50122		1 (potential)				
H2	Small-fruited Grey Gum	18-20	75	32.06142	152.50188		1 (potential)				



## Appendix 4: Core Koala Habitat Assessment

### 1.0 Potential Koala Habitat Assessment

As detailed in section 5.1, the site contains Potential Koala Habitat, hence Part 2 of SEPP 44 applies.

### 2.0 Core Koala Habitat Assessment

#### 2.1 Introduction

##### 2.1.1 Koala Ecology

###### 2.1.1.1 Diet

###### 2.1.1.1.1 General Ecology

Koalas feed primarily but not exclusively on (and also intra-specifically, depending on poorly understood edaphic, chemical and socio-behavioural factors) selected species of the genus *Eucalyptus*. Nationally, they have been observed feeding or resting in about 120 eucalypt species (66 in NSW) and 30 non-eucalypt (7 in NSW) species. In the Hastings and Macleay regions, some eucalypt species not listed under Schedule 2 of SEPP 44 that are known to be used by Koalas are: *E. amplifolia*, *E. seeana* and *E. propinqua*. Non-endemic species also used by koalas include *E. nicholii* and *E. citriodora*.

Some non-eucalypt species reported to be used for feeding or other behavioural purposes (some in this region) are *Acacia costata*, *A. mearnsii*, *A. melanoxylon*, *Allocasuarina torulosa*, *Bombax malabrica*, *Lophostemon conferta*, *L. suaveolens*, *Exocarpus cupressiformis*, *Leptospermum laevigatum*, *Melaleuca ericifolia*, *M. quinquenervia*, *Pinus radiata* and *Cinnamomum camphora* (Martin and Lee 1984, Kel Mackay pers. comm.). Koalas have also been observed using trees with dense foliage or retreating to rainforest during adverse weather such as high temperatures, strong wind or heavy rain (Jurskis and Potter 1997).

Research by the Australian Koala Foundation (AKF) suggests that usage of habitat by koalas may be a function of the abundance of the present species. The AKF describes Primary Habitat as areas where the dominant tree species are preferred browse species, with their usage being independent of the species' density. However, in some areas, a species considered a secondary browse species may be preferentially used as a primary tree, often where its occurrence in the area is infrequent.

A koala food tree is usually identified by a significant number of scats at its base, though such trees may also be used for roosting. Contrary to a long held assumption though, observation of Koalas resting in a tree does not always indicate it is a feed tree (Phillips 2000b, NPWS 2003).



Koalas appear to prefer young leaves rather than mature leaves, and preferred foliage usually has a threshold for minimum moisture content (which may vary seasonally) and nitrogen content (Jurskis and Potter 1997, Pahl and Hume 1990). Other studies have also shown threshold levels for essential oils, with preferred species having more volatile oils and less heavy oils (Hume 1995); preferences for higher concentrations of crude protein, phosphorous and potassium, and lower concentrations of fibre (Ullrey et al 1981); and more simple sugars and less complex sugars (Osawa 1993). These components all vary interspecifically and intraspecifically, and factors such as species, age, size and crown condition also influence the physiological processes that ultimately affect nutritional quality and palatability, especially in a suboptimal environment (Jurskis and Potter 1997).

Species, individual tree and foliage selection for browsing by koalas hence, is still poorly understood. In addition to the above, it also varies with season (which may be an indication of varying nutritional value), as well as location (koalas may feed on one particular species at a specific location, and ignore it at another); and may also be influenced by local abundance of food species, as well as social organisation of the population (Hindell and Lee 1990; Reed, Lunney and Walker 1990). As mentioned above, nutritional quality of individual trees may also be a factor, with nutrition shown to vary inter and intraspecifically (Braithwaite, Turner and Kelly 1983, Anon 1999).

Usage may also be determined by site-dependant edaphic factors eg soil type (Sharp and Phillips 1999), which affects the nutrient quality of forage. A gradient in nutrient concentration in soils and foliage is a major determinant of the distribution of arboreal fauna (Anon 1999, Gibbons and Lindenmayer 2002). Forest consisting of primary browse species associations located on deep, fertile soils on floodplains, in gullies and along watercourses are generally considered preferred habitat. This may possibly be a reflection of the nutritional value of the foliage.

Other research suggests that concentrations of plant chemical defences (especially diformyl-phloroglucinols or DFPs) may be a key factor. Koalas may be selecting trees with lower concentrations of DFPs. This would suggest that Koala preference is not based on species, but on an individual tree basis, as DFP level vary intraspecifically as well as interspecifically (Anon 1999). DFP level also does not appear to vary due to environmental factors, as trees of the same species within the same area can vary widely (Anon 1999).

Structural features may also be important in individual tree selection eg on hot days, koalas are often observed in trees with greater foliage cover. Large trees are thought by some researchers to be preferred for their greater amount of foliage which reduces the need for returning to the ground to move to another tree, and thus risking predator attack (Hindell and Lee 1990; Reed, Lunney and Walker 1990) although research in other areas has found highest activity on younger trees eg 20-30cm trunk dbh (Mackay 1996) which could be a function of nutrition (eg varies with vigour/health or age) or forest structure (eg age classes may have been modified by logging) (Jurskis and Potter 1997).

Research for the Pine Creek State Forest KPOM (Smith and Andrews 1997) found a preference for trees with trunk dbh 40-100cm (and a dislike for <20cm dbh), while Lunney *et al* (1999) found a preference for trees from 50-60cm dbh in the Coffs Harbour area.





Jurskis and Potter (1997) suggest that climbing “mechanics” may be a factor, as they found Koalas near Eden to prefer trees 30-90cm diameter. They suggest Koalas climb more efficiently if tree diameter is close to the combined reach of the forelegs, and are physically/mechanically disadvantaged when tree width is significantly less than the Koalas reach.

### 2.1.1.1.2 North Coast Preferred Species

Phillips (2000a) produced a list of Primary, Secondary and Tertiary preferred browse species per Koala Management Area for NSW, which are detailed in the draft Koala Recovery Plan (NPWS 2003). For the North Coast Management area, the following table lists the species considered as Primary, Secondary and Tertiary Species that occur in the LGA:

**Table 19: Preferred Koala browse species in the LGA**

Source (DECC 2008)

Primary	Secondary	Tertiary
Tallowwood ( <i>E. microcorys</i> )	Small Fruited Grey Gum ( <i>E. propinqua</i> )	Thin-Leaved Stringybark ( <i>E. eugenioides</i> )
Forest Red Gum ( <i>E. tereticornis</i> )	Grey Gum ( <i>E. biturbinata</i> )	White Stringybark ( <i>E. globoidea</i> )
Swamp Mahogany ( <i>E. robusta</i> )	Narrow-Leaved Red Gum ( <i>E. seeana</i> )	Blue-Leaved Stringybark ( <i>E. agglomerata</i> )
Cabbage Gum ( <i>E. amplifolia</i> )	Red Mahogany ( <i>E. resinifera</i> )	
	Slaty Red Gum ( <i>E. glaucina</i> )	

In addition to this, the GTCC CKPOM (AKF 2002) has produced a list of Primary, Secondary and Tertiary preferred browse species for the shire:

**Table 20: Preferred Koala browse species in the LGA**

(Source: AKF 2002)

Primary	Secondary	Tertiary
Tallowwood ( <i>E. microcorys</i> )	Small Fruited Grey Gum ( <i>E. propinqua</i> )	Cabbage Gum ( <i>E. amplifolia</i> )
Forest Red Gum ( <i>E. tereticornis</i> )	Ironbark ( <i>E. siderophloia</i> )	Ribbon Gums ( <i>E. viminalis</i> / <i>E. nobilis</i> )
Swamp Mahogany ( <i>E. robusta</i> )	Grey Ironbark ( <i>E. placita</i> / <i>E. paniculata</i> )	Messmate Stringybark ( <i>E. obliqua</i> )
	Thin-Leaved Stringybark ( <i>E. eugenioides</i> )	

The significance of this information is that several of the species previously considered (mostly on the basis of observation of Koalas within these trees) to be Primary Preferred Browse Species in the Shire (Connell Wagner 2000a, 2000b) ie Blackbutt, Scribbly Gum and *Melaleuca quinquenervia*, are not listed even as Tertiary species. As noted above, the basis of the draft Koala Recovery Plan refutes the assumption that the observation of a Koala within a specific tree can be



considered a reliable indicator of the tree being a preferred food species (NPWS 2003, Phillips 2000a, 2000b).

Most significantly, Scribbly Gum (*E. signata*), currently listed as a Primary Preferred Browse Species under SEPP 44, is not listed, while two other species not listed in Schedule 2 are considered Primary Browse. Personal communication (2002) with Dr Phillips led to advice following extensive work in the Hastings area (eg Area 13 – Thrumster) for Hastings Council that Scribbly Gum (as well as Blackbutt and *Melaleuca quinquenervia*) was not a preferred browse species. These species are often in association with preferred species such as Tallowwood and Swamp Mahogany, and hence Koala use of these non-browse species was considered to be either due to non-foraging purposes (eg shelter) or detection of scats falling from the adjacent food tree. However, Scribbly Gum and other species such as Broad-Leaved Paperbark may be used intensively in some situations even constituting (via other evidence) Core Koala Habitat as found by this consultant (Darkheart 2004m, 2004q). Consequently, it is considered by this consultant that each site should be treated individually, in order to encompass the full range of habitats and browse species utilised by Koalas, and the circumstances they exist in.

### **2.1.1.2 Population and Life Cycle Characteristics**

Koalas are solitary, and territorial (particularly males), yet live in established, sedentary polygynous breeding aggregates arranged in matrix of overlapping home ranges, whose size varies according to sex (males tend to be larger so that they overlap the ranges of several females), and carrying capacity of the habitat (usually measured in terms of density of primary browse species) (Phillips and Callaghan 1995). These aggregates basically consist of an alpha (dominant) male, with his harem of at least 2-4 females and their offspring (juveniles and/or sub-adult koalas) of varying stages of maturity and independency (Phillips 1997).

Adult koalas appear to generally avoid each other, except during mating season (generally warmer months from Spring, but as early as July-August) when the males actively seek females, with most births occurring late November-March (Martin and Lee 1984). Social cohesion is maintained in a population by interactions through common tree usage, scent marking, vocalisations and agonistic behaviour patterns (Phillips 1997).

A Koala may live for around 15 years (especially females, though 8-10yrs is likely to be the average age), with breeding for most females occurring at 1.5-2years, and for males about 4 years (when they reach a sufficient size to defend a territory) (Martin and Lee 1984, Biolink 2005b). Young remain in the pouch for 5-6 months, and associate with the mother until at least about 11 months (and up to 2 years), after which they disperse into a population (generally coinciding with reaching sexual maturity).

Female koalas do not necessarily breed every year; perhaps due to the dependence on quality foraging resources (dependant on variety of factors eg seasonality and condition of habitat), density of other breeding females/competition for resources, demand for high site philopatry (movement is restricted to known areas within their home range with high quality forage potential required for lactation), and the physiological demand of raising offspring (Phillips 1997).

Young, sub-dominant and senescent males are often forced into secondary habitats by dominant



males. Such habitat is generally located on the outer periphery of the core breeding/high quality habitat, and characterised by poorer soils, greater disturbance, and lower frequency/poorer condition of preferred browse species (Martin and Lee 1984). These animals have more ephemeral home ranges, sometimes moving between established populations, which is desirable for maintaining genetic flow. Consequently though, this group has a higher mortality rate (Phillips 1997).

### 2.1.1.3 Home Range and Home Range Trees

#### (a) Home Range

*Home range* is the territory of a single koala, usually occupied for at least several years, or more commonly throughout its life (Phillips 1997, Sharp and Phillip 1999). Size may vary from a hectare to hundreds of hectares (eg Jurskis and Potter 1997 report home ranges of 38-520ha, with average of 169ha, near Eden); varying with habitat quality (eg if primary browse species dominate the tree component, home range size is expected to be small and carrying capacity high), sex (males have larger territories and may make forays into other areas), age of the animals (eg sub-adults versus adults), and location (Jurskis and Potter 1997, Phillips 1997, Sharp and Phillip 1999).

Home range and hence Koala density varies per region due to the above factors. For example, Jurskis and Potter (1997) collated Koala densities from Queensland to Victoria, and showed Koala density ranging from 0.006-7.5 Koalas/ha. Koalas have been recorded at very low densities in areas as a result of dispersed food resources and possibly due to historical disturbances eg clearing of fertile lands for agriculture (eg Jurskis and Potter 1997). Within such large home ranges, a few specific areas may be subject to a relatively higher level of use, while others are less commonly used (Jurskis and Potter 1997).

As mentioned previously, the alpha male has a large home range to overlap those of his females, thus he may include secondary (lower quality) habitat within his home range to achieve this. The alpha male's home range is also vigorously defended from other males to ensure rights to food resources and females (Phillips 1997).

In the initial stages of independence, a young female koala usually remains within its mother's home range for about a year, until they establish their own, often overlapping with their mother's, or dispersing to other aggregates. In contrast, a young male is often turned out of the maternal home range (usually around 2 years of age), and becomes a nomad (forced out of other koala home ranges by the dominant males especially during breeding season) for up to 3-4 years, until they are of sufficient size to establish their own home range. During their younger years, these males may be forced into marginal habitats, and become more generalist in their dietary intake.

Both sexes may travel and are also capable of traversing large distances, depending on demand (eg up to 50km over a few weeks or months), which is more often driven by the need to find other koalas (ie to mate), than potential habitat (Phillips 1997). Movements, distances and reasons for such are considered complex and poorly understood (Dr Steven Phillips, pers. comm.). Distance travelled per day will vary with many factors such as topography, distance between forage trees, season/climate, breeding state, and threats. Koalas have been recorded moving from 10m to several hundred metres during the day, and >1.3km overnight when they are typically more active



(Jurskis and Potter 1997, Kel Mackay pers. comm.). Movement is greatest during the breeding season, especially by males (Kel Mackay, pers. comm.), with a female recorded moving 2.6km out of its range to mate, presumably in response to male territorial calls, and returned to its home range (Lee and Martin 1998, Lee *et al* 1998).

### **(b) Home Range Trees**

Within a home range, a few specific trees (*home range trees*) are used by koalas to mark territories and identify individual koalas. Such trees are often recognisable by heavy scratching and collections of scats close to the tree base, and may also have significant forage value (Phillips and Callaghan 1995, Hume 1989). Male koalas may leave their scent by rubbing the gland on their chest against the bark. Koalas frequently return to these trees, or deliberately seek them out during travel (koalas have been recognised to have the ability to know where they are and return to a discrete location (Phillips 1997). Such trees are very important as they maintain social cohesion through identification of population members and assist geographical location (Phillips 1997, Sharp and Phillips 1999).

## **2.1.2 Definition of Core Koala Habitat**

Under SEPP 44, Core Koala Habitat is defined as “*an area of land with a resident population of koalas, as evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a koala population*” (Source: State Environment Planning Policy No. 44 - Koala Habitat Protection).

The definition “an area of land” is interpreted as the land to which the development application applies (if it exceeds 1ha in area, together with any land in the same ownership).

Information to determine if a resident population of koalas exists on the site was obtained by direct survey of the site using standard survey techniques (direct survey of koalas, call playback, scat searches, and tree usage/activity levels assessment) and review of relevant published information and records.

## **2.2 METHODS AND RESULTS**

### **2.2.1 Literature Review**

Koala records in the area are abundant, with 62 recorded in a 10km radius by the OEH Bionet/ Atlas of Wildlife (2015a). No Koalas records occur on the site, however there are several proximate records in the Tallwoods area directly to the north however these are from 2001 to 2006.

A cluster of records also occur nearby around Blackhead and Diamond Beach (OEH 2015a).



## 2.2.2 Field Survey

### 2.2.2.1 Methods

The site was surveyed for Koalas by the following methods:

- Intensive diurnal searches over 1 day
- Scat searches undertaken in accordance with the Spot Assessment Technique (SAT).
- Spotlighting for 1 night
- Searches for definitive Koala scratches.

Searches for scats consisted of checking the ground and leaf litter in a 2m radius around a designated tree. This technique is recognised as a very efficient method of detecting Koala presence, and in some instances, is a method used to identify areas of major Koala activity/significance eg Core Koala Habitat (Phillips and Callahan 1995, 2000, Biolink 2009, 2005a, 2005b, Jurskis and Potter 1997, NPWS 2001, 2004a).

This technique is limited by the following factors:

- *Scat life* – scats naturally deteriorate over time due to insect attack, weather condition (eg rain), fire (though scats have been recorded surviving wildfire) and other disturbances eg mowing and slashing, bulldozing, etc.
- *Groundcover/leaf litter density*: Scats may be hidden in dense groundcover or leaf litter, or searches may be physically impossible in areas of tall, dense groundcover, or waterlogged/swampy areas.
- *Identification*: The observer must be able to identify Koala scats and scratches from other scats and scratches.
- *Bark type*: Rough barked trees do not show evidence of scratch marks like smooth barked gums, thus identification or even detection of climbing may not be determinable. Scratch marks are not usually obvious on Tallowwood unless the tree is heavily used, for example a home range tree. The only smooth-barked trees on the site were Forest Red Gum



## 2.2.2.2 Results

### Direct Observations and Secondary Evidence

No Koalas were directly observed during the survey.

### SAT Surveys

No direct or indirect evidence of Koala's was observed during the field

A number of old animal scratches were found on the smooth-barked Grey Gums on site, however none were attributed to Koalas.

### Spotlighting

No Koalas were observed during the spotlighting surveys.

## 2.3 DISCUSSION AND CONCLUSION

SEPP 44 defines Core Koala Habitat as “*an area of land with a resident population of koalas, as evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a koala population*”. The attributes are provided as examples of only some of characteristics a Core Koala Habitat may demonstrate, and thus to meet the definition of Core Koala Habitat, a site does not necessarily need to show all of these attributes, and may even show other evidence indicating the site is Core Koala Habitat.

In regards to the two identified attributes though, the following is provided:

- 1) “*Breeding females (that is, females with young)*”. This survey failed to detect any evidence of breeding female Koalas on site.
- 2) “*Recent sightings and historical records of a Koala population*”. As mentioned previously no Koalas were observed during the survey, also no indirect evidence of Koala activity was found during the SAT survey. Thus, there is a possibility that Koala may have on association used the site, however it would only form a very small part of a single Koalas territory or be used as transitory habitat.

Despite the occurrence of Potential Koala Habitat on site, the lack of direct or indirect evidence of Koala activity suggests that there is only a low chance of occasional occurrence. This was not unexpected given the fragmented landscape and extent of habitat modification in the study area. As the site does qualify as an area of significant Koala activity and there have been no recent sightings or historical records of Koalas, the site is not Core Koala Habitat and hence a Koala Plan of Management is not required for the proposal.

## ***Attachment B – Contamination Assessment***

**Coastplan Consulting**

**Proposed Residential Development, Lot 612 DP1160096, Blackhead  
Road, Hallidays Point**

**Phase 1 Contamination Assessment**

Report No. RGS01243.1-AB

25 May 2016

**REGIONAL**  
GEOTECHNICAL SOLUTIONS







**Manning-Great Lakes**

**Port Macquarie**

**Coffs Harbour**

RGS01243.1-AB

25 May 2016

Coastplan Consulting  
11 Manning Street  
TUNCURRY NSW 2428

**Attention: Gavin Maberly-Smith**

Dear Gavin,

**RE: Proposed Residential Development, Lot 612 DP1160096, Blackhead Road, Hallidays Point**

**Phase 1 Contamination Assessment**

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a Phase 1 Contamination Assessment at Lot 612 DP1160096, Blackhead Road, Hallidays Point. A residential development is proposed for the site. It is currently occupied by rural grazing land with some livestock yards in the northwest corner.

The assessment found the proposed residential development at the site is feasible with regard to the presence of soil contamination, provided the recommendations and advice of this report are adopted.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

**Regional Geotechnical Solutions Pty Ltd**

A handwritten signature in black ink, appearing to read 'S. Morton', is written over a light blue horizontal line.

**Steven Morton**

Principal



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## **Figures**

Figure 1 Sample Location Plan

## **Appendices**

Appendix A Site History Documentation

Appendix B Results of Laboratory Testing



## 1 INTRODUCTION

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a Phase 1 Contamination Assessment at Lot 612 DP1160096, Blackhead Road, Hallidays Point

The site is understood to be currently (and previously) occupied by rural grazing land with some livestock yards in the northwest corner. A residential development is proposed for the site.

The purpose of the work described herein was to assess the suitability of the site for the proposed residential development with respect to the presence of site contamination resulting from past land use and activities. The work included:

- Identification of Areas of Concern and Chemicals of Concern;
- Undertaking limited targeted sampling and analysis at the selected Areas of Concern to allow assessment of the presence of contamination;
- Evaluation of test results against industry accepted criteria for the intended landuse;
- Conclusions regarding the presence of contamination at the site and its potential impacts on the proposed residential landuse;
- The requirement for remediation, further investigation, or ongoing management of site contamination.

The work was commissioned by Craig McColl of Focal Point Properties Pty Ltd in accordance with proposal number RGS01243.1-AA dated 17 March 2016.

## 2 METHODOLOGY

In accordance with the relevant sections of the *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (Amended 2013)*, the assessment involved the following process:

- A brief study of site history, with the aim of identifying past activities on or near the site that might have the potential to cause contamination;
- Site walkover to assess visible surface conditions and identify any evidence of contamination, or past activities that may cause contamination;
- Review of available recent and historical aerial photography for the last 50 years to identify visible evidence of potential contamination or potentially contaminating activities;
- Search of government records of groundwater use in the area;
- Land title search of the respective lots using records available from the Land Titles Office to identify the history of land ownership, to assist in identifying potentially contaminating activities that may be associated with past site owners;
- Using the above information, characterise the site into Areas of Concern, in which the potential for contamination has been identified, and nominate Chemicals of Concern that might be associated with those activities.



Based on the results of the site history study, judgemental sampling at selected locations was undertaken to assist in identifying potential contamination and assessing the requirement for further investigation or site management with regard to contamination.

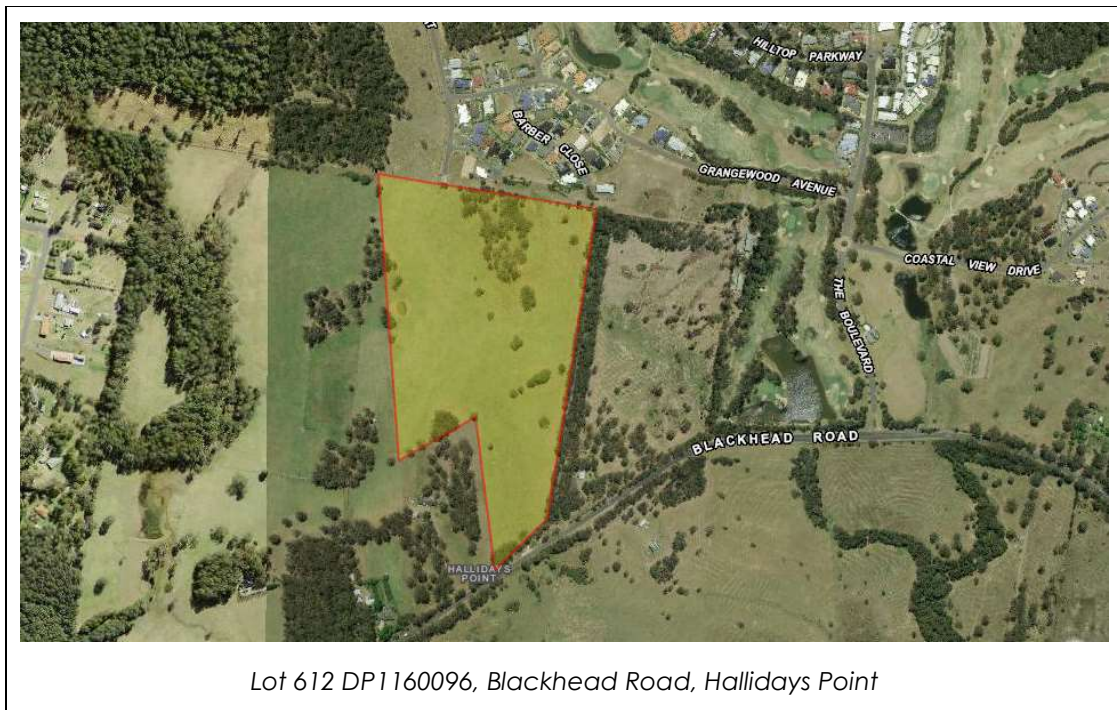
### 3 SITE SETTING and HISTORY

#### 3.1 Site Description

The site is comprised of one lot identified as Lot 612 DP1160096, located at Blackhead Road, Hallidays Point.

The site is 17.02 hectares in area and is situated in moderately to steeply undulating terrain. A north – south ridgeline runs through the centre of the site. It is located on the northern side of Blackhead Road and to the west of and south of the existing Tallwoods residential development. Surface slopes range from approximately 3° - 5° toward the east and north east on the eastern side of the ridgeline and 2° - 5° toward the western boundary on the western side of the ridgeline. There were no structures on the site; vegetation consisted of grass cover to approximately 1m in height and sparsely spaced large Eucalypt trees up to approximately 25m in height.

An image of the site taken from the NSW Department of Property Information website is reproduced below.



The site is bound by other rural properties / grazing land to the east and west, Blackhead Road to the south and by a residential subdivision (Tallwoods Village) to the north.



### 3.2 Historical Aerial Photography

Aerial photographs of the site were purchased from the NSW Land and Property Management Authority and reviewed to assist in identifying past land uses that may contribute to site contamination. The results of the review are summarised in Table 1.

**Table 1- Aerial Photograph Summary**

Year	Site	Surrounding Land
1952	Site is undeveloped bushland.	The land immediately surrounding the site is also undeveloped bushland. Blackhead Road is clearly visible.
1963	No significant change.	Some land clearing has occurred to the south of Blackhead Road.
1971	No significant change.	Some land clearing has occurred to the north of the site in the area now known as Tallwoods Village.
1980	The site appears to have been cleared of vegetation.	Clearing of vegetation has occurred on land immediately surrounding the site.
1991	No significant change.	Clearing of vegetation to the north of the site in the area now known as Tallwoods Village has continued.
2001	No significant change.	Development of the golf course and some residential properties appears to have occurred in Tallwoods Village located to the north of the site. Residential development has occurred to the south of Blackhead Road.
2006	No significant change	There appears to have been further clearing of land on the property immediately to the east of the site and continued residential development in Tallwoods Village.

### 3.3 Site Observations

Fieldwork was undertaken on 10 May 2016. Observations made during the site visit are summarised below:

- Access to the site was from The Pulpit, a road in the Tallwoods Village subdivision which adjoins the site to the north.



- No structures, or evidence of structures previously in existence, were observed on the site.
- Appears the site has been used primarily for rural grazing land. An old fence was situated toward the southern part of the site which suggests that livestock may have been kept in different sections of the property. Evidence of former livestock yards was observed in the northwest corner.
- One small stockpile of fill was thought to have been encountered in the central part of the site, however upon closer inspection the area was a thicket of weeds which gave the appearance of being a fill stockpile.
- The site was generally comprised of cleared land with thick waist high grass and sparse pockets of large Eucalypt trees up to 25m in height. The trees were predominantly located in the northern part of the site.
- A small dam was located close to the western property boundary approximately halfway along its length.
- The site is located in an area of moderately undulating terrain and sits along a north to south ridgeline which runs through the centre of the site.
- There a number of slope changes across the site. Surface slopes in the central and northern parts of the site (on the eastern side of the ridgeline) are approximately 3° – 5° to the east and north east. Surface slopes in central part of the site (on the western side of the ridgeline) are approximately 2° – 5° to the west and north west.
- The site is typically flat in the southern part of site towards Blackhead Road.
- Surface soils were expected to be comprised of topsoil/colluvium overlying residual clays.
- Drainage of the site would be via surface infiltration and overland flow following the slope changes described above.



A selection of images of the site is presented below.



*Looking south across the centre of the site*



*Looking north showing the small dam close to the western boundary.*



*Looking north east across the centre of the site*



*Looking south east toward the southern part of the site*



*Looking north along the eastern boundary*



*Small thicket of weeds in the central part of the site*





### 3.4 NSW EPA Records

A check with the NSW Office of Environment and Heritage website ([www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)) revealed that no notices have been issued on the site under the Contaminated Land Management Act (1997).

### 3.5 Land Title Search

A list of past registered proprietors and lessors of the site was obtained from the Land Titles Office. A summary of the title details is included in Appendix A.

The title history search revealed the following:

#### Lot 612 DP 1160096

- Prior to 1952: Crown Land
- From 1952 to 1955: owned by the Rural Bank of New South Wales
- From 1955 to 1956: owned by a dairy farmer
- From 1956 to 1961: owned by a joiner
- From 1961 to 1963: owned by a farmer
- From 1962 to 1968: owned by an individual
- From 1968 to 1972: owned by a boat hirer
- From 1972 to 2005: owned by an orchardist
- From 2005 to date: owned by Focal Point Properties Pty Ltd (formerly Bell Equipment Pty Ltd) and John Earnings Pty Ltd

### 3.6 Council Records

The lot is zoned RU1 – Primary Production, as per the Greater Taree City Local Environmental Plan 2010.

### 3.7 Geology

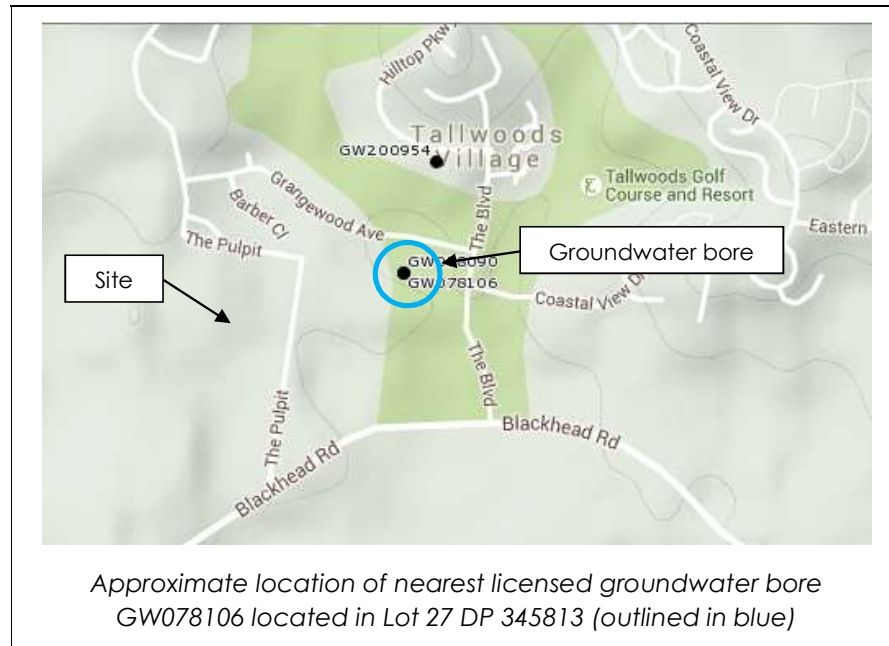
The site is situated in an area underlain by the Bundook Beds comprising grey to brown lithic sandstone and siltstone which is frequently cherty and ribbon banded, interbedded with massive greywackes and minor conglomerate and limestones.



### 3.8 Groundwater

A groundwater bore search on the NSW Office of Water website, <http://waterinfo.nsw.gov.au/gw/> indicates that there are no licensed groundwater bores present within the site boundary.

#### Groundwater Bore Map (From NSW Office of Water website)



The nearest licensed groundwater bore GW078106 is present on Lot 27 DP345813, approximately 500m to the east of the site, although its actual location was not visible during fieldwork. The bore records indicate that it was approved for irrigation and recreational use with its current status listed as “converted”. It was constructed in 1997 and the profile observed during drilling is recorded as clay soils to 8.5m, broken shale to 20.7m and conglomerate to 67.0m. The water bearing zone was present from 13.7m to 21.3m and from 51.8m to 57.3m.

Regional groundwater flow direction typically follows topographic slopes, which for this site would be towards the east and north east.

### 3.9 Site History Summary

Based on available data the site was developed in the following chronological sequence:

- Prior to 1952 the site was crown land;
- From 1955 to 1956 the site was owned by a dairy farmer;
- From 1956 to 1961 the site was owned by a joiner;
- From 1961 to 1963 the site was owned by a farmer;
- From 1962 to 1968 the site was owned by an individual;



- From 1968 to 1972 the site was owned by a boat hirer;
- From 1972 to 2005 the site was owned by an orchardist;
- Aerial photographs indicate that the site was cleared of vegetation prior to 1980;
- From the site history and observations made during the investigation, it appears that the site has been used for farming and/or rural grazing purposes;
- A number of remnant fences suggest that livestock may have been kept in different sections of the property. Evidence of former livestock yards was observed in the northwest corner;
- No structures, or evidence of former structures, (other than fences) were observed on the site;
- A small dam was located close to the western boundary approximately half along its length; and
- No areas of environmental significance such as water courses or national parks are located within close vicinity of the property.

## **4 SITE CONTAMINATION ASSESSMENT**

### **4.1 Guidelines and Assessment Criteria**

The *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (Amended 2013)*. The NEPM (2013) document provides a range of guidelines for assessment of contaminants for various land use scenarios.

The proposed land use on the site is understood to be for a residential development. The investigation levels for a residential Type 'A' development with garden/ accessible soil have therefore been adopted as the primary investigation criteria in accordance with NEPM. On this basis the following criteria were adopted for this assessment:

- Health Investigation Levels for residential 'A' landuse (HIL-A) were used to assess the potential human health impact of heavy metals and PAH;
- Health Screening Levels (HSL-A) for fine textured (clay) soils on a residential site were adopted as appropriate for the soils encountered to assess the potential human health impact of petroleum hydrocarbons and BTEX compounds;
- Ecological investigation levels (EIL) for residential landuse were used for evaluation of the potential ecological/environmental impact of heavy metals and PAH. No areas of ecological significance were noted to be present in the immediate vicinity;
- Ecological Screening Levels (ESL) for fine textured (clay) soils on a residential site were adopted as appropriate for the soils encountered, to assess the potential ecological/environmental impact of petroleum hydrocarbons and BTEX compounds.

In accordance with NEPM 2013, exceedance of the criteria does not necessarily deem that remediation or clean-up is required, but is a trigger for further assessment of the extent of contamination and associated risks.



## 4.2 Conceptual Site Model

Based on the site observations and knowledge obtained about site activities as outlined above, potential Areas of Concern and Chemicals of Concern were identified for the assessment as outlined in Table 2. Based on the site observations and knowledge obtained about site activities as outlined above, potential pathways and receptors identified for the assessment are summarised in Table 3.

**Table 2: Conceptual Site Model**

Area of Concern	Mode of Potential Contamination	Chemicals of Concern	Likelihood
Soils in vicinity of former live stock yards	Potential spillage of chemicals from containers and farm machinery including cleaning fluids/ fuel /oils, herbicide/ pesticide.	Heavy Metals, TPH, BTEX, PAH, OC/OPP	Low to moderate
Whole of site	Leakage of fuels/oils from vehicles and farm machinery.	Heavy Metals, TPH, BTEX, PAH	Low
Whole of site	Presence of imported fill of unknown origin	Heavy Metals, TPH, BTEX, PAH, OC/OPP, asbestos	Low
<i>Heavy Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc</i> <i>BTEX - Benzene, Toluene, Ethylbenzene and Xylene</i> <i>TPH - Total Petroleum Hydrocarbons</i> <i>PAH - Polycyclic Aromatic Hydrocarbons</i> <i>OC/OPP - Organochlorine and Organophosphorus Pesticides</i>			

**Table 3: Potential Pathways and Receptors**

Chemicals of Concern	Pathway	Receptor
Asbestos, heavy metals, TPH, BTEX, PAH, OC/OPP	Skin contact	Onsite – Residents
Heavy Metals, TPH, BTEX, PAH, OC/OPP	Surface runoff and leaching of soils	Offsite - Environment surface waters
Heavy Metals, TPH, BTEX, PAH, OC/OPP	Leaching of soils	Onsite - Environment groundwater Offsite - Environment groundwater
<i>Heavy Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc</i> <i>BTEX - Benzene, Toluene, Ethylbenzene and Xylene</i> <i>TPH - Total Petroleum Hydrocarbons</i> <i>PAH - Polycyclic Aromatic Hydrocarbons</i> <i>OC/OPP - Organochlorine and Organophosphorus Pesticides</i>		



Taking into account the elevation of the site and the likely depth to groundwater the risk of groundwater contamination was considered low as the potential sources of contamination were typically of surface origin. A groundwater assessment was therefore not undertaken as part of this Phase 1 contamination assessment.

#### **4.3 Field Work**

Field work for the assessment was undertaken on 10 May 2016 and included:

- Site walkover by an Environmental Engineer to assess visible surface conditions and identify any evidence of contamination, or past activities that may cause contamination;
- Collection of 9 primary and 1 duplicate surface soil samples using hand tools;
- Surface sample locations were based on professional judgement with consideration of the site history and visible site features.

The locations of the surface samples are shown on Figure 1. They were obtained on site by measurement relative to existing site features.

Soil samples were collected using disposable gloves and hand tools which were decontaminated between sampling points using Decon90 detergent and deionised water. The samples were collected in acid-rinsed 250mL glass jars and placed in an ice-chilled cooler box.

#### **4.4 Laboratory Testing**

Samples were transported under chain-of-custody conditions to ALS Laboratory Group, a NATA accredited specialist chemical testing laboratory, to be tested for the following suite of contaminants;

- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Recoverable Hydrocarbons (TRH)
- Benzene, Toluene, Ethyl-benzene, Xylenes (BTEX)
- Organochlorine Pesticides (OC/OPs)
- Heavy metals (arsenic, cadmium, chromium, cobalt, copper, lead, mercury, and zinc)
- Presence of asbestos

The results are presented in Appendix B.

#### **4.5 Quality Control**

Samples were obtained using industry accepted protocols for sample treatment, preservation, and equipment decontamination. The laboratory conducted internal quality control testing including surrogates, blanks, and laboratory duplicate samples. The results are presented with the laboratory test results in Appendix B. A duplicate of SS8 (0.0 – 0.2m) was submitted to the laboratory for analysis as D2 (0.0 – 0.2m). Results of the duplicate analysis indicated heavy metal concentrations correlated very well between the samples.

On the basis of the results of the field and laboratory quality control procedures and testing the data is considered to reasonably represent the concentrations of contaminants in the soils at the sample locations at the time of sampling and the results can be adopted for this assessment.



## **5 SITE CONTAMINATION ASSESSMENT - RESULTS**

### **5.1 Analysis Results**

An appraisal of the laboratory test results presented in Appendix B is provided below with reference to the adopted soil investigation and screening levels discussed in Section 4.1.

- Concentrations of heavy metals were above laboratory detection, but were below adopted health investigation criteria for a Residential A site in each of the samples analysed;
- Concentrations of BTEX and phenol contaminants were below laboratory detection in all samples analysed;
- Concentrations of TRH hydrocarbons were below laboratory detection in all samples analysed;
- Concentrations of PAH hydrocarbons were below laboratory detection in all samples analysed;
- Concentrations of herbicide/pesticide contaminants were below laboratory detection in all samples analysed; and
- Asbestos was not detected in the submitted soil samples.

## **6 ASSESSMENT AND CONCLUSIONS REGARDING SITE CONTAMINATION**

A Phase 1 Site Contamination Assessment was required to identify potentially contaminating activities that have occurred at the site, potential contamination types, and assess whether the property is suitable for the proposed residential development.

Based on the results outlined in this report the following conclusions and recommendations are made:

- It appears likely that the site has previously been used for rural grazing and farming. However, only minor evidence of such activities were present on the site at the time of field work. Visual evidence of contamination was not observed during the investigation.
- Subsequent laboratory analysis of surface soil samples taken from the site confirmed the anticipated low likelihood of contamination. The laboratory results indicated that all samples analysed had concentrations of the contaminants of concern at levels that were either below the laboratory detection limits and/or below the adopted residential landuse guideline levels.
- Given the large size of the site and relatively small number of samples collected and analysed during the investigation, the presence of undetected contamination is considered unlikely but cannot be precluded. Soil contamination (if any) would most likely be due to the presence of uncontrolled fill and/or isolated "hotspots" of contamination such as minor spills from farm equipment and machinery, and pesticide and herbicide use.
- Should uncontrolled fill materials or other materials suspected of being contaminated be encountered on the site during development of the proposed residence, the owner / builder should avail themselves of the services of a suitably qualified person to assess the potential risk of contamination.



Based on the results obtained in this investigation the proposed residential development of the site is feasible with regard to the presence of soil contamination, provided the recommendations and advice of this report are adopted.

## **7 LIMITATIONS**

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted environmental practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points. If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

**Regional Geotechnical Solutions Pty Ltd**

**Steven Morton**

Principal



## Figures





**Legend**  
⊕ Surface Sample Location



<b>Client:</b>	Coastplan Consulting	<b>Job No.:</b>	RGS01243
<b>Project:</b>	Proposed Residential Development Lot 612 DP1160096	<b>Drawn By:</b>	APH
<b>Title:</b>	Sample Location Plan	<b>Date:</b>	25-May-16
		<b>Drawing No.:</b>	<b>Figure 1</b>



# **Appendix A**

## **Site History Documentation**



**Title Tree**  
**Lot 612 DP 1160096**

Folio Identifier 612/1160096

Folio Identifier 61/1077935

Folio Identifier 6/588352

Certificate of Title Volume 13281 Folio 38

**(a)**

**(b)**

CTVol 11841 Folio 195

CTVol 11841 Folio 196

CTVol 8214 Folio 21

CTVol 8214 Folio 2

Certificate of Title Volume 7073 Folio's 12 to 14

Certificate of Title Volume 6704 Folios 143

Certificate of Title Volume 6591 Folio 240

Crown Land

\*\*\*\*

**Summary of proprietor(s)**

### Lot 612 DP 1160096

Year	Proprietor
	<b>(Lot 612 DP 1160096)</b>
2011 – todate	Focal Point Properties Pty Limited John Earnings Pty Limited
	<b>(Lot 61 DP 1077935)</b>
2010 – 2011	Focal Point Properties Pty Limited <i>(formerly Bell Equipment Pty Limited)</i> John Earnings Pty Limited
2005 – 2010	John Earnings Pty Limited Bell Equipment Pty Limited
2005 – 2005	Carl John Carlson, orchardist Joan Alva Carlson, spinster
	<b>(Lot 6 DP 588352)</b>
1988 – 2005	Carl John Carlson, orchardist Joan Alva Carlson, spinster
	<b>(Lot 6 DP 588352 – CTVol 13281 Fol 38)</b>
1977 – 1988	Carl John Carlson, orchardist Joan Alva Carlson, spinster

See Notes (a) & (b)

**Note (a)**

	<b>(Lot 2 DP 555158 – CTVol 11841 Fol 195)</b>
1972 – 1977	Carl John Carlson, orchardist Joan Alva Carlson, spinster
1972 – 1972	Hubert Frank Godfrey, boat hirer Rita May Godfrey, wife
	<b>(Portion 30 &amp; Part 29 Parish Beryan – Area 180 Acres 2 Roods 11 Perches – CTVol 8214 Fol 21)</b>
1968 – 1972	Hubert Frank Godfrey, boat hirer Rita May Godfrey, wife
1963 – 1968	Iris Lucy Thomas, spinster
1961 – 1963	George Walter Alfred Watson, farmer Wilga Josephine Watson, wife
	<b>(Portion 30 &amp; Part 29 Parish Beryan – Area 180 Acres 2 Roods 11 Perches – CTVol 7073 Fol’s 12 to 14)</b>
1956 – 1961	Thomas James Fleet Arthur, joiner Henry Orchard Arthur, joiner Frederick Ernest Arthur, joiner
	<b>(Portion 30 &amp; Part 29 Parish Beryan – Area 180 Acres 2 Roods 11 Perches – CTVol 6704 Fol 143)</b>
1955 – 1956	Colin James Newell, dairy farmer
1953 – 1955	Rural Bank of New South Wales
	<b>(Portion 30 &amp; Portion 29 Parish Beryan – Area 210 Acres – CTVol 6591 Fol 240)</b>
1952 – 1953	Rural Bank of New South Wales
	<b>(Portion 30 &amp; Portion 29 Parish Beryan – Area 210 Acres)</b>
Prior – 1952	Crown Land
<i>(1919 – 1952)</i>	<i>(ACP 1919/132 Maitland to Rural Bank of New South Wales)</i>
<i>(1903 – 1919)</i>	<i>(Conditional Lease 1903/43 Maitland to Herbert John Hardy)</i>

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**Note (b)**

	<b>(Lot 3 DP 555158 – CTVol 11841 Fol 196)</b>
1972 – 1977	Carl John Carlson, orchardist Joan Alva Carlson, spinster
1972 – 1972	Hubert Frank Godfrey, boat hirer Rita May Godfrey, wife
	<b>(Portion 30 &amp; Part 29 Parish Beryan – Area 180 Acres 2 Roods 11 Perches – CTVol 8214 Fol 21)</b>
1968 – 1972	Hubert Frank Godfrey, boat hirer Rita May Godfrey, wife
1962 – 1968	Iris Lucy Thomas, spinster
1961 – 1962	George Walter Alfred Watson, farmer Wilga Josephine Watson, wife
	<b>(Portion 30 &amp; Part 29 Parish Beryan – Area 180 Acres 2 Roods 11 Perches – CTVol 7073 Fol’s 12 to 14)</b>
1956 – 1961	Thomas James Fleet Arthur, joiner Henry Orchard Arthur, joiner Frederick Ernest Arthur, joiner
	<b>(Portion 30 &amp; Part 29 Parish Beryan – Area 180 Acres 2 Roods 11 Perches – CTVol 6704 Fol 143)</b>
1955 – 1956	Colin James Newell, dairy farmer
1953 – 1955	Rural Bank of New South Wales
	<b>(Portion 30 &amp; Portion 29 Parish Beryan – Area 210 Acres – CTVol 6591 Fol 240)</b>
1952 – 1953	Rural Bank of New South Wales
	<b>(Portion 30 &amp; Portion 29 Parish Beryan – Area 210 Acres)</b>
Prior – 1952	Crown Land
<i>(1919 – 1952)</i>	<i>(ACP 19-132 Maitland to Rural Bank of New South Wales)</i>
<i>(1903 – 1919)</i>	<i>(Conditional Lease 03-43 Maitland to Herbert John Hardy)</i>

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# **Appendix B**

## **Laboratory Test Results**



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>ES1610214</b>	Page	: 1 of 16
<b>Client</b>	: <b>REGIONAL GEOTECHNICAL SOLUTION</b>	<b>Laboratory</b>	: Environmental Division Sydney
<b>Contact</b>	: Andrew Hills	<b>Contact</b>	:
<b>Address</b>	: 44 BENT STREET WINGHAM NSW, AUSTRALIA 2429	<b>Address</b>	: 277-289 Woodpark Road Smithfield NSW Australia 2164
<b>Telephone</b>	: +61 02 6553 5641	<b>Telephone</b>	: +61-2-8784 8555
<b>Project</b>	: RGS01243.1	<b>Date Samples Received</b>	: 12-May-2016 09:00
<b>Order number</b>	: ----	<b>Date Analysis Commenced</b>	: 13-May-2016
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 20-May-2016 15:02
<b>Sampler</b>	: Andrew Hills		
<b>Site</b>	: ----		
<b>Quote number</b>	: ----		
<b>No. of samples received</b>	: 14		
<b>No. of samples analysed</b>	: 13		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

- EP080: The trip spike and its control have been analysed for volatile TPH and BTEX only. The trip spike and control were prepared in the lab using reagent grade sand spiked with petrol. The spike was dispatched from the lab and the control retained. Result confirmed by re-extraction and re-analysis.
- **EA200: As only one sample container was submitted for multiple tests, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly and NATA accreditation does not apply to analysis on these samples.**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.  
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Trip Spike	Trip Blank	SS1 0.0-0.2	SS2 0.0-0.2	SS3 0.0-0.2
Client sampling date / time				[10-May-2016]	[10-May-2016]	10-May-2016 14:30	10-May-2016 14:40	10-May-2016 15:00	
Compound	CAS Number	LOR	Unit	ES1610214-001	ES1610214-002	ES1610214-003	ES1610214-004	ES1610214-005	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content</b>									
Moisture Content (dried @ 103°C)	----	1	%	----	----	15.3	24.3	22.7	
<b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b>									
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	No	No	No	
Asbestos Type	1332-21-4	-	--	----	----	-	-	-	
Sample weight (dry)	----	0.01	g	----	----	12.3	21.2	19.7	
APPROVED IDENTIFIER:	----	-	--	----	----	S.SPOONER	S.SPOONER	S.SPOONER	
<b>EG005T: Total Metals by ICP-AES</b>									
Arsenic	7440-38-2	5	mg/kg	----	----	<5	6	<5	
Cadmium	7440-43-9	1	mg/kg	----	----	<1	<1	<1	
Chromium	7440-47-3	2	mg/kg	----	----	7	6	4	
Copper	7440-50-8	5	mg/kg	----	----	10	14	13	
Lead	7439-92-1	5	mg/kg	----	----	5	5	<5	
Nickel	7440-02-0	2	mg/kg	----	----	3	3	2	
Zinc	7440-66-6	5	mg/kg	----	----	31	39	28	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.1	mg/kg	----	----	<0.1	<0.1	<0.1	
<b>EP066: Polychlorinated Biphenyls (PCB)</b>									
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	<0.1	----	----	
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	<0.1	<0.1	
<b>EP068A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
beta-BHC	319-85-7	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
gamma-BHC	58-89-9	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
delta-BHC	319-86-8	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Aldrin	309-00-2	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
^ Total Chlordane (sum)	----	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Dieldrin	60-57-1	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Trip Spike	Trip Blank	SS1 0.0-0.2	SS2 0.0-0.2	SS3 0.0-0.2
Client sampling date / time					[10-May-2016]	[10-May-2016]	10-May-2016 14:30	10-May-2016 14:40	10-May-2016 15:00
Compound	CAS Number	LOR	Unit	ES1610214-001	ES1610214-002	ES1610214-003	ES1610214-004	ES1610214-005	
				Result	Result	Result	Result	Result	
<b>EP068A: Organochlorine Pesticides (OC) - Continued</b>									
Endrin	72-20-8	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Methoxychlor	72-43-5	0.2	mg/kg	----	----	<0.2	<0.2	<0.2	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
<b>EP068B: Organophosphorus Pesticides (OP)</b>									
Dichlorvos	62-73-7	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	<0.2	<0.2	<0.2	
Dimethoate	60-51-5	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Diazinon	333-41-5	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	<0.2	<0.2	<0.2	
Malathion	121-75-5	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Fenthion	55-38-9	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Parathion	56-38-2	0.2	mg/kg	----	----	<0.2	<0.2	<0.2	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Prothiofos	34643-46-4	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Ethion	563-12-2	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Carbophenothion	786-19-6	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	<0.05	<0.05	<0.05	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Trip Spike	Trip Blank	SS1 0.0-0.2	SS2 0.0-0.2	SS3 0.0-0.2
Client sampling date / time					[10-May-2016]	[10-May-2016]	10-May-2016 14:30	10-May-2016 14:40	10-May-2016 15:00
Compound	CAS Number	LOR	Unit	ES1610214-001	ES1610214-002	ES1610214-003	ES1610214-004	ES1610214-005	
				Result	Result	Result	Result	Result	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Acenaphthene	83-32-9	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	<b>1.2</b>	<b>1.2</b>	<b>1.2</b>	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	10	mg/kg	<b>12</b>	<10	<10	<10	<10	
C10 - C14 Fraction	----	50	mg/kg	----	----	<50	<50	<50	
C15 - C28 Fraction	----	100	mg/kg	----	----	<100	<100	<100	
C29 - C36 Fraction	----	100	mg/kg	----	----	<100	<100	<100	
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	10	mg/kg	<b>14</b>	<10	<10	<10	<10	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<b>10</b>	<10	<10	<10	<10	
>C10 - C16 Fraction	----	50	mg/kg	----	----	<50	<50	<50	
>C16 - C34 Fraction	----	100	mg/kg	----	----	<100	<100	<100	
>C34 - C40 Fraction	----	100	mg/kg	----	----	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	<50	<50	<50	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	<50	<50	<50	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Trip Spike	Trip Blank	SS1 0.0-0.2	SS2 0.0-0.2	SS3 0.0-0.2
Client sampling date / time				[10-May-2016]	[10-May-2016]	10-May-2016 14:30	10-May-2016 14:40	10-May-2016 15:00	
Compound	CAS Number	LOR	Unit	ES1610214-001	ES1610214-002	ES1610214-003	ES1610214-004	ES1610214-005	
				Result	Result	Result	Result	Result	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.5	mg/kg	1.7	<0.5	<0.5	<0.5	<0.5	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	1.3	<0.5	<0.5	<0.5	<0.5	
ortho-Xylene	95-47-6	0.5	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	3.5	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	1330-20-7	0.5	mg/kg	1.8	<0.5	<0.5	<0.5	<0.5	
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1	
<b>EP066S: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	107	84.2	126	
<b>EP068S: Organochlorine Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.05	%	----	----	95.1	109	106	
<b>EP068T: Organophosphorus Pesticide Surrogate</b>									
DEF	78-48-8	0.05	%	----	----	101	105	98.9	
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	0.5	%	----	----	82.4	79.5	82.0	
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	89.1	86.9	88.3	
2,4,6-Tribromophenol	118-79-6	0.5	%	----	----	63.8	70.3	68.4	
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	102	99.9	101	
Anthracene-d10	1719-06-8	0.5	%	----	----	91.7	87.9	88.1	
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	100	99.4	98.7	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	98.6	105	116	105	117	
Toluene-D8	2037-26-5	0.2	%	109	91.3	97.8	91.3	106	
4-Bromofluorobenzene	460-00-4	0.2	%	105	93.1	85.7	90.6	101	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS4 0.0-0.2	SS5 0.0-0.2	SS6 0.0-0.2	SS7 0.0-0.2	SS8 0.0-0.2
Client sampling date / time				10-May-2016 15:15	10-May-2016 15:20	10-May-2016 15:30	10-May-2016 15:40	10-May-2016 15:50	
Compound	CAS Number	LOR	Unit	ES1610214-006	ES1610214-007	ES1610214-008	ES1610214-009	ES1610214-010	
				Result	Result	Result	Result	Result	
<b>EA055: Moisture Content</b>									
Moisture Content (dried @ 103°C)	----	1	%	20.8	26.2	21.8	17.8	21.0	
<b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b>									
Asbestos Detected	1332-21-4	0.1	g/kg	----	No	----	No	No	
Asbestos Type	1332-21-4	-	--	----	-	----	-	-	
Sample weight (dry)	----	0.01	g	----	19.5	----	12.9	11.8	
APPROVED IDENTIFIER:	----	-	--	----	S.SPOONER	----	S.SPOONER	S.SPOONER	
<b>EG005T: Total Metals by ICP-AES</b>									
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	5	<5	
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1	
Chromium	7440-47-3	2	mg/kg	9	6	8	9	7	
Copper	7440-50-8	5	mg/kg	13	<5	12	13	12	
Lead	7439-92-1	5	mg/kg	6	<5	6	8	6	
Nickel	7440-02-0	2	mg/kg	4	<2	2	4	3	
Zinc	7440-66-6	5	mg/kg	43	8	33	34	34	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	
<b>EP066: Polychlorinated Biphenyls (PCB)</b>									
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----	
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	
<b>EP068A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS4 0.0-0.2	SS5 0.0-0.2	SS6 0.0-0.2	SS7 0.0-0.2	SS8 0.0-0.2
Client sampling date / time				10-May-2016 15:15	10-May-2016 15:20	10-May-2016 15:30	10-May-2016 15:40	10-May-2016 15:50	
Compound	CAS Number	LOR	Unit	ES1610214-006	ES1610214-007	ES1610214-008	ES1610214-009	ES1610214-010	
				Result	Result	Result	Result	Result	
<b>EP068A: Organochlorine Pesticides (OC) - Continued</b>									
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
<b>EP068B: Organophosphorus Pesticides (OP)</b>									
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	





## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS4 0.0-0.2	SS5 0.0-0.2	SS6 0.0-0.2	SS7 0.0-0.2	SS8 0.0-0.2
Client sampling date / time					10-May-2016 15:15	10-May-2016 15:20	10-May-2016 15:30	10-May-2016 15:40	10-May-2016 15:50
Compound	CAS Number	LOR	Unit	ES1610214-006	ES1610214-007	ES1610214-008	ES1610214-009	ES1610214-010	
				Result	Result	Result	Result	Result	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	<b>1.2</b>	<b>1.2</b>	<b>1.2</b>	<b>1.2</b>	<b>1.2</b>	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10	
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100	
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10	
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50	
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS4 0.0-0.2	SS5 0.0-0.2	SS6 0.0-0.2	SS7 0.0-0.2	SS8 0.0-0.2
Client sampling date / time				10-May-2016 15:15	10-May-2016 15:20	10-May-2016 15:30	10-May-2016 15:40	10-May-2016 15:50	
Compound	CAS Number	LOR	Unit	ES1610214-006	ES1610214-007	ES1610214-008	ES1610214-009	ES1610214-010	
				Result	Result	Result	Result	Result	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1	
<b>EP066S: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.1	%	123	108	118	113	114	
<b>EP068S: Organochlorine Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.05	%	107	91.3	92.4	100	95.9	
<b>EP068T: Organophosphorus Pesticide Surrogate</b>									
DEF	78-48-8	0.05	%	96.8	70.4	92.3	85.8	90.4	
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	0.5	%	79.3	81.4	79.7	79.1	72.3	
2-Chlorophenol-D4	93951-73-6	0.5	%	86.5	88.3	86.6	85.3	75.8	
2,4,6-Tribromophenol	118-79-6	0.5	%	72.7	65.7	72.4	62.6	62.6	
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	0.5	%	98.1	99.3	99.1	98.9	86.8	
Anthracene-d10	1719-06-8	0.5	%	87.2	88.2	85.6	85.7	80.7	
4-Terphenyl-d14	1718-51-0	0.5	%	95.1	99.6	97.5	96.9	90.6	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	118	108	112	112	122	
Toluene-D8	2037-26-5	0.2	%	95.0	84.9	97.0	98.1	105	
4-Bromofluorobenzene	460-00-4	0.2	%	90.2	94.0	96.0	99.8	100	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS9 0.0-0.2	D2 0.0-0.2	TSC	----	----
Client sampling date / time				10-May-2016 16:05	10-May-2016 15:50	[10-May-2016]	----	----	
Compound	CAS Number	LOR	Unit	ES1610214-011	ES1610214-013	ES1610214-014	-----	-----	
				Result	Result	Result	----	----	
<b>EA055: Moisture Content</b>									
Moisture Content (dried @ 103°C)	----	1	%	30.2	21.8	----	----	----	
<b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b>									
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	----	----	----	
Asbestos Type	1332-21-4	-	--	-	-	----	----	----	
Sample weight (dry)	----	0.01	g	15.5	15.2	----	----	----	
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	G.MORGAN	----	----	----	
<b>EG005T: Total Metals by ICP-AES</b>									
Arsenic	7440-38-2	5	mg/kg	<5	6	----	----	----	
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----	
Chromium	7440-47-3	2	mg/kg	4	7	----	----	----	
Copper	7440-50-8	5	mg/kg	5	12	----	----	----	
Lead	7439-92-1	5	mg/kg	5	6	----	----	----	
Nickel	7440-02-0	2	mg/kg	<2	3	----	----	----	
Zinc	7440-66-6	5	mg/kg	8	33	----	----	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	----	----	
<b>EP066: Polychlorinated Biphenyls (PCB)</b>									
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----	
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	----	----	----	
<b>EP068A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	----	----	----	
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	----	----	----	
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	----	----	----	
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	----	----	----	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	----	----	----	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	----	----	----	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	----	----	----	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	----	----	----	
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	----	----	----	
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	----	----	----	
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	----	----	----	
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	----	----	----	
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	----	----	----	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	----	----	----	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS9 0.0-0.2	D2 0.0-0.2	TSC	----	----
Client sampling date / time				10-May-2016 16:05	10-May-2016 15:50	[10-May-2016]	----	----	
Compound	CAS Number	LOR	Unit	ES1610214-011	ES1610214-013	ES1610214-014	-----	-----	
				Result	Result	Result	----	----	
<b>EP068A: Organochlorine Pesticides (OC) - Continued</b>									
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	----	----	----	
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	----	----	----	
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	----	----	----	
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	----	----	----	
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	----	----	----	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	----	----	----	
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	----	----	----	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	----	----	----	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	----	----	----	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	----	----	----	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	<0.05	----	----	----	
<b>EP068B: Organophosphorus Pesticides (OP)</b>									
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	----	----	----	
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	----	----	----	
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	----	----	----	
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	----	----	----	
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	----	----	----	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	----	----	----	
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	----	----	----	
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	----	----	----	
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	----	----	----	
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	----	----	----	
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	----	----	----	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	----	----	----	
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	----	----	----	
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	----	----	----	
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	----	----	----	
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	----	----	----	
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	----	----	----	
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	----	----	----	
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	----	----	----	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS9 0.0-0.2	D2 0.0-0.2	TSC	----	----
Client sampling date / time				10-May-2016 16:05	10-May-2016 15:50	[10-May-2016]	----	----	
Compound	CAS Number	LOR	Unit	ES1610214-011	ES1610214-013	ES1610214-014	-----	-----	
				Result	Result	Result	----	----	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	<b>0.6</b>	<b>0.6</b>	----	----	----	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	<b>1.2</b>	<b>1.2</b>	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<b>23</b>	----	----	
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	----	
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	----	
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<b>27</b>	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<b>15</b>	----	----	
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	----	----	----	
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----	



## Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS9 0.0-0.2	D2 0.0-0.2	TSC	----	----
Client sampling date / time				10-May-2016 16:05	10-May-2016 15:50	[10-May-2016]	----	----	
Compound	CAS Number	LOR	Unit	ES1610214-011	ES1610214-013	ES1610214-014	-----	-----	
				Result	Result	Result	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	----	----	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	5.4	----	----	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.9	----	----	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	4.2	----	----	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	1.9	----	----	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	12.4	----	----	
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	6.1	----	----	
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	----	----	
<b>EP066S: PCB Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.1	%	130	123	----	----	----	
<b>EP068S: Organochlorine Pesticide Surrogate</b>									
Dibromo-DDE	21655-73-2	0.05	%	113	105	----	----	----	
<b>EP068T: Organophosphorus Pesticide Surrogate</b>									
DEF	78-48-8	0.05	%	98.7	97.3	----	----	----	
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	0.5	%	77.2	81.0	----	----	----	
2-Chlorophenol-D4	93951-73-6	0.5	%	82.5	87.8	----	----	----	
2,4,6-Tribromophenol	118-79-6	0.5	%	63.5	63.7	----	----	----	
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	0.5	%	92.2	98.9	----	----	----	
Anthracene-d10	1719-06-8	0.5	%	90.0	87.0	----	----	----	
4-Terphenyl-d14	1718-51-0	0.5	%	102	98.6	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	108	121	102	----	----	
Toluene-D8	2037-26-5	0.2	%	88.6	99.7	107	----	----	
4-Bromofluorobenzene	460-00-4	0.2	%	87.6	88.8	100	----	----	



## Analytical Results

### Descriptive Results

Sub-Matrix: **SOIL**

<i>Method: Compound</i>	<i>Client sample ID - Client sampling date / time</i>	<i>Analytical Results</i>
<b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b>		
EA200: Description	SS1 0.0-0.2 - 10-May-2016 14:30:00	Mid brown clay soil with grey rocks.
EA200: Description	SS2 0.0-0.2 - 10-May-2016 14:40:00	Mid brown clay soil with grey rocks.
EA200: Description	SS3 0.0-0.2 - 10-May-2016 15:00:00	Mid brown clay soil with grey rocks.
EA200: Description	SS5 0.0-0.2 - 10-May-2016 15:20:00	Mid brown clay soil with grey rocks.
EA200: Description	SS7 0.0-0.2 - 10-May-2016 15:40:00	Mid brown clay soil with grey rocks.
EA200: Description	SS8 0.0-0.2 - 10-May-2016 15:50:00	Mid brown clay soil with grey rocks.
EA200: Description	SS9 0.0-0.2 - 10-May-2016 16:05:00	Mid brown clay soil.
EA200: Description	D2 0.0-0.2 - 10-May-2016 15:50:00	Mid brown clay soil.



## Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP066S: PCB Surrogate</b>			
Decachlorobiphenyl	2051-24-3	39	149
<b>EP068S: Organochlorine Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	49	147
<b>EP068T: Organophosphorus Pesticide Surrogate</b>			
DEF	78-48-8	35	143
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
<b>EP075(SIM)T: PAH Surrogates</b>			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130





Client: Coastplan Consulting  
 Job No. RGS01243.1  
 Project: Proposed Residential Development  
 Location: Minmi

TABLE B1 - RESULTS OF CHEMICAL ANALYSES (concentrations in mg/kg) 'Residential A' Site.

Report No. RGS01243.1-AB

Location	DEPTH (m)	Asebestos	TOTAL RECOVERABLE HYDROCARBONS					PAH		OC-OP PESTICIDES	BTEX	PCB	HEAVY METALS							
			C6-C10	C10-C16	C16-C34	C34-C40	TOTAL 10-40	Total	b-a-p				As	Cd	Cr*	Cu	Pb	Ni	Zn	Hg
SS1	0.0 - 0.2	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	<5	<1	7	10	5	3	31	<0.1
SS2	0.0 - 0.2	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	6	<1	6	14	5	3	39	<0.1
SS3	0.0 - 0.2	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	<5	<1	4	13	<5	2	28	<0.1
SS4	0.0 - 0.2	----	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	<5	<1	9	13	6	4	43	<0.1
SS5	0.0 - 0.2	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	<5	<1	6	<5	<5	<2	8	<0.1
SS6	0.0 - 0.2	----	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	<5	<1	8	12	6	2	33	<0.1
SS7	0.0 - 0.2	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	5	<1	9	13	8	4	34	<0.1
SS8	0.0 - 0.2	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	<5	<1	7	12	6	3	34	<0.1
SS9	0.0 - 0.2	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	<5	<1	4	5	5	<2	8	<0.1
D2 (Duolicate of SS8)	0.0 - 0.2	No	<10	<50	<100	<100	<50	<0.5	<0.5	<0.05	<0.2	<0.1	6	<1	7	12	6	3	33	<0.1
Health Based Soil investigation Level				280				300	3	70	NL	1	100	20	100#	600	300	400	7400	40
Ecological Investigation Level (EIL):			800	1000	3500	10000							40		447	149	1100	41	218	
Ecological Screening Level (ESL):			180	120	300	2800			0.7		50		Coarse grained soil in mg/kg							
			180	120	1300	5600			0.7		65		Fine grained soil in mg/kg							

NOTES:

- Denotes concentration exceeds health based guideline for Residential A land use (NEPM 2013)
- Denotes concentration exceeds ecological guideline for Residential land use
- Denotes concentration exceeds health and ecological based guideline for Residential land use

- NL No Limit available
- LOR Limit of Reporting
- TRH health based guidelines for upper 1m of soil

## ***Attachment C – Bushfire Assessment***



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# Travers

bushfire & ecology

---

## bushfire protection assessment

Rezoning Application  
Lot 612 DP 1160096  
166 Blackhead Road, Hallidays Point

Under Section 117(2) Direction No 4.4  
of the *EP&A Act*

February 2017  
(REF: A16066)



The logo for Traversers bushfire & ecology features the word "Traversers" in a large, orange, hand-drawn style font. Below it, "bushfire & ecology" is written in a smaller, black, sans-serif font. The logo is framed by a blue horizontal bar at the top and a blue wavy line at the bottom.

## Bushfire Protection Assessment

**Rezoning Application  
Lot 612 DP 1160096  
166 Blackhead Road, Hallidays Point**

Report Authors:	Nicole van Dorst BPAD Level 2
Plans prepared:	Emma Buxton
Checked by:	Nicole van Dorst BPAD Level 2
Date:	8 February 2017
File:	A16066

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### Disclaimer:

This report has been prepared to provide advice to the client on matters pertaining to the particular and specific development proposal as advised by the client and / or their authorised representatives. This report can be used by the client only for its intended purpose and for that purpose only. Should any other use of the advice be made by any person including the client then this firm advises that the advice should not be relied upon. The report and its attachments should be read as a whole and no individual part of the report or its attachments should be relied upon as meaning it reflects any advice by this firm. The report does not suggest or guarantee that a bush or grass fire will not occur and or impact the development. This report advises on matters published by the *NSW Rural Fire Service* in their guideline *Planning for Bush Fire Protection 2006* and other advice available from that organisation.

The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.



## EXECUTIVE SUMMARY

This revised bushfire protection assessment has been undertaken for the proposed rezoning located at Lot 612 DP 1160096, 166 Blackhead Road, Hallidays Point. This report has been prepared as a response to the NSW RFS letter (dated 29 November 2016) which states that;

*'The NSW RFS cannot support the Planning Proposal in its current form. Council would need to provide the following information to permit the NSW RFS to re-assess the Planning Proposal;*

- *A traffic Masterplan for the locality identifying all current and future road systems within and servicing the Tallwoods Village including Lot 612.*
- *A concept subdivision plan identifying the proposed residential road layout within Lot 612.*
- *A traffic management study on the proposed road layout plan for the site including all access points to Blackhead Road, Diamond Beach and The Lakes Way. The study shall incorporate all current and future traffic flows through the identified access routes.*
- ***A revised Bushfire Protection report based on the recommendations of the traffic management study for vehicle access to the site. The NSW RFS notes that residents egressing the site to the north via The Pulpit, will be travelling towards a significant bush fire threat. As such, the current NSW RFS position is that any future residential subdivision of Lot 612 shall include direct public road access to Blackhead Road.***

TBE have provided a direct response to point 4 above within Appendix 2 of this report. In addition this report has been updated to reflect the proposed rezoning from RU1 Primary Production to R1 – General Residential and E2 – Environmental Conservation (as opposed to E3– Environmental Management) and takes into account the proposed revegetation of the E2 zone land to a forest / woodland structure.

This report identifies matters for consideration for the planning proposal and highlights the required bushfire protection measures, including asset protection zones (APZs), for future development under the *Environmental Planning and Assessment Act 1979 (EP&A Act)*, *Section 117 Direction 4.4* and in accordance *Planning for Bush Fire Protection 2006 (PBP)* and *Community Resilience Practice Note 2/12 Planning Instruments and Policies*.

The key principle for the proposal is to ensure that future development is capable of complying with *PBP*. Planning principles for the proposal include the provision of adequate access including perimeter roads, establishment of adequate APZs for future housing, specifying minimum lot depths to accommodate APZs and the introduction of controls which avoid placing inappropriate developments in hazardous areas and placement of combustible material in APZs.

Our assessment found that bushfire can potentially affect the site from the proposed forest vegetation located within the E2 zone as well as external to the site's north-western and north-eastern boundary. Bushfire threat also exists from the pockets of remnant vegetation located to the west and east resulting in possible ember attack, radiant heat and potentially flame attack. The risk posed by the unmanaged grassland vegetation surrounding the site has also been assessed.

The assessment has concluded that future development on site is capable of providing compliance with the planning principles of *PBP* and *Community Resilience Practice Note 2/12 – Planning Instruments and Policies*.

## **GLOSSARY OF TERMS**

AHIMS	Aboriginal Heritage Information System
APZ	Asset protection zone
AS1596	<i>Australian Standard – The storage and handling of LP Gas</i>
AS2419	<i>Australian Standard – Fire hydrant installations</i>
AS3745	<i>Australian Standard – Planning for emergencies in facilities</i>
AS3959	<i>Australian Standard – Construction of buildings in bushfire-prone areas 2009</i>
BAL	<i>Bushfire attack level</i>
BCA	<i>Building Code of Australia</i>
BSA	Bushfire safety authority
EEC	Endangered ecological community
FDI	Fire danger index
IPA	Inner protection area
LEP	<i>Local environmental plan</i>
OPA	Outer protection area
PBP	<i>Planning for bush fire protection 2006</i>
RFS	NSW Rural Fire Service
SFPP	Special fire protection purpose



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### REFERENCES

SCHEDULE 1 – Bushfire Protection Measures

APPENDIX 1 – Management of asset protection zones

APPENDIX 2 – Response to NSW RFS additional information request



# Introduction

# 1

*Travers bushfire & ecology* has been requested by *Coastplan Group Pty Ltd* to undertake a bushfire protection assessment for the proposed rezoning located at Lot 612 DP 1160096, 166 Blackhead Road, Hallidays Point.

The proposal is located on land mapped by *Greater Taree City Council* as being bushfire prone. *Direction 4.4, Planning for Bush Fire Protection 2006 (PBP)* identifies matters for consideration for planning proposals that will affect, or are in proximity to land mapped as bushfire prone.

As such, the proposal is subject to the requirements of Section 117(2) of the *Environmental Planning and Assessment Act 1979 (EP&A Act)* which requires Council to consult with the Commissioner of the NSW Rural Fire Service (RFS) and to take into account any comments by the Commissioner.

## 1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- Review the bushfire threat to the landscape
- Undertake a bushfire attack assessment in accordance with *PBP*
- Provide advice on planning principles, including the provision of perimeter roads, asset protection zones (APZs) and other specific fire management issues
- Review the potential to carry out hazard management over the landscape, taking into consideration the proposed retention of trees within the final development plans.

## 1.2 Project synopsis

The proposal is to rezone approximately 17 hectares of land at 166 Blackhead Road, Hallidays Point from RU1 Primary Production to R1 – General Residential and E2 – Environmental Conservation to facilitate the proposed expansion of the Tallwood village.

The rezoning seeks to convert 15.8ha of land into general residential (R1) and a further 1.2ha into environmental conservation, which will be placed within the north-eastern corner of the site to include the small wetland area identified as an endangered ecological community (EEC) in the ecological assessment for the site.

The E2 zone will consist of a small area of wetland (along the drainage corridor) as well as the planting of native trees to create a forest / woodland area (as an off set to the central woodland which is to be removed).

The proposal at this stage does not involve a concept plan and as such the bushfire constraints have been highlighted and minimum APZs have been recommended from the site boundary and E2 zone boundary. It should be noted that the further retention and/or rehabilitation of vegetation within the site may trigger the requirement for additional APZs beyond those

recommend within this report. Recommendations have also been made for future road design, building construction, water supply and utilities.

### **1.3 Information collation**

To achieve the aims of this report, a review of the information relevant to the property was undertaken prior to the initiation of field surveys. Information sources reviewed include the following:

- Greater Taree Local Environmental Plan 2010
- Statutory Ecological Assessment , 2015 prepared by *Naturecall Environmental*
- Greater Taree City Council, Planning Proposal, January 2016
- *Google* aerial photography
- Topographical maps *DLPI of NSW 1:25,000*
- *Australian Standard 3959 Construction of buildings in bushfire-prone areas*
- *Planning for Bush Fire Protection 2006 (PBP)*
- *Community Resilience Practice Notes 2/12 Planning Instruments and Policies.*

An inspection of the proposed development site and surrounds was undertaken by Nicole van Dorst on 29 July 2016 to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

### **1.4 Site description**

The site is located at Lot 612 DP 1160096, 166 Blackhead Road, Hallidays Point (refer Figure 1.1). It is situated to the north of Blackhead Road and approximately 500m south-west of Tallwoods Village, a larger developing residential estate (approximately 150ha) which comprises a golf course and club.

The site is bounded to the north by general residential development and by further primary production land to the south, east and west.



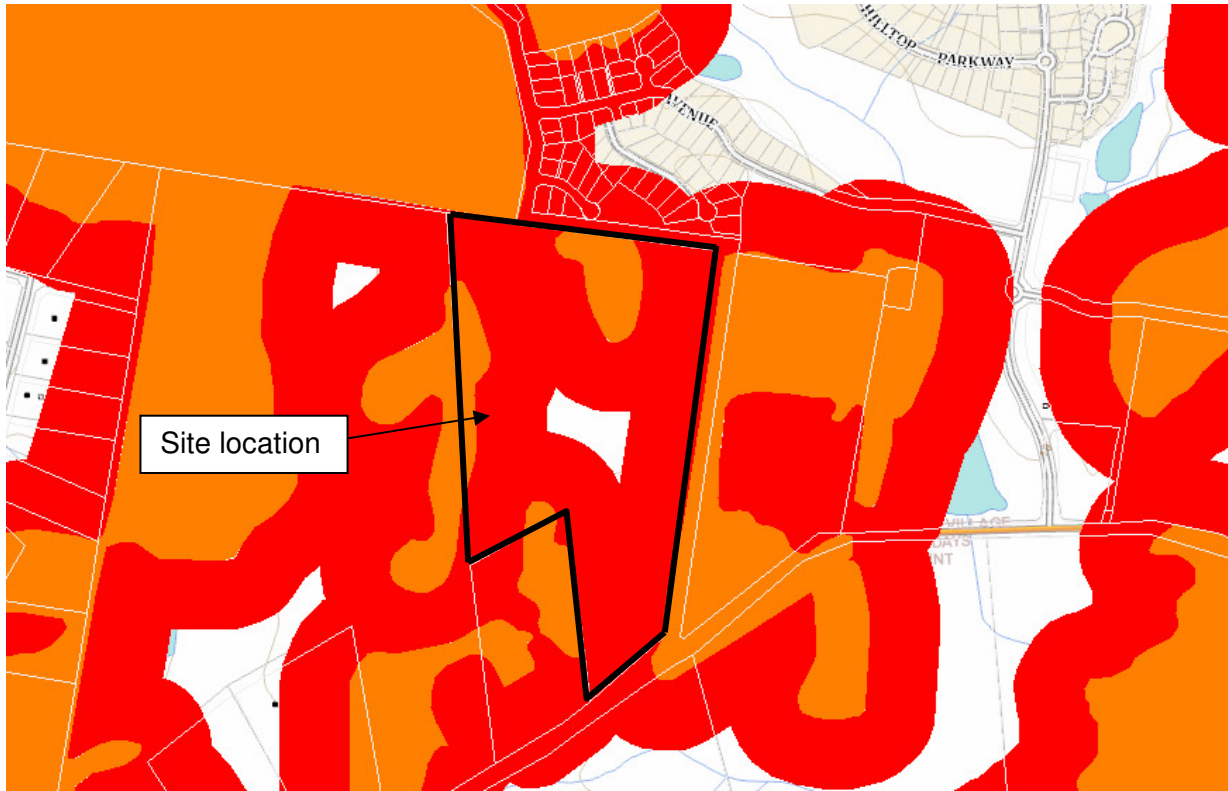
Figure 1.1 – Aerial appraisal

## 1.5 Legislation and planning instruments

### 1.5.1 *Environmental Planning and Assessment Act 1979 (EP&A Act) and bushfire prone land*

The *EP&A Act* governs environmental and land use planning and assessment within New South Wales. It provides for the establishment of environmental planning instruments, development controls and the operation of construction controls through the *Building Code of Australia (BCA)*. The identification of bushfire prone land is required under Section 146 of the *EP&A Act*.

Bushfire prone land maps provide a trigger for the development assessment provisions. The proposed rezoning is located on land that is mapped by *Greater Taree City Council* as being bushfire prone (refer Figure 1.2).



**Figure 1.2** – Bushfire prone land map  
 (Source: Greater Taree City Council)

*PBP* (pg 4) stipulates that if a proposed amendment to land use zoning or land use affects a designated bushfire prone area then the Section 117(2) Direction No 4.4 of the *EP&A Act* must be applied. This requires Council to consult with the Commissioner of the RFS and to take into account any comments by the Commissioner and to have regard to the planning principles of *PBP* (detailed within Section 1.5.3).

### **1.5.2 Local Environmental Plan (LEP)**

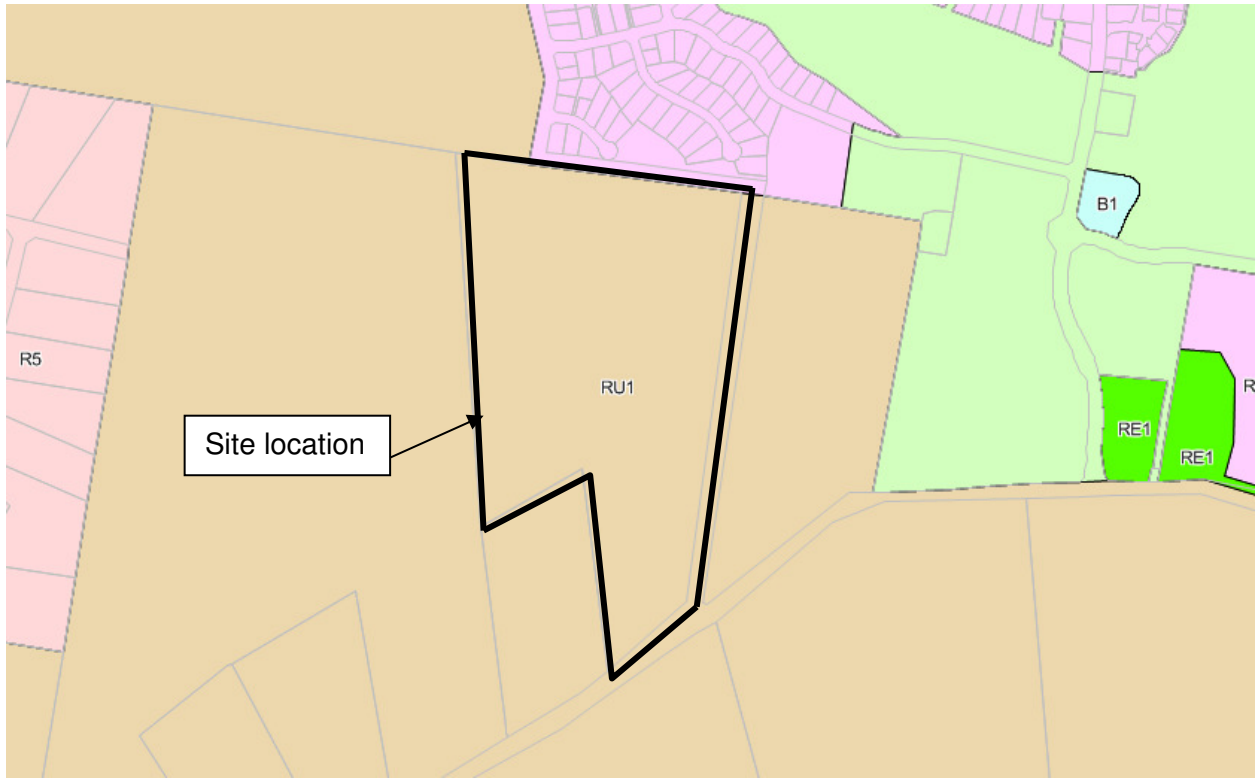
A LEP provides for a range of zonings which list development that is permissible or not permissible, as well as the objectives for development within a zone.

The proposal is to proceed as an amendment to the current *Greater Taree LEP 2010* as outlined below.

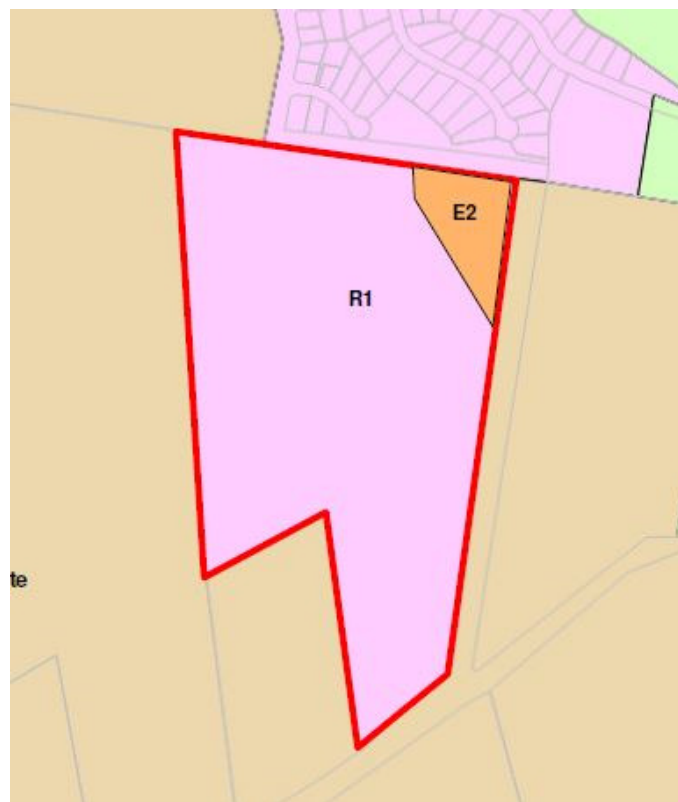
#### *Greater Taree Local Environmental Plan 2010*

The site is currently zoned under the *Greater Taree LEP 2010* as RU1 – Primary Production (refer Figure 1.3). The land surrounding the property to the east, south and west is also RU1, with the land to the north zoned as R1 – General Residential.

The proposal seeks to amend the LEP to rezone the land to R1 – General Residential and E2 Environmental Conservation (Figure 1.4).



**Figure 1.3** – Greater Taree LEP 2010  
 (Source: Greater Taree Shire Council website)



**Figure 1.4** – Proposed zoning changes  
 (Source: Planning Proposal, 2016)

The proposal, including the provision of APZs, would seek to comply with the objectives of the proposed rezoning.

### **1.5.3 Planning for Bush Fire Protection 2006 (PBP)**

Bushfire protection planning requires the consideration of the RFS planning document entitled *PBP*. *PBP* provides planning principles for rezoning to residential land as well as guidance on effective bushfire protection measures.

The policy aims to provide for the protection of human life (including fire fighters) and to minimise impacts on property and the environment from the threat of bushfire, while having due regard to development potential, on site amenity and protection of the environment.

*PBP* outlines the following planning principles that must be achieved for all rezoning proposals:

1. Provision of a perimeter road with two way access which delineates the extent of the intended development.
2. Provision, at the urban interface, for the establishment of adequate APZs for future housing.
3. Specifying minimum residential lot depths to accommodate APZs for lots on perimeter roads.
4. Minimising the perimeter of the area of land interfacing the hazard, which may be developed.
5. Introduction of controls which avoid placing inappropriate developments in hazardous areas, and
6. Introduction of controls on the placement of combustible materials in APZs.

In addition to the above, *PBP* outlines the bushfire protection measures required to be assessed for new development in bushfire prone areas.

The proposed rezoning has been assessed in compliance with the following measures to ensure that future development is capable of complying with *PBP*:

- asset protection zones
- building construction and design
- access arrangements
- water supply and utilities
- landscaping
- emergency arrangements

### **1.5.4 Building Code of Australia (BCA) and the Australian Standard AS3959 Construction in bushfire-prone areas 2009 (AS3959)**

The *BCA* is given effect through the *EP&A Act* and forms part of the regulatory environment of construction standards and building controls. The *BCA* outlines objectives, functional statements, performance requirements and deemed to satisfy provisions. For residential dwellings these include Classes 1, 2 and 3 buildings. The construction manual for the deemed to satisfy requirements is *AS3959*.

## **1.6 Environmental and cultural constraints**

### **1.6.1 Environmental constraints**

*Naturecall Environmental Consultants* prepared a Statutory Ecological Assessment for the property which has identified the following ecological features within the site;

- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions; and
- Presence of one (1) threatened fauna species - Grey-headed flying fox

The EEC vegetation occurs within a small remnant patch in the north-eastern corner of the site. This vegetation will be retained and protected (within the E2 zone) within the final design of the future residential development.

### **1.6.2 Cultural constraints**

A basic search was conducted on the Aboriginal Heritage Information System (AHIMS). The results show that there are no identified Aboriginal sites of significance within Lot 612 DP 1160096 or within 50m of the site.





# Bushfire Threat Assessment

## 2

To assess the bushfire threat and to determine the required width of an APZ for a development, a review of the elements that comprise the overall threat needs to be completed.

*PBP* provides a methodology to determine the size of any APZ that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

### 2.1 Hazardous fuels

*PBP* guidelines require the identification of the predominant vegetation formation in accordance with David Keith (2004) to determine APZ distances for subdivision developments.

The hazardous vegetation is calculated for a distance of at least 140m from a proposed site boundary and can be summarised as:

- Forest vegetation to the north-west and north-east.



**Photo 1:** Forest vegetation located to the north-west

- Patches of remnant forest within the rural residential grazing lands to the west and within the unmade road reserve to the east. *PBP* describes remnant vegetation as a parcel of vegetation with a size of less than 1ha or a shape that provides a potential fire run directly towards a building not exceeding 50m. The vegetation exhibits these

qualities (i.e. <30m) and therefore the threat posed is considered low and APZ setbacks for this aspect are the same as for the rainforest category outlined in *PBP*.



**Photo 2:** Remnant forest vegetation located west of the site boundary



**Photo 3:** Remnant forest vegetation (<30m width) adjoining the eastern boundary

- Unmanaged grassland (i.e. exceeding a height of 10cm) to the west.



**Photo 4:** Grassland vegetation to the west

- The proposed creation and rehabilitation of the 1.2ha environmental conservation land within the north-eastern corner of the site to include a small area of wetland (along the drainage corridor) as well as the planting of native trees to create a forest / woodland area will create a future bushfire risk to the site.

## 2.2 Effective slope

The effective slope is assessed for a distance of up to 100m. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

The effective slope within the hazardous vegetation is provided in detail in Table 2.1 but can be summarised as:

- 6° downslope within the forest vegetation to the north-west
- 0-4° downslope within the grassland / remnant vegetation to the west (northern portion of western boundary)
- level to 5° upslope within the grassland / remnant vegetation to the west (southern portion of western boundary)
- 0-3° upslope within the remnant forest to the east (southern portion of eastern boundary)
- 0-3° downslope within the remnant forest to the east (northern portion of eastern boundary)

- level to upslope within the proposed E2 zoned land in the north-east

### 2.3 Bushfire attack assessment

A fire danger index (FDI) of 80 has been used to calculate bushfire behaviour on the site using forest vegetation located within the Greater Taree region.

Table 2.1 provides a summary of the bushfire attack assessment, the minimum required APZs in compliance with Appendix 2 (*PBP*).

**Table 2.1 – Bushfire attack assessment**

Aspect	Vegetation within 140m of development	Effective slope of land	Minimum APZ required (based on BAL 29 construction)
North-west	Forest	6 <sup>oD</sup>	30m
West (northern portion of western boundary)	Grassland	0-4 <sup>oD</sup>	9m
	Remnant Forest (Note 1)		10m (83m separation provided)
West (southern portion of western boundary)	Grassland	0-5 <sup>oU</sup>	8m
	Remnant Forest (Note 1)		10m (25-45m separation provided)
East	Remnant forest (Note 1)	0-3 <sup>oU</sup>	10m
		0-3 <sup>oD</sup>	10m
North-east (E2 zone land)	Forest	Level	20m
North	Managed land	N/A	N/A

Notes: \* Slope is either 'U' meaning up slope or 'C' meaning cross slope or 'D' meaning down slope

**Note 1:** *PBP* describes remnant vegetation as a parcel of vegetation with a size of less than 1ha or a shape that provides a potential fire run directly towards a building not exceeding 50m. The vegetation to these aspects exhibits these qualities and therefore the threat posed is considered low and APZ setbacks for this aspect are the same as for the rainforest category outlined in *PBP*.

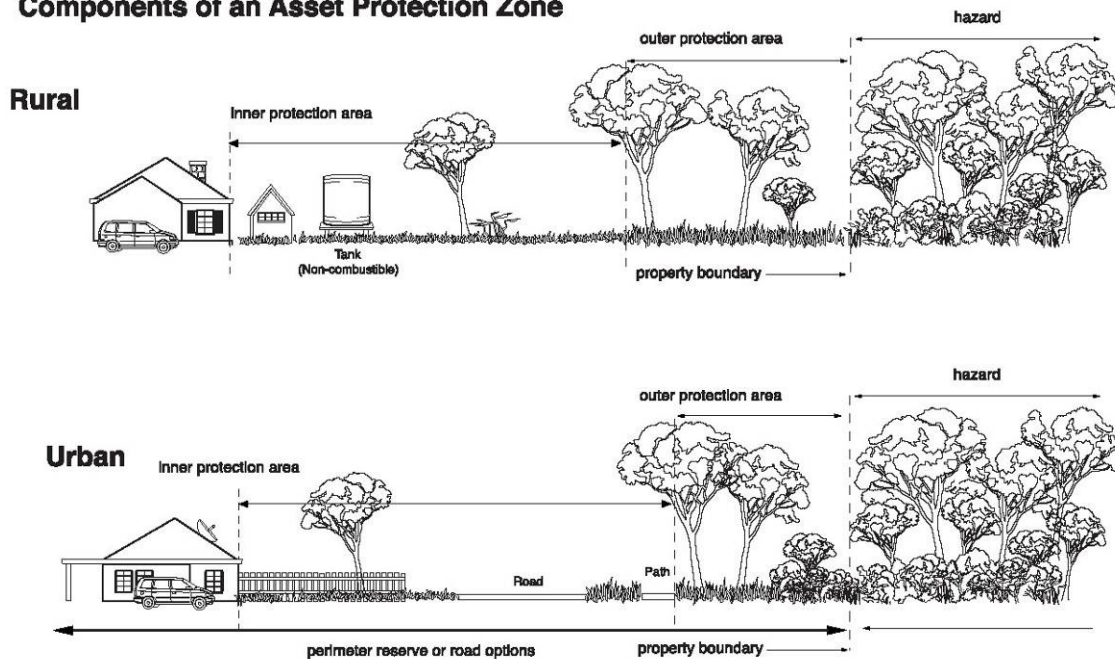
# Specific Protection Issues

## 3

### 3.1 Asset protection zones (APZs)

APZs are areas of defensible space separating hazardous vegetation from buildings. The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. The IPA cannot be used for habitable dwellings but can be used for all external non-habitable structures such as pools, sheds, non-attached garages, cabanas, etc. A typical APZ and therefore defensible space is graphically represented below:

#### Components of an Asset Protection Zone



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

**Note:** Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

*PBP* dictates that the subsequent extent of bushfire attack that can potentially emanate from a bushfire must not exceed a radiant heat flux of  $29\text{kW/m}^2$  for residential subdivision developments. This rating assists in determining the size of the APZ in compliance with *PBP* to provide the necessary defensible space between hazardous vegetation and a building. Table 3.1 outlines the proposals compliance with the performance criteria for APZs.

**Table 3.1 – Performance criteria for asset protection zones (PBP guidelines pg. 19)**

<b>Performance criteria</b>	<b>Acceptable solutions</b>	<b>Complies</b>
Radiant heat levels at any point on a proposed building will not exceed 29kW/m <sup>2</sup> .	APZs are provided in accordance with Appendix 2.  APZs are wholly within the boundary of the development site.	Yes - refer Table 2.1.
APZs are managed and maintained to prevent the spread of fire towards the building.	In accordance with the requirements of <i>Standards for Asset Protection Zones (NSW RFS 2005)</i> .	Yes - to be made a condition of consent.
APZ maintenance is practical , soil stability is not compromised and the potential for crown fires is negated.	The APZ is located on lands with a slope of less than 18°.	Yes - Slopes are less than 18°.

### **3.2 Building protection**

The construction classification system is based on five (5) bushfire attack levels (BAL). These are BAL – Flame Zone (FZ), BAL 40, BAL 29, BAL 19 and BAL 12.5 AS3959 – *Construction of buildings in bushfire-prone areas*. The lowest level, BAL 12.5, has the longest APZ distance while BAL – FZ has the shortest APZ distance. These allow for varying levels of building design and use of appropriate materials.

The minimum asset protection zones outlined in Table 2.1 and depicted in Schedule 1 attached are based on a BAL 29 construction standard.

Future applications for dwelling construction (Class 1, 2 & 3 buildings as identified by the *Building Code of Australia*) for lots located on bushfire prone land will be subject to a separate application either under section 79BA of the *EP&A Act* or as complying development under the Codes SEPP.

### **3.3 Hazard management**

The APZs are to be managed in accordance with the RFS guidelines *Standards for Asset Protection Zones (RFS, 2005)*, with landscaping to comply with Appendix 5 of *PBP*. APZs are to be confined within the development lots to ensure ongoing management of the APZ.

A summary of the guidelines for managing APZs is attached as Appendix 1 to this report.

### **3.4 Access for fire fighting operations**

Future residential development within the site will be accessed via Pulpit Road in the north. Access to Blackhead Road in the south will be available for emergency vehicles only.

Table 3.2 outlines the performance criteria and acceptable solutions for public roads within the future subdivision design. Appendix 2 provides further detail regarding the safety of Pulpit Road as the primary evacuation route (to address NSW RFS additional information request).

**Table 3.2 – Performance criteria for public roads (PBP guidelines pg. 20)**

Performance criteria	Acceptable solutions
<p>Fire fighters are provided with safe all weather access to structures (thus allowing more efficient use of fire fighting resources).</p>	<p>Public roads are two-wheel drive, all weather roads.</p>
<p>Public road widths and design that allow safe access for fire fighters while residents are evacuating an area.</p>	<p>Urban perimeter roads are two way, that is, at least two traffic lane widths (carriageway 8m minimum kerb to kerb) allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 3.3 below.</p> <p>Perimeter road is linked with the internal road system at an interval of no greater than 500m in urban areas.</p> <p>Traffic management devices are constructed to facilitate access by emergency services.</p> <p>Public roads have a cross fall not exceeding 3°.</p> <p>All roads are through roads. If unavoidable, dead end roads are not more than 200m in length, incorporate a minimum 12m outer radius turning circle, sign posted dead end and direct traffic away from the hazard.</p> <p>Curves of roads (other than perimeter) have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress.</p> <p>The minimum distance between inner and outer curves is 6m.</p> <p>Maximum grades for sealed roads do not exceed 15° and an average grade of not more than 10°.</p> <p>Minimum vertical clearance of 4m above the road at all times.</p>
<p>The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles</p>	<p>The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (15 tonnes for reticulated water and 28 tonnes for all other areas). Bridges clearly indicate load rating.</p>
<p>Roads that are clearly sign posted (with easily distinguishable names) and buildings / properties that are clearly numbered.</p>	<p>Public roads &gt;6.5m wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water.</p> <p>Public roads 6.5-8m wide are No Parking on one side with the hydrant located on this side to ensure accessibility to reticulated water.</p> <p>Public roads &lt;6.5m wide provide parking within parking bays and locate services outside of parking bays to ensure accessibility to reticulated water.</p> <p>One way only public access are no less than 3.5m wide and provide parking within parking bays and locate services outside of parking bays to ensure accessibility to reticulated water.</p>

Performance criteria	Acceptable solutions
There is clear access to reticulated water supply. Parking does not obstruct the minimum paved width	<p>Parking bays are a minimum of 2.6m wide from kerb edge to road pavement. No services or hydrants are located within parking bays.</p> <p>Public roads directly interfacing the bushfire hazard are to provide roll top kerbing to the hazard side of the road.</p>

**Table 3.3 – Minimum widths for public roads that are not perimeter roads**

Curve radius (inside edge) (metres width)	Swept path (metres width)	Single lane (metres width)	Two way (metres width)
<40	3.5	4.5	8.0
40-69	3.0	3.9	7.5
70-100	2.7	3.6	6.9
>100	2.5	3.5	6.5

### 3.5 Water supplies

Town reticulated water supply is available to the property in the form of an underground reticulated water system.

Table 3.4 outlines the performance criteria and acceptable solutions for reticulated water supply.

**Table 3.4 – Performance criteria for reticulated water supplies (PBP guidelines pg. 27)**

Performance criteria	Acceptable solutions
Water supplies are easily accessible and located at regular intervals.	<p>Reticulated water supply to urban subdivision uses a ring main system for areas with perimeter roads.</p> <p>Fire hydrant spacing, sizing and pressures comply with AS2419.1 - 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles.</p> <p>Hydrants are not placed within any road carriageway.</p> <p>All above ground water and gas pipes external to the building are metal, including and up to taps.</p> <p>The provisions for parking on public roads are met.</p>



### 3.6 Gas

Table 3.5 outlines the required performance criteria for the gas supply.

**Table 3.5 – Performance criteria for gas supplies (PBP guidelines pg. 27)**

Performance criteria	Acceptable solutions
Location of gas services will not lead to the ignition of surrounding bushland land or the fabric of buildings	<p>Reticulated or bottled gas bottles are to be installed and maintained in accordance with AS1596 (2002) and the requirements of relevant authorities. Metal piping is to be used.</p> <p>All fixed gas cylinders are to be kept clear of flammable materials to a distance of 10m and shielded on the hazard side of the installation.</p> <p>If gas cylinders are to be kept close to the building the release valves must be directed away from the building and at least 2m away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal.</p> <p>Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.</p>

### 3.7 Electricity

Table 3.6 outlines the required performance criteria for electricity supply.

**Table 3.6 – Performance criteria for electricity services (PBP guidelines pg. 27)**

Performance criteria	Acceptable solutions
<p>Location of electricity services limit the possibility of ignition of surrounding bushland or the fabric of buildings</p> <p>Regular inspection of lines in undertaken to ensure they are not fouled by branches.</p>	<p>Where practicable, electrical transmission lines are underground</p> <p>Where overhead electrical transmission lines are proposed:</p> <ul style="list-style-type: none"> <li>• Lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas: and</li> <li>• No part of a tree is closer to a power line than the distance set out in accordance with the specification in <i>Vegetation Safety Clearances</i> issued by <i>Energy Australia</i> (NS179, April 2002).</li> </ul>



# Conclusion & Recommendations

# 4

## 4.1 Conclusion

A bushfire protection assessment has been undertaken for the proposed rezoning located at Lot 612 DP 1160096, 166 Blackhead Road, Hallidays Point. The proposal is to rezone the land from RU1 Primary Production to R1 – General Residential and E2 – Environmental Conservation.

Our assessment found that bushfire can potentially affect the site from the proposed forest vegetation located within the E2 zone as well as external to the site’s north-western and north-eastern boundary. Bushfire threat also exists from the pockets of remnant vegetation located to the west and east resulting in possible ember attack, radiant heat and potentially flame attack. The risk posed by the unmanaged grassland vegetation surrounding the site has also been assessed.

The assessment has concluded that future development on site (including access) is capable of providing compliance with the planning principles of *PBP* and *Community Resilience Practice Note 2/12 – Planning Instruments and Policies*.

Future development on site is to comply with the following planning principles.

**Table 4.1 – Planning principles**

Planning principles	Recommendations
Provision of a perimeter road with two way access which delineates the extent of the intended development.	Future subdivision design should consider the provision of perimeter roads to provide clear access for firefighting operations to the remnant vegetation in the east and forest vegetation to the north-west.
Provision, at the urban interface, for the establishment of adequate APZs for future housing.	APZs have been recommended in compliance with BAL 29 (AS3959, 2009).
Specifying minimum residential lot depths to accommodate APZs for lots on perimeter roads.	Future subdivision design is to allow for the minimum APZs as recommended within Table 2.1 and as depicted within Schedule 1 attached.
Minimising the perimeter of the area of land interfacing the hazard, which may be developed.	Compliant.
Introduction of controls which avoid placing inappropriate developments in hazardous areas.	Future development consists of residential dwellings and is appropriate for the level of bushfire risk.
Introduction of controls on the placement of combustible materials in APZs.	Compliant – can be made a condition of consent.

The following recommendations are provided to ensure that future residential development is in accordance with, or greater than, the requirements of *PBP*.

## **4.2 Recommendations**

**Recommendation 1** - APZs are to be provided to the future residential development. APZs are to be measured from the exposed wall of any dwelling toward the hazardous vegetation. The minimum APZ must be achievable within all lots fronting the bushfire hazard as nominated in Table 2.1 and also as generally depicted in Schedule 1.

**Recommendation 2** - Fuel management within the APZs is to be maintained by regular maintenance of the landscaped areas, mowing of lawns in accordance with the guidelines provided in Appendix 1, and as advised by the RFS in their publications.

**Recommendation 3** - Building construction standards are to be applied for future residential dwellings in accordance with *Australian Standard AS3959 Construction of buildings in bushfire-prone areas (2009)* with additional construction requirements as listed within Section A3.7 of Addendum Appendix 3 of *PBP*.

**Recommendation 4** - Public access roads are to comply with the acceptable solutions provided within Section 4.1.3 of *PBP* (refer Section 3.4 of this report).

**Recommendation 5** - Water, electricity and gas supply are to comply with the acceptable solutions as provided within Section 4.1.3 of *PBP* (refer Sections 3.5, 3.6 and 3.7 of this report).

## REFERENCES

- Australian Building Codes Board (2010) – *Building Code of Australia, Class 1 and Class 10 Buildings Housing Provisions Volume 2.*
- Chan, K.W. (2001) – *The suitability of the use of various treated timbers for building constructions in bushfire prone areas.* Warrington Fire Research.
- Councils of Standards Australia AS3959 (2009) – *Australian Standard Construction of buildings in bush fire-prone areas.*
- Hon Brad Hazzard (7 June 2012) – *Planning proposal to rezone land at Boundary Road, Medowie from 1 (c1) Rural Small Holdings Zone to 1(c5) Rural Small Holdings, 1(c4) Rural Small Holdings and 7(a) Environmental Protection.*
- Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT.* The Department of Environment and Climate Change.
- Rural Fire Service (2006) - *Planning for bushfire protection– a guide for councils, planners, fire authorities and developers.* NSW Rural Fire Service.
- Rural Fire Service (2006) - Bushfire Attack Software on RFS Web site.
- Tan, B., Midgley, S., Douglas, G. and Short (2004) - *A methodology for assessing bushfire attack.* RFS Development Control Service.
- Travers, J. (2003) *The Ecological Management of Asset Protection Zones at Wallarah Peninsula – A Case Study.*
- Umwelt, 2012. *Ecological Assessment for Rezoning Application Lots 93 – 96 Boundary Road, Medowie.*



# Plan of Bushfire Protection Measures

S1



The proposed retention of the Freshwater Wetland EEC and planting of a Forest structure within the proposed E2 zoned land will require a minimum APZ setback of 20m to any future proposed dwelling.

- Legend**
- Lot Boundary
  - Contours (1m)
  - Asset Protection Zone (Based on BAL 29 construction)
  - Proposed E3 zone boundary

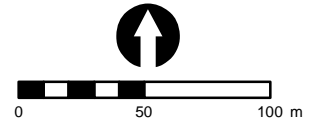
Aerial source: NearMap (05.08.2015)



PROJECT & MXD REFERENCE  
 Blackhead Road, Tallwoods  
 A16066\_BF001

DATE & ISSUE NUMBER  
 9/02/2017  
 Issue 1

SCALE & COORDINATE SYSTEM  
 1:3,000 @ A3  
 GDA 1994 MGA Zone 56



TITLE  
**Schedule 1 - Bushfire Protection Measures**

Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

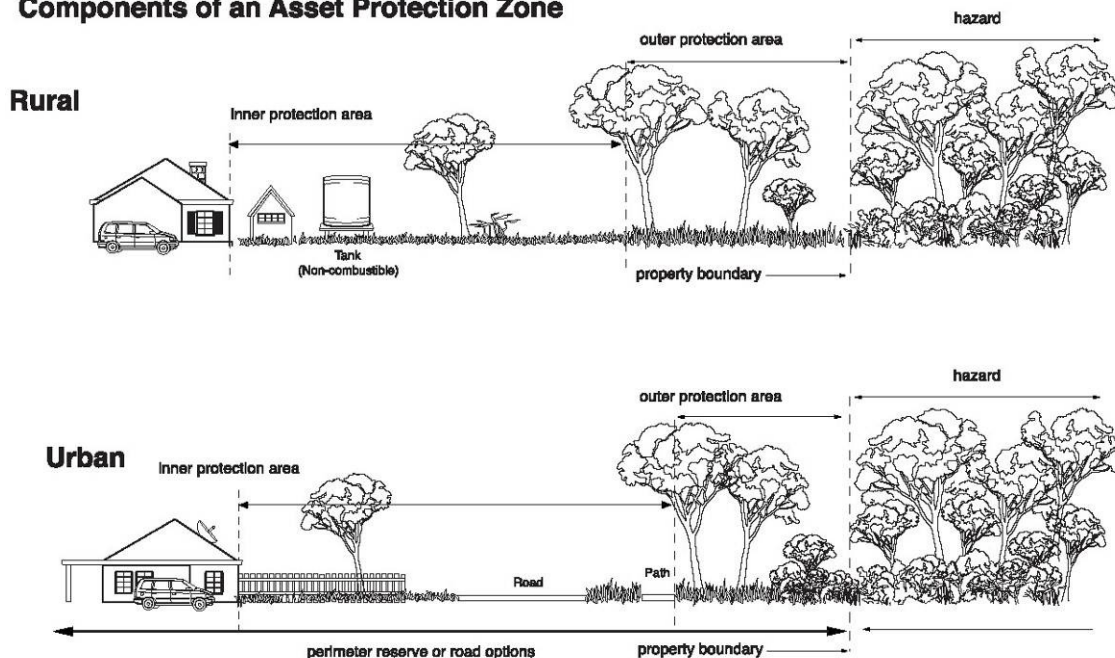
# Management of Asset Protection Zones

# A1

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 5 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. A typical APZ is graphically represented below:

## Components of an Asset Protection Zone



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

**Note:** Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following provides maintenance advice for vegetation within the IPA and OPA.

### Inner Protection Area (IPA)

Fuel loads within the IPA are to be maintained so it does not exceed 4t/ha.

Trees are to be maintained to ensure;

- Canopy cover does not exceed 15%
- Trees (at maturity) do not touch or overhang the building
- Tree canopies (at maturity) should be well spread out and not form a continuous canopy

- There should be no unmanaged vegetation within 10m of windows, doorways, eaves and gutters
- Lower limbs should be removed up to a height of 2m above ground

Shrubs are to be maintained to ensure;

- Large discontinuities or gaps in vegetation
- Shrubs should not be located under trees
- Shrubs should be in clumps no greater than 5m<sup>2</sup>
- Shrubs should be no closer than 10 metres from an exposed window or door.

Grass is to be maintained to ensure:

- A height of 10cm or less
- Leaves and debris is removed.

#### Outer Protection Area (OPA)

Fuel loads within the OPA are to be maintained so it does not exceed 8t/ha.

Trees are to be maintained to ensure;

- Canopy cover does not exceed 30% (trees may touch each other, however a separation is to be provided between the hazard the APZ)

Shrubs are to be maintained to ensure;

- They do not form a continuous canopy
- Shrubs should be in clumps no greater than 10m<sup>2</sup>
- Clumps of shrubs should be separated from each other by 10m

Grass is to be maintained to ensure:

- A height of 10cm or less
- Leaves and debris is removed.

Landscaping to the site is to comply with the principles of Appendix 5 of PBP. In this regard the following landscaping principles are to be incorporated into the development:

- Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways;
- Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come in contact with the building;
- When considering landscape species consideration needs to be given to estimated size of the plant at maturity;
- Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies;
- Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown;
- Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e. leaf litter);
- Avoid climbing species to walls and pergolas;
- Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building;
- Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and
- Use of low flammability vegetation species.





# Response to RFS additional information request

A2

Our Ref: A16066B2: NVD/JT  
Council Ref: PP\_2016\_GTARE  
RFS REF: L08/0054

Monday 23<sup>rd</sup> January, 2017

Coastplan Group Pty Ltd  
PO Box 568  
FORSTER NSW 2428



**Attention:** Mr Gavin Maberly-Smith

Dear Gavin

**Re: Response for Additional Information Request  
Planning Proposal – Rezoning 166 Blackhead Road, Hallidays Point**

*Travers bushfire & ecology (TBE)* has been engaged to provide a response to the NSW RFS letter (dated 29 November 2016) which states that;

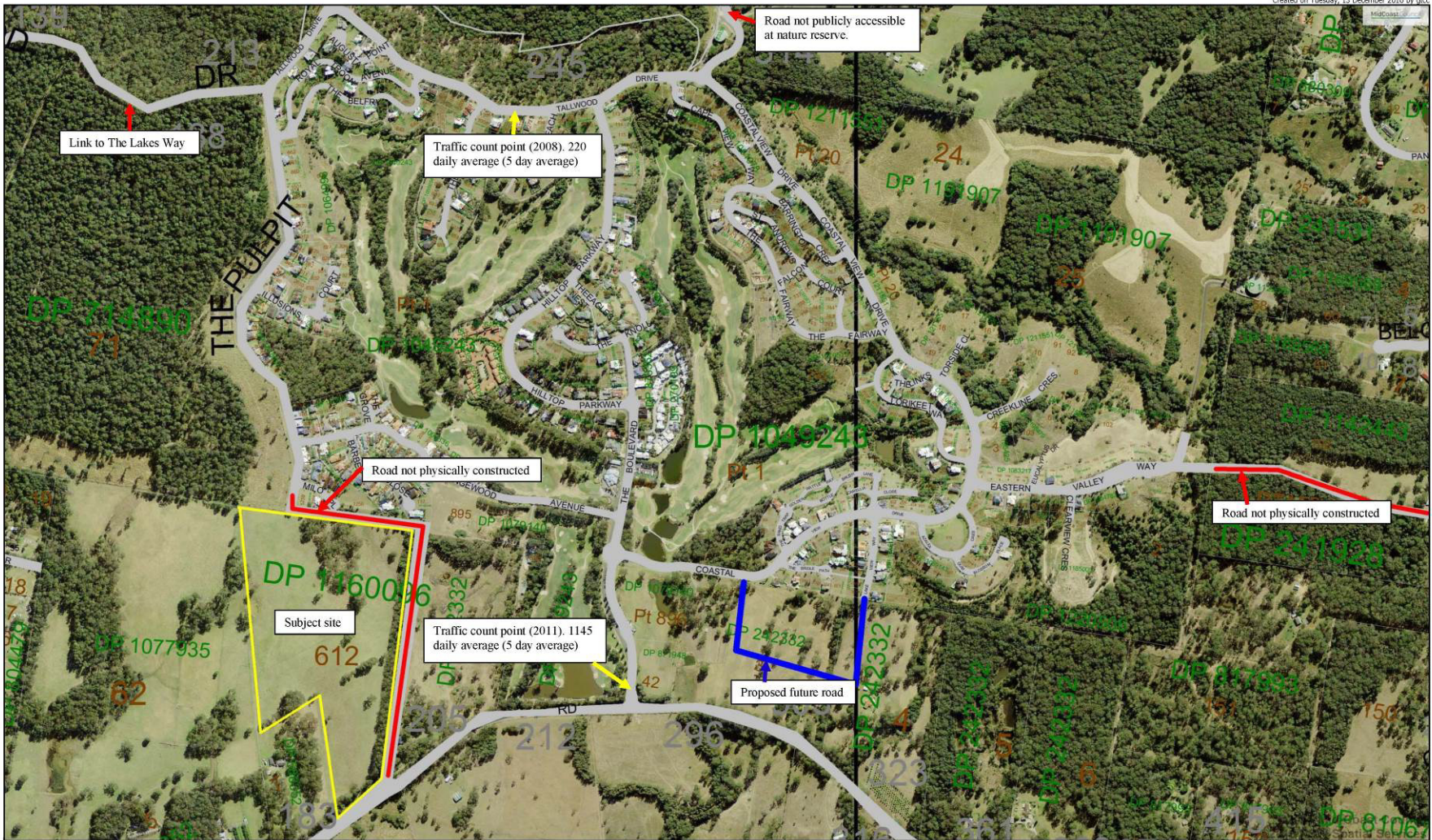
*'The NSW RFS cannot support the Planning Proposal in its current form. Council would need to provide the following information to permit the NSW RFS to re-assess the Planning Proposal;*

- *A traffic Masterplan for the locality identifying all current and future road systems within and servicing the Tallwoods Village including Lot 612.*
- *A concept subdivision plan identifying the proposed residential road layout within Lot 612.*
- *A traffic management study on the proposed road layout plan for the site including all access points to Blackhead Road, Diamond Beach and The Lakes Way. The study shall incorporate all current and future traffic flows through the identified access routes.*
- ***A revised Bushfire Protection report based on the recommendations of the traffic management study for vehicle access to the site. The NSW RFS notes that residents egressing the site to the north via The Pulpit, will be travelling towards a significant bush fire threat. As such, the current NSW RFS position is that any future residential subdivision of Lot 612 shall include direct public road access to Blackhead Road.***

In response to dot points 1 & 2 above Council have supplied the following overview map and concept plan which shows traffic counts at various points throughout the Tallwoods Village and golf course.

Mid Coast Council have advised that their engineers are opposed to having direct access to Blackhead Road for safety reasons. As a result access to Blackhead Road is to be limited to emergency services only.

As a result *TBE* can confirm that primary evacuation route for residents of Lot 612 will result in egress via The Pulpit to the north over a distance of 160m before continuing east along Grangewood Avenue and then south on the Boulevard onto Blackhead road away from the direct threat of bushfire. Alternatively a further two potential egress points east of the development will be provided (as depicted in the concept plan). The majority of these egress routes are well over 100m from any bushfire prone vegetation, therefore clearly complying with the requirements outlined in the planning document *Planning for Bushfire Protection 2006 (PBP)*.



Link to The Lakes Way

Traffic count point (2008). 220 daily average (5 day average)

Road not publicly accessible at nature reserve.

Road not physically constructed

Subject site

Traffic count point (2011). 1145 daily average (5 day average)

Proposed future road

Road not physically constructed

### MidCoastCouncil

Mid-Coast Council  
2 Pulukey Street  
PO Box 482  
TAREE NSW 2430  
Ph: (02) 6962 5299  
Fax: (02) 6962 5311  
Email: [taraco@midcoast.nsw.gov.au](mailto:taraco@midcoast.nsw.gov.au)

**Important Notice!**  
This map is not a precise survey document. Accurate locations can only be determined by a survey on the ground.  
This information is provided for the convenience of the user only. No statement is made about the accuracy or suitability of the information for use for any purpose (whether the purpose has been notified to Council or not). While every care is taken to ensure the accuracy of this data, neither the Mid-Coast Council nor Land and Property Information (LPI) makes any representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason.  
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**Imagery:**  
**Contour Interval:**  
**Projection:** MGA Zone 56 (GDA94)  
**Cost:**  
**Date:** Tuesday, 13 December 2016  
**Drawn By:** gtc

**Map Scale: 1:7,750 at A3**  
Map Zoom: 3174 m



1. RELIANCE OF IMPROVEMENTS TO BOUNDARIES IS UNDERSTOOD ONLY WHERE SPECIFIED AND CRITICAL THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
2. CONTIGUOUS SHOWN SHOWN THE TYPICAL HEIGHT AT SPOT LEVELS SHOWN CONTAINS DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT.
3. SERVICES SHOWN THEREON HAVE BEEN DETERMINED FROM VISUAL FORMATION ONLY FROM TO ANY SUFFICIENT OCCUPATION OR CONSTRUCTION ON THE SITE. THE RELIANCE ACCURACY SHOULD BE CONTACTED TO ESTABLISH DETAILED LOCATION AND DEPTH.
4. THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:1000. THIS LOCATION IS ONLY ACCURATE TO +/- 0.2M.
5. THIS DRAWDING AND APPROXIMATE ONLY AND FURTHER SURVEY MUST BE REQUIRED FOR ARCHITECTURAL DESIGN.
6. BOUNDING AND DISTANCES ARE BY TITLE AND/OR DEED ONLY. NO SUFFICIENT INVESTIGATION HAS BEEN CONDUCTED.
7. THIS DRAWING SHOWS THE PROPERTY OF LOT 612, SURROUND & NEIGHBOUR AND IS SUBJECT TO OTHER SURVEY LEVELS.

LSW  
SCALE 1:1250

DRAWN: [ ] CHECKED: [ ] DATE: [ ]	PROJECT: [ ] CLIENT: [ ] ADDRESS: [ ]	<b>PROPOSED SUBDIVISION OF LOT 612 BLACKHEAD ROAD HALLIDAYS POINT.</b>	<b>LSW LIBBURY, SUMMERS &amp; WHITEMAN CONSULTING SURVEYORS, PLANNERS &amp; ENGINEERS</b> 1st FLOOR, 3 WARRUP ST, FORTITUDE VALLEY VIC 3060 TEL: 03 9487 1100 FAX: 03 9487 1101 WWW.LSW.COM.AU	SCALE: 1:1250 SHEET: 1 OF 1 DATE: 31/07/2006	DRAWN: [ ] CHECKED: [ ] DATE: [ ]
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In response to dot point 4 of the *RFS* letter which states;

***A revised Bushfire Protection report based on the recommendations of the traffic management study for vehicle access to the site. The NSW RFS notes that residents egressing the site to the north via The Pulpit, will be travelling towards a significant bush fire threat. As such, the current NSW RFS position is that any future residential subdivision of Lot 612 shall include direct public road access to Blackhead Road.***

*TBE* provide the following response.

Although a traffic management study has not been completed *TBE* can confirm that the primary egress route to the north clearly complies with the requirements of *PBP*. In addition, the concept subdivision plan shown above depicts an additional two (2) egress routes via the land to the east. These routes link to Grangewood Avenue in the north and well away from the direct threat of bushfire.

The intent of measures outlined in *PBP*, for public roads, is to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

The performance criterion for these public roads is that roads and access to the site must enable safe access for emergency services and allow fire and emergency service crews to work with equipment about the emergency vehicles.

The primary egress route via the Pulpit, Grangewood Avenue and The Boulevard will provide safe egress for residents evacuating without direct contact with unmanaged bushland areas and outside of the flame contact zone. As depicted in Schedule 2 attached the nearest bushfire prone vegetation is located 76 – 100 to the west of The Pulpit (refer photo 1), 80m to the north and 95m to the south of Grangewood Avenue.



**Photo 1** – Managed land between The Pulpit and forest vegetation in the west.

The carriageway widths of the evacuation route varies between 7.5 – 10m which provides ample space for evacuating residents while emergency services crews work about their vehicles. This width and design complies with the performance requirements.

Whilst the adjoining vegetated areas do have the potential to carry fire the separation distances provided by the adjoining managed land will reduce potential radiant heat impacts to <6.21kW/m<sup>2</sup> at the road surface. This is within the life safety threshold given that people evacuating will have the radiant heat protection offered by their car over a short time period (refer Table 1 below).

**Table 1 – Radiant heat flux and effects on buildings and people for a modelled forest fire (FDI 100 on flat ground).**

Radiant Heat Flux	Likely Effects	Approx. Distances
2.1 kW/m <sup>2</sup>	Unprotected person will suffer pain after 1 minute exposure – non fatal.	140 metres
3 kW/m <sup>2</sup>	Hazardous conditions. Firefighters expected to operate for a short period (10 minutes)	100 metres
4.7 kW/m <sup>2</sup>	Extreme conditions. Firefighter in protective clothing will feel pain. (60 seconds exposure)	70 metres
7 kW/m <sup>2</sup>	Likely fatal to unprotected person after exposure for several minutes	55 metres
10 kW/m <sup>2</sup>	Critical conditions. Firefighters not expected to operate in these conditions although they may be encountered. Considered to be life threatening < 1 minute in protective equipment. Fabrics inside a building could ignite spontaneously with long exposures.	45 metres
12.5 kW/m <sup>2</sup>	Standard float glass could fail (BAL-12.5 construction) during the passage of a bush fire. Some timbers can ignite with prolonged exposure and with piloted ignition source (e.g. embers).	40 metres
19 kW/m <sup>2</sup>	Screened float glass could fail (BAL-19 construction) during the passage of a bush fire.	27 metres
29 kW/m <sup>2</sup>	Ignition of most timbers without piloted ignition (3 minutes exposure) (BAL-29 construction) during the passage of a bush fire. Toughened glass could fail.	20 metres
>29 – 40 kW/m <sup>2</sup>	<i>Potential flame contact and increased radiant heat and ember attack.</i>	15 - 20 metres
>40 – 110 kW/m <sup>2</sup>	<i>Significant higher likelihood of flame contact. Coupled with the radiant heat and increased ember attack is a significant risk to most structures and building materials.</i>	0 - 15 metres

**Note:** Assumes flame temperature of 1090K for all scenarios.

Attachment 2 provides the modelled results from the forest vegetation to the west of The Pulpit and to the north and south of Grangewood Avenue, based on the separations provided, the effective slope and maximum forest fuel loads of (25/35t/ha). The remainder of the evacuation route is surrounded by managed golf course lands.

Based on the modelled outputs which show radiant heat impacts of less than 6.21kW/m<sup>2</sup> impacting a relatively small proportion of the primary evacuation route, an alternative means of egressing the site in the event of a bushfire emergency is not required. However as depicted in the concept subdivision plan two (2) additional evacuation routes will be provided in the future via the adjoining land in the east.

As a result the planning proposal clearly complies with the requirements outlined in the planning document *Planning for Bushfire Protection 2006 (PBP)*.

Should you require further information, please do not hesitate to contact Nicole van Dorst or the undersigned on 4340 5331 or [info@traverseecology.com.au](mailto:info@traverseecology.com.au).

Yours faithfully



John Travers

BA Sc. / Ass Dip / Grad Dip / BPAD-Level 3-15195 (FPA)

Managing Director – **Travers bushfire & ecology**

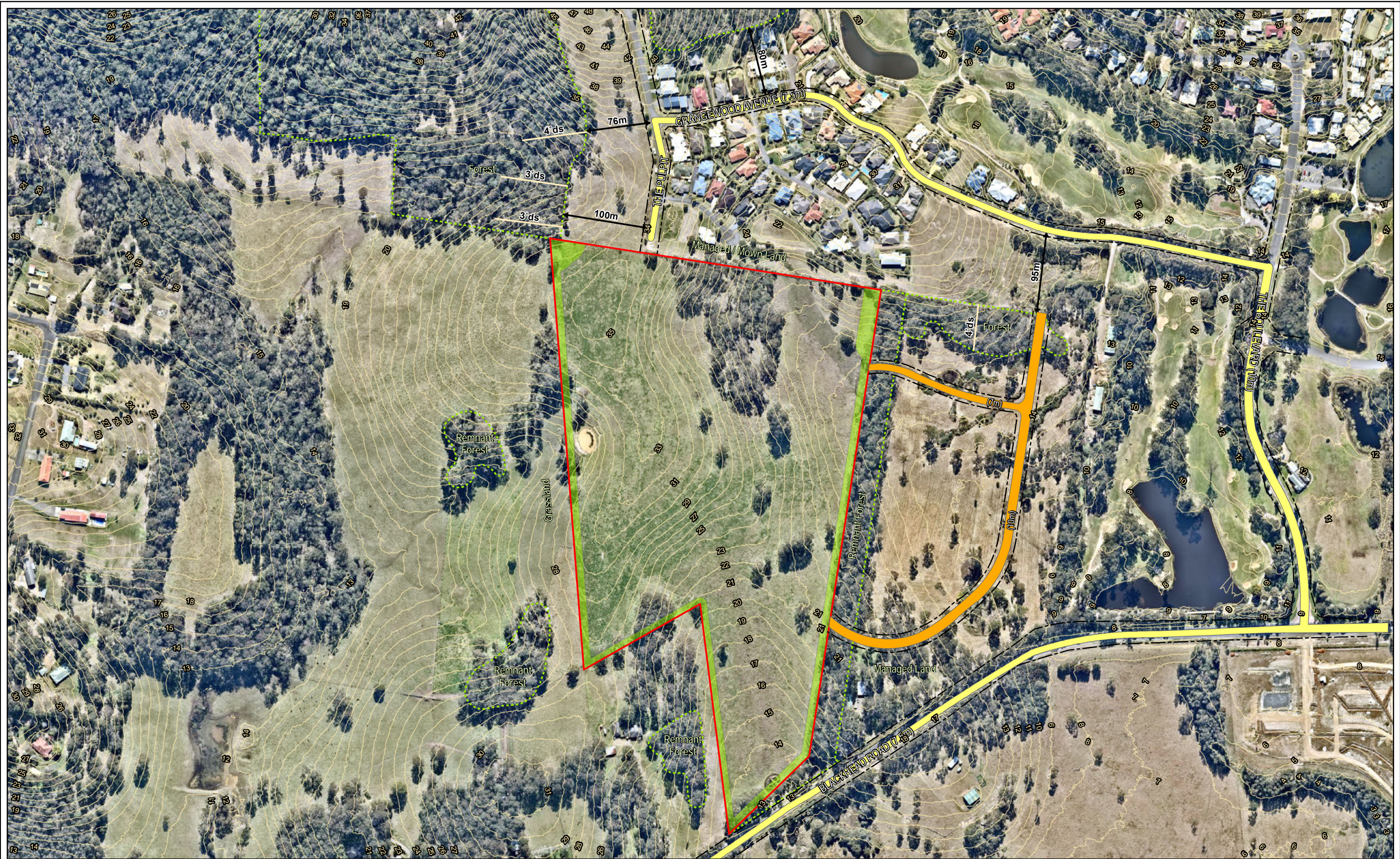
Attachment 1 – Schedule 2 - Evacuation Route

Attachment 2 – Modelled results



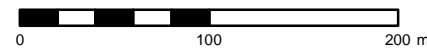
**Travers bushfire & ecology employs a  
Bushfire Planning and Design (BPAD) Accredited Practitioner**

John Travers and Nicole van Dorst are BPAD consultants. Both are certified by the Fire Protection Association. FPA Australia administers the Bushfire Planning and Design (BPAD) Accreditation Scheme. The Scheme accredits consultants who offer bushfire assessment, planning, design and advice services. It accredits practitioners who meet criteria based on specific accreditation and competency requirements, including a detailed knowledge of the relevant planning, development and building legislation for each State and Territory. Through the Accreditation Scheme, BPAD Accredited Practitioners are recognised by industry, regulators, fire agencies, end-users and the community as providers of professional bushfire assessment, planning, design and advice services. The Scheme provides an enhanced level of confidence for government and the community that practitioners are accredited by a suitably robust scheme that is administered by the peak national body for fire safety. Note: L3 is the highest level and L1 is the lowest level.



**Legend**

- Lot Boundary
- Road corridor (source: LPI)
- Contours (1m)
- Primary evacuation routes
- Asset Protection Zone
- Additional evacuation routes



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

PROJECT & MXD REFERENCE  
 Blackhead Road, Tallwoods  
 A16066\_BF002

DATE & ISSUE NUMBER  
 9/02/2017  
 Issue 1

SCALE & COORDINATE SYSTEM  
 1:4,000 @A3  
 GDA 1994 MGA Zone 56

TITLE  
**Schedule 2 - Primary Evacuation Route**



Aerial source: Nearmap

Document Path: N:\GIS\_STORAGE\N Drive\A16066\_BF002\BlackheadRd\_Tallwoods\MXD\A16066\_BF002.mxd



## Attachment 2 – Modelled Results

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### NBC Bushfire Attack Assessment Report V2.1

AS3959 (2009) Appendix B - Detailed Method 2

Printed: 20/01/2017 Assessment Date: 20/01/2017

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Site Street Address: 166 Blackhead Road, Hallidays Point  
 Assessor: Mr Admin; admin  
 Local Government Area: Greater Taree Alpine Area: No

#### Equations Used

Transmissivity: Fuss and Hammins, 2002  
 Flame Length: RFS PBP, 2001  
 Rate of Fire Spread: Noble et al., 1980  
 Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005  
 Peak Elevation of Receiver: Tan et al., 2005  
 Peak Flame Angle: Tan et al., 2005

---

Run Description: North - Grangewood Avenue

---

#### Vegetation Information

Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	0 Degrees	Vegetation Slope Type:	Level
Surface Fuel Load(t/ha):	25	Overall Fuel Load(t/ha):	35

---

#### Site Information

Site Slope	0 Degrees	Site Slope Type:	Level
Elevation of Receiver(m)	Default	APZ/Separation(m):	80

---

#### Fire Inputs

Veg./Flame Width(m):	100	Flame Temp(K)	1090
----------------------	-----	---------------	------

---

#### Calculation Parameters

Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg)	18600	Ambient Temp(K):	308
Moisture Factor:	5	FDI:	80

---

#### Program Outputs

Category of Attack:	LOW	Peak Elevation of Receiver(m):	9.68
Level of Construction:	BAL 12.5	Fire Intensity(kW/m):	43400
Radiant Heat(kW/m2):	4.51	Flame Angle (degrees):	78
Flame Length(m):	19.8	Maximum View Factor:	0.08
Rate Of Spread (km/h):	2.4	Inner Protection Area(m):	60
Transmissivity:	0.738	Outer Protection Area(m):	20

---

<b>Run Description:</b> South - Grangewood Avenue	
<b><u>Vegetation Information</u></b>	
<b>Vegetation Type:</b> Forest	<b>Vegetation Group:</b> Forest and Woodland
<b>Vegetation Slope:</b> 4 Degrees	<b>Vegetation Slope Type:</b> Downslope
<b>Surface Fuel Load(t/ha):</b> 25	<b>Overall Fuel Load(t/ha):</b> 35
<b><u>Site Information</u></b>	
<b>Site Slope:</b> 0 Degrees	<b>Site Slope Type:</b> Downslope
<b>Elevation of Receiver(m):</b> Default	<b>APZ/Separation(m):</b> 95
<b><u>Fire Inputs</u></b>	
<b>Veg./Flame Width(m):</b> 100	<b>Flame Temp(K):</b> 1090
<b><u>Calculation Parameters</u></b>	
<b>Flame Emissivity:</b> 95	<b>Relative Humidity(%):</b> 25
<b>Heat of Combustion(kJ/kg):</b> 18600	<b>Ambient Temp(K):</b> 308
<b>Moisture Factor:</b> 5	<b>FDI:</b> 80
<b><u>Program Outputs</u></b>	
<b>Category of Attack:</b> LOW	<b>Peak Elevation of Receiver(m):</b> 12.06
<b>Level of Construction:</b> BAL 12.5	<b>Fire Intensity(kW/m):</b> 57195
<b>Radiant Heat(kW/m2):</b> 4.18	<b>Flame Angle (degrees):</b> 77
<b>Flame Length(m):</b> 24.76	<b>Maximum View Factor:</b> 0.075
<b>Rate Of Spread (km/h):</b> 3.16	<b>Inner Protection Area(m):</b> 72
<b>Transmissivity:</b> 0.728	<b>Outer Protection Area(m):</b> 23
<b>Run Description:</b> West - The Pulpit	
<b><u>Vegetation Information</u></b>	
<b>Vegetation Type:</b> Forest	<b>Vegetation Group:</b> Forest and Woodland
<b>Vegetation Slope:</b> 4 Degrees	<b>Vegetation Slope Type:</b> Downslope
<b>Surface Fuel Load(t/ha):</b> 25	<b>Overall Fuel Load(t/ha):</b> 35
<b><u>Site Information</u></b>	
<b>Site Slope:</b> 0 Degrees	<b>Site Slope Type:</b> Downslope
<b>Elevation of Receiver(m):</b> Default	<b>APZ/Separation(m):</b> 76
<b><u>Fire Inputs</u></b>	
<b>Veg./Flame Width(m):</b> 100	<b>Flame Temp(K):</b> 1090
<b><u>Calculation Parameters</u></b>	
<b>Flame Emissivity:</b> 95	<b>Relative Humidity(%):</b> 25
<b>Heat of Combustion(kJ/kg):</b> 18600	<b>Ambient Temp(K):</b> 308
<b>Moisture Factor:</b> 5	<b>FDI:</b> 80
<b><u>Program Outputs</u></b>	
<b>Category of Attack:</b> LOW	<b>Peak Elevation of Receiver(m):</b> 11.96
<b>Level of Construction:</b> BAL 12.5	<b>Fire Intensity(kW/m):</b> 57195
<b>Radiant Heat(kW/m2):</b> 6.21	<b>Flame Angle (degrees):</b> 75
<b>Flame Length(m):</b> 24.76	<b>Maximum View Factor:</b> 0.11
<b>Rate Of Spread (km/h):</b> 3.16	<b>Inner Protection Area(m):</b> 56
<b>Transmissivity:</b> 0.742	<b>Outer Protection Area(m):</b> 20

## ***Attachment D – Cultural Heritage Assessment***



# Myall Coast Archaeological Services

"Tall Pines" Phone: 49971011 Mobile: 0403071922  
Tea Gardens. 2324 Email: [archaeology@myallcoast.net.au](mailto:archaeology@myallcoast.net.au) ACN: 002 992 430

## Aboriginal Heritage Assessment

**Lot 612 DP 1160096,  
Blackhead Road, Hallidays Point,**



**Report to  
Coastplan  
Tuncurry, NSW  
23rd, October 2016**

*By Len Roberts B.A. (Arch/Hist); Grad. Dip. Comp; Dip. Sp. Ed.  
In conjunction with Forster Local Aboriginal Land Council*

**Myall Coast Archaeological Services**  
(“Tall Pines”, Tea Gardens. 2324 Ph: 49 971011)

# **Aboriginal Heritage Assessment**

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<b>C. Management Plan</b>	

## 1. Introduction

### 1.1 Background

This report has been prepared at the request of Coastplan, Tuncurry, NSW, to assess the possible impact a proposed rezoning may have on Aboriginal Cultural Heritage at Lot 612 DP 1160096, Blackhead Road, Hallidays Point by:

1. Identifying whether or not Aboriginal objects are, or are likely to be, present in an area;
2. Determining whether or not their activities are likely to harm Aboriginal objects (if present); and
3. Determining whether an Aboriginal heritage Impact Permit (AHIP) application is required.

The development proposal is being assessed as a Planning Proposal under the Environmental Planning and Assessment Act (EP&A).

Although this assessment deals with a particular parcel of land in particular, a wider study area was considered. This is necessary as any Aboriginal heritage management options need to be addressed in context of the wider landscape. Similarly any assessment of Aboriginal archaeology and heritage cannot be undertaken over individual pockets of land but potential impacts of the proposal on Aboriginal heritage of the entire project must be assessed in a local and regional context.

There is no specific proposal per se being considered under this assessment as the results of the assessment will help determine the final layout of the proposal. However, an indicative concept outlines the potential development footprint.

The key objective of the planning proposal is to extend the residential area of the Tallwoods Village. This site provides a more gentle sloping landscape than that provided elsewhere in the village and will enable a more conventional residential development. In addition, parts of the site with ecological values (containing Freshwater Wetlands Endangered Ecological Communities (EEC)) will be protected within an Environmental Management (E3) zone.

Figure 1 illustrates the regional location of the study area; Figure 2 shows the study area in a local context and Figure 3 the study area.

References in this document to the “study area” refer to that parcel of land which will be impacted by the proposal.



Figure 1 Regional Location

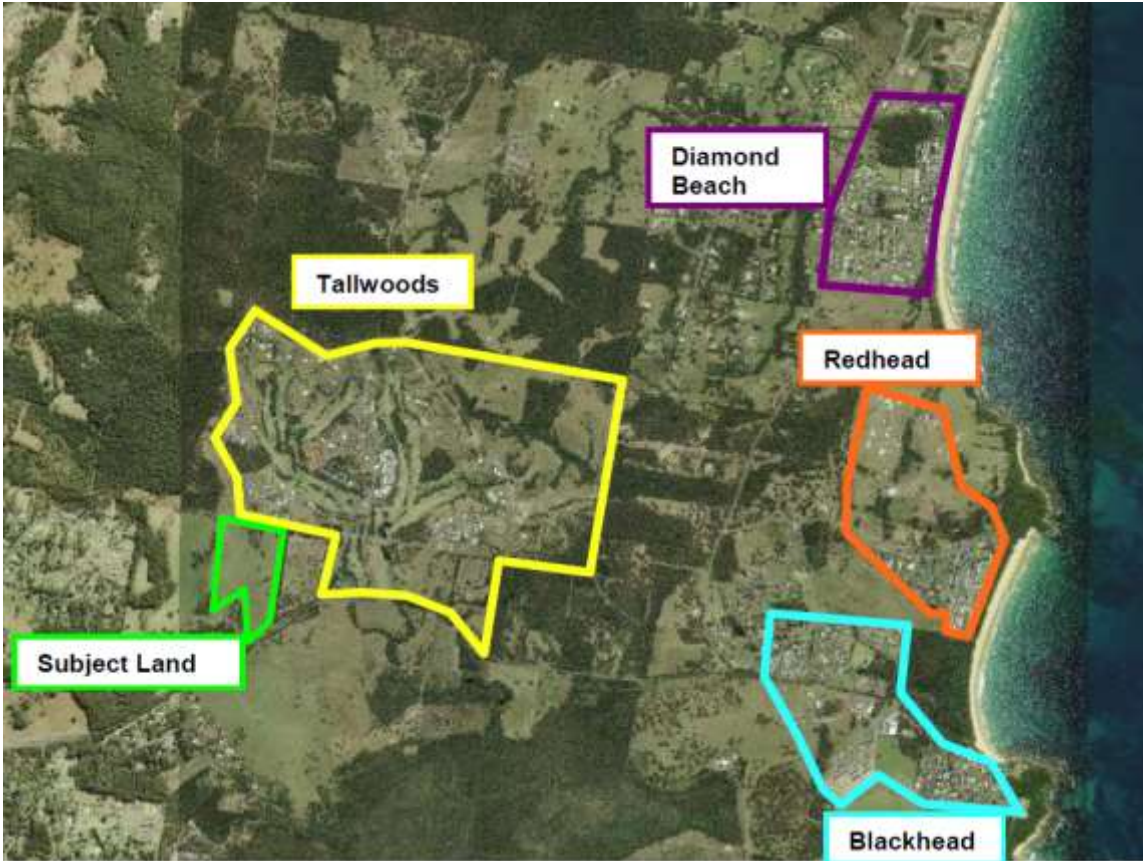


Figure 2 Local context



Figure 3 Study Area

## 1.2 Legislative Context

Under Section 52 Aboriginal Land Rights Act 1983, Local Aboriginal Land Council has the following functions in relation to Aboriginal culture and heritage:

- (a) to take action to protect the culture and heritage of Aboriginal persons in the Council's area, subject to any other law,
- (b) to promote awareness in the community of the culture and heritage of Aboriginal persons in the Council's area.

The primary law which affects the above functions of a land Council is The *National Parks and Wildlife Act 1974*, (NPW Act) administered by the Office of Environment and Heritage (OEH). It has as one of its Objects, the conservation of objects, places and features of significance to Aboriginal people. That is once an object, place or feature is determined to be significant to Aboriginal people it becomes protected by the NPW Act. Section 85 of that Act, vests authority in the Chief Executive to be responsible for; the proper care, preservation and protection of any Aboriginal objects, features and places. It is not the role of a land council to "care" for the object but the Chief Executive of OEH.

'*Aboriginal object* means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.'

Under section 86 of the NPW Act, it is an offence to 'harm' an Aboriginal object. 'Harm' means any act or omission that:

- Destroys, defaces, damages or desecrates the object
- Moves the object from the land on which it had been situated, or
- Causes or permits the object to be harmed.



However under Section 87 there are certain defences and exemptions that permit harm.

The NPW Act provides several defences to prosecution for an offence. Where a person either knows or does not know they are harming an Aboriginal object, a person has a defence under section 87 where:

- The harm or desecration concerned was authorised by an Aboriginal heritage impact permit (AHIP), and the conditions to which that Aboriginal heritage impact permit was subject were not contravened.
- Due diligence was undertaken and it was reasonably determined that no Aboriginal object would be harmed.
- Was work on land that has been disturbed for maintenance of existing roads, fire and other trails and tracks, maintenance of existing utilities and other similar services
- Land is disturbed if it has been the subject of human activity that has changed the land's surface, being changes that remain clear and observable.

Harm does not include something that is trivial or negligible.

It is section 87 that overrides the function of a Land Council to protect Aboriginal Culture and heritage.

However, before the power to take “proper care” of an Aboriginal Object by the Chief Executive of OEH, the object must first be determined that it is significant to Aboriginal people.

Such determination can only be made by Aboriginal people and ipso facto by its legislated function; an Aboriginal Land Council.

The regulations under the NPW Act set out a generic *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*, as well as, a *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* to assess the significance and extent of archaeological evidence in order to apply for an AHIP.

The regulated code links to other planning processes under the EP&A Act and the applicable section in the code referring to the EP&A Act is as follows:

#### **4.1 Development under Part 4 EP&A Act and activities under Part 5 EP&A Act**

*Consideration of the potential impacts of development on Aboriginal heritage is a key part of the environmental impact assessment process under the Environmental Planning and Assessment Act 1979 (EP&A Act). The standards in this code can be used or adapted by proponents to inform the initial assessment of the environmental impacts of an activity on Aboriginal heritage. An environmental impact assessment which meets all of the requirements of this code will satisfy the due diligence test. Alternatively, you could adapt the requirements of this code, provided it still meets the ordinary meaning of exercising due diligence (see section 7.7).*

*If it is found through this initial assessment process that Aboriginal objects will or are likely to be harmed, then further investigation and impact assessment will be required to prepare information about the types of objects and the nature of the harm. This is further explained at step 5 in section 8. If you are going to harm a known Aboriginal object you will need to apply for an AHIP. In this situation, the need to obtain the AHIP is in addition to any approval under the EP&A Act (unless the project is subject to Part 3A EP&A Act).*

As the proposal is a planning proposal, Section 117(2) Direction 2.3 of the Environmental Planning and Assessment Act 1979, must be considered, namely;

*“A planning proposal must contain provisions that facilitate the conservation of: (a) items, places, buildings, works, relics, moveable objects or precincts of environmental heritage significance to an area, in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item, area, object or place, identified in a study of the environmental heritage of the area, (b) Aboriginal objects or Aboriginal places that are protected under the National Parks and Wildlife Act 1974, and (c) Aboriginal areas, Aboriginal objects, Aboriginal places or landscapes identified by an Aboriginal heritage survey prepared by or on behalf of an Aboriginal Land Council, Aboriginal body or public authority and provided to the relevant planning authority, which identifies the area, object, place or landscape as being of heritage significance to Aboriginal culture and people.”*

Whilst Due diligence is a legislated defence if one harms an Aboriginal Object, an assessment under the generic Due diligence code does not meet the requirements for assessment under the EP and A Act for planning proposals. A fuller assessment is required that assesses and considers Aboriginal cultural heritage values. However, such an archaeological and cultural heritage assessment is part of the legislated Due Diligence process.

The determination of significance is a matter for Aboriginal people and not a Government Department or authority.

Consent authorities must consult with an Aboriginal Land Council with respect to determining significance. Referral to OEH is only triggered if an Aboriginal Object is likely to be harmed and an AHIP is required. There may be specific planning proposal requirement to refer the assessment to OEH. However such requirement could be seen as ultra vires.

## 2.0 Assessment Process

According to OEH regulated codes, (Archaeological Code of Practice and Due Diligence Code of Practice for protection of Aboriginal Objects in NSW) the objective of any archaeological investigation (where necessary) is to learn about past human societies through the study of material remains and historical, oral and environmental sources. Archaeological investigations locate, identify and study Aboriginal objects, archaeological deposits and potential archaeological deposits, and historical, oral and environmental sources to provide an assessment of the archaeological significance of the objects and the subject area.

In order to fulfil this objective the following steps need to be undertaken:

- Clearly describe the aims of the project. The rationale for the archaeological assessment must be clearly defined through these aims.
- Present a feasible and appropriate methodology for the archaeological survey and other investigations to ensure that work can be clearly linked to these aims.
- Present the findings and interpretation of the results within a wider context of archaeological knowledge and Aboriginal history.
- Ensure that the findings and interpretation of the results support the assessment of the archaeological significance of the subject area.

The purpose of the Code and Guidelines is to assist individuals and organisations to exercise due diligence when determining whether or not to obtain a permit to harm Aboriginal objects. The National Parks and Wildlife Act 1974 (NPW Act) provides that a person who exercises due diligence in determining that their actions would not harm Aboriginal objects has a defence against prosecution if they later harm an object without an Aboriginal heritage impact permit.

The Codes set out the reasonable and practicable steps which individuals and organisations can take to:

1. identify whether or not Aboriginal objects are present in an area
2. consider whether or not their activities are likely to harm Aboriginal objects (if present)
3. make a reasonable determination as to whether an Aboriginal heritage impact permit is required

The aim of this assessment is to identify the Aboriginal heritage and archaeological values of the proposed study area in particular and the landscape area in totality and the potential impacts on those values as a result of the proposal. Rather than only attempting to identify individual sites across the study area, the assessment also takes a landscaped approach to determine any potential Aboriginal archaeological evidence. This will require the identification of the range of landscape units, which are likely to contain Aboriginal archaeological evidence. This will ensure that the landscape context is assessed for significance. The landscape approach as well as previous archaeological work in the area will determine a predictive model of Aboriginal occupation of the study area.

This will be achieved through Aboriginal stakeholder consultation, surveys and literature.

This assessment also provides recommendations on the management and mitigation of impacts on known and unknown (uncovered through post approval work) heritage and values that may be potentially impacted by the proposal.

## **2.1 Assessment Personnel**

The research, visual assessment and report were undertaken by Len Roberts, (BA [Arch.], Grad. Dip. Comp., Dip Sp. Ed.,) who also holds a certificate in Archaeological fieldwork, from Tel Aviv University, Israel. Len has worked on archaeological projects in Australia and overseas. Len is a member (since 1990) and was Deputy Chairperson (2007 -2011) of Karuah Local Aboriginal Land Council and currently Hon. CEO. He was appointed, in 1977, (under S32AV of the Local government Act 1919) as a part time, non- judicial expert (having, special knowledge of and experience in law, local government administration or town planning administration) member of the Local Government Appeals Tribunal from 1977 until it was replaced by the Land and Environment Court in 1980. He has been an expert witness before the Land and Environment court on Aboriginal heritage matters. Len has also taught English and Society (Australiana) at Beifang University, Yinchuan, China as an invited lecturer in second semester 2011.

Len has undertaken archaeological work for various planning and surveying companies, as well as large organizations such as AMP, Department of Public Works, RTA, Local Government Authorities, Energy Australia, Australian Rail and Track Corporation, Rio Tinto, Woolworths and numerous other clients. The projects have ranged from small aquaculture (at sea), industrial and residential projects to large rezoning proposals, as well as linear surveys for sewerage treatment upgrades, pipelines, transmission lines, wind farms, rail line upgrades and highways.

The assessments have included Due Diligence assessments, gateway determinations, as well as assessments under, Parts 3A, 4 and 5 of the EP & A Act

Len has completed various S90 applications, as well as identifying and recording in excess of 1,000 Aboriginal objects and has authored in excess of 120 reports in the last 15 years.

The visual inspection component of this assessment was undertaken on 23/9/2016 by this archaeologist in conjunction with Robert Yettica of Forster LALC.

## **2.2 Aboriginal Community Consultation**

In accordance with the Office of Environment and Heritage (OEH) requirements Aboriginal community consultation was undertaken to advise, consult and oversee the Aboriginal Cultural Heritage Assessment for the project.

For this assessment, the OEH Consultation Guidelines (2010) were followed. The consultation information and correspondence is annexed at Appendix A. It must be noted that despite emails and letters sent out to likely stakeholders only the Forster Land Council responded.

In summary the following occurred:

- An advertisement was placed in the Great Lakes Advocate which covers the study area on the 6/4/2016 (p.35).
- Letters written to Aboriginal people and organisations identified through agency response seeking an expression of interest in the project.
- Forster LALC, responded and was registered as a stakeholder for the project.
- Several further attempts and additional time were made to obtain additional stakeholders but no response was received. This was probably because the area in question was not necessarily an area of interest and secondly and perhaps more importantly, a good relationship exists between the various family groupings and the Land Council and the families are content for the Land Council to manage the cultural heritage matters.

- Initial meeting held with the LALC to explain the project and seek information about the area.
- Visual inspection of the study area was conducted with Robert Yettica of the FLALC
- It was agreed that a combined single report from FLALC and MCAS would be written.

### 2.3 Assessment Methodology

Various models have been proposed by archaeologists to explain Aboriginal occupation and use of the landscape environments in NSW.

The predictive or contextual model for the archaeological assessment of the site forms the basis for developing a picture of Aboriginal occupation.

The assessment of the data enables a prediction of what form of Aboriginal occupation was likely to have existed on the study area and would show the potential for finding Aboriginal Sites. A field survey is then able to evaluate the prediction and to extrapolate reasons as to why the survey did or did not match the prediction.

The study methodology was based on data research, field survey of the site and report compilation. The analysis and assessment of the study area's archaeological potential and the impact of the proposal required the completion of the following;

- Research

This involved a review of primary and secondary sources including written material, maps, plans, AHIMS database and other reports as outlined in the reference section (10) of this report.

- Predictive modelling;

This involved an analysis of the research to produce a model of possible archaeological deposits within the study area. In order to conduct the analysis of the research material in an effective and consistent manner the following aspects were examined:

1. Aboriginal heritage values
2. Archaeological record
3. Previous Studies
4. Landscape
5. Soils
6. Geological Features
7. Past land use

- Visual Inspection

This involved the "ground truthing" of the above research with the study area's potential to reveal/conceal archaeological evidence. The visual inspection was generally conducted in accordance with the Archaeological Code of Practice, even though the Code is specifically used to undertake test excavations and to apply for an AHIP. The details of the visual inspection are contained within section 4 of this report.

To ensure compliance under the S117 direction, it is proposed to undertake a 6 steps process:

### *STEP 1 Preliminary assessment*

The main purpose of a preliminary assessment is to identify whether there are Aboriginal cultural heritage values associated with the subject site.

This study will use the OEH Due Diligence process for the preliminary assessment. The due diligence process is a standardised process which enables transparency and can be used for all activities across all environments.

### *STEP 2 Information Requirements*

Aboriginal heritage assessment requires a “multi-value” approach which includes a range of methods to satisfy data/information/reporting needs. The information required for understanding Cultural Landscape includes a range of data sets detailing the physical setting (landscape); the history of the peoples living on that land (documentation from archival and oral sources, as well archaeological information)

### *STEP 3 Integration of information and identification of heritage values*

The synthesis and integration of the information collected will provide the description of the Cultural Landscape to provide the basis for identifying the range of heritage values present. It will also provide the basis for development of criteria to clearly support the identification of areas/places/landscapes/features and sites of high heritage value to be considered as candidates for conservation/protection and/or the consideration of suitable off-set strategies eg community enhancement projects. This assessment will then also support the decisions regarding which areas/places/landscapes/features and sites will be impacted and any appropriate short and long-term mitigation requirements.

### *STEP 4 Information regarding the proposed development*

This step will identify the nature and extent of the development and impacts on the Aboriginal heritage values across the development area. The extent of impact will include both direct and indirect impacts and their effect on Aboriginal heritage needs to be quantified to ensure that appropriate management in the context of the assessed values can be determined. Indirect impacts may affect sites or features located immediately beyond the development area or within the development area.

### *STEP 5 Integration of assessment with proposed development*

This involves using the above information as the basis for assessing the cultural values against the impacts from any proposed development to identify specific outcomes.

This will include consideration of the following:

- justification for any likely impact(s), including any alternatives considered for the proposal;
- Any measures which will be implemented to avoid, mitigate or offset the likely impact(s).
- Demonstration that the input by affected Aboriginal communities has been considered when determining and assessing impacts, developing options, and making final recommendations to ensure that Aboriginal cultural heritage outcomes can be met by the proposed development.

### *STEP 6 Management strategy for Aboriginal heritage*

This section will set out the specific management outcomes arising from the above assessment stages agreed to by the developer for management of the Aboriginal heritage values. This is to include identification of the final development impacts and the places, sites and landscape areas to be avoided and protected or conserved.

It is also to include, the nature of and location of any offsets, requirements for further work such as, archaeological salvage or community collection for objects of high archaeological or community value; specific on-going management protocols for both physical conservation outcomes and specific Aboriginal community requirements. This would include a contingency plan that details the measures to be taken in the event that Aboriginal objects of significance or a nature not anticipated, such as burials or ceremonial items are discovered during the course of works on the development site.

### 3.0 Step 1 Preliminary Assessment

The preliminary assessment follows the numerical sequencing and headings of the OEH Due Diligence Code.

#### **3.1 Description of Land and Activity**

The study area can generally be described as Lot 612 DP 1160096, Blackhead Road, Hallidays Point. The site is located on Blackhead Road, approximately 4.2km west of Halliday's Point. It occurs directly south of the western section of the Tallwoods Village, a larger developing residential estate (approximately 150ha) which comprises a golf course and club encircled by Tallwoods estate.

Blackhead Rd serves as the southern border to the site.

The land has been used for various rural pursuits such as grazing and timber getting. It is well cultivated and pasture improved land. There is limited tree coverage. It is some 17ha in size and currently zoned for primary production.

The proposed activity is to subdivide the land into approximately 114 residential lots with associated infrastructure and environmental buffers.

Land disturbance will occur through block formation through cutting and filling, road construction and once subdivided; housing construction. Figure 5 following is a topographical representation of the study area (site)



Figure 5 Study area in topographical context

#### **3.2 Is the Land defined as “Disturbed Land” or an exempt or complying development?**

Whilst the NPW Act defines disturbed land as:

*“Land that has been previously subjected to any activity that has resulted in clear and observable changes to the land’s surface. Examples include: **soil that has been ploughed**; urban development*



*that has occurred; existing rural infrastructure such as dams and fences; existing roads, trails and walking tracks; and other existing infrastructure such as pipelines, transmission lines and stormwater drainage.”*

Whilst the definition, includes ploughed land as an example of disturbed land, cultivation, with the associated stick raking and stone gathering, tended to destroy surface evidence. However cultivation and pastoral land use, also helped preserve the archaeological record. In some cases cultivation would expose evidence in others, cover the evidence.

If the definition was to be taken literally and rule out all ploughed land, then planning proposals for farm land would not require assessment.

It would appear that disturbed land that is associated with farming activities, is there as a defence to continue with routine agricultural activities. That is, the disturbance of the land will not be greater than what has already occurred.

Under a planning proposal, Aboriginal heritage values need to be assessed and not merely as a defence against harming an object through continuing activity. As such, disturbed land in a planning proposal context, would constitute a land profile that has been clearly altered through construction, or substantial earthworks, rather than simply having been ploughed. Ploughing may destroy context whereas, construction tends to obliterate.

In this assessment whilst extensive cultivation has occurred, as the land profile has not been altered (except for dams and fencing etc.); it is assumed as non-disturbed.

Thus as this assessment is for a planning proposal, the greater proportion of the study area cannot be classified as disturbed in that *there have not been clear and observable changes to the land surface*. However, whilst there are no clear and observable changes to the landform, the soil profile/horizons have been modified and disturbed through pasture preparation and production.

### **3.3 Is the activity exempt?**

No

### **3.4 Will the activity involve harm that is trivial or negligible?**

No

### **3.5 Is the activity in an Aboriginal Place or are you already aware of Aboriginal objects on the land?**

No

### **3.6 Is the activity a low impact activity for which there is a defence in the regulation?**

No

### **3.7 Will the activity disturb the ground surface?**

Not the proposal per se as the clearing, infrastructure works and erection of buildings for the proposal will occur at the subdivision and residential construction stages post rezoning.

### **3.8 Does the Aboriginal Heritage Information Management System suggest potential?**

No.

**3.9 Is there archaeological potential because the proposal is:**

- **within 200m of waters;**  
No.
- **located within a sand dune;**  
No.
- **located on a ridge top, ridge line, or headland;**  
No. The higher area could not be described as a ridge top or ridgeline.
- **located within 200m below or above a cliff face;**  
No
- **within 20m of or in a cave, rock shelter, or a cave mouth;**  
No

**3.10 Can harm be avoided to the object or disturbance of the landscape feature?**

Yes.

**3.11 Is Desktop assessment and visual inspection required?**

Yes. Desktop assessment and visual inspection forms sections 4.0 and 5.0 (Step 2)

**3.12 Are further investigations and impact assessment required?**

NO.

## 4.0 STEP 2A Information Requirements (desktop study)

An understanding of environmental factors within the local landscape provides a context for analysing past human occupation and history of an area. The analysis of environmental factors contributes to the development of the predictive modelling of archaeological sites, as well as providing a basis to contextualise the archaeological material and to interpret patterns of past human behaviour.

In particular, the nature of the local landscape including topography, geology, soils, hydrology and vegetation are factors which affect patterns of past human occupation.

Aboriginal occupation of the landscape and land use practices changed over time. Landuse has the potential to affect the visibility of archaeological material; they may obscure, or expose archaeological sites. In addition, previous disturbances may have exposed archaeological material, such as excavation for dams or other ground disturbing works. It is important that such factors are also considered when making assessments of archaeological resources in an area and understanding the distribution of observed sites.

Whilst this report is primarily focussed on the archaeological aspects of Aboriginal heritage, it is important to acknowledge and assess the importance of Aboriginal cultural context regarding places and landscapes.

### 4.1 Aboriginal Cultural Context

The estimated minimum viable population of about five hundred was the average size of a so-called tribe in Australia. Several anthropologists feel that 'tribe' does not accurately reflect the interaction and make-up of Aboriginal Australia, preferring the term 'band' to be the most appropriate term to describe the basic social and economic unit of Aboriginal society. It is described as a small-scale population, comprising between 2 to 6 extended family units, who together occupied and exploited a specific area.

The band was by no means a social or cultural isolate but, rather, interacted with other bands in a variety of ways. Typically these interactions involved visits, marriage, ceremonies and trade. As a result of these interactions, clusters of bands were formed; wherein there was a sense of collective identity, often expressed in terms of common and distinctive language.

In recent times the territories of Aboriginal bands generally encompassed the drainage basin of one river and stretched from the shoreline up to the top of an escarpment, another river or prominent landform feature.

The bands developed into regional groupings or cultural areas of interacting Aboriginal societies possessing broadly similar languages, social organisation and customs, material culture and art styles, ways of life and environment. According to the work by Peterson (1986), there is a general correlation between culture areas and major drainage basins, which has been explained on the grounds that a drainage basin is unified by its river system and bounded by its catchment. Water supply determines plant cover and therefore the availability of food and consequently, Aboriginal population density.

According to Horton (1994) Fig 6, the Band that would be of interest to this survey, would be the family groupings of the Biripi who occupied the Mid North Coast around the Manning Valley. Their neighbours to the south are the Worimi to the north, the Dainggatti and to the west, the Kamilaroi.

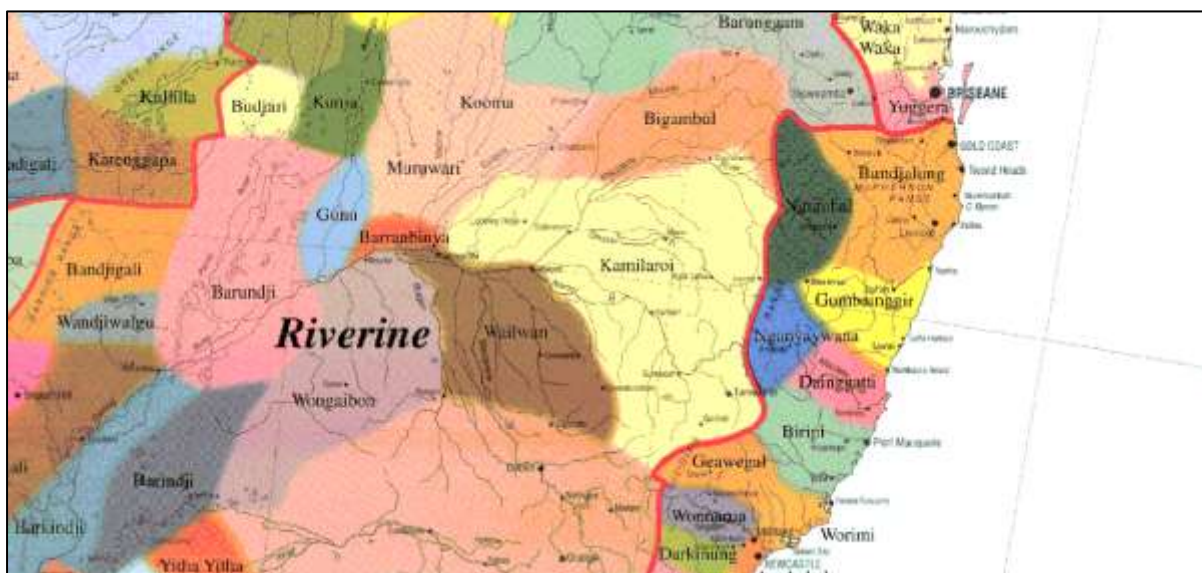


Figure 6 Horton's Map of Aboriginal Territorial Organisation

The Biripi comprised several distinct but interrelated groupings of people, each associated with a separate geographical area. In 1818, Oxley (1820:342-343) noted a large Aboriginal population in the Manning - Great Lakes region, attributing this to the favourable environment.

The earliest inhabitants were hunters and gatherers living off the abundant wildlife. The varied environment - terrestrial, rivers and estuaries, sand dunes and mountains provided a diet of oysters, fish, turtles, kangaroos, wallabies, possums, pigeons, bats, wild fruits and roots.

Trees were an important resource. In addition to providing the raw materials needed to produce products that were utilised in everyday life, trees also provided access to the birds and animals that made use of them. Tree climbing using steps gouged by hatchets, allowed aborigines to access a variety of foodstuffs including wild honey, possums, flying foxes koalas and bird eggs.

There is an assumption that prior to European settlement the land was heavily forested. However, according to early settler's accounts and the Aboriginal oral history, this was not so as regular, light burning was the pattern all over Australia at the time of first European contact. The fires were of low intensity, which meant that they consumed the litter of leaves and branches on the forest floors but did not burn down the trees. Walsh, (p26), cites extracts from the accounts of early explorers,

*"The extracts from letters, diaries and journals of early European settlers, explorers and government officials describe a parklike landscape of grasslands and grassed open forest lands with very few areas of thick forest. The cessation of regular burning following European settlement allowed a growth of thick forest of young trees that, together with an increasing understorey, choked out the grasses."*

Other uses of fire were for longer term hunting strategies. After firing, the Bush would regenerate; new grass would spring up and attract kangaroos and other animals, on which the hunters could prey. Likewise, fire encouraged the regrowth of eucalyptus trees and of edible plant roots. The ashes acted like manure, and sweet, new green shoots would spring up after the first hard rain following the burn.

The term 'fire-stick farming' has been applied to this aspect of hunting. Aborigines never put out their fires. Campfires were left burning, as were signal fires, including those lit in a sequence to indicate the direction of travel of humans or game.

The food resources available controlled the Aboriginal population, which in turn were related to water resources: the areas with the highest rainfall were generally richest in food. When food was difficult to obtain, the food quest simply required more time and effort rather than new strategies. Thus when times were hard, the people could simply move more often and further afield.

The typical Australian Bands economy is flexible with a wide variety of foods being sought and advantages being taken of seasonal abundance or chance events, such as the stranding of a whale. Aboriginal Australia was not vulnerable to famine through the failure of one crop.

The simplicity and self-sufficiency of Aboriginal society was observed by Captain Cook in 1770, and cited in Beaglehole, 1955 (p.399).

*"From what I have said of the natives of New Holland they may appear to some to be the most wretched people on earth, but in reality they are far more happier than we Europeans. They live in a tranquillity which is not disturbed by the inequality of condition: the air and sea of their own accord furnishes them with all things necessary for life, they covet not magnificent houses, household stuff etc., they lie in a warm and fine climate and enjoy a very wholesome air, so that they have very little need of clothing and this may seem to be fully sensible of, for many to whom we gave cloth etc. to, left it carelessly upon the sea beach and in the Woods as a thing they had no matter of use for. In short they seemed to set no value upon any thing we gave them, nor would they ever part with anything of their own for any one article we could offer them; this in my opinion argues that they think themselves provided with all the necessary's of life and that they have no superfluities."*

The above comment is probably the first recorded by a European with respect to Aboriginal society and culture. It sets the background or the context in which to assess the cultural significance of an area. From a first contact European perspective it appears that items of value were carried and kept whereas, items of little value discarded. Permanent dwellings were of no interest, nor European belongings. They were not wretched but happy and content. The environment and landscape provided for their needs.

According to the Aboriginal knowledge holders, many of the artefacts found across the landscape today were generally discards and of little importance, yet they are protected by law, whilst the real value which lies in the landscape and the sense of place ,which provided "all the necessary's of life," is not.

It is important in assessing the cultural significance of a place that one does not focus on the discards but on the connection to land. Whilst all land and all objects are significant to the Aboriginal community as they tell a story of place; past and present, not all objects are seen as "valuable". According to the Aboriginal knowledge holders, stone flakes (for instance) in Aboriginal society are superfluous but grinding grooves, hearths, rock shelters, carved trees and ceremonial grounds indicate a sense of connection to the past and present and valued. Cultural assessment should be seen in the context of "home" not through the nebulous value of stone discards that are generally found at the lowest point in a landscape and from not whence they originated.

By 1850 most of the coastal plain had been appropriated by Europeans and traditional social and land-use systems were severely affected. Deprived of their economic base, the Kattang speakers were forced to depend on handouts of food and blankets, many becoming fringe-dwellers on the edges of European settlements. By 1877 only 50 members of the Forster-Tuncurry bands are believed to have survived most living in bark huts on the site now occupied by the Tuncurry Public School (Holman 1954). A number of other campsites, possibly used prior to European intrusion, have

been reported in the Nabitac area, including one beside the Wallamba River near the Glen Ora ceremonial ground (Gilbert 1954b:10).

#### 4.2 Archaeological Record

Historical references indicate that the Blackhead area was used for ceremonial gatherings, and 4 Keepara (ceremonial) grounds (AHIMS #38-3-0010, 38-3-0007, 38-3-0223, 38-3-0231) and ceremonial tree, south of Blackhead.

The AHIMS database search area places the study area in a very broad archaeological context in which to assess archaeological potential. These individual sites may contain 1 or many artefacts. The search results of the Aboriginal Heritage Management System are found at Appendix B.

The majority of objects were located during specific cultural assessments and tend to skew results to only that land which has been investigated. However patterns of Aboriginal land use can be postulated from that information.



Figure 7 AHIMS Search Area as provided by AHIMS

- The two objects are a midden/artefact (38-2-0106) and artefact (38-3-0278)

An examination of the location of the landscape context of the artefacts reveals that they are generally associated with a water or food source. The artefact scatters tend to be found on elevated ground above swamplands and marsh along the creeks and estuaries. The middens tend to be located close to the ocean often along the fore dunes, but also in association with freshwater resources. Although the recorded objects are correlated with surveys, it is in all likelihood indicative of the paucity of evidence within the study area.

### 4.3 Previous Studies

Locally, several archaeological surveys have been conducted, that are of interest to this study. The Aboriginal Objects identified at Figure 9 were observed during those surveys and discussed below.

In 2007, Wheeler surveyed a 17.61 hectare section of 210 Diamond Beach Road, Diamond Beach, Lot 6, DP 598522. Archaeological evidence was re-recorded from a survey conducted by Leon & Yettica (for Forster Local Aboriginal Land Council) in 1998.

**Relevance:**

*The study area forms part of the wider landscape where artefacts were found and suggests that the study area would have been used in a transitory or resource way.*

A survey was conducted by Bonhomme (1988) on a 840 hectare land parcel extending from the coast west to The Lakes Way, and north from Tuncurry Cemetery to the vicinity of Halidays Point.

Bonhomme's survey area encompassed much of the Tuncurry barrier. Frontal dune exposures and access tracks further inland were searched for archaeological evidence, although no indication is given as to what proportion of the land was directly sampled. The survey resulted in the recording of three middens, two of which (#38-2-025 and -026) were situated near the elevated inland rim of the strand plain.

In 2001, Collins surveyed a pipeline route that traversed the strand plain between Tuncurry and the Halidays Point Sewage Treatment Plant. The #38-2-026 midden previously registered by Bonhomme (1988) was the only site detected.

**Relevance:**

*Whilst a differing landscape the study area forms part of the wider occupation area and suggests that the study area would have been used in a transitory or resource way*

In 2003, Roberts, conducted a survey at Lot 5, Blackhead Road, Hallidays Point, 1km east of the study area. No artefacts were observed or potential for subsurface deposits

**Relevance:**

*The study area has similar landform.*

In 2004 Leon, *et alia* conducted a survey on 2 lots just north of the study area at Rainbow flat. The land was adjacent to the ridgeline. 10 isolated artefacts were recorded.

**Relevance:**

*The study area is a gentle slope overlooking estuarine lowland and artefacts were found upon the ridgeline to the north. There is potential for the low lying areas to be a repository for artefacts carried down from higher areas. However, unless there is a natural repository within the study area, it is more likely that the artefacts would be carried down to Frogilla swamp some 1km further down slope.*

In 2011, a report to Lidbury Summers and Whiteman, of a large area assessment at 210 Diamond Beach Road, Diamond Beach. This was a continuation of the earlier work by Wheeler in 2007. Two additional incidences of Aboriginal cultural material evidence were detected during the study. A rounded river pebble with pitting marking on two surfaces was located within a drainage line sourced from a constructed dam in the southern section of the study area. A red, chert flake with reworking on the lateral margins and platform was recorded from the far south east corner of the study area. The report also indicated that some potential also remains for archaeological materials (particularly middens) to outside the study area on the eastern perimeters of the subject lands.

**Relevance:**

*The study area forms part of the wider landscape where artefacts were found and suggests that the study area would have been used in a transitory or resource way.*

On a state wide basis, several studies have been undertaken which have proven to be definitive works for understanding the correlation of landscape and archaeological potential.

- **Importance of wetlands**

Archaeological investigations by Kuskie (1994), Ruig (1995) and Effenberger and Baker (1996) on margins of various wetlands indicate that artefacts could be found on all types of landscapes abutting wetlands with density in direct correlation to distance from the margin.

**Relevance:**

*The study area is some 20-30m AHD above the wetlands known as Frogilla Swamp. Given that the margin of the wetland is some 1km from the study area it is possible that artefacts could be located within the study area but according to the studies, frequency and density would be diminished.*

- **Relationship of Objects and Distance from Water /Song trails**

A report for the Brigalow country undertaken by the Resource and Assessment Council titled Aboriginal cultural heritage assessment NSW western regional assessments final report September 2002 – Brigalow Belt South Stage 2. This large scale landmark study analysed the finding of separate independent studies and was able to establish an information base that highlighted Aboriginal association with forests, travelling stock routes (early roads), rural properties and towns.

The study showed that of the sites recorded, 50% were within 200 metres of water and Aboriginal occupation may have occurred for prolonged periods under the right conditions, made possible by a different array of water features (chains of ponds) that existed prior to European usage of the forests.

**Relevance:**

*The study area is at its closest point form the major permanent water source ( Frogilla Swamp). The above study suggests that there would be limited frequency and density of artefacts if at all.*

- **Relationship between Stream Order and occupation pattern**

A survey by Jo McDonald 1988 was an east west survey from Dubbo to Tamworth. The report found stream order influenced occupation pattern. Her analysis concluded that;

*“The size (density and complexity) of archaeological features will vary according to the permanence of water (i.e. stream order), landscape unit and proximity to lithic resources in that density and complexity are greater in 4<sup>th</sup> order (major creeklines and rivers).”*

Stream order is a measure of the relative size of streams. The smallest tributaries are referred to as first-order streams, while the largest river in the world, the Amazon, is a twelfth-order waterway.

**Relevance:**

*The study area has 2 minor drainage channels (1<sup>st</sup> order) commencing within its boundaries. They only carry water during rain events and do not hold water. There is some conjecture about the capacity of the drainage channels given that a part of the north eastern drain has been classified floristically as containing wetland flora. It is above a man-made dam and the soil tends to remain soggy after a prolonged rain event due to the dam restricting g flow. The plant species does not*



indicate the presence of a wetland but rather according to the statutory ecological assessment conducted over the site)“ the vestigial remnants of the original occurrence of the EEC – Subtropical Coastal Floodplain Forest, prior to clearing.” The following plate illustrates the area concerned and reinforces the lack of water holding. The stream order therefore suggests limited likelihood of artefactual evidence.

Photo 4: Freshwater Wetland EEC in the northeast of the site



Plate 1 NE Drainage channel.

- **Relationship of landform type and ceremonial areas**

Work by Klaver and Heffernan (1991) which was an assessment of sites in the Greater Taree Council area, identified landscape attributes for ceremonial sites. Citing an earlier work by Fitzpatrick (1986), they stated, "Ceremonial grounds were said to comprise two rings, one on top of a low ridge and the other in a level place below. The latter was..."established in a roomy place, so that all the gins could camp there close to the ring." This aligns with this author's findings at North Arm Cove and Kings Hill, Raymond Terrace.

**Relevance:**

*The study area has no attributes for ceremonial areas.*

- **Relationship between Object type and landscape**

Brayshaw, in 1986 conducted a Study of Colonial Records of the Aborigines of the Hunter Valley and was able to present an account of the environment and way of life of the Aborigines at the time of colonial settlement. Her study also indicated areas and landforms of Aboriginal use and occupation. Dean-Jones and Mitchell (1993) conducted a similar assessment of archaeological sites in the Hunter Valley.

The above studies indicated:

- Open campsites would be near water holes
- Grinding grooves are more likely to be found in rocky outcrops exposed by erosion or in creek beds.
- Scarred trees may be present in any type of landscape, but this would depend on the age and type of tree.
- Artefacts are more likely to be found along creek and drainage lines
- Stone arrangements and ceremonial artefacts are more likely to be found in significant landscape aspects such as caves and hills.
- Artefacts can be found in any landscape in proximity to an abundant food/water source.
- Archaeological evidence is more likely to occur in undisturbed areas.

**Relevance:**

*The study area has: disturbance through extensive cultivation; does not contain waterholes; no ceremonial attributes, no rock outcrops and limited drainage lines. However it does have some proximity to an abundant food/water source.*

- **Burials**

With respect to burials, work by Donlon (1990), where she analysed skeletons uncovered on beaches on the Central Coast of NSW, ethnographic reports by Bennett 1929, along with other research cited by Mulvaney and Kamminga (1999), has tended to indicate that whilst burials could be found almost anywhere and diverse in practice, intentional or formal burials, generally in Eastern NSW, consisted of isolated burials being placed in sandy type soil, near the high water mark, and sufficient soil depth to bury the person vertically in a sitting position and with various belongings. In the Central west of NSW according to Garnsey (1942: p.23ff), the body was placed in a squatting position; with the elbows placed on the knees and the head between the hands. In this position, the body was placed at the foot of a Coolabah tree facing east. A blaze on the tree was also carved in tribal markings to show the man's status. These carved trees were apparently only associated with the graves of the spiritual leaders. For the period of mourning, the body remained out of the ground. The only recorded cemeteries are within the Murray River corridor or at Broadbeach in Queensland. Most burials are discovered by accident.

**Relevance:**

*The study area does not appear to have landscape conducive to burials.*

- **Occupation Pattern**

A general pattern is emerging that more concentrated remains of Aboriginal occupation are associated with wetland or swamp resources along the principal rivers of the region and/or where resources suitable for the manufacture of tools are present.

The pattern of Aboriginal occupation was underpinned by 2 tenets:

- Aboriginal camping areas were always situated in areas of good shelter and good resources
- Base campsites would be near reliable water.

**Comment:**

The archaeological evidence suggests that base camps were located close to freshwater and food sources. The campsites were in favourable climactic conditions, safe, not only from intruders but also for young children. Campsites were therefore not near fast, flowing rivers, dangerous swampy areas or steep cliffs. (Many Dreamtime stories were developed to keep children away from dangerous areas). Trails from campsites and to other clans were generally along creek lines or ridgelines.

Although archaeological evidence is generally associated with creeks because they are the lowest elevation and natural depositional areas, it is more likely that camping occurred on higher ground.

With respect to the study area it appears the elevated areas overlooking estuarine swamps or creeks were favoured short term occupation or foraging areas. Aboriginal objects are more likely to be found on these crests within 20cm of topsoil. Freshwater was a factor in establishing longer term camping.

#### 4.4 Landscape

The differing landscape creates different land use. For instance swampy or poorly drained land would not be conducive to campsites or burial grounds. Whereas, caves and rock shelters would give rise to artwork, and practical purposes such as shelter or women's birthing areas. Early roads, stock routes and river crossings during European settlement often followed Aboriginal Song Trails (walking trails) and natural features adjacent to such trails were of significance for various reasons. Over the years, the main highways and roads have been realigned and adjusted, but initially the roads between settlements which were generally established around Aboriginal camping grounds, followed the Aboriginal trails.

The landscape survey and classification followed in this report is that formulated by Speight and others in the Australian Soil and Land Survey, Field Handbook, Second Edition.

Landform is basically divided into 2 classifications, the classification covering a larger area is known as Landform Pattern, which can then be subdivided into smaller areas known as Landform Elements. About 40 types of landform pattern are defined and include, for example, floodplain, dunefield and hills. Whereas, about 70 of the smaller landform elements are defined, including cliff, footslopes and valley flat. Relative elevation classes have been standardised and used throughout Australia. The landscape is divided into the following classes:

Landform	Relative Elevation
Plains	0-9 m
Rises	9-30 m
Low hills	30-90 m
Hills	90-300 m
Mountains	>300 m

Landforms as well as having morphological characteristics (surface dimensions) have been formed by processes. The formation processes can interact to produce an array of landforms. For example, plains can be separated into depositional plains of various kinds or erosional surfaces (peneplain). The formation process contributes to the concealing/revealing and the preserving/destroying of archaeological evidence. The identification of landform is paramount in predicting areas that have the potential to contain archaeological evidence.

#### **Comment:**

Topography, hydrology and drainage are important for understanding how accessible an area was for Aboriginal occupation, as well as providing information on available water resources vital to the sustainability of any population.

The study area landform pattern is generally part of the coastal floodplain, with an 30m AHD on the northern boundary and most of the area until the southern boundary where it slopes to just above 10m AHD. The slope runs over a distance of 500 metres. The site is part of a larger landscape of a

northwest/southeast trending ridgeline that terminates at Hallidays Point. Lithic sandstone, clay, shale and conglomerate are generally the predominant soil composition. The ridgeline forms part of the Tamworth Synclinal Zone that crops out from Warialda in the west to the coast between Newcastle and Southwest Rocks. (McIlveen, 1974)

The following Figure shows the relative landform/ landscape profile of the wider area.



Figure 10 Landscape Context

#### 4.5 Soils

Where an archaeological survey is only a surface investigation, any information relating to subsurface information is important, in that it indicates:

- The possibility of archaeological evidence beneath the surface.
- The possibility of archaeological evidence destroyed through erosion or other natural phenomena.
- The possibility of archaeological evidence preserved through soil/sand deposition.

The main soil features of interest are the depth of deposits, stability of the soil composition and the depositional age of the soil groups. Detailed analysis of the effects of different soils on the burial process of archaeological remains can only be carried out during an excavation.

The susceptibility of land to sheet and rill erosion is governed largely by the topsoil texture, slope of the land, length of slope and the probability of intense summer rainfalls. The topsoil or A horizon is where most nutrients, organic matter, seed and macroporosity so desirable for a seedbed exists. If this is stripped away through soil loss the fertility of the soil is lost and productivity reduced. The first few centimetres of soil also generally contain artefacts.

Soils over the land are generally comprised of consolidated materials. The slopes over the land are not considered steep and there is no evidence of slope instability.

#### **Comment:**

The soil is a shale clay composition with very little rock. Soil deposition from the hills and ridges would have occurred overtime, but due to the destruction of the soil profile through earthworks, a reliable analysis of archaeological potential would not be possible.

#### *4.6 Geological Features*

The geological data allows for analysis of the landscape to determine any special features that may contribute to historical Aboriginal occupation. There may be particular outcrops or features that would suggest significant Aboriginal use. The upper limits of three drainage depressions occur on site – one on the southern end, one in the west-northwest, and one in the northeast. All three have had a small dam (<10m wide) constructed within them near the boundary fence. These do not have defined channels on site, hence are considered open drainage depressions.

#### **Comment:**

There is no indication of a geological abnormality or feature that would suggest special significance to the landscape based on the geological mapping.

#### *4.7 Past Land Use*

Past Aboriginal activities are not well manifested by archaeological record because many activities did not leave material evidence or because the material evidence was not durable. Many of the implements were organic material, such as wood and bone and readily decayed when exposed to the elements. Even burials, are subject to the acidic condition of the soil.

Durable evidence, such as stone and rock implements, is affected by European land use. Easily recognisable implements such as stone axes, have found their way into many private collections, well before it became illegal to do so, with no record of the location of the find.

In general, the archaeological record is dependent on the exposure of sites through erosion, weathering, fire, drought and anthropogenic activities.

The vegetation within the study area is predominantly Open Forest dominated by various species. The majority of the trees appear to be of a similar age and would probably be less than 20 years of age.

The current vegetation does not give a good indication of the archaeological potential as it is basically regrowth or introduced grasses and pasture and is not necessarily indicative of what was there over 200 years ago.

The variety of vegetation that was probably on the subject site at European contact would also have lent itself to the fostering of animal food resource. Many of the current animal and bird species found on the subject site most probably existed on the site at European occupation although as to the abundance is speculative but probably more intense and greater variety.

- *European*

The subject land has clearly been long mostly cleared and converted to beef cattle grazing on improved pastures, and is currently maintained for this use. Remnant native vegetation is limited to two main clumps of regrowth forest, some scattered paddock trees, and some remnant wetland vegetation in the northeast drainage depression. Regeneration is minimal due to cattle grazing and routine maintenance.

## Implications

The land in the study area has been disturbed by European Activities since 1820. The land has been used for various agricultural and rural pursuits. Although Aboriginal occupation occurred within the study area, evidence of such occupation appears remote, as the past land use has probably destroyed all but scattered and isolated stone artefacts.

- *Aboriginal*

The 2011 report to Lidbury, Summers and Whiteman put Aboriginal landuse well:

*Aboriginal people believe they have occupied their land since the Dreaming, and stories of the Dreaming show the link between land and people. At the time of first European settlement the Tuncurry - Saltwater district was inhabited by the Kattang speaking peoples of the Worimi and Biripi tribes (Enright 1932; Holmer 1966; Gilbert 1954a). These tribes were divided into a number of local groups, each with a degree of autonomous identity and rights associated with a specific geographical estate. The size, composition and distribution of individual extended family bands within the estate of the larger local group varied in response to social and economic circumstances (Dawson 1935:25).*

*Available ethnographic information suggests that a seasonal pattern of movement and resource exploitation was followed (Ella Simon in Ramsland 1987:180; Brayshaw 1986:41), but this may not necessarily have been the case prior to European contact. Even though coastal groups had economic, social and ceremonial links spanning wide areas, life on the coastal plain seems to have been fairly settled, prompting Cunningham (1827:185) to write of the „better order of things“ obtaining amongst Aboriginal people at Port Stephens and northwards. He describes their “comfortable“ huts of tea-tree bark that were capable of holding several persons.*

## Implications:

As land was given as freehold to the new settlers, and as fences, farms and houses were constructed, Aboriginal people found it more and more difficult to travel from camp to camp. Many Aboriginal people were forced onto Missions and Reserves. This meant that much of the traditional areas were now occupied and a loss of historical understanding of the relationship between the land and the people has occurred. Such lack of understanding can only be overcome through the stories of the knowledge holders being related to the landscape that was once there.

## 4.8 Predictive Model

According to Orton (2000),”In archaeology, predictive modelling refers to a process that considers variables that may influence the location, distribution and density of sites, features or artefacts across the landscape. As well as a review of the results of previous archaeological work and available ethnographic information (to make judgements about past Aboriginal settlement of the landscape), the variables often included in a predictive model are environmental and topographic variables such as soils, distance from landscape features, slope, landform elements, and cultural resources.”

A predictive model of Aboriginal object location is constructed to identify areas of high archaeological sensitivity (i.e. locations where there is a high probability of an archaeological site occurring), so it can be used as a basis for the planning and management of Aboriginal sites. Predictive modelling involves reviewing existing literature to determine basic patterns of site distribution. These patterns are then modified according to the specific environment of the study area to form a predictive model of site location. A sampling strategy is employed to test the predictive model and the results of the survey used to confirm refute or modify aspects of the model.

The use of land systems and environmental factors in predictive modelling is based upon the assumption that they provide distinctive sets of constraints, which influenced Aboriginal land use patterns. Following from this is the expectation that land use patterns may differ between each zone, because of differing environmental constraints and that this may result in the physical manifestation of different spatial distributions and forms of archaeological remains.

The predictive model is based on information from the following sources:

- Identification of land systems and landform units
- Previous archaeological surveys conducted within the region
- Distribution of recorded sites and known site density
- Traditional Aboriginal landuse patterns
- Known importance of any part of the study area to the local Aboriginal community

The types, contents and distribution of sites within the study area can be predicted using such modelling.

The following raw materials have been identified in the region (in order of frequency) silcrete, shell indurated mudstone, silicified tuff, chert, quartz and other materials. Artefacts types identified in order of frequency are flakes, cores and tools.

An analysis of the density of distribution, site type and landscape context shows that any archaeological evidence will tend to be middens, scarred trees, stone artefacts associated with a watercourse or midden and occasional ceremonial Objects such as grinding grooves will be dependent on a sandstone outcrop associated with a water course. It is not likely that burials or ceremonial areas will be found given the ethnographic and historical record shows them to be elsewhere. Ceremonial areas, like churches and war memorials today. Tended to serve a wider area.

Where there is a potential for sub-surface deposit with artefacts (such as flaked stone) it is identified as a PAD. Sub-surface deposits are important as they have the potential to contain intact in-situ archaeological material. In some cases, they may contain material that can be placed in chronological sequence. PADs are significant because they may contain new scientific and cultural information and have the potential to further our understanding of past Aboriginal occupation of the region. Generally PADs in the area are associated with middens.

The recorded archaeological data suggests that there is a correlation between watercourses and the presence of Aboriginal sites. There is higher potential for sites to be identified within 200m of a water course, than further away. Sites are likely to occur within flat, open depression, simple slope and crest formations.

#### **Prediction of Site Type, Location and Density**

Based on the foregoing information (Section 4) the likely site types to be found within the study area depending on the level of disturbance are:

##### *Isolated stone artefacts*

These can be located anywhere in the landscape and represent the remnant of a dispersed artefact scatter (open campsite), the simple loss or random discard of artefacts or anthropogenic and natural processes.

##### *Stone artefact scatters (open campsites)*

This type of site can range from as few as two stone artefacts to an extensive scatter containing a variety of tools and flaking debris, sometimes with associated materials such as bone, shell, ochre,

charcoal and hearth stones. An artefact scatter does not necessarily mark a place where actual camping was carried out, but may instead be the product of specialised and/or short-term activities involving some level of stoneworking or whilst in transit from one occupation area to another. Artefact scatters may occur as surface concentrations or indicate subsurface stratified deposits.

#### *Scarred Trees*

Whilst only one scarred or carved or modified tree has been identified in the general area, it is possible to observe a modified tree. Most modified trees have been either removed by past logging or destroyed by fire or naturally deteriorated.

#### *Location*

Artefacts in the wider area have been found on well-drained low-gradient footslope immediately adjacent to a swamp. Low crests or rises for instance, would have a high level of potential sensitivity. The potential location of artefacts within the study area is likely to be, if present, on a rise or bund overlooking the Frogilla Swamp. Artefacts may also occur subsurface in deposition areas.

#### *Density*

Based on adjacent recorded average data density of artefacts will be low and generally in the order of less than 3 artefacts per hectare. However, where a concentrated occupation site occurred numerous artefacts possibly into the thousands can be revealed (Davies 2006).



## 5.0 STEP 2B Information Requirements (Visual Inspection)

The integration of the information consists of checking the predictive modelling against the on ground reality. The developed predictive modelling indicated that any archaeological evidence would be found in the non- disturbed areas of creek catchments and would generally consist of artefacts and maybe grinding grooves.

Although the entire study area was considered in this assessment, it needed also to be considered in context of the lands relationship to the water and land features nearby which would have impacted on the use of the study area by Aboriginal people

### 5.1 Strategy

The following was used to inform the visual inspection of the proposal.

- Vehicle traverse used for reconnaissance observations of the proposal area to inform and design a pedestrian survey strategy for the area and any other areas adjacent to the proposal considered not to be disturbed under the NPWS Act.

### 5.2 Method

- As the proposal is areal, the entire land area of the proposal was inspected by car for reconnaissance observations prior to implementing a survey strategy.
- Survey on foot of those areas deemed by observation to have even the slightest probability to contain evidence of Aboriginal occupation.
- Accurately define and name survey units
- Include representative photographs of survey units and landforms where informative
- Record landform and general soil information for each survey unit
- Record the land surface and vegetation conditions encountered during the survey and how these impact on the visibility of objects
- Record any Aboriginal objects (including those already registered on AHIMS or otherwise known) observed during the survey
- Record survey coverage and calculate survey effectiveness

As the proposed development footprint is over one landform unit; a gentle slope leading to Frogilla Swamp the study area was left as one survey unit.

### 5.3 Coverage Data

The effectiveness of archaeological field survey is to a large degree related to the degree of ground surface visibility. The dominant factor affecting the ground surface visibility was the disturbed and modified nature of the ground. Although the total amount of exposure was limited, it is believed there was sufficient landform type and exposure to indicate any potential archaeological material that may be present.

The characteristics of the survey unit and effective survey coverage are as follows:

#### Unit 1

As shown by the following plates, the survey area was constrained by prolific pasture. The trees present were of an age that was far too young to contain scars of Aboriginal origin. There was neither permanent water source on site nor any areas of exposure.



Plate 2 Unit 1



Plate 3 Unit 1

<i>Survey unit</i>	<i>Topography</i>	<i>Surface slopes</i>	<i>Visibility</i>	<i>Area available for detection</i>	<i>Finds</i>	<i>Archaeological Survey constraints</i>
Unit 1	Gentle slope	Generally <5%	Extremely poor almost non existent	10%	nil	Lush pasture

Table1 Survey Effectiveness

#### 5.4 Findings

No Aboriginal objects were located. Although the land was heavily pastured and visibility almost nil, it was still possible (based on landscape attributes) to determine that subsurface objects were unlikely. Nonetheless artefacts can be found in all situations and landforms.

## 6.0 Step 3 Integration of information and identification of heritage values

The integration of the information consists of checking the predictive modelling against the on ground reality. The developed predictive modelling indicated that any archaeological evidence would be found in the non- disturbed areas of creek catchments and would generally consist of artefacts and maybe grinding grooves.

### 6.1 Key principles in determining Occupation Pattern

Roberts, 2009 formulated 7 key principles to determine probable Aboriginal land use of a particular area.

Using those principles it is possible to place the study area into Aboriginal occupation context and use.

1. Proximity to water  
*There is no known water on site. The nearest potential water is at Frogilla Swamp a km away.*
2. Food resource  
*The study area is adjacent to a significant food resource, Frogilla Swamp..*
3. Geological features  
*There is no unusual, unique and prominent geological attributes within the study area.*
4. Ease of access  
*The study area is easily accessible on foot for all age groups, however, its swampy type conditions would have attracted mosquitos and would not have been a favoured access area.*
5. Connectivity  
*The study area does not appear to link other areas. The coastline was a favoured travel route at least seasonally.*
6. Safety  
*The study area is not dangerous or close to dangerous landforms.. There does not appear to be natural protection from harsh and extreme weather. There are no commanding views from various parts of the study area.*
7. Archaeological evidence  
*Whilst no Aboriginal objects were identified within the study area, the spatial distribution is probably more indicative of the occupation of the total area landscape rather than just the immediate area itself. The overall lack of evidence probably also suffers from the pasture improved nature of much of the land. Nonetheless there is sufficient evidence to attribute intermittent Aboriginal occupation to the study area and its environs.*

### **Comment**

Although the majority of the study area has been disturbed, it is still possible to suggest the occupation context and landuse. The information from the above 7 principles indicate:

- The study area was occupied by the Aboriginal community. Food and other practical resources were available nearby and there were no access constraints. However there are

no indications that any of the study area was intensively or extensively used on a permanent basis. The lack of areas such as grinding grooves and low density of archaeological evidence suggest occasional or less intensive use. The landscape and archaeological evidence not too distant from the study area indicate more favourable areas for permanent, occasional and more intensive camping.

The study area was probably used as a resource and rest area on the way to more permanent or intensive occupation sites. There does not appear to be any landscape attributes that would suggest more than occasional use.

## **6.2 Landscape Significance Assessment**

It is important to stress that the significance of a cultural landscape is not dependent on archaeological evidence being significant in itself but the interrelatedness of the individual objects to the cultural landscape as a whole. Through understanding the cultural landscape in an holistic manner one may be able to appreciate the associations that may exist between Aboriginal objects and other features within the landscape.

Using the criteria outlined earlier the significance of the study area in an Aboriginal cultural heritage context can be assessed as follows:

- *Social value*

Much of the oral tradition and knowledge has been lost to the Aboriginal communities today. However as research and surveys discover and reveal greater understanding of the past, communities are rediscovering and appreciating what has gone before. At the present time, there does not appear to be spiritual, traditional, historical or contemporary associations and attachments which the place or area has for the present-day Aboriginal community. Similarly there does not appear to be associations with tragic or warmly remembered experiences, periods or events. However that is not to say that discovery of evidence or knowledge of past spiritual connection to the place will not rekindle such association.

- *Historic value*

At this time, there does not appear to be an association of the study area with a person, event, phase or activity of importance to the history of the Aboriginal community.

- *Scientific value*

Technically, there is **NO** scientific value to the study area as no evidence was detected and it was determined that subsurface artefacts would be unlikely. In its purest form archaeological scientific value can only be considered when evidence is observed and scientific analysis of that evidence has value or could add to the archaeological record. However, given that it the land is unlikely to contain evidence, from a scientific perspective, there is always value to use such an area as a control or null value focus. The scientific method usually involves setting up a hypothesis and then seeking to test by objective means whether the hypothesis can be rejected or not. By survey, the archaeologist takes samples of the area and a non-affected control area and tests statistically by comparing artefact composition, density and distribution at the affected and control sites whether or not the hypothesis can be rejected. Potential scientific value for the study area centres on the opportunity to use the area as a control comparison if there is an occasion to examine the landscape of known archaeological potential, of nearby areas such as a ridgeline and wetland. However such opportunity is beyond the remit of determining scientific value for the study area.

- *Aesthetic value*

The sensory, scenic, and creative milieu of various parts of the landscape evokes feelings of a sense of place and its past use, but does not evoke any special or unusual use.

**Comment**

Aboriginal Heritage is centred on Frogilla Swamp, the coastline and the ridgeline to the north. It must be noted that the study area is but part of the wider landform centred on the coastline and Frogilla Swamp.

**Whilst all landscapes are of significance to Aboriginal people there are no observable areas of archaeological significance within the study area.**

## 7.0 STEP 4 Information regarding the proposed development

The extent of impact both direct and on Aboriginal heritage is discussed to ensure that appropriate management in the context of the assessed values can be implemented.

The proposal will ultimately involve residential development and associated infrastructure.

All new development has the potential in the future to alter water use, water flows and soil erosion outside the proposal area.

The study area has been extensively cultivated, visibility is almost negligible and the likelihood of archaeological evidence of existing on site has been assessed as unlikely. However, given that the study area exists between two known areas of archaeological landscapes such likelihood cannot be completely ruled out.

It is not possible to predict with any certainty the level of such indirect impact may have on any unknown or undetected archaeological evidence that may exist, if any, however it is possible, through appropriate management strategies to alleviate or minimise any accidental harm.

It is important to note that whilst all landscape is significant to the Aboriginal community, the landscape within the proposal area is considered to be of occasional occupation and any likely evidence within the proposal area lacks would lack contextual integrity.

## 8.0 STEP 5 Integration of assessment with proposed development

This step involves using the above information as the basis for assessing the cultural values against the impacts from any proposed development to identify specific outcomes.

- *justification for any likely impact(s), including any alternatives considered for the proposal;*  
As discussed previously there does not appear that the proposal will impact Aboriginal objects..
- *any measures which will be implemented to avoid, mitigate or offset the likely impact(s).*  
A management plan will be implemented to deal with any unknown Aboriginal objects within the study area as well as mitigating any impacts that may occur on artefacts discovered in the course of the development construction.
- *demonstration that the input by affected Aboriginal communities has been considered when determining and assessing impacts, developing options, and making final recommendations to ensure that acceptable Aboriginal cultural heritage outcomes can be met by the proposed development.*

The affected Aboriginal community represented by the stakeholders (which was established through the application of the OEH consultation requirements) has been consulted throughout this assessment and has had input into the assessment as follows:

- All relevant Aboriginal people or Aboriginal organisations were given the opportunity to express an interest in being consulted and involved in the assessment. Appendix A contains the consultation log.
- Registered stakeholders met with this archaeologist for presentation of the proposal, discuss concerns and knowledge and develop procedures for the visual inspection.
- FLALC undertook visual inspection and made recommendations to be included in the report for consideration
- The draft report sent to stakeholders to offer suggestions and approve its finalisation and outlining their input and recommendations to be included in this assessment.

The registered stakeholder concurred with the findings and recommendations of the report and endorsed the report by co-authoring.



## 9.0 STEP 6 Management strategy for Aboriginal heritage

This step involves identifying management strategies to be implemented post-approval, including:

- *identification of the nature of and location of any offsets;*  
There is no need for any offsets as there are no Aboriginal Objects that will be impacted directly or indirectly by the proposal.
- *requirements for further work such as archaeological salvage or community collection for objects of high archaeological or community value;*  
At this stage there does not appear to be any requirements for further archaeological work as there are no identified objects of archaeological or community value.
- *Specific on-going management protocols for both physical conservation outcomes and specific Aboriginal community requirements.*  
No specific ongoing management protocols are required. The specific Aboriginal community requests for test excavations are considered by OEH as inappropriate and unnecessary as the assessment has concluded low archaeological value to the study area.

### RECOMMENDATIONS

After applying the due diligence process including desktop assessment and visual inspection, it is reasonably concluded that an AHIP application is not warranted as Aboriginal Objects are not likely to be harmed due to the disturbed nature of the site and that upon approval from the consent authority work can proceed with caution.

1. That the consent authority include the following as a condition of consent:  
The consent for this development does not authorise the harming of an Aboriginal object. Under the NPW Act 1974, it is the responsibility of all persons to ensure that harm does not occur to an Aboriginal object. Whilst undertaking works, if an Aboriginal object is found, work must stop in the vicinity of the object and OEH notified. An application for an AHIP may also be required. Some works may not be able to resume until an AHIP has been granted. Further investigation may be required depending on the type of Aboriginal object that is found. If human skeletal remains are found during the activity, work must stop immediately, the area secured to prevent unauthorised access and the NSW Police contacted. The NPW Act requires that, if a person finds an Aboriginal object on land and the object is not already recorded on AHIMS, they are legally bound under s.89A of the NPW Act to notify OEH as soon as possible of the object's location. This requirement applies to all people and to all situations.
2. As part of the due diligence process an Aboriginal Cultural Education Program should be developed by the proponent for the induction of personnel involved in the construction activities in the project area. The Local Aboriginal Land Council may be able to assist in delivery of such induction.
3. A post approval management plan is to be prepared in consultation with the Aboriginal stakeholders to consider preservation and protection of Aboriginal heritage values in the event that new Aboriginal objects of significance or a nature not anticipated, such as burials or ceremonial items are discovered during construction. Appendix C contains a draft plan.

## 10.0 Certification

This preliminary Aboriginal heritage assessment was prepared in accordance with the brief given by Coastplan to assess of the impact of the proposed rezoning on Aboriginal heritage and was undertaken to consider and assess Aboriginal cultural heritage values and to demonstrate a Due Diligence process.

**This report is a joint report between the Forster LALC and MCAS.** As such this report reflects the views of the Forster LALC and this archaeologist.

To the best of our knowledge the report accurately reflects the archaeological survey, findings and results, as well as the input and recommendations of the Local Aboriginal Land Council.

Whilst every care has been taken in compiling this report to determine the impact the proposal may have on Aboriginal Heritage and to demonstrate a due diligence process, neither MCAS nor Forster Local Aboriginal Land Council can warrant or guarantee that due diligence has been met. It is the responsibility of the individual or proponent to ensure that they have undertaken due diligence.

**Signed**

A handwritten signature in black ink that reads "L.B. Roberts". The signature is written in a cursive, slightly slanted style.

**(Archaeologist)**

21/10/2016

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## **Maps**

### **Central Mapping Authority**

Topographical Map NSW 25k East. Copyright © 2010 NSW Department of Lands

### **Aboriginal Australia**

*Source: Aboriginal Australia by David R. Horton. Names and regions as used by D. Horton in his book "The Encyclopaedia of Aboriginal Australia" published in 1994 by Aboriginal Studies Press for the Australian Institute of Aboriginal and Torres Strait Islander Studies.*

## 12.0 Glossary

### Aboriginal Site

#### 1. Occupation Sites

Evidence of human occupation, which includes food remains, stone tools, baked clay, fire-blackened and fire-cracked stones and charcoal, is found in a range of sites known collectively as occupation sites

- *Shell middens.* These sites are found on the coastline and along the edges of rivers and lakes. It is a deposit composed of the remains of edible shellfish and also usually contains fish and animal bones, stone tools and campfire charcoal.
- *Rock shelters with archaeological deposit.* In rock outcrops such as sandstone and granite, overhangs sometimes form creating useable shelters. Sediment from fires, roof fall, discarded stone tools and food remains form a deposit protected within the shelter and this deposit can be excavated by archaeologists to study patterns of Aboriginal life.
- *Open campsites.* These sites are mostly surface and associated subsurface scatters of stone artefacts, sometimes with fireplaces. They exist throughout the landscape and are the most common site type in rural areas, While found in all environmental locations larger and denser sites tend to be found on riverbanks and lower slopes racing watercourses, as well as ridgelines and other areas that offers movement routes. The study or open sites can assist in understanding patterns of Aboriginal land use.
- *Base camp.* This is the name applied to the major or main area of habitation. They tended to be close to a permanent water source and food source. Generally well sheltered. These camps would be rotated for hygiene reasons. They are different to smaller open campsites, which were mainly camps on transport routes or overnight areas on hunting forays.

#### 2. Aboriginal Reserves and Missions

These places are very important to Aboriginal people today. Although Aboriginal people were often moved to reserves by force and were restricted by harsh regulations, the reserves became home to many people, where they and their families were born, lived and died. Historic cemeteries at many reserves are still cared for by the local Aboriginal community.

#### 3. Rock Paintings

Aboriginal paintings are found on the ceilings and walls of rockshelters, which occur wherever suitable rock surfaces and outcrops, exist. Figures include humans, kangaroos, emus, echidnas, grid patterns, animal tracks, boomerangs, axes, hand stencils and other motifs. Paintings are made with white, red, yellow and black pigments. The motifs may be drawn, painted or stencilled, and charcoal drawings are common as well.

#### 4. Rock Engravings

These occur usually where there is a suitable exposure of fairly flat, soft rock or in rock overhangs. The outlines of motifs were made by hitting the rock surface with a sharp stone to make small holes or pits. Sometimes the pits were jointed to form a groove, by rubbing with a stone. People, animal shapes and tracks are common as well as non-figurative designs such as circles.

#### 5. Grinding Grooves

Grooves are located on flat rock exposures close to a stream or rock hole. They vary in size but are generally long (about 30-40cm in length) and elliptical in shape. Stone axes were ground into the softer stone allowing a working edge to be created or sharpened- Deeper grooves may have been used to work spears or other thin implements.

#### 6. Quarries

Quarry sites occur wherever there are outcrops of siliceous or igneous rock. Stone material was used in creating stone tools, which in turn were used to work wood and provide people with tools to assist in hunting

and gathering activities. Siliceous rock is easily flaked and made useful cutting and scraping tools whereas igneous rock was preferred for edge-ground tools, particularly axes.

### 7. Ceremonial grounds

These sites were used for initiation ceremonies, marriages, tribal meetings and other important functions and are of great significance to Aboriginal people. Bora rings, which are one or more raised earth rings, were used for male initiations.

### 8. Stone arrangements

These range from simple stone mounds to complex circles and pathways. Arrangements are found throughout inland New South Wales as well as the coast, where fish traps were sometimes constructed.

### 9. Carved and scarred trees

Tree bark was used for constructing canoes, shelters, coolamons and shields. Distinctive scars are left from bark removal and can usually be differentiated from natural scars. Carved trees are more distinctive, exhibiting patterns etched into the wood of the tree. They can occur throughout the state although clearing and forestry practices have greatly reduced numbers.

A range of diagnostic criteria has been developed to assist in the identification of Aboriginal scarred trees. The following criteria are based on archaeological work conducted by Simmons (1977) and Beesley (1989) It should be noted that these criteria have never been quantitatively tested or quantified using non-relative criteria such as absolute dating or an analysis of pre-occluded scar morphologies. This is because radiocarbon dating or dendrochronology is mostly inconclusive. and the removal of regrowth exposes trees to further damage.

1. **The scar does not normally run to ground level:** (scars resulting from fire, fungal attack or lightning nearly always reach ground level). However, ground termination does not necessarily discount an Aboriginal Origin (some ethno-historic examples of canoe scars reach the ground);
  1. (A). **If a scar extends to the ground, the sides of the original scar must be relatively parallel:** (natural scars tend to be triangular in shape);
  2. **The scar is either approximately parallel sided or concave, and symmetrical:** (few natural scars are likely to have these properties except fire scars which may be symmetrical but are wider at the base than their apex. Surveyors marks are typically triangular and often adzed);
  3. **The scar should be reasonably regular in outline and regrowth:** scars of natural origin tend to have irregular outlines and may have uneven regrowth;
  4. **The ends of the scar should be shaped, either squared off, or pointed** (often as a result of regrowth): (a 'keyhole' profile with a 'tail' is suggestive of branch loss);
  5. **A scar which contains adze or axe marks** on the original scar surface is likely to be the result of human scarring. Their morphology and distribution may lend support to an interpretation of an Aboriginal origin: (marks produced after the scarring event may need to be discounted);
  6. **The tree must date to the time of Aboriginal bark exploitation within its region:** (an age of *at least* 100 years is prerequisite)
  7. **The tree must be endemic to the region:** (and thus exclude historic plantings).

Field based identification of Aboriginal scars, is based on surface evidence only and will not necessarily provide a definitive classification. In many cases the possibility of a natural origin cannot be ruled out, despite the presence or several diagnostic criteria or the balance or interpretation leaning toward an Aboriginal origin. For this reason interpretations of an Aboriginal origin are qualified by the recorder's degree of certainty. The following categories are used

**Definite Aboriginal scar** - This is a scar that conforms to all of the criteria and/or has in addition a feature or characteristic that provides definitive identification, such as diagnostic axe or adze marks or an historical identification. All conceivable natural causes of the scar can be reliably discounted.

**Aboriginal origin is most likely** - This is a scar that conforms to all of the criteria and where a natural origin is considered unlikely and improbable.

**Probable Aboriginal scar** - this is a scar that conforms to all of the criteria and where an Aboriginal origin is considered to be the most likely. Despite this, a natural origin cannot be ruled out.

**Possible Aboriginal scar** - This is a scar which conforms to all or most of the criteria and where an Aboriginal origin cannot be reliably considered as more likely than alternative natural causes. The characteristics of this scar will also be consistent with a natural cause.

## 10. Burials

Aborigines feel equally as respectful about prehistoric burials as modern cemeteries. As Aborigines have lived in Australia for over 30 000 years burials are seen as part of a continuing culture and tradition as well as offering valuable archaeological information. The dead were sometimes cremated, sometimes placed in trees or rock ledges and sometimes buried. Burials exist throughout New South Wales and can be accidentally uncovered in construction work or become exposed through erosion. It is important that if a skeleton is found it be reported to the police, to a representative of the National Parks and Wildlife Service and to the relevant Aboriginal community group.

## II. Natural sacred sites

Many features of the landscape, such as mountains, rocks, waterholes etc., are regarded as sacred sites by Aborigines. They are places associated with Dreamtime ancestors and usually can only be identified by Aboriginal people. They retain a high significance to Aborigines.

### Fire- stick Farming

The process of burning to aid in hunting. Animals could be speared or clubbed as they fled to escape the flames. Other uses of fire were for long term hunting strategies. After firing, the bush would regenerate attracting animals on which the hunters would prey. (Flood, p250)

**Flake** fragment of stone that was used as a tool for weapons, scrapers etc.

## Geographical

**AHD (Australian Height Datum)** Australian standard measurement from the mean high sea level.

**Swamp.** An almost level, closed, or almost closed depression with a seasonal or permanent water table at or above the surface, commonly aggraded by overbank stream flow (Speight1990: 33).

## Legal

**Activity** means a project, development, activity or work (ie this term is used in its ordinary way, and does not just refer to an activity as defined by Part 5 EP&A Act)

**Disturbed land** or land already disturbed by previous activity Land that has been previously subjected to any activity that has resulted in clear and observable changes to the land's surface. Examples include: soil that has been ploughed; urban development that has occurred; existing rural infrastructure such as dams and fences; existing roads, trails and walking tracks; and other existing infrastructure such as pipelines, transmission lines and stormwater drainage.

**Due diligence** Taking reasonable and practicable steps to avoid harm and protect Aboriginal objects.

**harm** an object or place includes any act or omission that:

- (a) destroys, defaces or damages the object or place, or
- (b) in relation to an object—moves the object from the land on which it had been situated, or



(c) is specified by the regulations, or  
(d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c),  
but does not include any act or omission that:  
(e) desecrates the object or place, or  
(f) is trivial or negligible, or  
(g) is excluded from this definition by the regulations.

**Sand Dune** Refers to sand ridges and sand hills formed by the wind, usually found in desert regions, near a lake or in coastal areas. In areas of Western NSW, windblown dunes can occur along the eastern edges of ephemeral lakes (called lunettes dunes). They can also occur along the banks of rivers.

**Waters** means the whole or any part of: any river, stream, lake, lagoon, swamp, wetlands, natural watercourse, tidal waters (including the sea). Note: the boundary of tidal waters is defined as the high water mark. <sup>2</sup>

## 13.0 Appendix

- (A) Aboriginal Community Consultation
- (B) AHIMS Results
- (C) Management plan

## APPENDIX A

## Consultation Checklist

### Stage 1

Letters written: 4/4/2016

- (a) the relevant DECCW EPRG regional office
- (b) the relevant Local Aboriginal Land Council(s)
- (c) the Registrar, *Aboriginal Land Rights Act 1983* for a list of Aboriginal owners
- (d) the National Native Title Tribunal for a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements
- (e) Native Title Services Corporation Limited (NTSCORP Limited)
- (f) the relevant local council(s)
- (g) the relevant catchment management authorities for contact details of any established Aboriginal reference group.

In that correspondence, proponents must include the information required in 4.1.3 (a) and (b).

[Copy of email sent to OEH Nicole Davis and Peter Saad on 4/4/2016 attached](#)

### Stage 2

Proponents must write to the Aboriginal people whose names were obtained in step 4.1.2 and the relevant Local Aboriginal Land Council(s) to notify them of the proposed project. The proponent must also place a notice in the local newspaper circulating in the general location of the proposed project explaining the project and its exact location.

#### **Names Obtained:**

[Saltwater Tribal Council](#)

[18 Ronald Road](#)

[TAREE, NSW 2430](#)

[Ph: \(02\) 65524440](#)

[Ghinni Ghinni Youth and Culture Aboriginal Corporation](#)

[PO Box 641](#)

[TAREE, NSW 2430](#)

[Ph: \(02\) 65512160](#)

[Ghinni\\_ghinni@hotmail.com](#)

[Bindi Aboriginal Heritage and Cultural Centre Inc.](#)

[187 Beechwood Road](#)

[WAUCHOPE, NSW 2446](#)

[Ph: \(02\) 65864560](#)

Sunrise Guiwan Biripi Elders Corporation

Warner Saunders

PO Box 129

CUNDLETOWN NSW 2430

Ph: 0487660726

Warner.saunders9@gmail.com

Doowakee and Larriki

Mick Leon

PO Box 22

TAREE NSW 2430

Ph 02 6552 7856

Fax 02 6552 7543

Mob 0402 751 584

doowakee@gmail.com

Copy of email attached showing organisations sent above letter seeking expressions of interest and copy of letter attached sent and copy of advertisement attached.

Only FLALC responded and was subsequently registered as a stakeholder.

Proposed project information was included in the notice seeking registration and discussions were held with Jay Currie and Robert Yettica from FLALC. Robert Yettica and the proponent also had separate discussion about the project. The FLALC (Robert Yettica was involved in the field inspection.

### **Stage 3 – Gathering information about cultural significance**

The FLALC reiterated the importance of Frogilla swamp and the Ridgheline connecting the saltwater to the freshwater

### **Stage 4 – Review of draft cultural heritage assessment report**

The report was reviewed by Robert Yettica and Jay Currie who endorsed the report in its entirety and to show that endorsement FLALC was shown as co-authoring the report.

## Len Roberts

---

**From:** Len Roberts <len@myallcoast.net.au>  
**Sent:** Monday, 4 April 2016 8:01 AM  
**To:** 'Nicole Davis'  
**Cc:** peter.saad@environment.nsw.gov.au  
**Subject:** RE: Consultaion

Hi Nicole, Peter,

With the recent changes within OEH not sure who to send the usual notice seeking potential stakeholders for cultural assessments.

I have therefore sent it you both hoping if I have sent it to the incorrect person, you could forward it on to the correct person and advise me of who that is. Kindest regards Len Roberts.

Myall Coast Archaeological Service has been engaged by Coastplan Forster to undertake (2) Aboriginal Heritage Assessments for (2) Planning Proposals (rezoning). One at *Lots 4 & 5 DP 243425 and Lot 22 DP 255386, Tallwood Drive and Old Soldiers Road, Rainbow Flat*, the other at *Tallwoods Lot 612 Blackhead Road, Hallidays Point*.

An invitation is extended to Aboriginal people and Aboriginal Organisations who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in either or both of the areas of the proposed projects to register an interest in a process of community consultation with the proponent regarding the proposed activities. Please note for legal reasons individuals will need to demonstrate their right to speak on behalf of country. An Aboriginal organisation is either a Land Council or a registered Aboriginal Corporation. It is not a company, partnership or other type of registered organisation.

The purpose of community consultation with Aboriginal people is to assist the proponent in the preparation (if required) of an application for an AHIP and to assist the Director General of OEH in his or her consideration and determination of the application

I understand you may be able to assist in advising me of potential stakeholders. In doing so could you also advise how you came to the conclusion that they are potential knowledge holders of country. A reply by email within 7 days would be greatly appreciated.

Yours sincerely,

Len Roberts  
PH: 0403233000  
6783 Pacific Highway,  
Tea Gardens 2324

## Len Roberts

---

**From:** Nicole Davis <Nicole.Davis@environment.nsw.gov.au>  
**Sent:** Monday, 4 April 2016 8:01 AM  
**To:** Len Roberts  
**Subject:** Automatic reply: Consultaion

Hi, I am currentlty out of the office and will return on Mon 4 April 2016.  
Cheers Nicole

AGISTMENT
40 ACRES
MACHINERY & PLANT

PUBLIC NOTICES
STALLHOLDERS WANTED WEEKEND ON WHEELS
Sunday May 29th.

PUBLIC NOTICES
FORSTER TOWN PARK MARKETS
To be held on Sunday 10th April 2016

POSITIONS VACANT
FT QUALIFIED BUTCHER
required at Smiths Lake.

POSITIONS VACANT
TRACTOR MECHANIC
required. Email CV to infoisus@infoisus.com

Buy It... Sell It... Tell It...
in your local Classifieds

POSITIONS VACANT
Gloria Jean's COFFEES
Manager/Barista
Experienced Barista required who is passionate about great coffee.

WORK WANTED
BATHROOM RENOVATIONS
All types of tiling FREE Quote Lic128477C

BUILDER
For all your building & maintenance work. Carpentry, concreting, tiling & bathroom renovations.

EXCAVATOR 2t, Bobcat 763, Hino truck 7.5t, plus extras, will separate.

CLINICAL PSYCHOPHYSICS & HYPNOTHERAPIST
Joanne Witt Tuncurry
65557521/0431534542

POSITIONS VACANT
CASUAL HAIRDRESSER
fully qualified Approx 2 days p/w Email: reneekerry83@gmail.com

CLASSES WORK

POSITIONS VACANT

EAGLES BATHROOM KITCHEN PLUMBING
Branch Manager - Forster
About Eagles
We are a locally owned and operated plumbing supplies company with stores throughout the Newcastle Mid-North Eastern Seaboard of NSW.

WORK WANTED
A1 PAINTING
35 years exp Int/Ext Pensioner discount Call Michael 0447 824084

WORK WANTED
CARPENTRY & Maintenance affordable local insured tradesman. Call Peter 0404 001 909 Lic # 43129C

ALL LAWN
Lou's Lawns Mowing, Pruning, Weeding. Ph 0417 043 759

CHIMNEY SWEEP
Safe, warm, full/insured. Free quotes. James 6551 7883, 0427 013 397

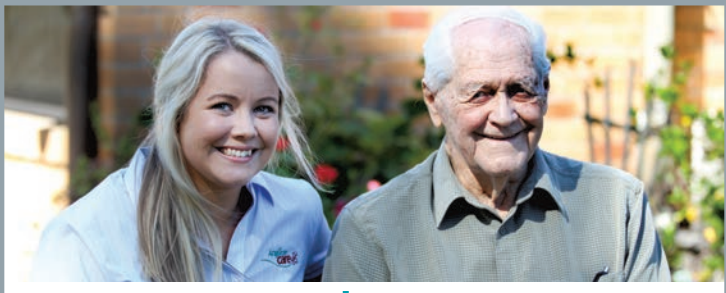
PUBLIC NOTICES

ART CLASSES
With multi award winner M.Cranfield 6554 0994

PUBLIC NOTICES

Aboriginal Cultural Consultation
Call for expression of interest
Myall Coast Archaeological Service has been engaged by Coastplan Forster to undertake (2) Aboriginal Heritage Assessments for (2) Planning Proposals (rezoning).

Providing a wide choice of quality services for seniors in the Hunter, Central Coast and Manning regions.



Anglican care logo

PASTORAL CARE ASSOCIATE

Manning Area Part Time Position

Applications are invited for the above position, which reports directly to the Chaplaincy Services Co-ordinator. The successful applicant will be required to provide pastoral care at both Storm Village and Bishop Tyrrell Place.

To be considered for this role you will have: Essential Requirements:

- > The successful completion of two basic units of Clinical Pastoral Education or currently working towards the same or equivalent.
> Skills in the provision of Pastoral Care, including an understanding and respect for diverse value systems, beliefs and practices.
> Commitment to the provision of a compassionate, non-judgemental, empathic pastoral presence, centred on the skills inherent in reflective listening.
> Capacity to demonstrate an empathic and sensitive approach to the specific needs and feelings of the sick and dying.
> Commitment to the Mission, Vision and Values of Anglican Care.
> A person of active spirituality.

Desirable Requirements:

- > Tertiary qualifications in Theology, Pastoral Care or Counselling.
> Experience in a health care setting.
> Highly developed communication & interpersonal skills.
> Demonstrated ability to work as a member of a multidisciplinary team.
> Demonstrated computer literacy.

Apply to: jobs@anglican care.com.au
Close date: Friday 15th April 2016

Anglican Church logo
At Anglican Care it's not just a job, it's a career! www.anglican care.com.au

WORK WANTED
ALL LAWN
Lou's Lawns Mowing, Pruning, Weeding. Ph 0417 043 759

AUZ TREE
All aspects of Tree work Fully Insu FREE quotes. 0419 999 123

BUILDER
Carpenter, Lic 25330C. David - 0412 803 187

CLEANING & MAINTENANCE
Home & Commercial. Inside & Outside. Insured. Ph Ivan 0427 526 224

DONE4U
Mowing & Slashing + Rubbish removal Ph Ivan 0427 526 224 Insured

POSITIONS VACANT

MID COAST COMMUNITIES
LINKERS
Mid Coast Communities is seeking Coordinators known as 'Linkers' to deliver Ability Links NSW, this position is based in Taree

Manning Valley Neighbourhood Services Inc

We are seeking to employ a part time worker for 12 months to:

- Establish & implement an information, referral & court support program for people living with a mental health issue by:
- Linking them to needed legal/mental health & other services and/or
- Supporting them to navigate the criminal justice & housing tribunal systems at Taree Court
• Coordinate & lead a team of volunteers to support the above

Interested applicants should go to www.mvns.org.au & follow the steps outlined in the application package.

TAREE AUTO GROUP

I am seeking a Workshop Controller, suit technician wishing to come of the tools, responsible for the efficient work flow through the shop, must have excellent communication and people skills, able to work under pressure, remain focused and well organised, good phone manner and computer skills. Contact Grant Bernasconi on 65521000 resume to PO Box 318 Taree

PACIFIC PALMS SLSC INC

invites expressions of interest for the position of Venue Coordinator. The application package can be accessed at http://www.pacificpalmslsc.org.au/#/ positions-vacant/wzqss Applications close 22 April 2016

Solutions from 30 March 2016

Crossword puzzle grid with solutions filled in.

SUDOKU No.079 Level of Difficulty: 7
1 6 9 3 8 4 7 5 2
3 2 4 1 7 5 6 8 9
8 7 5 6 2 9 4 1 3
4 3 2 8 1 6 9 7 5
7 5 1 9 4 3 8 2 6
6 9 8 2 5 7 1 3 4
5 1 3 4 9 8 2 6 7
9 8 7 5 6 2 3 4 1
2 4 6 7 3 1 5 9 8

SUDOKU No.2382 Level of Difficulty:13
6 1 7 2 5 8 3 4 9
4 5 9 1 7 3 6 2 8
2 3 8 6 9 4 5 1 7
3 2 5 7 8 9 4 6 1
1 8 4 5 3 6 9 7 2
9 7 6 4 2 1 8 5 3
8 6 1 9 4 2 7 3 5
5 4 3 8 1 7 2 9 6
7 9 2 3 6 5 1 8 4



Dear Potential Stakeholder,

I am writing to you as per the OEH Consultation Guidelines 2010 under the NPW Act 1974 as amended. Myall Coast Archaeological Service has been engaged by Coastplan Forster to undertake (2) Aboriginal Heritage Assessments for (2) Planning Proposals (rezoning). One at Lots 4 & 5 DP 243425 and Lot 22 DP 255386, Tallwood Drive and Old Soldiers Road, Rainbow Flat, the other at Tallwoods Lot 612 Blackhead Road, Hallidays Point.

I am writing to you as your name has been forwarded to me or you responded as An Aboriginal person who may have an interest in Aboriginal Cultural matters in the Singleton Area and may have a right to be consulted regarding the project.

The purpose of the consultation is to:

- Assist in determining appropriate decisions and recommendations, informed by Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of objects and/or places regarding the conservation and management of Aboriginal objects and/or places.
- Assist the proponent in the preparation (if required) of an application for an AHIP and to assist the Director General of DECCW in his or her consideration and determination of the application
- Ensure opportunity for effective involvement of Aboriginal people or groups with relevant cultural knowledge in the heritage-impact assessment processes
- Enable Aboriginal people to efficiently identify those within their communities who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places.

The objective of community consultation is to ensure that Aboriginal people have the opportunity to improve assessment outcomes by:

- providing relevant information about the cultural significance and values of the Aboriginal object(s) and/or place(s)
- influencing the design of the method to assess cultural and scientific significance of Aboriginal object(s) and/or place(s)
- actively contributing to the development of cultural heritage management options and recommendations for any Aboriginal object(s) and/or place(s) within the proposed project area
- Commenting on draft assessment reports before they are submitted by the proponent to DECCW.

An invitation is extended to you as an Aboriginal person or Aboriginal Organisation if you hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation with the proponent regarding the proposed activity. Please note for legal reasons individuals will need to demonstrate their right to speak on behalf of country.

Only Aboriginal persons or Aboriginal organisations can register an interest. If an Aboriginal organisation i.e. Land Council or Registered and active Aboriginal Corporation wishes to register an interest then a representative must be nominated. By law, a company, partnership, trust or business entity is not

considered to be an Aboriginal organisation. **You cannot register an interest on behalf of another person.**

According to the Consultation Guidelines the qualifications of those who can register their interest as an Aboriginal party are those people who:

- continue to maintain a deep respect for their ancestral belief system, traditional lore and custom
- recognise their responsibilities and obligations to protect and conserve their culture and heritage and care for their traditional lands or Country
- Have the trust of their community, knowledge and understanding of their culture, and permission to speak about it.

If you meet the qualifications and would like to register an interest please provide the following Information. It is important that all information is supplied to allow proper consideration of your request.

Name

Residential Address

Postal address (if applicable)

Phone

Email (if applicable)

Organisation you are representing (if applicable)

Authority to speak on country

To register your interest, please contact in writing:

Sue Roberts

Myall Coast Archaeological Services

6783 Pacific Highway

Tea Gardens. 2324

Email:archaeology@myallcoast.net.au

**Closing date for Registration 5pm 31/5/2016**

For record purposes the registration must be in writing. So if you have expressed an interest previously please provide the above information as well. If you are aware of others please pass a copy of this letter to them so that they can respond personally.

Please note Aboriginal people who are registering an interest, your details will be forwarded to DECCW and the Local Aboriginal Land Council (LALC) unless you specify that you do not want your details released.

Once a stakeholder list has been established you will be advised of a consultation meeting to be held at Singleton for the community to determine the stakeholders and to discuss project options. Your earliest response would be greatly appreciated.

Kind regards

Sue Roberts

10/5/2016

RE: Site Officer - Message (HTML)

File Message

Ignore X Reply Reply Forward Meeting  
Junk Delete All More  
Delete Respond

Move OneNote Mark Categorize Follow  
Move Actions Unread Tags Up  
Translate Related Select  
Editing

Zoom Save to Evernote  
Zoom Evernote

From: CEO <ceo@forsterlalc.org.au> Sent: Fri 15/04/2016 9:31 A  
To: archaeology@myallcoast.net.au  
Cc:  
Subject: RE: Site Officer


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Hi Sue

Im email you regarding the **Aboriginal Cultural Consultation** I would like if you will take on board that FLALC site officer would attend this work at \$120 p/h thank you.

Regards  
Jay Currie  
Chief Executive Officer

Forster Local Aboriginal Land Council  
10 Breckenridge Street. Forster NSW 2428  
P.O. Box 384, Forster NSW 2428  
Ph; 6555 5411 Mob; 0457 009 800  
Email; [ceo@forsterlalc.org.au](mailto:ceo@forsterlalc.org.au)



File Message

Ignore, Delete, Reply, Reply All, Forward, Meeting, More

didgeridoo, To Manager, Done, Create New

Rules, OneNote, Actions, Move, Mark Unread, Categorize, Follow Up, Translate, Find, Related, Select, Zoom, Save to Evernote

From: Len Roberts <len@myallcoast.net.au> Sent: Thu 12/05/2016 10:21 AM  
To: 'ceo@forsterlalc.org.au'  
Cc: 'Ghini Ghinni@hotmail.com'; Mick Leon (doowakee@gmail.com); 'Warner.saunders9@gmail.com'  
Subject: Expression of interests

Message Potential Stakeholder Letter.pdf (245 KB)

I am writing to you as your name has been provided as possibly having an interest in being a stakeholder or you responded to the advertisement regarding cultural heritage in the Rainbow Flat area. Please see attached document

An invitation is extended to Aboriginal people and Aboriginal Organisations who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in either or both of the areas of the proposed projects to register an interest in a process of community consultation with the proponent regarding the proposed activities. Please note for legal reasons individuals will need to demonstrate their right to speak on behalf of country.

Please note this is not an invitation for paid work, but rather to ascertain from you any cultural knowledge you may have to offer regarding the area.

The stakeholder list is being prepared in accordance with the requirements of OEH consultation requirements.

As Forster Land Council has expressed an interest they are automatically registered and do not need to take any further action at this stage.

Would you be so kind as to complete the attached application and return ASAP. Once the stakeholder list has been finalised a stakeholder consultation meeting will be arranged.

Kindest Regards,  
Len Roberts

## Len Roberts

---

**From:** CEO <ceo@forsterlalc.org.au>  
**Sent:** Friday, 15 April 2016 9:31 AM  
**To:** archaeology@myallcoast.net.au  
**Subject:** RE: Site Officer

Hi Sue

Im email you regarding the **Aboriginal Cultural Consultation** I would like if you will take on board that FLALC site officer would attend this work at \$120 p/h thank you.

Regards  
Jay Currie  
Chief Executive Officer

Forster Local Aboriginal Land Council  
10 Breckenridge Street. Forster NSW 2428  
P.O. Box 384, Forster NSW 2428  
Ph; 6555 5411 Mob; 0457 009 800  
Email; [Ceo@forsterlalc.org.au](mailto:Ceo@forsterlalc.org.au)



## APPENDIX B

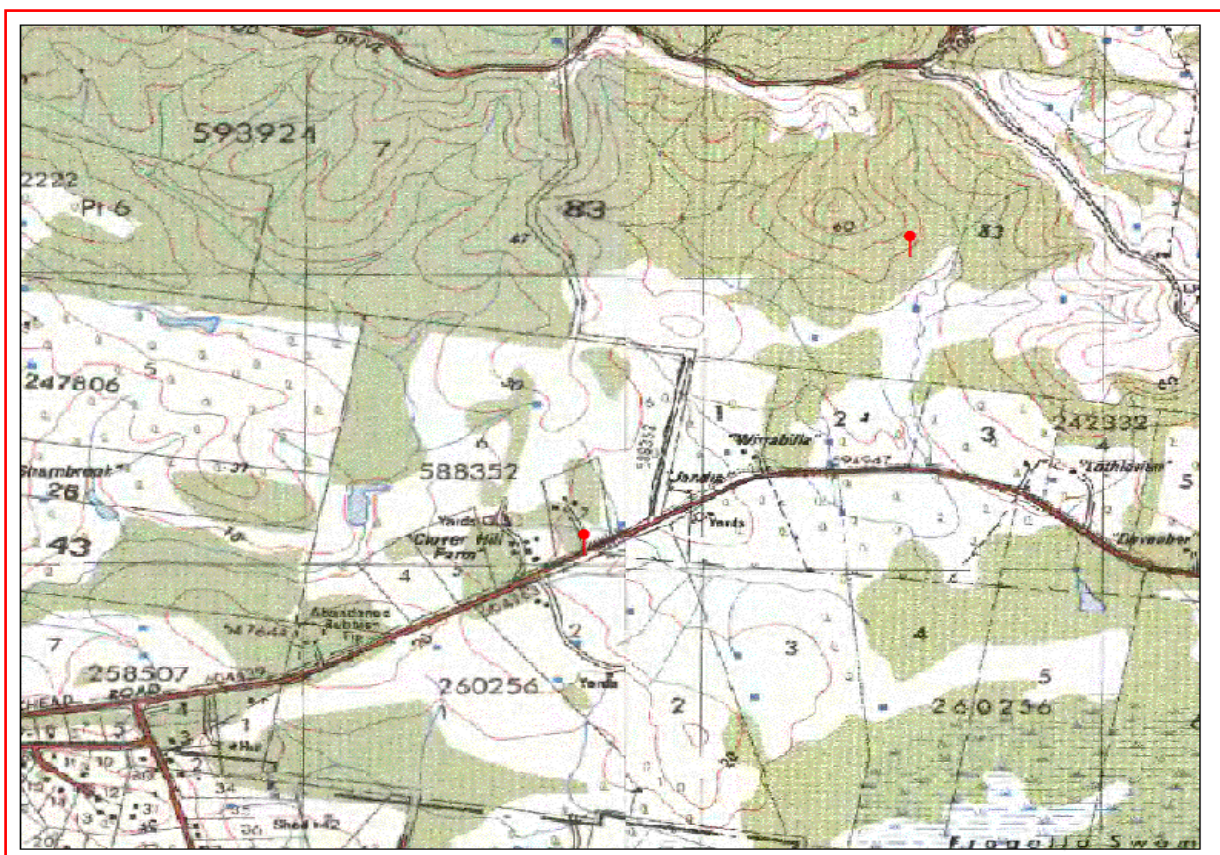
Susan Roberts  
6783 Pacific Highway  
Tea Gardens New South Wales 2324  
Attention: Susan Roberts  
Email: sue@tallpines.net.au

Date: 24 October 2016

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 612, DP:DP1160096 with a Buffer of 1000 meters, conducted by Susan Roberts on 24 October 2016.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>2</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

### **If your search shows Aboriginal sites or places what should you do?**

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(http://www.nsw.gov.au/gazette\)](http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

### **Important information about your AHIMS search**

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.





# AHIMS Web Services (AWS)

## Extensive search - Site list report

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
38-2-0106	Tallwoods 4	AGD	56	452190	6453630	Open site	Valid	Artefact : -, Shell : -	Midden,Open Camp Site	
	<u>Contact</u>									
38-3-0278	Tallwoods 5	AGD	56	452710	6453750	Open site	Valid	Artefact : -	Open Camp Site	
	<u>Contact</u>									
		<u>Recorders</u>	Mick Leon					<u>Permits</u>	1834	
		<u>Recorders</u>	Mick Leon					<u>Permits</u>	1834	

Report generated by AHIMS Web Service on 24/10/2016 for Susan Roberts for the following area at Lot : 612, DP:DP1160096 with a Buffer of 1000 meters. Additional Info : determine impact from nearby proposed development. Number of Aboriginal sites and Aboriginal objects found is 2

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

## APPENDIX C

# ABORIGINAL HERITAGE MANAGEMENT PLAN (AHMP)

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## INTRODUCTION

This Aboriginal Heritage Management Plan (AHMP) has been developed to assist and guide the development of a (insert details) This AHMP defines the actions and procedures that will be implemented for the proposal to facilitate the protection and management of Aboriginal heritage values.

The Aboriginal Heritage Assessment, carried out for the proposal (insert details) identified (insert details) and recommended (insert details)

This AHMP has been prepared not only to protect and enhance Aboriginal heritage values but also establish protocols that will be triggered if any objects are discovered during the development process. It also forms part of a Due Diligence process for the Protection of Aboriginal Objects in New South Wales.

## AIMS AND OBJECTIVES

This Aboriginal Heritage Management Plan seeks to establish a framework to ensure that the Aboriginal cultural significance of the site is protected before, during and after the proposed development is undertaken. It aims to foster engagement and understanding of Aboriginal cultural significance and ensure compliance with the relevant state and federal legislation.

The design of the development has had due regard to the known objects/potential areas of Aboriginal cultural sensitivity and as such, these areas are all located in areas of proposed conservation, buffer zones, or within areas that will allow for them to be retained within their existing setting.

This plan aims to ensure that any additional finds are managed in a manner that is consistent with the cultural sensitivity of the local Aboriginal community and in accordance with legislation. This framework seeks to ensure that any additional finds are not destroyed but rather managed/conserved in the manner which the custodians of the culture deem appropriate..

## ABORIGINAL COMMUNITY

It is acknowledged that the Aboriginal community have a principal role in identifying cultural significance and cultural values and that Aboriginal people have the right to be consulted and involved in all aspects of investigation and decision making.

Ongoing Consultation throughout the assessment phase of the project has occurred with the Aboriginal community through the established registered stakeholders (Registered Aboriginal Parties); LALC, (insert details)

In relation to Aboriginal heritage it is recognised that the Local Aboriginal Land Council ((insert details) LALC) function as the central point of contact with the Aboriginal community in relation to heritage issues. Where Aboriginal community participation is specified in the actions and procedures throughout this document, it is understood that LALC will generally fulfil this role.

LALC representatives and the other registered stakeholders (insert details) will be consulted on the effectiveness of this AHMP, any future versions, and any other heritage issues that are deemed relevant by either party.

## DEFINITIONS

The following definitions apply to this plan:

- **Aboriginal Relic** refers to burial sites and associated artefacts and human remains.
- **AHA** refers to the Aboriginal Heritage Advisor
- **AHIP** is an Aboriginal Heritage Impact permit
- **Archaeologist** refers to Myall Coast Archaeological Services or their nominee.
- **ARG** refers to the advisory group / consultative committee established to advise the proponent on all Aboriginal matters of interest throughout the life of the project. It is constituted with representatives of the RAP and the proponent. It is an administrative arm to ensure ongoing consultation throughout the life of the project. It is not a RAP.
- **Expected finds** refers to existing unrecorded objects expected to be present in a subsurface / surface context as identified in the previous assessment of the sites in the project area.
- **OEH** refers to the Office of Environment and Heritage.
- **RAP** refers to the registered Aboriginal parties.
- **The Proponent** refers to (insert details) and its agents/contractors.
- **Unexpected or New** refers to other objects that are outside of the range of those that were identified (and expected also to be present in a subsurface context) as part of the previous assessment of the sites in the project area.

It is expressly understood by all parties (the Proponent, RAP ARG,) that:

- An AHIP is not required as all known Objects are to be protected/conserved and left in-situ or non-existent.
- If during construction objects are discovered and harm cannot be avoided then an AHIP will be sought
- The plan is a result of a consultative process between RAP and the Proponent.
- This plan deals with the ongoing management of Aboriginal Cultural Heritage for the development approval, and may be reviewed and updated from time to time.
- This plan sets out the requirements, protocols and procedures for protecting the known Aboriginal Objects and new or unexpected Aboriginal Objects and Aboriginal relics.
- It sets out the roles, responsibilities, relationships and conduct of all parties and personnel including dispute resolution procedures
- It sets out clear procedures for monitoring, recording and managing expected and unexpected Aboriginal heritage (objects / artefacts) and relics.
- The plan must be in force prior to any ground disturbance process.

# THE PLAN

## 1. Details of induction program for all workers associated with construction activities

An Aboriginal Heritage induction program will be developed and approved by ARG. It may be reviewed and updated from time to time as deemed necessary.

The program will outline protocols and responsibilities with respect to the management of Aboriginal cultural heritage for the site. It will also provide an overview of the site types present as well as procedures for reporting the identification of Aboriginal archaeological sites.

In addition, Aboriginal cultural awareness training will be mandatory for all staff whose roles may reasonably bring them into contact with Aboriginal sites and / or involve consultation with local Aboriginal community members. Training will also be offered on a voluntary basis to all other staff and contractors.

An Aboriginal cultural awareness training package will be developed for use throughout the operational life of the development. The training package will be completed prior to ground disturbance works commencing.

The cultural awareness training package is to be developed in collaboration with the RAP and will, at a minimum, involve the presentation of information on the Aboriginal history of the area (pre- and post-contact), the nature of known sites, potential Aboriginal archaeological resources, identification of Aboriginal archaeological sites, relevant management policies and procedures, and statutory obligations.

A register of all persons having completed Aboriginal heritage inductions & cultural awareness training will be maintained throughout the construction and operational phases of the development.

## 2. Details of WHS protocols required for site access

### 2.1 Safety

Access to the site during construction will be via approved site or visitor's induction only. There will be no unauthorised access to the site during the construction operations phases.

All persons attending the site must abide by all site safety policies and procedures whilst on site.

All work activities conducted on the site must be assessed and documented to identify potential hazards and any controls implemented. A Risk Assessment (RA) and Safe Work Procedure (SWP) will be developed for the tasks to be conducted by the proponent. The RA and SWP will be reviewed and approved by the proponent to the tasks being conducted.

### 2.2 Relationship obligations of Aboriginal Induction Service providers with other workers / management

All workers, Aboriginal inductors and contractors shall treat each other with due professionalism, courtesy and respect. If an occasion arises where a person feels aggrieved by another's behaviour or attitude then the dispute resolution process is triggered.

An outline of the procedures and protocols between the contractors, employees and the Aboriginal monitors / workers, shall be developed and completed in conjunction with the proponent, prior to commencement of the construction project.

## 2.3 Aboriginal Community Access

Aboriginal community members may, during the development process, wish to access the site and / or areas within the site for cultural purposes (e.g. education and ceremony).

The proponent is committed to facilitating such access. All access requests must go through ARG and be approved by ARG. The relevant site inductions and safety briefings will be required to be completed.

Access, in all instances, will be subject to relevant operational and safety considerations and cannot be guaranteed; and access to some of the site will be restricted during periods of construction.

There will be no unauthorised access to the site.

## 3. Responsibilities of stakeholders

Each party involved in the development of the site and / or having knowledge / carriage of matters relating to matters of Aboriginal cultural heritage have varying responsibilities. This section outlines the understood responsibilities.

**Aboriginal Heritage Advisor** - to advise on Aboriginal heritage matters.

**Archaeologist** - to assess and develop management strategies for known, new objects and relics and other tasks identified in the management plan.

**ARG** - to advise the proponent on all Aboriginal matters of interest throughout the life of the project and to oversee the functions and tasks in which the RAP may be involved.

**Cessnock City Council** - Monitor compliance with consent conditions and issue various compliance orders if necessary.

**Proponent** - responsible for the preparation and fulfilment of the management plan in consultation with RAP and Archaeologist in accordance with the guidelines for consultation.

**RAP** - to be consulted in accordance with legislated consultation guidelines regarding Aboriginal heritage management and undertake tasks as per the management plan.

## 4. Details of mitigation and management strategies

Prior to construction and in collaboration with ARG a survey map indicating the known objects and conservation transect and buffer zones will be produced and form the basis for management protocols.

A table/checklist of management procedures will also be produced outlining what is protected, mitigation measures required and other actions will also be established. The table will outline the actions, responsibility for those actions and time frame for implementation.

All Aboriginal heritage management and mitigation works carried out under the AHMP for the project will be documented to a standard comparable to that required by the Code of Practice for Archaeological Investigation of Aboriginal Objects 2010. This includes the completion of site cards in accordance with salvage and repatriation protocols granted under any AHIP.

The map and table will be standalone documents but will form part of this document at Appendix A

## 5. Procedures for new sites, relics and human remains

Refer to flowcharts 1, 2 and 3 in schedule 1 of this document

## **6. Reporting**

ARG will develop the process and reporting format, including a data sheet to document the artefacts and compliance with mitigation measures. Such reporting shall be undertaken at least annually. ARG will be responsible for ensuring appropriate recording occurs and personnel to undertake the report compilation. The archaeologist may be involved at the request of ARG.

## **7. Compliance / review procedures**

### **7.1 Review / update of the plan**

The plan will be reviewed every three to five years by ARG and may include seeking technical advice from the archaeologist.

The review of the AHMP will involve a compliance audit to ensure that management procedures have been adhered to.

Request for review of the AHMP may also be raised by any of the stakeholders as part of ongoing implementation procedures.

If the AHMP is to be revised, copies of the document are to be sent to the registered Aboriginal parties for comment for a 7 day review period prior to finalisation. Their comments will be taken into account and the plan amended as required.

Following review and revision of the AHMP it, along with the RAP comments, will be forwarded to the consent authority (insert details) for endorsement if applicable.

### **7.2 Suspected non-compliance with condition of consent**

If a person has good reason to believe the proponent is not implementing the Aboriginal heritage conditions of Approval satisfactorily, then that person, or the supervisor, must notify the nominated dispute contact person giving full details outlining the potential breach. The nominated contact person shall refer the matter to ARG.

ARG shall meet to discuss the concern and if unable to resolve the concern, must refer the matter to Cessnock City Council for independent review.

## **8. Dispute Resolution**

It is understood by all parties that any dispute regarding performance or activities conducted under this plan that:

- The issues will be resolved quickly rather than allowing them to escalate through inaction;
- All relevant parties should be consulted so that all sides of the story are taken into account;
- It will be handled sensitively – disputes should, where possible and appropriate, be resolved in a confidential context in order to minimise impact on others not affected by the dispute, and
- Work is to continue normally during the dispute resolution process subject to any reasonable concerns about WHS issues.

### **8.1 The resolution process**

- The proponent in consultation with ARG shall nominate a person to be the dispute contact in the event a dispute arises.
- The monitor and / or project employee who feels that there is a dispute will contact their supervisor to discuss the concern.
- The supervisor will listen carefully to the monitor(s) and together they will try to resolve the dispute. If the supervisor and the concerned person are unable to resolve the dispute or it is not

appropriate that the supervisor deal with it, the matter should be referred to the nominated dispute contact person.

- The dispute is either resolved or referred to ARG.
- The dispute is either resolved or referred to an independent conciliator or mediator.

## **8.2 Technical Dispute**

A technical dispute occurs where two parties disagree on a methodological or interpretative issue for any of the management recommendations of this AHMP.

The normal dispute resolution process above will apply except that the independent conciliator shall be the archaeologist who's decision will be final.

## **9. Ongoing consultation process**

ARG has been established under a separate process as the conduit for ongoing consultation. Matters arising shall be considered at ARG meetings.

## **10. Ongoing / Future Management**

It is recognised that given the history of the site there is the potential for addition items / relics of Aboriginal cultural heritage to be uncovered during the construction phase of the project. The purpose of this ACMP is to put in place a framework that would protect and manage any such finds.

An important element of this is providing the opportunity for the local community to manage their cultural heritage in a manner that both retains the link to place, and fosters greater understanding. This section sets the proposal for ongoing management of relics that may be found.

### **10.1 Cultural heritage**

The LAIC have been nominated custodian of Aboriginal cultural heritage associated with the site.

### **10.2 Onsite retention / display**

(insert details)

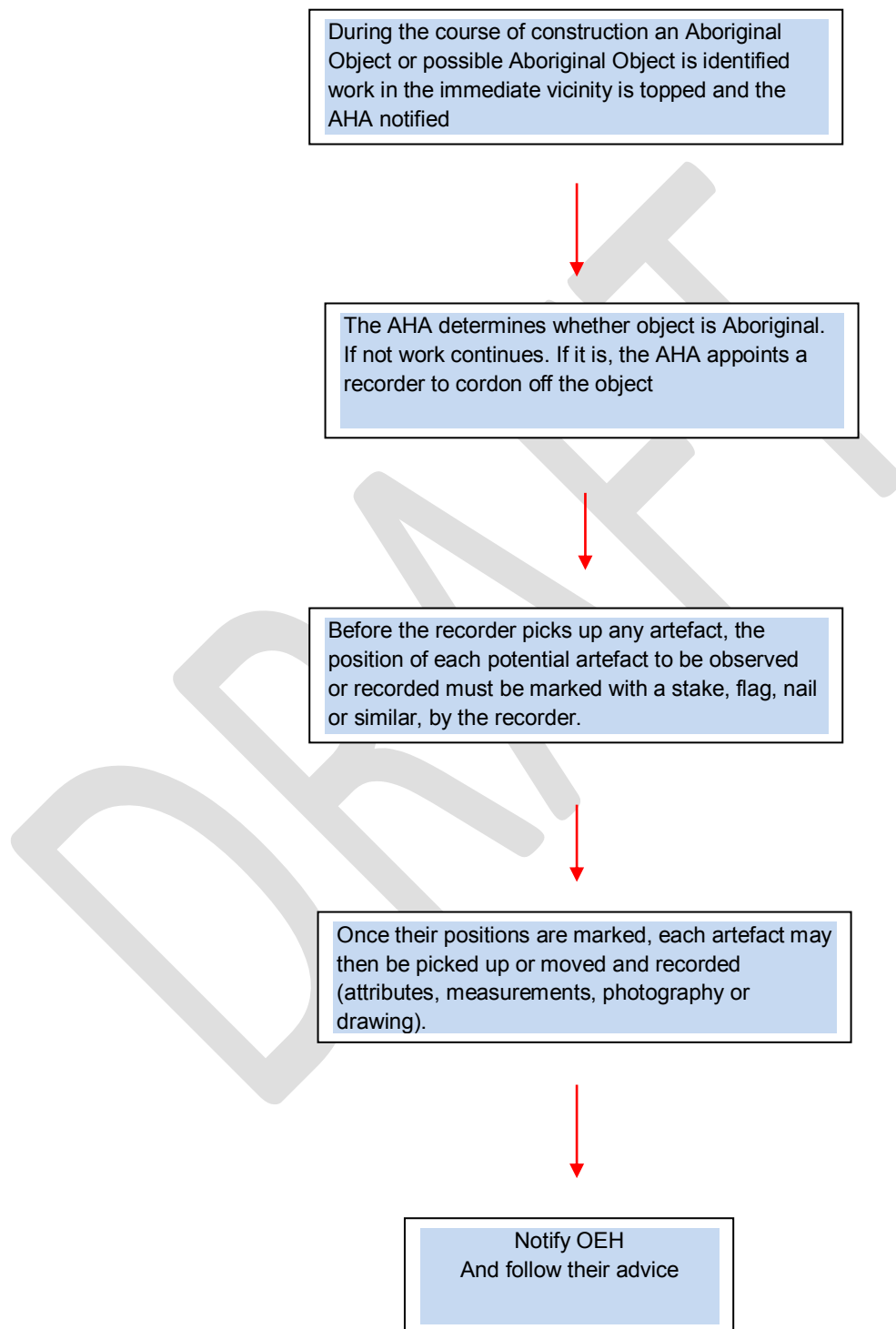


# SCHEDULE 1

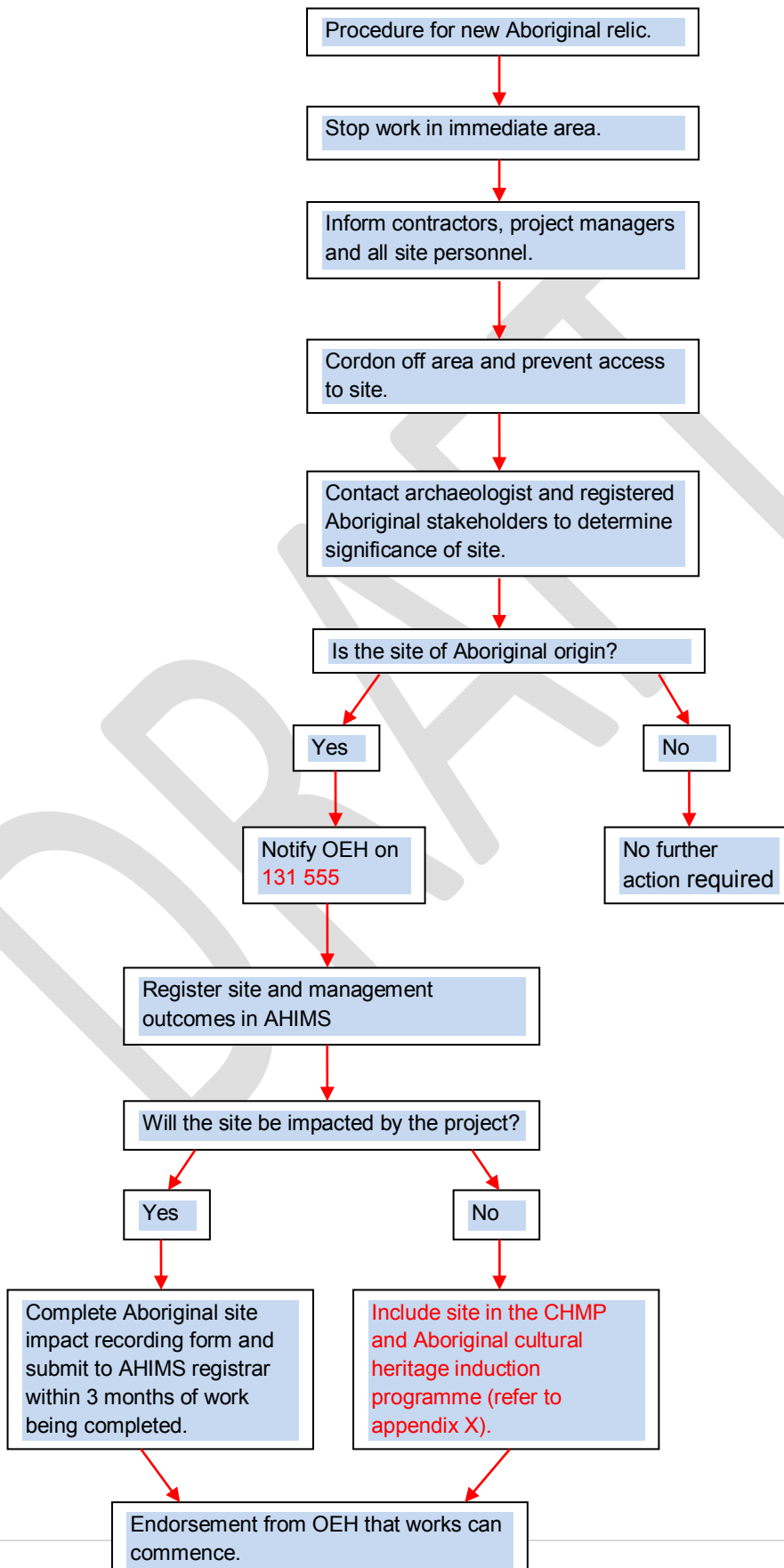
DRAFT

# FLOWCHART 1 – PROCEDURE FOR UNRECORDED ABORIGINAL OBJECTS

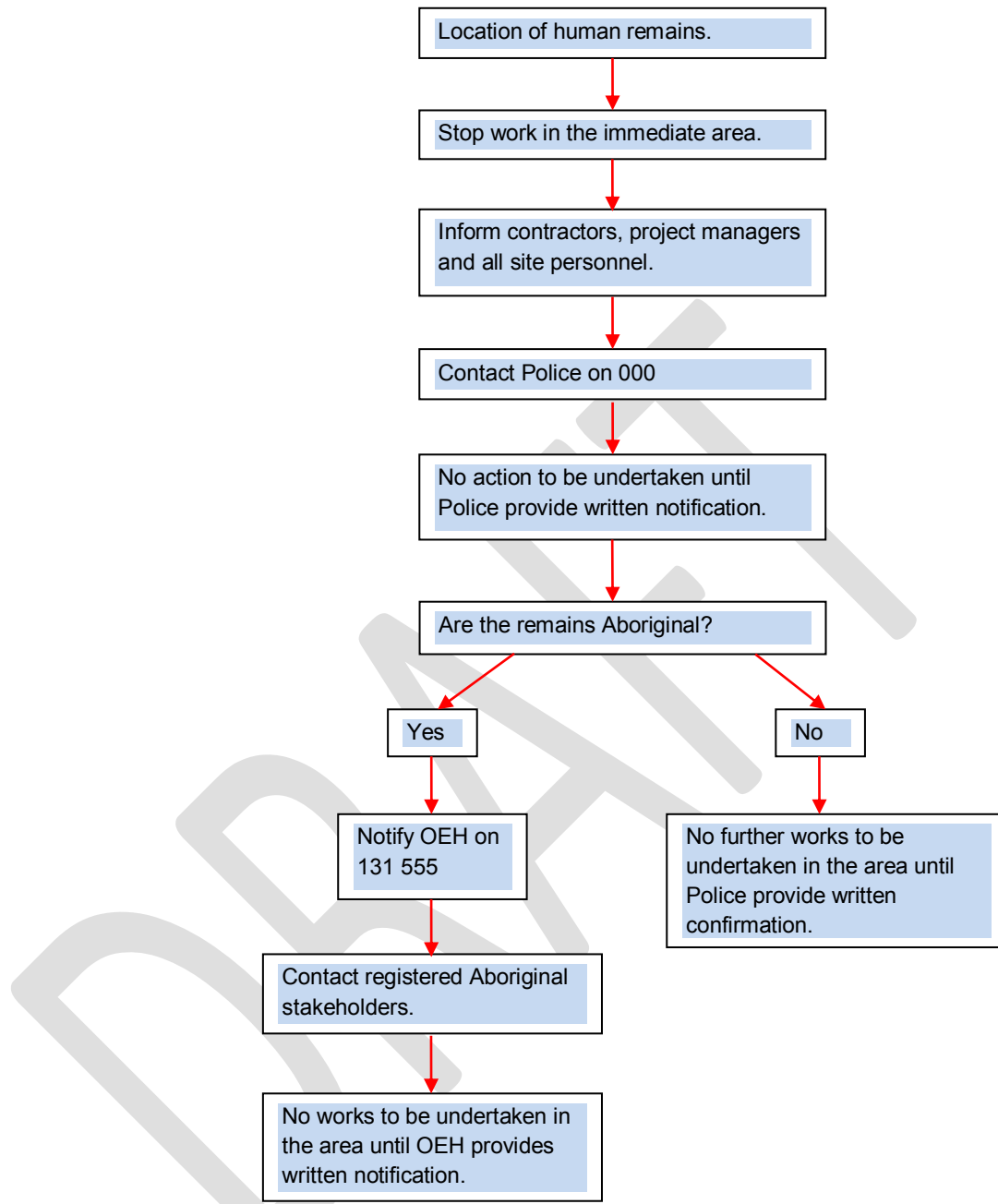
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# FLOWCHART 2 – PROCEDURE FOR ABORIGINAL RELICS



# FLOWCHART 3 – PROCEDURE FOR HUMAN REMAINS



***Attachment E – Correspondence from Agencies following  
Consultation***



# Office of Environment & Heritage

Your reference: PP 2016 GTARE 001 00  
Our reference: DOC16/128152-1  
Contact: Ziggy Andersons, 4927 3151

Mr Ron Posselt  
General Manager  
Greater Taree City Council  
PO Box 482  
TAREE NSW 2430

Attention: Angela Tinlin

Dear Mr Posselt

## **RE: PLANNING PROPOSAL - TALLWOODS - LOT 612 BLACKHEAD ROAD, HALLIDAYS POINT**

I refer to your email dated 10 March 2016 requesting comment from the Office of Environment and Heritage (OEH) on the Tallwoods Planning Proposal. The amended Gateway determination (issued 26 February 2016) requires Council to consult with OEH on the assessment of Aboriginal cultural heritage and the application of either E2 Environmental Conservation zone or E3 Environmental Management zone for the land containing the freshwater wetlands endangered ecological community (EEC). A response to your request is provided below.

### **PROPOSED ENVIRONMENTAL ZONING**

OEH's environmental zoning preference for the area of EEC is E2 Environmental Conservation. The E2 zone has a greater level of environmental protection and limits the number of approved activities compared to E3 zone. However, it should be noted that there are still a number of activities that are permissible within both E2 and E3 zonings that could have a impact on the EEC, the most likely being construction and operation of stormwater management infrastructure. In addition, provisions should be made within both the planning proposal and any subsequent development approvals to ensure that the recommendations within the ecological report are implemented.

### **ABORIGINAL CULTURAL HERITAGE ASSESSMENTS**

Aboriginal objects and places are protected under the *National Parks and Wildlife Act 1974* and must not be harmed without appropriate authorisation. Planning proposals must contain provisions to identify and manage any Aboriginal cultural heritage constraints that may be present/associated to the proposal and clearly outline all efforts that will be undertaken to conserve Aboriginal cultural heritage.

### **Assessing Aboriginal cultural heritage early provides greater certainty**

Aboriginal cultural heritage values should be considered as early as possible in the planning process to provide greater certainty for heritage and development outcomes. OEH recommends that planning authorities assess and consider Aboriginal heritage values (tangible and intangible) when they prepare planning proposals. Early assessment provides:

- the best opportunity to avoid, mitigate and manage impacts to Aboriginal heritage

- an opportunity to engage with Aboriginal stakeholders so they can have meaningful input to the decision-making process
- greater certainty at the development application stage.

A guide to preparing planning proposals (Department of Planning and Infrastructure, October 2012) notes that:

*“An amendment to an LEP is a stand-alone component of the development process. The RPA [relevant planning authority] and the community must be confident that the proposed planning controls suggested by the planning proposal are acceptable as an outcome appropriate in that location, regardless of the subsequent approval or refusal of any future development application. Sufficient information must be provided to enable an assessment of the proposal to be undertaken.”*

### **Planning proposals must help to conserve Aboriginal cultural heritage**

The requirement to protect Aboriginal cultural heritage in planning proposals is stated in Local Planning (section 117) Direction 2.3 Heritage Conservation:

*“A planning proposal must contain provisions that facilitate the conservation of:*

- a) items, places, buildings, works, relics, moveable objects or precincts of environmental heritage significance to an area, in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item, area, object or place, identified in a study of the environmental heritage of the area,*
- b) Aboriginal objects or Aboriginal places that are protected under the National Parks and Wildlife Act 1974, and*
- c) Aboriginal areas, Aboriginal objects, Aboriginal places or landscapes identified by an Aboriginal heritage survey prepared by or on behalf of an Aboriginal Land Council, Aboriginal body or public authority and provided to the relevant planning authority, which identifies the area, object, place or landscape as being of heritage significance to Aboriginal culture and people.”*

### **Planning proposals should identify whether Aboriginal cultural heritage values are known or are likely to occur**

A suitably qualified person<sup>1</sup> should, as a minimum, assess whether Aboriginal cultural heritage values are known or likely to occur in the area covered by the proposal. The initial assessment of the likelihood of Aboriginal cultural heritage values should include:

1. A search of the Aboriginal Heritage Information Management System (AHIMS) database and any other sources of information available:

Information on AHIMS searches is available on the OEH website at:

[www.environment.nsw.gov.au/licences/AboriginalHeritageInformationManagementSystem.htm](http://www.environment.nsw.gov.au/licences/AboriginalHeritageInformationManagementSystem.htm)

Other sources of information can include previous studies, reports or surveys undertaken in the area.

An AHIMS search is not exhaustive evidence for Aboriginal objects and cultural significance of land so the assessment should also include consideration of landscape features, a site inspection and local Aboriginal knowledge.

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<sup>1</sup> Suitably qualified person as defined in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (2010)*, has:

1. a minimum of a bachelor's degree with honours in archaeology or relevant experience in the field of Aboriginal cultural heritage management; and
2. the equivalent of two years full-time experience in Aboriginal archaeological investigation, including involvement in a project of similar scope; and
3. a demonstrated ability to conduct a project of the scope required through inclusion as an attributed author on a report of similar scope.

2. Determination of whether the area covered by the planning proposal includes landscape features that indicate the likely presence of Aboriginal objects:

Aboriginal objects are often associated with particular landscape features as a result of Aboriginal people's use of those features in their everyday lives and for traditional cultural activities. Examples include, but are not limited to, rock shelters, sand dunes, waterways, waterholes and wetlands.

3. A site inspection:

The purpose of the inspection is to understand the integrity (disturbance), topography and other relevant landscape features of the area covered by the planning proposal. The inspection should determine if Aboriginal objects can be identified on the surface or are likely to be contained below the surface in areas of potential archaeological deposit. A targeted approach may be used if the area is large, but, if used, the targeted approach should be archaeologically justifiable and suitably documented.

4. Consultation with Aboriginal knowledge holders:

The information collected as part of the AHIMS search, landscape features and site inspection should be informed by relevant local Aboriginal knowledge that will aid in determining any significance values associated with the land subject to the planning proposal. Consultation with Aboriginal people who have appropriate cultural information relevant to determining significance should be undertaken in accordance with the *Aboriginal cultural heritage consultation requirements for proponents* DECCW 2010, available at [www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/09781ACHconsultreq.pdf](http://www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/09781ACHconsultreq.pdf)

If cultural heritage values are known or are likely to occur, the planning proposal should indicate what further studies and consultation will be undertaken post Gateway determination and how Aboriginal cultural heritage values could be addressed through appropriate planning provisions.

**Due diligence is not an assessment of Aboriginal cultural heritage values**

It is important to note that *The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (2010) should not be used to support a planning proposal. Due diligence is an assessment of likely harm and not a detailed assessment of Aboriginal cultural heritage values. Due Diligence is a voluntary process that provides an individual with a defence against prosecution for the strict liability offence if they later unknowingly harm an Aboriginal object without an Aboriginal Heritage Impact Permit.

**If Aboriginal cultural heritage values are known or are likely to occur in the planning proposal area then a detailed investigation of Aboriginal cultural heritage values is required**

A suitably qualified person should identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the proposal. This may include the need for archaeological surface surveys and test excavation, anthropological assessments and ethnographic studies. Identifying cultural heritage values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (DECCW, 2011) available at: [www.environment.nsw.gov.au/licences/investassessreport.htm](http://www.environment.nsw.gov.au/licences/investassessreport.htm).

Consultation with Aboriginal people should be undertaken in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010) available at: [www.environment.nsw.gov.au/licences/consultation.htm](http://www.environment.nsw.gov.au/licences/consultation.htm).

The significance of cultural heritage values for Aboriginal people who have a cultural association with the land should be documented in the planning proposal. These results should be considered in addition to any archaeological values that the land may retain.



## Planning proposals must contain provisions to help conserve Aboriginal cultural heritage


The planning proposal must include provisions to facilitate the conservation of Aboriginal cultural heritage values in accordance with Local Planning Direction 2.3. Provisions may include:

- appropriate land use zoning (e.g. E2 conservation)
- redesign of future development to avoid harm
- incorporating areas into passive open space
- recommendations for a Development Control Plan.

If impacts to Aboriginal cultural heritage cannot be avoided, they must be minimised and managed. It is important to note that any impact to Aboriginal cultural heritage can only proceed in accordance with appropriate authorisation (such as an approved Aboriginal Heritage Impact Permit - AHIP).

If you have any enquiries concerning this advice, please contact Ziggy Andersons, Conservation Planning Officer, on 4927 3151.

Yours sincerely

 29 MAR 2016

**RICHARD BATH**  
Senior Team Leader Planning, Hunter Central Coast Region  
Regional Operations



DOC16/568556-2  
PP 2016 GTARE 001 00

Ms Angela Tinlin  
Assistant Strategic Planner  
MidCoast Council  
angela.tinlin@midcoast.nsw.gov.au

Dear Ms Tinlin


**Planning Proposal – Tallwoods, Lot 612 DP 1160096, Blackhead Road, Hallidays Point**

I refer to your email dated 9 November 2016 seeking advice from the Office of Environment and Heritage (OEH) in relation to the above mentioned planning proposal. It is understood that the proposal seeks to amend the Greater Taree Local Environmental Plan 2010 to rezone Lot 612 DP 1160096 from RU1 Primary Production to R1 General Residential and E2 Environmental Conservation. It is noted that a positive Gateway Determination was made in relation to this proposal on 26 February 2016 which included various concerns to be addressed by Council including consideration of s117 directions 2.1 Environmental Protection and 2.3 Heritage Conservation, the use of environmental zones, and the proposals impact on the regional habitat corridor.

OEH objects to the rezoning proceeding based on concerns with the adequacy of the Aboriginal cultural heritage assessment process. Further detail on this is provided in **Attachment 1**. Within the attachment advice is also provided in relation to biodiversity considerations if the proposal progresses.

If you require any further information regarding this matter please contact Anne Browett, Conservation Planning Officer, on 4927 3160.

Yours sincerely



25 NOV 2016

**RICHARD BATH**  
Senior Team Leader Planning, Hunter Central Coast Region  
Regional Operations

cc: Department of Planning and Environment  
Enclosure: Attachment 1

## ATTACHMENT 1: OEH REVIEW OF PLANNING PROPOSAL AT TALLWOODS, LOT 612 DP 1160096, BLACKHEAD ROAD, HALLIDAYS POINT

The Office of Environment and Heritage (OEH) understands that MidCoast Council proposes to amend the Greater Taree Local Environmental Plan 2010 to rezone Lot 612 DP 1160096 from RU1 Primary Production to R1 General Residential and E2 Environmental Conservation at Tallwoods, Lot 612 DP 1160096, Blackhead Road, Hallidays Point. OEH objects to the proposal proceeding given concerns with the adequacy of the Aboriginal cultural heritage assessment process. Details of these concerns are outlined below. In addition, OEH provides advice to Council in relation to biodiversity matters, in particular the need to achieve an 'improve or maintain' outcome for biodiversity values as the proposal progresses.

### ABORIGINAL CULTURAL HERITAGE

OEH objects to the proposed rezoning due to concerns with the adequacy of the Aboriginal cultural heritage assessment process. OEH understands that the Aboriginal Heritage Assessment (AHA) (Myall Coast Archaeological Services 2016) has not identified any Aboriginal cultural heritage constraints within the proposed rezoning area. However, it is noted a number of inconsistencies and conflicting statements within the AHA which raise questions about the potential Aboriginal cultural heritage values of the proposed rezoning area. OEH requests clarification on the following matters in order to reassess the proposal:

- The AHA has determined that subsurface objects are unlikely within the proposed rezoning area, however, the justification for this finding is inadequate and sometimes contradictory. For example, the assessment does not adequately address the presence of landscape features (specifically proximity to water) within the project area, and justify how these features have been considered in determining that the proposed rezoning area has low potential (especially given the site survey was inhibited by "*almost non-existent*" visibility). The assessment states that the proposed rezoning area is not within 200 metres of any 'waters' (as defined), however, the rezoning proposal identifies a small area of freshwater wetland in the north east corner of the site, and three drainage lines are mapped in the AHA. Indeed the AHA acknowledges the potential sensitivity of wetlands margins, noting that artefacts could be expected in these areas. Similarly, the AHA includes conflicting statements regarding the nature and extent of "*disturbed land*" within the proposed rezoning area, variously stating that "*the greater proportion of the study area cannot be classified as disturbed*" but subsequently discussing destruction of the soil profile through earthworks. Further clarification of these matters is required so that the assessment of the likelihood of Aboriginal objects being present is clearly justified.
- The AHA states that subsurface objects are unlikely to occur within the project area, yet subsequently recommends that archaeological test excavations be conducted in areas likely to be disturbed by earthworks under the *Code of Practice for Archaeological Investigation of Aboriginal objects in NSW* (DECCW 2010). The Code of Practice outlines a process whereby archaeological test excavations can be undertaken without an Aboriginal Heritage Impact Permit in instances where it can be demonstrated that sub-surface Aboriginal objects with potential conservation value have a high probability of being present in an area. Therefore the inclusion of a recommendation for test excavation in this case seems to imply that Aboriginal objects are considered likely to be present within the proposed rezoning area. This does not align with the finding that there is a low likelihood of Aboriginal objects being present within the proposed rezoning area.
- The AHA states that the proposed rezoning area has scientific value, but does not elaborate on how these values have been identified and how they may be impacted by the proposed rezoning.
- The AHA recommends that a Management Plan be prepared to "*consider preservation and protection of Aboriginal heritage values*", however, the assessment does not articulate what Aboriginal heritage values have been identified and how they may be impacted by the proposed rezoning.

- The AHA states that Aboriginal community consultation has been undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010), however, limited evidence of this is included in the report. Further documentation of the consultation processes should be included in the revised AHA (e.g. copies of correspondence with registered Aboriginal parties, a consultation log).

OEH is currently unable to support the proposed rezoning because of the matters outlined above. However, if the AHA is revised to address these matters and re-submitted, OEH can provide a review and updated advice to Council at that time.

## **BIODIVERSITY**

OEH supports the E2 Environmental Conservation zoning proposed for the Freshwater Wetland on Coastal Floodplains EEC and associated buffer areas. However, it is unclear how the proposed R1 General Residential rezoning and subsequent impacts to the dry sclerophyll woodland will be offset or compensated for in order to achieve an improve or maintain outcome for biodiversity values over the site. OEH also notes that this dry sclerophyll woodland vegetation is not allocated to a plant community type in the Statutory Ecological Assessment (Naturecall Environmental, September 2015). It is important for Council and the proponent to address these points as the proposal progresses. In order to quantify any impacts on biodiversity and any biodiversity offsets required to achieve an improve or maintain outcome, OEH recommends the use of the Biobanking Assessment Methodology 2014. Further detail on assessing and offsetting impacts on biodiversity can be found at: [www.environment.nsw.gov.au/biodivoffsets](http://www.environment.nsw.gov.au/biodivoffsets)

It is noted that the Froggala-Swamp Regional Corridor (with focal species brush-tailed phascogale and rufous bettong) is mapped over part of the property. Council could investigate whether there are opportunities for improving connectivity across the broader landscape as part of this development process, for example strategic revegetation/rehabilitation in important connectivity areas.

Council should note that in the absence of a formal Biodiversity Certification or BioBanking Agreement under Parts 7A and 7AA of the *Threatened Species Conservation Act 1995*, threatened species assessments under the *Environmental Planning and Assessment Act 1979* will be required at the development application stage. If the proposed development application is for land that is critical habitat or is likely to significantly affect threatened species, populations or ecological communities or their habitats, a Species Impact Statement will be required and OEH will have a concurrence role in the development application.



Office of  
Environment  
& Heritage

DOC17/298556-2  
PP 2016 GTARE 001 00

Ms Angela Tinlin  
Town Planner - Strategic  
MidCoast Council  
angela.tinlin@midcoast.nsw.gov.au

Dear Ms Tinlin

**Updated Aboriginal Heritage Assessment – Tallwoods Planning Proposal - Lot 612 DP 1160096, Blackhead Rd, Hallidays Point**

I refer to your email dated 29 May 2017 seeking advice from the Office of Environment and Heritage (OEH) in relation to further updates to the *Aboriginal Heritage Assessment* prepared for the Tallwoods planning proposal. I also refer to previous correspondence between OEH and council in relation to this assessment and associated planning proposal including letters dated 25 November 2016, 9 February, 10 March and 12 April 2017, and various telephone conversations.

OEH has reviewed the updated *Aboriginal Heritage Assessment* (dated 23 October 2017) prepared by Myall Coast Archaeological Services, and is satisfied that the concerns raised previously by OEH in relation to the assessment have now been adequately addressed. As such, OEH does not have any objection to the planning proposal with respect to Aboriginal cultural heritage.

Should you have any questions in relation to this matter, please contact Anne Browett, Conservation Planning Officer, on 4927 3160.

Yours sincerely

19 JUN 2017

**RICHARD BATH**  
Senior Team Leader Planning, Hunter Central Coast  
Regional Operations



# NSW RURAL FIRE SERVICE



The General Manager  
Mid Coast Council  
PO Box 482  
TAREE NSW 2430

Your reference: PP\_2016\_GTARE  
Our reference: L08/0054  
DA16111404718AB

Attention: Angela Tinlin

24 March 2017

Dear Ms Tinlin

**Agency Comment: Greater Taree LEP 2010 Planning Proposal – Rezoning of Lot 612 DP 1160096; 166 Blackhead Road Hallidays Point**

I refer to your correspondence dated 9 November 2016 and 23 February 2017 seeking comments from the NSW Rural Fire Service (NSW RFS) with respect to the above Planning Proposal.

The NSW RFS has reviewed the submitted documentation and understands the Planning Proposal will amend Greater Taree Local Environmental Plan 2010 in the following manner:

- Rezone Lot 612 DP 1160096 to R1 General Residential and E2 Environmental Management;
- Amend the minimum lot size map for Lot 612 DP 1160096 to permit subdivision to 450m<sup>2</sup> per residential allotment and 40 hectares within the E2 land use zone;
- Amend the floor space ratio map for Lot 612 DP 1160096 to permit a minimum 0.6:1 residential floor space per allotment;
- Amend the height of buildings map for Lot 612 DP 1160096 to permit maximum building height of 8.5 metres.

The land to which the Planning Proposal relates is mapped as bush fire prone land by Mid Coast Council.

The RFS notes that no residential subdivision concept plan or overall Development Masterplan for the Tallwoods locality has been forwarded with the Planning Proposal. Additional information provided by Council dated 23 February 2017 has identified that future public road access will be linked to:

*"A local plan under DCP 2010 is proposed to be made which will require future subdivision of the land to include connection to the adjoining properties to the east and west. The land to the east is also identified for future development in the local and regional planning strategies and will provide a link back to Grangewood Avenue. The land to the west may be developed in the future (and was identified for future large lot residential development in the draft Manning Valley Local Strategy) and may provide a link to either Blackhead Road or Chelmsbrook Road."*

The NSW RFS has no objection to the Planning Proposal and provides the following comment:

Postal address  
NSW Rural Fire Service  
Locked bag 17  
GRANVILLE NSW 2142

Street address  
NSW Rural Fire Service  
Planning and Environmental Services  
Suite 1, 129 West High Street  
COFFS HARBOUR NSW 2450

T (02) 6691 0400  
F (02) 6691 0499  
[www.rfs.nsw.gov.au](http://www.rfs.nsw.gov.au)



- Any future residential subdivision development applications under S100B of the Rural Fires Act 1979 shall comply with the specifications and requirements of *Planning for Bush Fire Protection 2006*.
- The future residential subdivision layout shall include public road linkages to existing lands immediately to the east and west of the subject land.
- The future residential subdivision layout shall include a emergency road access from the proposed public road system to Blackhead Road.

For any queries regarding this correspondence please contact Alan Bawden on 6691 0400.

Yours sincerely



**John Ball**  
**Manager – Planning and Environment Services**

*The RFS has made getting information easier. For general information on 'Planning for Bush Fire Protection, 2006', visit the RFS web page at [www.rfs.nsw.gov.au](http://www.rfs.nsw.gov.au) and search under 'Planning for Bush Fire Protection, 2006'.*

Date: 25<sup>th</sup> November 2016  
MCW Ref: 73062  
Your Ref: PP\_2016\_GTARE\_001\_00

The General Manager  
MidCoast Council  
PO Box 482  
Taree NSW 2430

Att: Angela Tinlin

Via Email: [Angela.tinlin@midcoast.nsw.gov.au](mailto:Angela.tinlin@midcoast.nsw.gov.au)  
CC: [Michael.griffith@midcoast.nsw.gov.au](mailto:Michael.griffith@midcoast.nsw.gov.au)

RE: PLANNING PROPOSAL: 166 BLACKHEAD RD, HALLIDAYS POINT (PP\_2016\_GTARE\_001\_00)

Dear Angela,

Thank you for the opportunity to provide a submission in relation to the planning proposal for 166 Blackhead Rd, Hallidays Point (Lot 612 DP1160096).

The proposed rezoning is within MidCoast Water's servicing area and can be serviced through an extension of both water and sewerage reticulated networks. At the time of writing there is sufficient capacity within the water and sewer networks to cater for the proposed development as outlined in the planning proposal.

MidCoast Water is planning an augmentation of the existing sewer network servicing this area for the 2017/2018 financial year. This augmentation is necessary to support the servicing of current development on Lot 4 DP260256 and will also enable servicing of the proposed land subject to this planning proposal.

MidCoast Water is content for the planning proposal to proceed subject to the following conditions:

1. Applicants for development of the site are required to submit a local water supply and sewerage strategy for MidCoast Water's approval. This strategy is to confirm the proposed residential development can be serviced through connections to the existing water supply and sewerage networks.
2. All water supply and sewerage infrastructure necessary to service the site will be constructed to MidCoast Water's requirements and shall be provided at the applicant's cost.

ABN 33 274 464 218 All correspondence to PO Box 671 Taree, NSW 2430

General enquiries 1300 133 455 Fax 02 6555 8516 Web [midcoastwater.com.au](http://midcoastwater.com.au)

Forster Customer Service Centre 16 Breese Parade Forster Taree Customer Service Centre 26 Muldoon Street Taree







3. In order to satisfy water supply and sewerage servicing requirements the following conditions are to be applied to approvals for development within the site:

- a. *Provision of Certificate of Attainment (for construction of services)*
- b. *Provision of Certificate of Compliance (for Subdivision)*

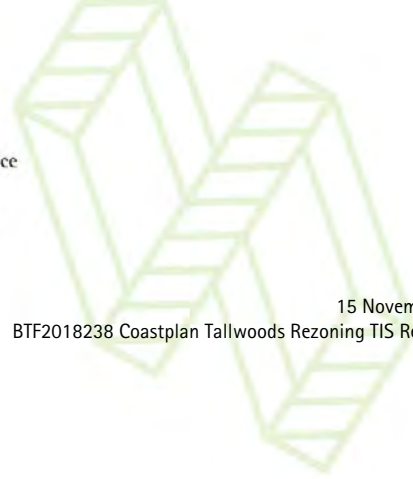
Please feel free to contact me on (02) 6591 7513 should you have any questions or require further information.

Yours faithfully

**Craig Wilkinson**  
**Development Coordinator**



## ***Attachment F – Traffic report***



15 November 2017

BTF2018238 Coastplan Tallwoods Rezoning TIS Rev01.docx

Focal Point Properties and Stedikas Holdings  
C/- Coast Plan Group  
PO Box 568  
Forster NSW 2428  
Attn: Gavin Maberly-Smith

E: [gavin@coastplan.com.au](mailto:gavin@coastplan.com.au)

Dear Gavin,

## TRAFFIC IMPACT STATEMENT

### Proposed Rezoning Tallwoods Village NSW.

Further to your recent instructions, we have now reviewed the site and traffic conditions for the proposed rezoning of land for a residential development off The Pulpit at Tallwoods Village NSW, and completed a traffic impact assessment for the proposal. This letter outlines our advice prepared in accordance with the RTA Guide to Traffic Generating Developments (Version 2.0, RTA October 2002).

#### Background to the Proposal

The planning proposal seeks to amend the *Greater Taree Local Environmental Plan 2010* (LEP 2010) to provide for residential development adjoining the Tallwoods Village. It is understood that Lot 612 Blackhead Road, Hallidays Point has been identified as an extension of the Tallwoods Village in local strategies since 2000 and is consistent with the *Mid North Coast Regional Strategy 2006-2031*.

Scope of Work – Our completed scope of work for the assessment was:

- a. **Traffic data collection.** We have allowed for turning movement data collection at 2 locations:
  - i. Grangewood Avenue/ The Boulevard
  - ii. Grangewood Avenue/ The PulpitAdditional data is available from another 2 locations collected in early 2017:
  - iii. Blackhead Road / The Boulevard
  - ii. The Boulevard / Coastal View Drive
- b. **Access Review**–Review of traffic aspects of the proposed access to subject site.
- d. **Traffic Impact Assessment and Draft Report** – Completed in accordance with the requirements of the Guide to Traffic Generating Developments (RTA October 2002) and is a standardised assessment process.
- e. **Site Inspection** – Allowance for one site visit
- f. **Document Reviews and Final Traffic Impact Statement** – Review collated comments / issues.



#### Traffic Impact Statement



This Traffic Impact Statement has been prepared having due regard for the requirements of the Guide to Traffic Generating Developments (Version 2.2, RTA October 2002) and Austroads guidelines. Details of the findings and recommendations of the assessment process are attached.

The TIS has considered:

- Network capacity (including intersections) for this development's traffic
- Safety of the roads and intersections for this development's traffic
- Vehicles queuing on public roads
- Pedestrian access including routes to bus stops
- Waste collection services and emergency vehicles

1. TRAFFIC IMPACT ASSESSMENT

Item	Issue	Comment
<b>2. Existing Situation</b>		
<b>2.1 Site Description &amp; Proposed Activity</b>		
2.11 Site Location and NO Access	NO	<p>The subject land, known as Lot 612 Blackhead Road, is located in Hallidays Point, which is south east of the regional centre of Taree and north of Forster. Hallidays Point is approximately 250km north east of Sydney within the Mid North Coast region.</p> <p>It is approximately 17.02 hectares in area and currently zoned RU1 Primary Production. The subject site adjoins the Tallwoods Village and is located south west of the existing developed areas. The regional context and site location are shown in Figure 1 &amp; 2 below.</p>
		
<p><b>Figure 1 - Regional Context</b></p>		
<p>The site location is illustrated below.</p>		
		
<p><b>Figure 2 - Site Location</b></p>		

Item	Issue	Comment
<b>2.2 Existing Traffic</b>	<b>Conditions</b>	
2.2.1 Road Hierarchy	NO	<p><u>The Lakes Way</u></p> <p>The Lakes Way is a 2 lane rural arterial standard regional road in this location under the care and control of Mid Coast Council, with some sections also under NSW Roads and Maritime Services. It connects with the Pacific Highway just north of Bulahdelah, and to coastal twin towns of Foster and Tuncurry at the entrance to Wallace Lake. The road continues north to connect again with the Pacific Highway between Nahiack and Taree.</p> <p>The sealed carriageway width is approx. 11 metres, a 9 metre pavement with 1 metre sealed shoulders.</p>  <p><b>Photo Plate 1 – The Lakes Way</b></p> <p><u>Blackhead Road</u></p> <p>Blackhead Road is a rural collector road that connects the localities of Black Head, Red Head, and Diamond Beach with The Lakes Way, to the north of Failford Road. It is built to a 2 lane 2 way standard. The sealed pavement width is approximately 9 metres wide.</p>  <p><b>Photo Plate 2 – Black Head Road</b></p>

Item	Issue	Comment
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The intersection of Blackhead Rod and The Boulevard is constructed with standard Channelised Right and Auxiliary Left turn lanes.

The Boulevard

The Boulevard is an urban collector road, the main entrance to Tallwoods Village. Passed its entry treatment on Blackhead road it is built to a generous 2 lane 2 way standard. (Sufficient width for 2 travel lanes and 2 parking lanes.)

The posted speed limit on The Boulevard in the vicinity of the Blackhead Road intersection is 50 kph.



Photo Plate 3 – The Boulevard looking south toward Blackhead Road



Photo Plate 4 – The Boulevard looking south Coastal View Drive Rbt

Item	Issue	Comment
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Grangewood Avenue  
 Grangewood Avenue is an urban local road built to Council standards, serving as access for the western areas of Tallwoods Village. It is built to a 2 lane 2 way standard of sufficient width (approximately 8 metres) to allow 2 travel lanes and occasional parking. It has two distinct sections, one almost rural in nature and the western section, a typical urban local street with residential property frontage along a curvilinear alignment. Sight lines are satisfactory for the low levels of traffic volumes that use the road.



Photo Plate 4 – Grangewood Avenue looking east toward The Boulevard



Photo Plate 5 – Grangewood Avenue east of The Pulpit

Item	Issue	Comment
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The Pulpit

The Pulpit is a local 'edge' road built to Council standards, serving as access for the western edge of Tallwoods Village. It is built to a 2 lane 2 way standard of sufficient width to allow 2 travel lanes and occasional parking.



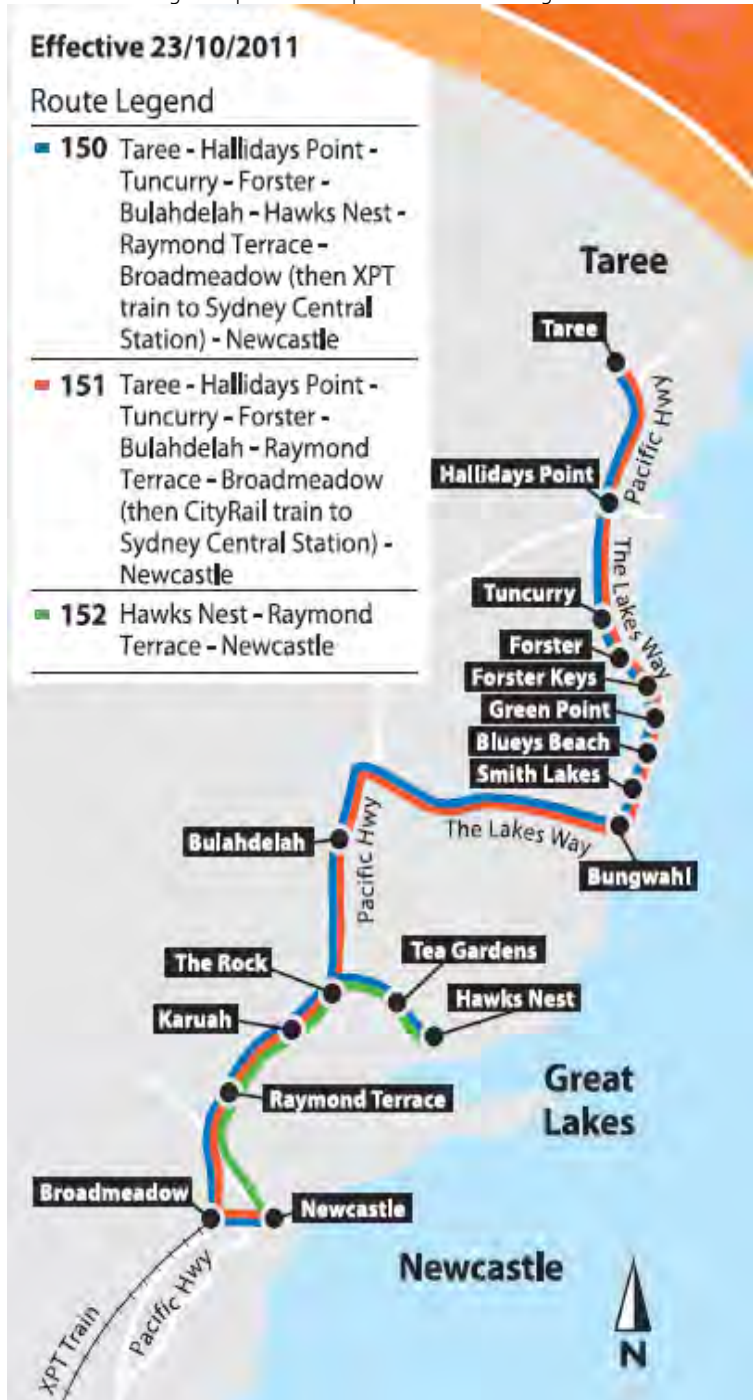
Photo Plate 5 – The Pulpit looking south toward Grangewood Avenue



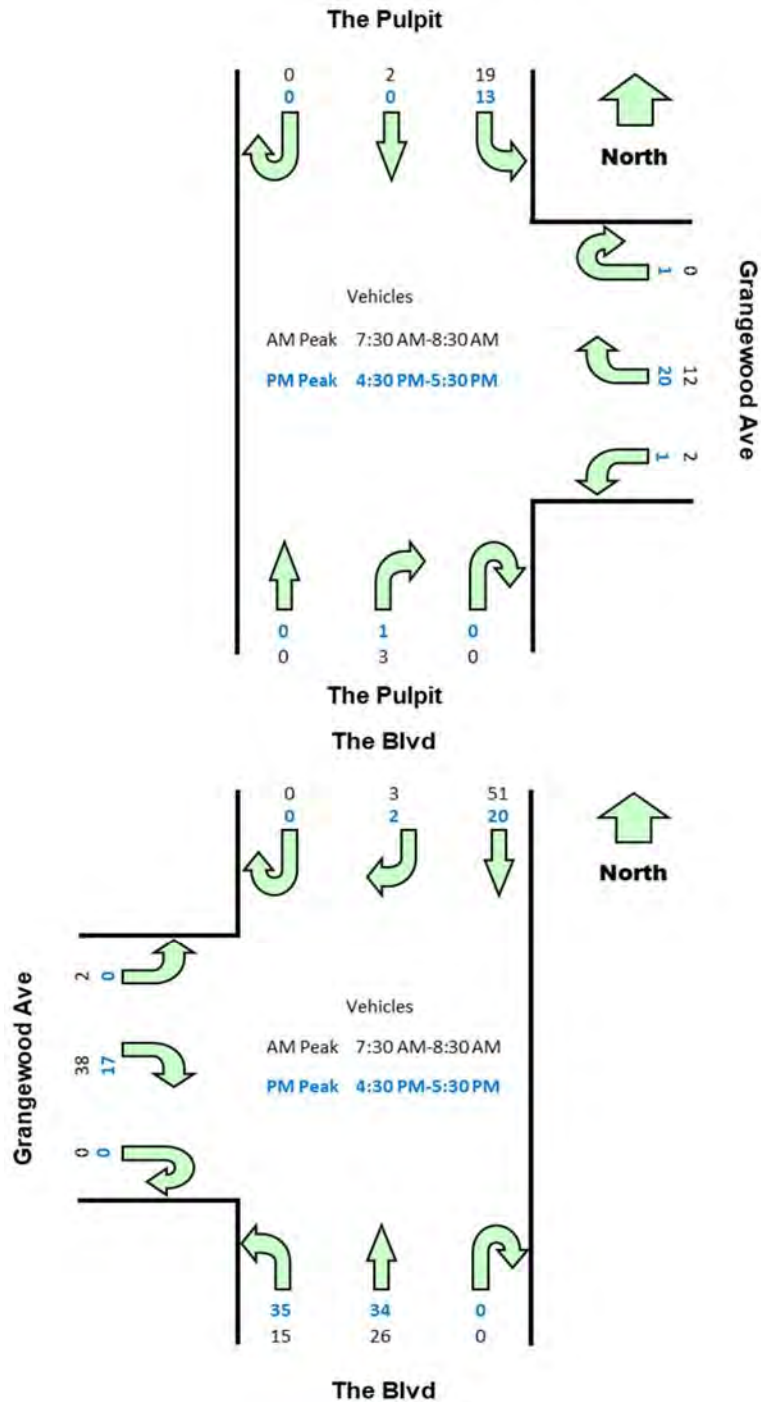
Photo Plate 6 – The Pulpit looking south toward site



Item	Issue	Comment
2.2.2 Roadworks	NO	No known works program other than routine maintenance by Council.
2.2.3 Traffic Management Works	NO	Recent upgrade works at the junction of Blackhead Rd and The Lakes Way have been completed. No other known works program other than routine maintenance by Council.
2.2.4 Pedestrian and Cycling Facilities	NO	NO specific Pedestrian or Cycling facilities of note in the vicinity of the subject site.
2.2.5 Public Transport	NO	Busways operates services from Taree to Newcastle via Hallidays Point, Tuncurry and Forster. No changes to public transport services serving Tallwoods are envisaged.

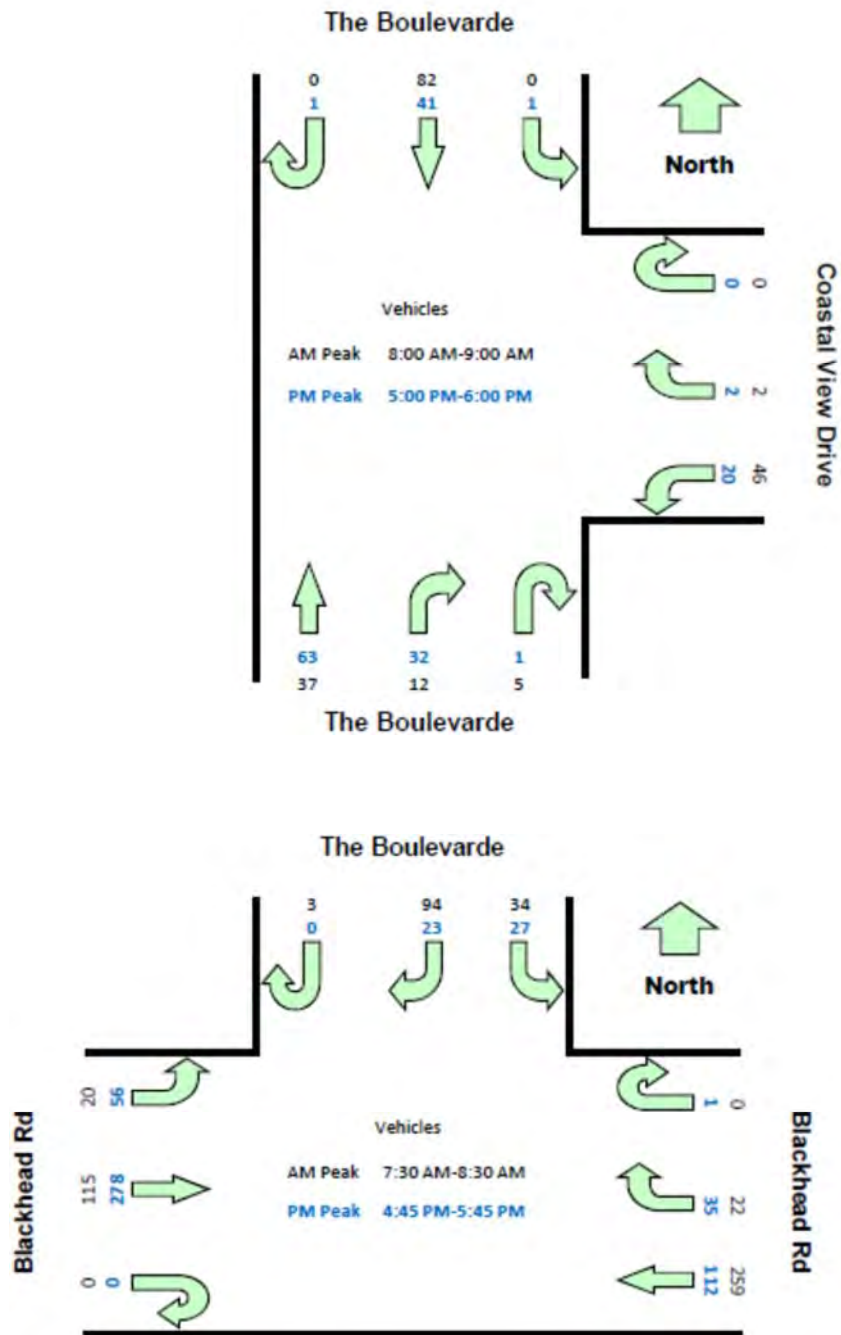


Item	Issue	Comment
2.3 Traffic Flows	NO	Traffic movement surveys were conducted on 23 <sup>rd</sup> February 2017 at the intersections of The Boulevard with Blackhead Road and Coastal View Drive, and on 18 <sup>th</sup> October 2017 at the intersections of Grangewood Avenue with The Boulevard and The Pulpit. Copies of the survey results are attached to this Statement. In all instances intersection volumes were observed at levels below which capacity analysis is unnecessary, as defined in the Austroads guidelines (Austroads 2009.)



Traffic Surveys 18 October 2017

Item	Issue	Comment
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Traffic Surveys 23 February 2017

Item	Issue	Comment
2.3.1 Daily Traffic Flows	NO	Daily traffic on the local road network are well within agreed capacity limits for an urban road network.
2.3.2 Daily Traffic Flow Distribution	NO	As per observed traffic movements surveys on 23 <sup>rd</sup> February 2017.
2.3.3 Vehicle Speeds	NO	No speed survey completed. Traffic speeds observed on local road network were within the currently posted speed limit. Posted speed limit (50 km/h) is appropriate for local urban road conditions.
2.3.4 Existing Site Flows	NO	Site vacant – no flows
2.3.5 Heavy Vehicle Flows	NO	Limited. Garbage collection vehicles and occasional delivery vehicles by small commercial vehicles only. Services would operate in a similar manner to those already servicing the Tallwoods Village. This would also apply for emergency service vehicles.
2.3.6 Current Road Operations	NO	Observed as being well within accepted urban road capacity limits.
<b>2.4 Traffic Safety and Accident History</b>	NO	Specific accident investigations have not been completed, observed traffic flows being well within accepted urban road environmental capacity limits. No significant accident issues are expected.
<b>2.5 Parking Supply and Demand</b>	NO	Very low existing parking demand observed on the approach road network to the subject site.
2.5.1 On-street Parking Provision	NO	Ample existing on street parking supply. Very low existing parking demand observed on the approach road network to the subject site.
2.5.2 Off-Street Parking Provision	NO	New site - vacant, no existing parking provision. Design to Council requirements expected to more than cater for site demands.
2.5.3 Parking Demand and Utilisation	NO	Limited vehicles parked adjacent to site. Existing on street parking demand is minimal.
2.5.4 Set down or pick up areas	NO	Limited vehicles parked adjacent to site. No existing set down / pick up adjacent to site areas
<b>2.6 Public Transport</b>		
2.6.1 Rail Station Locations	NO	None in vicinity of subject site.
2.6.2 Bus Stops and Associated Facilities	NO	Existing bus route and services on Blackhead Road serving Hallidays Point (Including Tallwoods Village) Taree, Tuncurry, Forster, Newcastle Route.
2.6.3 Pedestrians	NO	No specific existing pedestrian facilities or demand. Expect similar treatment for subject site to surrounding Tallwoods design standards. (i.e. no paved footpaths on Grangewood or The Pulpit.)
<b>2.7 Other Proposed Developments</b>	NO	None known.
<b>3. Proposed Development</b>		
3.1 The Development	-	Site Area = 17.02 Ha Net Developable Area = 15.8 Ha Number of dwellings proposed / planned = 150
3.1.1 Nature of Development	-	<b>General Residential Zone</b>
3.1.2 Access and Circulation Requirements	NO	All parking for the subject site is to be accommodated on site. Vehicle access is possible with entry and exit in a forward direction from The Pulpit.
<b>3.2 Access</b>	NO	All vehicles will be able to enter and exit the site in a forward direction.
3.2.1 Driveway Location	NO	Access road location on The Pulpit considered satisfactory.
3.2.2 Sight Distances	NO	Posted speed limit will be local at 50 km/h. Visibility requirement of 40 metres in both directions. No issues anticipated with road design.

Item	Issue	Comment
3.2.3 <i>Service Vehicle Access</i>	NO	Local street system within the subject site assumed will be designed to cater for standard refuse collection at kerbside. Occasional access for small commercial delivery vehicles would also be able to be accommodated within the site if required.
3.2.4 <i>Queuing at entrance to site</i>	NO	With ample parking on site traffic movements associated with site are therefore unlikely to form queues off site.
3.2.5 <i>Comparison with existing site access</i>	NO	New road - no existing site access.
3.2.6 <i>Access to Public Transport</i>	NO	No change to existing public transport access is proposed. Residents of the new village will be able to make use of the existing services for Tallwoods Village.
<b>3.3 Circulation</b>		
3.3.1 <i>Pattern of circulation</i>	NO	All vehicles can enter and exit the site in a forward direction
3.3.2 <i>Road width</i>	NO	All driveway and road widths assumed to be able to conform to local road design requirements
3.3.3 <i>Internal Bus Movements</i>	NO	NOT required
3.3.4 <i>Service Area Layout</i>	NO	NOT required
<b>3.4 Parking</b>		
3.4.1 <i>Proposed Supply</i>		See Below
3.4.2 <i>Authority Parking Requirements</i>	NO	Individual allotments within the subject site assumed to be provided with individual parking supply to meet Council's requirements.
3.4.3 <i>Parking Layout</i>	NO	Assumed that parking will be designed to conform to AS/NZS 2890 - Off Street Car parking facilities requirements. (And expected to be conditioned as such by Council.)
3.4.4 <i>Parking Demand</i>	NO	Subject site capable of meeting its parking demand requirements.
3.4.5 <i>Service Vehicle Parking</i>	NO	No specific parking provided or required
3.4.6 <i>Pedestrian and Bicycle Facilities</i>	NO	No specific facilities provided. Road system of the subject site is expected to be designed as a low speed urban environment to Council's residential standards.
<b>4. Impact of Proposed Development</b>		
4.1 <b>Traffic Generation</b>	NO	Proposal is for 150 lots which will generate up to 107 AM peak vehicle movements and 117 PM peak vehicle movements in the weekday peak hours under residential demands. (RTA August 2013) Daily trip generation will be in the order of 1110 vehicle movements. (Rates applied are as per RMS Technical Direction TDT 2013/04a, August 2013)
4.1.1 <i>Daily and Seasonal Factors</i>	NO	Limited variation in daily and seasonal flows is anticipated from this style of development. .
4.1.2 <i>Pedestrian Movements</i>	NO	No specific existing pedestrian facilities or demand beyond standard residential requirements expected or assumed. Expect similar treatment for subject site to surrounding Tallwoods design standards, (i.e. no paved footpaths on Grangewood or The Pulpit.) with the local pedestrian arrangements appropriate for the site functions. Limited external pedestrian movements are anticipated from the subject site.
4.2 <b>Traffic Distribution and Assignments</b>	NO	Consistent with observed existing distribution and assignments patterns. Volumes do not represent an impact beyond existing environmental capacity limits.
4.2.1 <i>Origin / destinations assignment</i>	NO	Consistent with observed existing distribution and assignments patterns. Volumes do not represent an impact beyond existing environmental capacity limits.
4.3 <b>Impact on Road Safety</b>	NO	Traffic flows are relatively low, designs will be in accordance with the requisite standards and so impact on road safety is expected to be low.
4.4 <b>Impact of Generated Traffic</b>	NO	Maximum of 117 vehicles per hour in the PM peak, added to all roads including The Pulpit, Grangewood Ave, the Boulevard and Blackhead Road is well within the existing environmental capacity of the road network.

Item	Issue	Comment
4.4.1 <i>Impact on daily Traffic Flows</i>	NO	1110 vehicles per day added to all roads including The Pulpit, Grangewood Ave, the Boulevard and Blackhead Road is well within the existing capacity of the road network.
4.4.2 <i>Peak Hour Impacts on Intersections</i>	NO	107 vehicles per hour in the AM peak, 117 vehicles per hour in the PM peak, added to all intersections including The Pulpit, Grangewood Ave, the Boulevard and Blackhead Road is well within the existing capacity of these intersection. Flows will remain at levels below which capacity analysis is unnecessary
4.4.3 <i>Impact of Construction Traffic</i>	NO	Majority of construction work will be contained within site. A Construction Traffic Management Plan (CTMP) is recommended to cover movements on the existing local road network on the Boulevard, Grangewood Avenue and The Pulpit from Blackhead road to the subject site.
4.4.4 <i>Other Developments</i>	NO	None known.
<b>4.5 Public Transport</b>	NO	No changes proposed or required. Existing services are considered to have adequate capacity to cater for the marginal change in demand from the subject site.
4.5.1 <i>Options for improving services</i>	NO	Not considered warranted based on the low demands generated by the subject site alone.
4.5.2 <i>Pedestrian Access to Bus Stops</i>	NO	Unchanged from existing arrangements
<b>4.6 Recommended Works</b>		
4.6.1 <i>Improvements to Access and Circulation</i>	-	Assumed all road design will be in accordance with requisite Council design standards.
4.6.2 <i>Improvements to External Road Network</i>	-	None required.
4.6.3 <i>Improvements to Pedestrian Facilities</i>	-	None required.
4.6.4 <i>Effect of Recommended Works on Adjacent Developments</i>	-	Nil
4.6.5 <i>Effect of Recommended Works on Public Transport Services</i>	-	Nil
4.6.6 <i>Provision of LATM Measures</i>	-	None required
4.6.7 <i>Funding</i>	-	Developer funded local road network and facilities to support the subject site.

## 2. EVALUATION OF SITE ACCESS

### Trip Generation and Environmental Capacity Assessment

With 15.8 Ha of residential land, and a planned yield for the site of 150 lots, generated peak trips based on the RMS trips rates (RMS TDT/04a, RMS August 2013) of 0.71 (AM) and 0.78 (PM) trips per hour would be 107 AM trips and 117 PM trips.

Existing flows recorded on Grangewood Avenue are:

AM 2 way volume on Grangewood near The Boulevard – 58 vph

PM 2 way volume on Grangewood near The Boulevard – 54 vph

So Existing plus development would be:

58+107= 165 vph AM

54+117= 171 vph PM



The RMS stated environmental goal for a local street is 200 vph (RTA GtTGD Version 2 October 2002) as reproduced in the table below. The environmental maximum peak hour volume for a local street is 300 vph

The equivalent goals and maximum for a collector class road are:

Environmental goal for a collector street is 300 vph

Environmental maximum for a collector street is 500 vph

Even on The Boulevard immediately north of Black Head Road , the existing plus development peak hour flows are forecast to be less than 300 vehicles per hour (277 (AM) , 258 (PM) ) which means the flows are also less than the environmental goal for a collector street.

### Environmental capacity performance standards on residential streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal 300 maximum
Collector	Street	50	300 environmental goal 500 maximum

**Note:** Maximum speed relates to the appropriate design maximum speeds in new residential developments. In existing areas maximum speed relates to 85th percentile speed.

Table 1 Environmental capacity performance standards on residential streets

Source: RTA GtTGD Version 2 October 2002

### Intersection Performance Assessment

Using the 2017 recorded traffic flows and adding the forecast flows from the subject site (107 vph (AM), 117 vph (PM)) all intersections from the Pulpit to The Boulevard will have flow combinations that are less than the volumes below which intersection analysis is considered unnecessary, as illustrated in Table 2 overleaf.

### Intersection volumes below which capacity analysis is unnecessary

Type of road	Light cross and turning volumes maximum design hour volumes vehicles per hour (two way)		
Two-lane major road	400	500	650
Cross road	250	200	100
Four-lane major road	1000	1500	2000
Cross road	100	50	25

Source: Austroads Guide to Traffic Management Part 3 Traffic Studies and Analysis

Table 2 Intersection volumes below which capacity analysis is unnecessary

Even the flow combinations at the intersection of The Boulevard and Blackhead Road are forecast to be 277/396 (AM) and 258/425 (PM) are only just outside the thresholds nominated in Table 2 above.



Intersection modelling using the SIDRA Intersection tool, applied to a 'T' junction with flows at this level will record a Level of Service of 'A' under the Austroads Guidelines, which is the highest performance level for an intersection.

It is noted that the intersection of Blackhead Road and The Boulevard is already planned to be upgraded to a 4 leg roundabout junction to accommodate development on the southern side of Blackhead Road. Roundabout control is an even higher form of intersection control that will also be able to operate at the highest service levels while catering for the existing flows plus planned development, and including the forecast flows from the subject site of this investigation.

#### Impact on Road Safety

It is noted that the alignment of Grangewood Avenue through the residential precinct near its western end includes a number of horizontal and vertical curves, such that sight distances are somewhat constrained, (but still at acceptable levels for a 50 kph speed environment.) Whilst still within parameters it is recommended that centreline line marking be included on this section of Grangewood Drive to improve overall safety of movement for all road users.

This recommendation is made irrespective of the traffic flows and issues created by the rezoning proposal that is the subject of this assessment.

### **3. Conclusion and Recommendations**

The following conclusions and recommendations are drawn from the traffic impact assessment of the site:

- a. In terms of road and intersection capacity the traffic generation of the subject site is quite low, and is able to be catered for within the existing environmental capacity limits of the local roads and intersections. As such no external improvements to roads and intersections are required or warranted for the subject proposal.
- b. On-site road and parking design requirements will be able to be addressed in the design phase of the project to satisfy Council requirements.
- c. Forecast traffic flows remain within environmental capacity limits on all approach roads.
- d. Centreline marking is recommended on the western section of Grangewood Drive to improve overall safety of movement for all road users where the vertical and horizontal alignment includes several curves.

Note: This recommendation is made irrespective of the subject proposal.

Subject to the findings and recommendation contained herein, the proposal for the subject site is supported on traffic and transport engineering grounds.

### **4. Further Information**

We hope this information is sufficient for your rezoning submission needs. Please contact me directly on 0409 250773 should you have any queries or require any further traffic engineering information for this project.

Yours sincerely

**Mark Waugh**  
*Director*

Attachments	A	Site Location Plan
	B	Traffic Movement Surveys 18 Oct 17
	C	Traffic Movement Surveys 23 Feb 17



## Attachment A - Site Location Plan





**Attachment B - Traffic Movement Surveys 18 Oct 17**

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# TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

Intersection of The Pulpit and Grangewood Ave, Tallwoods

trafficsurvey.com.au



<b>Date:</b>	Wed 18-10-17
<b>Weather:</b>	Overcast
<b>Suburban:</b>	Tallwoods
<b>Customer:</b>	BTFF

<b>North:</b>	The Pulpit
<b>East:</b>	Grangewood Ave
<b>South:</b>	The Pulpit
<b>West:</b>	N/A

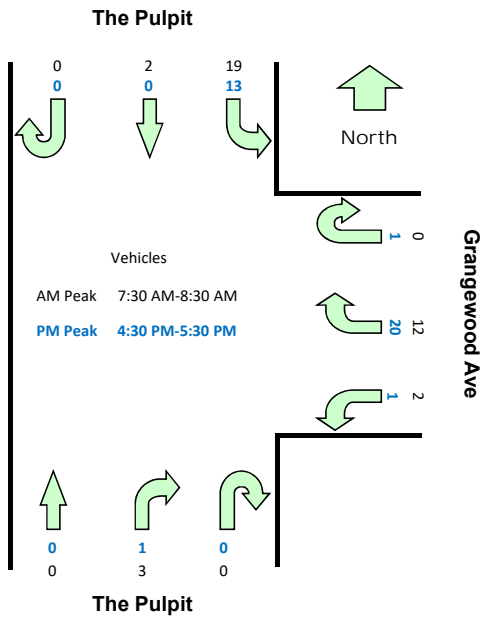
<b>Survey Start</b>	AM:	6:00	PM:	15:00
<b>Vehicular Peakhour</b>		<b>Pedestrians Peakhour</b>		
AM:	7:30 AM-8:30 AM	AM:	N/A	
PM:	4:30 PM-5:30 PM	PM:	N/A	

## All Vehicles

Time		North Approach The Pulpit			st Approach Grangewood A			South Approach The Pulpit			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
6:00	6:15	0	0	1	0	1	0	0	0	0	12	
6:15	6:30	0	0	2	0	0	0	0	1	0	15	
6:30	6:45	0	0	1	0	1	0	0	0	0	20	
6:45	7:00	0	0	4	0	1	0	0	0	0	25	
7:00	7:15	0	0	2	0	3	0	0	0	0	28	
7:15	7:30	0	0	6	0	2	0	0	0	0	37	
7:30	7:45	0	0	2	0	5	0	0	0	0	38	Peak
7:45	8:00	0	0	5	0	3	0	0	0	0	37	
8:00	8:15	0	1	8	0	4	0	0	1	0	37	
8:15	8:30	0	1	4	0	0	2	0	2	0	34	
8:30	8:45	0	0	3	0	2	0	0	1	0	31	
8:45	9:00	0	0	5	0	2	0	0	0	1	29	
9:00	9:15	0	1	3	1	4	1	0	1	0	23	
9:15	9:30	0	0	3	0	2	0	0	1	0		
9:30	9:45	0	0	2	0	2	0	0	0	0		
9:45	10:00	0	0	0	0	2	0	0	0	0		
15:00	15:15	0	1	1	0	0	1	0	1	0	22	
15:15	15:30	0	0	1	1	2	1	0	0	0	22	
15:30	15:45	0	0	1	0	4	1	0	0	0	23	
15:45	16:00	0	0	1	0	5	1	0	0	0	23	
16:00	16:15	0	0	3	0	1	0	0	0	0	29	
16:15	16:30	0	0	1	0	5	0	0	0	0	32	
16:30	16:45	0	0	1	0	4	1	0	0	0	36	Peak
16:45	17:00	0	0	6	0	7	0	0	0	0	34	
17:00	17:15	0	0	2	0	5	0	0	0	0	24	
17:15	17:30	0	0	4	1	4	0	0	1	0	23	
17:30	17:45	0	0	0	0	2	1	0	0	1	18	
17:45	18:00	0	0	0	0	3	0	0	0	0	18	
18:00	18:15	0	1	3	1	1	0	0	0	0	18	
18:15	18:30	0	0	2	0	3	0	0	0	0		
18:30	18:45	0	1	0	0	3	0	0	0	0		
18:45	19:00	0	0	2	0	0	0	0	1	0		

Peak Time		North Approach The Pulpit			st Approach Grangewood A			South Approach The Pulpit			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	
7:30	8:30	0	2	19	0	12	2	0	3	0	38
16:30	17:30	0	0	13	1	20	1	0	1	0	36

**Graphic**



**Light Vehicles**

Time		North Approach The Pulpit			st Approach Grangewood A			South Approach The Pulpit		
Period Start	Period End	U	SB	L	U	R	L	U	R	NB
6:00	6:15	0	0	1	0	1	0	0	0	0
6:15	6:30	0	0	2	0	0	0	0	1	0
6:30	6:45	0	0	1	0	1	0	0	0	0
6:45	7:00	0	0	4	0	1	0	0	0	0
7:00	7:15	0	0	2	0	2	0	0	0	0
7:15	7:30	0	0	6	0	2	0	0	0	0
7:30	7:45	0	0	2	0	4	0	0	0	0
7:45	8:00	0	0	5	0	2	0	0	0	0
8:00	8:15	0	1	7	0	4	0	0	1	0
8:15	8:30	0	1	3	0	0	0	0	1	0
8:30	8:45	0	0	3	0	2	0	0	1	0
8:45	9:00	0	0	5	0	2	0	0	0	1
9:00	9:15	0	1	3	1	4	1	0	1	0
9:15	9:30	0	0	3	0	2	0	0	1	0
9:30	9:45	0	0	2	0	1	0	0	0	0
9:45	10:00	0	0	0	0	1	0	0	0	0
15:00	15:15	0	1	1	0	0	1	0	1	0
15:15	15:30	0	0	1	0	2	1	0	0	0
15:30	15:45	0	0	1	0	4	1	0	0	0
15:45	16:00	0	0	1	0	5	1	0	0	0
16:00	16:15	0	0	3	0	1	0	0	0	0
16:15	16:30	0	0	1	0	5	0	0	0	0
16:30	16:45	0	0	1	0	4	1	0	0	0
16:45	17:00	0	0	6	0	7	0	0	0	0
17:00	17:15	0	0	1	0	5	0	0	0	0
17:15	17:30	0	0	3	1	4	0	0	1	0
17:30	17:45	0	0	0	0	2	1	0	0	1
17:45	18:00	0	0	0	0	3	0	0	0	0
18:00	18:15	0	1	3	1	1	0	0	0	0
18:15	18:30	0	0	2	0	3	0	0	0	0
18:30	18:45	0	1	0	0	3	0	0	0	0
18:45	19:00	0	0	2	0	0	0	0	1	0



# TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of The Blvd and Grangewood Ave, Tallw

<b>Date:</b>	Wed 18-10-17
<b>Weather:</b>	Overcast
<b>Suburban:</b>	Tallwoods
<b>Customer:</b>	BTF

<b>North:</b>	The Blvd
<b>East:</b>	N/A
<b>South:</b>	The Blvd
<b>West:</b>	Grangewood Ave

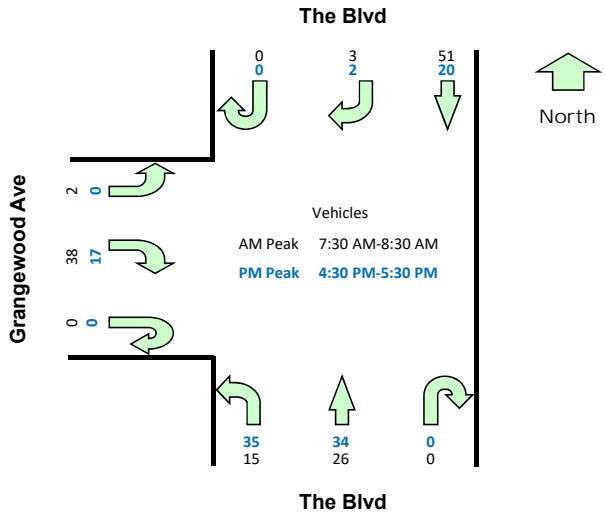
<b>Survey Start</b>	<b>AM:</b>	6:00	<b>PM:</b>	15:00
<b>Vehicular Peakhour</b>		<b>Pedestrians Peakhour</b>		
<b>AM:</b>	7:30 AM-8:30 AM	<b>AM:</b>	N/A	
<b>PM:</b>	4:30 PM-5:30 PM	<b>PM:</b>	N/A	

**All Vehicles**

Time		North Approach The Blvd			South Approach The Blvd			West Approach Grangewood Ave			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
6:00	6:15	0	0	3	0	0	1	0	2	0	44	
6:15	6:30	0	0	1	0	1	0	0	7	0	62	
6:30	6:45	0	0	2	0	2	0	0	0	1	70	
6:45	7:00	0	0	8	0	9	2	0	3	2	88	
7:00	7:15	0	0	9	0	2	4	0	8	1	100	
7:15	7:30	0	1	2	0	3	4	0	6	1	124	
7:30	7:45	0	2	6	0	10	1	0	3	1	135	Peak
7:45	8:00	0	0	16	0	4	4	0	11	1	130	
8:00	8:15	0	1	19	0	6	7	0	15	0	116	
8:15	8:30	0	0	10	0	6	3	0	9	0	90	
8:30	8:45	0	1	2	0	2	4	0	8	1	84	
8:45	9:00	0	0	5	0	9	2	0	6	0	81	
9:00	9:15	0	1	8	0	5	4	0	4	0	80	
9:15	9:30	0	0	9	0	7	2	0	4	0		
9:30	9:45	0	0	5	0	3	2	0	4	1		
9:45	10:00	0	0	8	0	8	2	0	3	0		
15:00	15:15	0	0	3	0	7	7	0	3	0	98	
15:15	15:30	0	0	5	0	8	4	0	2	0	102	
15:30	15:45	0	0	7	0	9	9	0	6	0	107	
15:45	16:00	0	0	9	0	8	6	0	5	0	97	
16:00	16:15	0	0	7	0	10	4	0	3	0	104	
16:15	16:30	0	2	7	0	6	6	0	3	0	102	
16:30	16:45	0	0	2	0	5	11	0	3	0	108	Peak
16:45	17:00	0	1	7	0	14	7	0	6	0	108	Peak
17:00	17:15	0	0	4	0	8	8	0	2	0	100	
17:15	17:30	0	1	7	0	7	9	0	6	0	96	
17:30	17:45	1	0	3	0	7	6	0	4	0	81	
17:45	18:00	0	0	8	0	9	8	0	2	0	72	
18:00	18:15	0	0	3	0	7	3	0	2	3	58	
18:15	18:30	0	0	4	0	5	4	0	2	0		
18:30	18:45	0	0	4	0	4	4	0	0	0		
18:45	19:00	0	0	1	0	6	1	0	5	0		

Peak Time		North Approach The Blvd			South Approach The Blvd			West Approach Grangewood Ave			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
7:30	8:30	0	3	51	0	26	15	0	38	2	135
16:30	17:30	0	2	20	0	34	35	0	17	0	108

**Graphic**





**Light Vehicles**

Time		North Approach The Blvd			South Approach The Blvd			West Approach Grangewood A		
Period Start	Period End	U	R	SB	U	NB	L	U	R	L
6:00	6:15	0	0	3	0	0	1	0	2	0
6:15	6:30	0	0	1	0	1	0	0	7	0
6:30	6:45	0	0	2	0	2	0	0	0	1
6:45	7:00	0	0	8	0	9	2	0	3	2
7:00	7:15	0	0	9	0	2	3	0	8	1
7:15	7:30	0	1	2	0	3	4	0	6	1
7:30	7:45	0	2	5	0	10	0	0	3	1
7:45	8:00	0	0	16	0	4	3	0	11	1
8:00	8:15	0	1	19	0	6	5	0	14	0
8:15	8:30	0	0	9	0	6	2	0	8	0
8:30	8:45	0	1	2	0	2	4	0	8	1
8:45	9:00	0	0	5	0	9	2	0	6	0
9:00	9:15	0	1	8	0	5	4	0	3	0
9:15	9:30	0	0	9	0	7	1	0	4	0
9:30	9:45	0	0	5	0	3	2	0	4	1
9:45	10:00	0	0	8	0	8	2	0	3	0
15:00	15:15	0	0	3	0	7	7	0	3	0
15:15	15:30	0	0	5	0	8	4	0	2	0
15:30	15:45	0	0	7	0	9	9	0	6	0
15:45	16:00	0	0	9	0	8	6	0	5	0
16:00	16:15	0	0	7	0	10	4	0	2	0
16:15	16:30	0	2	7	0	6	6	0	3	0
16:30	16:45	0	0	2	0	5	11	0	3	0
16:45	17:00	0	1	7	0	14	7	0	6	0
17:00	17:15	0	0	4	0	8	8	0	2	0
17:15	17:30	0	1	7	0	7	9	0	6	0
17:30	17:45	1	0	3	0	7	6	0	4	0
17:45	18:00	0	0	8	0	9	8	0	2	0
18:00	18:15	0	0	3	0	7	3	0	2	3
18:15	18:30	0	0	4	0	5	4	0	2	0
18:30	18:45	0	0	4	0	4	4	0	0	0
18:45	19:00	0	0	1	0	6	1	0	4	0





**Attachment C - Traffic Movement Surveys 23 Feb 17**

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**TURNING MOVEMENT SURVEY**

**Intersection of The Boulevard and Coastal View Drive, Tallwoods**

Date:	Thu 23-02-17
Weather:	Overcast
Suburban:	Tallwoods
Customer:	BTF

North:	The Boulevard
East:	Coastal View Drive
South:	The Boulevard
West:	N/A

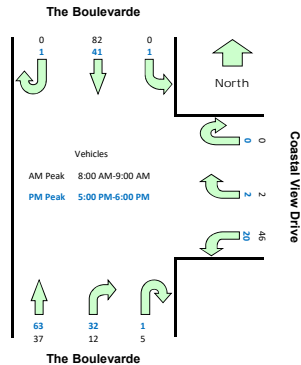
Survey Start	AM: 7:00	PM: 15:30
Vehicular Peakhour	Pedestrians Peakhour	
AM: 8:00 AM-9:00 AM	AM:	N/A
PM: 5:00 PM-6:00 PM	PM:	N/A

**All Vehicles**

Time		North Approach The Boulevard			East Approach Coastal View Drive			South Approach The Boulevard			Hourly Total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour
7:00	7:15	0	8	0	0	0	3	0	4	2	107
7:15	7:30	0	8	2	0	1	3	0	4	6	148
7:30	7:45	0	12	0	0	0	8	0	4	4	173
7:45	8:00	0	16	1	0	0	10	0	6	5	180
8:00	8:15	0	25	0	0	1	18	3	2	9	184
8:15	8:30	0	24	0	0	0	11	2	4	8	151
8:30	8:45	0	18	0	0	0	8	0	2	7	138
8:45	9:00	0	15	0	0	1	9	0	4	13	133
9:00	9:15	0	8	0	0	0	6	0	4	7	132
9:15	9:30	0	11	0	0	0	8	0	5	12	
9:30	9:45	0	14	1	0	0	6	0	3	6	
9:45	10:00	0	16	1	0	1	4	0	8	11	
15:30	15:45	0	5	0	0	1	6	1	5	19	158
15:45	16:00	0	8	0	0	0	6	2	12	18	158
16:00	16:15	0	11	0	0	0	5	2	12	14	138
16:15	16:30	0	7	0	0	1	2	0	9	12	127
16:30	16:45	0	10	0	0	0	3	0	7	17	133
16:45	17:00	0	6	1	0	0	4	0	7	8	148
17:00	17:15	0	4	1	0	1	4	0	9	14	161
17:15	17:30	1	8	0	0	0	2	0	11	15	159
17:30	17:45	0	15	0	0	1	7	0	6	23	155
17:45	18:00	0	14	0	0	0	7	1	6	11	
18:00	18:15	0	10	0	0	1	1	0	5	14	
18:15	18:30	0	9	0	0	0	5	0	2	17	

Peak Time		North Approach The Boulevard			East Approach Coastal View Drive			South Approach The Boulevard			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
8:00	9:00	0	82	0	0	2	46	5	12	37	184
17:00	18:00	1	41	1	0	2	20	1	32	63	161

**Graphic**



**Light Vehicles**

Time		North Approach The Boulevard			East Approach Coastal View Drive			South Approach The Boulevard		
Period Start	Period End	U	SB	L	U	R	L	U	R	NB
7:00	7:15	0	8	0	0	0	3	0	4	2
7:15	7:30	0	8	2	0	1	3	0	4	6
7:30	7:45	0	12	0	0	0	8	0	4	4
7:45	8:00	0	16	1	0	0	10	0	6	5
8:00	8:15	0	25	0	0	1	18	3	2	9
8:15	8:30	0	24	0	0	0	11	2	4	8
8:30	8:45	0	18	0	0	0	8	0	2	7
8:45	9:00	0	15	0	0	1	9	0	4	13
9:00	9:15	0	8	0	0	0	6	0	4	7
9:15	9:30	0	11	0	0	0	8	0	5	12
9:30	9:45	0	14	1	0	0	6	0	3	6
9:45	10:00	0	16	1	0	1	4	0	8	11
15:30	15:45	0	15	0	0	1	6	1	5	19
15:45	16:00	0	8	0	0	0	6	2	12	18
16:00	16:15	0	11	0	0	0	5	2	12	14
16:15	16:30	0	7	0	0	1	2	0	9	12
16:30	16:45	0	10	0	0	0	3	0	7	17
16:45	17:00	0	6	1	0	0	4	0	7	8
17:00	17:15	0	4	1	0	1	4	0	9	14
17:15	17:30	1	8	0	0	0	2	0	11	15
17:30	17:45	0	15	0	0	1	7	0	6	23
17:45	18:00	0	14	0	0	0	7	1	6	11
18:00	18:15	0	10	0	0	1	1	0	5	14
18:15	18:30	0	9	0	0	0	5	0	2	17

**TURNING MOVEMENT SURVEY**  
**Intersection of The Boulevard and Blackhead Rd, Tallwoods**

Date:	Thu 23-02-17
Weather:	Overcast
Suburban:	Tallwoods
Customer:	BTF

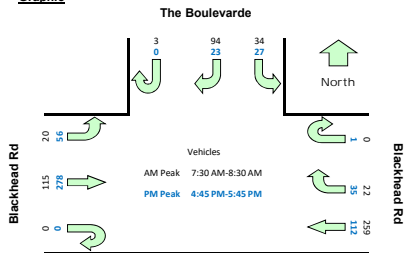
North:	The Boulevard
East:	Blackhead Rd
South:	South Ave
West:	Blackhead Rd

Survey Start	AM: 7:00	PM: 15:30
Vehicular Peakhour		Pedestrians Peakhour
AM: 7:30 AM-8:30 AM	AM: N/A	
PM: 4:45 PM-5:45 PM	PM: N/A	

All Vehicles												
Time		North Approach The Boulevard			East Approach Blackhead Rd			West Approach Blackhead Rd			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
7:00	7:15	0	10	2	0	2	29	0	12	4	410	
7:15	7:30	0	8	2	0	4	50	0	23	7	504	
7:30	7:45	1	14	6	0	3	69	0	22	3	547	Peak
7:45	8:00	0	20	6	0	6	67	0	34	6	546	
8:00	8:15	2	37	8	0	6	67	0	28	5	542	
8:15	8:30	0	23	14	0	7	56	0	31	6	493	
8:30	8:45	0	18	7	0	5	52	0	30	5	456	
8:45	9:00	0	16	9	0	12	60	0	33	5	454	
9:00	9:15	0	8	5	0	6	61	0	20	4	436	
9:15	9:30	0	15	5	0	8	41	0	23	8		
9:30	9:45	1	11	9	0	6	51	0	33	4		
9:45	10:00	0	12	8	0	11	47	0	32	7		
15:30	15:45	0	8	5	0	12	36	0	39	14	511	
15:45	16:00	0	8	7	0	12	38	0	59	19	526	
16:00	16:15	0	5	12	0	8	37	0	57	19	515	
16:15	16:30	0	4	6	0	7	29	0	55	15	504	
16:30	16:45	0	4	9	0	11	27	0	64	14	521	
16:45	17:00	0	3	6	0	3	34	0	75	11	532	Peak
17:00	17:15	0	3	5	0	7	32	0	65	15	511	
17:15	17:30	0	3	8	1	13	19	0	75	14	496	
17:30	17:45	0	14	8	0	12	27	0	63	16	455	
17:45	18:00	0	10	13	0	4	21	0	48	15		
18:00	18:15	0	6	6	0	9	29	0	53	9		
18:15	18:30	0	4	9	0	10	24	0	37	8		

Peak Time		North Approach The Boulevard			East Approach Blackhead Rd			West Approach Blackhead Rd			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Peak total
7:30	8:30	3	94	34	0	22	259	0	115	20	547
16:45	17:45	0	23	27	1	35	112	0	278	56	532

**Graphic**



**Light Vehicles**

Light Vehicles												
Time		North Approach The Boulevard			East Approach Blackhead Rd			West Approach Blackhead Rd			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
7:00	7:15	0	10	2	0	2	29	0	12	4		
7:15	7:30	0	8	2	0	4	50	0	23	7		
7:30	7:45	1	14	6	0	3	69	0	22	3		
7:45	8:00	0	20	6	0	6	67	0	34	6		
8:00	8:15	2	37	8	0	6	67	0	28	5		
8:15	8:30	0	23	14	0	7	56	0	31	6		
8:30	8:45	0	18	7	0	5	52	0	30	5		
8:45	9:00	0	16	9	0	12	60	0	33	5		
9:00	9:15	0	8	5	0	6	61	0	20	4		
9:15	9:30	0	15	5	0	8	41	0	23	8		
9:30	9:45	1	11	9	0	6	51	0	33	4		
9:45	10:00	0	12	8	0	11	47	0	32	7		
15:30	15:45	0	8	15	0	12	46	0	70	14		
15:45	16:00	0	8	7	0	12	38	0	59	19		
16:00	16:15	0	5	12	0	8	37	0	57	19		
16:15	16:30	0	4	6	0	7	29	0	55	15		
16:30	16:45	0	4	9	0	11	27	0	64	14		
16:45	17:00	0	3	6	0	3	34	0	75	11		
17:00	17:15	0	3	5	0	7	32	0	65	15		
17:15	17:30	0	3	8	1	13	19	0	75	14		
17:30	17:45	0	14	8	0	12	27	0	63	16		
17:45	18:00	0	10	13	0	4	21	0	48	15		
18:00	18:15	0	6	6	0	9	29	0	53	9		
18:15	18:30	0	4	9	0	10	24	0	37	8		

## ***Attachment G – Summary of submissions***



**Planning Proposal - Lot 612 Blackhead Rd, Hallidays Point**  
 Summary of submissions

Issue	Response
<p>Submission 1</p> <p>The ratio of E2 Environmental Conservation zone for the residential development does not meet the current criteria of planning laws. The additional houses will impact on environmental corridors, especially given other extensions to Tallwoods, including the 200 manufactured homes proposed</p>	<p>There is no ratio of E2 required in residential developments in planning legislation. The E2 zone and DCP have been applied to the site to protect important ecological values found on the site through ecological assessments.</p> <p>This land has been recognised as a potential extension of the Tallwoods Village since 2000. There are no environmental corridors through this site.</p> <p><b>No change required.</b></p>
<p>The location of roads and infrastructure has not been considered. The traffic impacts will be significant</p>	<p>A traffic study has been undertaken in response to submissions raising concerns about road infrastructure capacity. This study concludes that the existing road infrastructure providing access to the site is sufficient to support any potential increase in traffic resulting from development on this site. An internal road layout has not been provided as part of this rezoning - this will be determined in the future based on the subdivision layout. The ability to connect to other infrastructure such as water and sewer was considered in the planning proposal – all services can be connected to this site.</p> <p><b>No change required.</b></p>
<p>Submission 2</p> <p>There is already sufficient land supplied and demand is low– bringing online additional land will decrease value (rate notices indicate a 50%</p>	<p>This proposal will provide an extension to the Tallwoods Village on land with a gentler slope than available elsewhere in the village enabling</p>

<p>decrease in value).</p>	<p>more conventional residential development.  This site has been recognised as a potential Tallwoods Village expansion since 2000. This rezoning will provide a different product to that currently available in the majority of the village and the potential increase in lots is likely to have minimal impact on the surrounding land values.  Property values are subject to a number of factors and is not a factor considered in the rezoning process.  <b>No change required.</b></p>
<p>There is insufficient infrastructure (jobs and services) to support the increase in population</p>	<p>An increase in population has the potential to trigger additional employment in the housing sector. Jobs are rarely in the same location where people live, particularly in rural/coastal localities. It is expected that people living in Hallidays Point would work in other centres such as Taree or Forster/Tuncurry. Separate strategies exist to increase the number of jobs in the LGA.  <b>No change required.</b></p>
<p>Actual construction process is very slow.</p>	<p>It can take a minimum of 3-5 years for houses to be constructed following a rezoning being sought. This long lead time is why it is essential to consider rezonings well before shortages in land supply are experienced..  <b>No change required.</b></p>
<p>Submission 3</p>	
<p>Extend the timeframe for public exhibition due to Councillors being unavailable to contact in regard to the matter</p>	<p>Timing around placing proposals on exhibition is centred around allowing sufficient time for people to read exhibition material and provide written responses to Council. 28 or 30 days is considered an acceptable exhibition period for most proposals. The availability of Councillors is not a factor considered during public exhibition.  <b>No change required.</b></p>





<p>Concern with the type of development being carried out</p>	<p>Rezoning to enable residential development is proposed. This type of development is consistent with that present in Tallwoods village and the wider Hallidays Point area. <b>No change required.</b></p>
<p>Traffic- access should be directly to Blackhead Road, unsafe to use internal Tallwoods roads</p>	<p>A traffic assessment has been undertaken in response to this and a number of other submissions which concludes that the internal roads are able to cater for the traffic generation potential of this site. A single access from the Tallwoods village to Blackhead Road has consistently been applied for any expansion within Tallwoods. From a traffic and safety perspective the less road accesses onto Blackhead Road the better to maintain its status as the primary road providing access to Hallidays Point. <b>No change required.</b></p>
<p>Tree screening for all boundaries should be mandatory</p>	<p>As this proposal is a residential extension to the Tallwoods Village it is only desirable to screen the site from Blackhead Road for amenity purposes. The DCP provisions for this site require a minimum 10m wide area along the frontage to Blackhead Road to be planted with native vegetation to screen this part of Tallwoods village from Blackhead road. <b>No change required.</b></p>
<p>Submission 4</p>	
<p>Concern regarding the ability for another manufactured home estate to be built on the site</p>	<p>While the R1 – General Residential zone in Greater Taree Local Environmental Plan 2010 (which is proposed for this site) has the potential to allow a manufactured home estate on this site, the proposal is for standard residential development. Whether such a use is appropriate within this zone is a wider issue than rezoning this site for future housing, and one which should be considered in a more holistic manner than for a site specific rezoning. <b>No change required.</b></p>



<p>"we do not want high density development – manufactured home development – in this area." Erosion of lifestyle</p>	<p>The proposed planning provisions do not allow for high density development. The proposed height of buildings, floor space ratio and lot size provisions support either low or medium density development of the site. <b>No change required.</b></p>
<p>Safeguards are needed to protect residential zoned land from being used for manufactured home developments.</p>	<p>Manufactured home estates are a form of residential development. The State government supports this type of development in residential areas and Council has limited ability to influence its prohibition. Whether it is possible or appropriate to limit such development in residential zones is a matter separate to this rezoning and something which should be considered in a strategic manner. <b>No change required.</b></p>
<p>Submission 5</p>	
<p>Dissatisfaction with the result of information session 20 September.</p>	<p>The drop in session on 20 September 2017 was provided in addition to the legal consultation requirements for planning proposals. The session was well attended and provided the opportunity for residents to hear from staff about this rezoning and to have any questions they may have answered. The relatively low number of submissions received for this rezoning is indicative of a successful consultation where people had their questions answered and their concerns addressed. <b>No change required.</b></p>
<p>Manufactured homes not appropriate in the Tallwoods Village</p>	<p>No development application for this site has been lodged. While this type of development is permissible in the proposed zone, the rezoning has been sought on the basis of standard residential development. An assessment of the appropriateness and impacts of a manufactured homes estate at the site would be assessed and exhibited if a development application for the type of development is submitted. <b>No change required.</b></p>
<p>Traffic is of concern- blackhead road and the Lakes Way and within</p>	<p>A traffic assessment has been undertaken in response to this issue</p>



	<p>which concludes that the internal roads, Blackhead Road and The Lakes Way are able to cater for the traffic generation potential of this site.</p>
<p>Submission 6</p> <p>Traffic- Grangewood Ave's suitability (crests, road side parking)</p>	<p>A traffic assessment has been undertaken in response to this issue which concludes that the internal roads are able to cater for the traffic generation potential of this site. <b>No change required.</b></p>
<p>Manufactured homes not appropriate in the area due to insufficient services</p>	<p>Manufactured homes are one of a large number of permissible uses in the general residential zone. The rezoning process aims to determine if the residential zone is appropriate for the site as it was recognised in the Hallidays Point Development Strategy in 2000 as being a potential residential extension. The planning proposal has confirmed that the site is suitable for residential development. <b>No change required.</b></p>
<p>Delay the rezoning until planning rules are adjusted to prohibit manufactured homes estates</p>	<p>Manufactured homes are one of a large number of permissible uses in the general residential zone. Delaying the rezoning in case someone decides to apply for such a development at some time in the future is not appropriate. Land should ideally be rezoned for its highest and best use prior to any shortage in land being experienced in an area. The rezoning must also be completed within the timeframe set by the Department of Planning and Environment in the Gateway Determination. <b>No change required.</b></p>
<p>Submission 7</p> <p>Traffic: Tallwoods drive- this road is not appropriate for a higher volume of traffic</p>	<p>Tallwoods Drive is not the access road for this site. Blackhead Road is the main access road for the Tallwoods village, with internal access roads providing access to this site within the village. If an increased use of Tallwoods Drive from the Tallwoods village is experienced in the</p>



	<p>future, Council can decide whether steps can and should be taken to limit this.</p> <p><b>No change required.</b></p>
Submission 8	
Concern regarding loop hole potentially allowing manufactured home estates in R1.	<p>Manufactured homes are one of a large number of permissible uses in the general residential zone. The development assessment process will determine if manufactured homes estates are an appropriate outcome on the site if a development application is lodged for that type of development.</p> <p><b>No change required.</b></p>
Lack of confidence in Council's ability to uphold community expectations regarding planning matters	<p>Noted. Council undertook the community consultation for the rezoning process over and above legislative requirements. Community concerns are considered when firstly identifying sites in strategies for future development, in the rezoning process and lastly in the development application process. Council must also balance the expectations of the local community with regard to the provision of diverse and affordable overall housing for the broader community</p> <p><b>No change required.</b></p>
Significant local community unhappiness with manufactured home estates occurring in the Tallwoods Village- rezoning should not be permitted to proceed until planning policy framework is reviewed.	<p>The rezoning has been sought for a residential zone to permit standard residential development. The fact that the zone also permits Manufactured Home Estates is an issue that should be considered in a strategic way, not by an individual rezoning such as this.</p> <p><b>No change required.</b></p>
Traffic danger spot on Grangewood Avenue.	<p>A traffic assessment has been undertaken in response to this issue which concludes that the internal roads, Blackhead Road and The Lakes Way are able to cater for the traffic generation potential of this site. Grangewood Avenue was not recognised as having an unacceptable traffic safety level.</p> <p><b>No change required.</b></p>



<p>Submission 9</p>	<p>Lot 7 DP 588352 (lot adjoining site) should be included in the rezoning as it was identified as suitable in the 2004 study.</p>	<p>Lot 7 (located to the immediate west of this rezoning) was not recognised in an endorsed strategy, which it needs to be to be considered for rezoning. The Mid North Coastal Regional Strategy 2006-31 and the Haildays Point Development Strategy 2000 did not identify this lot for future urban land. As such it would be inappropriate to extend the rezoning to include the adjoining Lot 7.</p> <p><b>No change required.</b></p>
<p>Access concerns- Grangewood avenue is not suitable for increased traffic.</p>	<p>A traffic assessment has been undertaken in response to this issue submissions which concludes that the internal roads, Blackhead Road and The Lakes Way are able to cater for the traffic generation potential of this site.</p> <p><b>No change required.</b></p>	
<p>An access should be provided through lot 7 with a roundabout to Blackhead Road to service the retirement village on Lot 611</p>	<p>As all development within the Tallwoods village has consistently been required to only have a single access point from Balckhead Road, access through other adjoining land such as Lot 7 has never been envisaged.</p> <p><b>No change required.</b></p>	

