



Roads &
Maritime

Addenda to Nest Box Management Plan

Sections 8 and 9

**Woolgoolga to Ballina Pacific Highway
upgrade**

October 2014

Revision History

Revision	Date	Description	Prepared By	Reviewed By
A	30/09/14	Draft	Mr David Charley, Dr Melissa Van Zwieten	Mr Stuart Austin
B	02/10/14	Final	Mr David Charley, Dr Melissa Van Zwieten	
C				

Distribution History

Revision	Date	Issued to	Position	Name
A	30/09/14	Roads and Maritime Services	Environmental Project Officer	Mr Stuart Austin
B	02/10/14	Roads and Maritime Services	Environmental Project Officer	Mr Stuart Austin

This collaborative project has been completed by Mr David Charley (Reporting and GIS) of Wildsearch Environmental Services and Dr Melissa Van Zwieten of Melaleuca Group (Review).



Report to be cited: Melaleuca Group (2014). Assessment of Impact of Planned Fauna Mitigation measures. Addendum to Nest Box Management Plan. Sections 8 and 9 of the Woolgoolga to Ballina Pacific Highway Upgrade. Addendum Report prepared by Melaleuca Group © for Roads and Maritime Services.

Front Cover Image: White-bellied Sea-Eagles nest - 8HT580
Photograph by David Charley, Wildsearch Environmental Services 2014.



Date: 2nd October 2014

Prepared for:

NSW Roads and Maritime Services

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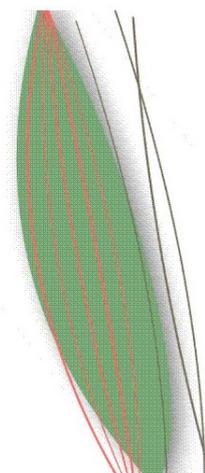
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Executive Summary

The upgrade of Sections 8 and 9 of the Woolgoolga-Ballina Pacific Highway project proposes a number of activities that have potential to impact on terrestrial ecological values. Loss of habitat for fauna including food resources, shelter and refuge areas during nonbreeding and breeding life stages has been recognised as one of a number of potential impacts on fauna along the Project Corridor.

The loss of hollow-bearing trees has been identified as potentially having a significant impact on native fauna. To compensate for this loss it has been proposed to install a number of nest boxes.

Approximately 102 nest boxes of a variety of sizes will need to be placed adjacent to certain parts of Sections 8 and 9 of the proposed upgrade corridor to compensate for hollow-bearing tree losses incurred during clearing operations. Potential installation sites are widespread in the southern parts of the corridor and adjacent to the northern end of Section 9. The mid sections are more developed and the vegetation in this part is more fragmented and isolated.

Five nest box installation zones or sites were identified. Three of these were on land owned and managed by the NSW Roads and Maritime Services (RMS), one privately owned and one owned and managed by the NSW National Parks and Wildlife Services, Office of Environment and Heritage (NPWS).

Approval to install nest boxes at the private property location has been granted by the owners. The NPWS has also approved the installation of the nest boxes on lands managed by that government department. It was assumed that RMS would give approval for the installation of nest boxes on lands it manages.

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1. Introduction

This report is an addendum to "Habitat Tree Survey and Nest Box Management Plan for the Construction Corridor, Sections 8 and 9 of the Woolgoolga to Ballina Pacific Highway Upgrade" prepared by Melaleuca Group in June 2014.

Melaleuca Group has been engaged by Roads and Maritime Services (RMS) to undertake a survey for Hollow-Bearing Trees along the Project Corridor for Section 8 and 9 (Trustum's Hill to Broadwater National Park (NP) and Broadwater NP to Richmond River respectively) of the proposed Pacific Highway upgrade from Woolgoolga to Ballina (see Figure 1) and to prepare a Nest Box Management Plan for these sections.

The Hollow-bearing tree survey and nest box plan has been prepared to address the development of the Pacific Highway upgrade and associated impacts on biodiversity.

Approximately 102 nest boxes of a variety of sizes will need to be placed adjacent to certain parts of Sections 8 and 9 of the proposed upgrade corridor to compensate for hollow-bearing tree losses incurred during clearing operations (Melaleuca Group 2014).

There are five (5) nest box installation sites (zones) identified in the Nest Box Management Plan for Sections 8 and 9 of the Pacific Highway Upgrade (Melaleuca Group 2014). All of these are either private property, lands owned and managed by the NSW Roads and Maritime Services or lands managed by the NSW National Parks and Wildlife Service, Office of Environment and Heritage (OEH). Fauna mitigation measures (land bridges, rope bridges, underpasses) as well as bridges and other structures are proposed to be installed in the vicinity of a number of these locations (SPIR fauna infrastructure inventory 2014, Draft Threatened Glider Aerial Crossing – Targeted Survey. Sandpiper 2014). The impact of these fauna mitigation structures on the location of the nest box installation areas will need to be taken into account.

2. Project Objectives

This addendum report addresses the following project objectives, namely:

- Seek agreement from landholders to have nest boxes installed on their property;
- Consider impact of planned fauna mitigation measures: Assess location of proposed fauna mitigation structures and review proposed nest box locations in relation to proposed structures and vegetation type, proximity to contiguous vegetation, appropriateness of alternatives;
- Additional mapping and revision of Nest Box Management Plan: including production of maps with locations of fauna crossings and structures as per SPIR fauna infrastructure inventory 200214 and "Threatened Glider Aerial Crossing – Targeted Survey" report by Sandpiper 2014 as supplied, specific locations of nest boxes, and revision of report with scope of project as specified.

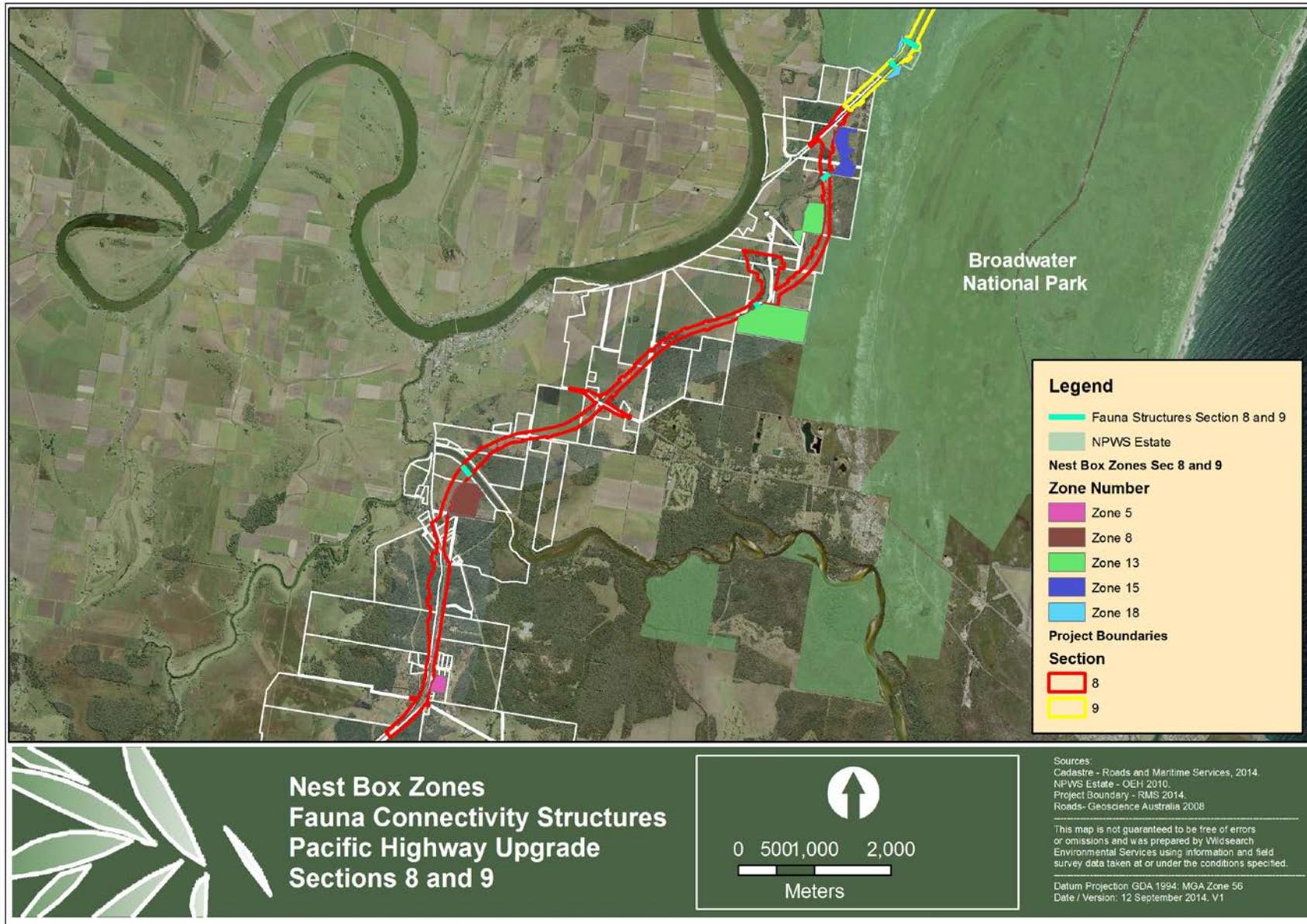


Figure 1. Study Area and nest box zones requiring nest boxes.

2.1 Areas not accessed

For a variety of reasons a number of areas within the Construction Corridor could not be surveyed for hollow-bearing trees. These include:

- Lot 2/DP608704 (access not permitted at the time of the field survey);
- Lot 280/DP755624 (access not permitted at the time of the field survey);
- Lot 4/DP253906, Lot 367/DP755624 (part excluded), Lot 6/DP1043232 (part excluded) All within an identified Aboriginal area –advised access not permitted; and,
- Lot 6/DP755624 (part excluded), Lot 64/DP755624 (part excluded), Lot 104/DP755624 (part excluded), all within an identified Aboriginal area –advised access not permitted.

These areas will be surveyed for hollow-bearing trees once property access has been granted and an addendum added to the nest box management plan detailing the findings and proposed location of any nest box placement areas. It is expected that many of these nest boxes could be located in the nest boxes installation zones already identified.

3. Nest Box Placement along the Corridor

The Nest Box Management Plan (Melaleuca Group 2014) identified a number of placement criteria or conditions. These were:

- Nest boxes are installed in suitable habitats adjacent to, or within 250m of those sections from where they will be lost and in adjacent areas with relatively low hollow densities.
- Nest boxes should be placed in more extensive habitat that has links to other suitable vegetation. Isolated narrow corridors (i.e. less than 20-30m wide) should be avoided as should remnants containing a high percentage of exotic tree species.
- Sites should include areas of identified high use by the target species.
- Remnant vegetation occurring as median strips or islands within the road corridor should be avoided.
- Nest boxes should not be placed within habitat 50 – 100m either side of rope bridges, fauna underpasses or fauna overpasses. This will avoid the possibility of territorial species dominating the vegetation and access to these crossing points.
- Nest boxes provided for colonial or social species such as the small lorikeets can be clustered and can include a number of boxes installed on one tree.
- Generally nest boxes would be installed in loose clusters of 2 – 4 nest boxes in a 50 x 50m area. Clusters would be a minimum of 100m apart.
- This would not apply to boxes provided for large forest owls, Yellow-bellied Glider or large cockatoo boxes which would be limited in number and widely scattered. As a general principle and only if required, only one large forest owl nest box would be installed in an individual identified placement area. The same principle applies to those boxes installed for the Yellow-bellied Glider.

4. Nest Box Zone Assessments

A total of five nest box installation areas (zones) were identified in the Nest Box Management Plan. Preference has been given to relatively undisturbed vegetation; vegetation that is linked to more extensive patches; vegetation that is linked to Broadwater National Park or other conservation areas; stands of vegetation similar to that which is being cleared; and vegetation that has a range of tree age classes. In a number of cases the placement of nest boxes on private land was unavoidable due to the highly developed nature of the landscape through which the corridor passed and the fragmented nature of much of the vegetation in the mid-sections of the project area. Re-evaluation of these areas will need to take place once clearing has commenced and the final tally of hollow-bearing trees to be retained within the corridor is known. The preliminary placement areas (See Fig. 1 and Appendix A) are:

- Area of Forest Red Gum grassy open forest on private land adjacent to Zone 5 in the vicinity of chainages 127200 – 127600 (Zone 5). This vegetation has been developed as part of a rural residential area. Numerous houses, gardens and paddocks fragment this area. A number of separate Lots cover this area.
- Extensive area of Broad-leaved Paperbark swamp forest on RMS owned lands (road reserve and Lots 19, 18 and 17 in DP864108) and on crown road reserve to the east of the corridor in the vicinity of chainages 129210 - 129500 (being off-set for Zone 8). This will provide similar and more contiguous habitat to the area within the construction corridor. This area has been disturbed by clearing, some infrequent fire and disturbance due to cattle grazing.
- An extensive area of Forest Red Gum and Paperbark swamp forest on the project corridor (uncleared parts outside of the construction corridor) and on RMS owned land (Lots 140 and 149 DP755624) to the south of the corridor in the vicinity of chainages 134650 – 134850 (Zone 13). This area is relatively undisturbed and is contiguous with Broadwater National Park. It has the added advantage of having good linkages with the surrounding vegetation, is close to the area being cleared and would not be isolated between the upgrade corridor and the Richmond River as would the alternatives to north of the upgrade corridor, or alternatively;
- Patches of Forest Red Gum grassy open forest and Swamp Mahogany forest on private land to the west of the corridor in the vicinity of chainages 135600 – 136300 (Lot 212 DP851963) (off-set area for Zone 13). This will provide similar habitat to the area being cleared however it is more than 250m to the north;
- Swamp Box Swamp forest on RMS owned land east of the corridor between chainages 136700 – 137300 (Lot 133 DP839607) (Zones 15).
- Swamp Mahogany forest on Broadwater National Park adjacent to the western and eastern sides of the corridor between chainages 138200 – 138900 (Zone18).

For each of these zones the proposed fauna connectivity mitigation structures, potential nest box placement areas, vegetation types and alternatives were assessed. The information generated by these assessments and associated comments are presented below (See Sections 4.1 to 4.5 and Appendix A).

4.1 Nest Box Zone 5

Zone Feature	Comment				
Nest Box Zone	5				
W2B Section	8				
Side of Carriageway	Eastern				
Adjacent chainage	127170 - 127360				
Tenure	Private Property				
Lot / DP	Lot2/DP845833				
Land owner / Manager	N. and B. Brine				
Total number of nest boxes required	5				
Nest Box Type	Sg	Pa	Mb	Sm	Sb
Number	0	0	5	0	0
Agreement from landholder	Yes. Landholder agreement for nest boxes to be installed. Agreement form signed.				
Contact	Landowner				
Fauna mitigation measures proposed in vicinity	No				
Crossing types in vicinity	n/a				
Target faunal group	n/a				
Crossing chainage – fauna underpass	n/a				
Crossing chainage – land bridge	n/a				
Dominant vegetation in Zone	Forest Red Gum grassy open forest, Cleared pasture, Areas of regrowth forest with Acacia spp.				
Habitat connectivity	Forest Red Gum grassy open forest and cleared pasture linking to Grey Gum - Grey Ironbark open forest and Paperbark swamp forest further to the east and north.				
Alternative location for nest boxes	Lot 43/DP1025678 further to the north which is dominated by Grey Gum - Grey Ironbark open forest. Eastern side of carriageway adjacent to chainages 127670 – 127850.				
Alternative nest box location required	Lot 10 / DP1184402				
Nest box requirements and recommendations	Nest boxes are only to be placed on rough barked trees. Boxes to be well spaced and at different heights and aspects.				

4.2 Nest Box Zone 8

Zone Feature	Comment				
Nest Box Zone	8				
W2B Section	8				
Side of Carriageway	Eastern				
Adjacent chainage	129210 - 129500				
Tenure	RMS Owned				
Lot / DP	Lots 19, 18 and 17 in DP864108				
Land owner / Manager	NSW Roads and Maritime Services				
Total number of nest boxes required	10				
Nest Box Type	Sg	Pa	Mb	Sm	Sb
Number	1	3	3	2	1
Agreement from landholder	Yes. Landowner agreement for nest boxes to be installed. RMS land.				
Contact	RMS - Grafton				
Fauna mitigation measures proposed in vicinity	Yes – underpass (bridge over Tuckumbil Canal). Located to the north of installation zone area.				
Crossing types in vicinity	Combined under bridge				
Target faunal group	Macropods				
Crossing chainage –bridge	130107				
Dominant vegetation in Zone	Paperbark swamp forest of the coastal lowlands of the North Coast				
Habitat connectivity	Extensive Paperbark dominated swamp forest to the east linking with Bundjalung NP.				
Alternative location for nest boxes	Road reserve along southern boundary of Lot 12 / DP864108. Adjacent to chainage 129480.				
Alternative nest box location required	None required				
Nest box requirements and recommendations	Nest boxes will be placed at least 100m from the access points to bridge underpass. Nest box locations to be at least 50m from any crossing furniture or structures. Nest boxes are only to be placed on rough-barked species. Nest boxes not to be placed on Acacia species.				

4.3 Nest Box Zone 13

Zone Feature	Comment							
Nest Box Zone	13							
W2B Section	8							
Side of Carriageway	Eastern							
Adjacent chainage	134300 - 134650							
Tenure	RMS Owned							
Lot / DP	Lot140/DP755624							
Land owner / Manager	NSW Roads and Maritime Services							
Total number of nest boxes required	71							
Nest Box Type	Po	Pa	Co	Mb	Sm	Sb	Extra Po	
Number	9	11	6	9	9	7	20	
Agreement from landholder	Yes. Landowner agreement for nest boxes to be installed. RMS land.							
Contact	RMS Grafton.							
Fauna mitigation measures proposed in vicinity	Yes – drainage underpass (1)							
Crossing types in vicinity	Combined drainage (bridge) fauna underpass							
Target faunal group	Oxleyan Pygmy Perch							
Crossing chainage – fauna underpass	134600							
Dominant vegetation in Zone	Paperbark swamp forest of the coastal lowlands of the North Coast							
Habitat connectivity	Extensive and continuous Paperbark swamp forest linking directly to the Broadwater NP to the east.							
Alternative location for nest boxes	Lot 149/DP755624 to the East and immediately adjacent to Lot 140. An extensive area of Paperbark swamp forest.							
Alternative nest box location required	None required primary location on RMS land							
Nest box requirements and recommendations	Nest boxes will be placed at least 100m from the access points to both the drainage underpasses. Nest box locations to be at least 50m from any crossing furniture or structures. Nest boxes are only to be placed on rough-barked species. Boxes to be installed as clusters of mixed types. Larger boxes to be well spaced and not in clusters.							

4.4 Nest Box Zone 15

Zone Feature	Comment						
Nest Box Zone	15						
W2B Section	8						
Side of Carriageway	Eastern						
Adjacent chainage	137100 - 137320						
Tenure	RMS Owned						
Lot / DP	Lot133/DP839607						
Land owner / Manager	NSW Roads and Maritime Services						
Total number of nest boxes required	12						
Nest Box Type	Sg	Po	Pa	Mb	Sm	Sb	Extra Po
Number	1	2	1	2	2	1	3
Agreement from landholder	Yes. Landowner agreement for nest boxes to be installed. RMS land.						
Contact	RMS Grafton						
Fauna mitigation measures proposed in vicinity	Yes – under twin road bridges						
Crossing types in vicinity	Combined fauna under-bridge.						
Target faunal group	Oxleyan Pygmy Perch						
Crossing chainage – fauna underpass	136666						
Dominant vegetation in Zone	Swamp Box swamp forest of the coastal lowlands of the North Coast, Exotic species (plantation).						
Habitat connectivity	Heathland, Swamp Box swamp forest and patches of Swamp Mahogany to adjacent Broadwater NP.						
Alternative location for nest boxes	None required						
Alternative nest box location required	None required RMS land						
Nest box requirements and recommendations	Nest boxes will be placed at least 100m from the access points to the underpass. Nest box locations to be at least 50m from any crossing furniture or structures. Nest boxes are only to be placed on rough-barked species. Nest boxes to be scattered throughout area. Nest boxes not to be placed on Acacia species.						

4.5 Nest Box Zone 18

Zone Feature	Comment						
Nest Box Zone	18						
W2B Section	9						
Side of Carriageway	Northern						
Adjacent chainage	138480 - 138800						
Tenure	National Park - Broadwater National Park						
Land owner / Manager	NSW National Parks and Wildlife Service, NSW Office of Environment and Heritage						
Total number of nest boxes required	4						
Nest Box Type	Sg	Po	Pa	Mb	Sm	Sb	Extra Po
Number	1	0	0	1	1	1	0
Agreement from landholder	Yes. NPWS agreement for nest boxes to be installed.						
Contact	Northern Rivers Regional Manager, NPWS, Alstonville.						
Fauna mitigation measures proposed in vicinity	Yes - crossings						
Crossing types in vicinity	Dedicated fauna underpass, Dedicated fauna land bridge						
Target faunal group	Herpetofauna, Koala, small to large mammals, birds, herpetofauna						
Crossing chainage – fauna underpass	138430						
Crossing chainage – land bridge	138796						
Dominant vegetation in Zone	Swamp Mahogany swamp forest.						
Habitat connectivity	Extensive heathland and patches of Swamp Mahogany in adjacent Broadwater NP.						
Alternative location for nest boxes	Eastern side of carriageway adjacent to chainages 138200 – 138500 in Swamp Mahogany swamp forest.						
Alternative nest box location required	None required						
Nest box requirements and recommendations	Nest boxes will be placed at least 50m from the access points to both the land bridge and underpass. Nest box locations to be at least 50m from any crossing furniture or structures. Nest boxes are only to be placed on Swamp Mahogany. Nest boxes not to be placed on Acacia species.						

5. Discussion

Approximately 102 nest boxes of a variety of sizes will need to be placed adjacent to certain parts of Sections 8 and 9 of the proposed upgrade corridor to compensate for hollow-bearing tree losses incurred during clearing operations. Potential installation sites are widespread in the southern parts of the corridor and adjacent to the northern end of Section 9. The mid sections are more developed and the vegetation in this part is more fragmented and isolated.

Five nest box installation zones or sites were identified. All were within 250m of the location of the hollow-bearing trees to be removed. Three of these zones are on lands owned and managed by the NSW Roads and Maritime Services (RMS), one privately owned and one owned and managed by the National Parks and Wildlife Services, NSW Office of Environment and Heritage (NPWS).

Approval to install nest boxes at the private property location has been granted by the owner. At the time of preparing this report the NPWS is still to provide written agreement for four nest boxes to be installed on Broadwater National Park and it was assumed that RMS would give approval for the installation of nest boxes on lands it manages.

6. References

Melaleuca Group 2014. Habitat Tree Survey and Nest Box Management Plan for the Construction Corridor, Sections 8 and 9 of the Woolgoolga to Ballina Pacific Highway Upgrade. Report prepared by Melaleuca Group © for Roads and Maritime Services.

NSW Roads and Maritime Services, 2013. Woolgoolga to Ballina Pacific Highway Upgrade – Environmental Impact Statement Main Volume 1A, Chapter 10 – Biodiversity.

Sandpiper Ecological Surveys, 2014. Pacific Highway Upgrade – Woolgoolga to Ballina. Threatened Glider Aerial Crossings - Target Surveys. Draft report V1. Unpublished report to the NSW Roads and Maritime Services.

Appendix A. Nest Box Placement Zone Maps

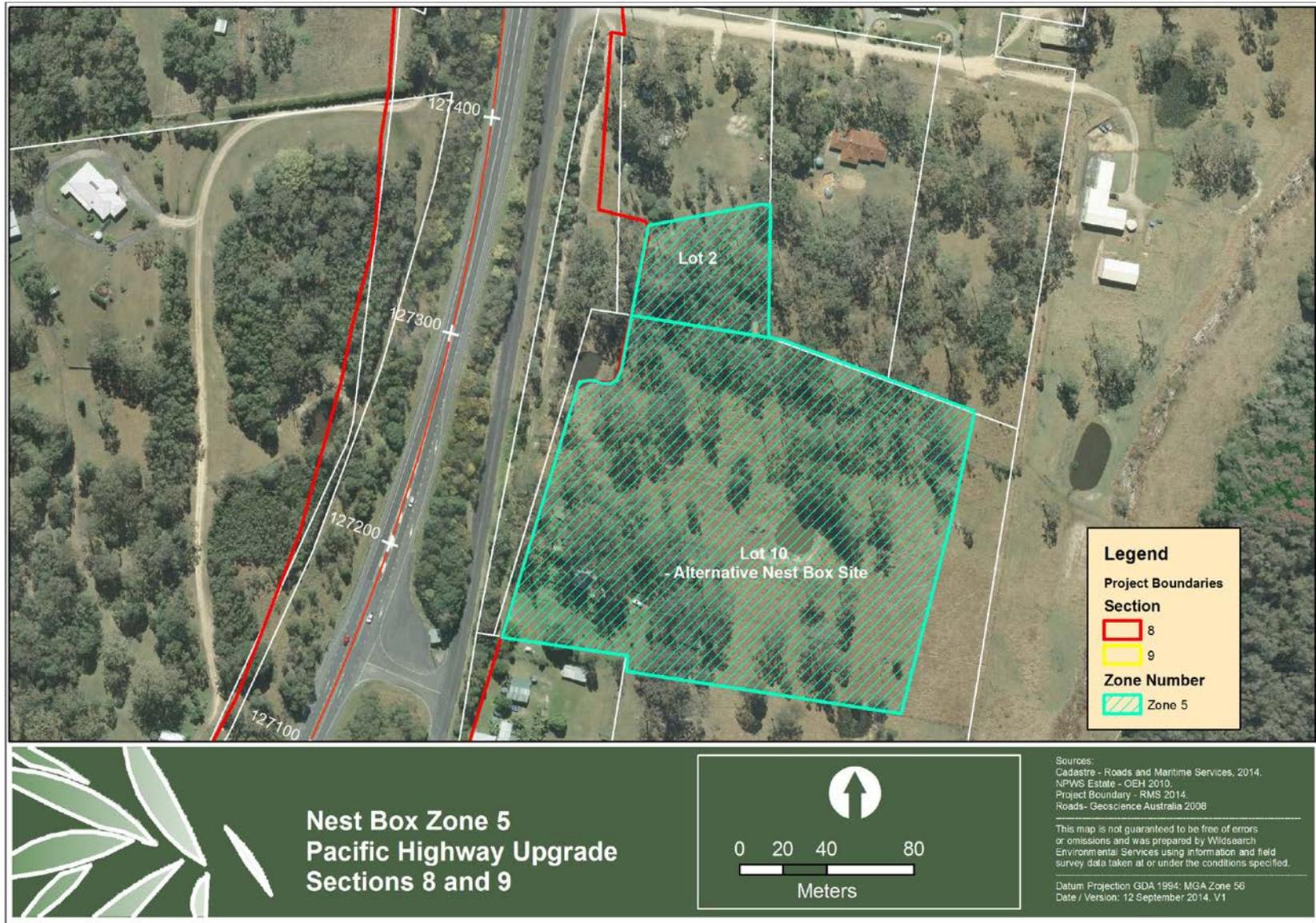


Figure A1: Preliminary Nest Box Placement Zone 5, Section 8

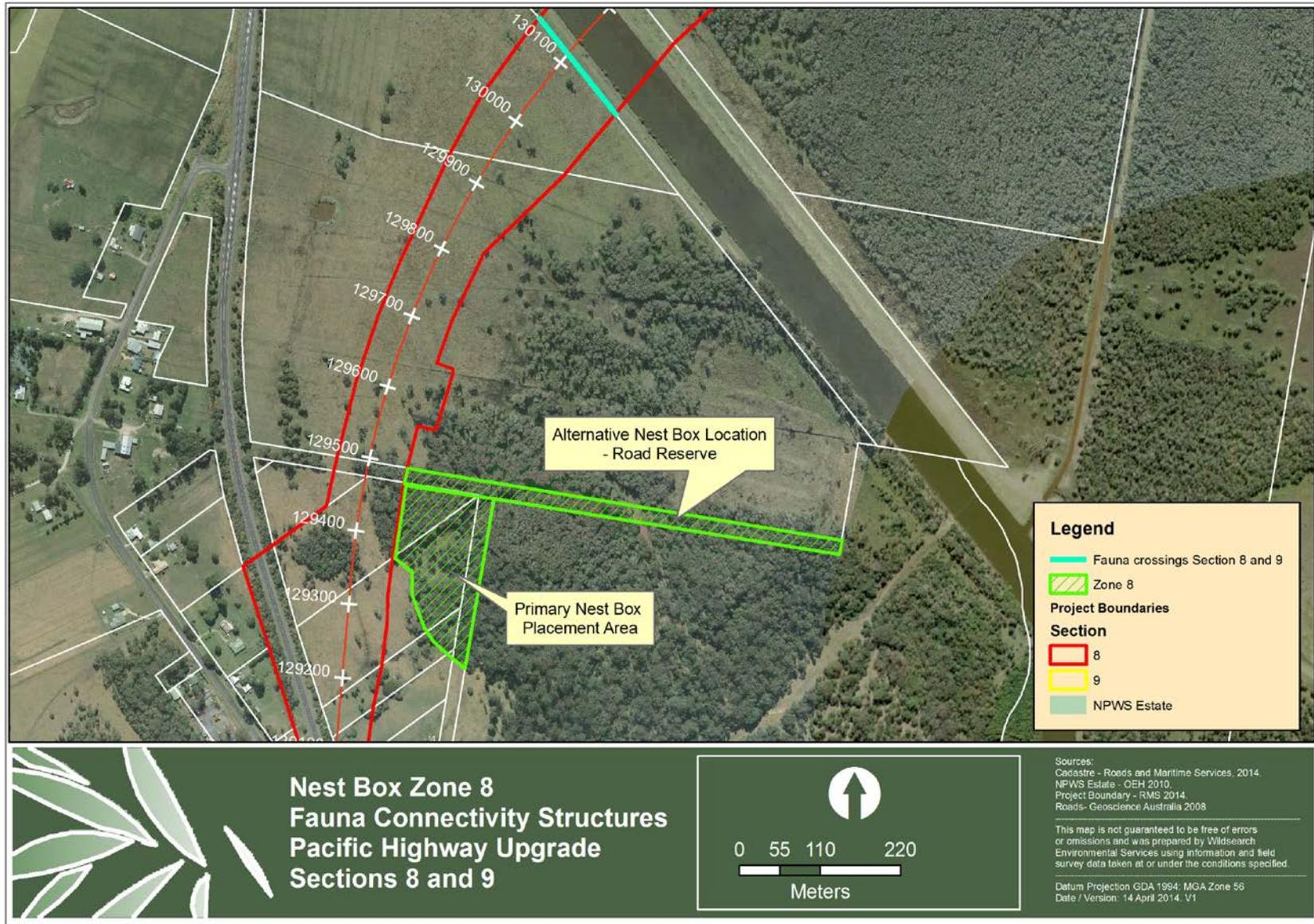


Figure A2: Preliminary Nest Box Placement Zone 8, Section 8

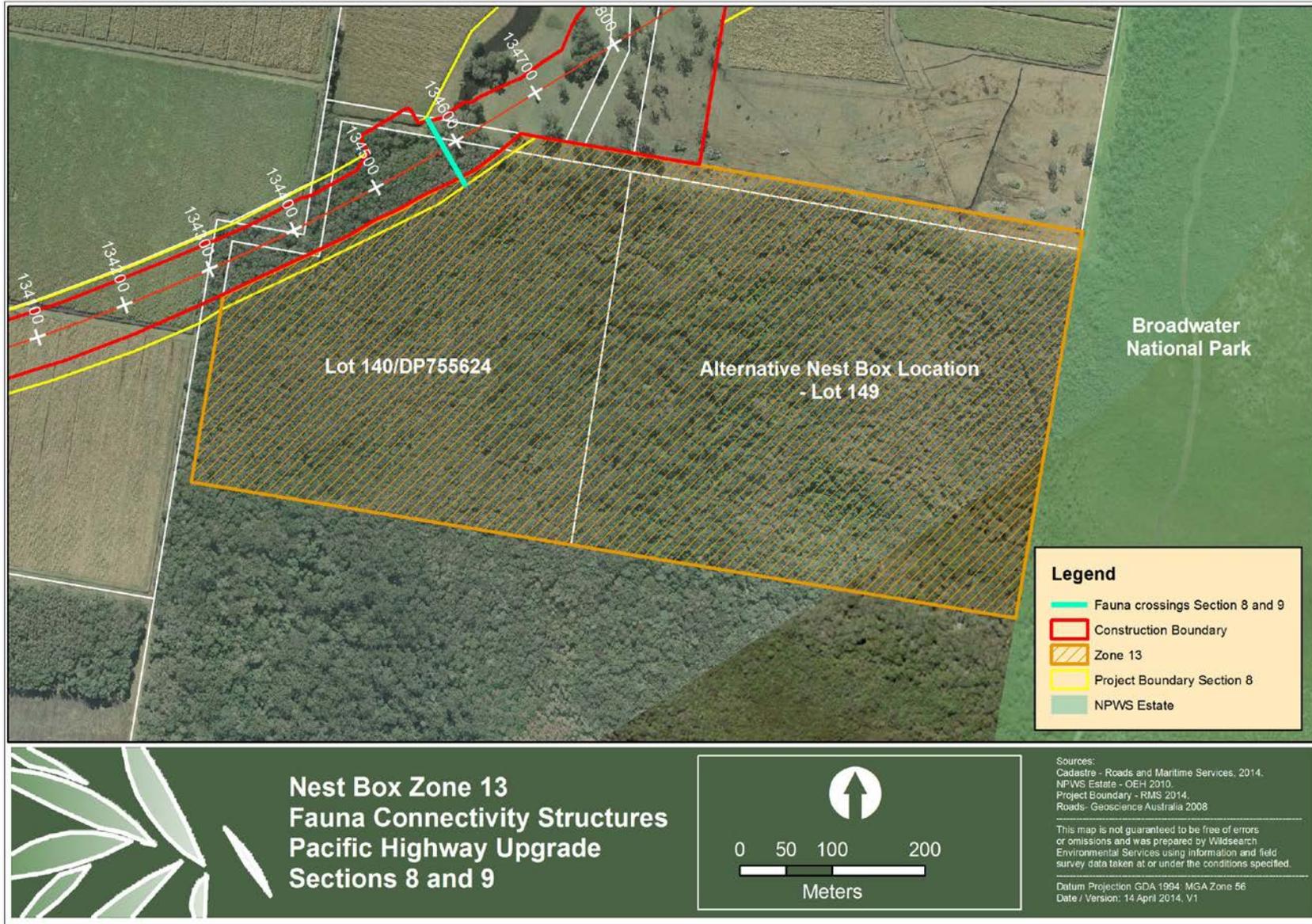


Figure A3: Preliminary Nest Box Placement Zone 13, Section 8

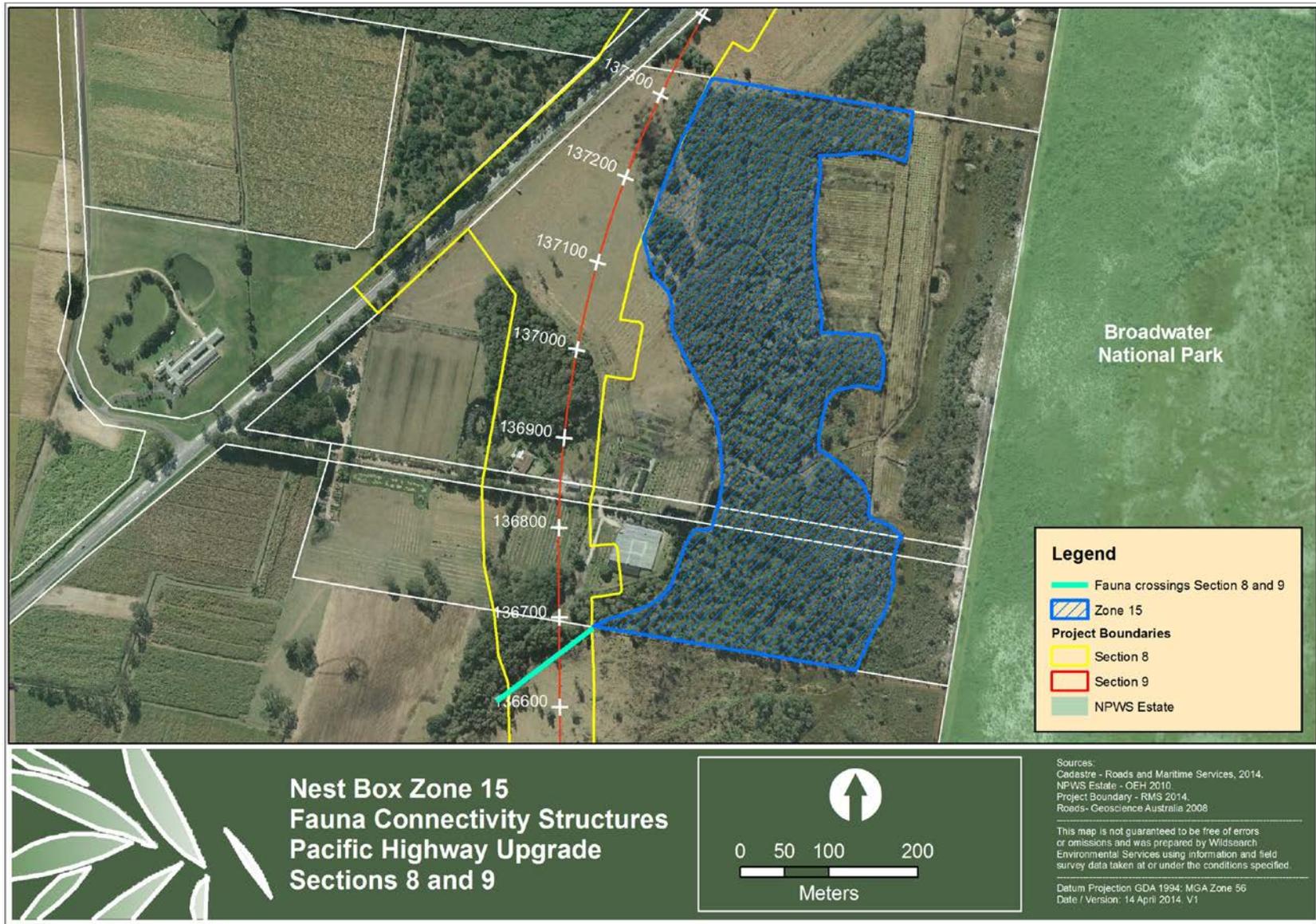
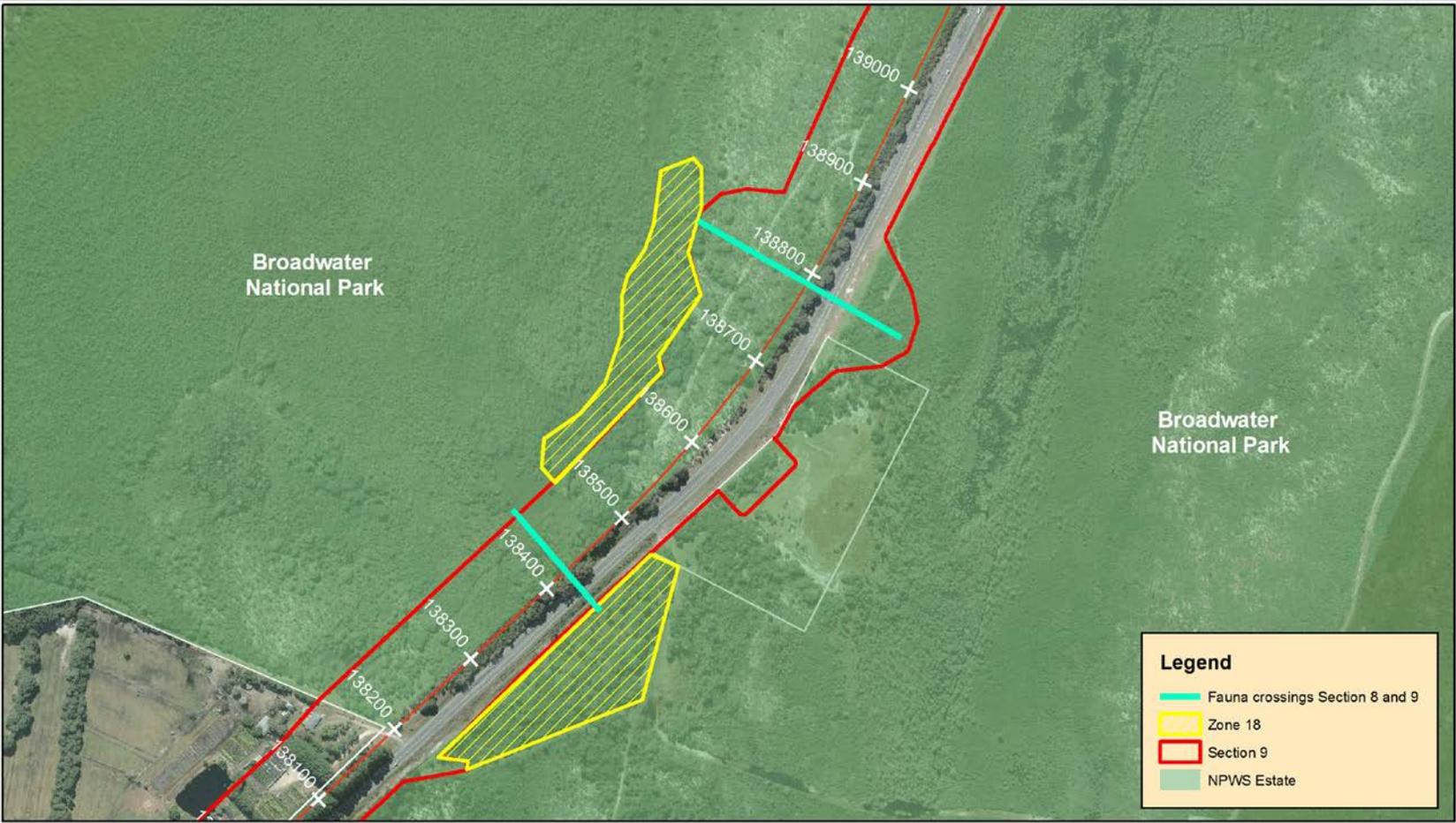


Figure A4: Preliminary Nest Box Placement Zone 15, Section 8



Legend

- Fauna crossings Section 8 and 9
- Zone 18
- Section 9
- NPWS Estate



**Nest Box Zone 18
Fauna Connectivity Structures
Pacific Highway Upgrade
Sections 8 and 9**



0 45 90 180
Meters

Sources:
Cadastral - Roads and Maritime Services, 2014.
NPWS Estate - OEH 2010.
Project Boundary - RMS 2014.
Roads- Geoscience Australia 2008

This map is not guaranteed to be free of errors or omissions and was prepared by Wildsearch Environmental Services using information and field survey data taken at or under the conditions specified.

Datum Projection GDA 1994; MGA Zone 56
Date / Version: 14 April 2014. V1

Figure A5: Preliminary Nest Box Placement Zone 18, Section 9