CONSTRUCTION FLORA AND FAUNA MANAGEMENT PLAN

Moorebank Precinct West Stage 1

19 NOVEMBER 2020

SYDNEY INTERMODAL TERMINAL ALLIANCE

Moorebank Precinct West Stage 1

Construction Flora and Fauna Management Plan

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SIMTA.004	19/11/2020	Updating Early Works boundary, Site Layout, stockpiling locations and ER authority and addressed DPIE comments	[redacted]	[redacted]

CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND DEFINITIONS

Acronym/Term	Meaning
BC Act	Biodiversity Conservation Act 2016 (NSW)
CEMP	Construction Environmental Management Plan
CFFMP	Construction Flora and Fauna Management Plan
CoC	Conditions of Consent
CUST	Cullen Universal Steel Truss
DPIE	NSW Department of Planning, Industry and Environment (formerly Department of Planning and Environment)
DotEE	Department of the Environment and Energy (formerly Department of Sustainability, Environment, Water, Population and Community)
EA	Environmental Assessment
EEC	Ecologically Endangered Communities
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	Environment Planning and Assessment
EPBC Act	Environment Protection Biodiversity Conservation Act 1999
EWMS	Environmental Work Method Statements
FBA	Framework for Biodiversity Assessment
NPW Act	National Parks and Wildlife Act 1974
OEH	Office of Environment and Heritage
MPW Stage 1	Moorebank Precinct West Stage 1 – Early Earthworks as approved under SSD 5066
Non-compliance	An occurrence, set of circumstances, or development that results in a non-compliance or is non-compliant with Development Consent SSD 5066 Conditions of Consent or EPBC Act Approval or EPBC Act Approval (EPBC 2011/6086) Conditions of Approval but is not an incident
Non-conformance	Observations or actions that are not in strict accordance with the CEMP and the aspect specific subplan
REMM	Revised Environmental Mitigation Measures
Site	Means the project site or work area where the Contractor is undertaking activities on behalf of SIMTA
SSD 5066	Means State Significant Development number 5066 – Concept Approval and Early Earthworks Approval for MPW Stage 1
STRARCH	Abbreviation of 'stressed arch' referring to the design of the STRARCH hangar
TEC	Threatened Ecological Communities

Acronym/Term	Meaning
The Contractor	The company, companies or other legal entity appointed by SIMTA to undertake works under the Project Approval

INTRODUCTION

This Construction Flora and Fauna Management Plan (CFFMP) forms part of the Construction Environmental Management Plan (CEMP) to manage the impacts to biodiversity during the Moorebank Intermodal Land Preparation Works – Demolition and Remediation package ('Early Works'). This CFFMP has been prepared to address the requirements of the Minister's Conditions of Consent (CoC) (DP&E 2016) and all applicable legislation relating to the project.

1.1 Project Background

The Moorebank Intermodal Terminal Environmental Assessment (EA) (Parsons Brinkerhoff, 2014) assessed the impacts of construction of the Early Works on biodiversity. As part of EA development, detailed Ecological Impact Assessment with associated Biodiversity Offset Strategy was prepared under the NSW Biodiversity Offsets Policy for Major Projects (OEH 2014a) and the Framework for Biodiversity Assessment (FBA [OEH 2014b]) to address the Director General's Requirements issued by the then Department of Planning. The assessments were included in the Environmental Impact Statement as:

- Compliance with statutory obligations; and
- Volume 4, Technical Paper 3: Ecological Impact Assessment with associated Biodiversity Offset Strategy (Parsons Brinckerhoff 2014).

The following ecology documents were also prepared as part of the response to submissions:

- Appendix C: Biodiversity Offset Strategy Part A and B (Parsons Brinckerhoff 2015).

1.2 Study Area

The Moorebank Intermodal Terminal is located in Moorebank, NSW. The study area is located in the Liverpool Local Government Area, approximately 30 kilometres south-west of the Sydney CBD and 4 kilometres south of the Liverpool CBD (Figure 1).

1.3 Early Works and Footprint

Moorebank Precinct West - Stage 1 (MPW Stage 1) Project Approval (Early Works) was approved within the Concept Plan Approval (SSD-5066) which describe Early Works as "*the demolition of buildings, including services termination and diversion; rehabilitation of the excavation/earthmoving training area; remediation of contaminated land; removal of underground storage tanks; heritage impact remediation works; and the establishment of construction facilities and access, including site security*."

However, it was determined by Tactical Group and Arcadis that the Early Works, and project area, were poorly defined. As such a further detailed interpretation of the Early Works was provided to, and approved by, the then Department of Planning and Environment in the Preliminary Environmental Assessment for the Moorebank West Precinct Stage 2 EIS application. This definition is as follows:

- the demolition of existing buildings and structures;
- service utility terminations and diversion/relocation;
- removal of existing hardstand/roads/pavements and infrastructure associated with existing buildings;
- rehabilitation of the excavation/earthmoving training area (dust bowl);
- remediation of contaminated land and hotspots, including areas known to contain asbestos, and the removal of:
  - underground storage tanks
  - unexploded ordnance and explosive ordnance waste if found
  - asbestos contaminated buildings
- archaeological salvage of Aboriginal and European sites;
- establishment of a conservation area along the Georges River;
- establishment of construction facilities (which may include a construction laydown area, site offices, hygiene units, kitchen facilities, wheel wash and staff parking) and access, including site security; and

- vegetation removal, including the relocation of hollow-bearing trees, as required for remediation/demolition purposes, however:
  - vegetation clearing will only occur as required to carry out Early Works activities
  - no Endangered Ecological Communities (EECs) or Threatened Ecological Communities (TECs) will be removed except where required for Early Works activities.

The Early Works footprint is illustrated in Figure 1.

There are a number of incidents where works will be required outside of the approximate Early Works footprint, but are allowable under the Stage 1 Conditions of Consent. These are summarised below.

- Demolition of existing pavement hardstand and structures not identified in original Early Works footprint figure.
- Remediation of known anthropogenic fill areas and removal of fly-tipped material.
- Utilities termination at Moorebank Avenue on the eastern boundary of the site. This will involve potholing, minor excavation, capping of utilities, concreting and back filling of the excavation.
- The establishment of stockpile sites to stockpile demolition material such as concrete and to facilitate remediation will also be required and is the primary subject for this environmental review.

1.4 Scope of Early Works

The scope of work is to undertake demolition and remediation works on MPW Stage 1, in order to provide unencumbered access for the subsequent works package/s. The works generally include the following:

- establishment of construction site facilities and management of site security;
- utility services and stormwater identification, termination and removal;
- heritage salvage and relocation works;
- demolition of existing infrastructure and buildings;
- remediation/management of identified contaminated areas;
- rehabilitation of the Former Dust Bowl Fire Training Area (Dust Bowl);
- PFAS affected catchment capping and lining; and
- installation of environmental management measures.

Further detail of the activities to be undertaken as part of early works can be found in Section 3 of the MPW Stage 1 CEMP.

1.4.1 Demolition Works

The Contractor will demolish identified existing hardstands, pavements and associated civil infrastructure, utility services and building structures throughout the Early Works footprint. The works involves:

- removal of hazardous materials in contaminated buildings including ACM;
- demolition of the building structures including single and multi-storey residential buildings, office buildings of various sizes and open and enclosed warehouse buildings. The buildings are required to be demolished to the underside of the lowest floor slab;
- demolition of the civil infrastructure including all existing roads, hardstands and external pavements to 500mm below finished ground level; and
- Removal and backfill of underground utility services.

1.4.2 Remediation Works

The extent of the remediation works involves:

- removal and disposal of underground storage tanks (UST) and associated infrastructure in accordance with UPSS Technical Note: Decommissioning, Abandonment and Removal of UPSS (DECCW, 2010), (ground validation by others) and backfilling of remediated excavations;

- remediation of contaminated soils and hotspots, including areas known to contain asbestos, and removal of Unexploded Ordnance (UXO) and Explosive Ordnance Waste (EOW);

remediation of contaminated stockpiles and anthropogenic fill waste/dump pits; and

- remediation of contaminated soils impacted by PFAS and PFOS.

Additional detail regarding remediation activities that are part of early works are provided in Section 3.6 of the MPW Stage 1 CEMP.

1.4.3 Heritage works

European heritage works

As per the change in scope the Cullen Universal Steel Truss (CUST) and STRARCH Hangar will be demolished. The European heritage work will involve the following:

- Careful demolition of the concrete floor of the CUST hut under the direction and attendance of a heritage representative in order to identify if the earthen floor is intact and if there is potential for relics and artefacts.
- Where no features or potential for relics of local or Commonwealth significance are identified, the former earthen floor is subject to archival recording by an heritage representative.
- Where features or potential for relics of local or Commonwealth significance are identified archaeological salvage excavation must be conducted in accordance with a research design prepared by the heritage representative prior to the commencement of demolition.
- Heritage salvage of archaeological deposits at MHPAD1 and MHPAD2 in accordance with an archaeological salvage program prepared by the heritage representative.

Aboriginal heritage works

The Aboriginal heritage works involves the following:

- heritage salvage works of Moorebank Aboriginal Heritage Artefact Sites (MA), MA1, MA2, MA3, MA4, MA5, MA9 and MA14 in accordance with detailed salvage strategy and investigation program prepared by the heritage representative in consultation with the relevant stakeholders and authorities
- any further archaeological excavation works identified and recommended by the results of the salvage works and archaeological investigation program.
- Any further archaeological excavation works recommended by the results of the non-Aboriginal archaeological investigation program affecting non-Aboriginal sites MHPAD1 and MHPAD2.
- Relocate the Aboriginal scarred tree known as MA8 in accordance with the mitigation measures included within the Aboriginal heritage report and the approved relocation methodology prepared by the heritage representative.

1.4.4 Installation of Environmental Management Measures

The environmental management measures detailed in the CEMP and sub-plans (including this CFFMP) will be implemented as a part of Early Works and will include (but not be limited to):

- long-term erosion and sediment (ERSED) control measures as per the Construction Soil and Water Management Sub-Plan. ERSED measures include:
  - sediment basins
  - catch drains
  - clean water diversion
  - swale construction
  - a separation layer to maintain clean surface water runoff separation from PFAS impacted soils

  - rationalisation and consolidation of surface water sediment basins
- weed control, as detailed in this document
- establishment of environmental protection exclusion zones as detailed in this document.
- dust control measures as per the Construction Air Quality Management Sub-Plan including:
  - the use of water carts for dust suppression
  - sign-posted speed limits
  - polymer sprays
  - Rumble grids and/ or wheel wash.

1.5 Environmental Management Document System

The CFFMP is part of the MPW Stage 1 environmental management framework for the Early Works. In accordance with the requirements of CoC D21(d), this CFFMP has been developed in consultation with NSW Office of Environment and Heritage (OEH). Further details of the consultation are provided in Section 3 of this CFFMP.

Mitigation measures identified in this CFFMP will be incorporated into site or activity specific Environmental Work Method Statements (EWMS). EWMS will be developed and signed off by environment and management representatives prior to the commencement of the associated works. Construction personnel will be required to undertake works in accordance with the mitigation measures identified in the EWMS.

The combination of the CEMP, sub-plans strategies, procedures and EWMS identify the required environmental management actions for implementation by the Contractor's personnel and sub-contractors.

The review and document control procedures for this CFFMP are described in the CEMP.

1.6 Purpose and Objectives

The purpose of this CFFMP is to describe how construction works are likely to impact on biodiversity and provide a plan for impact minimisation and management.

The key objective of this CFFMP is to ensure that impacts to flora and fauna are minimised and are within the scope permitted by the CoCs. To achieve this objective the following will be undertaken:

- Ensure controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts to flora and fauna within and adjacent to the Early Works footprint.
- Ensure appropriate measures are implemented to address the relevant CoCs and Revised Environmental Mitigation Measures (REMM) outlined in Table 1 and Table 2 respectively.
- Ensure measures are implemented to comply with all relevant legislation and other requirements as described in Section 2 of this CFFMP.

LEGEND

- MPW site
- MAUW compound
- Main compound
- Additional compound
- Site access via Chatham Avenue
- Stockpile Area (ACM)*
- Stockpile exclusion area
- Access road
- Existing road

Other materials, such a site-won material and ENM, may also be stockpiled in this area. Materials associated with unexpected finds will be stockpiled adjacent to the find.

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA 1994 MGA Zone 56
Date issued: September 18, 2020
Aerial imagery supplied by Nearmap (Jan, 2020)

1:15,000 at A4

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Figure 1: Site Layout

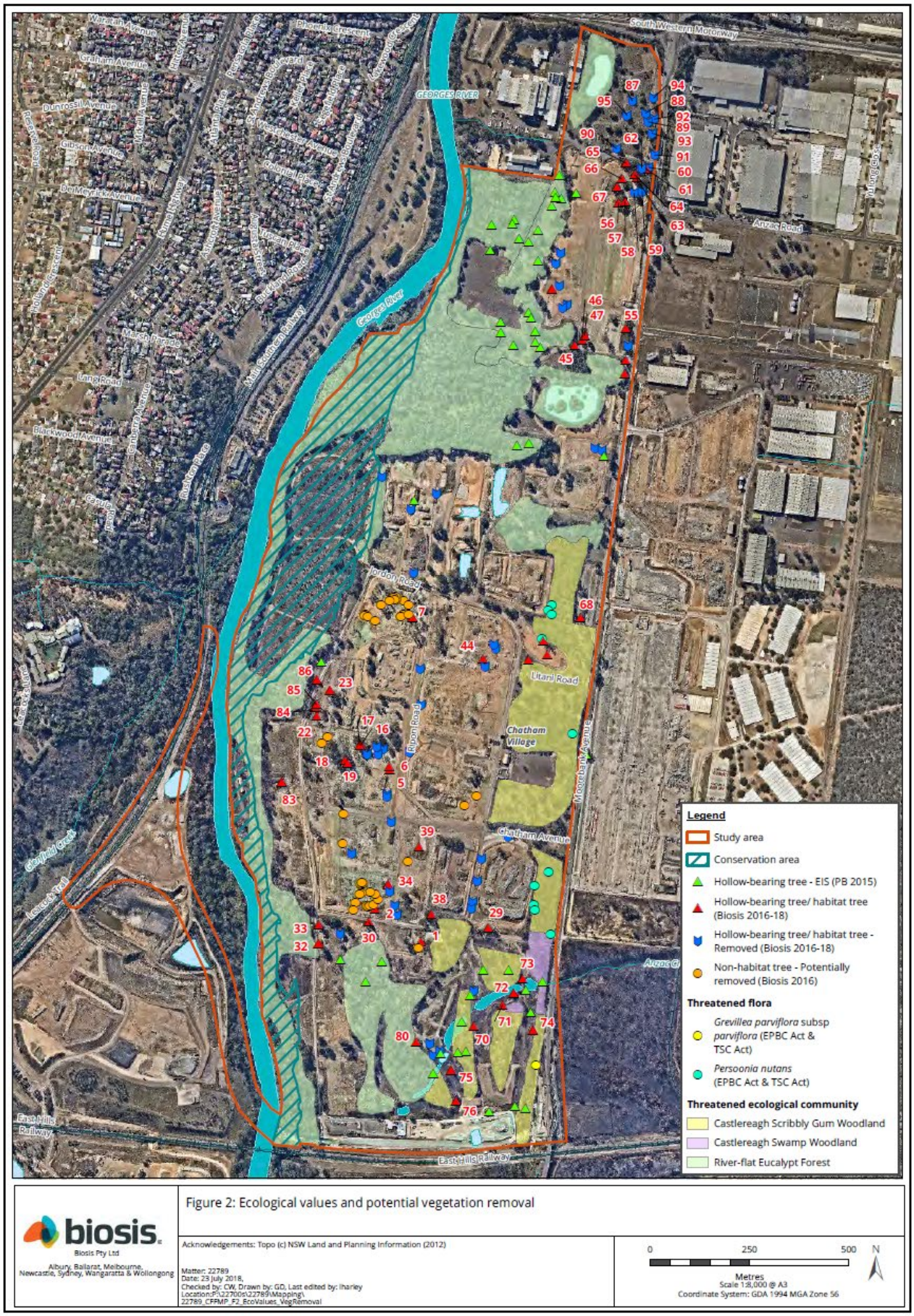

Figure 2 Ecological Values

ENVIRONMENTAL REQUIREMENTS

2.1 Relevant legislation and guidelines

The following section outlines the environmental requirements of the Early Works including relevant legislation and guidelines that have been used to assist in the formulation of this CFFMP. Legislation relevant to ecological values includes:

- Environmental Planning and Assessment Act 1979 (EP&A Act).
- Environment Protection Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth).
- Threatened Species Conservation Act 1995 (TSC Act) recently repealed and replaced by Biodiversity Conservation Act 2016 (BC Act).(Note. This CFFMP was originally prepared before the BC Act was enacted but updated where required to reflect the BC Act).
- Fisheries Management Act 1994 (FM Act).
- Noxious Weeds Act 1993 (NW Act).

Various recovery plans, Priority Actions Statements and best practice guidelines relating to the threatened species and ecological communities present within the study area were incorporated into this CFFMP.

2.2 Ministers conditions of consent

Table 1 Conditions of Consent relevant to this CFFMP

CoC No.	Condition requirements	CFFMP reference
CoC relating to the CFFMP		
D17	Within 12 months of the commencement of Early Works, the Applicant shall develop and implement a Biodiversity Offset Package for the approval of the Secretary. The Package shall detail how the ecological values lost as a result of the SSD will be offset. The Package shall be consistent with the NSW Biodiversity Offsets Policy for Major Projects (OEH 2014), unless otherwise agreed by the Secretary.	Biodiversity Offset Package (BOP) Approved by DPIE on 23/3/18.
D18	Subject to future Development Applications, no threatened species or communities can be cleared other than that required for Early Works. Any hollow bearing trees shall be relocated to areas to be determined by a suitably qualified ecologist in areas identified for conservation.	Section 0
D19	The Applicant shall prepare and implement a 'Threatened Dragonfly Species Survey Plan' to determine the presence or absence of threatened dragonfly species listed under the Fisheries Management Act 1994 on the Georges River, adjacent to the development site. The plan, including survey methodology, shall be prepared in consultation with DPI Fisheries prior to the commencement of Early Works.	Section 5.1
D21(d)	A Construction Flora and Fauna Management Plan to detail how impacts on ecology will be minimised and managed. The Plan shall be developed by a suitably qualified and experienced ecologist and in consultation with the OEH, and shall include, but not necessarily be limited to:	This plan
	(i) plans for impacted and adjoining areas showing vegetation communities; important flora and fauna habitat areas; locations where threatened species, populations or ecological communities have been recorded; including preclearing surveys to confirm the location of threatened flora and fauna species and associated habitat features.	Figure 2; Section 0 and Nest Box Plan
	(ii) the identification of areas to be cleared and details of management measures to avoid residual habitat damage or loss and to minimise or eliminate time lags between the removal and subsequent replacement of habitat such as: a) clearing minimisation procedures (including fencing),	Figure 2; Section 0 and Nest Box Plan

CoC No.	Condition requirements	CFFMP reference
	b) clearing procedures (including nest box plan), c) removal and relocation of fauna during clearing, d) habitat tree management, and e) construction worker education.	
	(iii) rehabilitation details, including identification of flora species and sources, and measures for the management and maintenance of rehabilitated areas.	Outside Contractors' scope for MPW Stage 1 works
	(iv) a Weed Management Strategy, incorporating weed management measures focusing on early identification of invasive weeds and effective management controls (including for those related to aquatic and riparian zones).	Appendix 2
	(v) a description of how the effectiveness of these management measures would be monitored	Section 0
	(vi) a procedure for dealing with unexpected EEC/ threatened species identified during construction, including cessation of work and notification to the OEH and DPI Fisheries, determination of appropriate mitigation measures in consultation with the OEH and DPI Fisheries (including relevant re-location measures) and updating of ecological monitoring and/ or biodiversity offset requirements; and	Appendix 3
	(vii) mechanisms for the monitoring, review and amendment of this plan.	Section 0

The Development Consent (SSD 5066) defines Construction as it relates to the Early Works Package as follows:

All work in respect of the SSD other than:

- Survey; acquisitions; or building/ road dilapidation surveys; fencing; investigative drilling, excavation or salvage.
- Work undertaken in accordance with a strategy or salvage operation required by the conditions of this approval; or minor clearing or translocation of native vegetation that does not comprise any EECs.
- Establishment of site compounds and construction facilities.
- Installation of environmental mitigation measures.
- Utilities adjustment and relocation that do not present a significant risk to the environment, as determined by the Environmental Representative.
- Other activities determined by the Environmental Representative to have minimal environmental impact.

2.3 Revised environmental mitigation measures

Table 2 Revised environmental mitigation measures relevant to this CFFMP

REMM No.	Mitigation measure	CFFMP reference
6A	Following detailed design and before construction, detailed flora and fauna mitigation measures would be developed and presented as part of the CEMP. These detailed measures would incorporate the measures listed in 6B to 6I The CEMP would address: • General impact mitigation. • Staff/contractor inductions. • Vegetation clearing protocols. • Pre-clearing surveys and fauna salvage/translocation. • Rehabilitation and restitution of adjoining habitat.	Sections 0 and 0

REMM No.	Mitigation measure	CFFMP reference
	• Weed control. • Pest management. • Monitoring. The plans would include clear objectives and actions for the Project including how to: • Minimise human interferences to flora and fauna. • Minimise vegetation clearing/disturbance. • Minimise impact to threatened species and communities. • Minimise impacts to aquatic habitats and species. • Undertake flora and fauna monitoring at regular intervals. It should be noted that these measures are outlined in the CFFMP (sub-plan to the CEMP).	
6B	Vegetation clearing would be restricted to the construction footprint and sensitive areas would be clearly identified as exclusion zones.	Section 0
6C	The exclusion zones would be marked on maps, which would be provided to contractors, and would also be marked on the ground using high visibility fencing (such as barrier mesh).	Section 0
6D	A trained ecologist would accompany clearing crews to ensure disturbance is minimised and to assist in relocating any native fauna to adjacent habitat.	Section 0
6E	A staged habitat removal process would be developed and would include the identification and marking of all habitat trees in the area. Where reasonable and feasible, clearing of hollow-bearing trees would be undertaken in March and April when most microbats are likely to be active (not in torpor) but are unlikely to be breeding or caring for young, and when threatened hollow-dependent birds in the locality are also unlikely to be breeding. Pre-clearing surveys would be conducted 12 to 48 hours before vegetation clearing to search for native wildlife (e.g. reptiles, frogs, Cumberland Land Snail) that can be captured and relocated to the retained riparian vegetation of the Georges River corridor. Vegetation would be cleared from a 10 m radius around habitat trees to encourage animals roosting in hollows to leave the tree. A minimum 48 hour waiting period would allow animals to leave. After the waiting period, standing habitat trees would be shaken (where safe and practicable) under the supervision of an ecologist to encourage animals roosting in hollows to leave the trees, which may then be felled, commencing with the most distant trees from secure habitat. Felled habitat trees would either be immediately moved to the edge of retained vegetation, or left on the ground for a further 24 hours before being removed from the construction area, at the discretion of the supervising ecologist. All contractors would have the contact numbers of wildlife rescue groups and would be instructed to coordinate with these groups in relation to any animal injured or orphaned during clearing. Within areas of high quality intact native vegetation proposed to be removed: • Topsoil (and seedbank) is to be collected from native vegetation that are to be permanently cleared and used in the revegetation of riparian areas; and • Native plants in areas that are to be permanently cleared are to be relocated and transplanted in riparian areas identified for rehabilitation.	Section 0
6F	Relocation of fauna to adjacent retained habitat would be undertaken by an ecologist during the supervision of vegetation removal.	Section 0

REMM No.	Mitigation measure	CFFMP reference
6G	An ecologist would supervise the drainage of any waterbodies on the Project site and would relocate native fish (e.g. eels), tortoises and frogs to the edge of the Georges River and/or the existing pond at the northern end of the IMT site.	**N/A -** No drainage of water bodies is proposed for the Early Works Package
6H	The design of site fencing and any overhead powerlines would consider the potential for collision by birds and bats and minimise this risk where practicable.	Section 0
6I	The potential for translocation of threatened plant species as individuals or as part of a soil translocation process would be considered during the detailed development of the CEMP.	Section 5.2.
6K	Important habitat elements (e.g. large woody debris) would be moved from the construction area to locations within the conservation area which would not be cleared during the Project, or to stockpiles for later use in vegetation/habitat restoration.	Section 0
6O	Erosion and sediment control measures such as silt fencing and hay bales would be used to minimise sedimentation of streams and resultant impacts on aquatic habitats and water quality.	Construction Soil and Water Management Plan
6R	The CEMP (or equivalent) would include detailed measures for minimising the risk of introducing weeds and pathogens.	**Error! Reference s ource not found.**
14C	Lighting required during construction of the Project would be designed and located to minimise the effects of light spill on surrounding sensitive receivers, including residential areas and the proposed conservation area.	Section 0

CONSULTATION

3.1 Consultation for preparation of the CFFMP

This CFFMP has been developed in consultation with the NSW OEH, in accordance with CoC D21(d). A summary of consultation undertaken during the preparation of this CFFMP is provided in Table 3

Table 3 Consultation undertaken during the preparation of the CFFMP

Organisation	Date	Outcome
Office of Environment and Heritage	26 September 2016	The CFFMP was submitted to Richard Bonner at Office of Environment and Heritage. No comments received from OEH.
Office of Environment and Heritage	27 and 29 September 2016	Followed up with phone calls to OEH and voice messages left.
Office of Environment and Heritage	12 November 2016	Emailed Richard Bonner of OEH asking for feedback in regard to the CFFMP and other sub plans. No response received.
Office of Environment and Heritage	16 November 2016	Followed up with a phone call to Richard Bonner of OEH and left a voice message asking for feedback in regard to the CFFMP and other sub plans.
Office of Environment and Heritage	9 January 2017	Called Richard Bonner, no answer. Called OEH general number and spoke to Susan Harrison. Susan advised that OEH have been swamped the past few months and have been focusing on project pre approvals, not the post approval project plans we have submitted. As we have not received any comments to date, consider there 'no comment' from OEH. Consultation closed.
Department of Primary Industries (Water)	18 October 2016	The CFFMP was emailed to Janne Grose for review.
Department of Primary Industries (Water)	8 November 2016	Review comments received via email. (See Appendix 4 for details)
Department of Primary Industries (Water)	17 November 2016	Comments addressed in revised plan. Consultation closed.

EXISTING ENVIRONMENT

4.1 Desktop review

The desktop review consisted of background research and review of available databases and key documents relevant to the Early Works, including:

- State Significant Development Approval – Concept Proposal and Early Works Moorebank Intermodal Terminal (SSD 5066) (Department of Planning &Environment [DP&E] 2016).
- *Moorebank Intermodal Terminal Project Environmental Impact Statement: Volume 4. Technical Paper 3 Ecological Impact Assessment* (with associated Biodiversity Offset Strategy) (Parsons Brinckerhoff 2014).
- *Moorebank Intermodal Terminal Biodiversity Offset Strategy* (Parsons Brinckerhoff 2015a).
- Moorebank Intermodal Terminal Supplementary Response to Submissions Report (Parsons Brinckerhoff 2015b).
- Commonwealth Department of Environment and Energy (DEE) Protected Matters Search Tool for EPBC Act listed Matters of National Environmental Significance (DEE 2016).
- OEH BioNet Atlas of NSW Wildlife for BC Act listed threatened flora, fauna populations and ecological communities (biota) (OEH 2016a).
- NSW Department of Primary Industries (DPI) Threatened and protected species - records viewer for FM Act listed threatened biota. NSW Department of Primary Industries (DPI) NW Act listed weeds for Liverpool City Council (DPI 2016).
- OEH Vegetation Information System (VIS) mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer (OEH 2016), such as, *The Native Vegetation of the Sydney Metropolitan Area* (OEH 2013a, b) and *The Native Vegetation of the Cumberland Plain Western Sydney* (NSW National Park and Wildlife Service [NPWS] 2002).

4.2 Ecological values of the study area

The study area encompasses an approximately 220 hectare site bound by Moorebank Avenue to the east, the South-Western Motorway (M5) to the north, Georges River to the west and T2 Airport Train Line to the south. Review of background documents found the following ecological values to be present at the study area (Figures 1 and 2).

- Three EECs listed under the NSW BC Act and/or the Commonwealth EPBC Act.
  - *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (River-flat Eucalypt Forest), listed as an endangered ecological community, BC Act only.
  - *Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion* (Castlereagh Scribbly Gum Woodland), listed as a vulnerable ecological community, BC Act and an endangered ecological community, EPBC Act.
  - *Castlereagh Swamp Woodland Community* (Castlereagh Swamp Woodland), listed as an endangered ecological community, BC Act only.
- Two threatened flora species listed under the NSW BC Act and the Commonwealth EPBC Act.
  - 10 specimens of Nodding Geebung *Persoonia nutans* listed as endangered on the BC Act and EPBC Act.
  - 16 specimens of Small-flower Grevillea *Grevillea parviflora* subsp. *parviflora* listed as vulnerable on the BC Act and EPBC Act.
- Approximately 69 hectares of native vegetation supporting habitat for the above threatened flora species, and an additional six flora species listed under the BC Act and/or EPBC Act, considered of moderate likelihood to occur as soil stored propagules. These additional species include:
  - Bynoes Wattle *Acacia bynoeana.*
  - Downy Wattle *Acacia pubescens.*

  - Dillwynia *tenuifolia.*
  - Woronora Beard-heath *Leucopogon exolasius.*
  - Hairy Geebung *Persoonia hirsuta .*
  - Sydney Bush-pea *Pultenaea parviflora.*
- Native vegetation has been assessed as providing a range of habitat values assessed as likely to support 34 threatened and/or migratory fauna species listed on the BC Act and/or EPBC Act, including birds, mammals and invertebrates. One species Grey-headed Flying-fox *Pteropus poliocephalus* listed as vulnerable on the BC Act and EPBC Act has been recorded flying over the study area.

Georges River, immediately west of the study area, was found to support native species of aquatic flora, aquatic fauna habitats, and nine species of fish, five of which are native.

The EIS assessed habitat provided by the Georges River has the potential to support two species of threatened dragonfly, Adam's Emerald Dragonfly *Archaeophya adamsi* and Sydney Hawk Dragonfly *Austrocordulia leonardi.* Both species have been assessed as having a low likelihood of occurrence within the study area (Parsons Brinckerhoff 2015).

4.2.1 Ecological Values of the MPW Stage 1 Works Area

The MPW Stage 1 works area is largely restricted to the Early Works footprint (Figure 1). The area, where the majority of demolition will be performed, does not generally contain any EECs (Figure 2), however, the removal of EEC, threatened species or high quality habitats may be required for the removal of underground services, heritage salvage and contamination remediation. The focus of Early Works activities covers the overall Project site where planning approval has been sought to commence the importation, placement and/or stockpiling of suitable fill for the first section of the next Land Preparation Works package.

Areas to be cleared of vegetation for access to demolition sites will be restricted to the Early Works footprint (Figure 1), unless subsequent Environmental review permits additional vegetation removal works.Mapping of EEC's was previously undertaken by Parsons Brinkerhoff (2014). Following ground-truthing by Biosis staff, the boundaries for some of these EEC areas has changed. The updates to this mapping is provided in Appendix 5 and is incorporated in Figure 2.

4.3 Noxious weeds

The following Table outlines noxious weed species in the Liverpool Local Government Area (LGA) recorded as present on site during preparation of the EIS (Parsons Brinckerhoff 2015) and outlines recommended treatment methods.

Requirements for treatment of noxious weeds during the Contractor's works are outlined in Table 4 below.

Table 4 Noxious weed management requirements

Scientific Name	Common Name	Control class	Legal requirements
Alternanthera philoxeriodes	Alligator weed	3	*The plant must be fully and continuously suppressed and destroyed.*
Asparagus aethiopicus	Asparagus fern	4	*The plant must not be sold, propagated or knowingly distributed.*
Asparagus asparagoides	Bridal creeper	4	*The plant must not be sold, propagated or knowingly distributed.*
Chrysanthemoides monilifera subsp. monilifera	Bitou bush	3	*The plant must be fully and continuously suppressed and destroyed.*
Chrysanthemoides monilifera subsp. rotundata	Boneseed	1	*The plant must be eradicated from the land and that land must be kept free of the plant.*

Scientific Name	Common Name	Control class	Legal requirements
Lantana camara	Lantana	4	*The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.*
Ligustrum lucidum	Broad-leaf privet	4	*The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.*
Ligustrum sinense	Small-leaf privet	4	*The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.*
Ludwigia peruviana	Ludwigia	3	*The plant must be fully and continuously suppressed and destroyed.*
Olea europaea subsp. cuspidata	African Olive	4	*The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.*
Rubus fruticosus species aggregate	Blackberry	4	*The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.*
Sagittaria platyphylla	Sagittaria	4	*The plant must not be sold, propagated or knowingly distributed.*
Salvinia molesta	Salvinia	2	*The plant must be eradicated from the land and that land must be kept free of the plant.*

ENVIRONMENTAL ASPECTS AND IMPACTS

5.1 Ecological impacts

Potential ecological impacts associated with the Contractor's Early Works Package include:

- loss of vegetation and habitat;
- removal of threatened species and EEC;
- direct and indirect impacts on threatened species and their habitats;
- habitat fragmentation and loss of wildlife connectivity;
- injury and mortality of fauna;
- invasion of exotic species, weeds, pests and pathogens;
- impacts due to noise, vibration and light; and
- cumulative impacts.

More details on these impacts are provided in the sections below. The mitigation and management measures provided in Table 5 and Table 6 will be implemented to minimise the above-listed potential impacts.

5.1.1 Loss of vegetation and habitat

Initial pre-clearance assessment (undertaken 26 July 2016) recorded a total of seven habitat trees (including six trees supporting hollows and one tree containing a bird nest) that would require removal to facilitate machine access to the demolition sites. Supplementary tree assessments recorded a total of 93 additional habitat trees (including 88 trees supporting hollows and 5 trees with other fauna habitat features) across the site. To date (as at 20/08/2018) a total of 53 habitat trees have been removed.

Figure 2 highlights the locations of all habitat trees within the project boundary. An inventory detailing all habitat trees, including the 53 trees that have been removed for demolition works, is found in the Nest Box Plan (Biosis 2018). This information was previously located in Appendix 1 of this document. All future tree removal (as of 20/08/2018) or habitat tree assessments will be monitored and recorded in the Nest Box Plan (Biosis 2018). Updates to this document will no longer occur.

Any tree removal that is undertaken should be done so in accordance with the management actions outlined in Table 5 of this CFFMP.

In accordance with CoC D18 clearing of native vegetation, including EEC, fauna habitats and threatened flora, will be required to carry out Early Works activities. Indirect impacts on vegetation and habitat arising from clearing and fragmentation may also occur. Indirect impacts may include increased edge effects, modification of habitat condition and structure, and loss of, or reduction in area of buffer zones.

Threatened Dragonfly Species Survey Plan Report (Arcadis 2016b) was completed in September 2016 and accepted by NSW DPI Fisheries as satisfying and closing out CoC C19. In summary, the report found a lack of preferred habitat for Adam's Emerald Dragonfly and Sydney Hawk Dragonfly (Endangered, FM Act) within the Moorebank Precinct West site (equivalent to the current study area). Due to this lack of preferred habitat and the previously assessed low likelihood of occurrence within the study area (Parsons Brinckerhoff 2015), no specific environmental mitigation measures have been developed to avoid or mitigate potential impacts to the species.

5.1.2 Impacts to threatened flora and fauna

As outlined above numerous threatened species and communities, have either been recorded within the study area, or have been assessed as likely to occur.

Removal of underground services, heritage salvage and contamination remediation works will occur across the Early Works footprint. Ecologist preclearance assessment and supervision will be undertaken prior to and during removal of any hollow-bearing trees required to access underground services in accordance with Table 5 of this CFFMP. Loss off tree hollows will be compensated by provision of nest boxes in accordance with the Nest Box Plan (Biosis 2018). Heritage salvage works will be restricted to the use of hand tools and will not require removal of vegetation.

5.1.3 Wildlife connectivity and habitat fragmentation

The extent and quality of the vegetated corridors through the study area will be reduced by the proposed works where tree and vegetation removal is required for Early Works. The riparian corridor (shown as the BioBank site in Figure 2) along the western boundary of the site will be maintained and will serve as the primary habitat corridor across the site throughout Early Works and later stages of the Project.

5.1.4 Injury and mortality

Injury and mortality to fauna species is possible during Early Works, particularly during habitat removal when fauna may be forced to move. Habitat clearing may result in an increase in arboreal and ground-dwelling mammals, reptiles and frogs being injured or killed by construction vehicles. It is expected that fauna will be able to move to safety via connected habitat by implementing a two stage clearing process as detailed in Section 0.

5.1.5 Weeds

The proposed works are not likely to significantly increase the presence or distribution of weeds in the area. There is, however, the potential for weeds to be spread during vegetation clearance, and through the movement of vehicles and machinery.

5.1.6 Noise, vibration and light

There is potential for resident native fauna to temporarily avoid habitats directly adjacent to the study area during construction, with bat species being particularly sensitive to any change in lighting that may occur.

5.2 Translocation of Threatened Flora Species

Translocation is defined as the “deliberate transfer of plant material from one area to another for conservation purposes” (Vallee et al. 2004). The three threatened species that are located within the construction footprint could be considered as candidates for translocation:

- *Grevillea parviflora* subsp. *parviflora*
- *Hibbertia puberula* subsp. *puberula*
- *Persoonia nutans.*

Translocation is not considered a mitigation measure under the EPBC Act and the flora individuals to be removed/translocated will still be considered to be directly impacted by the project. This impact will be compensated by the implementation of the Biodiversity Offset Package (BOP) that will be prepared for the Project.

Translocation is not considered to be necessary for *Grevillea parviflora* subsp. *parviflora* due to high representation of this species within the biobank site (estimated population of 6,186 (WSP 2018)). Similarly, *Hibbertia puberula* subsp. *puberula* has a high representation within the biobank site and translocation is not considered necessary for this species (direct count of 1,601 plants equivalent to an occupied area of habitat of 24.66 hectares).

Persoonia nutans will potentially be a good candidate for translocation since the population size within the biobank site is relatively low (258 plants counted) and because of its conservation status under both State and Commonwealth legislation (Endangered).

ENVIRONMENTAL MITIGATION MEASURES

Table 5 outlines tasks, potential environmental hazards and required management measures and actions associated with the Contractor undertaking demolition, salvage and remediation activities for Early Works.

These environmental mitigation measures and associated actions have been adapted from a plan provided to Biosis by Liberty Industrial via email (22 July 2016). The locations of the ecological values within the study area are indicated in Figure 2.

Table 5 Environmental mitigation measures – Demolition and remediation works

Task	Potential Hazard	Action	Responsibility
Site Establishment and protection of native vegetation and habitats			
Pre-clearance surveys of Early Works footprint	Clearing / injury to threatened flora or fauna Spread of noxious weeds	**No clearing of EEC vegetation is to occur without Environmental Representative approval through Environmental Review process.** • Project Ecologist to undertake a pre-clearing survey of the vegetation within 12-48 hours of clearing works to identify any potential threatened species, endangered vegetation, weed infestation, habitat trees. The ecologist will identify at a minimum: • The correct placement and installation of exclusion fencing; • The species and location of any weeds; • Locations of threatened flora species and habitat or hollow bearing trees; • Trees which require limbs to be removed; • Native wildlife (e.g. reptiles, frogs, Cumberland Land Snail) that can be captured and relocated to the retained riparian vegetation of the Georges River corridor. • Identification of pest fauna species. • If hollow-bearing or habitat trees are identified as requiring removal the two-staged clearing process is to be implemented and the clearing supervised by an ecologist. • Trees in clearing zones to be marked as follows: – Red flagging tape to indicate the tree is a habitat tree and an ecologist is required to supervise its removal. – Orange flagging tape to indicate the tree supports no fauna habitat and an ecologist is not required to be present during removal.	Contractor's Supervisor
Protection and re-use of habitat features	Loss of fauna habitat	• Suitable habitat elements (e.g. large woody debris) within the vegetation clearing zone may be stockpiled for later use in vegetation restoration	Contractor's EM Project Ecologist
Site lighting arrangements	Fauna disturbance	• Directional lighting will be used where lighting is required in construction areas to avoid impact on fauna.	Contractor's CM Site Supervisor
Contractor / Sub-contractor training and inductions	Accidental damage/injury to threatened flora and fauna	• Training will be provided to all project personnel, including relevant sub-contractors on flora and fauna requirements from this CFFMP through inductions and toolbox talks, e.g. construction workers shown	Contractor's Environmental Manager

Task	Potential Hazard	Action	Responsibility
		pictures of all threatened flora and fauna with a high likelihood of occurrence within the works area, and provided with identification information. • Training to be provided on the unexpected finds procedure.	
Top soil conservation	Loss of EEC and species diversity	Within areas of EEC that are proposed to be removed for Early Works: • Topsoil (and seedbank) should be collected from native vegetation to be permanently cleared and used in the revegetation of riparian areas; and • Native plants in areas that are to be permanently cleared are to be considered for relocation and translocation to riparian areas identified for rehabilitation.	Contractor's Environmental Manager
Fencing off of ecological values	Clearing / injury to threatened flora or fauna	As a minimum the following will be implemented to protect retained trees and threatened vegetation: • Fencing such as para-webbing or bunting is to be placed along the edge of the tree drip line for EEC vegetation that is not scheduled to be removed for Early Works. Signage to be placed to inform all personnel of the exclusion zone. • Retained trees will be fenced off and marked as exclusion zones within Environmental Control Plans. Fencing will be placed at the drip line of the tree at a minimum. • Where roots or branches are identified as being within the pre-construction zone, an arborist will be contacted to assess the likely impact on the tree prior to works commencing. • All exclusions zones will be included in sensitive areas maps.	Contractor's Supervisor
Heritage Fencing	Disturbance on items of heritage significance and EEC	• Heritage areas (unless otherwise specified for specific heritage items) for heritage items within the Early Works Footprint will be defined in all project mapping and will be adequately identified on the ground, including signage informing all personnel to keep out. • As part of the project induction all personnel will receive an induction relating to all heritage areas and items. This will include unexpected finds protocols and management measures.	Contractor's Project Manager, Supervisor and Environmental Manager
Heritage works			
Archival recording	Spread of weed and pathogens into EEC areas	• Ensure shoes and vehicle tyres/chassis are free from soil to prevent importing weed propagules and/or soil borne pathogens.	Contractor's Supervisor
Infrastructure disassembly and storage	Injury to fauna	• Project ecologist to inspect buildings prior to disassembly to check for presence of micro-bats and other fauna. • Fauna located should be translocated to appropriate habitat within the conservation lands as close as possible to the works area.	Contractor's Supervisor
Archaeological salvage (surface	Removal of EEC vegetation and spread of	• Project ecologist to inspect salvage / excavation areas for the presence of threatened species. • Limits of excavation within EEC vegetation are to be clearly marked and works restricted to within these areas.	Contractor's Project Manager, Supervisor and

Task	Potential Hazard	Action	Responsibility
salvage / excavation) in EEC zone	weed and pathogens into EEC areas	• Ensure shoes and vehicle tyres/chassis are free from soil to prevent importing weed propagules and/or soil borne pathogens.	Environmental Manager
Archaeological surface salvage of Aboriginal heritage items inside EEC zone: MA2, MA3, MA4	Damage to EEC vegetation and spread of weed and pathogens into EEC areas	• Undertake work in accordance with approved Salvage Strategy (Biosis 2017). • Prepare Environmental Work Method Statement to the satisfaction of the Environmental Representative. • No machinery access or use. • Works undertaken by foot. • Ensure shoes are free from soil to prevent importing weed propagules and/or soil borne pathogens.	Contractor's Project Manager, Supervisor and Environmental Manager
Archaeological sub-surface salvage of Aboriginal heritage item inside EEC zone: MA10/MRSA1	No works planned to be undertaken	• Should works become necessary: • Undertake work in accordance with approved Salvage Strategy (Biosis 2017). • Prepare Environmental Work Method Statement to the satisfaction of the Environmental Representative. • Undertake works subject to approval of environmental review by the Environmental Representative. • Ensure shoes and vehicle tyres/chassis are free from soil to prevent importing weed propagules and/or soil borne pathogens.	Contractor's Project Manager, Supervisor and Environmental Manager
Archaeological sub-surface salvage of non-Aboriginal heritage items inside EEC zone: MH1, MH6	Damage to EEC vegetation and spread of weed and pathogens into EEC areas	• Undertake work in accordance with approved Salvage Strategy (Biosis 2016). • Prepare Environmental Work Method Statement to the satisfaction of the Environmental Representative. • Minimise damage to EEC vegetation to the fullest extent practicable. • Undertake works subject to approval of environmental review by the Environmental Representative. • It is likely MH6 is outside the EEC zone. • Ensure shoes and vehicle tyres/chassis are free from soil to prevent importing weed propagules and/or soil borne pathogens.	Contractor's Project Manager, Supervisor and Environmental Manager
Archaeological salvage of Aboriginal heritage items outside EEC zone: MA1/PAD1, MA5	Spread of weed and pathogens into EEC areas	• Ensure shoes and vehicle tyres/chassis are free from soil to prevent importing weed propagules and/or soil borne pathogens. • Ensure no access to EEC zone.	Contractor's Project Manager, Supervisor and Environmental Manager
Archaeological salvage of non-Aboriginal heritage items outside EEC zone: MHPAD1, B99 transport compound, MH6, CUST hut,	Spread of weed and pathogens into EEC areas	• Ensure shoes and vehicle tyres/chassis are free from soil to prevent importing weed propagules and/or soil borne pathogens. • Ensure no access EEC vegetation that does not require removal for Early Works.	Contractor's Project Manager, Supervisor and Environmental Manager

Task	Potential Hazard	Action	Responsibility
STRARCH hangar, RAE chapel, MHPAD 2			
Vegetation Clearing			
Two-Stage clearing process of Early Works footprint Two-Stage clearing process of Early Works footprint.	Injury to fauna	• Environment Advisor to issue 'Permit to Clear' once pre-clearing survey is complete and signed off. No clearing shall be undertaken without Permit to Clear. Clearing of vegetation outside of the defined clearing permit boundary is not permitted. • If feasible clearing of any hollow-bearing vegetation (if required) is to be undertaken between March and April to minimise impacts to microbats and threatened bird species. If clearing of hollow-bearing vegetation is required outside this timeframe, this two-staged clearing process, under the supervision of an Ecologist is considered sufficient to minimise impacts to threatened species. • Local wildlife and vets to be contacted to assist in treating injured animals if necessary. • Ecologist to be present on site during the clearing process and relocate fauna for release at designated area where required. • Non-habitat vegetation removal first to a radius of 10m around habitat trees. Habitat trees are to remain standing overnight before further clearing to allow fauna to vacate the habitat. • After remaining standing overnight habitat trees are to be shaken (where safe and practicable) under the supervision of an ecologist to encourage roosting fauna to leave the trees, which may then be felled, commencing with the most distant trees from secure habitat. • Felled habitat trees are to be immediately moved to the edge of retained vegetation, or left on the ground for a further 24 hours before being removed from the construction area, at the discretion of the supervising ecologist. • Important habitat elements (e.g. large woody debris) are to be moved to locations within the conservation area (under supervision of the ecologist), which will not be cleared during the Project, or to stockpiles for later use in vegetation/habitat restoration. • Select appropriate size/type of machines and equipment for clearing. Remove trees so as not to cause damage to surrounding vegetation or to areas outside the project boundary (ensuring groundcover disturbance is kept to a minimum). • Only the ecologist or fauna handler to touch or move fauna. If fauna is present, allow to move through worksite or contact the ecologist, fauna handler or WIRES to assist in relocation to adjacent retained habitat.	Contractor's Project Manager, Supervisor and Environmental Manager
	Damage to retained trees and EEC habitat	• All personnel to stay out of the vegetation zones not covered by the clearing permit. • Ensure no materials are stockpiled and no vehicles are parked within the tree drip line. • No excavation or placing of fill near any tree without advice from an ecologist.	Contractor's Project Manager, Supervisor and

Task	Potential Hazard	Action	Responsibility
		• Route haul roads and access tracks clear of the tree drip line.	Environmental Manager
Re-use of fauna habitat / installation of nest boxes	Loss of fauna habitat	• Any hollow bearing trees removed shall be relocated to areas to be determined by the Project Ecologist in areas identified for conservation. • The removal of hollow-bearing or habitat trees will trigger the requirement to implement the Nest box plan (Biosis 2018).	Contractor's Project Manager, Supervisor and Environmental Manager
Disturbance to vegetation	Spread of noxious weeds	Ongoing monthly weed inspections are to be undertaken by a person experienced in the identification of noxious weed species. If weeds are identified within area of clearing permit then: • Weeds to be treated in accordance with Table 6 below and disposed of off-site at a licenced waste facility. Weedy material must not be mulched or retained on site. • Weed contaminated topsoil is to be segregated from non-weed contaminated topsoil or removed from site to a designated licensed landfill. Stockpile to be bunded and covered to minimise potential of seed washing away. • Plant/equipment used in areas where noxious weeds are present to be washed down and declared weed free before moving to a non-weed area.	Contractor's Project Manager, Supervisor and Environmental Manager

COMPLIANCE MANAGEMENT

7.1 Roles and responsibilities

The Contractor's and SIMTAs organisational structure and overall roles and responsibilities are outlined in the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Sections 0 of this CFFMP.

7.2 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls / management measures, compliance and conformance with the CoC, this sub-plan, and other relevant approvals, licenses and guidelines.

Weekly (internal) inspections will be undertaken by the Environmental Adviser which will include monitoring and maintenance of "no-go zones" and exclusion fencing, as outlined in Section 9 of the CEMP.

External audits will be undertaken by the Independent Auditor to ensure management measures such as maintenance to "no-go zones", installation and maintenance of nest boxes (if required), suppression of noxious weeds, and other CFFMP requirements, outlined in Table 5, are undertaken.

7.3 Incidents

If an incident occurs that results in actual or potential impacts on known threatened ecological values and/or threatened ecological values that are discovered unexpectedly, the OEH and other relevant government agencies are to be notified immediately.

7.4 Non-compliance, Non-conformance and Actions

It is the responsibility of all site personnel to report non-compliances and non-conformances to the Site Supervisor and/or the Contractor's EM.

Non-compliances, non-conformances and corrective and preventative actions will be managed in accordance with Section 10.3 of the CEMP.

7.5 Reporting

Reporting requirements and responsibilities of biodiversity related issues should be documented in accordance with the environmental management processes in the CFFMP and CEMP. These are to include:

- Pre-clearance inspections and reports as outlined in Table 5, with any urgent issues communicated and rectified prior to commencement of clearing works.
- Ongoing monthly weed inspections and reports to ensure any new weed outbreaks are treated as outlined in the Weed Management Strategy outlined in Appendix 2.

REVIEW AND IMPROVEMENT

8.1 Continuous improvement

Opportunities for the improvement of this CFFMP will be found through the ongoing evaluation of environmental management performance against environmental policies, objectives and targets as outlined in Section 1.5 of the CEMP. The purpose of this is to:

- identify opportunities for the improvement of environmental management and performance;
- determine the cause or causes of non-conformances and deficiencies;
- development and implementation of a plan of corrective and preventative actions to address any non-conformances and deficiencies in this CFFMP;
- corroborate the efficiency of the corrective and preventative actions;
- document any changes in procedures resulting from process improvement; and
- revise the objectives and targets of this CFFMP accordingly.

8.2 CFFMP update and amendment

The processes described in Section 1.5 of the CEMP may result in the need to update or revise this CFFMP. This will occur as needed. A copy of the updated CFFMP and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure.

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APPENDIX 1 NEST BOX PLAN AND ADVICE

APPENDIX 2 WEED MANAGEMENT STRATEGY

Table 6 below outlines noxious weed species in the Liverpool Local Government Area (LGA) recorded as present on site during preparation of the EIS (Parsons Brinckerhoff 2015) and outlines recommended treatment methods.

Ongoing monthly weed inspections and reports are to be undertaken, as outlined in Section 0, to ensure early detection of weeds and to enable new weed outbreaks are treated utilising best practice treatment methods. Weed inspections should be undertaken across all areas where disturbance to vegetation is likely to occur as part of the Contractor's Early Works Package.

All noxious weed species listed below (Table 6) are to be treated as a priority before vegetation disturbance. Class 1 – 3 noxious species are to be treated as highest priority across the entire site as per their NW Act control requirements, those being:

Class 1 - The plant must be eradicated from the land and that land must be kept free of the plant.

Class 2 - The plant must be eradicated from the land and that land must be kept free of the plant.

Class 3 - The plant must be fully and continuously suppressed and destroyed.

Noxious weed species are also to be noted during pre-clearance surveys as outlined in Table 5. Should disturbance to noxious weed be likely during vegetation removal works, noxious weeds are to be managed as outlined in Table 5, utilising the treatment techniques outlined in Table 6 below.

Table 6 Noxious weed management

Scientific Name	Common Name	Control class	Manual control	Chemical control
Alternanthera philoxeriodes	Alligator weed	3	Mechanical removal, wherever possible	Spot spray with Glyphosate 360 g/L at a rate of 10 ml per 10 L. Actively growing summer through winter, floating form only.
Asparagus aethiopicus	Asparagus fern	4	Mechanically remove rhizomes where possible.	Spot spray application of Glyphosate 360 g/L Roundup® at a rate of 1 part glyphosate to 50 parts water. Best done between flowering and berries forming.
Asparagus asparagoides	Bridal creeper	4	Mechanically remove rhizomes where possible.	Spot spray application of Glyphosate 360 g/L Roundup® at a rate of 1 part glyphosate to 50 parts water. Best done between flowering and berries forming.
Chrysanthemoides monilifera subsp. monilifera	Bitou bush	3	Hand removal of young plants, encourage native species regeneration.	Gas gun/Splatter gun application of Glyphosate 360 g/L Roundup® at a rate of 1 part per 29 parts water or 1 part per 19 parts water. Use the higher rate on bushes over 1.5 m.
Chrysanthemoides monilifera subsp. rotundata	Boneseed	1	Hand removal of young plants, encourage native species regeneration.	Gas gun/Splatter gun application of Glyphosate 360 g/L Roundup® at a rate of 1 part per 29 parts water or 1 part per 19 parts water. Use the higher rate on bushes over 1.5 m.
Lantana camara	Lantana	4	Manual control can be effective by slashing or manual removal.	Spot spray application of Dichlorprop 600 g/L Lantana 600® at a rate of 1.0 L per 200 L of water. Completely wet all leaves and stems.

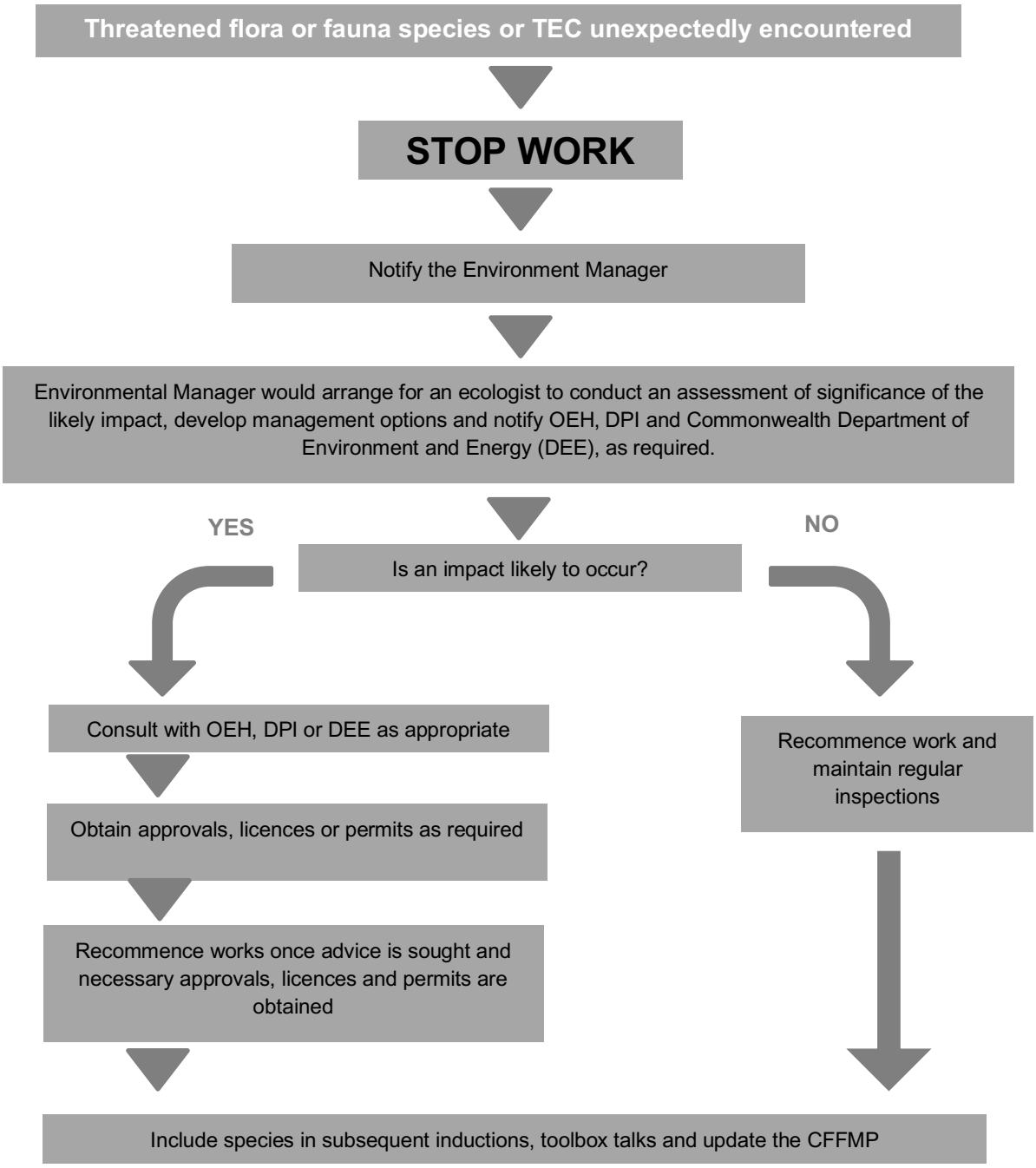
Scientific Name	Common Name	Control class	Manual control	Chemical control
Ligustrum lucidum	Broad-leaf privet	4	Small plants and seedlings can be manually controlled.	Apply Metsulfuron-methyl 600 g/kg Brush-off® to bushes up to 3 m high at a rate of 10 g per 100 L of water. Complete coverage is essential.
Ligustrum sinense	Small-leaf privet	4	Small plants and seedlings can be manually controlled.	Apply Metsulfuron-methyl 600 g/kg Brush-off® to bushes up to 3 m high at a rate of 10 g per 100 L of water. Complete coverage is essential.
Ludwigia peruviana		3	Small plants and seedlings can be manually controlled.	Spot spray application of Glyphosate 360 g/L at a rate of 1 L of glyphosate per 100 L of water. Actively growing at or beyond the early bloom stage of growth but before autumn change of colour. Thorough coverage is necessary for best results.
Olea europaea subsp. cuspidata	African Olive	4	Physically remove young plants.	Cut and paint small plant with neat Glyphosate 360 g/L. Cut stump/scrape stem application for saplings. Stem injection application large trees and shrubs.
Rubus fruticosus species aggregate	Blackberry	4	Slashing of juvenile bushes.	Gas gun/Splatter gun application of Triclopyr 300 g/L + Picloram 100 g/L Grazon® DS at a rate of 335 mL per 10 L of water. Apply to actively growing bushes.
Sagittaria platyphylla		4	Isolated plants can be manually removed.	Spot spray application of Glyphosate 360 g/L at a rate of 10 L of glyphosate per 100 L of water. Direct spray onto weed mats in infested areas. Do not broadcast spray over water.
Salvinia molesta		2	Isolated plants can be manually removed.	Spot spray application of Glyphosate 360 g/L at a rate of 01 L of glyphosate per 100 L of water. Direct spray onto weed mats in infested areas. Do not broadcast spray over water. Hand gun application of Glyphosate 360 g/L, follow directions on the permit.

APPENDIX 3 UNEXPECTED EEC / THREATENED SPECIES PROCEDURE

The unexpected EEC/threatened species procedure details the actions to be taken when a threatened flora or fauna species or EEC is unexpectedly encountered on site.

Induction/Training

All site personnel are to be inducted on the potential threatened species occurring on site and the unexpected threatened species finds procedure. Fact sheets including photos and descriptions of threatened species that construction personnel should keep watch for during earth works are included.



Threatened species present on site – Nodding Geebung *Persoonia nutans*

An erect to spreading shrub to 2.5 m high with hairy young branches. Leaves are well separated on mature stems, linear, 1 - 3 cm long, 1 - 1.8 mm wide, usually flat, with recurved margins. They are sparsely hairy when immature, and hairless when mature. Flowers are yellow, pendant to drooping on a stalk to 12 mm long. Flowering typically occurs from November to March. (OEH TSPD 2016)

Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests. Southern populations also occupy tertiary alluvium, but extend onto shale sandstone transition communities and into Cooks River / Castlereagh Ironbark Forest. (OEH TSPD 2016)

Nodding Geebung (OEH 2016)

Nodding Geebung flower (OEH 2016)

The species is known to occur within the study area in Castlereagh Scribbly Gum Woodland EEC (Figures 1 and 2).

Threatened species present on site – Small-flowered Grevillea *Grevillea parviflora* subsp. *parviflora*

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. (OEH TSPD 2016)

Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Sydney region occurrences are usually on Tertiary sands and alluvium, and soils edrived from the Mittagong Formation. Soil landscapes include Lucas Heights or Berkshire Park. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. In Sydney it has been recorded from Shale Sandstone Transition Forest and in Cooks River / Castlereagh Ironbark Forest at Kemps Creek. (OEH TSPD 2016)

Small-flowered Grevillea (OEH 2016)

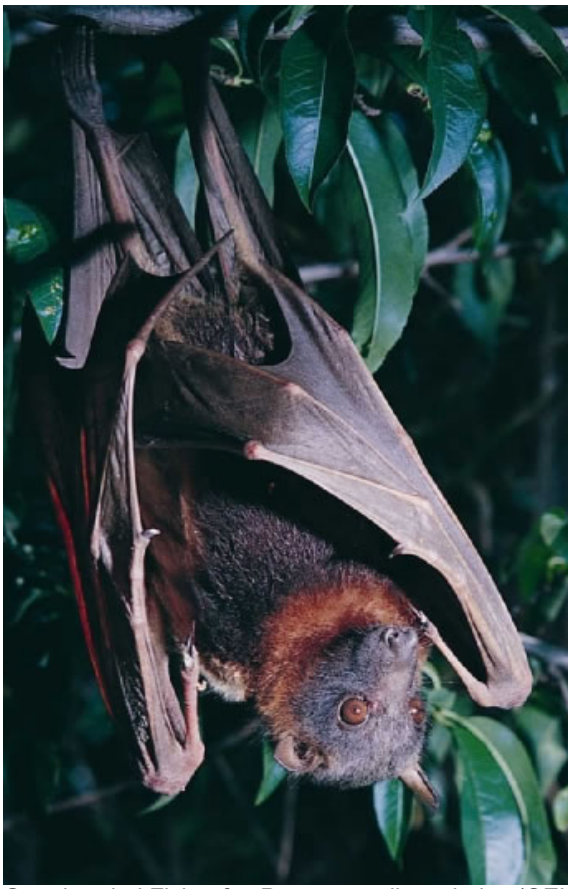
Small-flowered Grevillea habit and habitat (OEH 2016)

The species is known to occur within the study area in Castlereagh Scribbly Gum Woodland EEC (Figures 1 and 2).

Threatened species present on site – Grey-headed Flying-fox *Pteropus poliocephalus*

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. (OEH TSPD 2016)

Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. (OEH TSPD 2016)



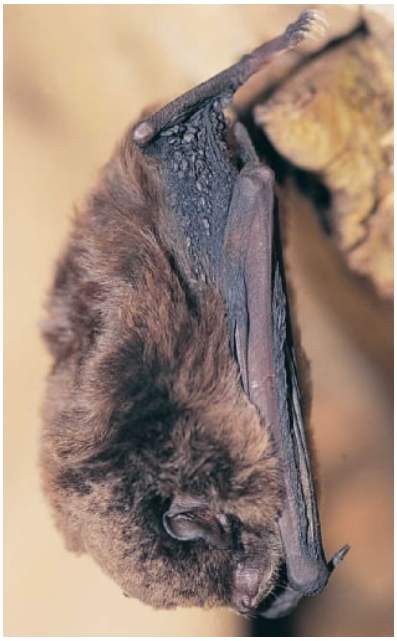
Grey-headed Flying-fox Pteropus poliocephalus (OEH 2016)

Threatened species highly likely to be present on site (Parsons Brinckerhoff 2014)

Little Lorikeet *Glossopsitta pusilla* (OEH 2016)

The Little Lorikeet is found in forests, woodland, and in treed areas along watercourses and roads. Forages mainly on flowers, nectar and fruit. Found along coastal east Australia from Cape York in Queensland down east coast and round to South Australia. Uncommon in southern Victoria (Higgins 1999, Parsons Brinckerhoff 2014).

Eastern Bent-Wing Bat *Miniopterus schreibersii oceanensis* (OEH 2016)



Usually found in well-timbered valleys where it forages on small insects above the canopy. Roosts in caves, old mines, stormwater channels and sometimes buildings and often return to a particular nursery cave each year (Churchill 2008, Parsons Brinckerhoff 2014).

Eastern Free-tail Bat *Mormopterus norfolkensis* (OEH 2016)

The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in manmade structures (Churchill 2008). It will travel and forage in open country or along creek lines and may utilise remnants too isolated or disturbed for many other species. (Department of Environment and Climate Change 2007, Parsons Brinckerhoff 2014).

Southern Myotis *Myotis macropus* (OEH 2016)

Colonies occur in caves, mines, tunnels, under bridges and buildings. Colonies always occur close to bodies of water where this species feeds on aquatic insects (Churchill 2008, Parsons Brinckerhoff 2014).

Threatened species potentially present on site

Bynoes Wattle *Acacia bynoeana* (OEH 2016) Species is known to occur within Castlereagh Scribbly Gum Woodland EEC (Figures 1 and 2).

Downy Wattle *Acacia pubescens* (OEH 2016) Species is known to occur within highly disturbed areas with no or limited native vegetation, and EEC vegetation surrounding the study area. EEC vegetation present within the study area is not known to support the species.

***Dillwynia tenuifolia* (OEH 2016)** Species is known to occur within Castlereagh Scribbly Gum Woodland EEC and Castlereagh Swamp Woodland (Figures 1 and 2).

Woronora Beard-heath *Leucopogon exolasius* (OEH 2016) Species is known to occur within Castlereagh Scribbly Gum Woodland EEC and Castlereagh Swamp Woodland EEC (Figures 1 and 2).

Hairy Geebung *Persoonia hirsuta* (OEH 2016) Species is known to occur within River-flat Eucalypt Forest EEC (Figures 1 and 2).

Sydney Bush-pea *Pultenaea parviflora* (OEH 2016) Species is known to occur within Castlereagh Scribbly Gum Woodland EEC (Figures 1 and 2).

Cumberland Plain Land Snail carapace (OEH 2016) Species known to occur in leaf litter and flaking bark detritus around the bases of mature trees. Likely to occur on the edges of EEC vegetation.

Cumberland Plain Land Snail (OEH 2016)

APPENDIX 4 NSW DPI (WATER) COMMENTS

Table 7 details comments received from NSW (Water) DPI on the CFFMP.

Table 7 NSW DPI (Water) comments

Section	DPI (Water) comment	Contractor's Response	Relevant section
2.3 Table 2	08/11/2016 The CFFMP includes the following Revised Environmental Mitigation Measures (REMMs), which are relevant to the CFFMP and that apply to areas within high quality intact native vegetation that are proposed to be removed (see Table 2, REMM No 6E, page 10): Topsoil (and seedbank) is to be collected from native vegetation that are to be permanently cleared and used in the revegetation of riparian areas; and Native plants in areas that are to be permanently cleared are to be relocated and transplanted in riparian areas identified for rehabilitation Table 2 indicates these REMMs are addressed in Section 6 of the CFFMP but Table 5 of Section 6 does not specifically include Actions to collect the topsoil and seedbank for the use in the revegetation of riparian areas, or to relocate and transplant native plants from areas that are to be cleared to the riparian corridor. DPI Water notes Table 5 includes an Action that "important habitat elements (e.g. large woody debris) are to be moved to locations within the conservation area….., or to stockpiles for later use in vegetation/habitat restoration". It is unclear why Actions are not included which specifically address the above REMMs. DPI Water recommends: Table 5 is amended to include Actions which specifically address the above REMMs so as to ensure they are undertaken as part of Stage 1 early works project; or The CFFMP explains why these REMMs are not relevant to the project.	17/11/2016 Changes made to Table 2. REMM 6E is not applicable to the scope of work. No areas of high quality native vegetation are to be removed for the Early Works package.	2.3 Table 2

APPENDIX 5 MAPPING UPDATES

Mapping of EEC's was previously undertaken by Parsons Brinkerhoff (2014). Following ground-truthing by Biosis staff the boundaries for some of these EECs has changed. Amendments include:

Revised EEC mapping of Castlereagh Scribbly Gum Woodland along Chatham Avenue (

- Figure 3).
- Revised EEC mapping of River-flat Eucalypt Forest north-west of Lake Sisinyak (Figure 4)

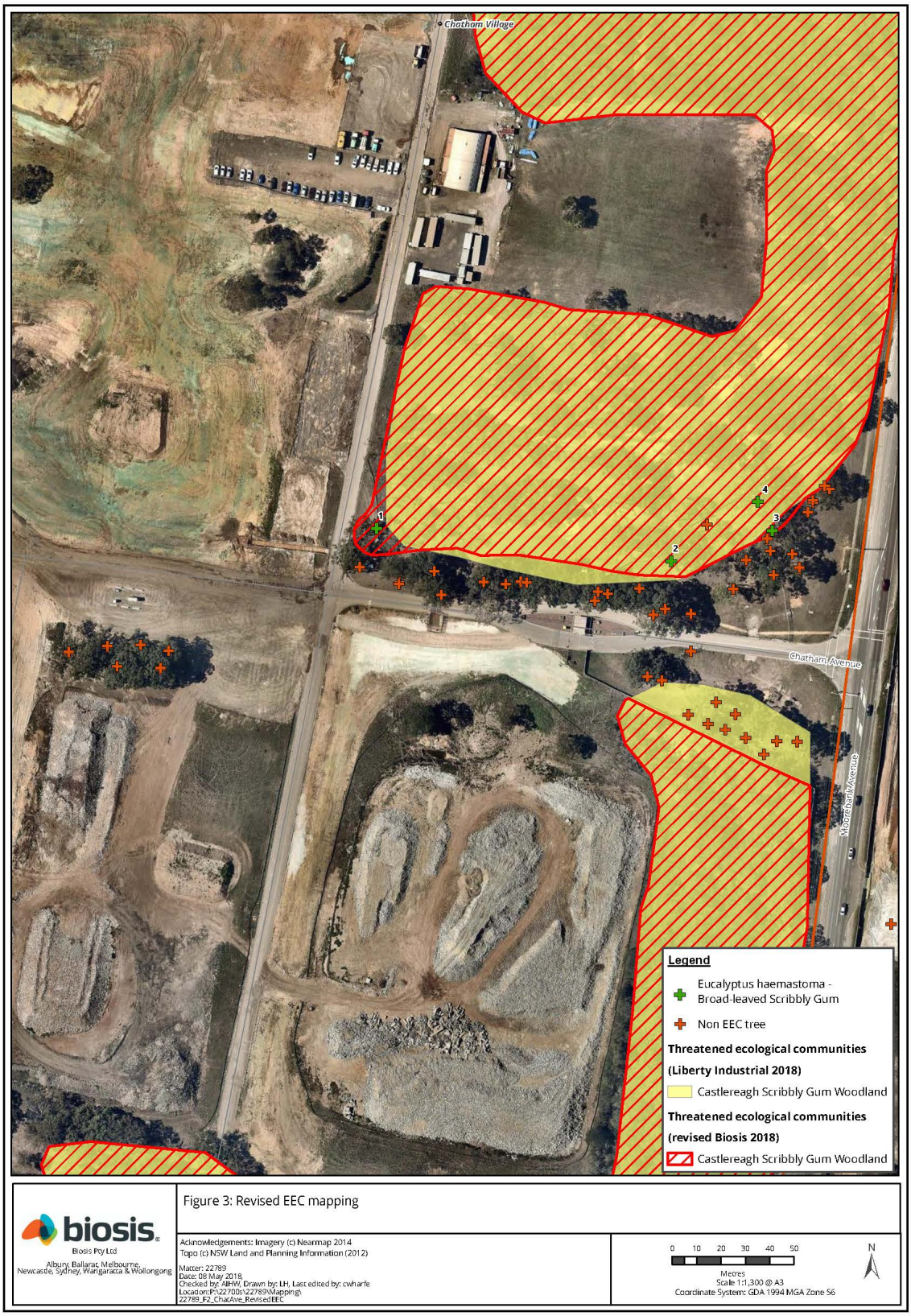


Figure 3 Revised EEC mapping of Castlereagh Scribbly Gum Woodland along Chatham Avenue

Figure 4 Revised EEC mapping of River-flat Eucalypt Forest north-west of Lake Sisinyak