



## **ANNUAL HABITAT MONITORING REPORT**

**Birrigan Iluka Beach, Iluka  
Lot 99 on DP823635 (Parent Lot)**

A Report Prepared for  
The Stephens Group Pty Ltd

NOVEMBER 2021

## DOCUMENT CONTROL

### Document

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### Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW1	10/11/21	Nicole Davies	ND	Adam McArthur	AM
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# 1 INTRODUCTION

## 1.1 Background

JWA Pty Ltd have been engaged by The Stephens Group Pty Ltd to prepare an Annual Habitat Monitoring report for the Birrigan Iluka Beach development site, located at Hickey Street, Iluka - originally described as Lot 99 on DP823635 (parent lot). This lot has been subdivided into Lot 1, Lot 2 and Lot 3 DP271283. The Birrigan Iluka Beach development is an approved 141 lot community scheme subdivision over the subject land (**FIGURES 1 & 2**). The subdivision incorporates 140 residential allotments and one (1) Community Property allotment (now Lot 1 DP271283) containing retained bushland. The Community Property Lot will be owned and maintained by the Birrigan Iluka Beach Association.

JWA previously prepared a Habitat Management Plan (HMP) (JWA 2020) as required by EPBC Act approval (2017/8003) which included an amelioration strategy designed to minimise the impacts on fauna during both the construction and operational phases, undertake nature regeneration/revegetation works and to ensure that ecological processes and corridor function within the identified rehabilitation areas are protected and amplified. The HMP was subsequently approved by Minister for the Environment on the 3<sup>rd</sup> August 2020.

As part of the amelioration strategy, an ongoing monitoring program was established to meet the conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals. The ongoing monitoring program includes:

- Fauna management;
- Nest boxes;
- Retained habitat/rehabilitation;
- Subdivision infrastructure construction by Contractor; and
- Operational management by the Association.

A separate Koala Monitoring and Reporting Program has been prepared in accordance with Condition 4f of the EPBC Act approval (2017/8003). Some of the fauna management procedures during vegetation clearing are also relevant to the koala, and this is noted where applicable.

This report details the methodology and results from the 1<sup>st</sup> annual habitat monitoring program.

## 1.2 Project Status

The following provides an update on the key milestones and current status of the Birrigan Iluka Beach development.

- The project received approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 22<sup>nd</sup> March 2019 (EPBC Act Ref 2017/8003).





**PROJECT:**  
ILUKA  
LOT 99 ON DP 823635

**LOCATION:**  
ILUKA ROAD, ELIZABETH, RIVERVIEW AND HICKEY STREETS  
ILUKA, NSW, 2466

DEVELOPMENT CHARACTERISTICS	
ITEM	DESCRIPTION
PROPERTY DESCRIPTION	LOT 99 DP823635
AREA OF LOT 99	19.41 ha.
TOTAL NUMBER OF LOTS	141
PART LOT 1 (Approx.)	5.29 ha.

**CLARENCE VALLEY COUNCIL**  
New Bushfire Trail Connection  
**APPROVAL**

**This is the plan referred to in Council's**  
**Notice of Determination of SUB2015/0034**

**Date: 13/11/2019**

BIKE / PATHWAY CONNECTION TO ILUKA ROAD  
- BIKE LANE SITUATED ON THE NORTH EASTERN SIDE OF THE ILUKA ROAD INTERSECTION WITH HICKEY STREET AND TO PROVIDE A REFUGE ISLAND ON ILUKA ROAD

STREETS FOR LIVING - CHARACTERISTICS				
STREET	RESERVE WIDTH (m)	VERGE WIDTH (m)	TOTAL SEAL WIDTH (m)	CUL DE SAC DIAMETER (m)
HICKEY STREET	30 EXISTING	VARIES	8	-
1	20	6 (*1)	8	30 outer, 15 inner
2	20 (*1)	6 (*1)	8	-
3	25	6 (*2)	8	20
4, 6, 7	20	6	8	-
5, 8	20	6	8	20
AWAY 3	VARIES	3.5 (*3)	4	-

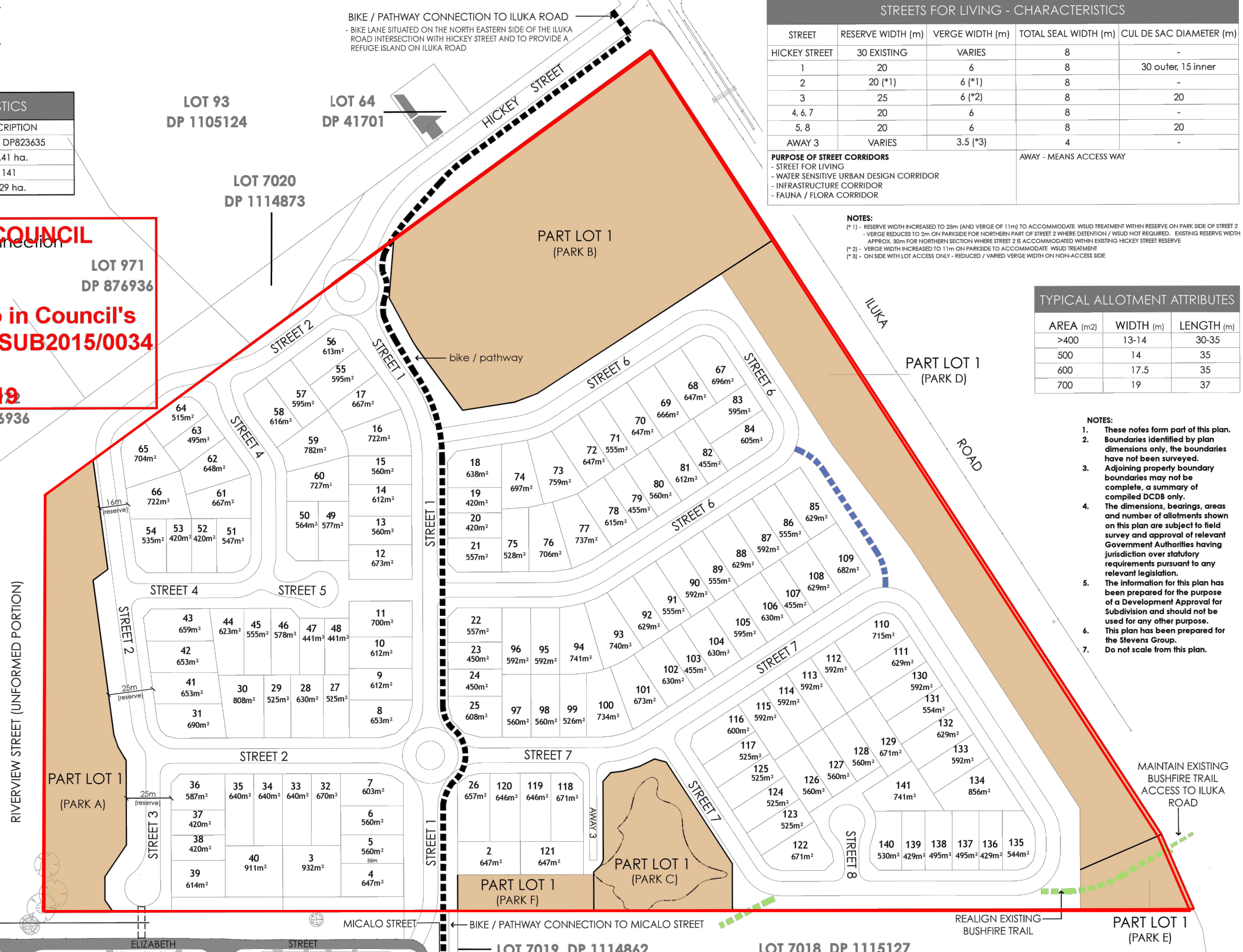
**PURPOSE OF STREET CORRIDORS**  
- STREET FOR LIVING  
- WATER SENSITIVE URBAN DESIGN CORRIDOR  
- INFRASTRUCTURE CORRIDOR  
- FAUNA / FLORA CORRIDOR

AWAY - MEANS ACCESS WAY

**NOTES:**  
(\*1) - RESERVE WIDTH INCREASED TO 25m (AND VERGE OF 11m) TO ACCOMMODATE WSUD TREATMENT WITHIN RESERVE ON PARK SIDE OF STREET 2  
- VERGE REDUCES TO 2m ON PARKSIDE FOR NORTHERN PART OF STREET 2 WHERE DETENTION / WSUD NOT REQUIRED. EXISTING RESERVE WIDTH APPROX. 30m FOR NORTHERN SECTION WHERE STREET 2 IS ACCOMMODATED WITHIN EXISTING HICKEY STREET RESERVE  
(\*2) - VERGE WIDTH INCREASED TO 11m ON PARKSIDE TO ACCOMMODATE WSUD TREATMENT  
(\*3) - ON SIDE WITH LOT ACCESS ONLY - REDUCED / VARIED VERGE WIDTH ON NON-ACCESS SIDE

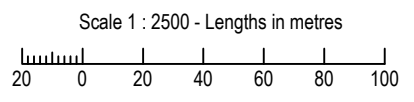
TYPICAL ALLOTMENT ATTRIBUTES		
AREA (m <sup>2</sup> )	WIDTH (m)	LENGTH (m)
>400	13-14	30-35
500	14	35
600	17.5	35
700	19	37

- NOTES:**
- These notes form part of this plan.
  - Boundaries identified by plan dimensions only, the boundaries have not been surveyed.
  - Adjoining property boundary boundaries may not be complete, a summary of compiled DCDB only.
  - The dimensions, bearings, areas and number of allotments shown on this plan are subject to field survey and approval of relevant Government Authorities having jurisdiction over statutory requirements pursuant to any relevant legislation.
  - The information for this plan has been prepared for the purpose of a Development Approval for Subdivision and should not be used for any other purpose.
  - This plan has been prepared for the Stevens Group.
  - Do not scale from this plan.



Emergency Access Only

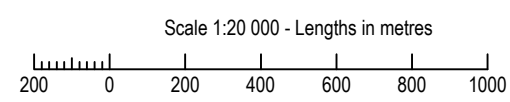
note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.



SOURCE: OneCollective - Masterplan (191113 CVC Approved Plans - Extract.pdf)	CLIENT Ocean Park Consulting Pty Ltd	FIGURE 1	TITLE APPROVED MASTER PLAN
SCALE: 1 : 2500 @ A3	PROJECT Baseline Koala Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA		
JWA PTY LTD Ecological Consultants		PREPARED: BW DATE: 02 June 2020 FILE: N202001_SAT_20200302.dwg	



**LEGEND**  
 Site Boundary



SOURCE: Open Street Maps  
 SCALE: 1: 20 000 @ A3  
 JWA PTY LTD  
 Ecological Consultants

CLIENT  
 Ocean Park Consulting Pty Ltd  
 PROJECT  
 Baseline Koala Monitoring Report  
 Birrigan Estate  
 Lot 99 on DP823635, Hickey Street, Iluka NSW  
 Clarence Valley Council LGA

**FIGURE 2**  
 PREPARED: BW  
 DATE: 02 March 2020  
 FILE: N202001\_SAT\_20200302.dwg

TITLE  
**LOCALITY PLAN**

- Clarence Valley Council (CVC) approved the Stage 1 Vegetation Clearing and Bulk Earthworks on the 2<sup>nd</sup> December 2020 (CVC Ref CC 2020/0623).
- Stage 1 Vegetation Clearing and Bulk Earthworks commenced on site on the 3<sup>rd</sup> December 2020 and were completed on the 18<sup>th</sup> December 2020.
- CVC approved the Subdivision Works Certificate - Stage 2 Vegetation Clearing on the 1<sup>st</sup> July 2021 (CVC Ref CC 2021/0061).
- Stage 2 Vegetation Clearing commenced on site on the 23<sup>rd</sup> August 2021 and were completed on the 8<sup>th</sup> September 2021.
- Stage 1 Bushland Rehabilitation works commenced on the 27<sup>th</sup> September 2021.
- A small area of additional clearing (within Elizabeth Street road reserve) was completed on 26<sup>th</sup> October 2021.

## 2 MANAGEMENT STRATEGY IMPLEMENTATION

This Annual Habitat Monitoring Report has been prepared to discuss the results of the monitoring of management strategies implemented to date in relation to retained vegetation and rehabilitation, koala infrastructure, and construction and operational management against the Monitoring Performance Criteria identified in the approved HMP (JWA 2020). Management strategies within the approved HMP are apportioned to pre-construction, construction and operational phases of the development.

The Implementation Schedules below (**TABLES 1-3**) have been extracted from the approved HMP and identify the associated personnel, and timing for all pre-construction, construction and operational phase management actions. Performance measures to be achieved during the ‘establishment period’ and ‘maintenance period’ of the project are also included in the implementation tables where appropriate. The Implementation Tables have been reproduced below as a checklist for whether the relevant management actions have been complied with, and appropriate evidence is also provided where relevant.

**TABLE 1: PRE-CONSTRUCTION PHASE IMPLEMENTATION TABLE**

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
Education of Site Personnel	MA1 / MU1	An induction program will be developed prior to construction commencing and all construction personnel, and any other persons/contractors completing works on the site during the construction phases, are to complete the induction prior to starting work on the site in accordance with SECTION 6.2 of the HMP.	Principal Contractor / Site Supervisor	Induction program developed and all relevant personnel completed induction prior to starting work on the site. Records of all training conducted maintained.	✓	A site induction was completed with construction personnel and contractors prior to construction commencing by Adam McArthur, Principal Ecologist (JWA), on the 2 <sup>nd</sup> December 2020.
Nest Boxes	MA2 / MU2 MA3 / MU4 MA4 / MU7 MA5 / MU10	Hollows removed for development replaced with nest boxes at minimum 1:1 ratio one (1) month prior to clearing works in accordance with SECTION 6.3 of the HMP.	Project Ecologist	Nest boxes installed and details of each installation provided to Council.	✓	Nest boxes were installed on the 27 <sup>th</sup> July 2020 and details on each installation and the first round of monitoring is provided in APPENDIX 1.
Provision of Spotter Catcher	MA1 / MU1	A suitably qualified fauna spotter catcher will be appointed to conduct a pre-clearing site inspection and oversee all clearing works in accordance with SECTION 6.3.2 of the HMP.	Principal Contractor / Site Supervisor	Fauna spotter catcher appointed.	✓	Pre-clearing inspection and supervision of clearing works have been undertaken prior to Stage 1 clearing, Stage 2 clearing and a small amount of additional clearing required within the Elizabeth Street road reserve. Copies of relevant documentation is provided in APPENDIX 2.
Pre-clearing Site Inspection for Habitat Features	MA1 / MU1	Site Inspection completed no more that one (1) day prior to commencement of clearing with each stage to identify and mark for habitat trees/features in accordance with SECTION 6.3.3 of the HMP.	Project Ecologist	Site inspection completed and habitat trees/features marked.	✓	Pre-clearing site inspection were completed and habitat/trees were marked by a JWA ecologist prior to clearing of Stage 1 and Stage 2. Refer to copies of relevant documentation in APPENDIX 2.
	MA1 / MU1	A pre-clearing report prepared prior to clearing in accordance with SECTION 6.3.3 of the HMP.	Project Ecologist	Report prepared.	✓	
Erosion and Sediment Control Measures	MA1 / MU1	All measures contained in the Sediment and Erosion Control Plan to be implemented prior to the commencement of construction in accordance with SECTION 6.5 of the HMP.	Proponent	Sediment and erosion control measures implemented.	✓	Sediment and erosion control measures have been implemented as necessary.
Management of Retained Habitat	MA2 MA3 MA4 MA5 MA6	Retained habitat within Bushland Parks A - E clearly identified on site with marking pegs prior to commencement of construction works in accordance with SECTION 6.8 of the HMP.	Principal Contractor / Site Supervisor	Boundaries of retained habitat areas identified and marked.	✓	Retained habitat within Bushland Parks A - E was clearly identified on site prior to commencement of clearing works.
Retained Habitat / Rehabilitation Monitoring	MA2 MA3 MA4 MA5 MA6	Baseline retained habitat monitoring completed prior to commencement of construction in accordance with SECTION 7.4 of the HMP.	Project Ecologist	Baseline retained habitat monitoring completed.	✓	Baseline retained habitat monitoring has been completed and a copy of the report is provided in APPENDIX 3.
	MA2 MA3 MA4 MA5 MA6	Baseline monitoring report prepared in accordance with SECTION 7.6.1 of the HMP.	Project Ecologist	Baseline monitoring report completed.	✓	

TABLE 2 - CONSTRUCTION PHASE IMPLEMENTATION TABLE

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
No Go Zones	MA2 MA3 MA4 MA5 MA6	Access to no-go zones (Management Areas 2 - 6) by construction personnel and machinery is prohibited during clearing works except for non-destructive works (e.g. bush regeneration) with prior approval in accordance with SECTION 6.4.3 of the HMP.	Principal Contractor / Site Supervisor / Project Ecologist	No unauthorised access to no-go zones.	✓	No unauthorised access to no-go zones has occurred.
	MA2 MA3 MA4 MA5 MA6	In accordance with SECTION 6.3.5 of the HMP the following activities are not permitted within the No Go Zones: <ul style="list-style-type: none"> <li>Storage and mixing of materials;</li> <li>Vehicle parking;</li> <li>Liquid disposal;</li> <li>Machinery repairs and/or refuelling;</li> <li>Construction site office or shed;</li> <li>Combustion of any material;</li> <li>Stockpiling of soil, rubble and debris, cleared vegetation and site mulch;</li> <li>Any filling or excavation including trench line, topsoil skimming and/or surface excavation; and</li> <li>Unauthorised pesticide, herbicide or chemical applications.</li> </ul>	Principal Contractor / Site Supervisor	No prohibited activities within no go zones.	✓	No prohibited activities within no go zones have occurred.
Pre-clearing Site Inspection for Fauna	MA1 / MU1	Clearing area to be inspected for presence of koalas and other fauna prior to the commencement of clearing each day in accordance with SECTION 6.3.4 of the HMP.	Fauna Spotter Catcher	Pre-clearing site inspection for fauna completed.	✓	Pre-clearing inspection and supervision of clearing works have been undertaken prior to Stage 1 clearing, Stage 2 clearing and a small amount of additional clearing required within the Elizabeth Street road reserve. No native animals have been observed to be injured or killed to date. Copies of relevant documentation is provided in APPENDIX 2.
				No native animals injured or killed.	✓	
Nest Boxes	MA2 / MU2 MA3 / MU4 MA4 / MU7 MA5 / MU10	Additional hollows removed during clearing works replaced with nest boxes at minimum 1:1 ratio in accordance with SECTION 6.3 of the HMP.	Project Ecologist	Nest boxes installed and details of each installation provided to Council.	✓	Nest boxes were installed on the 27 <sup>th</sup> July 2020 and details on each installation and the first round of monitoring is provided in APPENDIX 1.
	MA2 / MU2 MA3 / MU4 MA4 / MU7 MA5 / MU10	Nest boxes monitored and maintained on an annual basis until completion of all stages and then for an additional period of three (3) years in accordance with SECTION 7.3 of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Nest boxes monitored and repaired/replaced as required.	✓	
	MA2 / MU2 MA3 / MU4 MA4 / MU7 MA5 / MU10	Annual nest box monitoring results to be included in the Annual Habitat Monitoring Report in accordance with SECTION 7.3 and SECTION 7.6.2 of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Reporting completed.	✓	
Vegetation and Fauna Management During Construction Phase	MA1 / MU1	Tree clearing undertaken in accordance with procedures outlined in SECTION 6.3.6 and SECTION 6.3.7 of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	Tree clearing procedures followed.	✓	All tree clearing procedures have been followed under the supervision of a suitably qualified fauna spotter catcher. Copies of relevant documentation is provided in APPENDIX 2.
	MA1 / MU1	Vegetation waste to be mulched and retained on site for re-use in landscape works or disposed of appropriately in accordance with SECTION 6.3.6 of the HMP.	Principal Contractor / Site Supervisor	Vegetation waste reused on site or disposed of appropriately.	✓	Vegetation has been mulched and reused in rehabilitation areas - refer to APPENDIX 4.
	MA1 / MU1	Hollow logs to be relocated to areas proposed for rehabilitation works in accordance with SECTION 6.3.6 of the HMP.	Project Ecologist	Hollow logs relocated where appropriate.	✓	Hollow logs have been relocated to areas proposed for rehabilitation where appropriate - refer to the spotter catcher reports (APPENDIX 2).



Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
	MA1 / MU1	Stockpile areas are to be clearly delineated on plans and on the ground and soil and vegetation debris must be stockpiled within defined areas in accordance with <b>SECTION 6.3.6</b> of the HMP.	Principal Contractor / Site Supervisor	Stockpile locations identified and marked. Soil and vegetation debris stockpiled in designated areas.	✓	Stockpile locations were identified and marked prior to commencement. Soil and vegetation debris has been stockpiled in designated areas.
	MA1 / MU1	Construction zone to be regularly monitored for weeds and any weeds controlled in accordance with <b>SECTION 6.3.6</b> of the HMP.	Principal Contractor / Site Supervisor	Weeds controlled during construction phase.	✓	Weeds have been suitably controlled during construction phase of Stage 1 and Stage 2.
	ALL	Hygiene protocols for machinery (such as wash-down procedures) and personnel (such as boot-cleaning), are to be strictly observed to minimise the spread of weeds and the movement of pathogens in accordance with <b>SECTION 6.3.6</b> of the HMP.	Principal Contractor / Site Supervisor	Hygiene protocols followed.	✓	Hygiene protocols have been appropriately followed.
	MA1 / MU1	Any fauna captured on site during clearing works will be relocated/translocated by the spotter catcher to a suitable habitat area/s on or adjacent to the site the same day of capture in accordance with <b>SECTION 6.3.7.4</b> of the HMP.	Fauna Spotter Catcher	Fauna relocated as required.	✓	Any fauna captured on site during clearing works have been suitably relocated/translocated. Refer to the spotter catcher reports ( <b>APPENDIX 2</b> ).
	MA1 / MU1	Any animals injured or requiring support / rehabilitation during tree clearing to be immediately removed from site and taken to an appropriately qualified veterinary surgeon / wildlife carer or centre as required in accordance with <b>SECTION 6.3.7.4</b> and <b>SECTION 6.3.8</b> of the HMP.	Fauna Spotter Catcher	Animals provided appropriate care.	✓	No animals have been injured to date. Refer to the spotter catcher reports ( <b>APPENDIX 2</b> ).
	MA1 / MU1	Earthworks and/or the clearing of native vegetation will be temporarily suspended (up to 72 hrs) within a 25 m radius of any tree in which a koala is located and will not resume until the koala has moved outside of the clearing area of its own accord ( <b>SECTION 6.3.7.4</b> of the HMP). If the animal does not self-relocate out of the clearing area within 72 hrs of its initial observation, experts will be consulted in relation to an appropriate protocol to encourage the animal to relocate. The tree can only to be removed following inspection by an appropriately qualified ecologist/fauna handler to ensure that the koala has dispersed and that the removal of the tree poses no direct threat to the health or survival of the koala.	Fauna Spotter Catcher	Procedures for tree clearing in vicinity of koalas observed.	✓	No koalas located during clearing works of Stage 1 and Stage 2. Spotter catcher reports are included in <b>APPENDIX 2</b> .
	MA1 / MU1	A Post Clearing Fauna Spotter Report to be prepared within two (2) weeks of completion of each stage of clearing activities and forwarded to all relevant agencies including CVC in accordance with <b>SECTION 6.3.7.4</b> of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	Post Clearing Fauna Spotter Report prepared and provided to relevant agencies.	✓	Spotter catcher reports are included in <b>APPENDIX 2</b> .
	Protocols for the Discovery of an Injured or Dead Animal	ALL	Any animals injured or requiring support / rehabilitation during construction phase to be immediately removed from site and taken to an appropriately qualified veterinary surgeon / wildlife carer or centre as required in accordance with <b>SECTION 6.3.7.4</b> and <b>SECTION 6.3.8</b> of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	Animals provided appropriate care.	✓
ALL		WIRES to be notified of any dead animals in accordance with <b>SECTION 6.3.8</b> of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	WIRES notified as required.	✓	No animals have been killed to date. Refer to the spotter catcher reports ( <b>APPENDIX 2</b> ).

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
	ALL	Any koala observation or incident during the construction phase should result in an observation/incident report in accordance with <b>SECTION 6.3.8</b> of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	Observation/incident report completed as required.	✓	No koalas located during clearing works of Stage 1 and Stage 2. Spotter catcher reports are included in <b>APPENDIX 2</b> .
Fencing During Construction	MA1 / MU1	The works area to be clearly delineated with temporary fencing (e.g. with high visibility para-webbing) during clearing and construction works in accordance with <b>SECTION 6.4.1</b> of the HMP.	Principal Contractor / Site Supervisor	Temporary fencing installed.	✓	Temporary fencing has been installed and inspected and as required. No repairs have been necessary to date.
	MA1 / MU1	Temporary fencing to be inspected at not less than one (1) monthly intervals in accordance with <b>SECTION 6.4.1</b> of the HMP.	Principal Contractor / Site Supervisor	Temporary fencing inspected.	✓	
	MA1 / MU1	Any damage to fences to be repaired within two (2) working days of the discovery in accordance with <b>SECTION 6.4.1</b> of the HMP.	Principal Contractor / Site Supervisor	Temporary fencing repaired as required.	n/a	
Construction Signage	ALL	Temporary signage to be installed during construction phases in accordance with <b>SECTION 6.4.3</b> of the HMP.  Following signage required: <ul style="list-style-type: none"> <li>Signs warning all personnel and the public of dangers, work health and safety requirements and contact details for the Site Manager.</li> <li>At appropriate and highly visible locations noting the total prohibition of dogs on the site;</li> <li>Beside temporary roads/haul routes noting a 50 km/hr speed limit, or 40 km/hr speed limit where roads traverse the environmental protection areas; and</li> <li>At approximately 100 m intervals along all fencing stating "Environmental Protection Zone - No Unauthorised Entry".</li> </ul>	Principal Contractor / Site Supervisor	Temporary signage installed.	✓	Temporary signage has been installed as appropriate.
Permanent Signage	ALL	Permanent signage to be installed at end of construction phase at each Bushland Park in accordance with <b>SECTION 6.4.4, SECTION 6.11</b> and <b>SECTION 6.10</b> of the HMP.  Following types of signage required: <ul style="list-style-type: none"> <li>Notification of conservation area (including educational material on significant flora, fauna and EECs known to occur within the local area - Coastal Cypress Pine Forest and Littoral rainforest);</li> <li>Specific information regarding the Iluka Peninsula Koala population;</li> <li>Prohibition of dumping of garden refuse in bushland areas;</li> <li>The importance of dog control, particularly between dusk and dawn and warning of total prohibition of dogs within the conservation area;</li> <li>Contact details for WIRES as the primary organization for the rehabilitation of sick and injured koalas in the locality; and</li> <li>Contact information for incident reporting.</li> </ul>	Principal Contractor / Site Supervisor	Permanent signage installed.	n/a	Not applicable - the project is not yet at the end of construction phase.



Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
Erosion and Sediment Control Measures	MA1 / MU1	All measures contained in the Sediment and Erosion Control Plan to be implemented and maintained throughout construction phase in accordance with SECTION 6.5 of the HMP.	Principal Contractor / Site Supervisor	Sediment and erosion control measures implemented and maintained.	✓	Sediment and erosion control measures have been implemented as necessary.
Access and Traffic Management	ALL	All traffic access to occur via Hickey Street or at the intersection of Elizabeth Street and Micalo Street, or within the existing bushfire access track during construction in accordance with SECTION 6.6 of the HMP.	Principal Contractor / Site Supervisor	Appropriate traffic and access controls implemented.	✓	Appropriate traffic and access controls have been implemented.
	ALL	Vehicles and deliveries are not to block any access along roads or the fire trail in accordance with SECTION 6.6 of the HMP.	Principal Contractor / Site Supervisor	Appropriate traffic controls implemented.	✓	
	ALL	Vehicles and construction plant to be restricted to a maximum speed of 40 kph (or less as identified by the contractor) and daylight operation for the duration of the construction phase in accordance with SECTION 6.6 of the HMP.	Principal Contractor / Site Supervisor	Appropriate traffic controls implemented. No reported vehicle strike mortalities	✓ ✓	To date there has been no reported vehicle strike mortalities.
Verge Management and Maintenance	MA1 / MU1	Tree planting in the road verges to be completed in accordance with the Landscape Master Plan (Moir Landscape Architecture 2018) and SECTION 6.7 of the HMP.	Principal Contractor / Site Supervisor	Tree planting in road verges completed as required.	n/a	Construction is ongoing and landscaping works are yet to commence.
Management of Retained Habitat	ALL	Retained habitat to be maintained/improved through weed control and rehabilitation works in accordance with the protocols as described in SECTION 6.8 and SECTION 6.9 of the HMP.	Bush Regeneration Company	Weed control and rehabilitation works completed as required. Specific performance indicators and targets for rehabilitation works are provided in SECTION 7.4.3.	✓	Weed control and rehabilitation works commenced on 27th September 2021. Compliance with Specific performance indicators and targets for rehabilitation works will be assessed during the first round of monitoring (to be completed March/April 2022).
Rehabilitation Strategy	MA2 MA3 MA4 MA5 MA6	Rehabilitation works and weed control to be completed in accordance with SECTION 6.9 of the HMP.	Bush Regeneration Company	Rehabilitation works and weed control completed. Specific performance indicators and targets for rehabilitation works are provided in SECTION 7.4.3.	✓	Weed control and rehabilitation works commenced on 27th September 2021. Compliance with Specific performance indicators and targets for rehabilitation works will be assessed during the first round of monitoring (to be completed March/April 2022).
	MA2 MA3 MA4 MA5 MA6	Weed monitoring visits will be completed every month for the duration of the establishment period, and every six (6) months during the maintenance period in accordance with SECTION 6.9.5.5 of the HMP.	Bush Regeneration Company	Weed monitoring completed.	✓	Weed control and rehabilitation works commenced on 27th September 2021 and the first follow-up inspection and treatment occurred in November 2021. Compliance with Specific performance indicators and targets for rehabilitation works will be assessed during the first round of monitoring (to be completed March/April 2022).
	MA2 MA3 MA4 MA5 MA6	Plantings within the APZs are to be minimal and consist of low, 'fire retardant' ground covers in accordance with SECTION 6.9.7.4 of the HMP.	Bush Regeneration Company	Minimal plantings within APZ.	✓	Rehabilitation works within APZs are compliant.
	MA2 MA3 MA4 MA5 MA6	No rehabilitation plantings are to occur within the existing fire break along the southern boundary in accordance with SECTION 6.9.7.4 of the HMP.	Bush Regeneration Company	No plantings within fire break.	✓	No plantings have occurred within the fire break.
	MA2 MA3 MA4 MA5 MA6	Replacement preferred koala food trees to be planted in rehabilitation areas in accordance with SECTION 6.9.7.4 of the HMP.	Bush Regeneration Company	Replacement trees planted.		Weed control and rehabilitation works commenced on 27th September 2021 and the first follow-up inspection and treatment occurred in November 2021. Replacement preferred koala food trees will be planted as soon as planting site are suitably prepared.
	ALL	No plantings of any <i>Acronychia</i> species are to occur on site in accordance with SECTION 6.9.7.4 of the HMP.	Bush Regeneration Company	No <i>Acronychia</i> species planted.	✓	No <i>Acronychia</i> species have been planted.

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
Domestic Pet Controls	ALL	All dogs will be banned from the subject site during the construction phase in accordance with SECTION 6.10 of the HMP.	Contractor / Site Supervisor	No dogs on site.	✓	To date there has been no dogs reported on site
	ALL	Any evidence of dogs within Bushland Parks observed during monitoring or maintenance works to be reported to the Community Association in accordance with SECTION 6.10 of the HMP.	Contractor / Site Supervisor	Evidence of dogs reported.	✓	
Fire Management	ALL	Fire hazard within Bushland Parks managed appropriately in accordance with SECTION 6.12 of the HMP.	The Proponent	Fire management activities completed as required.	n/a	Fire management activities have not occurred/been necessary at this stage.
Fauna Management Monitoring	MA1 / MU1	Details of all fauna encountered during clearing works are to be recorded and reported in accordance with SECTION 7.2 of the HMP.	Project Ecologist / Fauna Spotter Catcher	Reporting completed.	✓	Spotter catcher reports are included in APPENDIX 2. No other encounters with fauna have occurred to date.
Retained Habitat / Rehabilitation Monitoring	MA2 MA3 MA4 MA5 MA6	Retained habitat/rehabilitation monitoring to be completed six (6) monthly until the establishment period performance criteria are met and then annually during the maintenance period in accordance with SECTION 7.4.2 of the HMP.	Project Ecologist	Retained habitat / rehabilitation monitoring completed	n/a	Weed control and rehabilitation works commenced on 27th September 2021. Compliance with Specific performance indicators and targets for rehabilitation works will be assessed during the first round of monitoring (to be completed March/April 2022).
	MA2 MA3 MA4 MA5 MA6	The bush regeneration team to keep work sheets detailing works completed in accordance with SECTION 7.4.2.4 of the HMP.	Bush Regeneration Company	Reporting completed.	n/a	Weed control and rehabilitation works commenced on 27th September 2021. Bush regeneration work sheets detailing works completed will be included in the next annual monitoring report.
Infrastructure, Construction and Operational Management Monitoring	ALL	Relevant construction activities and infrastructure to be monitored during and after construction in accordance with SECTION 7.5 of the HMP.	Contractor / Site Supervisor / Project Ecologist	Monitoring completed.	✓	Relevant monitoring during the construction period is ongoing.
	ALL	Construction/installation of temporary and/or permanent fences and signage to be monitored to ensure that no barriers to wildlife movement created and temporary fencing does not prevent koalas accessing koala habitat on the site in accordance with SECTION 7.5.2 of the HMP.	Project Ecologist	Fencing and signage installation/construction monitored and no barriers created.	✓	Temporary fencing has been installed and inspected and as required.
	ALL	Visual inspections of infrastructure to be completed on a monthly basis during construction phase in accordance with SECTION 7.5.2 of the HMP.	Project Ecologist	Inspections completed.	✓	Relevant monitoring during the construction period is ongoing.
	ALL	Where damage or other failures to infrastructure are observed a report will be prepared within 24 hours and the damage or failure corrected within 48 hours of the report in accordance with SECTION 7.5.2 of the HMP.	Principal Contractor / Site Supervisor	Report completed. Damage or failure corrected.	✓	No damage or other failures to infrastructure have been observed to date.
Disease Management for Koalas	ALL	In the event that a suspected diseased koala is observed during monitoring, the time, date and location of the sighting must be recorded and provided to an appropriate wildlife care organization as soon as practicable in accordance with SECTION 8.3.2 of the HMP.	Project Ecologist	Suspected diseased koalas reported.	✓	No sick koalas have been observed to date.
Annual Habitat Monitoring Report	ALL	Annual Habitat Monitoring Report to be prepared and submitted to CVC and DAWE in accordance with SECTION 7.5.2, SECTION 7.6.2 and SECTION 7.6.3 of the HMP.	Project Ecologist	Annual Habitat Monitoring Report prepared and submitted.	✓	This report represents the first Annual Habitat Monitoring Report.
Annual Koala Activity Monitoring and Reporting	MA2 MA3 MA4 MA5 MA6	Annual Koala activity monitoring to be completed from the date of commencement of works and continue for a period extending to five (5) years after completion of the final stage in accordance with SECTION 8.3.2 of the HMP.	Project Ecologist	Koala activity monitoring completed.	✓	The first Annual Koala Monitoring Report has been completed and is included in APPENDIX 5.

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
	MA2 MA3 MA4 MA5 MA6	Additional koala activity monitoring event to be completed in the event of an uncontrolled bushfire occurring on the Birrigan Iluka Beach site in accordance with <b>SECTION 8.3.3</b> of the HMP.	Project Ecologist	Additional monitoring completed as required.	n/a	Not applicable. No uncontrolled bushfires have occurred.
	MA2 MA3 MA4 MA5 MA6	Annual Koala Monitoring Report to be prepared in accordance with <b>SECTION 8.3.2</b> and <b>SECTION 8.6.2</b> of the HMP.	Project Ecologist	Annual Koala Monitoring Report prepared.	✓	The first Annual Koala Monitoring Report has been completed and is included in <b>APPENDIX 5</b> .
Lighting	MA1 / MU1	Lighting in public areas to be kept at a minimum required for safety and amenity in accordance with <b>SECTION 6.4.5</b> of the HMP.	Contractor, Utility Service Provider (electricity and lighting)	Appropriate lighting installed.	n/a	Construction is ongoing and installation of lighting is yet to commence.
	MA1 / MU1	All street lighting to be capped and/or positioned to minimise light spill into retained habitat and habitat rehabilitation areas in accordance with <b>SECTION 6.4.5</b> of the HMP.	Contractor, Utility Service Provider (electricity and lighting)	Street lighting capped and/or appropriately positioned.	n/a	Construction is ongoing and installation of lighting is yet to commence.

**TABLE 3 - OPERATIONAL PHASE IMPLEMENTATION TABLE**

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliance	Details
Fencing Post Construction	ALL	No fencing to be constructed within Bushland Parks in accordance with SECTION 6.4.2 of the HMP.	Community Property (Lot 1) Contractor	No fencing installed in Bushland Parks.	n/a	Not Applicable - Operational Phase is yet to commence
	ALL	Bollards or large stone blocks to be installed (where required) to delineate boundaries of Bushland Parks and prevent vehicle incursion in accordance with SECTION 6.4.2 of the HMP.	Community Property (Lot 1) Contractor	Appropriate measures installed where required to delineate Bushland Park boundaries and prevent vehicle access.	n/a	Not Applicable - Operational Phase is yet to commence
Permanent Signage	ALL	Permanent signage to be maintained in accordance with SECTION 6.4.4, SECTION 6.11 and SECTION 6.10 of the HMP.	Community Property (Lot 1) Contractor	Permanent signage maintained.	n/a	Not Applicable - Operational Phase is yet to commence
Lighting	MA1 / MU1	Lighting in public areas to be kept at a minimum required for safety and amenity in accordance with SECTION 6.4.5 of the HMP.	Contractor, Utility Service Provider (electricity and lighting)	Appropriate lighting installed.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	All street lighting to be capped and/or positioned to minimise light spill into retained habitat and habitat rehabilitation areas in accordance with SECTION 6.4.5 of the HMP.	Contractor, Utility Service Provider (electricity and lighting)	Street lighting capped and/or appropriately positioned.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Outdoor lighting in residential lots to be of low-wattage and of a type that reduces spills and glare in accordance with SECTION 6.4.5 of the HMP.	Owners and Occupiers	Appropriate lighting installed.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	No lights to be directed towards the retained bushland or into the entrances of pre-existing hollows in accordance with SECTION 6.4.5 of the HMP.	Community Property (Lot 1) Contractor / Residents	Lighting appropriately positioned.	n/a	Not Applicable - Operational Phase is yet to commence
Swimming Pools	MA1 / MU1	Backyard swimming pools to include an acceptable Koala escape mechanism in accordance with SECTION 6.4.6 of the HMP.	Owners and Occupiers	Koala escape mechanisms provided to swimming pools.	n/a	Not Applicable - Operational Phase is yet to commence
Access and Traffic Management	ALL	Access to the Bushland Parks to be via the existing roads and fire trails and internal tracks within the development footprint in accordance with SECTION 6.6 of the HMP.	Community Property (Lot 1) Contractor	No unauthorised vehicle access.	n/a	Not Applicable - Operational Phase is yet to commence
	ALL	No vehicular access to the site is to occur through the Bushland Parks or via any new access point from Iluka Road in accordance with SECTION 6.6 of the HMP.	Community Property (Lot 1) Contractor	No unauthorised vehicle access.	n/a	Not Applicable - Operational Phase is yet to commence
	ALL	Fire trail and APZs are to remain clear and act as maintenance tracks in accordance with SECTION 6.6 of the HMP.	Community Property (Lot 1) Contractor	Fire trails and APZs managed and maintained.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Traffic calming measures to be implemented after occupation in accordance with SECTION 6.6 of the HMP.	Community Property (Lot 1) Contractor	Appropriate traffic calming measures installed where required.	n/a	Not Applicable - Operational Phase is yet to commence
	ALL	Awareness of potential for vehicle strike. Vehicles not to exceed speed limits.	Community Property (Lot 1)	No native animals injured or killed on roads.	n/a	Not Applicable - Operational Phase is yet to commence

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliance	Details
			Contractor			
Verge Management and Maintenance	MA1 / MU1	Internal public road verges on site and existing external public road verges surrounding the site to be managed and maintained in accordance within <b>SECTION 6.7</b> of the HMP.	Community Property (Lot 1) Contractor	Road verges managed and maintained.	n/a	Not Applicable - Operational Phase is yet to commence
Management of Retained Habitat	ALL	Weeds to be controlled within Bushland Parks in accordance with <b>SECTION 6.8</b> and <b>SECTION 6.9.5</b> of the HMP.	Community Property (Lot 1) Contractor	Weeds controlled as needed.	n/a	Not Applicable - Operational Phase is yet to commence
Domestic Pet Controls	ALL	Any evidence of dogs within Bushland Parks observed during monitoring or maintenance works to be reported to the Community Association in accordance with <b>SECTION 6.10</b> of the HMP.	Community Property (Lot 1) Contractor	Evidence of dogs reported.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Dog-proof and koala-proof exclusion fences and koala escape posts / planks to be installed at premises with dogs in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	Dog-proof and koala-proof exclusion fences and koala escape posts / planks installed where required.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Dogs to be on leash at all times within the subdivision when outside of fenced premises in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	Dogs properly controlled when outside fenced premises.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Domestic dogs to be confined indoors or within a koala exclusion external fence in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	No domestic dogs outside premises or enclosures.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Domestic cats to be confined indoors or within a cat-proof enclosure in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	No domestic cats outside premises or enclosures.	n/a	Not Applicable - Operational Phase is yet to commence
	ALL	All domestic pets are prohibited from Bushland Parks in accordance with <b>SECTION 6.10</b> of the HMP.	Community Property (Lot 1) Contractor / Residents	No domestic pets in Bushland Parks.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Dogs and cats are to be desexed in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	Dogs and cats desexed.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	All domestic pets are to be microchipped and registered within the CVC in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	Dogs and cats microchipped and registered.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Vaccinations for all dogs and cats are to be kept up to date at all times in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	Dogs and cats vaccinated.	n/a	Not Applicable - Operational Phase is yet to commence
	MA1 / MU1	Dogs and cats are to be wearing appropriate identification (collar and tag) at all times in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	Dogs and cats wearing identification.	n/a	Not Applicable - Operational Phase is yet to commence
MA1 / MU1	Domestic cats are to either be fitted with a bell to their collar or a motion activated audible and visual alarm to warn nearby wildlife in accordance with <b>SECTION 6.10</b> of the HMP.	Owners and Occupiers	Cats wearing bell or alarm.	n/a	Not Applicable - Operational Phase is yet to commence	

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliance	Details
Disease Management for Koalas	ALL	In the event that a suspected diseased koala is observed during monitoring, the time, date and location of the sighting must be recorded and provided to an appropriate wildlife care organization as soon as practicable in accordance with SECTION 8.3.2 of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Suspected diseased koalas reported.	n/a	Not Applicable - Operational Phase is yet to commence
Fire Management	ALL	Fire hazard within Bushland Parks managed appropriately in accordance with SECTION 6.12 of the HMP.	Community Property (Lot 1) Contractor	Fire management activities completed as required.	n/a	Not Applicable - Operational Phase is yet to commence
Raising Community Awareness and Education	MA1 / MU1	All new residents will be provided with a copy of the Community Management Statement/bylaws and an environmental education package in accordance with SECTION 6.13 of the HMP.	The Proponent	Community Management Statement/bylaws and an environmental education package provide to all new residents.	n/a	Not Applicable - Operational Phase is yet to commence
Retained Habitat / Rehabilitation Monitoring and Reporting	MA2 MA3 MA4 MA5 MA6	Retained habitat / rehabilitation monitoring to be completed six (6) monthly until the establishment period performance criteria are met and then annually during the maintenance period in accordance with SECTION 7.4.2 of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Retained habitat / rehabilitation monitoring completed	n/a	Not Applicable - Operational Phase is yet to commence
	MA2 MA3 MA4 MA5 MA6	The bush regeneration team to keep work sheets detailing works completed in accordance with SECTION 7.4.2.4 of the HMP.	Bush Regeneration Company	Reporting completed.	n/a	Not Applicable - Operational Phase is yet to commence
	MA2 MA3 MA4 MA5 MA6	Annual Habitat Monitoring Report to be prepared and submitted to CVC and DAWE in accordance with SECTION 7.6.2 of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Annual Habitat Monitoring Report prepared and submitted.	n/a	Not Applicable - Operational Phase is yet to commence
Annual Koala Activity Monitoring and Reporting	MA2 MA3 MA4 MA5 MA6	Annual Koala activity monitoring to be completed from the date of commencement of works and continue for a period extending to five (5) years after completion of the final stage in accordance with SECTION 8.3.2 of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Koala activity monitoring completed.	n/a	Not Applicable - Operational Phase is yet to commence
	MA2 MA3 MA4 MA5 MA6	Additional koala activity monitoring event to be completed in the event of an uncontrolled bushfire occurring on the Birrigan Iluka Beach site in accordance with SECTION 8.3.3 of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Additional monitoring completed as required.	n/a	Not Applicable - Operational Phase is yet to commence
	MA2 MA3 MA4 MA5 MA6	An Annual Koala Monitoring Report to be prepared in accordance with SECTION 8.6.2 of the HMP.	Project Ecologist	Report prepared.	n/a	Not Applicable - Operational Phase is yet to commence

### **3 CONCLUSION**

All pre-construction phase requirements have been complied with. The construction phase is underway, and all relevant fauna and habitat management related actions have been completed in compliance with the requirements of the approved HMP. No non-compliances with the requirements of the approved HMP (JWA 2020) have occurred or been identified to date.

## REFERENCES

JWA Pty Ltd (2020) Habitat Management Plan, Birrigan Iluka Beach, Hickey Street, Iluka (Lot 99 on DP823635). Report to Steven Holdings Pty Ltd.

JWA Pty Ltd (2021) Koala (*Phascolarctos cinereus*) 1<sup>st</sup> Annual Monitoring Report. Birrigan Iluka Beach, Iluka (Lot 99 on DP823635). Report to The Stephens Group Pty Ltd.

JWA Pty Ltd (2021) Baseline Retained Habitat Monitoring Report. Birrigan Iluka Beach, Iluka (Lot 99 on DP823635). Report to The Stephens Group Pty Ltd.



## **APPENDIX 1 - NEST BOX MONITORING REPORT**



## **NEST BOX MONITORING REPORT**

**Birrigan Iluka Beach, Iluka  
Lot 99 on DP823635**

A Report Prepared for  
The Stephens Group Pty Ltd

SEPTEMBER 2021

### **NEW SOUTH WALES**

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## DOCUMENT CONTROL

### Document

<b>Title</b>	Nest Box Monitoring Report
<b>Job Number</b>	N202001
<b>File Reference</b>	\\SERVER\data\2020 CLIENTS\202001 - Birrigan Iluka Beach - Iluka\Nest Box Monitoring
<b>Version and Date</b>	RW1 02/09/21
<b>Client</b>	The Stephens Group Pty Ltd

### Revision History (office use only)

Issue	Version	Draft/Final	Date Sent	Distributed To	No. Copies	Media	Delivery Method
1	RW1	FINAL	02/09/21	Client	1	.pdf	Email

### Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW1	02/09/21	Nicole Davies	ND	Adam McArthur	AM

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# 1 INTRODUCTION

## 1.1 Background

JWA Pty Ltd (JWA) have been engaged by The Stephens Group Pty Ltd to undertake required annual nest box monitoring at the Birrigan Iluka Beach development site, located at Hickey Street, Iluka - formally described as Lot 99 on DP823635. The Birrigan Iluka Beach development is an approved 141 lot community scheme subdivision over the subject land (**FIGURES 1 & 2**). JWA previously prepared a Habitat Management Plan (HMP) (JWA 2020) which included an amelioration strategy designed to minimise the impacts on fauna during both the construction and operational phases, undertake nature regeneration/revegetation works and to ensure that ecological processes and corridor function within the identified rehabilitation areas are protected and amplified.

As part of the amelioration strategy, an ongoing nest box monitoring program was established. This report details the methodology and results from the 1st annual nest box monitoring completed by JWA during August 2021.

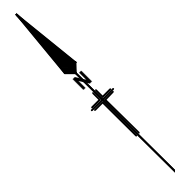
## 1.2 Nest Box Installation/Locations

The installation of nest boxes is required in accordance with the development consent issued for the Birrigan Iluka Beach development to meet the conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals.

JWA completed an initial habitat tree audit over the proposed Stage 1 and 2 clearing areas and identified eight (8) hollow-bearing trees within and adjoining the Stage 1 clearing area containing a total of eighteen (18) small hollows, one (1) medium hollow and one (1) large hollow. Based on the 1:1 offset ratio required and the fauna species recorded from the site, particularly the Threatened species that rely on hollows, JWA recommend installing twenty (20) nest boxes.

The nest boxes were installed within the retained habitat areas on the 27<sup>th</sup> July 2020 by qualified ecologists to compensate for the loss of hollow-bearing trees as part of the development. **FIGURE 3** shows the nest box locations. Nest boxes were designed for target species (Hollow Log Homes Pty Ltd CYPLAS Boxes) and consisted of:

- One (1) Black cockatoo/large owl box (Approx. 360mm l, 490mm w, 640mm h, 150mm opening);
- One (1) Possum box (Approx. 260mm l, 340mm w, 460mm h, 110mm opening);
- Nine (9) Bat boxes (Approx. 300mm l, 160mm w, 340mm h, bottom opening); and
- Nine (9) Small parrot boxes (Approx. 180mm l, 200mm w, 490mm h, 75mm opening).



**PROJECT:**  
ILUKA  
LOT 99 ON DP 823635

**LOCATION:**  
ILUKA ROAD, ELIZABETH, RIVERVIEW AND HICKEY STREETS  
ILUKA, NSW, 2466

DEVELOPMENT CHARACTERISTICS	
ITEM	DESCRIPTION
PROPERTY DESCRIPTION	LOT 99 DP823635
AREA OF LOT 99	19.41 ha.
TOTAL NUMBER OF LOTS	141
PART LOT 1 (Approx.)	5.29 ha.

**CLARENCE VALLEY COUNCIL**  
New Bushfire Trail Connection  
**APPROVAL**

**This is the plan referred to in Council's**  
**Notice of Determination of SUB2015/0034**

**Date: 13/11/2019**

BIKE / PATHWAY CONNECTION TO ILUKA ROAD  
- BIKE LANE SITUATED ON THE NORTH EASTERN SIDE OF THE ILUKA ROAD INTERSECTION WITH HICKEY STREET AND TO PROVIDE A REFUGE ISLAND ON ILUKA ROAD

STREETS FOR LIVING - CHARACTERISTICS				
STREET	RESERVE WIDTH (m)	VERGE WIDTH (m)	TOTAL SEAL WIDTH (m)	CUL DE SAC DIAMETER (m)
HICKEY STREET	30 EXISTING	VARIES	8	-
1	20	6	8	30 outer, 15 inner
2	20 (*1)	6 (*1)	8	-
3	25	6 (*2)	8	20
4, 6, 7	20	6	8	-
5, 8	20	6	8	20
AWAY 3	VARIES	3.5 (*3)	4	-

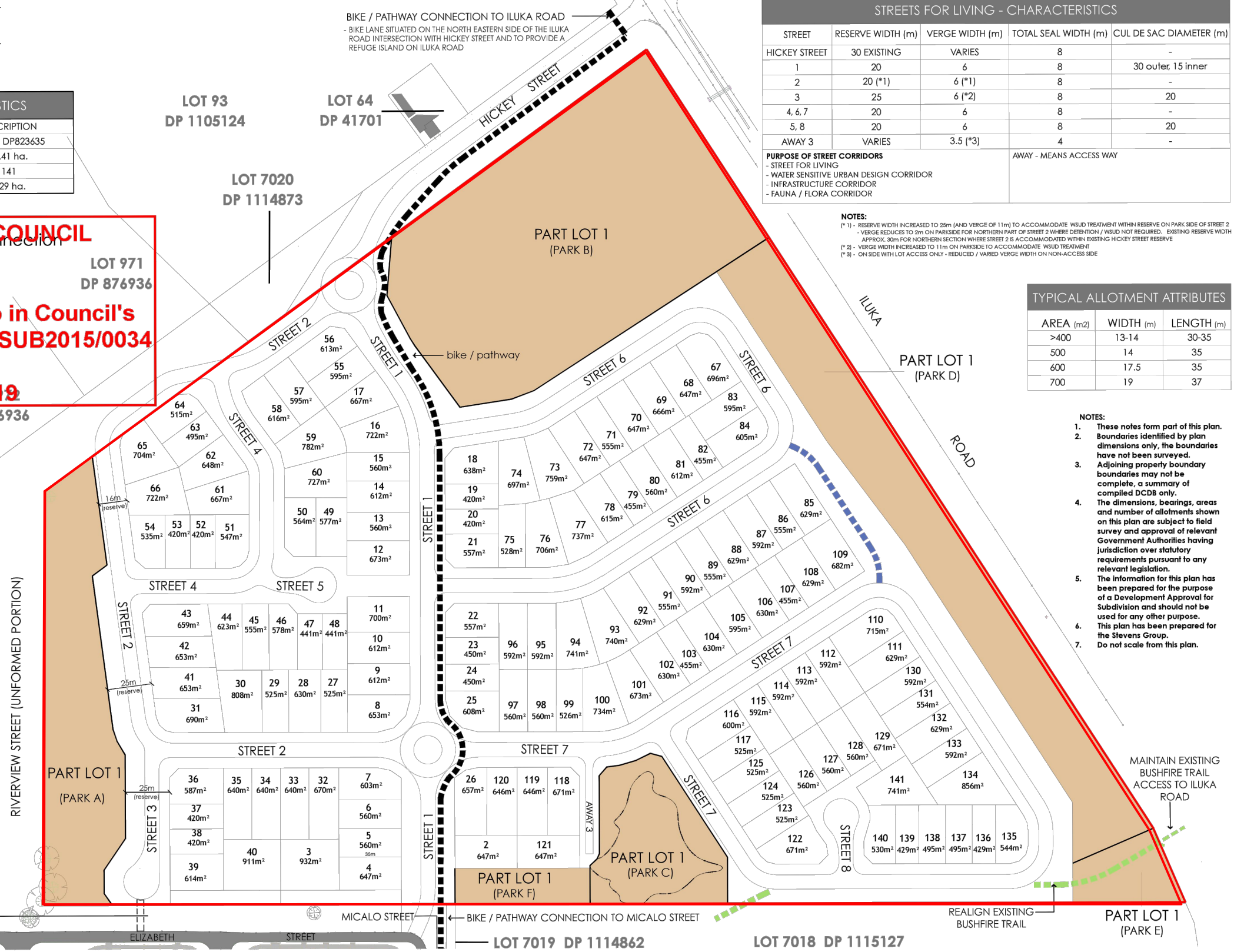
**PURPOSE OF STREET CORRIDORS**  
- STREET FOR LIVING  
- WATER SENSITIVE URBAN DESIGN CORRIDOR  
- INFRASTRUCTURE CORRIDOR  
- FAUNA / FLORA CORRIDOR

AWAY - MEANS ACCESS WAY

**NOTES:**  
(\*1) - RESERVE WIDTH INCREASED TO 25m (AND VERGE OF 11m) TO ACCOMMODATE WSUD TREATMENT WITHIN RESERVE ON PARK SIDE OF STREET 2  
- VERGE REDUCES TO 2m ON PARKSIDE FOR NORTHERN PART OF STREET 2 WHERE DETENTION / WSUD NOT REQUIRED. EXISTING RESERVE WIDTH APPROX. 30m FOR NORTHERN SECTION WHERE STREET 2 IS ACCOMMODATED WITHIN EXISTING HICKEY STREET RESERVE  
(\*2) - VERGE WIDTH INCREASED TO 11m ON PARKSIDE TO ACCOMMODATE WSUD TREATMENT  
(\*3) - ON SIDE WITH LOT ACCESS ONLY - REDUCED / VARIED VERGE WIDTH ON NON-ACCESS SIDE

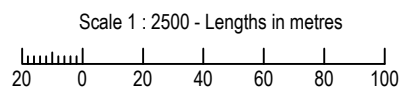
TYPICAL ALLOTMENT ATTRIBUTES		
AREA (m <sup>2</sup> )	WIDTH (m)	LENGTH (m)
>400	13-14	30-35
500	14	35
600	17.5	35
700	19	37

- NOTES:**
- These notes form part of this plan.
  - Boundaries identified by plan dimensions only, the boundaries have not been surveyed.
  - Adjoining property boundary boundaries may not be complete, a summary of compiled DCDB only.
  - The dimensions, bearings, areas and number of allotments shown on this plan are subject to field survey and approval of relevant Government Authorities having jurisdiction over statutory requirements pursuant to any relevant legislation.
  - The information for this plan has been prepared for the purpose of a Development Approval for Subdivision and should not be used for any other purpose.
  - This plan has been prepared for the Stevens Group.
  - Do not scale from this plan.

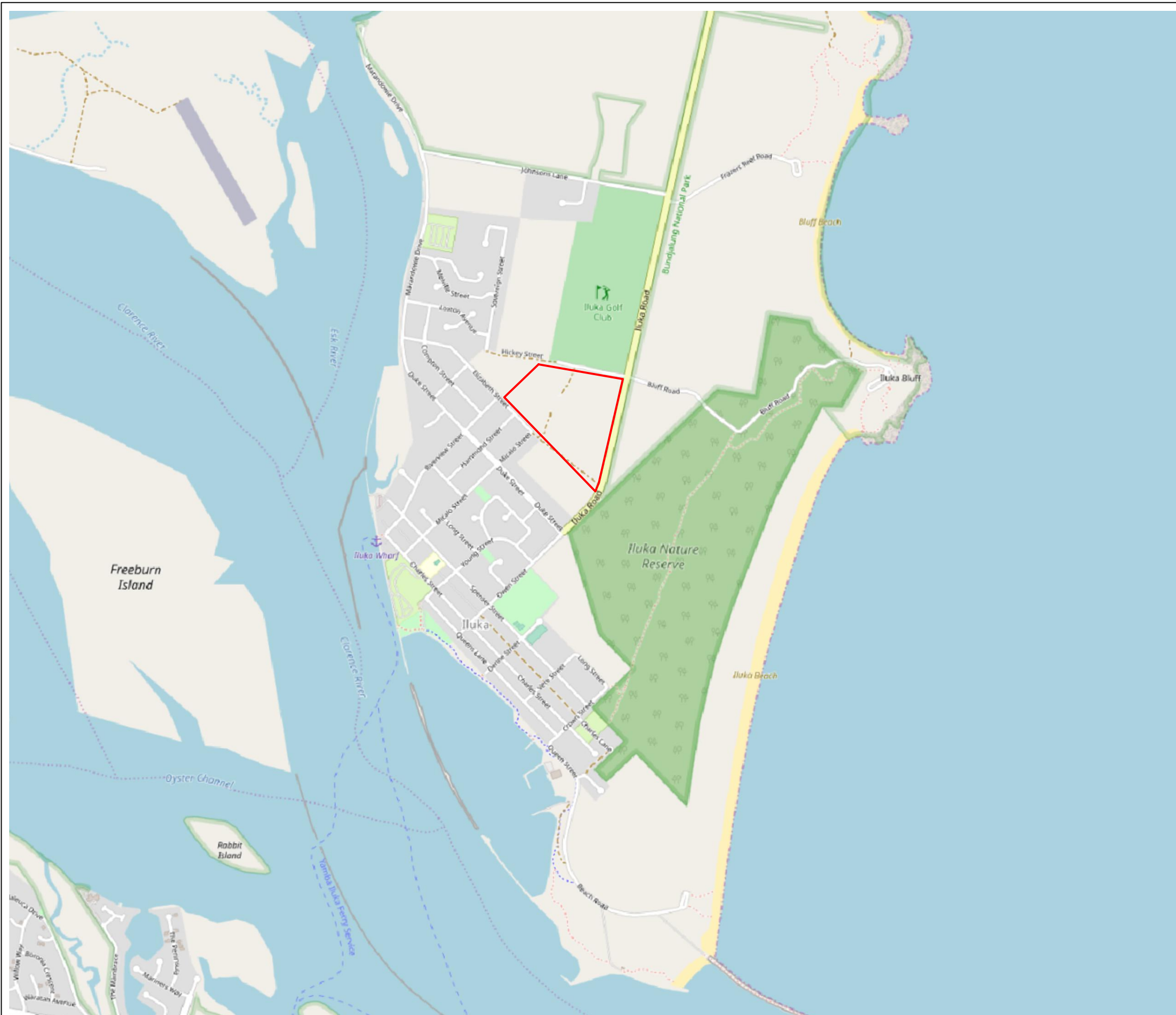


Emergency Access Only

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.



SOURCE: OneCollective - Masterplan (191113 CVC Approved Plans - Extract.pdf)	CLIENT: Ocean Park Consulting Pty Ltd	FIGURE 1	TITLE: APPROVED MASTER PLAN
SCALE: 1 : 2500 @ A3	PROJECT: Annual Koala Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA		
JWA PTY LTD Ecological Consultants		PREPARED: BW DATE: 08 September 2021 FILE: N202001_SAT_20210908.dwg	



**LEGEND**  
 Site Boundary



Scale 1:20 000 - Lengths in metres  
 200 0 200 400 600 800 1000

SOURCE: Open Street Maps

SCALE: 1 : 20 000 @ A3

**JWA PTY LTD**  
 Ecological Consultants

CLIENT  
 Ocean Park Consulting Pty Ltd  
 PROJECT  
 Annual Koala Monitoring Report  
 Birrigan Estate  
 Lot 99 on DP823635, Hickey Street, Iluka NSW  
 Clarence Valley Council LGA

**FIGURE 2**

PREPARED: BW  
 DATE: 08 September 2021  
 FILE: N202001\_SAT\_20210908.dwg

TITLE

**LOCALITY  
 PLAN**

## **2 METHODOLOGY**

### **2.1 Introduction**

The methodology for the nest box monitoring program has been outlined in detail in the HMP (JWA 2020). The methodologies are briefly described in the following sections.

### **2.2 Monitoring Program**

Nest boxes are to be monitored by an experienced ecologist on an annual basis for obvious signs of disrepair and replaced as necessary. Any boxes occupied by feral bees are to be replaced. The annual monitoring of nest boxes will occur until completion of all stages and then for an additional period of three (3) years. The requirement for further ongoing monitoring of nest boxes is to be reviewed upon cessation of this three (3) year period.

An inspection camera mounted on an extendable pole will be used to inspect the contents of nest boxes.

Monitoring of nest boxes will be undertaken and documented by a suitably qualified Ecologist trained to handle fauna (in the event that non-target species are found in the boxes) and to identify fauna species, so target species are not unnecessarily removed or harassed. Records of all inspections are to be provided to the Applicant.

Monitoring should determine the occupation of the boxes by the target species and highlight any maintenance actions that are required. During each monitoring event, a visual inspection of each nest box should be completed, and the following information recorded:

- Any native/pest species occupancy; and
- Any nest box maintenance requirements.

Visual inspection will enable the observer to perform a close inspection for signs of fauna occupancy including feathers, droppings/scats, hair, nesting material and animals themselves. During monitoring, any maintenance requirements should be considered including:

- The need to remove non-target species such as European bees and Ants;
- Replacement of fallen or damaged nest boxes;
- The GPS location of any damaged boxes;
- Re-positioning, re-installation and/or relocation of any wrongly installed or ineffective nest boxes; and
- Checking that each box is not holding water.

### **2.3 Controls and Corrective Actions**

The following controls and corrective actions will be implemented:



- If a nest box becomes occupied by exotic or invasive fauna, the fauna is to be removed within one (1) month of monitoring event; and
- Where damage to a nest box is identified during a monitoring event, the nest box is to be repaired or replaced within one (1) month of monitoring event.

## **2.4 Reporting**

Results of the annual nest box monitoring will be included in the Annual Habitat Monitoring Report.

### 3 RESULTS

#### 3.1 Nest box monitoring

Nest boxes at the subject site were monitored on the 12th August 2021 by one (1) ecologist. Nest box monitoring results are shown in **TABLE 1**.

No nest boxes required maintenance/replacing due to damage. No nest boxes were occupied by feral bees.

**TABLE 1  
NEST BOX MONITORING RESULTS**

Nest Box		Monitoring Period
		July 2020 - August 2021
Bat Box	Nb-01	Unoccupied.
	Nb-03	Unoccupied.
	Nb-05	Estimated 5 microbats observed. Not identified to species level to avoid disturbance.
	Nb-08	Unoccupied.
	Nb-09	Unoccupied.
	Nb-11	Unoccupied.
	Nb-12	Estimated 6 microbats observed. Not identified to species level to avoid disturbance.
	Nb-13	Unoccupied.
	Nb-18	Unoccupied. Vines and ant nest removed.
Small Parrot Box	Nb-02	Unoccupied.
	Nb-04	Unoccupied.
	Nb-07	Unoccupied.
	Nb-10	Unoccupied.
	Nb-14	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-15	Unoccupied.
	Nb-16	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-19	Unoccupied.
	Nb-20	Unoccupied.
Possum Box	Nb-06	Unoccupied.
Black Cockatoo/ Large Owl Box	Nb-17	Unoccupied.

#### 3.2 Corrective actions

No nest boxes required maintenance/replacing due to damage or pest species during the 2021 monitoring round. No corrective actions are required at the time of this monitoring report.

## 4 NEXT MONITORING ROUNDS

The requirements and future survey dates for the nest box monitoring program are present in **TABLE 2**. Monitoring reports will be prepared annually.

**TABLE 2**  
**MONITORING PROGRAM REQUIREMENTS AND SURVEY DATES**

<b>Requirement</b>	<b>Frequency</b>	<b>Latest Survey Date</b>	<b>Next Survey Date</b>
Nest box monitoring	Boxes physically inspected annually	August 2021	July/August 2022
Monitoring reports	Monitoring reports prepared annually	September 2021	September 2022

## **APPENDIX 2 - PRE-CLEARING INSPECTION & SPOTTER CATCHER REPORTS**

Our Ref: AM/N202001/Lw1

10<sup>th</sup> February 2021

Stevens Holdings Pty Ltd  
C/- Ocean Park Consulting Pty Limited  
PO Box 99  
Miami, QLD 4220

Attention: Rangi Campbell (rangi@oceanparkqld.com.au)

Dear Rangi,

**RE: Birrigan Iluka Beach - Spotter Catcher Services**

JWA Pty Ltd (JWA) were commissioned by Stevens Holdings Pty Ltd, the holder of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval issued on 22<sup>nd</sup> March 2019 (Ref No. 2017/8003), to provide spotter catcher services during clearing of vegetation occurring on land at Hickey Street, Iluka - formally described as Lot 99 on DP82363.

The following outlines the methodologies and results of the fauna spotter catcher services provided during clearing works on the 3<sup>rd</sup> and 7<sup>th</sup> - 11<sup>th</sup> December 2020.

**Pre-clearance inspections**

Prior to any heavy disturbance activities each day, a thorough pre-clearance inspection within the clearance boundaries was undertaken. Survey methodologies included:

- Terrestrial habitats
  - Targeted searches for indications of occupancy of rocks and rock piles, hollow logs, bark exfoliations, scattered timber and timber piles, burrows, soil cracks and termite mounds, ground nests, dense shrubs, leaf litter and grasses;
  - Occupancy indicators include: wildlife presence, scats, tracks, slide marks, food scraps or diggings.
  - Any high value terrestrial habitat was clearly delineated.
  
- Arboreal habitats
  - Visual searches for indications of occupancy of nests, hollows, exfoliating bark, fissures, dreys and arboreal termitaria.

- Occupancy indicators include: wildlife presence, detritus (scats/scraps/hair) in the drip zone, markings or scratches to trunk, chew marks and/or smooth entries to hollows, incisions in trunk and adult presence at nests.
- All koala food trees were searched for the presence of koalas.
- Any high value habitat was clearly delineated.

### **Vegetation clearance procedures**

The fauna spotter catcher worked alongside the machinery operator to ensure tree felling was undertaken in a methodical, systematic way facilitating the best possible fauna management outcomes.

Communication between the fauna spotter catcher and clearing operators involved the use of UHF radios, direct communication and visual communications where appropriate.

The fauna spotter catcher directly supervised the felling and/or disturbance of all site vegetation. If no wildlife could be sighted, habitat trees were felled in a manner to cause minimal impact to features that could potentially conceal undetected fauna.

Where fauna was present in standing vegetation the tree was either left standing overnight or the animal/s was encouraged out of the tree and/or captured by the fauna spotter.

Once a habitat tree was felled the fauna spotter catcher inspected all habitat features for the presence of fauna.

### **Fauna spotter catcher results**

**ATTACHMENT 1** details the clearing location, the fauna found, the actions taken and the habitat types impacted with details as required.

### **Hollow-bearing tree audit**

The installation of nest boxes is required to meet relevant conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals. JWA completed an initial habitat tree audit over the proposed Stage 1 clearing area prior to clearing commencing. Eight (8) hollow-bearing trees were observed within and adjoining the Stage 1 clearing area potentially containing a total of eighteen (18) small hollows, one (1) medium hollow and one (1) large hollow.

Based on the 1:1 offset ratio required within the approved HMP, and the fauna species recorded from the site (particularly the Threatened species that rely on hollows) JWA have recommend and installed the following nest boxes:

- 9 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 9 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 1 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and

- 1 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

The approved Habitat Management Plan (JWA 2020) notes that additional/supplementary boxes may need to be installed after the felled trees are inspected within each development stage and the numbers and characteristics of the hollows properly determined. Additional/supplementary nest boxes (if required) are to be erected as soon as possible after the clearing.

An audit of actual hollows removed from the clearing area was completed by the fauna spotter catcher (**ATTACHMENT 1**). In total, the clearing removed fourteen (14) small hollows, one (1) medium hollow and one (1) large hollow. Therefore, sufficient numbers and types of nest boxes were installed prior to clearing works and additional/supplementary nest boxes are not required at this stage.

### Summary and Conclusion

All vegetation on the site was cleared/felled under the supervision of the fauna spotter/catcher. All recovered native vertebrate fauna were assessed for injuries and the appropriate actions taken.

Sufficient numbers and types of nest boxes were installed prior to clearing works and additional/supplementary nest boxes are not required at this stage.

Please do not hesitate to contact me if you require any further information.

Yours faithfully,  
JWA Pty Ltd



Adam McArthur  
Director / Principal Ecologist

## ATTACHMENT 1 - Fauna spotter catcher data

Date	Fauna / Habitat Feature	Tree Hollow Details					Action taken
		Tree Species	DBH (m)	Height (m)	Hollows	GPS	
3 <sup>rd</sup> December 2020	Small birds nest in Acacia						Lowered slowly by machine, no fauna or eggs observed. Nest relocated.
3 <sup>rd</sup> December 2020	Small birds nest in Acacia						Lowered slowly by machine, no fauna or eggs observed. Nest relocated.
7 <sup>th</sup> December 2020	Brown snake ( <i>Pseudonaja textilis</i> )						Found dead near cleared vegetation.
7 <sup>th</sup> December 2020	Blue tongue lizard ( <i>Tiliqua scincoides</i> )						Rescued and relocated to retained vegetation area in good health.
7 <sup>th</sup> December 2020	Hollow ground logs x 2						Large hollow ground logs left overnight to allow any fauna escape . Logs relocated to retained vegetation on 8 <sup>th</sup> December 2020.
8 <sup>th</sup> December 2020	Termitaria with bird entrance hole						Lowered slowly by machine, no fauna or eggs observed.
8 <sup>th</sup> December 2020	Yellow-footed antechinus ( <i>Antechinus flavipes</i> ) with young	Stag	0.6	20	1 Medium (trunk) 2 Small (limb)	29°23'55" S 153°21' 20" E	Found within hollow. Hollow blocked and relocated, unblocked in evening (Release point: Release 29°23'50" S 153°21'11" E). One juvenile fallen from hollow found deceased. Other juveniles remained attached to mother at time of release.
8 <sup>th</sup> December 2020	Birds nest in small tree						Lowered slowly by machine, no fauna or eggs observed. Nest relocated.
8 <sup>th</sup> December 2020	Red-bellied black snake ( <i>Pseudechis porphyriacus</i> )						Observed to self-relocate out of clearing area. Appeared healthy and uninjured.
9 <sup>th</sup> December 2020	Medium hollow ground log						No fauna observed. Log hollow salvaged and relocated to retained vegetation.



Date	Fauna / Habitat Feature	Tree Hollow Details					Action taken
		Tree Species	DBH (m)	Height (m)	Hollows	GPS	
9 <sup>th</sup> December 2020	Large trunk hollow on stag	Stag	0.4	4	1 Large (trunk)	29°23'50" S 153°21'16" E	Stag was "knocked" with excavator prior to clearing. No fauna were recorded within felled stag. Hollow limb was relocated to protection zone vegetation and placed on ground.
9 <sup>th</sup> December 2020	Pink-tongued skink ( <i>Cyclodomorphus gerrardii</i> ) x2						Observed to self-relocate out of clearing area. Appeared healthy and uninjured.
9 <sup>th</sup> December 2020	Bush rat ( <i>Rattus fuscipes</i> )						Observed to self-relocate out of clearing area from ground log hollow. Log hollow salvaged and relocated to retained vegetation.
10 <sup>th</sup> December 2020	Ground log Limb hollow				1 Small (limb)	29°23'51" S 153°21'16" E	Log hollow salvaged and relocated to retained vegetation.
10 <sup>th</sup> December 2020	Yellow-footed antechinus ( <i>Antechinus flavipes</i> ) with young	Stag	0.4	15	1 Small (trunk) 2 Small (limb)	29°23'51" S 153°21'16" E	Observed to self-relocate out of clearing area. All appeared healthy and uninjured.
10 <sup>th</sup> December 2020	Northern brown bandicoot ( <i>Isodon macrourus</i> )						Observed to self-relocate out of clearing area. Appeared healthy and uninjured.
10 <sup>th</sup> December 2020	Pink-tongued skink ( <i>Cyclodomorphus gerrardii</i> )						Found deceased.
10 <sup>th</sup> December 2020	Lace monitor ( <i>Varanus varius</i> ), juvenile.						Observed to self-relocate out of clearing area. Appeared healthy and uninjured.
10 <sup>th</sup> December 2020	Hollows	Stag	0.5	20	2 Small (limb)	29°23'53" S 153°21'17" E	Stag was "knocked" with excavator prior to clearing. No fauna were recorded within felled stag. Hollow limb was relocated to protection zone vegetation and placed on ground.

Date	Fauna / Habitat Feature	Tree Hollow Details					Action taken
		Tree Species	DBH (m)	Height (m)	Hollows	GPS	
10 <sup>th</sup> December 2020	6 - 8 unidentified Microchirpoteran bats	Stag	0.5	20	3 Small (limb)	29°23'53" S 153°21'17" E	Stag was "knocked" with excavator prior to clearing. Unidentified Microchirpoteran bats were observed to exit from stag into another nearby stag. Machine was stopped and both stags left overnight.
10 <sup>th</sup> December 2020	Yellow-footed antechinus (Antechinus flavipes) with young	Stag	0.4	12	1 Small (trunk) 1 small (limb)	29°23'51" S 153°21'17" E	Captured and placed into salvaged hollow and entrance blocked. Relocated to retained vegetation. Entrance unblocked that evening approx. 6pm.
10 <sup>th</sup> December 2020	Termitaria	Bloodwood	0.4	15	1 Small entrance	29°23'52" S 153°21'17" E	3 small bird eggs fell from birds nest inside termite nest. Eggs were determined to be infertile and were destroyed.
11 <sup>th</sup> December 2020	Stags with 6 - 8 unidentified Microchirpoteran bats described above				As above	As above	Stags were "knocked" with excavator first thing in morning approx. 7am. Weather was overcast with showers. 6-8 microbats evacuated middle stag and flew west into protection zone vegetation. No fauna were recorded within felled stags. 6 hollow limbs were relocated to protection zone vegetation and placed on ground.

Our Ref: AM/N202001/Lw1

16<sup>th</sup> September 2021

Stevens Holdings Pty Ltd  
C/- Ocean Park Consulting Pty Limited  
PO Box 99  
Miami, QLD 4220

Attention: Rangi Campbell (rangi@oceanparkqld.com.au)

Dear Rangi,

**RE: Birrigan Iluka Beach - Spotter Catcher Services (Stage 2 Clearing Works)**

JWA Pty Ltd (JWA) were commissioned by Stevens Holdings Pty Ltd, the holder of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval issued on 22<sup>nd</sup> March 2019 (Ref No. 2017/8003), to provide fauna spotter catcher services during Stage 2 vegetation clearing works which occurred on land at Hickey Street, Iluka - formally described as Lot 99 on DP82363.

The following outlines the methodologies and results of the fauna spotter catcher services provided during clearing works between the 23<sup>rd</sup> August and 8<sup>th</sup> September 2021.

**Pre-clearance inspections**

Prior to any heavy disturbance activities each day, a thorough pre-clearance inspection within the clearance boundaries was undertaken. Survey methodologies included:

- Terrestrial habitats
  - Targeted searches for indications of occupancy of rocks and rock piles, hollow logs, bark exfoliations, scattered timber and timber piles, burrows, soil cracks and termite mounds, ground nests, dense shrubs, leaf litter and grasses;
  - Occupancy indicators include: wildlife presence, scats, tracks, slide marks, food scraps or diggings.
  - Any high value terrestrial habitat was clearly delineated.
  
- Arboreal habitats
  - Visual searches for indications of occupancy of nests, hollows, exfoliating bark, fissures, dreys and arboreal termitaria.

- Occupancy indicators include: wildlife presence, detritus (scats/scraps/hair) in the drip zone, markings or scratches to trunk, chew marks and/or smooth entries to hollows, incisions in trunk and adult presence at nests.
- All koala food trees were searched for the presence of koalas.
- Any high value habitat was clearly delineated.

### **Vegetation clearance procedures**

The fauna spotter catcher worked alongside the machinery operator to ensure tree felling was undertaken in a methodical, systematic way facilitating the best possible fauna management outcomes.

Communication between the fauna spotter catcher and clearing operators involved the use of UHF radios, direct communication and visual communications where appropriate.

The fauna spotter catcher directly supervised the felling and/or disturbance of all site vegetation. If no wildlife could be sighted, habitat trees were felled in a manner to cause minimal impact to features that could potentially conceal undetected fauna.

Where fauna was present in standing vegetation the tree was either left standing overnight or the animal/s was encouraged out of the tree and/or captured by the fauna spotter.

Once a habitat tree was felled the fauna spotter catcher inspected all habitat features for the presence of fauna.

### **Fauna spotter catcher results**

**ATTACHMENT 1** details the clearing location, the fauna found, the actions taken and the habitat types impacted with details as required. No fauna injuries or fatalities were observed from clearing operations.

### **Hollow-bearing tree audit**

The installation of nest boxes was required to meet relevant conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals. JWA completed an initial habitat tree audit over the proposed Stage 2 clearing area prior to clearing commencing. Eight (8) hollow-bearing trees were observed within and adjoining the Stage 2 clearing area potentially containing a total of twenty-one (21) small hollows, five (5) medium hollows and three (3) large hollows.

The approved Habitat Management Plan (JWA 2020) notes that additional/supplementary boxes may need to be installed after the felled trees are inspected within each development stage and the numbers and characteristics of the hollows properly determined. Additional/supplementary nest boxes (if required) are to be erected as soon as possible after the clearing.

It is noted that the following nest boxes were installed prior to Stage 1 clearing works in December 2020:

- 9 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 9 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 1 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and
- 1 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

Nest box monitoring was completed prior to the recent Stage 2 clearing works (completed in August 2021) and determined that only three (3) of the nest boxes were currently occupied or showed signs of usage (i.e. 3 x bat boxes). It was not considered necessary, therefore, to install any additional nest boxes prior to commencement of the Stage 2 clearing works.

An audit of actual hollows removed from the clearing area was completed by the fauna spotter catcher (**ATTACHMENT 1**). In total, the clearing removed twenty-four (24) small hollows, five (5) medium hollows and four (4) large hollows.

Based on the 1:1 offset ratio required within the approved HMP, the fauna species recorded from the site (particularly the Threatened species that rely on hollows), and with consideration of the nest boxes previously installed that are not currently in use, JWA recommends that the following additional nest boxes are installed:

- 3 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 3 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 4 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and
- 3 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

### **Summary and Conclusion**

All vegetation on the site was cleared/felled under the supervision of the fauna spotter/catcher. All recovered native vertebrate fauna were assessed for injuries and the appropriate actions taken.

Sufficient numbers and types of nest boxes were installed prior to clearing works and additional/supplementary nest boxes are now proposed to be installed ASAP.

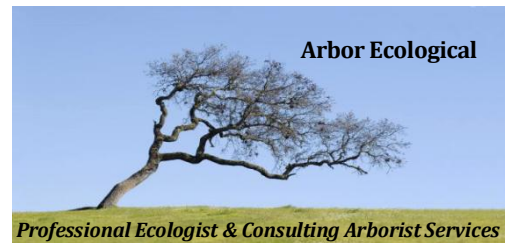
Please do not hesitate to contact me if you require any further information.

Yours faithfully,  
JWA Pty Ltd



Adam McArthur  
Director / Principal Ecologist

**Michael Hallinan**  
**Arbor Ecological**  
**334 Pearces Creek Road**  
**Alstonville NSW 2477**  
**Ph: 02 6628 0365**  
**Mob: 0424 064 002**  
**e: arborecological@netspace.net.au**  
**www.arborecological.com.au**



**Date 13/09/21**

**JWA Ecological Consultants Pty Ltd**  
**Attn. Adam McArthur**

**Re: Birrigan Iluka Beach Stage 2 ecologist pre-clearing inspections and spotter catcher ecologist monitoring of clearing works**

Between 23/08/21 and 08/09/21 ecologists Michael Hallinan and Annika Hallinan completed daily pre-clearing fauna inspections and undertook spotter catcher ecologist monitoring during tree clearing works on days when tree clearing occurred.

Reference was made to hollow-bearing trees previously recorded from the site and substantially hollow-bearing trees and fallen logs were re-flagged.

Tree clearing was undertaken with excavators using a two stage clearing process as follows:

- Non-hollow bearing trees were cleared first and vegetation was cleared around hollow bearing trees to isolate them for at least 24 hours.
- Hollow bearing trees were gently bumped by an excavator three times over a minimum five minute period with a minimum of one minute pause between bumps. The aim of this procedure is to encourage nesting, sheltering or roosting hollow dependant fauna to disperse.
- At least one minute after the final bump, the subject trees were felled as gently as possible to avoid possible injury to any fauna remaining within hollows.
- Once felled, the project ecologist inspected hollows at ground level with the aid of bright torchlight and a pointed metal probe. Estimates of hollow numbers and opening size ranges were recorded.
- Substantially hollow-bearing trees were left in situ for at least 48 hours after being felled to permit any remaining fauna to self relocate.
- Any non-mobile fauna detected within clearing areas were relocated to suitable habitat in identified environmental protection zones on the site with consideration of appropriate fauna release times and release locations.

Pre-clearing searches and habitat inspections were made before works commenced on each day of clearing. Searches targeted clearing areas and adjoining areas including the central gully where most of the hollow bearing trees and koala food trees were located. Tree crowns were examined with the aid of binoculars and a pointed metal probe was used to examine dead sections and under decorticating bark of living and dead trees. Fauna scat searches were made near the base of koala food trees and stags/ dead standing trees.

Searches were also made following tree clearing of any small hollowed sections associated with deadwood and branch shedding with the aid of a pointed metal probe and high-powered torch light. Cleared trees were then moved to into piles for processing. Spotter catcher ecologist monitoring of clearing works continued until works were completed on 08/09/21.

Details for the most substantial fauna observations and fauna habitat observations are included below in Table 1. Two emus were observed by the project foreman in the week prior to commencement of clearing in the Stage 1 portion of the site. The local Emu population is part of the listed endangered



Emu population in the NSW North Coast Bioregion and Port Stephens Local Government Area. No koalas or signs of koala use or occupation (or other threatened species) were detected and no fauna injuries or fatalities were observed from clearing operations.

Don't hesitate to contact me if you require clarification or further information regarding works undertaken or findings.



Regards  
Michael Hallinan


Bachelor of Applied Science - Environmental Resource Management  
Diploma in Arboriculture - AQF Level 5  
Associate Diploma in Horticulture (Arboriculture)




**Table 1. Ecological data from tree clearing, Birrigan Iluka Beach Stage 2**

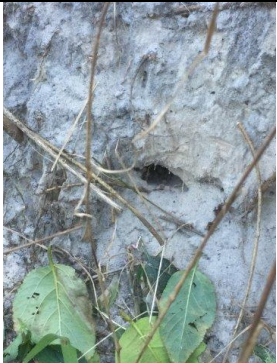

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
23/08/21	Fresh wallaby scats in clearing area							
23/08/21	Numerous cone-shaped fauna diggings typical of bandicoot							









Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
24/08/21	4x flagged hollow fallen ground logs and log piles						Clearing surrounding vegetation and exposed log piles left for 48 hours to allow any occupying fauna to relocate. 2 substantially hollow logs able to be moved to environmental protection zone without breaking up due to decay	
24/08/21	Fauna scratch marks typical of Lace Monitor on several smooth barked trees	<i>Eucalyptus tereticornis</i> Forest Red Gum						

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
25/08/21	Stag/ dead standing tree with Lace Monitor in spout			9m	Hollow stem and 3 small to medium sized hollow branches/ spouts	S 29.39980567 E 153.3561492	Relocated to environmental protection zone intact with Lace Monitor unharmed	
25/08/21	Stag/ dead standing tree			8m	5 small hollow branches/ spouts	S 29.39870108 E 153.3530759		
26/08/21	Stag/ dead standing tree with Lace Monitor			9m	Hollow stem and 2 medium sized hollow branches/ spouts	S 29.3985729 E 153.3570149	Relocated to environmental protection zone intact with Lace Monitor unharmed	
26/08/21	Vacant/ disused ground burrow with 10cm opening					S 29.39940966 E 153.3575201		


Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
27/08/21	Basal hollow and hollow branches	2x <i>Lophostemon confertus</i> Brushbox		16m	Hollow stem and 2 small to medium sized hollow branches/spouts			
30/08/21	Vacant disused small bird's nest in wattle						Wattle housing nest was gently lowered to allow inspection of nest. No fauna or eggs present. Nest relocated to environmental protection zone	
30/08/21	Vacant small ground burrow inspected prior to clearing							


Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
01/09/21	Unharm native Bush Rat ran from fallen log pile when disturbed							
01/09/21	Vacant disused tunnel/ nest chamber in sand mound typical of Rainbow Bee-eater inspected prior to disturbance							
01/09/21	Small branch hollows relocated to environmental protection zone as potential habitat							

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
01/09/21	Wallaby jaws found in clearing area							
03/09/21	Major Skink relocated from clearing area to environmental protection zone							
03/09/21	Vacant disused small bird's nest from wattle						Nest in wattle was gently lowered to allow inspection. No fauna or eggs present. Nest relocated to environmental protection zone	



Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
03/09/21	2x adult Eastern Blue-tongue Lizards relocated from clearing area to environmental protection zone							
3/12/20	Golden Whistler, one of numerous commonly occurring mobile bird species observed within, above and adjoining clearing areas							
6/09/21	Small vacant hollows in coalescent fig roots inspected prior to tree removal	<i>Ficus watkinsiana</i> Watkin's Fig		14m				




Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
6/09/21	Stag/ dead standing tree gently lowered revealing unharmed Common Brushtail Possum following partial break of main stem			9m	Large stem hollow and 2 small to medium sized upper hollow branches/ spouts	S 29.39938 E 153.35669	Stag undisturbed for 48 hours and bulk branches applied over possum occupied section for dense shade to allow possum to self-relocate in the evening (confirmed self-relocation on 8/9/21). Hollow stem relocated to environmental protection zone	
6/09/21	Juvenile Pink-tongued Lizard relocated from clearing area to environmental protection zone							

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
6/09/21	HT 21 Stag/ dead standing tree			9m	3 small to medium sized upper hollow branches/ spouts	S 29.39950 E 153.35661		
7/09/21	HT 6. Stag/ dead standing tree				Stem hollow and 3 small sized upper hollow branches/ spouts	S 29.39962 E 153.35614	Active Tree Termites ( <i>Nasutitermes walkeri</i> )	
7/09/21	Dead Broad-leaved Paperbark with cultural significance relocated from vegetation adjoining Elizabeth Street to environmental protection zone	Dead <i>Melaleuca quinquenervia</i> Broad-leaved Paperbark			Large main stem hollow		No occupying fauna observed in hollowed sections	
8/09/21	Stag/ dead standing tree			6m	Large stem hollow open at top	S 29.39950 E 153.35632	Highly decayed. Hollow stem relocated to environmental protection zone	



Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
8/09/21	Stag/ dead standing tree			7m	Large stem hollow and 3 medium sized upper hollow branches/ spouts	S 29.39931 E 153.35629	Relocated to environmental protection zone	
8/09/21	Stag/ dead standing tree			6m	Large stem hollow open at top	S 29.39928 E 153.35640	Highly decayed and unable to be relocated to environmental protection zone	
8/09/21	Stag/ dead standing tree			11m	Stem hollow and 3 small spouts at top	S 29.39899 E 153.35660	Relocated to environmental protection zone	
8/09/21	Stag/ dead standing tree			9m	Basal stem hollow	S 29.39907 E 153.35658	Highly decayed and unable to be relocated to environmental protection zone	
8/09/21	Stag/ dead standing tree			9m	Stem hollow and 3 small spouts at top	S 29.39948 E 153.35652	Relocated to environmental protection zone	

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
9/09/21	Mature Land Mullet						Detected by machine operator following completion of clearing and relocated to environmental protection zone unharmed	

## **APPENDIX 3 - BASELINE RETAINED HABITAT MONITORING REPORT**



## **BASELINE VEGETATION MONITORING REPORT**

### **Birrigan Iluka Beach, Iluka Lot 99 on DP823635**

A Report Prepared for  
The Stephens Group Pty Ltd

**NOVEMBER 2020**

**JWA Pty Ltd**

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## DOCUMENT CONTROL

### Document

<b>Title</b>	Baseline Vegetation Monitoring Report
<b>Job Number</b>	N202001
<b>File Reference</b>	\\SERVER\data\2020 CLIENTS\202001 - Birrigan Iluka Beach - Iluka\Baseline Monitoring
<b>Version and Date</b>	RW1 17/11/20
<b>Client</b>	The Stephens Group Pty Ltd

### Revision History (office use only)

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1	RW1	FINAL	17/11/20	JWA	1	.docx	Email

### Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW1	17/11/20	Nicole Davies/ Adam McArthur	ND/ AM	Adam McArthur	AM

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# 1 INTRODUCTION

## 1.1 Background

JWA Pty Ltd have been engaged by The Stephens Group Pty Ltd to undertake baseline monitoring of vegetation at the Birrigan Iluka Beach development site, located at Hickey Street, Iluka - formally described as Lot 99 on DP823635.

The Birrigan Iluka Beach development is an approved 141 lot community scheme subdivision over the subject land (**FIGURES 1 & 2**). The subdivision incorporates 140 residential allotments and one (1) Community Property allotment (Lot 1) containing retained bushland. The Community Property Lot will be owned and maintained by the Birrigan Iluka Beach Association.

JWA previously prepared a Habitat Management Plan (HMP) (JWA 2020) which included an amelioration strategy designed to minimise the impacts on fauna during both the construction and operational phases, undertake nature regeneration/revegetation works and to ensure that ecological processes and corridor function within the identified rehabilitation areas are protected and amplified. The HMP contains a detailed monitoring program, including baseline and ongoing monitoring and reporting.

This report details the methodology and results of the baseline vegetation monitoring completed across the site in November 2020.

## 1.2 Monitoring Requirements

In accordance with the HMP (JWA 2020) baseline monitoring has been completed within the Community Property (Lot 1) and Bushland Park areas in November 2020 (i.e. prior to the commencement of works on the site) by suitably qualified person. Ongoing monitoring will be completed six (6) monthly after commencement of rehabilitation works until the establishment period performance criteria are met, and then annually during the maintenance period.



**PROJECT:**  
ILUKA  
LOT 99 ON DP 823635

**LOCATION:**  
ILUKA ROAD, ELIZABETH, RIVERVIEW AND HICKEY STREETS  
ILUKA, NSW, 2466

DEVELOPMENT CHARACTERISTICS	
ITEM	DESCRIPTION
PROPERTY DESCRIPTION	LOT 99 DP823635
AREA OF LOT 99	19.41 ha.
TOTAL NUMBER OF LOTS	141
PART LOT 1 (Approx.)	5.29 ha.

**CLARENCE VALLEY COUNCIL**  
New Bushfire Trail Connection  
**APPROVAL**

**This is the plan referred to in Council's**  
**Notice of Determination of SUB2015/0034**

**Date: 13/11/2019**

STREETS FOR LIVING - CHARACTERISTICS				
STREET	RESERVE WIDTH (m)	VERGE WIDTH (m)	TOTAL SEAL WIDTH (m)	CUL DE SAC DIAMETER (m)
HICKEY STREET	30 EXISTING	VARIES	8	-
1	20	6	8	30 outer, 15 inner
2	20 (*1)	6 (*1)	8	-
3	25	6 (*2)	8	20
4, 6, 7	20	6	8	-
5, 8	20	6	8	20
AWAY 3	VARIES	3.5 (*3)	4	-

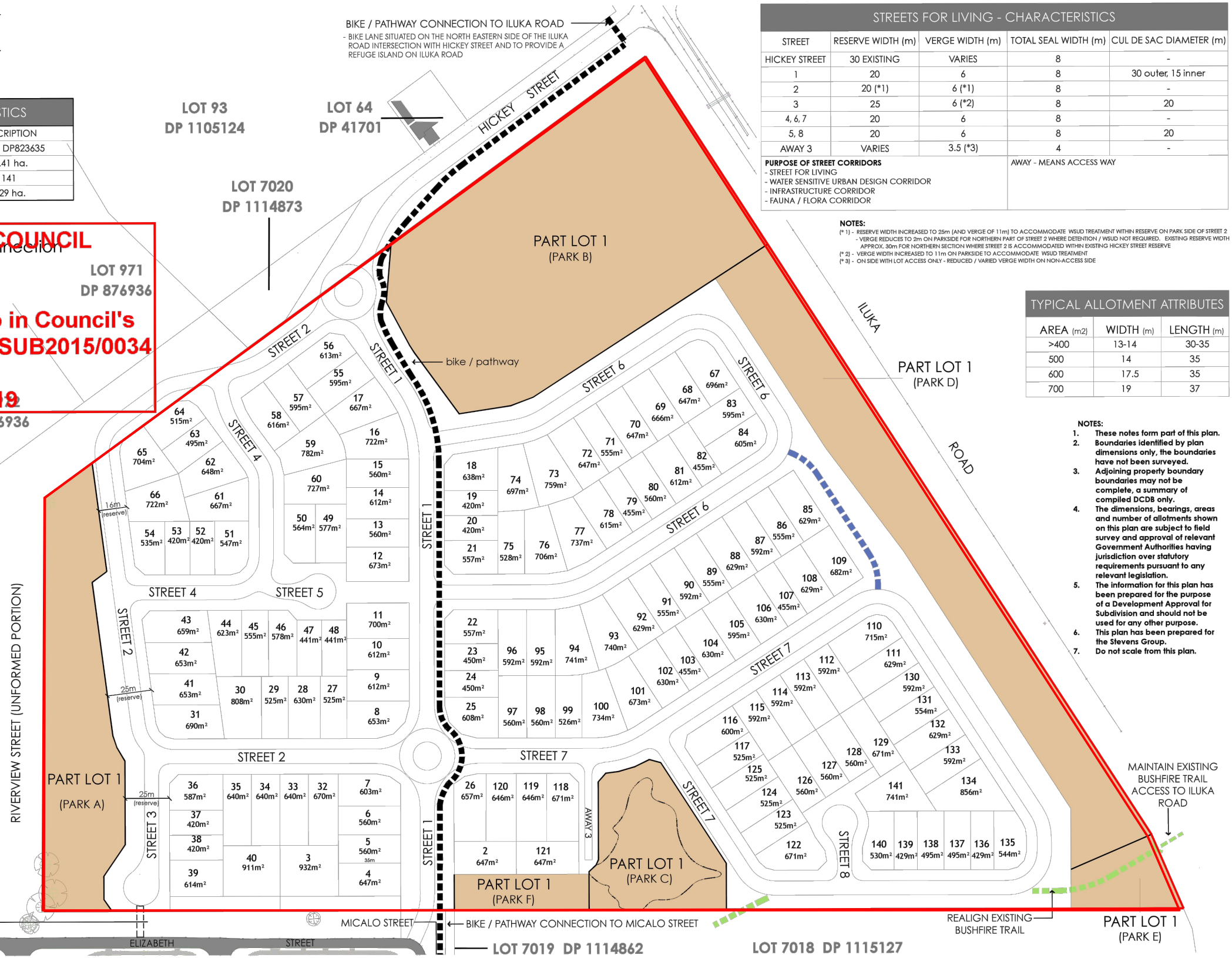
**PURPOSE OF STREET CORRIDORS**  
- STREET FOR LIVING  
- WATER SENSITIVE URBAN DESIGN CORRIDOR  
- INFRASTRUCTURE CORRIDOR  
- FAUNA / FLORA CORRIDOR

AWAY - MEANS ACCESS WAY

**NOTES:**  
(\*1) - RESERVE WIDTH INCREASED TO 25m (AND VERGE OF 11m) TO ACCOMMODATE WSUD TREATMENT WITHIN RESERVE ON PARK SIDE OF STREET 2  
- VERGE REDUCES TO 2m ON PARKSIDE FOR NORTHERN PART OF STREET 2 WHERE DETENTION / WSUD NOT REQUIRED. EXISTING RESERVE WIDTH APPROX. 30m FOR NORTHERN SECTION WHERE STREET 2 IS ACCOMMODATED WITHIN EXISTING HICKEY STREET RESERVE  
(\*2) - VERGE WIDTH INCREASED TO 11m ON PARKSIDE TO ACCOMMODATE WSUD TREATMENT  
(\*3) - ON SIDE WITH LOT ACCESS ONLY - REDUCED / VARIED VERGE WIDTH ON NON-ACCESS SIDE

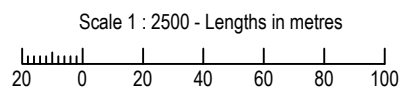
TYPICAL ALLOTMENT ATTRIBUTES		
AREA (m <sup>2</sup> )	WIDTH (m)	LENGTH (m)
>400	13-14	30-35
500	14	35
600	17.5	35
700	19	37

- NOTES:**
- These notes form part of this plan.
  - Boundaries identified by plan dimensions only, the boundaries have not been surveyed.
  - Adjoining property boundary boundaries may not be complete, a summary of compiled DCDB only.
  - The dimensions, bearings, areas and number of allotments shown on this plan are subject to field survey and approval of relevant Government Authorities having jurisdiction over statutory requirements pursuant to any relevant legislation.
  - The information for this plan has been prepared for the purpose of a Development Approval for Subdivision and should not be used for any other purpose.
  - This plan has been prepared for the Stevens Group.
  - Do not scale from this plan.



Emergency Access Only

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.

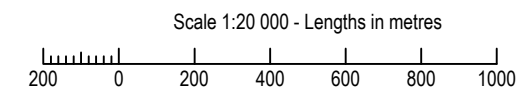


SOURCE: OneCollective - Masterplan (191113 CVC Approved Plans - Extract.pdf)	CLIENT: Ocean Park Consulting Pty Ltd	FIGURE 1	TITLE: APPROVED MASTER PLAN
SCALE: 1 : 2500 @ A3	PROJECT: Annual Koala Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA		
JWA PTY LTD Ecological Consultants		PREPARED: BW DATE: 08 September 2021 FILE: N202001_SAT_20210908.dwg	





**LEGEND**  
 Site Boundary



<p>SOURCE: Open Street Maps</p> <p>SCALE: 1 : 20 000 @ A3</p>	<p>CLIENT Ocean Park Consulting Pty Ltd</p> <p>PROJECT Annual Koala Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA</p>	<p><b>FIGURE 2</b></p>	<p>TITLE</p> <p><b>LOCALITY PLAN</b></p>
<p>JWA PTY LTD Ecological Consultants</p>	<p>PREPARED: BW DATE: 08 September 2021 FILE: N202001_SAT_20210908.dwg</p>		

## 2 MONITORING METHODOLOGY

### 2.1 Monitoring Locations

The locations of baseline monitoring have been identified to ensure representative sampling of all habitat types (FIGURE 3). The methodology for the site selection included the positioning of a 150 m x 150 m grid overlaid on the site so as to ensure uniform and unbiased coverage.

### 2.2 Plot-Based Vegetation Surveys

Plot-based vegetation surveys were undertaken at each monitoring location. Vegetation survey sites were permanently marked (i.e. star pickets or wooden stakes) and the end positions identified on a sitemap using a hand-held Global Positioning System (GPS).

The plot-based vegetation survey were based on a 20 m x 20 m plot (or 400 m<sup>2</sup> equivalent for linear areas).

Survey plots were established around a central 50 m transect as follows:

- a) One (1) 400 m<sup>2</sup> plot (standard 20 m x 20 m) is used to assess all performance indicators as set out in TABLE 1 below.
- b) Five (5) 1 m<sup>2</sup> sub-plots can be added to the program for the first monitoring event to assess groundcover recruitment for the plot. A decision as to the utility of these plots can be made after the first or second monitoring events.

The assessor assessed the plot for the information contained in TABLE 2.

**TABLE 1  
VEGETATION SURVEY DATA TO BE COLLECTED**

Attribute	Survey required
Native Canopy Cover	Estimate the % foliage cover across the plot. Cover should be recorded in decimals if less than 1% (0.1, 0.2...), or whole numbers up to 5% (1,2,3...), or to the nearest 5% where greater than 5% cover (5,10,15,20,25...).
Weed Presence	Estimate the % cover in the plot of individual weed species. Count the number of each species.
Shrub and Groundcover	Identify native shrub and groundcover species and their percentage cover. Cover should be recorded in decimals if less than 1% (0.1, 0.2...), or whole numbers up to 5% (1, 2, 3...), or to the nearest 5% where greater than 5% cover (5, 10, 15, 20, 25...)

The full species name (genus species) recorded for all native species, unless insufficient diagnostic plant material was present, in which case the genus name followed by a species number was used. Comments should also be included for all attributes (TABLE 2) on any notable variations elsewhere in the relevant management polygon - e.g. weeds occurring in the management polygon that are not (or poorly) represented in the transect.

**LOT 99 DP 823635**

- Core Conservation Zone
- Bushfire Trail Zone
- Street Verges / Landscape Zone
- APZ setbacks
- Residential Lots
- New Bushfire Trail Connection
- Koala SAT Site

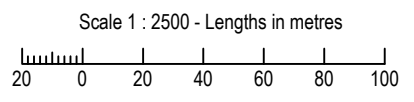
**CLARENCE VALLEY COUNCIL  
APPROVAL**

**This is the plan referred to in Council's  
Notice of Determination of SUB2015/0034**

**Date: 13/11/2019**



note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.



<p>SOURCE: JWA Site Investigations Feb 2020; OneCollective - Vegetation Zones (191113 CVC Approved Plans - Extract.pdf)</p> <p>SCALE: 1 : 2500 @ A3</p> <p style="text-align: center;"><i>JWA PTY LTD</i> Ecological Consultants</p>	<p>CLIENT Ocean Park Consulting Pty Ltd</p> <p>PROJECT Annual Koala Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA</p>	<p><b>FIGURE 3</b></p>	<p>TITLE</p> <p><b>MONITORING SITES</b></p>
<p>PREPARED: BW DATE: 08 September 2021 FILE: N202001_SAT_20210908.dwg</p>			

## 2.3 Photo Point Monitoring

Photo-monitoring points were completed as a means of demonstrating compliance or otherwise with performance criteria. Permanent photo stations were located at each monitoring location. Where transects were established, photo points were located on each transect. Four (4) photos were taken from each photo point. Photos were taken to the north, south, east and west. Photos were labelled with the:

- Transect code or photo point code;
- Direction of view; and
- Date and time.

## **3 RESULTS**

### **3.1 Transect Data**

Relevant monitoring data sheets are provided in **ATTACHMENT 1**. A summary of the data collected for each relevant monitoring site is provided in **TABLE 2**.

### **3.2 Photo points**

The results of photo point monitoring are provided in **ATTACHMENT 2** where the monitoring was completed in conjunction with the plot-based vegetation surveys.

**TABLE 2**  
**SUMMARY OF BASELINE VEGETATION MONITORING RESULTS**

Monitoring Site	Management Zone	Canopy Cover				Midstorey Cover				Groundcover			
		Native		Exotic		Native		Exotic		Native		Exotic	
		Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
1	Management Area 3: Bushland Park B	3	63%	0	0%	10	55.9%	1	15%	8	5.9%	3	12.1%
2	Management Area 3: Bushland Park B	4	32%	0	0%	10	34.9%	1	20%	8	12.1%	2	30%
3	Management Area 3: Bushland Park B	3	28%	0	0%	11	36.7%	1	10%	2	1.2%	3	40.6%
4	Management Area 5: Bushland Park D	3	28%	0	0%	10	41.4%	2	25.1%	9	1.9%	5	67.6%
5	Management Area 5: Bushland Park D	2	55%	0	0%	10	37.9%	2	15.1%	4	1.5%	3	83.1%

Birrigan Iluka Beach, Iluka - Baseline Vegetation Monitoring Report

Monitoring Site	Management Zone	Canopy Cover				Midstorey Cover				Groundcover			
		Native		Exotic		Native		Exotic		Native		Exotic	
		Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
6	Management Area 5: Bushland Park D	2	70%	0	0%	12	30.1%	2	25.1%	8	6.5%	3	60%
7	Management Area 5: Bushland Park D	3	65%	0	0%	10	23.6%	1	30%	6	6.1%	4	38%
8	Management Area 2: Bushland Park A	2	65%	0	0%	6	13.9%	4	36.1%	8	13.4%	6	50.4%
9	Management Area 2: Bushland Park A	2	75%	0	0%	11	23.3%	3	5.2%	9	9.2%	4	40.2%

## 4 ONGOING MONITORING AND REPORTING REQUIREMENTS

The results contained in this Baseline Vegetation Monitoring Report will form the baseline for future monitoring. Ongoing annual vegetation monitoring shall be completed in accordance with the following:

- Six (6) monthly after commencement of rehabilitation works until the establishment period performance criteria are met; and
- Then annually during the maintenance period.

An annual Habitat Monitoring Report will be prepared which discusses the results of the monitoring of retained vegetation and rehabilitation areas against the Monitoring Performance Criteria identified in the HMP. The information provided in the report should include, but not necessarily be limited to:

- Works undertaken (i.e. A summary of bush regenerators daily reports);
- A presentation of the results of the particular monitoring event/s;
- A detailed discussion of the results of each particular monitoring event;
- A detailed comparison with the baseline parameters and with previous survey data, as appropriate;
- A statement of compliance with the Monitoring Performance Criteria;
- Any problems since the previous inspection (death of a significant number of seedlings, broken fences etc.) and what effects these issues have had on the regeneration area;
- Success or failure of measures implemented to rectify previously identified problems;
- Measures to be taken to rectify new problems; and
- Adaptive management procedures to ensure that the management plan remains relevant and effective.

Each annual Habitat Monitoring Report will be submitted to Clarence Valley Council (CVC) and DAWE. The requirements and future monitoring and reporting dates for the vegetation monitoring program are present in **TABLE 2**.

**TABLE 2  
MONITORING PROGRAM REQUIREMENTS AND SURVEY DATES**

Requirement	Frequency	Latest Date	Next Date
Rehabilitation monitoring - establishment period	6 monthly	n/a	6 months after commencement of rehabilitation works
Rehabilitation monitoring - maintenance period	Annually	n/a	TBD
Monitoring reports	Monitoring reports prepared annually	n/a	November 2021



## REFERENCES

JWA (2020) Habitat Management Plan. Birrigan Iluka Beach Hickey Street, Iluka (Lot 99 on DP823635). Report prepared for Steven Holdings Pty Ltd by JWA Pty Ltd. July 202.

## **ATTACHMENT 1 - MONITORING DATA SHEETS**

## ATTACHMENT 2 - BASELINE PHOTOS POINTS

### Plot 1: November 2020



North



East



South



West



**Plot 2: November 2020**



North



East



South



West



**Plot 3: November 2020**



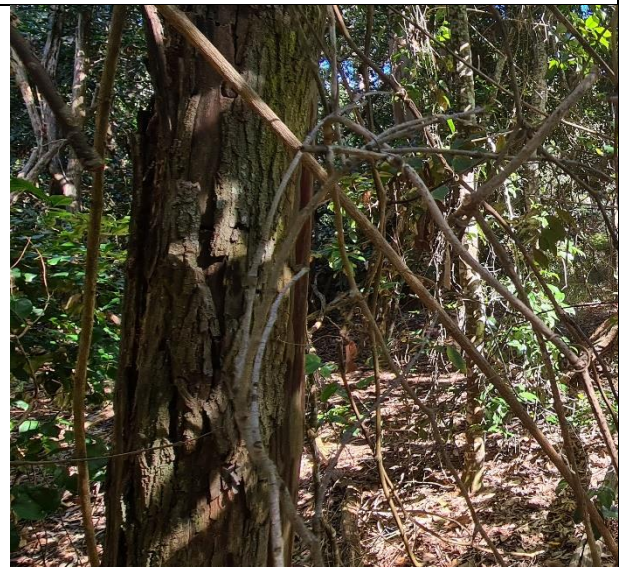
North



East



South



West



**Plot 4: November 2020**



North



East



South



West



**Plot 5: November 2020**



North



East



South



West



**Plot 6: November 2020**



North



East



South



West



**Plot 7: November 2020**



North



East



South



West



**Plot 8: November 2020**



North



East



South



West



**Plot 9: November 2020**



North



East



South



West

## **APPENDIX 4 - SITE PHOTOGRAPHS - WOOD CHIP IN PROGRESS**



**BIRRIGAN ILUKA BEACH  
SITE PHOTOGRAPHS – WOOD CHIP IN PROGRESS  
PHOTOGRAPHS TAKEN – 15 DECEMBER 2020**



**Photo 1:** Wood chip operation in progress. Looking from Micalo + Elizabeth Street intersection to the project site.



**Photo 2:** Wood chip stockpile north of Lot 1 Park C + F. Wood chip mulch berm to Lot 1 perimeter.





**Photo 3:** Excavators feeding wood chip grinder on western portion of Stage 1 looking from Elizabeth Street future emergency access position.



**Photo 4:** Wood chip / mulch berm to edge of vegetation clearing along north / eastern internal boundary taken from existing access track.





**Photo 5:** “Green vegetation shoots” coming through, wood chip stockpiles looking south towards Elizabeth Street just to west of Micalo Street intersection.



**Photo 6:** From northern Stage 1 clearing boundary looking south towards existing bushfire trail fence behind stockpile and Lot 1 (Park C) partly behind fence + part red flag demarcation.





**Photo 7:** Wood chip / mulch berm to perimeter of construction compound area off Lot 7020 + Hickey Street.



**Photo 8:** Wood chip / mulch stockpile + berm to perimeter access to Hickey Street looking from site towards Iluka Golf Club.



## **APPENDIX 5 - ANNUAL KOALA MONITORING REPORT**



**KOALA**  
**(*Phascolarctos cinereus*)**  
**1<sup>ST</sup> ANNUAL MONITORING REPORT**

**Birrigan Iluka Beach, Iluka**  
**Lot 99 on DP823635**

A Report Prepared for  
The Stephens Group Pty Ltd

SEPTEMBER 2021

**NEW SOUTH WALES**

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**QUEENSLAND**

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[www.jwaec.com.au](http://www.jwaec.com.au)

## DOCUMENT CONTROL

### Document

<b>Title</b>	Koala ( <i>Phascolarctos cinereus</i> ) 1 <sup>st</sup> Annual Monitoring Report
<b>Job Number</b>	N202001
<b>File Reference</b>	\\SERVER\data\2020 CLIENTS\202001 - Birrigan Iluka Beach - Iluka\Annual Monitoring - Koala
<b>Version and Date</b>	RW1 13/09/21
<b>Client</b>	The Stephens Group Pty Ltd

### Revision History (office use only)

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### Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW1	13/09/21	Nicole Davies	ND	Adam McArthur	AM

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# 1 INTRODUCTION

## 1.1 Background

JWA Pty Ltd have been engaged by The Stephens Group Pty Ltd to undertake annual monitoring for the koala (*Phascolarctos cinereus*) population at the Birrigan Iluka Beach development site, located at Hickey Street, Iluka - formally described as Lot 99 on DP823635. The Birrigan Iluka Beach development is an approved 141 lot community scheme subdivision over the subject land (**FIGURE 1**).

The koala is listed as a vulnerable species within schedules of the NSW *Biodiversity Conservation Act (2016)* (BC Act). The koala (combined population in Queensland, New South Wales and the Australian Capital Territory) is listed as a vulnerable species within schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Comprehensive Koala surveys have previously been undertaken by Keystone Ecological in 2014, using a variety of direct and indirect methods (spotlight, call broadcast, camera trap, predator scats, scratch searches, and Spot Assessment Technique surveys) (Keystone Ecological 2018). The presence of this species on the subject site was confirmed by a single camera trap image (Keystone Ecological 2018a).

In order to comply with approval condition 4f issued by the Commonwealth Department of the Environment and Energy (DEE), a Koala Monitoring and Reporting Program is required. The Koala Monitoring Program must be consistent with the provisions of the Clarence Valley Comprehensive Koala Plan of Management, including any provisions for registration of data on koala presence. Koala baseline monitoring was completed on the site by JWA in February 2020.

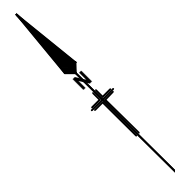
This report details the methodology and results from the 1<sup>st</sup> annual koala monitoring completed by JWA during August 2021.

## 1.2 Site Description

Birrigan Iluka Beach is a 19.41 ha site located in Iluka, within the Clarence Valley Local Government Area (LGA) (**FIGURE 2**). The Birrigan Iluka Beach subdivision is surrounded by residential development in the west and south-west, bushland to the north, east and south-east and the Iluka Golf Course to the north-east. Iluka Nature Reserve and the Bundjalung National Park are in proximity to the site to the east.

The site has experienced disturbance comprising clearing, sand mining, severe fires, weed infestation, possibly some recontouring and some seeding and/or planting of unknown material. The site continues to be used by locals as a dumping ground for garden waste, old furniture, building materials and other rubbish.

The vegetation is a mosaic of regenerating locally native canopy species. The understorey is dominated by exotic species across most of the site, particularly Lantana (*Lantana camara*) and Guinea Grass (*Megathyrsus maximus*). A narrow band of vegetation at the



**PROJECT:**  
ILUKA  
LOT 99 ON DP 823635

**LOCATION:**  
ILUKA ROAD, ELIZABETH, RIVERVIEW AND HICKEY STREETS  
ILUKA, NSW, 2466

DEVELOPMENT CHARACTERISTICS	
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AREA OF LOT 99	19.41 ha.
TOTAL NUMBER OF LOTS	141
PART LOT 1 (Approx.)	5.29 ha.

CLARENCE VALLEY COUNCIL  
New Bushfire Trail Connection  
APPROVAL

This is the plan referred to in Council's  
Notice of Determination of SUB2015/0034

Date: 13/11/2019

BIKE / PATHWAY CONNECTION TO ILUKA ROAD  
- BIKE LANE SITUATED ON THE NORTH EASTERN SIDE OF THE ILUKA ROAD INTERSECTION WITH HICKEY STREET AND TO PROVIDE A REFUGE ISLAND ON ILUKA ROAD

STREETS FOR LIVING - CHARACTERISTICS				
STREET	RESERVE WIDTH (m)	VERGE WIDTH (m)	TOTAL SEAL WIDTH (m)	CUL DE SAC DIAMETER (m)
HICKEY STREET	30 EXISTING	VARIES	8	-
1	20	6	8	30 outer, 15 inner
2	20 (*1)	6 (*1)	8	-
3	25	6 (*2)	8	20
4, 6, 7	20	6	8	-
5, 8	20	6	8	20
AWAY 3	VARIES	3.5 (*3)	4	-

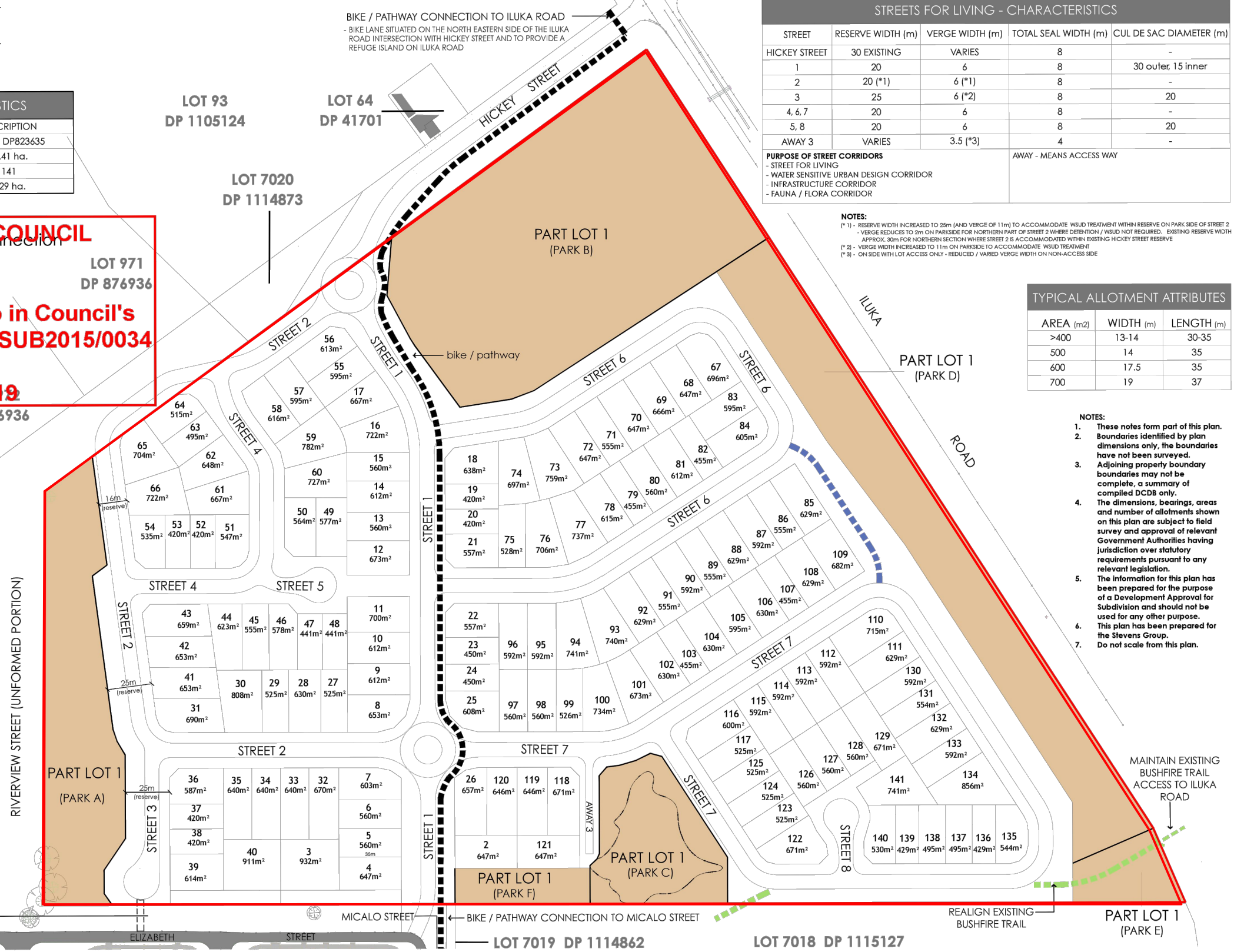
**PURPOSE OF STREET CORRIDORS**  
- STREET FOR LIVING  
- WATER SENSITIVE URBAN DESIGN CORRIDOR  
- INFRASTRUCTURE CORRIDOR  
- FAUNA / FLORA CORRIDOR

AWAY - MEANS ACCESS WAY

**NOTES:**  
(\*1) - RESERVE WIDTH INCREASED TO 25m (AND VERGE OF 11m) TO ACCOMMODATE WSUD TREATMENT WITHIN RESERVE ON PARK SIDE OF STREET 2  
- VERGE REDUCES TO 2m ON PARKSIDE FOR NORTHERN PART OF STREET 2 WHERE DETENTION / WSUD NOT REQUIRED. EXISTING RESERVE WIDTH APPROX. 30m FOR NORTHERN SECTION WHERE STREET 2 IS ACCOMMODATED WITHIN EXISTING HICKEY STREET RESERVE  
(\*2) - VERGE WIDTH INCREASED TO 11m ON PARKSIDE TO ACCOMMODATE WSUD TREATMENT  
(\*3) - ON SIDE WITH LOT ACCESS ONLY - REDUCED / VARIED VERGE WIDTH ON NON-ACCESS SIDE

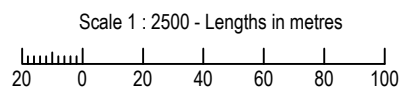
TYPICAL ALLOTMENT ATTRIBUTES		
AREA (m <sup>2</sup> )	WIDTH (m)	LENGTH (m)
>400	13-14	30-35
500	14	35
600	17.5	35
700	19	37

- NOTES:**
- These notes form part of this plan.
  - Boundaries identified by plan dimensions only, the boundaries have not been surveyed.
  - Adjoining property boundary boundaries may not be complete, a summary of compiled DCDB only.
  - The dimensions, bearings, areas and number of allotments shown on this plan are subject to field survey and approval of relevant Government Authorities having jurisdiction over statutory requirements pursuant to any relevant legislation.
  - The information for this plan has been prepared for the purpose of a Development Approval for Subdivision and should not be used for any other purpose.
  - This plan has been prepared for the Stevens Group.
  - Do not scale from this plan.

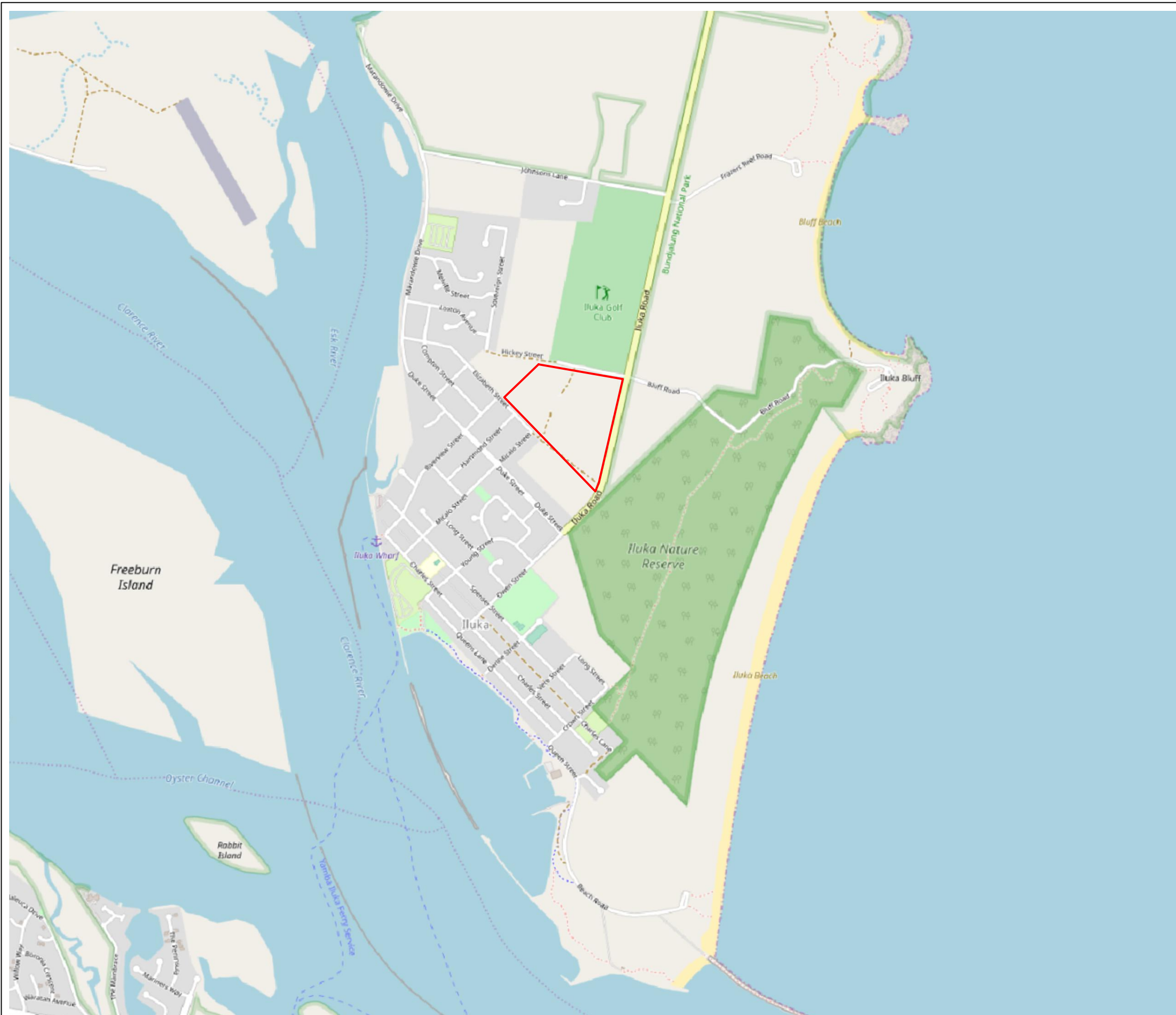


Emergency Access Only

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.



SOURCE: OneCollective - Masterplan (191113 CVC Approved Plans - Extract.pdf)	CLIENT: Ocean Park Consulting Pty Ltd	FIGURE 1	TITLE: APPROVED MASTER PLAN
SCALE: 1 : 2500 @ A3	PROJECT: Annual Koala Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA		
JWA PTY LTD Ecological Consultants		PREPARED: BW DATE: 08 September 2021 FILE: N202001_SAT_20210908.dwg	



**LEGEND**  
 Site Boundary

Scale 1:20 000 - Lengths in metres  
 200 0 200 400 600 800 1000

SOURCE: Open Street Maps SCALE: 1 : 20 000 @ A3	CLIENT Ocean Park Consulting Pty Ltd PROJECT Annual Koala Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA	<p style="text-align: center;"><b>FIGURE 2</b></p> PREPARED: BW DATE: 08 September 2021 FILE: N202001_SAT_20210908.dwg	TITLE <p style="text-align: center;"><b>LOCALITY PLAN</b></p>
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*JWA PTY LTD*  
 Ecological Consultants

western end of the site supports large trees and the landform seems to reflect a more natural pattern of dune and swale.

Three vegetation types have been recorded on the site (Keystone Ecological 2018):

- Community 190 Coast Banksia woodland and open forest of coastal dunes: 0.41 ha of relatively undisturbed vegetation at the site's western end. This area has elements of regenerating Littoral Rainforest (for example, some vines and rainforest tree species), but it is not structurally or floristically well developed.
- Community 193 Pink Bloodwood - Brush Box open forest on coastal dunes and sandplains: dominant community, occupying 18.16 hectares.
- Community 187 Coast Cypress Pine shrubby open forest: restricted on site to a dense patch of adult trees near the site's southern boundary, occupying 0.25 hectares.



## 2 METHODOLOGY

### 2.1 Background

A Baseline Koala Monitoring program was established in February 2020 across the retained vegetation on site to collect data to allow future monitoring to determine any changes in the distribution and level of Koala activity.

Monitoring is then to be undertaken annually to determine the effectiveness of management actions implemented and to monitor the Iluka Koala population.

The first annual monitoring was completed on the 10<sup>th</sup> August 2021 by one (1) JWA ecologist.

### 2.2 Koala Monitoring Program

#### 2.2.1 Introduction

This section discusses the proposed monitoring program for koalas at the Birrigan Iluka Beach site including the key monitoring objectives, methodologies employed during baseline monitoring and to be implemented during ongoing annual monitoring, and reporting requirements.

#### 2.2.2 Monitoring Program

##### 2.2.2.1 Baseline koala monitoring

The aims of the baseline monitoring are to establish survey sites and protocols and to collect data which will allow future monitoring to determine any changes in the distribution and level of Koala activity within the Birrigan Iluka Beach site.

Baseline koala monitoring has been completed across the vegetated areas to be retained on the site. Baseline monitoring was completed prior to the commencement of works on the site by suitably qualified and/or accredited persons<sup>1</sup>. Baseline monitoring included:

- diurnal searches of Birrigan Iluka Beach koala habitat; and
- a full measure of koala activity i.e. application of Spot Assessment Technique (SAT) methodology (Phillips and Callaghan 2011).

##### 2.2.2.2 Annual koala monitoring

Annual koala monitoring was completed over the Birrigan Iluka Beach site following the methodology described in the Baseline koala monitoring section (**SECTION 2.2.2.1**), and included:

- diurnal searches of Birrigan Iluka Beach koala habitat; and

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<sup>1</sup> Means a qualified ecologist with appropriate training and at least five years of experience in undertaking surveys in relation to the relevant EPBC Act listed threatened species.

- a full measure of koala activity i.e. application of Spot Assessment Technique (SAT) methodology (Phillips and Callaghan (2011)).

In reporting of annual monitoring results, liaison is to be undertaken with the Clarence Valley Council, NSW Koala Preservation Society, NSW - Office of Environment and Heritage and/or Clarence Valley WIRES to gather data on any koala incidents that may have occurred within the area in the previous two-year period. In accordance with the HMP (Keystone Ecological 2018), annual reports detailing the results of the monitoring program is to include:

- a comparison of koala activity with data from past surveys;
- a summary of koala incidents having occurred over the previous two year period;
- any other observations of relevance to koala management; and
- a discussion of the findings of the program and any recommendations for amendment of the Community Scheme Residential Subdivision Koala Plan of Management or further action by the Birrigan Iluka Beach Association or Clarence Valley Council or other relevant party.

Reporting of Koala sightings should be in accordance with the protocol adopted by the Clarence Valley Council - refer to the Council website for “Register a Koala Sighting Form”.

Any records of diseased koalas will be included in the results of the annual koala monitoring report. In the event that a suspected diseased koala is observed during monitoring, the time, date and location of the sighting must be recorded. These details should be passed on to an appropriate wildlife care organization as soon as practicable. If required, the observer should remain at the location until the wildlife rescuer attends.

### **2.2.3 Monitoring Methodology**

#### Sampling

The field surveys will utilise the Spot Assessment Technique (SAT) (Phillips and Callaghan 2011), which involves a radial assessment of koala “activity” within the immediate area surrounding a SAT site. In the field, the technique is applied as follows:

1. Locate the SAT site;
2. Identify and uniquely mark the thirty (30) nearest trees to the SAT site;
3. Undertake a search for koala faecal pellets beneath each of the thirty (30) marked trees based on a cursory inspection of the undisturbed ground surface within a distance of 100 centimetres around the base of each tree, followed (if no faecal pellets are initially detected) by a more thorough inspection involving disturbance of the leaf litter and ground cover within the prescribed search area.

For assessment purposes, a tree is defined as “a live woody stem of any plant species (excepting palms, cycads, tree ferns and grass trees) which has a diameter at breast height (DBH) of 100 mm or greater” (Phillips *et al.* 2000). In the case of multi-stemmed

trees, at least one of the live stems must have a DBH of 100 millimetres or greater in order to qualify.

Strict adherence to the 100 cm search area is a fundamental component of the SAT methodology. It is this distance that both optimises the probability of success in terms of actually finding faecal pellets, while at the same defining a workable search area (Phillips and Callaghan, 2011). In terms of search effort, an average of approximately two (2) person minutes per tree should be dedicated to the faecal pellet search. For assessment purposes, the search should be concluded once a single faecal pellet has been detected or when the maximum search time has expired, whichever happens first. This process should be repeated until each of the 30 trees in the site has been assessed. Where the location of faecal pellets falls within overlapping search areas due to two (2) or more trees growing in close proximity to each other, both should be scored for pellet(s).

In addition to the SAT analysis demographic attributes of the koala population will be determined via targeted searches of:

- a) 25 m fixed radius from the central tree (0.196 ha); and
- b) opportunistic sightings whilst traversing the subject site.

The following information relating to each koala sighting should be collected:

- Age class: Adult, sub-adult (2-4 kg) or juvenile (less than one (1) year old, less than 2 kg, not yet independent);
- Reproductive status: the presence of a pouch young, back young, or no young associated with an adult female;
- Health status: healthy, or showing signs of Chlamydia such as cystitis (wet, stained bottom) and/or conjunctivitis (red swollen eyes discharging pus), or other indicators of poor health such as discharges from nose or mouth, wasted or emaciated appearance etc.; and
- Koala location: using a map and/or GPS unit, the location of each koala should be plotted on a map to gain an overall distribution of koalas on the site.

Field sampling will be carried out between August to February (i.e. the breeding season) by ecologists experienced in koala faecal pellet identification, koala survey and tree species identification.

### Data Analysis

#### ***Koala Activity***

Koala ‘activity’ at each site will be determined by dividing the number of trees with a koala faecal pellet by the number of trees searched in the site (a minimum of 30). Activity thresholds of Phillip and Callaghan (2011) will be used to describe the results of field sites. This threshold allows interpretation of the activity level at each site in order to determine its relative importance to the koala population. The key measures on the east coast are summarized below in **TABLE 1**.

**TABLE 1**  
**SUMMARY OF KOALA ACTIVITY CATEGORIES AND THEIR INTERPRETATION**

Activity Category	Activity Level	Interpretation
Significant activity	≥ 22.52%	Site is regularly used by one or more koalas as part of normal ranging behaviour.
Low activity	0% - 22.51%	Occasional or transitory use of the site by (for example) dispersing animals not yet displaying established home ranging movement patterns.

### ***Habitat Utilisation / Occupancy rates***

Two measures of “occupancy” are to be assessed. “Occupancy” describes the proportion of a sampled area where the target species is present. The first is usage of habitat by koalas at any level (Habitat Utilisation rate), be it occasional or frequent. The second and more useful measure is occupancy by resident koala populations (Koala Occupancy rate). Changes in occupancy by resident koalas in a population is more meaningful, as it describes the trend as it relates to the majority of the koala population at any given time.

Baseline Habitat Utilisation rate will be estimated on the basis of the numbers of sampled field sites in which koala faecal pellets were recorded, while the Baseline Koala Occupancy rate will be the subset of these sites that had koala activity levels > 22.52%. The first provides a measure of what proportion of available habitat is currently utilised by koalas in any way, the second indicating what proportion of habitat is occupied by resident populations.

A Baseline koala density estimate will be determined by dividing the total number of koalas sighted within the 0.196 ha radial assessments, by the total area covered by this assessment process over the sampling period.

A test of significance utilising the Paired Student t-test will be completed after each monitoring event to determine if a statistically significant reduction in koala occupancy rates has occurred (i.e. to test the hypothesis that pre-development koala activity is higher than the post-development koala activity). As sample sizes are relatively small, however, the value of p (typically 0.05 or 0.01 in order for significance to be determined) should be raised to something that better reflects the limitations of the sample size. A p of 0.25 as the statistical benchmark of significant change should be considered, further qualified by a requirement that a major review should be initiated only after consideration of the monitoring data from two (2) successive monitoring events.

### ***2.2.4 Performance Criteria and Corrective Actions***

TABLE 2 provides the performance criteria for the koala monitoring program. Corrective actions are provided that are to be implemented if performance criteria are not met.

**TABLE 2**  
**KOALA MONITORING PERFORMANCE CRITERIA AND CORRECTIVE ACTIONS**

Performance Indicator	Corrective Action
For monitoring purposes, the benchmark habitat occupancy rate to be achieved for koala populations inhabiting the Birrigan Iluka Beach site will be equal to or greater than baseline levels	Investigate habitat usage on the Birrigan Iluka Beach site. Determine which areas of potential habitat are not being utilised by the population. Consult with OEH and koala experts to develop a strategy to improve/facilitate the usage of the potential koala habitat. Implement the strategy.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: Bushfire related deaths or damage to habitat are minimised	If a bushfire occurs within land an investigation will be triggered to assess damage to koalas and their habitat on the Birrigan Iluka Beach lands. The investigation will include a survey of the koala population occurring on the site. Consultation will occur with RFS, Council and OEH to determine the cause of the fire. A report will be prepared after the consultation. The report will address, causes, impacts and proposed changes, if considered necessary, to Bushfire management plans.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: No evidence or reports of dog attacks on a koala	If there is an instance of one (1) attack by a dog on a koala then an investigation of causes will be triggered. Dog management within the Birrigan Iluka Beach site will be investigated. If dog management strategies are considered to be ineffective or dog owners do not have sufficient awareness of their responsibilities, then Council, OEH and relevant specialists will be consulted and a more prescriptive dog ownership/management/education strategy will be prepared and implemented, including the installation of additional educational signage if necessary.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: No reported vehicle strike mortalities	If there is an instance of one (1) koala killed or injured on Birrigan Iluka Beach internal roads then an investigation of causes will be triggered.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: High rates of diseased koalas are not detected	Disease condition assessments will be carried out during the baseline monitoring assessment and in every annual assessment thereafter. If expert opinion considers that disease occurrence is over and above that which would be expected in a wild population of koalas or they consider that there has been a significant increase in diseased animals since the Baseline assessment, then

Performance Indicator	Corrective Action
	advice will be obtained from appropriate OEH scientists and/or other koala experts as considered necessary or appropriate. The advice will be implemented.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: Swimming pool drownings	If there is an instance of a koala drowning in a residential pool then an investigation will be triggered to ensure pool ownership strategies are in place e.g. checking to ensure all pool owners have pool fences which are koala-proof and pools have acceptable Koala escape mechanisms installed (e.g. shallow end or a thick rope). A report will be prepared in consultation with OEH, Council and/or koala experts as necessary or appropriate. The recommendations contained in the report will be implemented.



## **3 RESULTS**

### **3.1 Koala Surveys**

#### **3.1.1 Field Sites**

Nine (9) sites were sampled across the subject site by JWA ecologists as part of the baseline survey in February 2020 (**FIGURE 3**). These nine (9) sites were sampled again in August 2021. **TABLE 3** provides a summary of activity/occupancy data at the nine (9) sites sampled during both the baseline and scheduled monitoring.

#### **3.1.2 Koala Sightings**

No koalas were sighted during the 2020 Baseline survey or the August 2021 survey (**TABLE 3**).

#### **3.1.3 Koala Activity**

Koala activity was not recorded from any of the nine (9) field sites sampled during this baseline study or the August 2021 survey.

#### **3.1.4 Habitat Utilisation / Occupancy rates**

Baseline Habitat Utilisation rates (number of sampled field sites in which koala faecal pellets were recorded) were estimated at 0% (n=0) of the 9 sampled sites. This provides a measure of what proportion of available habitat is currently utilised by koalas in any way.

Baseline Koala Occupancy rate (subset of sites that had koala activity levels > 22.52%) were estimated at 0% (n=5) of the 9 sampled sites. The Baseline Koala Occupancy rate indicates what proportion of habitat is occupied by resident populations.

The Occupancy rate during the August 2021 monitoring survey was also estimated at 0% of the 9 sampled sites.

#### **3.1.5 Koala Density and Population Estimate**

The Baseline koala density and population estimates could not be estimated due to no koalas seen during the baseline surveys. No koalas were recorded during the August 2021 survey, therefore density and population estimates still could not be estimated.

#### **3.1.6 Summary of Recent Koala Sightings/Incidents**

The Clarence Valley Koala Register mapping indicates that three (3) koalas have been recorded within one (1) kilometre of the subject site in the last two (2) years. A further three (3) sightings and one (1) male koala hit and killed by a car have been recorded within two (2) kilometres of the subject site in the last two (2) years.

No further observations of relevance to koala management with relation to the subject site have been recorded.

**LOT 99 DP 823635**

- Core Conservation Zone
- Bushfire Trail Zone
- Street Verges / Landscape Zone
- APZ setbacks
- Residential Lots
- New Bushfire Trail Connection
- Koala SAT Site

**CLARENCE VALLEY COUNCIL  
APPROVAL**

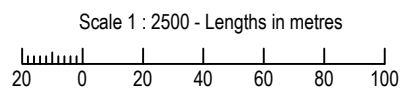
**This is the plan referred to in Council's  
Notice of Determination of SUB2015/0034**

**Date: 13/11/2019**



Emergency Access Only

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.



<p><small>SOURCE: JWA Site Investigations Feb 2020; OneCollective - Vegetation Zones (191113 CVC Approved Plans - Extract.pdf)</small></p> <p><small>SCALE: 1 : 2500 @ A3</small></p> <p style="text-align: center;"><small>JWA PTY LTD Ecological Consultants</small></p>	<p><small>CLIENT Ocean Park Consulting Pty Ltd</small></p> <p><small>PROJECT Annual Koala Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA</small></p>	<p><b>FIGURE 3</b></p>	<p>TITLE</p> <p><b>KOALA SAT SITES</b></p>
<p><small>PREPARED: BW DATE: 08 September 2021 FILE: N202001_SAT_20210908.dwg</small></p>			

**TABLE 3  
BASELINE KOALA SURVEY RESULTS**

Site	Trees Surveyed		Baseline (Feb 2020)			August 2021		
	Species	Number	No. of trees with Scats	Koalas Present	Koala Activity	No. of trees with Scats	Koalas Present	Koala Activity
1	Forest red gum ( <i>Eucalyptus tereticornis</i> )	4	x	x	0 (inactive)	x	x	0 (inactive)
	Pink bloodwood ( <i>Corymbia intermedia</i> )	7						
	Hickory wattle ( <i>Acacia disparrima</i> )	19						
2	Pink bloodwood ( <i>Corymbia intermedia</i> )	5	x	x	0 (inactive)	x	x	0 (inactive)
	Hickory wattle ( <i>Acacia disparrima</i> )	16						
	Yellow pear-fruit ( <i>Mischocarpus pyriformis</i> )	6						
	Fraser Island apple ( <i>Acronychia imperforata</i> )	3						
3	Forest red gum ( <i>Eucalyptus tereticornis</i> )	2	x	x	0 (inactive)	x	x	0 (inactive)
	Brushbox ( <i>Lophostemon confertus</i> )	2						
	Pink bloodwood ( <i>Corymbia intermedia</i> )	6						
	Yellow pear-fruit ( <i>Mischocarpus pyriformis</i> )	8						
	Hickory wattle ( <i>Acacia disparrima</i> )	6						
	Fraser Island apple ( <i>Acronychia imperforata</i> )	6						
4	Brushbox ( <i>Lophostemon confertus</i> )	2	x	x	0 (inactive)	x	x	0 (inactive)
	Fraser Island apple ( <i>Acronychia imperforata</i> )	6						
	Yellow pear-fruit ( <i>Mischocarpus pyriformis</i> )	10						
	Hickory wattle ( <i>Acacia disparrima</i> )	10						
	Pink bloodwood ( <i>Corymbia intermedia</i> )	2						
5	Pink bloodwood ( <i>Corymbia intermedia</i> )	4	x	x	0 (inactive)	x	x	0 (inactive)
	Hickory wattle ( <i>Acacia disparrima</i> )	16						

Site	Trees Surveyed		Baseline (Feb 2020)			August 2021		
	Species	Number	No. of trees with Scats	Koalas Present	Koala Activity	No. of trees with Scats	Koalas Present	Koala Activity
	Yellow pear-fruit ( <i>Mischocarpus pyriformis</i> )	3						
	Fraser Island apple ( <i>Acronychia imperforata</i> )	1						
	Brushbox ( <i>Lophostemon confertus</i> )	1						
6	Pink bloodwood ( <i>Corymbia intermedia</i> )	8	x	x	0 (inactive)	x	x	0 (inactive)
	Hickory wattle ( <i>Acacia disparrima</i> )	18						
	Fraser Island apple ( <i>Acronychia imperforata</i> )	3						
	Brushbox ( <i>Lophostemon confertus</i> )	1						
7	Pink bloodwood ( <i>Corymbia intermedia</i> )	5	x	x	0 (inactive)	x	x	0 (inactive)
	Brushbox ( <i>Lophostemon confertus</i> )	6						
	Fraser Island apple ( <i>Acronychia imperforata</i> )	10						
	Hickory wattle ( <i>Acacia disparrima</i> )	9						
8	Pink bloodwood ( <i>Corymbia intermedia</i> )	8	x	x	0 (inactive)	x	x	0 (inactive)
	Brushbox ( <i>Lophostemon confertus</i> )	6						
	Hickory wattle ( <i>Acacia disparrima</i> )	16						
9	Pink bloodwood ( <i>Corymbia intermedia</i> )	3	x	x	0 (inactive)	x	x	0 (inactive)
	Fraser Island apple ( <i>Acronychia imperforata</i> )	10						
	Tree heath ( <i>Trochocarpa laurina</i> )	6						
	Broad-leaved paperbark ( <i>Melaleuca quinquenervia</i> )	5						
	Yellow pear-fruit ( <i>Mischocarpus pyriformis</i> )	6						

## 4 DISCUSSION AND CONCLUSION

No Koalas or evidence of Koala activity (i.e. scats) were detected during the 2020 Baseline surveys or subsequent August 2021 survey. The proportion of habitat occupied by a resident koala population at the time of the baseline survey and first annual monitoring, and areas of the site that are subject to any koala use (whether occasional or frequent e.g. transient) at the time of the surveys is therefore estimated at 0%.

The nine (9) field sites sampled during this baseline study are considered to provide good coverage of the habitat on the subject site, are placed regularly throughout the landscape, and therefore provide a sound sample from which to examine trends over time. Proposed revegetation/regeneration works on the subject site in accordance with the Habitat Restoration Plan (JWA 2020) include planting of preferred koala food trees and other koala habitat embellishment measures, which may potentially lead to increased koala activity on the site. Two measures of “occupancy” will be assessed during ongoing annual koala monitoring. “Occupancy” describes the proportion of a sampled area where the target species is present. The first measure that will be monitored is usage of habitat by koalas at any level (Habitat Utilisation rate), be it occasional or frequent. The second and more useful measure that will be monitored over time is occupancy by resident koala populations (Koala Occupancy rate). Changes in occupancy by resident koalas in a population is more meaningful, as it describes the trend as it relates to the majority of the koala population at any given time.

## 5 NEXT MONITORING ROUNDS

The requirements and future survey dates for the annual Koala Monitoring Program are present in **TABLE 4**. Reporting will be annually for the duration of the monitoring program. The next monitoring event (i.e. second annual monitoring) will occur during the August 2022 to February 2023 period (i.e. the breeding season) and the results will be compared to the results of this monitoring report.

**TABLE 4  
MONITORING PROGRAM REQUIREMENTS AND SURVEY DATES**

Survey	Requirements/Frequency	Latest Survey Date	Next Survey Date
Baseline Koala Survey	Prior to commencement of site vegetation clearing works	Completed in February 2020	N/A
Koala Monitoring Survey	Annually for a minimum five-year management period following the completion of the initial phase of habitat protection works	1 <sup>st</sup> Annual Monitoring: Completed August 2021	2nd Annual monitoring: between August 2022 and February 2023



## REFERENCES

Keystone Ecological (2018a) Ecological Response for Preliminary Documentation, Hickey Street Iluka, Clarence Valley LGA. Report to Stevens Group.

Keystone Ecological (2018) Habitat Management Plan, Hickey Street Iluka, Clarence Valley LGA. Report to Stevens Group.

Phillips, S., and Callaghan, J. (2011) The “Spot Assessment Technique”: a tool for determining localized levels of habitat use by Koalas *Phascolarctos cinereus*. *Australian Zoologist*: **35(3)**, 774 - 780.