Fulton Hogan

Appendix B1: Flora and Fauna Management Sub-Plan

NEWCASTLE INNER CITY BYPASS – RANKIN PARK TO JESMOND (STAGE 4 – MAIN WORKS)

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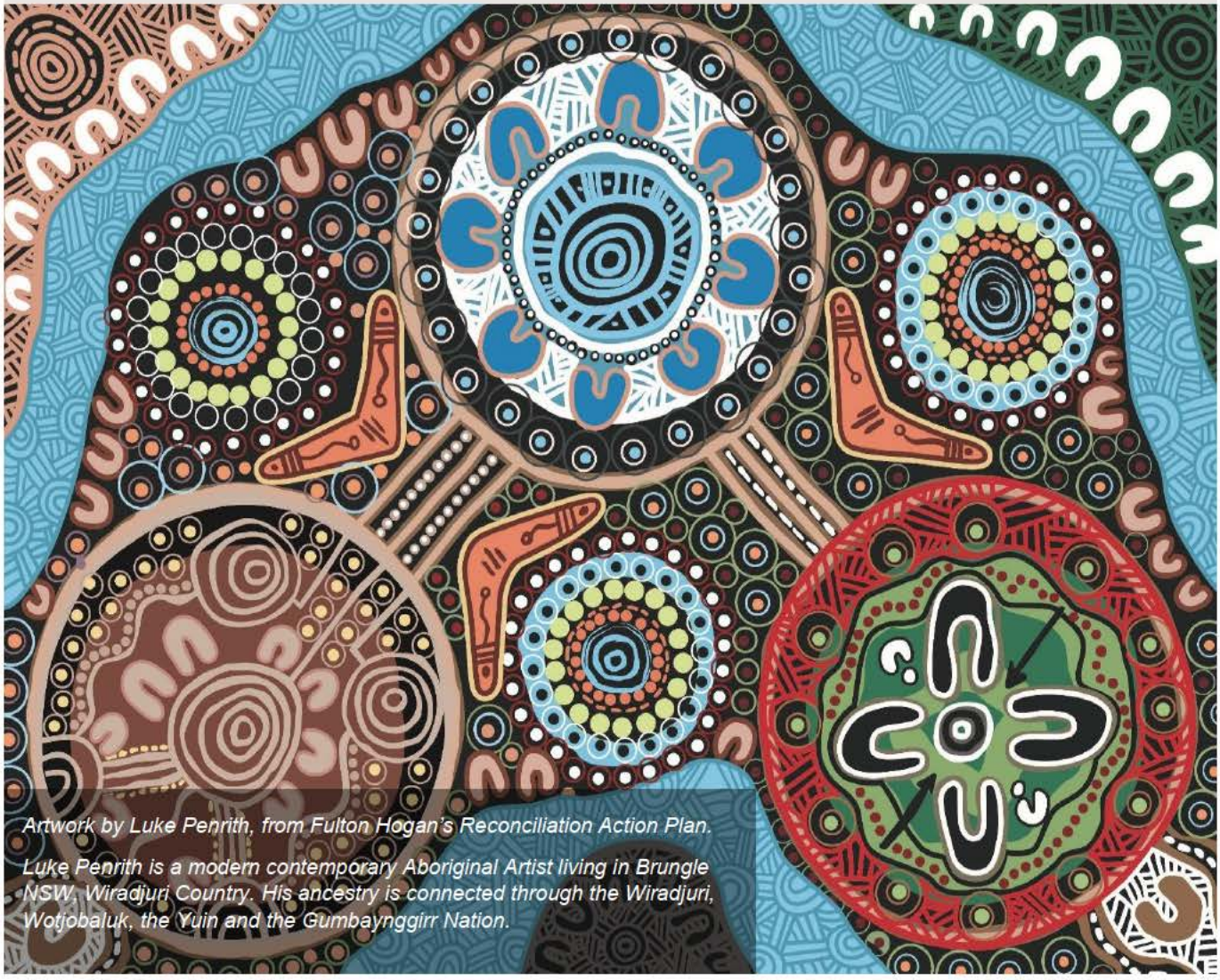
ACKNOWLEDGMENT OF COUNTRY

Fulton Hogan acknowledges the Awabakal People as the Traditional Owners of the land we are working on, and pay our respect to their Elders past, present and emerging.

We recognise their deep connection to Country and value the contribution to caring for, and managing the land and water.

We are committed to pursuing genuine and lasting partnerships with Traditional Owners to understand their culture and connections to Country in the way we plan for and carry out the delivery of the Works.



Artwork by Luke Penrith, from Fulton Hogan's Reconciliation Action Plan.

Luke Penrith is a modern contemporary Aboriginal Artist living in Brungle NSW, Wiradjuri Country. His ancestry is connected through the Wiradjuri, Wotjobaluk, the Yuin and the Gumbaynggirr Nation.

Document control

This is an e-copy of the Plan and it interfaces with the other associated plans, which together describe the proposed overall project management system for the project.

The latest revision of this plan is available on the Fulton Hogan server. If any unsigned hard copies of this document are printed, they are valid only on the day of printing.

The revision number is included at the bottom of each page. When revisions occur, the entire document will be issued with the revision number updated accordingly for each owner of a controlled copy.

Attachments/Appendices to this plan are revised independently of this plan.

Revision history

REV	DATE	AUTHOR / REVISED BY	ENDORSED BY	BRIEF DESCRIPTION OF CHANGE
0	01/09/2022	[redacted]	[redacted]	Initial issue for TfNSW & ER review
1	11/10/2022	[redacted]	[redacted]	Revised in response to comments from TfNSW & the ER
2	13/10/2022	[redacted]	[redacted]	Revised in response to comments from TfNSW
3	03/11/2022	[redacted]	[redacted]	Revised in response to agency consultation process
4	08/12/2022	[redacted]	[redacted]	Revised in response to comments from DPE. Also revised Section 1.4 and Table B-1.
5	15/12/2022	[redacted]	[redacted]	Revised in response to comments from TfNSW.
6	20/02/2023	[redacted]	[redacted]	Revised the definition of non-compliance and non-conformance in the Glossary/ Abbreviations.

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Glossary/ Abbreviations

Term/ abbreviation	Definition
BDAR	Biodiversity Development Assessment Report
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
Construction	Has the same meaning as the definition of the term in the Project Approval
Construction Boundary	Has the same meaning as the definition of the term in the Project Approval: The area physically affected by works described in documents listed in Condition A1.
DAWE	Commonwealth Department of Agriculture, Water and the Environment
D&C	Design and Construct
Department/ DPE	NSW Department of Planning and Environment
DPE Water	Water Group of the Department and the National Resources Access Regulator
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPA	NSW Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
ER	Environmental Representative for the SSI
ESCP	Primary Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statement
FFMP	Flora and Fauna Management Sub-Plan
GDE	Groundwater Dependent Ecosystem
HP	Hold Point: a point in the construction or verification process beyond which work may not proceed without receiving authorisation from the appropriate party.
Material harm	Has the same meaning as the definition of the term in the Project Approval: Is harm that: (a) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or (b) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)
Minister, the	NSW Minister for Planning
NA	Not applicable
NML	Noise Management Level

Term/ abbreviation	Definition
Non-compliance	Has the same meaning as the definition of the term in the Project Approval: An occurrence, set of circumstances or development that is a breach of the Project Approval. This includes a failure to comply with the processes included within this CEMP.
Non-conformance	Failure to conform to the requirements of project or Fulton Hogan system documentation.
OEH	NSW Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OEMS	Operational Environmental Management System
Planning Secretary, the	Planning Secretary of the DPE (or nominee, whether nominated before or after the date on which the Project Approval was granted.
PCT	Plant Community Type
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
Project, the	Newcastle Inner City Bypass Rankin Park to Jesmond
Project Approval, the	The Minister's approval for the SSI.
PV	Project Verifier
Relevant Council(s)	Has the same meaning as the definition of the term in the Project Approval: Lake Macquarie City Council and City of Newcastle, as relevant.
REMM	Revised Environmental Management Measure
RMS	Roads and Maritime Services (now TfNSW)
RP2J	Rankin Park to Jesmond
SPIR	Submissions and Preferred Infrastructure Report
SSI	State Significant Infrastructure, as generally described in Schedule 1 of the Project Approval, the carrying out of which is approved under the terms of the Project Approval.
Study area	The study area used in the project biodiversity assessments in the documents listed in CoA A1
SWTC	TfNSW Scope of Works and Technical Criteria
TEC	Threatened Ecological Community
TfNSW	Transport for NSW (previously RMS)
UDLP	Urban Design and Landscape Plan
WEMP	Waste and Energy Management Sub-Plan
WoNs	Weeds of National Significance
Work(s)	Has the same meaning as the definition of the term in the Project Approval: All physical activities to construct or facilitate the construction of the SSI, including environmental management measures and utility works. however, does not include work that informs or enables the detailed design of the SSI and generates noise that is no more than 5 dB(A) above the rating background level (RBL) at any residence

1. Introduction

1.1. Purpose

This Flora and Fauna Management Sub-Plan (FFMP) describes how Fulton Hogan will manage construction of the Newcastle Inner City Bypass Rankin Park to Jesmond (RP2J) Project (the project) to ensure that impacts on flora and fauna are minimised.

This FFMP has been prepared to detail how Fulton Hogan will comply with the project approval, and implement and achieve relevant performance outcomes, commitments and mitigation measures specified in the EIS as amended by the SPIR and subsequent Modification 1 Submissions Report (also known as 'Revised Environmental Management Measures' (REMMs)) during construction of the project. Additionally, this FFMP has been prepared to address the requirements of the Scope of Works and Technical Criteria (SWTC) Appendix 4 Additional Environmental Requirements, SWTC Appendix 5 Provisions for Fauna, TfNSW Specification D&C G36 Environmental Protection (G36) and TfNSW Specification D&C G40 Clearing and Grubbing (G40).

It is noted that the EPBC approval directly reflects the conditions contained in the project approval. Therefore, the EPBC approval is addressed in this FFMP by way of addressing the project approval in Table 2.

For the avoidance of doubt, the CEMP (including this FFMP) relates to the construction phase only. Detailed design environmental requirements will be addressed as part of the detailed design phase, separate to the CEMP approvals process. Detailed design is generally completed about six months after CEMP approval. In addition, operational environmental requirements will be met during the operational phase (upon completion of construction) and addressed in the Operational Environmental Management Plan (OEMP) or Environmental Management System (EMS) as agreed with the Planning Secretary in accordance with CoA D3. Moreover, biodiversity offset requirements under the project approval (i.e. CoA E4, E5, E6, E7) will be addressed separately to this FFMP by TfNSW.

1.2. Background

Chapter 7 of the EIS assessed the extent and magnitude of potential impacts of construction and operation of the project on biodiversity. As part of this, a detailed biodiversity assessment was undertaken and included in the EIS as:

- EIS Appendix E – Technical Paper 1 – Biodiversity Assessment Report (and Biodiversity Offset Strategy), prepared by Aurecon for RMS, dated November 2016.

As part of the SPIR, a review of the issues considered in the EIS was carried out to identify where additional assessment was required as a result of the proposed design refinements and submissions. In response, additional biodiversity field work was carried out and potential biodiversity impacts and offset requirements were reassessed. An updated biodiversity assessment was undertaken and included as:

- SPIR Appendix B – Technical Paper 1 – Biodiversity Assessment Report (and Biodiversity Offset Strategy), prepared by GHD for Aurecon for RMS, dated April 2018

Subsequent to the SPIR, a biodiversity development assessment report (BDAR) was prepared as part of the Modification 1 Report to assess the potential biodiversity impact from the modification (i.e. additional construction compounds) and included as Appendix D of the report. The Modification 1 Report identified that the modification area was heavily modified and comprised of mainly exotic vegetation. Native vegetation was only present at the Peatties Road site (0.2 hectares of low condition native vegetation). No significant biodiversity impacts were therefore identified as a result of the modification. Moreover, no offset credit requirements were identified for the modification.

It is noted that while the Peatties Road site was assessed as part of the Modification 1 Report, Fulton Hogan does not intend on using this site nor the Cardiff Road site, so the potential impacts associated with the use of these sites are no longer applicable to the delivery of the project.

1.3. Structure of FFMP

This FFMP is part of Fulton Hogan's environmental management framework for the project and is supported by other documents, such as Environmental Work Method Statements. The review and document control processes for this FFMP are described in Chapters 11 and 12 respectively of the CEMP.

1.4. Consultation for preparation of the FFMP

In accordance with CoA C4(c), consultation with DPI Fisheries and City of Newcastle has been undertaken during the preparation of this FFMP.

There are no outstanding issues in relation to the FFMP. DPI Fisheries provided no written comments and attended a meeting with TfNSW where no concerns were raised. City of Newcastle advised they had no comments. A summary of the consultation is provided below.

DPI Fisheries

26/09/22 1:30PM via mobile voicemail message – Fulton Hogan advised that the FFMP would be issued for review and comment by the end of the week (i.e. 30/09/22).

18/10/22 7:35AM via email - Fulton Hogan provided Revision 2 of the FFMP for review and comment. Comments were requested by 01/11/22.

20/10/22 meeting between TfNSW and DPI Fisheries – TfNSW outlined that the project is State Significant Infrastructure and only contains first order ephemeral watercourses with no key fish habitat. Moreover, consultation was completed with DPI Fisheries on the monitoring programs with no comments. A meeting action was assigned to DPI Fisheries to provide a response.

01/11/22 via email – TfNSW advised DPI Fisheries that it was Fulton Hogan's intention to submit the FFMP. TfNSW highlighted that based on previous discussions DPI Fisheries did not raise any concerns due to the lack of any key fish habitat in the project area. TfNSW requested a return email from DPI Fisheries.

02/11/22 via email - Fulton Hogan advised comments had not been received and the comment period closed on 01/11/22. Fulton Hogan acknowledged DPI Fisheries resourcing challenges and advised comments would be followed up later that day by phone. Fulton Hogan advised if they did not hear back from DPI Fisheries, it was Fulton Hogan's intention to submit the FFMP to the Planning Secretary of the Department of Planning and Environment (DPE) for approval.

02/11/22 9:47AM mobile voicemail message - Fulton Hogan asked whether DPI Fisheries had any comments on the FFMP as the comment period closed yesterday (01/11/22). Fulton Hogan advised of its intention to submit the FFMP to the Planning Secretary of DPE for approval. Fulton Hogan requested a return email or phone call.

03/11/22 via email - Fulton Hogan advised comments had not been received and given the time elapsed since originally providing the FFMP for comment (on 18/10/22), it was Fulton Hogan's intention to submit the FFMP to the Planning Secretary of DPE for approval. In so doing, allowing the CEMP approvals process to progress, without delaying the commencement of the project. Fulton Hogan advised that in the event comments are received after the approval of the CEMP, Fulton Hogan would work with DPI Fisheries to address those comments at that point in time.

10/11/22 via email – DPI Fisheries advised they have no objections or comments in relation to the FFMP.

City of Newcastle

City of Newcastle advised they had no comments.

Copies of all consultation correspondence is included at Appendix A5 of the CEMP.

Ongoing consultation will be undertaken during detailed design and construction of the project as required by the project approval. This will be subject to a separate consultation process to that required for preparation of this FFMP and undertaken in accordance with the Community Communication Strategy (CCS) approved by the Planning Secretary under CoA B3.

For the avoidance of doubt, as noted in the CEMP (main section), the Flora and Fauna Construction Monitoring Program required under CoA C9(e) was prepared separately to the CEMP (by TfNSW) and approved by the Planning Secretary. Consultation with DPI Fisheries and City of Newcastle in relation to the Flora and Fauna Construction Monitoring Program has already been undertaken as part of that process.

2. Objectives, targets and environmental performance outcomes

2.1. Objectives

The key objective of the FFMP is to ensure that impacts to flora and fauna are minimised and within the scope permitted by the project approval. To achieve this objective, Fulton Hogan will undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to avoid or minimise potential adverse impacts to flora and fauna along the Project corridor
- Ensure appropriate measures are implemented to address the relevant CoA and REMMs outlined in Table 2 and Table 3 respectively.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Chapter 3 of this FFMP.

2.2. Targets

The following targets have been established for the management of flora and fauna impacts during the project:

- Ensure full compliance with the relevant legislative requirements, CoA and REMMs outlined in Table 2 and Table 3 respectively.
- Minimise or avoid impacts on native flora and fauna
- Ensure notification of any unexpected threatened species/ TECs during construction.

2.3. Environmental performance outcomes

The environmental performance outcome(s) relevant to this FFMP are listed in Table 1. A cross reference is also included to indicate where the environmental performance outcome is addressed in this FFMP in terms of how it will be implemented and achieved.

Table 1: Environmental performance outcomes relevant to flora and fauna management

Key issue	Environmental performance outcome	How implemented and achieved
Biodiversity	Biodiversity Offsets Strategy in accordance with the NSW Biodiversity Offsets Policy for Major Projects and effective site revegetation	Biodiversity Offset Strategy – to be implemented separately to this FFMP (by TfNSW) Permanent revegetation design requirements are addressed by way of the Landscape Design Drawings (Detailed Design documentation). See Chapter 6 mitigation measure ID FFMM6.
	The project would minimise further impacts on biodiversity through the implementation of relevant mitigation measures.	Chapter 6 mitigation measures

3. Legal and other requirements

3.1. Legislation

Legislation relevant to flora and fauna management includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *National Parks and Wildlife Act 1974* (NPW Act)
- *Fisheries Management Act 1994* (FM Act)
- *Pesticides Act 1999*
- *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act)
- *Biosecurity Act 2015*
- *Biosecurity Regulation 2017*
- *Biodiversity Conservation Act 2016.*

Relevant provisions of the above legislation are explained in the Register of legal and other requirements included in Appendix A1 of the CEMP.

3.2. Guidelines and standards

The main guidelines, standards and policy documents relevant to this FFMP include:

- NSW Department of Primary Industries, Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings, Fairfull and Witheridge, 2003
- Fishnote – Policy and Guidelines for Fish Friendly Waterway Crossings – November 2003
- Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).
- NSW Department of Primary Industries, Policy and Guidelines for Fish Habitat Conservation and Management (update 2013).
- Natural Resources Access Regulator, DPI Water Guidelines for Controlled Activities on Waterfront Land (2018).

3.3. Conditions of approval

The CoA relevant to this FFMP are listed in Table 2. A cross reference is also included to indicate where the condition is addressed in this FFMP or other project management documents. As mentioned in Section 1.1, the EPBC approval directly reflects the conditions of approval contained in the project approval and therefore, the EPBC approval is also addressed by way of Table 2.

Table 2: Conditions of approval relevant to FFMP

CoA No.	Condition requirements	Document reference
PART C - CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
C4	The following **CEMP Sub-plans** must be prepared in consultation with the relevant public authorities identified for each **CEMP Sub-plan**:	Section 1.4

CoA No.	Condition requirements	Document reference
	Table 3: CEMP Sub-plan and relevant public authorities (a) Traffic and transport — Relevant council and Health Administration Corporation (b) Noise and vibration — Relevant council and Health Administration Corporation (c) Flora and Fauna — DPI Fisheries and Relevant council (d) Air quality — Relevant council and Health Administration Corporation (e) Soil and water — Relevant council, DPI Fisheries and DPE Water, (f) Aboriginal cultural heritage — Heritage NSW and Registered Aboriginal Parties (g) Flood management — Relevant council	
C5 (a)	The **CEMP Sub-plans** must state how: the environmental performance outcomes identified in the documents listed in **Condition A1** and terms of this approval will be achieved;	Section 2.3
(b)	the mitigation measures identified in the documents listed in **Condition A1** and terms of this approval will be implemented;	Through the implementation of this FFMP (in particular refer to Section 3.4).
(c)	the relevant terms of this approval will be complied with; and	Through the implementation of this FFMP
(d)	issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed.	Chapter 5, second paragraph Chapter 6
C6	The **CEMP Sub-plans** must be developed in consultation with the relevant public authorities specified in **Table 3**. Details of all information requested by an authority to be included in a **CEMP Sub-plan** as a result of consultation, including copies of all correspondence from those authorities, must be provided with the relevant **CEMP Sub-Plan**.	Section 1.4
C7	Any of the **CEMP Sub-plans** may be submitted along with, or subsequent to, the submission of the **CEMP** but in any event, no later than one (1) month before construction for approval by the Planning Secretary.	CEMP (main section) Section 1.4
C8	Construction must not commence until the **CEMP** and all **CEMP Sub-plans** have been approved by the Planning Secretary, or as otherwise agreed by the Planning Secretary. The **CEMP** and **CEMP Sub-plans**, as approved by the Planning Secretary, including any minor amendments approved by the **ER** must be implemented for the duration of construction. Where construction of the SSI is staged, construction of a stage must not commence until the **CEMP** and **sub-plans** for that stage have been approved by the Planning Secretary.	CEMP (main section) Section 1.4
PART C - CONSTRUCTION MONITORING PROGRAMS		
C9	The following **Construction Monitoring Programs** must be	Flora and Fauna Construction

<table>
<tr><th>CoA No.</th><th>Condition requirements</th><th>Document reference</th></tr>
<tr><td></td><td>prepared in consultation with the relevant public authorities identified for each to compare actual performance of construction of the SSI against the performance predicted in the in the documents listed in Condition A1 or in the CEMP:
Table 4: Construction Monitoring and relevant public authorities
<table>
<tr><th></th><th>Required Construction Monitoring Programs</th><th>Relevant public authorities to be consulted for each Construction Monitoring Program</th></tr>
<tr><td>(a)</td><td>Surface and Ground Water Quality</td><td>DPI Fisheries, DPE Water and Relevant council</td></tr>
<tr><td>(b)</td><td>Air Quality</td><td>Relevant council and Health Administration Corporation</td></tr>
<tr><td>(c)</td><td>Noise and vibration</td><td>Relevant council and Health Administration Corporation</td></tr>
<tr><td>(e)</td><td>Flora and fauna</td><td>DPI Fisheries and Relevant council</td></tr>
</table></td><td>Monitoring Program - prepared separately to the CEMP (by TfNSW) and approved by the Planning Secretary.</td></tr>
<tr><td colspan="3">PART E - BIODIVERSITY</td></tr>
<tr><td>E2</td><td>Any work associated with the SSI must limit the clearing of native vegetation to the greatest extent practicable.</td><td>Chapter 6 mitigation measure ID FFMM1, FFMM2, FFMM7, FFMM8, FFMM9, FFMM10.</td></tr>
<tr><td>E3</td><td>Impacts to plant community types must not exceed those identified in the documents listed in Condition A1.</td><td>Section 5.1
Chapter 6 mitigation measure ID FFMM1, FFMM2, FFMM7, FFMM8, FFMM9, FFMM10.</td></tr>
<tr><td>E4</td><td>The Biodiversity Offset Strategy (BOS) detailed in the documents listed under Condition A1 must be implemented. The credits specified in the BOS and detailed in Table 5 must be secured within 12 months of the commencement of construction, or as otherwise agreed by the Planning Secretary. The credits must be retired within 12 months of securing the credits, or in a timeframe agreed to by the Planning Secretary
Table 5: Biodiversity Credits to be Retired
<table>
<tr><th>Credit Type</th><th>EPBC Act equivalent EEC or habitat of EPBC Act listed threatened species</th><th>Number of Credits</th></tr>
<tr><td>Ecosystem Credits</td><td></td><td></td></tr>
<tr><td>HU833 (PCT 1619) – Smooth-barked Apple – Red Bloodwood – Brown Stringybark – Hairpin Banksia heathy open forest of coastal lowlands</td><td>Grey-headed Flying-fox (foraging habitat)</td><td>1,182</td></tr>
<tr><td>HU782 (PCT 1569) – Blackbutt – Turpentine – Sydney Blue Gum mesic tall open forest on ranges of the Central Coast</td><td>Grey-headed Flying-fox (foraging habitat)</td><td>337</td></tr>
<tr><td>HU806 (PCT 1592) – Spotted Gum – Red Ironbark – Grey Gum shrub – grass open forest on the Lower Hunter</td><td>Grey-headed Flying-fox (foraging habitat)</td><td>399</td></tr>
<tr><td>HU804 (PCT 1590) – Spotted Gum – Broad-leaved Mahogany – Red Ironbark shrubby open forest*</td><td>Grey-headed Flying-fox (foraging habitat)</td><td>1,098</td></tr>
<tr><td>HU841 (PCT 1627) – Smooth-barked Apple – Turpentine – Sydney Peppermint heathy woodland on sandstone ranges of the Central Coast</td><td>Grey-headed Flying-fox (foraging habitat)</td><td>228</td></tr>
<tr><td colspan="2">Total ecosystem credits required for offsetting</td><td>3,244</td></tr>
<tr><td>Species Credits</td><td></td><td></td></tr>
<tr><td colspan="2">Black-eyed Susan (Tetratheca juncea)</td><td>12,690</td></tr>
</table>
Note: Credits have been calculated using the Framework for Biodiversity Assessment.</td><td>Biodiversity Offset Strategy – to be implemented separately to this FFMP (by TfNSW)</td></tr>
<tr><td>E5</td><td>The Proponent must submit to the Planning Secretary a copy of the Credit Retirement Report issued by the BCD (once the offsets are</td><td>Credit Retirement Report – provided separately to this</td></tr>
</table>

CoA No.	Condition requirements	Document reference
	secured) within one month of receiving the report.	FFMP (by TfNSW)
E6	Plant community types that provide habitat for impacted EPBC Act threatened species must be retired in a manner that achieves "like-for-like" habitat for the species.	Credits retired separately to this FFMP (by TfNSW)
E7	The offsetting of biodiversity impacts must be carried out in accordance with the *NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014)* and can be achieved by: (a) acquiring and retiring "biodiversity credits" within the meaning of the *Biodiversity Conservation Act 2016*; and/or (b) making payments to an offset fund developed by the NSW Government; and/or (c) providing supplementary measures. *Notes:* *1. Following repeal of the Threatened Species Conservation Act 1995 on 25 August 2017, "biodiversity credits" created under that Act are taken to be "biodiversity credits" under the Biodiversity Conservation Act 2016 by virtue of clause 19 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017.* *2. Any residual impact on EPBC Act listed threatened species and ecological communities must be offset in accordance with an offset process endorsed by the DAWE.*	Biodiversity Offset Strategy – implemented separately to this FFMP (by TfNSW)
E8	Prior to work that impacts native vegetation, the Proponent must consult with local community, landcare groups and relevant public authorities to determine if there is an interest for the reuse of suitable timber and root balls in habitat enhancement and rehabilitation work. Timber and root balls must be retained from the project where there is a demonstrated demand for their reuse.	Chapter 6 mitigation measure ID FFMM11, FFMM12.
E9	The construction of the SSI must demonstrate how: (a) EPBC Act listed threatened species and ecological communities are protected; (b) noxious weeds are managed; and (c) contamination by pathogens, non-indigenous regenerative plant material and seeds can be prevented by the movement of all tools, vehicles, machinery and personnel. *Note: These additional requirements must be addressed in the **Flora and Fauna Management Sub-plan** required under **Condition C4 Table 3 (c).***	 Chapter 6 mitigation measure ID FFMM1, FFMM2, FFMM9. Section 4.5.1 for the Grey-headed Flying-fox Chapter 6 mitigation measure ID FFMM21, FFMM22, FFMM23, FFMM24, FFMM25. Appendix E Chapter 6 mitigation measure ID FFMM21, FFMM22, FFMM23, FFMM24, FFMM25. Appendix G
Pre-clearing Surveys		

CoA No.	Condition requirements	Document reference
E10	Before the removal or clearing of any vegetation, or the demolition of structure identified as potential roosting sites for microbats, commences, pre-clearing/demolition inspections for the threatened species must be undertaken. The inspections, and any subsequent relocation of fauna and associated management/offset measures, must be undertaken under the guidance of a suitably qualified and experienced ecologist. Survey and relocation methodologies and management/offset measures must be included in the **Construction Flora and Fauna Management Sub-plan** required under **Condition C4**, and the documents required under **Condition A9** in relation to Bridge 7.	Chapter 6 mitigation measure ID FFMM2. Appendix A Appendix B Microbat Management Strategy contained in Appendix B of the Flora and Fauna Construction Monitoring Program - prepared separately to the CEMP by TfNSW) and approved by the Planning Secretary.
E11	The SSI must be designed to retain as many trees as possible in Jesmond Park. Where trees are to be removed, and those trees are not required to be offset under **Condition E4**, the Proponent must provide a net increase in the number of replacement trees. Replacement trees must be planted within and on public land within 500 metres of the SSI boundary. Replacement tree plantings may be undertaken beyond 500 metres on public land within the relevant council area if planting within 500 metres of the SSI boundary is not practicable. The location of the replacement tree plantings must be determined in consultation with the relevant council and undertaken prior to the commencement of operation.	Detailed Design Appendix B section B3 Clearing Procedure, point 3a. Permanent revegetation design requirements are addressed by way of the Landscape Design Drawings (detailed design documentation). See Chapter 6 mitigation measure ID FFMM6.
E11A	The SSI must not impact street trees in the Peatties Road reservation between Charlestown Road and 5 metres past the Peatties Road ancillary facility entry/exit point, unless the work is required for: (a) the construction of the footpath required under Condition E71A; (b) vehicular access to the Peatties Road ancillary facility; (c) bushfire requirements; and (d) traffic safety requirements. Where trees are to be removed and those trees are not required to be offset under **Condition E4**, the Proponent must provide a net increase in the number of replacement trees. The replacement trees must be planted along or adjoining Peatties Road in consultation with City of Newcastle.	NA - As noted in Section 1.2 last paragraph, Fulton Hogan does not intend on using the Peatties Road ancillary facility, so there will be no associated impact to street trees in this area.

3.4. Revised environmental management measures

Relevant construction-related REMMs from the Modification 1 Submissions Report are listed in Table 3. A cross reference is also included to indicate where the measure is addressed in this FFMP or other project management documents.

Table 3: Revised environmental management measures relevant to FFMP

ID No.	Revised environmental management measure	Document reference
Biodiversity		
General		
BD01	A flora and fauna management plan will be prepared as part of the Construction Environmental Management Plan (CEMP) for the project. The flora and fauna management plan will be prepared and implemented in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	This FFMP Section 3.2
BD02	All workers will be provided with an environmental induction before starting work on-site. This would include information on the ecological values of the site and study area and measures to be implemented to protect biodiversity.	Section 7.2
Clearing of native vegetation		
BD03	The Biodiversity Offsets Strategy will be finalised, in accordance with the NSW Biodiversity Offsets Policy for Major Projects (OEH 2014b) as part of detailed design and required offsets secured	Biodiversity Offset Strategy – implemented separately to this FFMP (by TfNSW)
Impacts to threatened flora and fauna species		
BD04	Vegetation clearing will be carried out in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 4: Clearing of vegetation and removal of bushrock) (RTA 2011a).	Section 3.2 Chapter 6 mitigation measure ID FFMM2. Appendix B section B2 Scope.
BD05	Pre-clearance surveys will be carried out in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 1: Pre-clearing process) (RTA 2011a).	Section 3.2 Chapter 6 mitigation measure ID FFMM2. Appendix B section B2 Scope.
BD06	Any unexpected threatened species finds will be dealt with in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Section 3.2 Chapter 6 mitigation measure ID FFMM3. Appendix B section B2 Scope.
BD07	Exclusion zones will be identified and demarcated in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 2: Exclusion zones) (RTA 2011a).	Chapter 6 mitigation measure ID FFMM1.
Impacts to native vegetation		

ID No.	Revised environmental management measure	Document reference
BD08	Clearing of native vegetation and mature trees, particularly hollow-bearing trees, will be avoided and minimised where possible around watercourses, in Jesmond Park, near proposed fauna crossing structures and those identified as known or likely to be used for breeding and roosting by Powerful Owl (Ninox strenua).	Chapter 6 mitigation measure ID FFMM1, FFMM2, FFMM7, FFMM8, FFMM9, FFMM10.
BD09	Roads and Maritime will investigate opportunities to retain trees in construction compound A to provide an arboreal crossing for Squirrel Gliders and other arboreal fauna between vegetation to the east and west of the alignment.	As outlined in Section 2.5.1 of the CEMP, Fulton Hogan does not intend on using construction compound A, so there will be no associated impact to trees or arboreal fauna connectivity in this area from Fulton Hogan's activities.
BD10	The location of trees to be retained in the construction footprint would be confirmed during detailed design and incorporated in the flora and fauna management plan, landscape plan and re-vegetation management plan.	Detailed Design Appendix A, part B, point 4 Appendix B section B3 Clearing Procedure, point 3. Permanent revegetation design requirements are addressed by way of the Landscape Design Drawings (detailed design documentation). See Chapter 6 mitigation measure ID FFMM6.
BD11	Native vegetation will be re-established in accordance with a revegetation management plan prepared in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 3: Re-establishment of native vegetation) (RTA 2011a). The re-vegetation management plan will use suitable species from the indigenous vegetation communities present at the site to replace habitat for threatened species including Grey-headed Flying-fox.	Permanent revegetation design requirements are addressed by way of the Landscape Design Drawings (detailed design documentation). See Chapter 6 mitigation measure ID FFMM6. The FFMP addresses temporary revegetation during the construction phase only. Refer to Chapter 6 mitigation measure ID FFMM22, FFMM27.
Potential for spread of exotic species, or spread of pathogens		

ID No.	Revised environmental management measure	Document reference
BD12	Protocols for preventing or minimising the spread of noxious and environmental weeds will be developed and implemented in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 6: Weed Management) (RTA 2011a).	Chapter 6 mitigation measure ID FFMM2, FFMM21, FFMM22, FFMM23, FFMM24, FFMM25. Appendix E section E2 Scope.
BD13	Protocols for preventing the introduction and/or spread of disease causing agents such as bacteria and fungi will be developed and implemented in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 7: Pathogen Management) (RTA 2011a).	Chapter 6 mitigation measure ID FFMM2, FFMM21, FFMM22, FFMM23, FFMM24, FFMM25. Appendix E section E2 Scope. Appendix G
Impacts to fauna and fauna habitat		
BD14	Fauna handling will be conducted in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 9: Fauna handling) (RTA 2011a).	Section 3.2 Appendix B section B2 Scope.
BD15	Habitat will be replaced or re-instated in accordance with Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 5: Reuse of woody debris and bushrock and Guide 8: Nest boxes) (RTA 2011a).	Chapter 6 mitigation measure ID FFMM2, FFMM11, FFMM12, FFMM13.
BD16	Clearing of hollow-bearing trees will be carried out during periods which avoid breeding and hibernation seasons for threatened hollow-dependant fauna species (particularly the Powerful Owl (Ninox strenua) and Squirrel Glider (Petaurus norfolcensis)) where practicable.	Appendix B section B3 Clearing Procedure, first paragraph.
BD17	All permanent lighting will be designed to minimise light spill to surrounding habitat as far as practicable.	Detailed Design
BD18	Down-lights and motion sensor lighting will be used where possible during construction in order to reduce light spill to surrounding habitat.	Chapter 6 mitigation measure ID FFMM29.
Fragmentation of identified biodiversity links and habitat corridors		
BD19	The fauna connectivity strategy will be finalised during detailed design to minimise impacts to fauna movement, in particular the Squirrel Glider.	Detailed Design

ID No.	Revised environmental management measure	Document reference
BD20	Connectivity measures will be implemented in accordance with the Wildlife Connectivity Guidelines for Road Projects (Roads and Maritime, in preparation).	Consideration will be given to the *Wildlife Connectivity Guidelines for Road Projects* during detailed design after this document has been finalised by TfNSW and made available.
Aquatic habitat impacts		
BD21	Aquatic habitat will be protected in accordance with Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 10: Aquatic habitats and riparian zones) (RTA 2011a), standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013 (Department of Primary Industries 2013) and with reference to DPI Water Guidelines for Controlled Activities on Waterfront Land.	Chapter 6 mitigation measure ID FFMM18, FFMM19, FFMM20. Section 3.2
BD22	The realignment of the northern branch of watercourse 2 will be designed to behave in a similar hydrologic and geomorphic manner as existing conditions and encourage native revegetation.	Detailed Design
BD23	Native vegetation will be re-established around the realignment of the northern branch of watercourse 2 in accordance with a re-vegetation management plan prepared in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 3: Re-establishment of native vegetation) (RTA 2011a).	Permanent revegetation design requirements are addressed by way of the Landscape Design Drawings (detailed design documentation). See Chapter 6 mitigation measure ID FFMM6. The FFMP addresses temporary revegetation during the construction phase only.
Impacts to native vegetation		
BD24	Roads and Maritime will carry out further consultation with Newcastle City Council during detailed design regarding construction compounds D and E which are located in Jesmond Park to consider management measures required to minimise potential impacts to the area.	Detailed Design

4. Existing environment

This Chapter provides a brief summary of what is known about flora and fauna within and adjacent to the project based on information provided in Section 7.2 of the EIS as amended by the documents listed in CoA A1.

4.1. Threatened flora species

One threatened flora species, listed as Vulnerable under the TSC Act (now the BC Act) and Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was recorded within the project boundary/construction footprint (distinct from the 'study area') during field surveys (SPIR Appendix B, p100), namely:

- Black-eyed Susan (*Tetratheca juncea*).

The SPIR (Appendix B p100) identified 846 clumps within the construction footprint that would be subject to direct impacts. The locations where Black-eyed Susan (*Tetratheca juncea*) was recorded in the overall study area are represented by yellow stars on Figure 1 and Figure 2.

It is noted that Small Flower Grevillea (Grevillea parviflora subsp. parviflora) and Magenta Lilly Pilly (Syzygium paniculatum) both occur outside of the project boundary and will not be impacted by the project (SPIR Appendix B, p117).

No threatened flora species were identified within the modification 1 area (Modification 1 Report, pv).

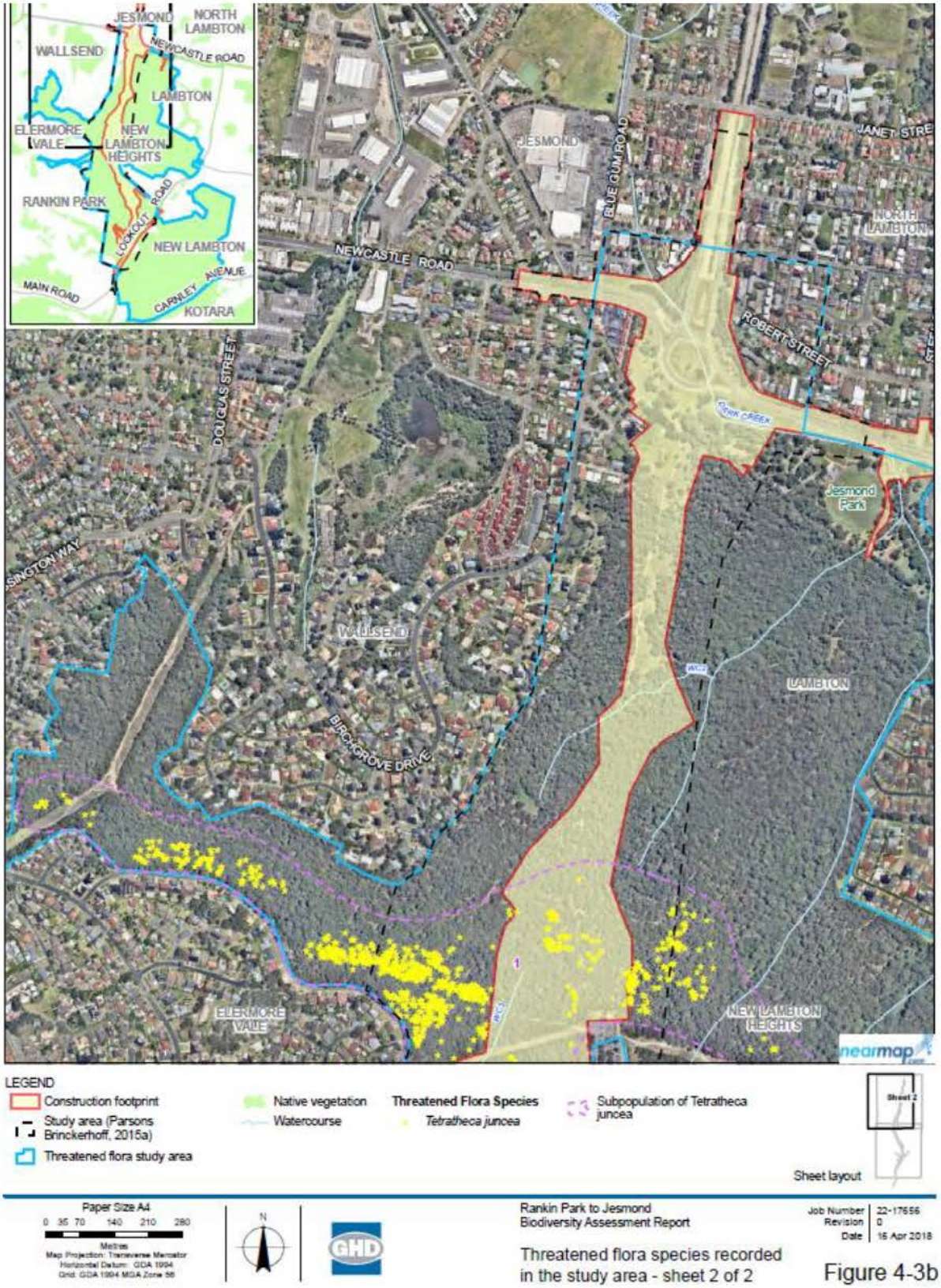

Figure 1: Locations of Black-eyed Susan (*Tetratheca juncea*) recorded in the study area – northern end of the project (SPIR Appendix B, p103)

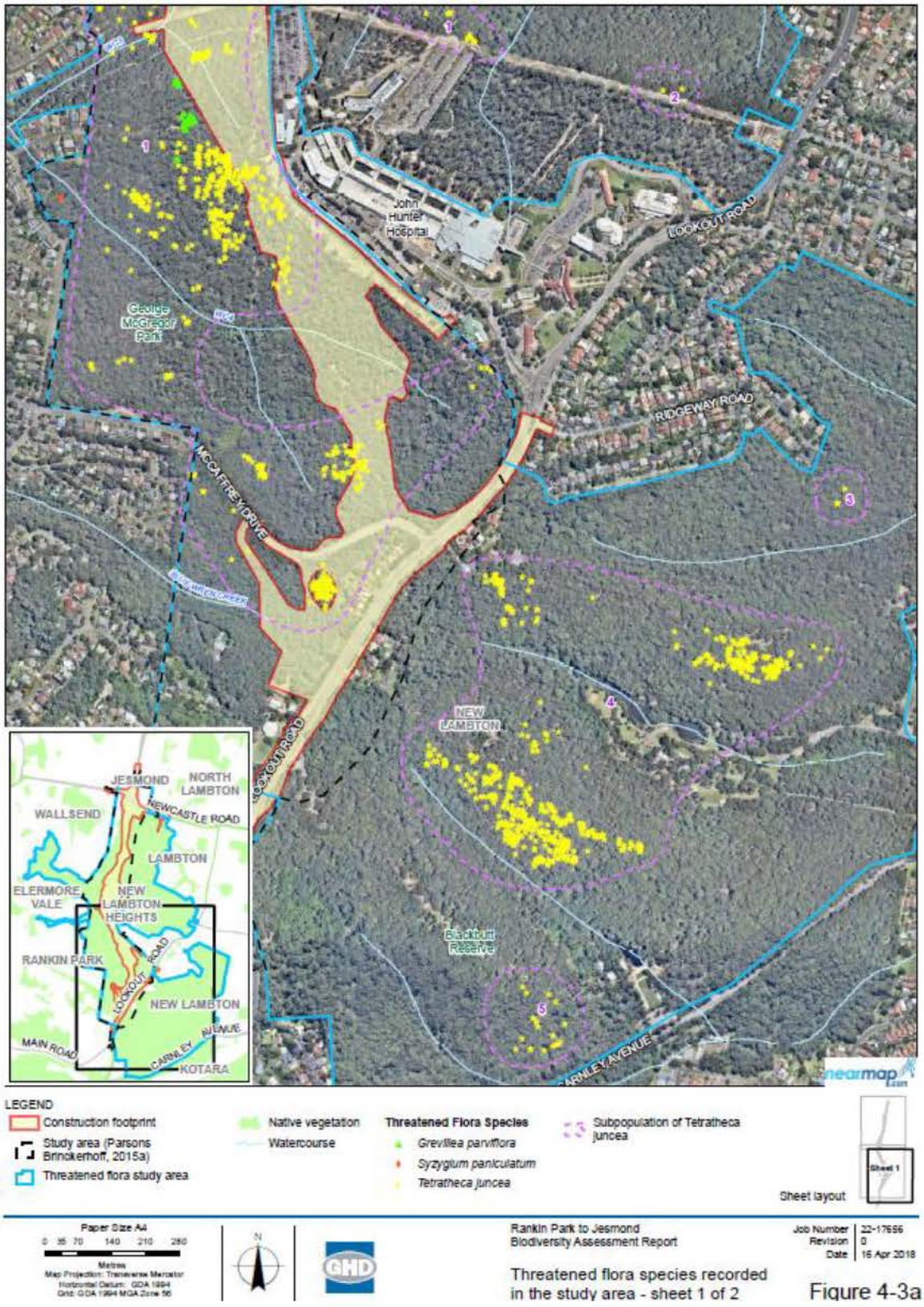

Figure 2: Locations of Black-eyed Susan (*Tetratheca juncea*) recorded in the study area – southern end of the project (SPIR Appendix B, p102)

4.2. Native vegetation communities

The SPIR (Appendix B p135) as amended by the Modification 1 Report (p6) identified clearing of about 43.7 hectares of native vegetation within the project boundary, including:

- About 4.4 hectares of Plant Community Type (PCT) Blackbutt - Turpentine - Sydney Blue Gum mesic tall open forest on ranges of the Central Coast (PCT code: HU782).
- About 12.4 hectares of PCT Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest of the Central Coast (PCT code: HU804).
- About 7.1 hectares of Lower Hunter Spotted Gum Ironbark Forest endangered ecological community listed under the former NSW Threatened Species Conservation Act 1995 (now replaced by the *Biodiversity Conservation Act 2016*). This corresponds with PCT – Spotted Gum – Red Ironbark – Grey Gum shrub – grass open forest of the Lower Hunter (PCT code: HU806).
- About 16.8 hectares of PCT Smoothbarked Apple – Red Bloodwood – Brown Stringybark – Hairpin Banksia heathy open forest of coastal lowlands (PCT code: HU833).
- About 2.8 hectares of PCT Smoothbarked Apple - Turpentine - Sydney Peppermint heathy woodland on sandstone ranges of the Central Coast (PCT code: HU841).
- About 0.2 hectares of PCT Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion (PCT code: 1071). This native vegetation community is associated with an artificially created wetland at the centre of the Peatties Road ancillary facility site. However, as noted in Section 1.2, Fulton Hogan does not intend on using the Peatties Road ancillary facility site.

4.3. Threatened ecological communities (TECs)

The SPIR (pii) identified one TEC within the project area, listed as Endangered under the former *Threatened Species Conservation Act 1995* (now replaced by the *Biodiversity Conservation Act 2016*) and not listed under the EPBC Act, namely:

- Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions (Lower Hunter Spotted Gum Ironbark Forest TEC).

The SPIR (pii) identified about 7.1 hectares of this TEC which occurs within the construction footprint would be removed by the project.

The Lower Hunter Spotted Gum Ironbark Forest TEC is present in the north of the project and its extent is shaded orange and brown and hatched in Figure 3. The occurrence of Lower Hunter Spotted Gum Ironbark Forest TEC within the project area corresponds with the PCT Spotted Gum – Red Ironbark –Grey Gum shrub – grass open forest of the Lower Hunter (PCT code: HU806) (SPIR Appendix B p55).

No TECs were identified within the modification 1 area (Modification 1 Report, pv).

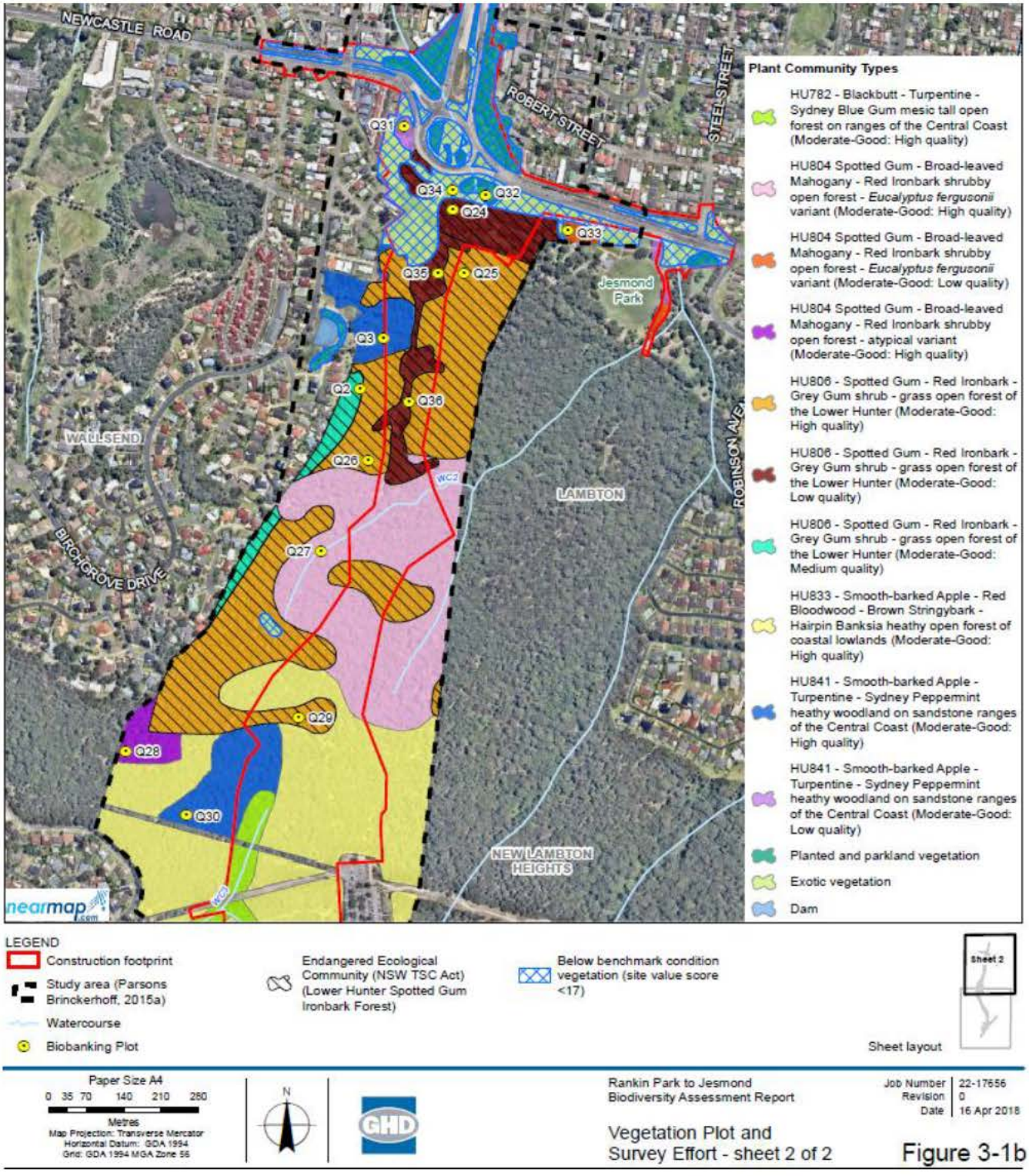

Figure 3: Plant community types/ Lower Hunter Spotted Gum Ironbark Forest TEC shaded orange and brown and hatched - northern end of project (SPIR Appendix B, p33)

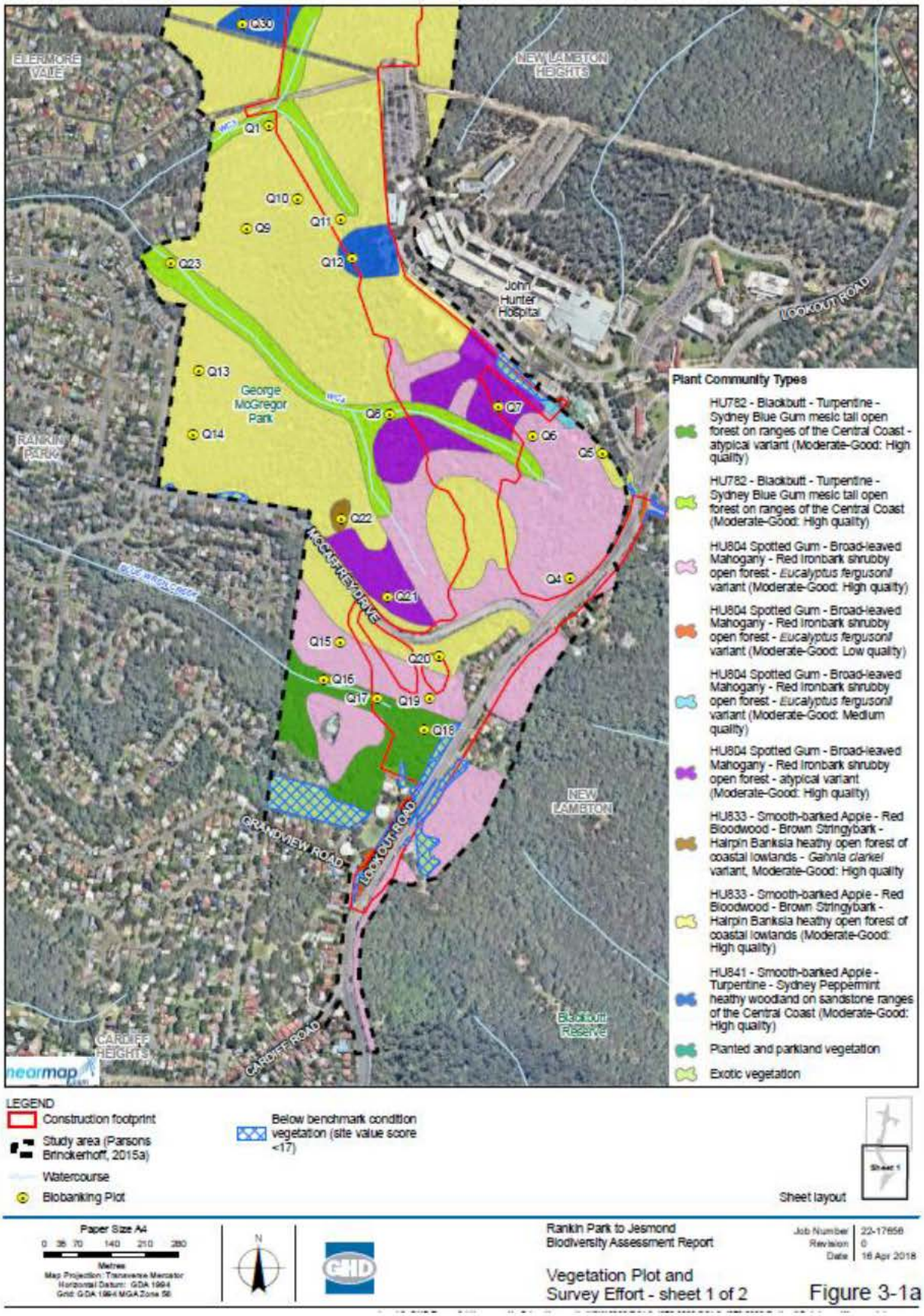

Figure 4: Plant community types – southern end of project (SPIR Appendix B, p32)

4.4. Noxious and environmental weeds

Seven flora species declared as noxious under the Noxious Weeds Act 1993 (NW Act) (now repealed and replaced by the *Biosecurity Act 2015*) for the City of Newcastle control area occur within the study area mostly along creek lines, next to roads and tracks and in close proximity to residential properties. Most of these are also listed as weeds of national significance. *Lantana camara* (Lantana) was identified at the site which is not considered a noxious weed within the Newcastle LGA but is listed as a weed of national significance and is also considered a significant environmental weed in the area (SPIR Appendix B, p25). Refer to Table 4.

Other highly invasive species that occur within the study area particularly along road verges and water bodies, include *Hyparrhenia hirta* (Coolatai Grass), *Chloris gayana* (Rhodes Grass), *Bidens pilosa* (Cobblers Pegs), *Sida rhombifolia* (Paddy's Lucerne), *Ligustrum sp*. (Privet) and *Setaria palmifolia* (Pigeon Grass) (Parsons Brinckerhoff 2015a) (EIS Appendix E, p21).

No additional noxious or environmental weeds were identified within the modification 1 area beyond those already mentioned above.

Table 4: Noxious weeds and weeds of national significance (SPIR Appendix B, p25)

Scientific name	Common name	Noxious weed category	Weed of national significance
Asparagus aethiopicus	Asparagus Fern	4 – Locally controlled weed *The plant must not be sold, propagated or knowingly distributed*	Yes
Ageratina adenophora	Crofton Weed		No
Asparagus officinalis	Asparagus		No
Rubus fruiticosus	Blackberry		Yes
Senecio madagascariensis	Fireweed		Yes
Chrysanthemoides monilifera subsp. *rotundata*	Bitou Bush		Yes
Cortaderia selloana	Pampas Grass	3 – Regionally controlled Weed *The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed*	No
Lantana camara	Lantana	-	Yes

4.5. Terrestrial threatened fauna species

Threatened fauna species were recorded within the study area during field surveys (SPIR Appendix B, p105), including:

- Little Lorikeet (*Glossopsitta pusilla*) (i.e. blossom dependent fauna), listed as Vulnerable under the BC Act and Not listed under the EPBC Act.
- Little Bent-winged Bat (*Miniopterus australis*) (i.e. microbat) listed as Vulnerable under the BC Act and Not listed under the EPBC Act.
- Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) (i.e. microbat) listed as Vulnerable under the BC Act and Not listed under the EPBC Act. It is noted that this species has been renamed to the Large Bent-winged Bat (*Miniopterus orianae oceanensis*).
- Eastern Freetail-bat (*Micronomus norfolkensis*) (i.e. microbat) listed as Vulnerable under the BC Act and Not listed under the EPBC Act.
- Powerful Owl (*Ninox strenua*) (i.e. forest owl) listed as Vulnerable under the BC Act and Not listed under the EPBC Act.
- Squirrel Glider (*Petaurus norfolcensis*) (i.e. arboreal mammal) listed as Vulnerable under the BC Act and Not listed under the EPBC Act.
- Grey-headed Flying-fox (*Pteropus poliocephalus*) (blossom dependent fauna) listed as Vulnerable under the BC Act and Vulnerable under the EPBC Act.
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) (i.e. microbat) listed as Vulnerable under the BC Act and Not listed under the EPBC Act.
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) (i.e. microbat) listed as Vulnerable under the BC Act and Not listed under the EPBC Act.

Of these species, only the Squirrel Glider (*Petaurus norfolcensis*), Powerful Owl (*Ninox strenua*), Little Lorikeet (*Glossopsitta pusilla*), Little Bent-winged Bat (*Miniopterus australis*) and Large Bent-winged Bat (*Miniopterus orianae oceanensis*) were identified within the project boundary/construction footprint. Locations of threatened fauna species are shown on Figure 5 and Figure 6. In addition, the Little Bent-winged Bat (*Miniopterus australis*) and Large Bent-winged Bat (*Miniopterus orianae oceanensis*) were recorded inside the Dark Creek culvert about 45 metres downstream of the inlet (Jesmond Park side) during a targeted survey in October 2019.

No threatened fauna species were recorded within the modification 1 area (Modification 1 Report, pv).

4.5.1. EPBC Act listed threatened fauna species - Grey-headed Flying-fox *(Pteropus poliocephalus)*

As identified in the Flora and Fauna Construction Monitoring Program (TfNSW, p23), the Grey-headed Flying-fox (GHFF) is a highly mobile blossom nomad and utilises a broad range of vegetation in irregular patterns. GHFF are capable of flying up to 50 km from their roost for foraging. As such, recording presence/absence of individuals foraging within vegetation surrounding the project boundary would not provide meaningful data (Flora and Fauna Construction Monitoring Program,TfNSW p23).

However, a nationally recognised GHFF camp is located around 200 metres from the southern extent of the project in Blackbutt Reserve. This GHFF camp is a locally important population, known to support breeding females and is the only continuously occupied camp in the Lower Hunter region (Flora and Fauna Construction Monitoring Program, TfNSW p32).

As identified in the Flora and Fauna Construction Monitoring Program (TfNSW, p32), the GHFF camp in Blackbutt Reserve would not be directly impacted by the project, however considering it is located around 200 metres from the southern extent of the Project, there is potential that construction works may increase noise and vibration above existing levels. However, due to the distance of the camp from the project boundary, the scope of works that would be undertaken around the boundary (i.e. no major earthworks or clearing) and the existing level of noise and vibration caused by traffic along Lookout Road, the potential for this impact is considered to be negligible (Flora and Fauna Construction Monitoring Program, TfNSW p32).

Regardless, monitoring will be undertaken in accordance with the Flora and Fauna Construction Monitoring Program to ensure the species is protected and to provide data on potential project impacts to the GHFF camp. The Flora and Fauna Construction Monitoring Program contains specific requirements regarding the GHFF camp including noise trigger levels and a site inspection at the camp if Noise Management Level (NML) + 10 dBA is reached. A summary of the monitoring approach is outlined in Table 7.1 of the Flora and Fauna Construction Monitoring Program, with monitoring locations shown in Figure 7.1c of the same Program.

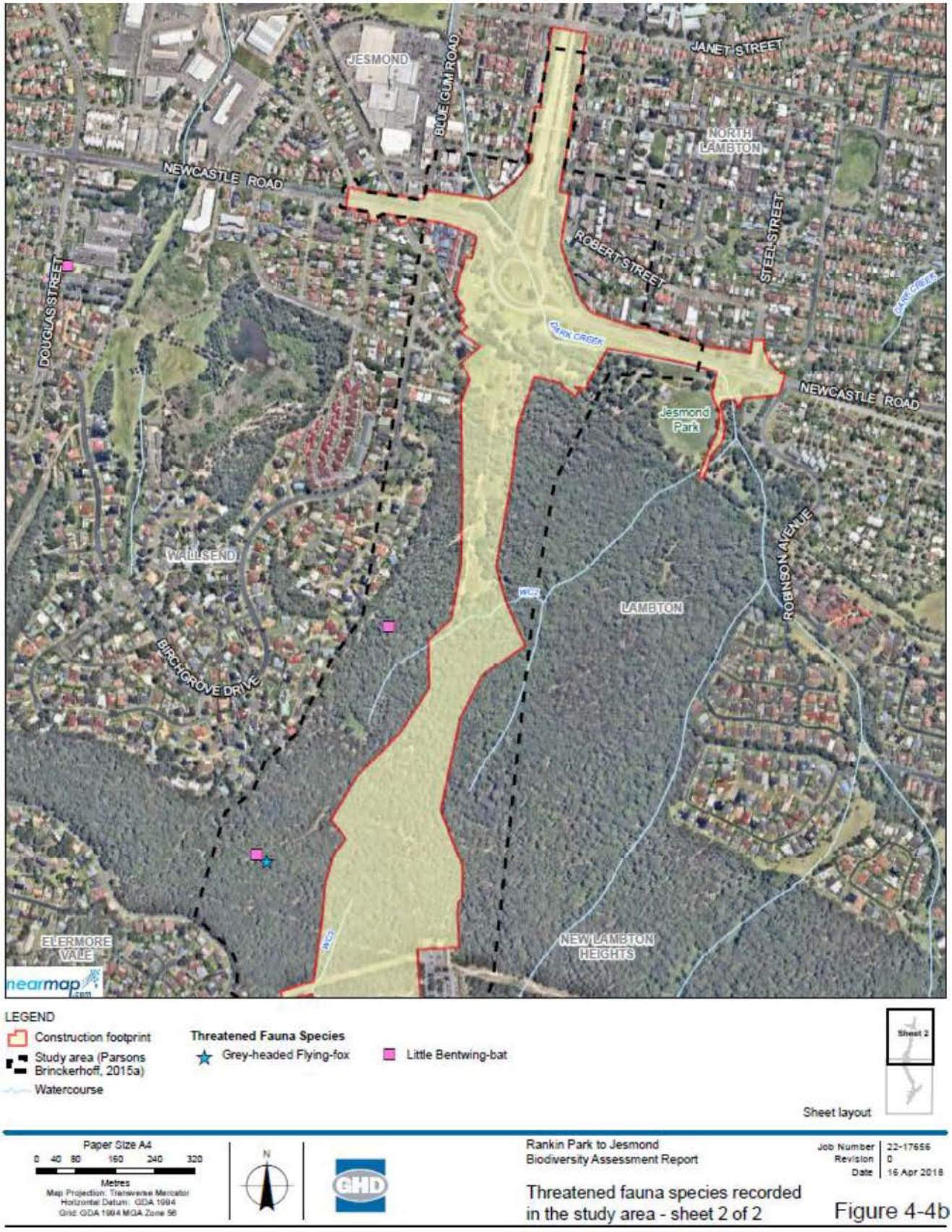

Figure 5: Locations of threatened fauna species recorded in the study area – northern end of the project (SPIR Appendix B p.114)

Figure 6: Locations of threatened fauna species recorded in the study area – southern end of the project (SPIR Appendix B p. 113

4.6. Terrestrial Fauna Habitats

The main fauna habitats that occur in the study area are dry open forest, wet sclerophyll forest, aquatic habitat and cleared land with scattered trees, as shown on Figure 7 (EIS Volume 2 p220).

Dry open forest supports a range of fauna habitats including hollow bearing trees for birds and arboreal mammals, including Powerful Owl breeding and roost sites and feed tree species for nectarivorous species such as the Grey-headed Flying-fox (*Pteropus poliocephalus*) and Squirrel Glider (*Petaurus norfolcensis*). Wet sclerophyll forest is present in the deep gullies of the study area and provides cover and foraging habitats for wet forest birds and other small mammals and roosting habitat for arboreal mammals and forest owls (EIS Volume 2 p220).

Additionally, a relatively high abundance of habitat trees was identified in the study area, about 450 hollow-bearing trees containing about 1312 hollows, with an additional 17 potential Powerful Owl roost trees and five known Powerful Owl roost trees identified in the construction footprint. All aquatic habitats in the study area are ephemeral and likely to provide habitat for only a limited range of commonly occurring aquatic species (EIS Volume 2 p220).

Planted and parkland vegetation is likely to provide foraging habitat for common species typical of urban parklands and gardens (eg birds, skinks and possums) (EIS Volume 2 p220).

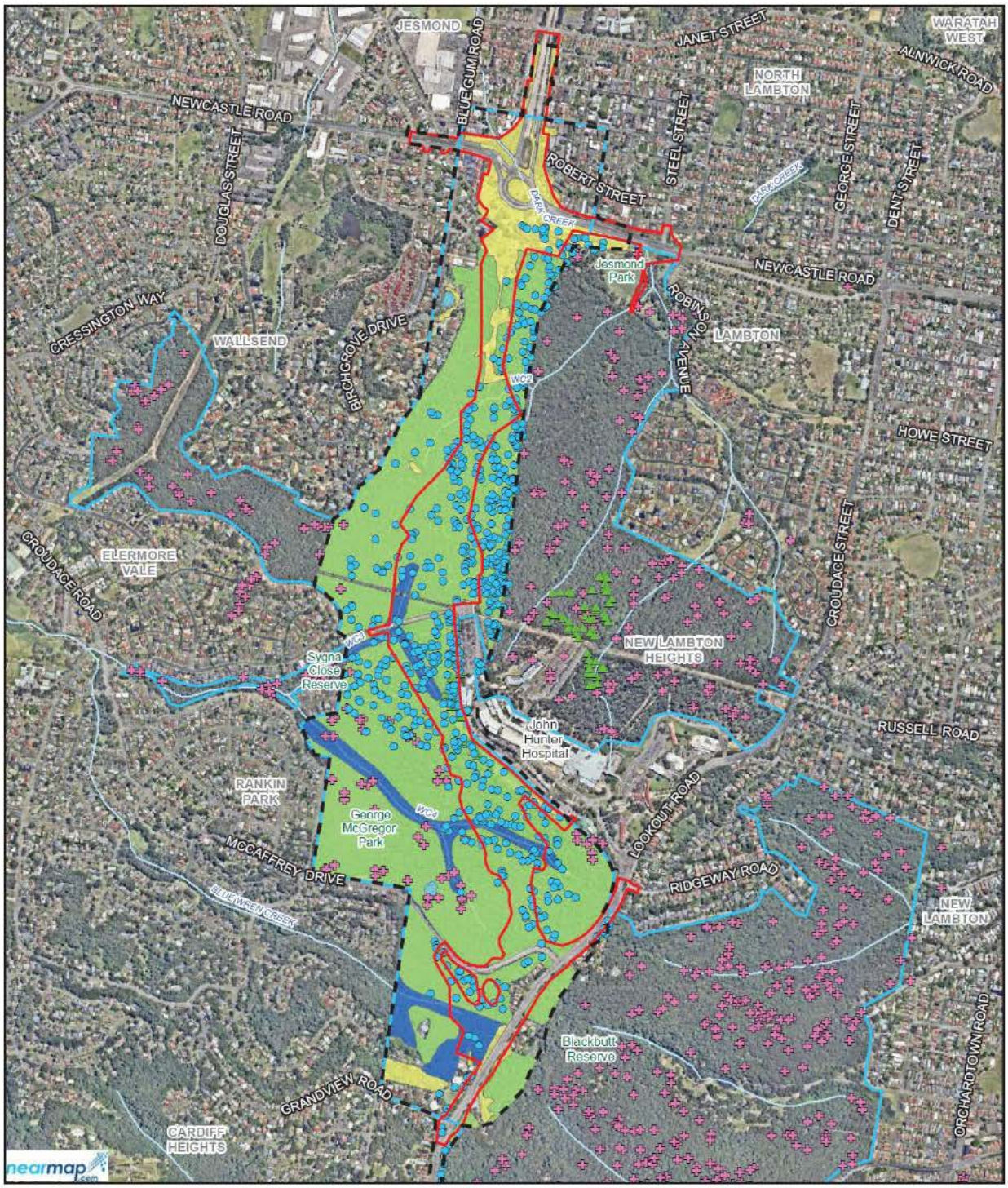

Figure 7: Main fauna habitats recorded in the study area (EIS Volume 2 p223)

4.7. Wetlands

There are no wetlands within the project area. The Hunter Estuary Wetlands Ramsar site (listed under the EPBC Act) occur about six kilometres downstream of the project (SPIR Appendix B, p145).

4.8. Biodiversity links

The SPIR (Appendix B, p23) identified that vegetation within the project area has limited connectivity to large expanses of native vegetation in the wider locality. Directly to the east is Blackbutt Reserve, which is separated from the project area by Lookout Road, a major road that would constitute a hostile gap for many fauna species. To the west is a network of patchy vegetated areas interspersed around the urban environment that provides some connectivity to Blue Gum Hills Regional Park located about five kilometres from the project area.

Although there are no state, regional or biodiversity links as defined by the FBA mapped within the project area, a sub-regional fauna corridor occurs through the construction footprint (DECCW 2012). Parsons Brinckerhoff (2015a) has also mapped a local corridor link running north-south through the project area. It is likely that a range of fauna species would use this corridor to move through the study area. The DECCW sub-regional fauna corridor and local biodiversity corridor link mapped by Parsons Brinckerhoff are shown on Figure 8 and Figure 9.

Habitat in the construction footprint forms part of a large isolated patch of remnant bushland surrounded by urban development, including the John Hunter Hospital precinct. Lookout Road currently forms a barrier between George McGregor Park and Blackbutt Reserve (refer to Figure 9).

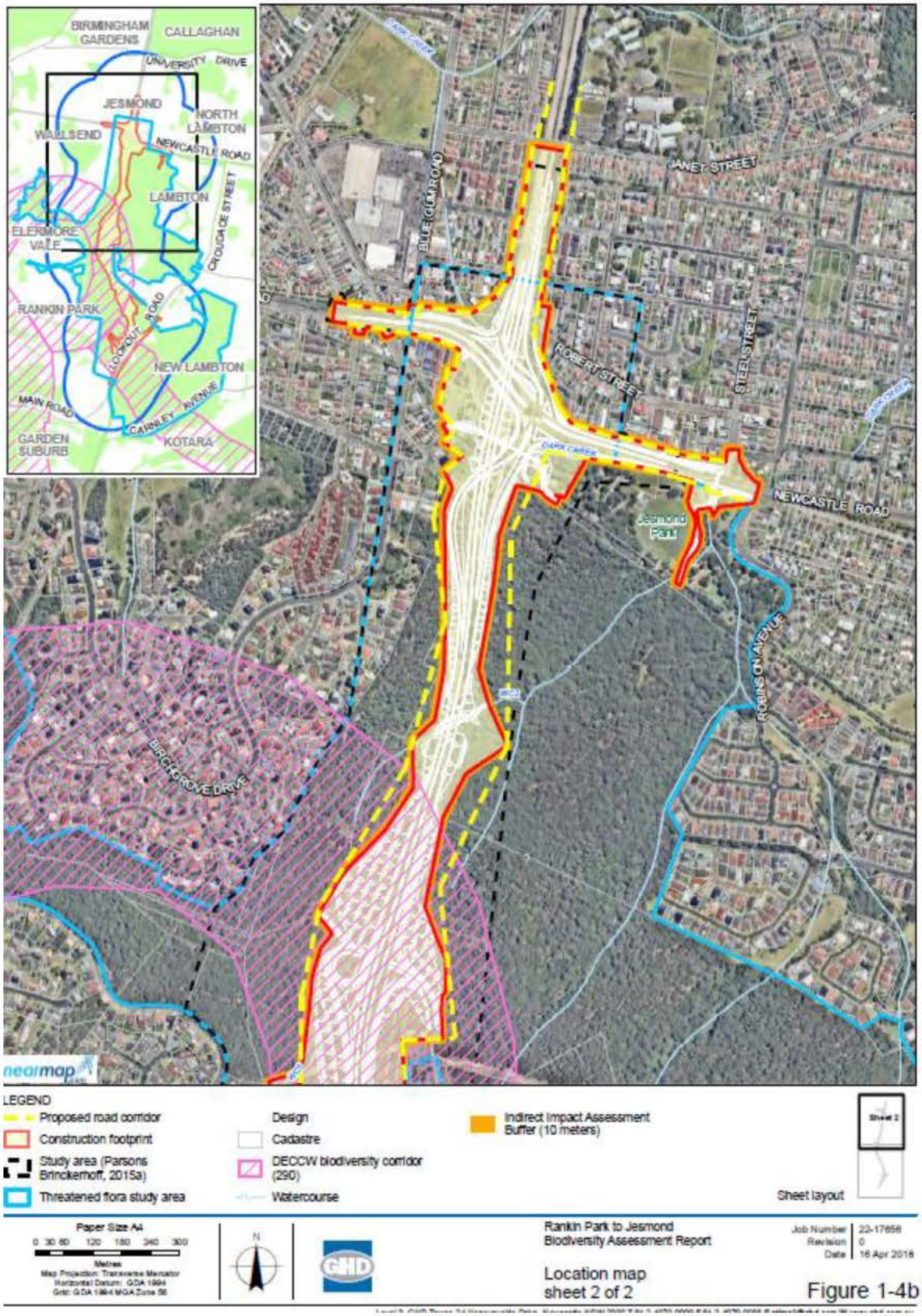

Figure 8: Biodiversity links – northern end of project (SPIR Appendix B, p10)

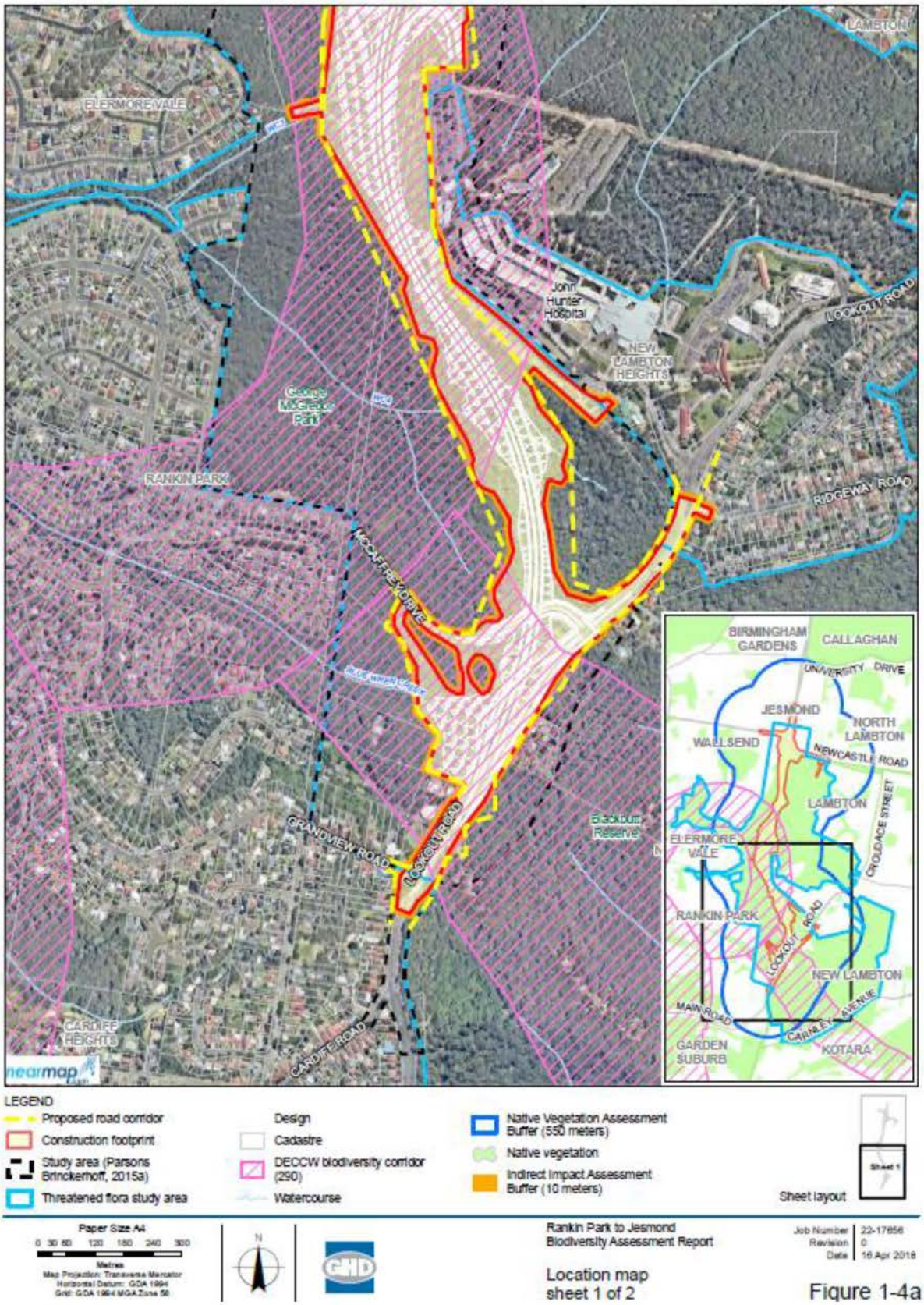

Figure 9: Biodiversity links – southern end of project (SPIR Appendix B, p9)

4.9. Groundwater dependent ecosystems

Two vegetation types considered to be intermittently dependent on groundwater have been identified within the project area at the southern end, as part of the SPIR (Appendix B p57). These are shown in Table 5 and Figure 10.

Vegetation within the project area identified as groundwater dependent ecosystems (GDEs) include the two variants of Blackbutt – Turpentine – Sydney Blue Gum mesic tall open forest on ranges of the Central Coast (PCT code: HU782). These PCTs are both riparian communities and are likely to rely on surface water runoff and accessing groundwater when groundwater levels are high and were therefore classified as being intermittently dependent on groundwater (Parsons Brinkerhoff 2015a) (SPIR Appendix B, p57). This community (PCT code: HU782) is the only riparian vegetation community identified in the project area (SPIR Appendix B, p57).

Table 5: Groundwater dependent ecosystems within the project boundary (SPIR Appendix B, p58)

Vegetation community	GDE type	Class	Habitat	Dependency on groundwater [1]
HU782 Blackbutt – Turpentine – Sydney Blue Gum mesic tall open forest on ranges of the Central Coast – *Syncarpia glomulifera* variant	Riparian and terrestrial vegetation	T1 – Riparian vegetation community	Terrestrial	Intermittently
HU782 Blackbutt – Turpentine – Sydney Blue Gum mesic tall open forest on ranges of the Central Coast – atypical variant	Riparian and terrestrial vegetation	T1 – Riparian vegetation community	Terrestrial	Intermittently

1 Known groundwater dependency as per (Eamus et al. 2006).

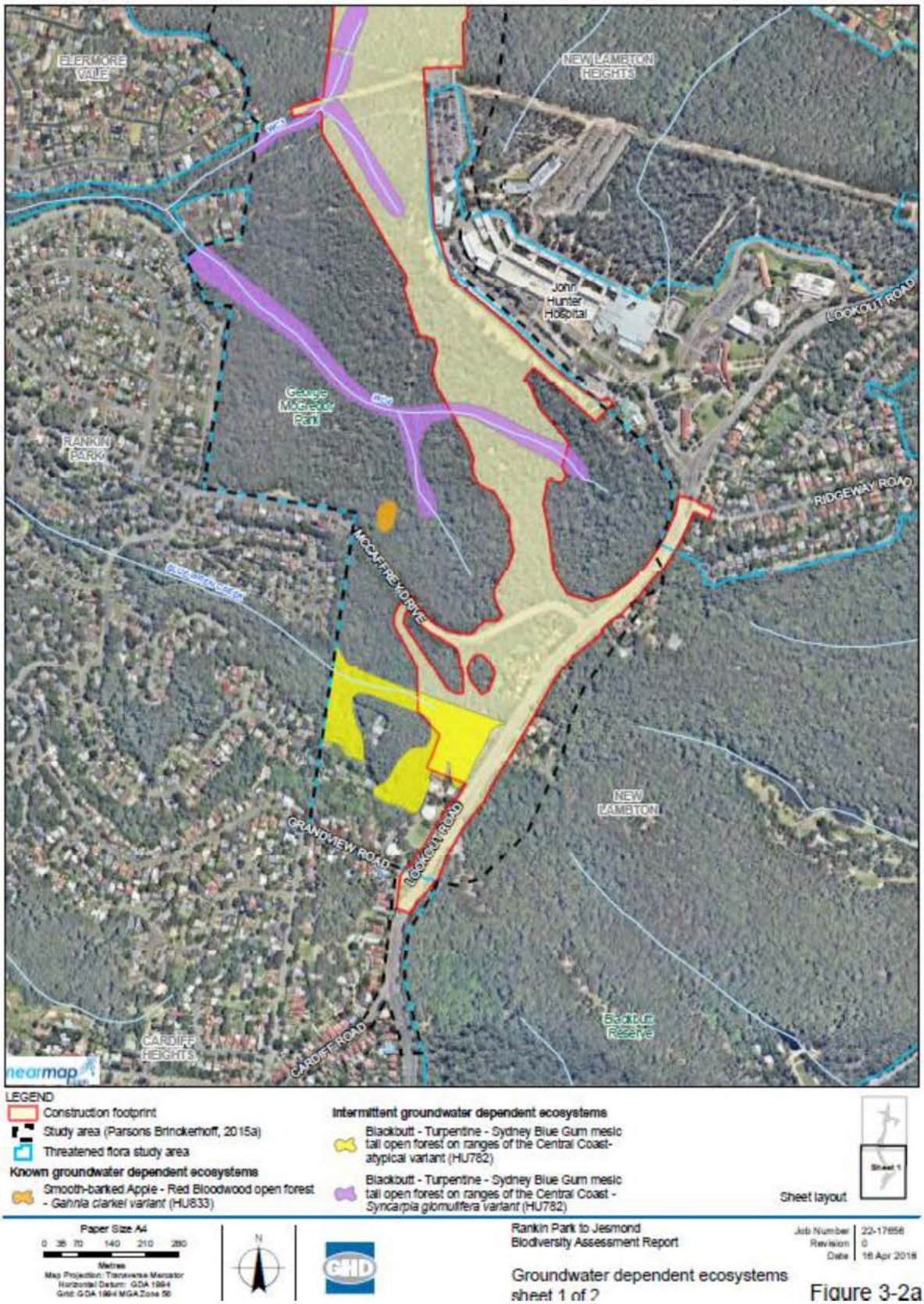

Figure 10: Intermittent groundwater dependent ecosystems within the project area – southern end of project (SPIR Appendix B, p59)

4.10. Aquatic flora and fauna

Aquatic habitats identified in the study area include Blue Wren Creek, Styx Creek, Dark Creek, several unnamed tributaries of Ironbark Creek, and a small dam located in the north-west corner of the study area (SPIR Appendix B, p115). It is noted that the dam is not located within the project boundary and has been constructed to collect runoff from the surrounding urban development (EIS Appendix E, p20).

The watercourses in the study area are classified as Class 4 – unlikely fish habitat in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management – Update 2013 (Department of Primary Industries 2013) (EIS Volume 2, p221).

The identified aquatic habitats, excluding the dam (outside the project boundary), were not observed to support native aquatic or wetland vegetation, and are not considered key fish habitat in accordance with the NSW DPI Fisheries Policy and Guidelines for Fish Habitat Conservation and Management – Update 2013 (Department of Primary Industries 2013) (EIS Volume 2, p221).

All aquatic habitats identified in the study area are ephemeral and are characterised by rocky and gravel based substrates. They contain moderate riparian vegetation cover (which are characterised by the identified intermittent groundwater dependent ecosystems (Section 4.9) and small pool sections which retained water for short periods (less than three weeks) following rainfall events. Due to the ephemeral nature of these water bodies, the aquatic habitats contained in the study area are likely to provide habitat for only a limited range of common aquatic animals EIS Volume 2, p221).

No endangered aquatic communities, aquatic fauna or marine vegetation listed under the FM Act or EPBC Act occur in the study area and no significant impacts on riparian vegetation or habitats downstream of the project site are anticipated as a result of the project. There would be no impact on key fish habitat as a result of the project. (SPIR Appendix B, p115).

No habitat for aquatic species was identified within the modification 1 area (Modification 1 Report, p37).

4.11. Pathogens

The EIS (Appendix E, p188) identified that the project has the potential to introduce pathogens such as Phytophthora (*Phytophthora cinnamomi*) and Myrtle Rust (Uredo rangelii) within the study area through vegetation disturbance and increased visitation unless appropriate mitigation measures are put in place. Additionally, spread of Chytrid fungus (*Batrachochytrium dendrobatidis*) is also possible, given the presence of drainage lines in the study area but is unlikely as these drainage lines are relatively small and ephemeral (EIS Appendix E, p188).

Where present, Phytophthora and Myrtle Rust may result in the dieback or modification of native vegetation and damage to fauna habitats. Chytrid fungus affects both tadpoles and adult frogs and can wipe out entire populations once introduced into an area.

No evidence of the abovementioned pathogens was observed during EIS field surveys.

Mitigation measures detailed in Chapter 6 of this FFMP will be implemented to minimise the potential for any impacts such as pathogen introduction as a result of the project. In addition, the protocols detailed in the Pathogen management procedure (refer to Appendix G) will be implemented to minimise the threat to native species associated with the introduction and/or spread of pathogens.

5. Environmental aspects and impacts

The key construction activities and the associated potential sources of flora and fauna impact are identified through a risk management approach. The consequence and likelihood of each activity's impact on the environment has been assessed to prioritise its significance. The results of this risk assessment are included in Appendix A3 of the CEMP.

Ongoing environmental risk analysis will be undertaken during construction through regular inspections, monitoring and auditing as described in Chapter 7. This will ensure that issues requiring management (including cumulative impacts) are appropriately managed.

5.1. Impacts

Key potential impacts associated with the project identified in the EIS as amended by the documents listed in CoA A1 include:

- Removal of about 846 clumps of Black-eyed Susan (*Tetratheca juncea*) (SPIR Appendix B, piii)
- Removal of five known and about 17 potential Powerful Owl roost trees (SPIR Appendix B, piii)
- Removal of about 320 identified hollow-bearing trees within known Squirrel Glider (*Petaurus norfolcensis*) habitat (SPIR Appendix B, piii)
- Clearing of about 43.7 hectares of native vegetation, including about 7.1 hectares of Lower Hunter Spotted Gum Ironbark Forest endangered ecological community (EEC) listed under the former TSC Act (now replaced by the BC Act) as provided in Table 6.

In accordance with CoA E3, impacts to plant community types (PCTs) must not exceed those identified in the documents listed in CoA A1, as summarised in Table 6.

Further to CoA E2 and CoA E3, Fulton Hogan will minimise clearing of native vegetation and Black-eyed Susan (*Tetratheca juncea*) in accordance with the requirements of G40 clause 2.6.

Potential impacts on biodiversity (including PCTs and Black-eyed Susan (*Tetratheca juncea*)) as a result of the project will be managed via the adoption of the mitigation measures provided in Chapter 6.

Table 6: Direct native vegetation impacts as identified in the documents listed in CoA A1

Native vegetation community	Area (ha) assessed to be impacted by the project as identified in the documents listed in CoA A1
HU782 – Blackbutt - Turpentine - Sydney Blue Gum mesic tall open forest on ranges of the Central Coast	4.4
HU804 - Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest	12.4
HU806 - Spotted Gum – Red Ironbark – Grey Gum shrub – grass open forest of the Lower Hunter (Note: this community is consistent with Lower Hunter Spotted Gum Ironbark Forest EEC)	7.1
HU833 – Smooth-barked Apple – Red Bloodwood – Brown Stringybark – Hairpin Banksia heathy open forest of coastal lowlands	16.8
HU841 – Smooth-barked Apple - Turpentine - Sydney Peppermint heathy woodland on sandstone ranges of the Central Coast	2.8
PCT 1071 - *Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion*	0.2

Native vegetation community	Area (ha) assessed to be impacted by the project as identified in the documents listed in CoA A1
TOTAL area of native vegetation assessed to be impacted	**43.7**

6. Environmental mitigation measures

Specific mitigation measures to address impacts on flora and fauna are outlined in Table 7.

Table 7: Flora and fauna mitigation measures

ID No.	Mitigation measure	Timing		Responsibility
		PC[1]	C[2]	
GENERAL				
FFMM1	Manage flora and fauna sites identified to be retained and protected as 'environmentally sensitive areas'. In this regard, erect exclusion fencing and signage to ensure that environmentally sensitive areas are protected in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 2: Exclusion zones) (RTA 2011a) and map these sites on the Sensitive Area Plans contained in Appendix A6 of the CEMP. *It is noted that for sites located outside of the project boundary, delineation and enforcement of the project boundary is required rather than individual identification of those sites.*	✓	✓	Project/ Site Engineers Foreman Environmental Manager
FFMM2	Clear vegetation in accordance with an EWMS for Clearing and Grubbing. This will include requirements to: ▪ identify clearing limits by placing clearly visible markers placed at 25m intervals on each side of the road formation and bridges, as required by G40 ▪ retain existing trees, grasses and other ground cover within 15 m of rivers, creeks and watercourses and in all drainage lines until immediately before construction commences in the area (G40 Clause 2.4.2) ▪ complete pre-clearing inspections (under the supervision of the Project Ecologist) to confirm the location of hollow bearings trees, habitat trees, woody debris, bushrock, TECs, threatened flora and fauna, weeds, riparian vegetation, potential roost sites and trees that require directional felling to avoid damage to environmentally sensitive areas for example. ▪ allow TfNSW to identify and mark any suitable bridge timber trees that must be felled, that will become the property of TfNSW. Any identified bridge timber trees must be felled by cutting off the stump, lower branches and crown from the trees and cross cutting to the lengths directed by TfNSW. Bridge timber must be neatly stockpiled, as directed by TfNSW in accordance with G40 Clause 2.4.4. ▪ complete a Pre-clearing permit (refer to Appendix A) prior to clearing		✓	Project/ Site Engineers Foreman Environmental Manager

ID No.	Mitigation measure	Timing		Responsibility
		PC[1]	C[2]	
	▪ adopt a two-stage approach to clearing (refer to Appendix B section B3) ▪ carry out clearing in a manner that prevents the mixing of topsoil with woody vegetation debris, as required by G40 Clause 2.4.2 ▪ incorporate non-woody vegetation (groundcovers) into topsoils as organic nutrients for use in rehabilitation, as required by G40 Clause 2.4.2 ▪ reuse mature tree trunks/ coarse woody debris/ felled habitat trees/ root balls in habitat enhancement and rehabilitation work where practicable, and ▪ reuse suitable felled timber for fauna furniture. *It is noted that EWMS are prepared progressively throughout construction and prior to the commencement of the relevant activities, separate to the CEMP/ FFMP approval process. Refer to CEMP Section 3.7 for additional details about EWMS.*			
LOSS OF UNEXPECTED TEC/ THREATENED SPECIES				
FFMM3	In the event that a threatened species/ TEC is unexpectedly identified during pre-clearing inspection or construction, follow the *Unexpected threatened species/TECs procedure* provided in Appendix D.	✓	✓	Environmental Manager
FFMM4	In the event that a TEC/ threatened species is unexpectedly identified during pre-clearing survey or construction, incorporate any specific procedures to deal with that species (e.g. relocation, translocation and/or management and protection measures) into this FFMP as required.	✓	✓	Foreman Environmental Coordinator
FFMM5	Where a TEC/ threatened species is unexpectedly identified during pre-clearing inspections or during construction, update Sensitive Area Plans (contained in Appendix A6 of the CEMP) with this new information.	✓	✓	Environmental Manager
LOSS OF NATIVE VEGETATION/ TEC/ FAUNA HABITAT				
FFMM6	Complete final/ permanent landscaping/revegetation in accordance with the Landscape Design Drawings to ensure local native species are used.		✓	Foreman Environmental Manager
FFMM7	Limit clearing of native vegetation and mature trees, particularly hollow-bearing trees to the minimum area necessary to construct the project works.	✓	✓	Foreman Environmental Coordinator
FFMM8	Use existing access roads and tracks for site access where possible.	✓	✓	Foreman

ID No.	Mitigation measure	Timing		Responsibility
		PC[1]	C[2]	
				Environmental Manager
FFMM9	Erect exclusion fencing and signage (or permanent boundary fencing) for the portion of the following sites adjoining the clearing boundary to avoid inadvertent impacts: ▪ Black-eyed Susan (*Tetratheca juncea*) as shown in Figure 1 and Figure 2. ▪ PCT code: HU782 - Blackbutt - Turpentine - Sydney Blue Gum mesic tall open forest on ranges of the Central Coast in Figure 3 and Figure 4. ▪ PCT code: HU804 - Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest of the Central Coast in Figure 3 and Figure 4. ▪ PCT code: HU806 – Spotted Gum – Red Ironbark – Grey Gum shrub – grass open forest of the Lower Hunter (TEC) in Figure 3. ▪ PCT code: HU833 - Smoothbarked Apple – Red Bloodwood – Brown Stringybark – Hairpin Banksia heathy open forest of coastal lowlands in Figure 3 and Figure 4. ▪ PCT code: HU841 - Smoothbarked Apple - Turpentine - Sydney Peppermint heathy woodland on sandstone ranges of the Central Coast in Figure 3 and Figure 4.	✓	✓	Foreman Environmental Manager
FFMM10	Restrict equipment storage and stockpiling of resources to designated areas within compound sites in cleared land and outside the dripline of trees to be retained, to minimise potential impacts on native vegetation.	✓	✓	Project / Site Engineers Environmental Coordinator
FFMM11	Prior to work that impacts native vegetation, consult with local community, Local Land Services, Landcare groups and relevant public authorities to determine if there is an interest for the reuse of suitable timber (e.g. salvaged hollows) and root balls in habitat enhancement and rehabilitation work.		✓	Project / Site Engineers Environmental Coordinator
FFMM12	During vegetation clearing, retain mature tree trunks/ coarse woody debris/ felled habitat trees/ salvaged hollows and root balls for reuse in habitat enhancement and rehabilitation work where there is a demonstrated demand for their reuse.	✓	✓	Project / Site Engineers Environmental Coordinator
FFMM13	Install replacement habitats to provide supplementary breeding habitat and shelter for hollow-dependent fauna where tree hollows are removed in accordance with the Replacement habitat strategy (to be prepared		✓	Project / Site Engineers Environmental Coordinator

ID No.	Mitigation measure	Timing		Responsibility
		PC[1]	C[2]	
	separately to this FFMP prior to the removal of vegetation during Construction).			
FFMM14	Install 70 per cent (70%) of replacement habitat at least one month prior to the removal of vegetation during Construction. Install the remainder of replacement habitat prior to Construction Completion.	✓	✓	Project / Site Engineers Environmental Coordinator
FFMM15	Prior to commencement of clearing and grubbing, provide access to the project by Landcare to enable salvage of Black-eyed Susan (*Tetratheca juncea*), following the implementation of clearing exclusion zones (G40 clause 2.4.1).		✓	Project / Site Engineers Environmental Coordinator
TERRESTRIAL FAUNA MORTALITY/ INJURY				
FFMM16	FFMM2 also applies	N/A	N/A	N/A
FFMM17	Where fauna is encountered that requires handling or rescue, follow the Fauna protection procedure contained in Appendix B.	✓	✓	Foreman Environmental Coordinator
LOSS OF AQUATIC/ MARINE HABITAT/ VEGETATION				
FFMM18	Retain stumps in riparian zones and aquatic habitats where practicable to reduce the potential for bank erosion. Even dead stumps and root systems may act to reduce erosion.	✓	✓	Foreman Project / Site Engineers Environmental Coordinator
FFMM19	Ensure temporary waterway crossings minimise impacts on aquatic habitat and fauna by: ▪ maintaining low flow conditions ▪ being designed with consideration of the potential for flooding during construction ▪ removing the crossing and rehabilitating the area following completion of construction in the area. Consideration will be given to the Policy and guidelines for fish habitat conservation and management (NSW DPI, 2013) and with reference to DPI Water Guidelines for Controlled Activities on Waterfront Land.	✓	✓	Project / Site Engineers Environmental Coordinator
FFMM20	FFMM12 and FFMM2 also apply.	N/A	N/A	N/A
INVASION/ SPREAD OF WEEDS/ PATHOGENS				

ID No.	Mitigation measure	Timing		Responsibility
		PC[1]	C[2]	
FFMM21	Restrict equipment storage and stockpiling of resources to designated areas within compound sites in cleared land to minimise potential invasion/ spread of weeds and pathogens. For the same reason, use designated access roads, tracks and parking areas.	✓	✓	Foreman Environmental Coordinator
FFMM22	Progressively revegetate batters and other disturbed areas with temporary cover crop species or final landscaping to control weed invasion during construction.		✓	Superintendent Foreman Environmental Coordinator
FFMM23	Manage weeds in accordance with the Weed management plan at Appendix E.		✓	Superintendent Foreman Environmental Coordinator
FFMM24	On or before supplying mulch for land application offsite ensure a 'written risk management protocol' has been prepared in accordance with the requirements of 'the mulch order 2016' in accordance with the Waste and Energy Management Sub-Plan (WEMP). The written risk management protocol will contain measures that minimise the potential for mulch to cause the introduction or spread of any weeds/ pathogens.		✓	Superintendent Foreman Environmental Coordinator
FFMM25	Ensure all plant and equipment is clean prior to arrival to site to minimise the potential for seeds and plant material entering the project site to prevent the introduction of further exotic plant species or disease/ pathogens.		✓	Superintendent Foreman Environmental Coordinator
REDUCED WATER QUALITY AND LOSS OF AQUATIC BIODIVERSITY (E.G. FISH)				
FFMM26	Carry out refuelling of plant and equipment, chemical storage and decanting at least 50 metres away from aquatic habitats unless additional controls are implemented to reduce risk of release.	✓	✓	Foreman Project / Site Engineers Environmental Coordinator
FFMM27	Progressively revegetate batters and other disturbed areas with cover crop species or final landscaping to stabilise the soil and provide vegetation cover as a method to minimise sedimentation of waterways and impacts on fish.		✓	Project / Site Engineers Environmental Coordinator

ID No.	Mitigation measure	Timing		Responsibility
		PC[1]	C[2]	
FFMM28	Follow the relevant EWMS and PESCP to minimise the potential of erosion and sedimentation impacts.	✓	✓	Foreman Project / Site Engineers
DISTURBANCE TO HABITAT DUE TO TEMPORARY LIGHT SPILL				
FFMM29	Use down-lights and motion sensor lighting during night works where safe to do so, to reduce light spill to surrounding habitat.		✓	Project / Site Engineers Environmental Coordinator

[1] PC means pre-construction; [2] C means construction

7. Compliance management

7.1. Roles and responsibilities

Fulton Hogan's Project Team organisational structure and overall roles and responsibilities are outlined in Section 4.1 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Table 7 of this FFMP.

7.1.1. Project Ecologist

The environmental responsibilities of the Project Ecologist are to:

- Undertake a pre-clearing inspection, prepare a pre-clearing inspection report and prepare a pre-clearing permit (Appendix B)
- Supervise felling of all habitat trees
- Manage and supervise all fauna protection including rescue tasks to minimise the impacts on fauna
- Review the fauna protection procedure

7.2. Training

All employees, subcontractors and utility staff working on site will undergo site induction training relating to flora and fauna management issues, including:

- requirements of this FFMP
- information on the ecological values of the project site
- relevant legislation
- identification of potential threatened flora and fauna species on the project (refer to Appendix F)
- discovery of any unexpected threatened species/ TECs and any specific procedures to deal with that species/ TEC (refer to Appendix D)
- limits of vegetation clearing and the areas of vegetation to be retained (i.e. exclusion zones)
- roles and responsibilities for flora and fauna management
- roles and responsibilities for weed and pathogen management
- plant and equipment must be clean prior to it entering the project site (as per Chapter 5 mitigation measure FFMM25).

Further details regarding staff induction and training are outlined in Chapter 5 of the CEMP.

7.3. Complaints

Complaints will be recorded and addressed in accordance with Section 6.2.3 of the CEMP and the Community Communication Strategy (CCS).

7.4. Inspections and monitoring

Regular inspections specific to flora and fauna will be undertaken during construction in accordance with Table 8.

Regular monitoring specific to flora and fauna will be undertaken during construction in accordance with the Flora and Fauna Construction Monitoring Program prepared by TfNSW and approved by the Planning Secretary.

General requirements and responsibilities in relation to inspections and monitoring are documented in in Sections 8.1 and 8.2 of the CEMP respectively.

Table 8: Inspections

Inspection Details	Record	Responsibility	Frequency
Pre-clearing inspection	Pre-clearing permit Project Ecologist's Pre-clearing inspection report	Environmental Manager or delegate	Prior to commencement of clearing
Inspection of all plant and equipment for absence of soil and debris to minimise the potential for seeds and plant material entering the project site and the introduction of further exotic plant species or disease.	Written verification from Subcontractors that all plant and equipment is clean prior to arrival to site. Mobile plant inspection check	Foreman Environmental Manager or delegate	Prior to mobilisation

7.5. Auditing

Auditing (both internal and external) will be undertaken to assess the effectiveness of environmental mitigation measures, compliance with this FFMP, TfNSW specifications and other relevant approvals, permits and licences. Auditing requirements are detailed in Section 8.4 of the CEMP.

7.6. Reporting

A Pre-clearing Report will be prepared in consultation with the Project Ecologist which addresses the requirements of the Fauna protection procedure outlined in Appendix B and details the findings from implementing this procedure. The Pre-clearing Report must also satisfy the requirements of G40 Clause 2.4.2 (a)-(c).

A Clearing Report will be prepared in consultation with the Project Ecologist and submitted to TfNSW as follows (SWTC Appendix 5 section 5.2.6):

- initially within 3 months of the commencement of clearing operations, and
- after initial submission of a report, the report must be updated and resubmitted to TfNSW, at intervals of not more than 3 months until all clearing has been completed except if no clearing work is undertaken, and written notice to that effect is provided to TfNSW.

A Structures Report will be prepared in consultation with the Project Ecologist and submitted to TfNSW as follows:

- initially within 1 month of the commencement of demolition of any structure, including culverts and associated structures, and
- after initial submission of a report, the report must be updated and resubmitted to TfNSW, at intervals of not more than 3 months until all demolition has been completed except if no demolition work which affected native fauna, as certified by the Project Ecologist, is undertaken, and written notice to that effect is provided to TfNSW.

The Clearing and Structures Reports will include the information required under SWTC Appendix 5 section 5.2.6(c).

A Post-clearing Report will also be prepared at the completion of clearing which documents the outcomes of the vegetation clearing including areas and species removed in accordance with the requirements of G40 clause 2.4.5.

In addition, general reporting requirements and responsibilities are documented in Chapter 9 of the CEMP.

7.7. Non-conformances

Non-conformances will be dealt with and documented in accordance with Chapter 10 of the CEMP.

8. Review and improvement of FFMP

The FFMP will be reviewed annually to ensure compliance with legislative requirements and its suitability and effectiveness for the project.

The review may be in the form of:

- A formal management review
- An audit, and/or
- An inclusion as a separate item at a site meeting.

The Environmental Manager may review and update the FFMP more regularly where:

- Significant changes in construction activities occur
- Where targets are not being achieved, or
- In response to audits and non-conformance reports.

Any minor changes to the FFMP will be approved by the ER and the remainder approved by the Planning Secretary in accordance with CoA C8. For additional information about the document review process, refer to Section 1.6 of the CEMP.

Appendix A: Pre-clearing permit

Pre-clearing permit

PROJECT ECOLOGIST CONTACT DETAILS
Name:
Company:
Phone number:

General Instructions

1. This copy is to be retained by the relevant persons authorised to supervise work crews and/or contractors.
2. Management must retain a copy.
3. Standard work method statements apply where relevant.
4. Additional environmental controls must be implemented as listed in Part C of this permit.
5. Managers and supervisors are responsible for advising their crew members of the additional environmental controls applicable to the works as listed in Part C of this permit.

PART A. DESCRIPTION OF WORKS	To be completed by Permit recipient
Date: / /	Project: Newcastle Inner City Bypass Rankin Park to Jesmond (Stage 4 – Main Works)
Location:	
Company/ Organisation conducting the work:	
Name of permit recipient:	
Date clearing is to commence: / /	
Brief description of work:	
Is demolition of built structures involved? (circle as appropriate) Yes / No	
Machinery to be used:	
Sensitive area plans for work area attached:	

PART B. PLANNING CHECKLIST	Yes	No	N/A	Comments include any details discussed with other parties
Are the limits of clearing identified by clearly visible markers?	☐	☐	☐	
Has the Project Ecologist completed pre-clearing inspections for:				
1. the presence or otherwise or evidence of the presence (including fresh scats, scratches and remains of prey) or otherwise of fauna, including threatened species?	☐	☐	☐	
2. bushrock, hollow bearing trees, potential hollow bearing trees and all other fauna containing habitat trees (including trees with nests, dreys and termitaria likely to be occupied by fauna) within the clearing zone?	☐	☐	☐	
3. the presence of native fauna, including bats that may be present in gaps in bridges (e.g. scuppers), disused buildings, culverts and associated structures that are to be demolished or removed?	☐	☐	☐	
4. the locations of trees to be retained, particularly: (a) trees in Jesmond Park (b) trees located directly adjacent to proposed fauna crossing structures, and (c) trees identified by the Project Ecologist as being known or likely sites for roosting and/or breeding by the Powerful Owl?	☐	☐	☐	
5. any trees outside the limits of clearing which are unsound and likely to fall upon the roadway or onto private property and whether pruning or removal is recommended?	☐	☐	☐	
6. the species and location of any presence of weeds?	☐	☐	☐	
Is there a specific EWMS in place that covers these works (e.g. Clearing and grubbing EWMS)?	☐	☐	☐	
Have all necessary approvals and permits for the works been obtained from the following organisations (where applicable)? • Council • EPA • Other (specify)	 ☐ ☐ ☐	 ☐ ☐ ☐	 ☐ ☐ ☐	
Have all necessary erosion and sediment controls been installed as per Progressive ESCP?	☐	☐	☐	
Will access to private properties be maintained during the works (If no, refer to the Community Communication Strategy)?	☐	☐	☐	
Have arrangements been made for the Project Ecologist to be present as required e.g. during Stage 2 clearing of habitat trees.	☐	☐	☐	

PART B. PLANNING CHECKLIST	Yes	No	N/A	Comments include any details discussed with other parties
Has the Hold Point under G40 Clause 2.4 ('Written notification of intention to clear any area, EWMS and Pre-clearing Report') been released by TfNSW/ PV?				

PART C. ADDITIONAL ENVIRONMENTAL CONTROLS
(as per Project Ecologist's recommendations or other environmental assessments)

List relevant additional environmental controls here. Include all additional environmental controls and communicate these at the toolbox meeting, to the crew members, subcontractors and any other relevant parties, prior to the commencement of the works. Ensure crews and subcontractors know the locations of the exclusion zones as shown on the Sensitive Area Plans.

Activity	Environmental Controls	Reference (i.e. Ecologist's report, consultation with TfNSW, community or other)

PART D. APPROVAL

PERMIT HOLDER

I understand and accept all conditions stated in this permit and any associated permits. I will ensure that all conditions are strictly adhered to by myself and colleagues.

Name of Permit Holder…….Signature: .....Date: .....Time:……..

ENVIRONMENTAL COORDINATOR

Approval is granted for the work listed above by the Environmental Coordinator. All conditions of this permit and any associated permits have been fully explained to the permit holder.

Name of approver…….....Signature: .....Date: ..... Time: .....

PROJECT ECOLOGIST

The Project Ecologist is only required to sign this Permit when undertaking two-stage clearing, hollow-bearing tree removal, or at the request of the Environmental Manager/ Environmental Coordinator.

Name of Project Ecologist.....Signature: .....Date: ..... Time: .....

Appendix B: Fauna protection procedure (including procedures for clearing, fauna rescue and handling)

Appendix B: Fauna protection procedure (including procedures for clearing, fauna rescue and handling)

B1 Purpose

This procedure details the actions to be taken during construction activities to:

- control clearing operations to minimise impacts on terrestrial flora and fauna
- minimise impacts on fauna (including injured, shocked, juvenile or other animal encountered within the project boundary) as a result of being handled by humans, and to prevent injury to people handling fauna.

It is acknowledged that SWTC Appendix 5 section 5.2.3(a) requires the fauna protection procedure to 'include procedures to reduce risks from vehicle impacts to fauna in newly cleared areas'. This requirement is satisfied by way of both the clearing procedure (refer to section B3) and the fauna rescue procedure (refer to section B4). The clearing procedure involves a pre-clearing assessment to first identify any fauna in the area prior to clearing, and the two-stage approach to clearing allows fauna an opportunity to move from habitat trees before habitat trees are removed. The fauna rescue procedure requires all work to stop in the vicinity of the fauna. These procedures combined reduce risks to fauna from vehicle impacts.

This fauna protection procedure has been developed in consultation with and reviewed by a degree qualified ecologist, suitably experienced and with expertise in fauna rescue, including care and handling of shocked and injured terrestrial fauna (as required by SWTC Appendix 5 section 5.2.1(c)).

B2 Scope

This procedure is applicable where:

- Hollow-bearing trees, including standing dead trees with hollows are to be removed.
- Substantial stands of vegetation providing potential threatened fauna habitats are to be impacted.
- Bushrock is to be removed.
- Removal of potential fauna habitat results in the need to capture and relocate or captive rear less mobile fauna.
- Trees are to be removed in Jesmond Park
- Potential roosting habitat for bats (including microbats) (e.g. hollow-bearing trees, disused buildings, bridges and culverts) is to be disturbed or removed.
- Native and introduced species are found on the project site.

This procedure is consistent with:

- Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 1: Pre-clearing process) (RTA 2011a).
- Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 4: Clearing of vegetation and removal of bushrock) (RTA 2011a).
- Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 9: Fauna handling) (RTA 2011a).

B3 Clearing Procedure

Where practicable, clearing of hollow-bearing trees will be carried out during periods which avoid breeding and hibernation seasons for threatened hollow-dependant fauna species (particularly the Powerful Owl (*Ninox strenua*) and Squirrel Glider (*Petaurus norfolcensis*)). The breeding season for the Powerful Owl (*Ninox strenua*) is specified in Table 7.1 of the Flora and Fauna Construction Monitoring Program prepared by TfNSW and approved by the Planning Secretary as 1 July – 31 August. The breeding season for the Squirrel Glider (*Petaurus norfolcensis*) is not specified in the documents listed in CoA A1 and has been taken to be April – November.

The Project Ecologist will undertake the following steps:

1. Prior to undertaking clearing at any location or time, a pre-clearing assessment must be undertaken by the Project Ecologist to identify the presence or otherwise or evidence of the presence (including fresh scats,

scratches and remains of prey) or otherwise of fauna, including threatened species. The assessment must be documented and include processes and actions taken to protect or rescue any identified fauna.

2. The pre-clearing assessment must also include the identification and assessment of habitat trees and roosting habitats (e.g. hollow-bearing trees, disused buildings, bridges and culverts) that are to be removed or demolished for the presence of native fauna (such as the Powerful Owl, Squirrel Glider and bats that may be present in gaps in structures or scuppers), including details of the checks by the Project Ecologist on trees for fauna, nests and the like.
3. The pre-clearing assessment must also assess opportunities for improvement of vegetation connectivity and retention of as many trees as possible, particularly:
   a. trees in Jesmond Park. It is noted that where trees are to be removed, and those trees are not required to be offset under CoA E4, the project must provide a net increase in the number of replacement trees.
   b. trees located directly adjacent to proposed fauna crossing structures, and
   c. trees identified by the Project Ecologist as being known or likely sites for roosting and/or breeding by the Powerful Owl.
4. The pre-clearing assessment must also identify any trees outside the limits of clearing which are unsound and likely to fall upon the roadway or onto private property and whether pruning or removal is recommended.
5. If bats (including microbats) are identified as roosting in or under a structure to be demolished or modified substantially, comprehensive roost exclusion will be undertaken. This will include the identification of alternative roost sites by the Project Ecologist. Once the alternative roost sites are identified, the project roost sites will be sealed, leaving only the alternative roost sites. Where a structure will not be demolished or modified substantially, it will remain open on at least one side at all times to allow any roosting bats to fly in or out. Refer to the Microbat Management Strategy contained in Appendix B of the Flora and Fauna Construction Monitoring Program (prepared by TfNSW and approved by the Planning Secretary).
6. All hollow-bearing trees, potential hollow-bearing trees and all other fauna containing habitat trees, including trees with nests, dreys and termitaria likely to be occupied by fauna, must be marked at least seven (7) days prior to the commencement of clearing in a manner which clearly identifies and demarcates the trees.
7. Marking of trees for directional felling to avoid damage to environmentally sensitive areas.
8. Clearing is not to be undertaken until the G40 Clause 2.4 Hold Point has been released.
9. Implement a two-stage approach to clearing:

Stage 1 - Non-habitat tree removal

- Remove non-habitat trees at least 24 hours[1] before habitat trees are removed, to allow fauna an opportunity to move from habitat trees and allow time to concentrate rescue efforts on the trees that are most likely to be inhabited.

Stage 2 - Habitat tree removal

- Fell habitat trees under the supervision of the Project Ecologist at least 24 hours[1] after Stage 1. Fell habitat trees using equipment that allows the trees to be lowered to the ground with minimal impact to minimise injury or shock to fauna that have remained within hollows or other habitat features.
- Leave felled habitat trees for a short period of time on the ground, as determined by the Project Ecologist, to give the ecologist a chance to check hollows or for any fauna trapped in the trees an opportunity to escape
- Assess habitat trees (Project Ecologist)

[1] unless a reduced time period is directed by the Project Ecologist and approved by TfNSW.

- Stop work where a threatened species is detected during vegetation clearing and follow the Unexpected threatened species/TECs procedure (refer to Appendix D).

10. All fauna captured will be relocated into areas of suitable habitat adjacent to the project site in accordance with the Fauna Rescue Procedure detailed in Section B4 below. Records will be kept of the fauna captured and relocated in the Fauna rescue event record (refer to Appendix C).

B4 Fauna Rescue Procedure

If wildlife is discovered on the project site during site construction activities, including clearing (refer Section B3 above) that may harm, or has resulted in harm, to the animal or poses a risk to site personnel, the following steps will be taken:

1. Stop all work in the vicinity of the fauna and immediately notify the Foreman who will notify the Environmental Manager (EM) or Environmental Coordinator (EC). The EM/ EC will then notify the Project Ecologist.
2. Preferably allow fauna to leave the area without intervention if it is not injured or in shock and if safe to do so (i.e. no machinery in the immediate vicinity).
3. Use a licensed fauna ecologist or wildlife carer with specific animal handling experience/licence to carry out any fauna handling.
4. Where necessary, to minimise stress to fauna and/or remove the risk of further injury before the fauna handler arrives onsite, the Environmental Coordinator shall implement the Fauna Handling Procedure detailed in Section B5 below.
5. If the animal cannot be handled (e.g. venomous reptiles):
   a. exclude all personnel from the vicinity with fencing and/or signage, and
   b. record the exact location of the animal and provide this information to the Project Ecologist or fauna handler
6. Call the appropriate rescue agency (i.e. wildlife carer with specific animal handling experience/ animal rescue agency such as WIRES) immediately and follow any advice provided by the agency. Once the rescue agency arrives at the site, they are responsible for the animal. Any decisions regarding the care of the animal will be made by the rescue agency. Contact details for the Project Ecologist, rescue agencies and local veterinary clinic are provided in Table B-1.

Table B-1 Fauna rescue contact details

Agency/ business	Contact number
Project Ecologist	To be confirmed
Wildlife Rescue (WIRES)	1300 094 737
Fletcher Vet Wallsend Village	0475 697 785
Cardiff Veterinary Hospital	(02) 4954 7055
Newcastle Animal Referral & Emergency Centre, Broadmeadow (24 hour emergency vet)	(02) 4957 7106

Note - The contact details for the Project Ecologist will be kept at a convenient location on the project site and be available to Fulton Hogan personnel to enable quick contact and access to the Project Ecologist.

In the event the rescue agency or local vet cannot be contacted, the injured animal will be delivered to the rescue agency as soon as practically possible.

In the event the rescue agency cannot be contacted, if required, the most appropriate euthanasia will be administered by the Project Ecologist (i.e. cervical dislocation for small vertebrates, ice slurry for introduced fish). This is to occur in accordance with applicable guidelines and legislative requirements.

7. If the fauna species is identified as a threatened species that is not a species identified in the FFMP/ EIS as amended by the documents listed in CoA A1, the Environmental Manager must:
    a. immediately cease all work likely to affect the threatened species
    b. follow the Unexpected threatened species/TECs procedure (refer to Appendix D).
8. Relocation of fauna captured during construction works, including clearing and associated works, will be undertaken by the Project Ecologist or rescue agency. If the animal is not injured or stressed, it should be released to an area that is not to be disturbed by the project construction works, in accordance with the following:
    a. sites identified as suitable release points by the Project Ecologist or rescue agency
    b. release site will contain similar habitat and occur as close to the original capture location as possible.
    c. if the species is nocturnal, release will be carried out at dusk
    d. release would generally not be undertaken during periods of heavy rainfall, and
    e. non-native fauna will not be translocated and will be euthanised.
9. If the animal has been placed into care due to injury, age (i.e. young) or shock, upon its rehabilitation it will be released in an area that is not to be disturbed by the project construction works, at the discretion of the Project Ecologist or rescue agency.
10. Following consultation with all relevant stakeholders, the Project Ecologist/ Environmental Manager will implement any corrective actions and additional management measures/ safeguards.
11. Following confirmation by the Project Ecologist/ Environmental Manager that all appropriate management measures/ safeguards have been implemented, construction works can recommence.
12. Project Ecologist/ Environmental Manager to record find/ translocation in the Fauna rescue event record (Appendix C). All relevant characteristics of the fauna find and relocation should be recorded to the extent practicable (i.e. visual signs of fauna behaviour, habitat, health signs, time, date, weather).

B5 Fauna Handling Procedure

The fauna handling procedure will be implemented to minimise stress to native fauna and/or remove the risk of further injury. The Project Ecologist will:

1. Cover larger terrestrial animals with a towel or blanket and place in a cardboard box and/ or hessian bag
2. Place smaller terrestrial animals in a cotton bag, tied at the top
3. Keep terrestrial fauna quiet, warm, ventilated and in a dark location away from noisy construction activities
4. Relocate aquatic fauna in accordance with the following steps:
    a. Ensure all aquatic fauna relocation works are supervised by a suitably qualified aquatic ecologist.
    b. Prior to the commencement of pumping, advice should be sought from the aquatic ecologist on pumping methods and the extent of drawdown.
    c. The water level should be pumped down to a level that will allow the safe and effective implementation of capture methods, such as seine nets, dip nets and electrofishing.
    d. A fine mesh screen with not >5mm mesh must be installed on the inlet of the pump or a fish basket used to remove the risk of native aquatic fauna being transferred through pump. A maximum depth of 500mm is typically required before fish salvage can commence but site-specific advice will be required from the aquatic ecologist.

e. Aquatic ecologist is to establish the presence of native and introduced aquatic fauna and plan relocation. Access to adjoining properties may be required for relocation, particularly when dewatering dams (where applicable). The aquatic ecologist will ensure that native aquatic fauna species are released into suitable habitat as close to the original location as possible.

f. Native fish will be placed in tubs full of water sourced from the salvage site where they will be housed for brief periods before being transferred to the release site. Pest fish will be euthanased using an ice slurry.

g. Following completion of relocation, a final check shall be undertaken to find any remaining fish, or dying/dead fish.

h. All euthanised and dead fish will be transported to a licensed landfill facility for disposal.

i. Records will be kept on habitat type, method of water extraction, species, number of individuals and reproductive status of fish encountered.

j. Aquatic ecologist will prepare a report on the relocation, detail the source of the fish, the number and species of fish released and euthanased.

5. Transport frogs without water or debris in recognition of the risk of transporting disease and the minimal transport time.

6. Animals such as venomous reptiles and raptors require particular handling and will only be handled by appropriately qualified personnel i.e. Project Ecologist or rescue agency.

7. If the animal cannot be handled (e.g. venomous reptiles):

   a. exclude all personnel from the vicinity with fencing and/or signage, and

   b. record the exact location of the animal and provide this information to the Project Ecologist or fauna handler.

8. If handling bats (including microbats), the handler must be vaccinated against the Australian Bat Lyssavirus (ABL), which is a form of rabies.

9. Any frog handling will be undertaken in accordance with the Hygiene Protocol for the Control of Disease in Frogs (DECC 2008). This protocol recommends onsite hygiene precautions be undertaken to minimise the transfer of disease between and within wild frog populations. Measures recommended include:

   a. thorough cleaning/ disinfecting of footwear and equipment when moving from one site to another

   b. spraying/ flushing vehicle tyres with a disinfecting solution where necessary in high risk areas

   c. cleaning/disinfecting hands between collecting samples/frogs (gloves, not bare hands, will be used to handle frogs), and

   d. limiting one frog or tadpole to a bag. Bags will not be reused.

Appendix C: Fauna rescue event record

Fauna rescue event record

Item	Detail
Date fauna located	
Time fauna located	
Weather conditions	
Location (i.e. chainage, habitat (in tree hollow, under stockpile, in open grass, near culvert etc.)	
Fauna type (e.g. possum, bird, snake etc.)	
Visual signs of fauna behaviour	
Species (if known)	
Is the fauna injured? (yes or no)	
If the fauna is injured complete this section	
What time was the fauna specialist called?	
What time did the fauna specialist arrive?	
Fauna specialist name and contact	
What was the outcome of calling the fauna specialist?	
If the fauna is not injured complete this section	
Where was the fauna relocated?	
Name and qualification of fauna handler	
Any other comments:	

Note: Fauna specialist - Project Ecologist/ wildlife carer with specific animal handling experience/ animal rescue agency such as WIRES/ Vet.

Completed by:

Date: / /

Appendix D: Unexpected threatened species/ TECs procedure

Appendix D: Unexpected threatened species/ TECs procedure

D1 Purpose

This procedure details the actions to be taken when a threatened flora or fauna species / TEC is unexpectedly encountered during excavation/ construction activities.

D2 Scope

This procedure is applicable to all activities conducted by personnel that have the potential to come into contact with threatened species/ TECs.

Where threatened fauna is unexpectedly encountered that requires rescue or handling refer to the Fauna protection procedure (Appendix B of this FFMP).

Refer to Figure D-1 for the Unexpected Threatened Species/ TECs procedure flow chart.

This procedure is consistent with:

- Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).

D3 Procedure

The Environmental Manager (EM) is responsible for implementing this procedure.

1. Threatened species/ TEC unexpectedly encountered during excavation/ construction activities

If a new threatened species/ TEC is unexpectedly encountered during excavation/ construction activities:

- STOP ALL WORK in the vicinity of the find immediately.

Immediately notify the Environmental Manager (EM) or Environmental Coordinator (EC) who will notify the Project Ecologist, TfNSW, the consent authority and the relevant BCD region. TfNSW will be notified both verbally and in writing.

2. Assessment of Impact

An assessment is to be undertaken by the Project Ecologist to determine the likely impact to the threatened species/ TEC and appropriate management options, such as relocation measures, developed in consultation with EM and TfNSW. The hierarchy of avoid, minimise and offset should be applied.

Measures taken to avoid, minimise and offset should be developed to the satisfaction of the consent authority, in consultation with BCD.

3. Approvals

Obtain any relevant licences, permits or approvals required if the threatened species/ TEC is likely to be significantly impacted.

4. Recommencement of Works

Construction works will recommence in the immediate vicinity once the Environmental Manager has:

- obtained approvals as required
- confirmed all corrective actions and additional mitigation measures (supported by the consent authority, in consultation with BCD) have been implemented.

The Environmental Manager must also:

- Ensure that the threatened species/ TEC is included in subsequent Sensitive Area Plans, Project Inductions and Toolbox Talks, and
- Provide information to TfNSW to enable update of biodiversity offset requirements if applicable.

The Proponent must:

- If the species is new to science, a nomination to list the species on the appropriate schedule of the *Biodiversity Conservation Act 2016* is to be prepared by the proponent and submitted to the NSW Scientific Committee.

Appendix E: Weed management plan

Appendix E: Weed management plan

E1 Purpose

The purpose of this Weed Management Plan (WMP) is to detail how Fulton Hogan will manage and control weeds throughout construction of the project to minimise the threat to remnant vegetation, native flora and fauna habitats and waterways within the local area.

E2 Scope

Weed management will be implemented to control weed infestation on the project and to limit the introduction and/or spread of weed species during construction activities.

Noxious weeds and weeds of national significance (WoNs) in the existing road corridor, construction areas and ancillary facility areas will be controlled in accordance with Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 6: Weed Management) (RTA 2011a). Weed control, generally, will have a strong focus on:

- restricting the area of native vegetation disturbed during construction works by application of exclusion zones
- restricting stockpiling to areas already cleared of vegetation
- controlling drainage that may contain weed propagules
- weed hygiene protocols including inspecting and cleaning light and heavy plant and equipment; inspecting materials brought to site, especially topsoil, turf and mulch to ensure that these are weed-free
- revegetating disturbed sites with locally indigenous plant species to stabilise the soil and provide native vegetation cover as a method of ongoing weed control.

This WMP must be read in conjunction with the Clearing and Grubbing Environmental Work Method Statement.

This procedure is consistent with:

- Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 6: Weed Management) (RTA 2011a).

E3 Weeds Overview

Weeds are often classed in broad groups depending on their characteristics and impacts. The main groups of weeds are: Noxious weeds under the *Noxious Weeds Act 1993* (NW Act) (now repealed and replaced by the *Biosecurity Act 2015*), Weeds of National Significance (WoNS), National Environmental Alert List weeds, environmental weeds and agricultural weeds. The focus of this procedure is on noxious weeds and WoNs, which are discussed below, followed by the weed control procedure.

Noxious Weeds and WoNs

The EIS as amended by the documents listed in CoA A1 identified seven (7) noxious weeds in the study area under the *Noxious Weeds Act 1993* (NW Act) (now repealed and replaced by the *Biosecurity Act 2015*). Most of these are also listed as WoNs. *Lantana camara* (Lantana) was identified at the site which is not considered a noxious weed within the Newcastle LGA but is listed as a WoNs and is also considered a significant environmental weed in the area (SPIR Appendix B, p25). The noxious weeds and WoNs in the study area are outlined in Table E-1. The noxious weed control category is also included in the table.

Table E-1 Noxious weeds and WoNs identified within the study area (SPIR Appendix B, p25)

Scientific name	Common name	Noxious weed category	Weed of national significance
Asparagus aethiopicus	Asparagus Fern	4 – Locally controlled weed *The plant must not be sold, propagated or knowingly distributed*	Yes
Ageratina adenophora	Crofton Weed		No
Asparagus officinalis	Asparagus		No
Rubus fruiticosus	Blackberry		Yes
Senecio madagascariensis	Fireweed		Yes
Chrysanthemoides monilifera subsp. *rotundata*	Bitou Bush		Yes
Cortaderia selloana	Pampas Grass	3 – Regionally controlled Weed *The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed*	No
Lantana camara	Lantana	-	Yes

E4 Weed control procedure

To control weed infestations during construction the Environmental Manager or Environmental Coordinator will ensure that the following procedure is implemented:

1. Weed inspection

The Environmental Manager/ Environmental Coordinator will undertake an inspection with the Project Ecologist to inspect the area for weeds:

- prior to clearing and grubbing (i.e. as part of the Pre-clearing inspection)
- when a potential weed infestation has been identified, and
- before spring (around August) to identify weeds before they go to flower and seed.

Infestations of noxious weeds and WoNS will be mapped with GPS by the Project Ecologist during the inspection. The Project Ecologist will note the specie(s), degree of infestation and capture an image of the weed for monitoring purposes.

2. Exclusion zones

The Project Ecologist will identify areas of weed infestation and exclusion zones will be established around these areas (as required) to prevent the distribution of weeds.

Weeds within an area to be cleared and grubbed will be removed and disposed of at an appropriately licensed waste facility as directed by the Environment Manager/ EC.

3. Weed treatment methodology
The Project Ecologist will advise the appropriate weed control methods, and timing for each area of works.
4. Pesticide Application Record
The Environmental Manger/ EC will follow the Fulton Hogan Pesticide Use Procedure and ensure that a Pesticide Application Record is completed and public notifications made in accordance with relevant legislation, where pesticides are to be used in areas that could be accessed by members of the public. Only pesticides registered for use near water may be used near any waterways.
5. Follow-up inspection
The Environmental Manger/ EC will ensure that a follow-up inspection is undertaken of identified weed infestation sites to verify the success of treatment. Where weeds cannot be effectively destroyed prior to topsoil stripping, weed-contaminated topsoil will be isolated and either encapsulated by deep burying, or disposed of at an approved offsite licensed facility as directed by the Environment Manager/ EC.
6. Vehicle, plant and equipment movement plan
Site specific vehicle, plant and equipment movement plans will be prepared for each worksite that contains noxious weeds. The plans will be incorporated into Progressive Erosion and Sediment Control Plans (PESCPs) and include identification of vehicles, plant, equipment, turning and parking areas. To prevent the spread of weeds throughout the construction site and surrounding areas, the movement of weed-contaminated plant and equipment will be monitored by Foreman. The Foreman will ensure that all plant and machinery entering the site is inspected and free of weeds applying standard weed hygiene protocols. Plant and equipment will be checked and cleaned before leaving a worksite that contains noxious weeds. Records of all construction plant screening checks will be recorded on the Mobile Plant Inspection Checklist and monitored by the Foreman.
7. Weed disposal
Where noxious weed areas are disturbed by the construction activities, weeds and topsoil potentially containing weed propagules will be removed and disposed of as required by the *Biosecurity Act 2015*. Any weeds physically removed (particularly those bearing seeds) will also be disposed of appropriately at a licensed facility in accordance with the *Biosecurity Act 2015*.

E5 Ongoing management and monitoring

Monitoring of weed infestations will occur as part of the routine weekly inspections to determine the effectiveness of management controls. The presence of any weeds and the necessary management actions will be noted on the Environmental Inspection Checklist.

Appendix F: Potential threatened flora and fauna species identification guide

Appendix F: Potential threatened flora and fauna species identification guide

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
FLORA					
Black-eyed Susan	*Tetratheca juncea*	Vulnerable	Vulnerable	A low shrub that grows in clumps of single or multiple stems. Flowers face downwards and usually have 4 petals which range from white to pink to dark purple in colour. They are borne singly or in twos along the stem. Stems are 30 to 60 cm long, usually leafless with 2 to 3 narrow wings that give them an angular appearance. Plants are usually sprawling and can be difficult to detect amongst other vegetation when not flowering.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Small Flower Grevillea	*Grevillea parviflora subsp. parviflora*	Vulnerable	Vulnerable	A low spreading to erect shrub, usually less than a metre high. It has erect narrow leaves are 2-3.5 mm long and less than 1.3mm wide, with silky hairs on the underside and a short pointed tip. Leaf margins are curved back, or even rolled completely under. The small flowers are spider-like and clustered in groups of 6-12. The whole flower, both tube and protruding style, is white, aging to pinkinsh-red, with rusty-brown hairs on the outside of the corolla.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Magenta Lilly Pilly	*Syzygium paniculatum*	Endangered	Vulnerable	The Magenta Lilly Pilly is a small to medium sized rainforest tree that grows to 8 m tall. The bark is flaky and the leaves are shiny, dark-green above and paler underneath. Leaves can be up to 10 cm long. Plants produce white flower-clusters at the end of each branch, between November and February. The petals are small and are accompanied by prominent long stamens. The deep magenta fruits, which may be spherical or egg-shaped, mature in May, and contain a single seed.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
FAUNA					
Little Lorikeet	*Glossopsitta pusilla*	Vulnerable	-	The Little Lorikeet is a small (16-19 cm; 40 g) bright green parrot, with a red face surrounding its black bill and extending to the eye. The undertail is olive-yellow with a partly concealed red base, and the underwing coverts are bright green. The mantle is imbued with light brown.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Little Bent-winged Bat	*Miniopterus australis*	Vulnerable	-	Little Bentwing-bats are small dark chocolate brown insectivorous bats with a body length of about 45 mm. The tip of the wing is formed by a particularly long joint of the third finger, folded back and bent under the wing while the bat is at rest. The fur is long and thick, especially over the crown and around the neck, and is slightly lighter in colour on the belly. They have distinctly short muzzles, and short, rounded roughly triangular shaped ears.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Eastern Bent-Wing Bat	*Miniopterus orianae oceanensis*	Vulnerable	-	The Eastern Bentwing-bat has chocolate to reddish-brown fur on its back and slightly lighter coloured fur on its belly. It has a short snout and a high 'domed' head with short round ears. The wing membranes attach to the ankle, not to the base of the toe. The last bone of the third finger is much longer than the other finger-bones giving the "bent wing" appearance. It weighs up to 20 grams, has a head and body length of about 6 cm and a wingspan of 30 - 35 cm.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Eastern Freetail-bat	*Micronomus norfolkensis*	Vulnerable	-	The Eastern Freetail-bat has dark brown to reddish brown fur on the back and is slightly paler below. Like other freetail-bats it has a long (3 - 4 cm) bare tail protruding from the tail membrane.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Powerful Owl	*Ninox strenua*	Vulnerable	-	It is a typical hawk-owl, with large yellow eyes and no facial-disc. Adults reach 60 cm in length, have a wingspan of up to 140 cm and weigh up to 1.45 kilograms. Males are larger than females. The upper parts of the Powerful Owl are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings. Juvenile Powerful Owls have a white crown and underparts that contrasts with its small, dark streaks and dark eye patches.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Squirrel Glider	*Petaurus norfolcensis*	Vulnerable	-	Adult Squirrel Gliders have a head and body length of about 20 cm. They have blue-grey to brown-grey fur above, white on the belly and the end third of the tail is black. There is a dark stripe from between the eyes to the mid-back and the tail is soft and bushy averaging about 27 cm in length. Squirrel Gliders are up to twice the size of Sugar Gliders, their facial markings are more distinct and they nest in bowl-shaped, leaf lined nests in tree hollows.	 Source: environment.nsw.gov.au
Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable	Vulnerable	The Grey-headed Flying-fox is the largest Australian bat, with a head and body length of 23 - 29 cm. It has dark grey fur on the body, lighter grey fur on the head and a russet collar encircling the neck. The wing membranes are black and the wingspan can be up to 1 m. It can be distinguished from other flying-foxes by the leg fur, which extends to the ankle.	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	Vulnerable	-	The Yellow-bellied Sheathtail-bat is a very distinctive, large, insectivorous bat up to 87 mm long. It has long, narrow wings, a glossy, jet-black back, and a white to yellow belly extending to the shoulders and just behind the ear. Characteristically, it has a flattened head and a sharply-pointed muzzle. The tail is covered with an extremely elastic sheath that allows variation in the tail-membrane area. Males have a prominent throat pouch; females have a patch of bare skin in the same place	 Source: environment.nsw.gov.au

Common name	Scientific name	BC Act	EPBC Act	Description	Photo
Greater Broad-nosed Bat	*Scoteanax rueppellii*	Vulnerable	-	The Greater Broad-nosed Bat is a large powerful bat, up to 95 mm long, with a broad head and a short square muzzle. It is dark reddish-brown to mid-brown above and slightly paler below. It is distinguished from other broad-nosed bats by its greater size.	 Source: environment.nsw.gov.au

Appendix G: Pathogen management procedure

Appendix G: Pathogen management procedure

G1 Purpose

This procedure details the protocols to be implemented during construction to minimise the threat to native species associated with the introduction and/or spread of pathogens.

G2 Scope

This procedure is applicable to all activities conducted on the project that have the potential to:

- disturb soil, water or plant material known to contain pathogens (as identified during pre-clearing survey and/or testing), or
- unintentionally import such soil or plant material from outside the project area.

This procedure must be read in conjunction with the Clearing and Grubbing Environmental Work Method Statement (EWMS) required under Chapter 6 mitigation measure ID FFMM2.

Site hygiene protocols are in accordance with the Roads and Maritime Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 7: Pathogen Management) (RTA 2011a).

G3 Procedure

To prevent the introduction and/or spread of pathogens during construction the Environmental Manager (EM) or Environmental Coordinator (EC) will ensure that the following procedure is implemented:

1. Identify and prevent pathogens

The EM/EC must consult with the Project Ecologist prior to the commencement of works to determine if there are any confirmed pathogen sites on the project or in the locality, and if so where the soil-borne or plant pathogen is located.

During the Pre-clearing inspection, the Project Ecologist will undertake a targeted search for:

- Plants displaying signs of Phytophthora cinnamomi-induced dieback
- Plants displaying signs of Myrtle Rust, and
- Amphibians displaying symptoms of chytrid fungus infection (where frog habitat is to be cleared).

If risks are identified in the vicinity of the project, testing from a National Association of Testing Authorities (NATA) approved laboratory may be required to confirm the presence of pathogens in the soil and/or water.

The EM/EC is responsible for overseeing works in the project area that are infected with pathogens.

2. Limit movement of soils potentially infected with pathogens via vehicles and machinery

Where potentially infected soils may be present:

- Install signage advising of special hygiene measures.
- Limit access to the infected area using fencing.
- Stop earthworks in the infected area after extended rainfall that could make the earth saturated and potentially cause overland flow.
- Where possible, do not drive through mud or potentially infected areas.
- If a vehicle or machinery is taken into an infected area, remove all mud and dirt (including that from floor mats, tyres, wheel rims and the undersides of vehicles) and wash the vehicle/ machinery with Truckwash (or equivalent) and disinfect with a cleaning product that contains benzalkonium chloride or 70 per cent methylated spirits in 30 per cent water (e.g. Phytoclean) immediately prior to leaving the area or immediately prior to accessing the project.
- Complete a Wash-down checklist for vehicles and machinery entering or leaving areas infected with pathogens (Appendix H of the FFMP).
- Do not use water from sediment basins, and potentially infected catchments, for vehicle wash-downs.
- Bund the area where a vehicle is to be washed using a 400mm high (approx.) sandbag wall.

▪ Capture and dispose of all liquids used in the washing and disinfecting process to an appropriately licenced waste facility.
3. Limit movement of soils potentially infected with pathogens via personnel and equipment
▪ Clean and disinfect footwear by removing mud and dirt and then stepping into a tray of Phytoclean (or equivalent) immediately prior to leaving the area or immediately prior to accessing the project. ▪ Clean and disinfect equipment by removing mud and dirt and sponging with a solution of Phytoclean (or equivalent) immediately prior to leaving the area. ▪ Capture and dispose of all liquids used in the washing and disinfecting process to an appropriately licenced waste facility.
4. Limit movement of soils potentially infected with pathogens via erosion and sediment controls
▪ Remove and dispose of any sandbags, straw bales or other erosion and sediment controls from infected areas to an appropriately licenced waste facility. Do not reuse erosion and sediment controls outside of the potentially infected area. ▪ Do not use water from sediment basins for dust control or other road construction purposes, which has originated from areas potentially infected with pathogens. Instead, this water may be used for concrete production, subject to the prior approval of TfNSW. ▪ Remove and dispose of sediment from sediment basins potentially infected with pathogens to an appropriately licensed waste facility, or onsite back into the catchment where it came from.
5. Limit movement of topsoil potentially infected with pathogens
▪ Stockpile, contain and reuse topsoil stripped from potentially infected areas, within the same area of the project.
6. Limit importation of soil and plant matter potentially infected with pathogens
▪ Check and clear any vehicles or equipment brought onto the project from areas potentially infected with pathogens (as identified in Step 1 above). ▪ If signs of soil and/or plant matter are present, clean the vehicle/equipment in accordance with the procedure in Step 2/3 above, as applicable. ▪ When purchasing new plants or cuttings ensure they are free from myrtle rust.

G4 Ongoing management and monitoring

Where pathogens are identified on the project or in the locality, monitoring of the soil-borne plant pathogen will occur as part of the routine weekly inspections to determine the effectiveness of the abovementioned protocols. Necessary management actions will be noted on the Environmental Inspection Checklist.

Appendix H: Wash down checklist for vehicles and machinery entering or leaving areas infected with pathogens

Wash down checklist for vehicles and machinery entering or leaving areas infected with pathogens

Objective: All vehicles and machinery will be clean and visually free of soil and plant matter before entering or leaving any project area that is current or was former pathogen infected land.

Action: All vehicles and machinery from pathogen infected land will be cleaned of all loose soil and plant matter as necessary prior to leaving or entering the project, washed down with Truckwash (or equivalent), and sterilised with Phytoclean disinfectant (or equivalent).

Machinery, equipment, plant	Components checked (includes all other parts of the machinery/equipment/plant not specifically mentioned)	Plant number		Cleaned By:		
			Name	Company	Signature	Date
[Bulldozer]	*[Rippers, blade, track frame, belly plate, air filter, cabins, floor mat.]*					
[Excavator]	*[Truck frame, underside of slew ring, buckets]*					
[Piling rig]	*[Track, drill bits]*					
[Grader]	*[Rippers, mould board]*					
[Motor Scraper]	*[Overflow area on rear of scraper]*					
[Tractor]	*[Top of slasher, skids]*					
[Backhoe]	*[Buckets, backhoe attachment]*					
[Bobcat]	*[Buckets, belly plate, other attachments]*					