

# Appendix B3

SGWPW-JHSW-NWW-PM-PLN-000514

Flora and Fauna Management Sub-Plan  
(State) – SSI 9737

Sydney Gateway Road Project

May 2021

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## Glossary/ Abbreviations

Abbreviations	Expanded text
BC Act	<i>Biodiversity Conservation Act 2016</i>
BS Act	<i>Biosecurity Act 2015</i>
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EESG	Environment, Energy and Science Group (DPIE)
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EWMS	Environmental Work Method Statements
FFMP	Flora and Fauna Management Plan
FM Act	<i>Fisheries Management Act 1994</i>
ISCA	Infrastructure Sustainability Council of Australia
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NW Act	<i>Noxious Weeds Act 1993</i>
Roads and Maritime	NSW Roads and Maritime Services
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
TSC Act	<i>Threatened Species Conservation Act 1995</i>

## Document control

### Approval and authorisation

<b>Title</b>	Flora and Fauna Management Sub Plan
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## Document control

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5	Environment Manager	
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# 1 Introduction

## 1.1 Context

This Flora and Fauna Management Sub Plan (FFMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Sydney Gateway Road Project (the Project).

This FFMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA) listed in the Projects combined Environmental Impact Statement (EIS) / Major Development Plan (MDP), Updated Management Measures (UMMs) from the Response to Submissions Report and all applicable legislation and TfNSW requirements.

## 1.2 Background and project description

### 1.2.1 Background

Transport for NSW (TfNSW) have gained approval to deliver a high capacity road connection linking the Sydney motorway network at St Peters interchange with Sydney Airport's domestic and international terminals and the Port Botany Precinct. The Project is located on both State and Commonwealth land.

For areas on State land, the Project was declared to be critical State significant infrastructure (CSSI) under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) and was approved by the NSW Minister for Planning and Public Spaces on 27 August 2020.

Commonwealth approval under the *Airports Act 1996* (the *Airports Act*) was granted by the Australian Minister for Infrastructure, Transport and Regional Development on 23 September 2020.

John Holland Seymour White Joint Venture (JHSWJV) have been contracted by Transport for New South Wales (TfNSW) for the Design and Construction of Sydney Gateway Stage 1 & Stage 3 (the Project).

### 1.2.2 Project Objectives

The objectives of the Project are to connect Sydney Airport Terminal 1 (the International Terminal) and Terminals 2/3 (the Domestic Terminals) with each other and with the Sydney motorway network via St Peters interchange. The Project aims to facilitate the movement of traffic towards Port Botany via General Holmes Drive, and will provide three main routes for traffic:

- Between the Sydney motorway network and Terminal 1, and towards the M5 motorway and the Princes Highway
- Between the Sydney motorway network and Terminals 2/3, and towards General Holmes Drive, Port Botany and Southern Cross Drive
- Between Terminal 1 and Terminals 2/3.

The Project also aims to provide improved access to Sydney Airport land located on both sides of Alexandra Canal and across the Botany Rail Line.

### 1.2.3 Detailed Description

The Project is located about eight kilometres south of the Sydney Central Business District, in the suburbs of Tempe, St Peters and Mascot. It sits within the boundaries of the Inner West, City of Sydney and Bayside local government areas.

The key features of the Project are illustrated in Figure 1-1, which include:

- Road links to provide access between the Sydney motorway network and Sydney Airport's terminals, consisting of the following components:
  - St Peters interchange connection – a new elevated section of road extending from St Peters interchange to the Botany Rail Line, including an overpass over Canal Road.
  - Terminal 1 connection – a new section of road connecting Terminal 1 with the St Peters interchange connection, including a bridge over Alexandra Canal and an overpass over the Botany Rail Line.
  - Qantas Drive upgrade and extension – widening and upgrading Qantas Drive to connect Terminals 2/3 with the St Peters interchange connection, including a high-level bridge over Alexandra Canal.
- Terminal links – two new sections of road connecting Terminal 1 and Terminals 2/3, including a bridge over Alexandra Canal.
- Terminals 2/3 access – a new elevated viaduct and overpass connecting Terminals 2/3 with the upgraded Qantas Drive.
- Road links to provide access to Sydney Airport land:
  - A new section of road and an overpass connecting Sydney Airport's northern lands on either side of the Botany Rail line (the northern lands access)
  - A new section of road, including a signalised intersection with the Terminal 1 connection and a bridge, connecting Sydney Airport's existing and proposed freight facilities on either side of Alexandra Canal (the freight terminal access)
- An active transport link, about 3 kilometres long and located along the western side of Alexandra Canal and section along Qantas Drive, to maintain connections between Sydney Airport, Mascot and the Sydney central business district.
- Intersection upgrades and/or modifications.
- Construction of operational ancillary infrastructure including maintenance bays, new and upgraded drainage infrastructure, signage and lighting, retaining walls, noise barriers, flood mitigation basin, emplacement mounds, utility works and landscaping.

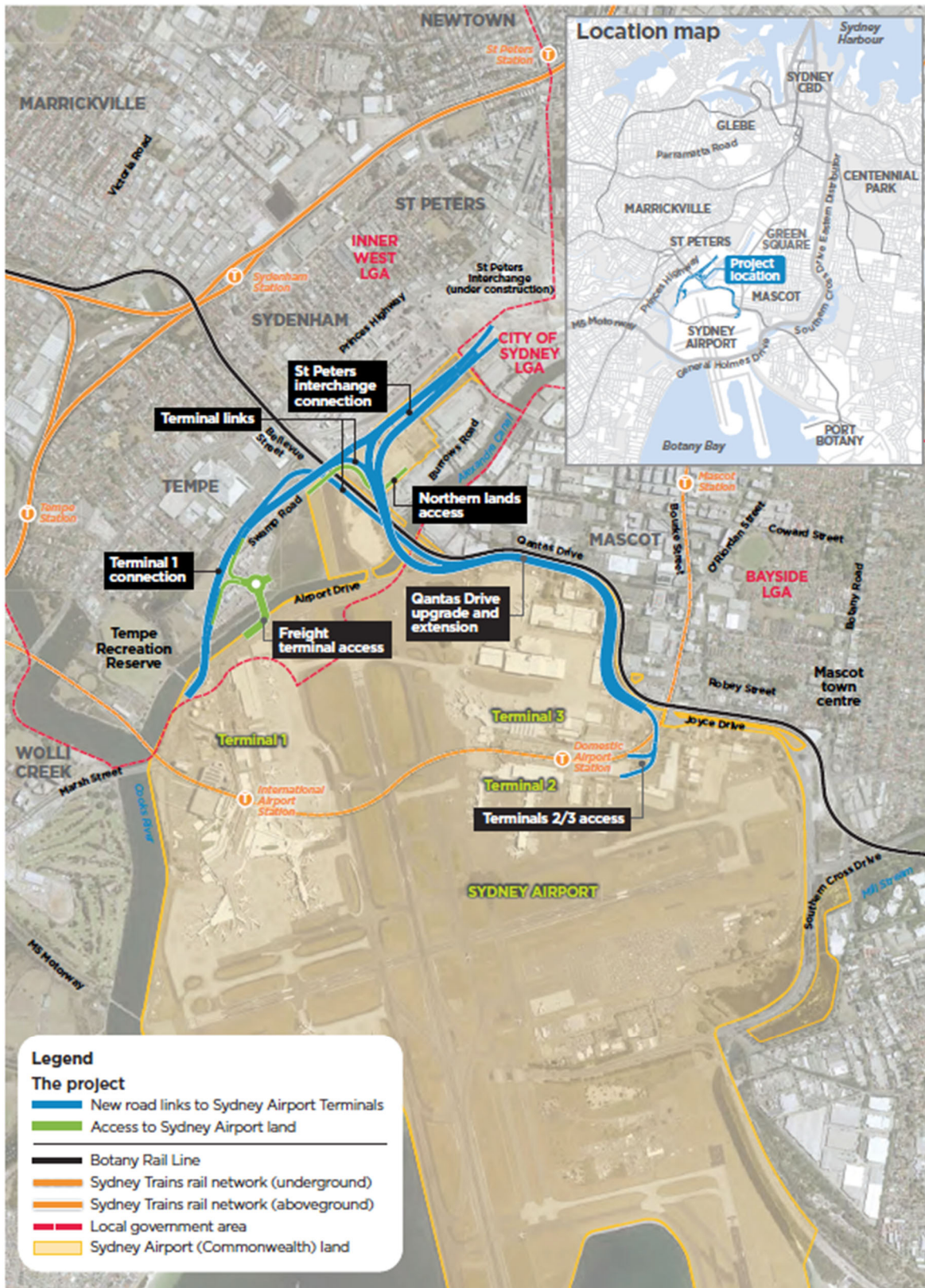
### 1.3 Scope of the Sub-Plan

This Plan has been developed specifically for works occurring within NSW State land under approval SSI 9737, which is administered by the NSW Department of Planning, Industry and Environment (DPIE). Works occurring within Commonwealth land are detailed in the Flora and Fauna Management Plan – Commonwealth.

### 1.4 Environmental management systems overview

The environmental management system overview is described in Section 1.5 of the CEMP. Used together, the CEMP, issue specific environmental management plans, strategies, procedures and environmental work method statements (EWMS) form management guides that clearly identify required environmental management actions for reference by JHSWJV personnel and contractors.





**Figure 1-1 Project overview**

## 2 Purpose and objectives

### 2.1 Purpose

The purpose of this plan is to describe how construction impacts on flora and fauna will be minimised and managed during the construction of the Project.

### 2.2 Objectives

- The objective of the FFMP is to ensure that all avoidance, mitigation and management measures relevant to the protection of native flora and fauna including threatened species and endangered ecological communities referred to in the documents listed are adopted and implemented: The combined Environmental Impact Statement (EIS) / Major Development Plan (MDP) prepared for the Sydney Gateway Project.
- Conditions of Approval for SSI 9737 issued by the Minister for Planning and Public Spaces (NSW), on 27 August 2020.
- Updated Management Measures (UMM's) detailed in the Response to Submissions Report.
- TfNSW specifications G36, G38 and G40.
- Relevant legislation and other requirements described in Section 3.1 of this Plan.

### 2.3 Targets and performance outcomes

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

- Ensure compliance with the relevant legislative requirements, CoAs and UMMs.
- Ensure training is provided in the form of inductions to relevant Project personnel relating to flora and fauna issues before they begin work on site.
- Implement mitigation measures to minimise flora and fauna impacts during construction.
- No impacts on threatened species, populations and ecological communities.
- No disturbance to flora and fauna outside the proposed Project footprint
- All fauna species encountered during construction are handled in accordance with the Project's Fauna Handling and Rescue Procedure
- Minimise impact to aquatic biodiversity values
- Minimise removal of high retention value trees

The following performance outcomes relevant to Flora and Fauna (as identified in Chapter 27.4 Compilation of performance outcomes of the EIS/MDP) are detailed in Table 2-1 below.

Table 2-1: Flora and Fauna Performance Outcomes

No.	Performance outcome	Where Addressed
1	<p>Biodiversity</p> <ul style="list-style-type: none"> <li>The Project is designed to minimise impacts on biodiversity. Where practicable, the design minimises the need to clear vegetation.</li> <li>Potential impacts on biodiversity are managed in accordance with relevant legislation, including the EP&amp;A Act, BC Act, EPBC Act and the <i>Biosecurity Act 2015</i> (NSW).</li> </ul>	<p>Implement the environmental safeguards BD1, BD2 and BD3 as specifically addressed in Appendix B- Vegetation Clearing Procedure and Appendix F- Tree Management Strategy of this Plan.</p>



## **3 Environmental requirements**

### **3.1 Relevant legislation and guidelines**

#### **3.1.1 Legislation**

All legislation relevant to this FFMP is included in Section 3.2.2 of the CEMP.

#### **3.1.2 Guidelines**

The main guidelines, specifications and policy documents relevant to this Plan include:

- TfNSW Specification G36 – Environmental Protection (Management System).
- TfNSW Specification G40– Clearing and Grubbing.
- Roads and Maritime Biodiversity Guidelines (September 2011).
- Department of Primary Industries 'Policy and Guidelines for Fish Habitat Conservation and Management (DPI 2013)
- Fishnote – Policy and Guidelines for Fish Friendly Waterway Crossings – November 2003;
- DECCW. 2008. Hygiene protocol for the control of disease in frogs.
- Australian Standard AS 4373 Pruning of Amenity Trees
- Australian Standard 4970 – 2009 Protection of Trees
- NSW WorkCover Code of Practice for the Amenity Tree Industry (1998)
- Australian Weeds Strategy 2017–2027

## 3.2 Ministers Conditions of Approval

The CoA relevant to the requirement for this Plan are listed Table 3 1 below. A cross reference is also included to indicate where the condition is addressed in this Plan or other project management documents.

Table 3-1: Minister's Conditions of Approval

CoA No.	Condition Requirements	Document Reference
C5	The following <b>CEMP Sub-plans</b> must be prepared in consultation with the relevant agencies identified for each <b>CEMP Sub-plan</b> . Details of all information requested by an agency during consultation must be included in the relevant <b>CEMP Sub-plan</b> , including copies of all correspondence from those agencies.  (h) Flora and fauna -- (EESG)	This Plan Section 3.4
C10	The Flora and Fauna Management Plan must include, but not be limited to:  (a) details of the measures to minimise disturbance to native vegetation to the minimum extent necessary; and (b) measures to avoid and minimise impacts on microbats, including pre-construction surveys of potential roost sites in accordance with "Standard survey methods - Roost Search (microbats)" on page 9 of 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method,' in built structures to be impacted, to confirm the presence or absence of roosting habitat.	This Plan  The requirement for pre-construction surveys of potential roosting sites for microbats is included in Table 6-2. The pre-construction surveys will be undertaken, and survey reports will be prepared prior to impacting any built structures.
C6	The <b>CEMP Sub-plans</b> must state how:	
	(a) the environmental performance outcomes identified in the documents listed in <b>Condition A1</b> will be achieved;	Section 2.3
	(b) the mitigation measures identified in the documents listed in <b>Condition A1</b> will be implemented;	Table 6-2
	(c) the relevant terms of this approval will be complied with; and	Section 3.2

CoA No.	Condition Requirements	Document Reference
	(d) issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed.	Table 6-2 Environmental Risk Assessment Workshop (Section 3.2.1 of CEMP)
C13	Any of the <b>CEMP Sub-plans</b> may be submitted along with, or subsequent to, the submission of the <b>CEMP</b> but in any event, no later than one (1) month before construction.	Refer to Section 2.2 of the CEMP
C14	Construction must not commence until the <b>CEMP</b> and all <b>CEMP Sub-plans</b> have been approved by the Planning Secretary. The <b>CEMP</b> and <b>CEMP Sub-plans</b> , as approved by the Planning Secretary, including any minor amendments approved by the <b>ER</b> , must be implemented for the duration of construction. Where construction of the CSSI is staged, construction of a stage must not commence until the <b>CEMP</b> and <b>Sub-plans</b> for that stage have been approved by the Planning Secretary.	Refer to Section 2.2 of the CEMP

### 3.3 Environmental Management Measures

Table 3.2 below details all other CoAs, UMMs and other requirements relevant to the development of this Plan.

Table 3-2: Other relevant requirements for development of this Plan

CoA No.	Condition Requirements	Document Reference
E82	The CSSI must be designed to retain as many existing trees as possible. Replacement trees and plantings must deliver a net increase in trees and tree canopy and aim to enhance the relevant council's position in respect of the Sydney Green Grid.	Section 6.6 Appendix F- Tree Management Strategy
E83	Replacement trees must:  (a) be located on public land and prioritised within 500 metres of the Construction Boundary in consultation with the relevant council and the Airport Operator; (b) comply with the National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports; (c) meet the requirements for quality tree stock specified in the AS2303:2018 Tree Stock for Landscape Use; (d) be provided no later than six (6) months following the commencement of operation; and (e) have a minimum pot size of 100 litres or 150 litres for safe clear trunk views at road verges unless a different pot size is specified in the relevant council's plans / programs / strategies for vegetation management, street planting, or open space landscaping, or as agreed by the relevant council(s) and Airport Operator.	Section 6.6 Appendix F- Tree Management Strategy

CoA No.	Condition Requirements	Document Reference
E84	A Landscape Strategy Report must be submitted to the Planning Secretary which details the type, size, number and location of replacement trees. The report must demonstrate how any replacement plantings are consistent with the requirements of Condition E83. The report must be submitted to the Planning Secretary for information no later than nine months following the commencement of operation.	Section 6.6 Appendix F- Tree Management Strategy
E85	The Proponent must consult with local community restoration/rehabilitation groups, Landcare groups, EESG, Sydney Water, and relevant councils prior to removing any native trees not to be reused by the CSSI, to determine if there is an interest for the reuse of suitable timber and root balls in habitat enhancement and rehabilitation work. If there is an interest, native trees that are removed for the construction of the CSSI and that are greater than 25-30 centimetres in diameter and three metres in length are to be salvaged and provided to the group(s) and/or relevant councils or agencies referred to in this condition as agreed.	Section 6.6 Appendix F- Tree Management Strategy

### Updated Management Measures

Outcome	Ref#	Requirement	Document Reference
Avoiding impacts on biodiversity	BD1	Detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat, including impacts on mapped areas of mangrove forest and Tempe Wetlands.	Appendix F- Tree Management Strategy
Avoiding impacts on biodiversity	BD2	Vegetation clearing will be limited to the minimum necessary to construct the Project. Micro-siting of infrastructure will be undertaken during detailed design to further minimise or avoid impacts on native vegetation where practicable. Exclusion areas will be established and maintained around any native vegetation adjoining the Project site to be retained in close proximity to work locations.	Section 6 Appendix F- Tree Management Strategy Appendix B- Vegetation Clearing Procedure
Tree protection during construction	LV11	Trees to be retained will be protected prior to the commencement of construction in accordance with AS4970-2009 Protection of trees on development sites and the Project's tree management strategy.  Any tree pruning will be undertaken in accordance with the Project's tree management strategy and carried out prepared by a qualified arborist.	Appendix F- Tree Management Strategy
Managing the loss of trees	LV4	The need to remove trees within the Project site will be avoided where practicable. For those trees that cannot be reasonably avoided, a tree management strategy will be developed, including measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation.  The strategy will also include on-site processes and protective measures to ensure trees identified for retention are appropriately protected during construction.	Appendix F- Tree Management Strategy

Outcome	Ref#	Requirement	Document Reference
Managing the potential for biodiversity impacts during construction	BD3	A Construction Biodiversity Management Plan will be prepared prior to construction and implemented as part of the CEMP. It will include measures to manage biodiversity and minimise the potential for impacts during construction. The plan will be prepared in accordance with relevant legislation, guidelines and standards.	This Plan
Attraction of wildlife at the former Tempe landfill	WM5	<p>The following measures would be implemented during works at the former Tempe landfill to avoid attracting wildlife:</p> <ul style="list-style-type: none"> <li>• Staging the excavation to minimise the amount of exposed waste at any one time</li> <li>• Minimising the size and area of exposed stockpiles</li> <li>• Ensuring material that has been disturbed, uncapped, or temporarily stockpiled is suitably covered at the end of each day.</li> </ul>	Soil and Water Management Plan (SGWPW-JHSW-NWW-PM-PLN-000515)

### 3.4 Consultation

This plan will be provided to Environment, Energy and Science Group (EESG) in accordance with CoA C5 (h). Refer to Section 2 and Section 3 of the CEMP for consultation requirements relating to the CEMP and all Sub-plans.

## 4 Existing Environment

The following sections summarise existing flora and fauna within and adjacent to the Project area including species, communities and habitats. The key reference documents are the EIS/MDP Biodiversity Chapter (Chapter 22) and the Biodiversity Assessment Report (Biodiversity Technical Working Paper 14).

The Project boundary and relevant ecological data is shown on the sensitive area maps included in Appendix A of this Plan.

### 4.1 Environmental aspects

#### 4.1.1 Threatened ecological communities

No threatened ecological communities listed under the BC Act or EPBC Act are located within the Project site.

Mapped patches of Swamp Oak floodplain swamp forest were assessed to determine whether they represent a threatened ecological community. The vegetation was compared with the final determination criteria for the BC Act listing of the *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* threatened ecological community and the EPBC Act listing of the *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland* threatened ecological community. Based on a review of existing landform, altitudinal range, soils, geology and vegetation structure, the recorded patches of Swamp Oak floodplain swamp forest are not considered to meet the BC Act or EPBC Act listings for these threatened ecological communities.

The location of this vegetation in relation to the Project is shown on the Sensitive Area Plans included at Appendix A of this Plan.

#### 4.1.2 Threatened or otherwise significant flora species

The Project is considered unlikely to impact on threatened flora species or their habitats and as such no species are considered affected in terms of Project impacts and Biodiversity Assessment Method (BAM) calculations.

Remnant native vegetation patches of Mangrove forest (plant community type 920) Swamp Oak floodplain swamp forest (plant community type 1232) are mostly disturbed and provide limited habitat for threatened flora species. As such, the likelihood of future threatened flora recruitment is considered low.

The location of these flora species in relation to the Project is shown on the Sensitive Area Plans included at Appendix A of this Plan.

#### 4.1.3 Fauna habitat

Seven fauna habitat types were identified by the EIS. These are listed below in Table 4.1 and are shown on the Sensitive Area Maps included at Appendix A of this Plan.

**Table 4-1: Fauna habitat types**

Habitat	Description	Key habitat characteristics	Threatened fauna species recorded or likely to occur	Migratory fauna species recorded or likely to occur
Mangrove forest	<p>These habitats, which are associated with low-lying tidal drainage channels draining to Alexandra Canal, and occur in two small patches:</p> <ul style="list-style-type: none"> <li>A narrow linear strip associated with a tidal section of a stormwater channel adjacent to the Botany rail line in Tempe</li> <li>A small patch on the western side of Alexandra Canal.</li> </ul>	Foraging habitat for common bird and reptile species.	No threatened species recorded. The Large Bent-winged Bat is likely to forage in the area.	No migratory species recorded. Given the very narrow and localised nature of the vegetation, migratory waders are unlikely to occur except on rare occasions.
Swamp Oak Floodplain Forest	Areas of this habitat do not appear to be associated with active coastal floodplain processes or influence by saline groundwater. The small linear patches fringing Alexandra Canal appear as regrowth on fill material associated with construction of the bentonite wall at the former Tempe landfill site.	Marginal habitat for common bird species, Ringtail Possum, and common lizards and frogs.	No threatened species recorded. The Large Bent-winged Bat is likely to forage in the area.	No migratory species recorded. Migratory woodland species (such as the Rufous Fantail) could occasionally use this habitat. However, they are unlikely to depend on it other than as stepping stones across the urban landscape.
Highly disturbed areas (exotic grassland and weeds)	These habitats are located along road reserves and on land adjacent to Alexandra Canal.	Few habitat resources for most native species, with some foraging resources for relatively mobile and native fauna, including small birds and reptiles.	No threatened species recorded. Microchiropteran bats (microbats) may forage in this habitat.	No migratory species recorded and none are likely to occur.
Urban exotic and planted native species	<p>These habitats are located on the former Tempe landfill site and the adjacent Tempe Recreation Reserve. They are dominated by a dense mid storey vegetation layer of variable complexity, including species such as Green Wattle, Parramatta Wattle, Native Blackthorn, Swamp Oak and Eucalyptus sp.</p> <p>Planted trees, including eucalypts and figs, are located along the sides of roads and at car parks.</p>	Foraging and breeding habitat for a range of common species typical of urban parks and gardens. No hollow-bearing trees were observed.	The Grey-headed Flying-fox may forage in planted eucalypts when they are flowering or fruiting. Microbats may occasionally forage in this habitat.	No migratory species recorded. Migratory woodland species (such as the Rufous Fantail) could occasionally use this habitat but are unlikely to depend on it.

Habitat	Description	Key habitat characteristics	Threatened fauna species recorded or likely to occur	Migratory fauna species recorded or likely to occur
Planted vegetation at Tempe Wetlands	Tempe Wetlands is an artificial wetland that acts as a detention basin for stormwater drainage from the surrounding area. It does not receive water from a natural watercourse. A range of planted native species are located around the three ponds in the wetlands, including Swamp Oak, eucalypts and acacias.	Tempe Wetlands and surrounding plantings provide important habitats for a range of common and threatened fauna. No hollow-bearing trees were observed.	The Grey-headed Flying-fox was recorded foraging in planted eucalypts. The Large Bent-winged Bat was recorded. The Eastern Freetail Bat may also forage in these habitats. No evidence of the Green and Golden Bell Frog was observed during targeted surveys.	No migratory species recorded. Migratory woodland species (such as the Rufous Fantail) could occasionally use this habitat but are unlikely to depend on it.
Mud flats at Alexandra Canal	Narrow bands of mud flats occur along the edges of Alexandra Canal in the Project site.	Foraging habitat for wading birds and other common bird species.	No threatened species recorded	No migratory species recorded. Migratory waders could occasionally use this habitat. However, these areas do not comprise important habitat for waders.
Bridges, culverts and buildings	The Project site contains a pedestrian footbridge, rail bridge, buildings and culverts located within State land which may provide microbat habitat (Appendix A). Some of these structures will not be directly impacted/demolished, however are in the vicinity of construction works. Additional buildings/structures located in Commonwealth land which may provide microbat habitat will be managed in accordance with the Commonwealth FFMP including approvals from SYD and the AEO prior to removal.	Crevices and pipes in the underside of the bridge or in culverts are potential roost habitat for microbats.	No evidence of roosting bats was observed.	None

#### 4.1.4 Threatened fauna

A total of 81 threatened fauna species listed under the BC Act, and 36 threatened fauna species listed under the EPBC Act, have been previously recorded or are predicted to occur in the Project area. A full list of these species is provided in Appendix G (extracted from Appendix B of Biodiversity Technical Working Paper 14).

Threatened fauna species identified during survey (confirmed) and those which have been previously recorded in the area are listed in Table 4-2.



Table 4-2: Threatened fauna

Common name	Scientific name	EPBC Act	BC Act	Occurrence likelihood
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable	Recorded
Large Bent-winged Bat (previously known as Eastern Bentwing-Bat)	<i>Miniopterus orianae oceanensis</i> (previously known as <i>Miniopterus schreibersii oceanensis</i> )	-	Vulnerable	Recorded

#### 4.1.5 Aquatic Biodiversity

##### 4.1.5.1 Aquatic habitats

###### Alexandra Canal

Alexandra Canal is mapped as key fish habitat, despite its highly disturbed and artificial form. Narrow mud flats within the canal provide limited habitat for oysters, mangroves and Swamp Oak. Sparse woody debris and submerged habitat structures provide some refuge for common fish species, which were observed or are considered likely to be present.

Planted *Juncus* sp. occur within the sandstone walls adjacent to Tempe Reserve. Some small Mangroves (*Avicenna* sp.) occur along the narrow mudflats, and Swamp Oaks (*Casuarina glauca*) are present in some locations along the banks.

Oysters are present in the mudflats and on the sandstone and concrete edges of the canal. Bream (*Acanthopagrus* sp.), juvenile fingerlings (species unknown) and jellyfish were observed in the canal during surveys. A range of other common fish species are likely to occur.

###### Tempe Wetlands

Tempe Wetlands is an artificial wetland with no flow from a natural system. Water enters from a stormwater drain and the wetlands drain to Alexandra Canal.

A number of emergent aquatic plants are present, including *Typha* and *Phragmites*. Floating algae covered about 60 per cent of the middle pond surface at the time of the survey.

Native fish are unlikely to occur in the wetlands given the lack of connectivity with Alexandra Canal and the Cooks River.

###### Cooks River

Near its confluence with Alexandra Canal the Cooks River is a highly modified habitat. The banks are typically concrete or stone blocks, with small areas of mud flats adjacent to these at low tide. Riparian vegetation is limited to occasional mangroves and planted trees. Some areas of saltmarsh are also present.

##### 4.1.5.2 Threatened aquatic species

Tempe Wetlands and Alexandra Canal do not provide habitat for any known threatened species. No threatened aquatic or migratory species were recorded during field surveys.

#### 4.1.6 Groundwater Dependent Ecosystems

Groundwater dependent ecosystems rely on a supply of groundwater to support the species composition, structure and function of the ecosystem. The closest groundwater dependent

ecosystems (identified in the *Groundwater Dependent Ecosystem Atlas* (Bureau of Meteorology, 2019) and the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources*) are:

- The Botany Wetlands and Lachlan Swamps, located about two kilometres south-east of the Project site; and
- Vegetation along Wolli Creek, located about one kilometre west of the Project site.

No groundwater dependent ecosystems are located in the Project site.

#### 4.1.7 Weed Species

Weeds are common throughout the study area, and include environmental weeds and weeds with formal control measures identified.

During field surveys, 163 species of plant were recorded. Of these 33 were native and 130 were introduced species.

Of the 130 introduced species recorded within the Project site, 12 species were listed under the NSW *Biosecurity Act 2015* as priority weeds for the Greater Sydney region (DPI 2018) while eight are also listed as Weeds of National Significance (Australian Weeds Committee, 2018). All priority weeds identified and species listed as Weeds of National Significance are outlined below in Table 4-3.

Table 4-3: Priority weeds and weeds of national significant recorded

Scientific name	Common name	Duty under the Biosecurity Act	Weed of national significance?
<i>Anredera cordifolia</i>	Madeira Vine	Prohibition on dealings: Must not be imported into the State or sold	Yes
<i>Arundo donax</i>	Giant Reed	Regional Recommended Measure: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment.	No
<i>Asparagus aethiopicus</i>	Ground Asparagus	Prohibition on dealings: Must not be imported into the State or sold	Yes
<i>Asparagus plumosus</i>	Climbing Asparagus Fern	Prohibition on dealings: Must not be imported into the State or sold	Yes
<i>Cestrum parqui</i>	Green Cestrum	Regional Recommended Measure: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment.	No
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i>	Bitou Bush	Prohibition on dealings: Must not be imported into the State or sold Biosecurity Zone: The Bitou Bush Biosecurity Zone is established for all land within the State except land within 10 kilometres of the mean high water mark of the Pacific Ocean between Cape Byron in the north and Point Perpendicular in the south (includes the Project site).	Yes

Scientific name	Common name	Duty under the Biosecurity Act	Weed of national significance?
<i>Cortaderia selloana</i>	Pampas Grass	Regional Recommended Measure: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment. This Regional Recommended Measure applies to <i>Cortaderia jubata</i> (pink pampas grass)	No
<i>Lantana camara</i>	Lantana	Prohibition on dealings: Must not be imported into the State or sold	Yes
<i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive	Regional Recommended Measure: The Greater Sydney region is classified as the core infestation area. Whole region: The plant or parts of the plant are not traded, carried, grown or released into the environment. Core infestation area: Land managers prevent spread from their land where feasible. Land managers reduce impacts from the plant on priority assets.	No
<i>Opuntia</i> sp.	Prickly Pear	Prohibition on dealings: Must not be imported into the State or sold	Yes
<i>Rubus fruticosus</i> agg.	Blackberry	Prohibition on dealings: Must not be imported into the State or sold	Yes
<i>Senecio madagascariensis</i>	Fireweed	Prohibition on dealings: Must not be imported into the State or sold	Yes

## 5 Environmental aspects and impacts

### 5.1 Construction activities

Key aspects of the Project that could result in impacts to terrestrial and aquatic flora and fauna include:

- Clearing of vegetation
- Demolition of potential bat roosts
- Noise and vibration from construction works and plant
- Dust impacts from earthworks / excavation
- Lighting impacts and overshadowing from site compounds or work fronts
- Construction traffic and movement of construction machinery and plant
- Impacts to water quality due to sediment runoff and deposition, polluted road runoff, high velocity runoff/discharge or uncontrolled release of construction water
- Use of chemicals / fuels (potential for spills)
- Transport of soils, water and other materials on and off-site and between sites.

Refer also to the Aspects and Impact Register included in Appendix A2 of the CEMP.

### 5.2 Ecological impacts

The Project footprint and surrounding area is largely disturbed and considered to have little ecological value. As such, the Project's anticipated ecological impact is minimal. Likely and/or potential impacts associated with the Project are discussed in Chapter 22 of the EIS and include:

- Removal of minimal areas of native and non-native vegetation communities
- Direct and indirect impacts to fauna, including injury and mortality
- Impacts on unexpected threatened species
- Spread of weeds
- Spread of feral animals
- Introduction of pathogens
- Physical, chemical and biological changes to aquatic environments.

Notwithstanding, mitigation and management measures provided in Table 6-2 aim to minimise the above likely and potential impacts to biodiversity values.

## 6 Environmental mitigation and management measures

A range of environmental requirements and control measures are identified in the various environmental documents, including the EIS/MDP, Submissions Report, Conditions of Approval and other TfNSW documents. Specific management measures to address these requirements and impacts on biodiversity are outlined in Table 6-2.

### 6.1 Flora and Fauna Management Strategies

#### 6.1.1 Pre-clearing surveys

In accordance with the G40 Specification Section 2.4, pre-clearing surveys will be carried out by the Project Ecologist to confirm the vegetation to be cleared as part of the Project, identify the presence and location of any habitat features (including tree hollows, bird nests and/or potential bat roosts) and identify any unexpected threatened flora and fauna species.

Initially, areas requiring a pre-clearing survey would be identified by the Environment & Sustainability Manager or their delegate, in consultation with the relevant construction personnel. Prior to any vegetation clearing or demolition, as included in the Environmental Work Method Statements (EWMS), the Environment & Sustainability Manager or their delegate would accompany the Project Ecologist to site to carry out a survey, inspecting the area for the presence of endangered or threatened species, or habitat features. The indicative locations for the pre-clearing survey are presented in Figure 6-1 below. More detailed figures are provided in Appendix H.



**Figure 6-1 Pre Clearing Inspection Areas**



Limits of clearing and environmentally sensitive areas would be delineated and demarcated in accordance with the Fencing and Signage Protocol outlined in Appendix B. Any subsequent relocation of species would be carried out under the guidance of the Project Ecologist, which would be documented in the Project Ecologist's pre-clearing report, along with recommended management measures.

In accordance with CoA C10, pre-construction surveys for microbats will be carried out prior to the commencement of any works which may impact potential microbat habitat in built structures. . The timing of the pre-construction surveys will be completed in the weeks leading up to the works (as advised by the Project Ecologist). Surveys will be undertaken by a suitably trained ecologist of potential roost sites in accordance with "Standard survey methods - Roost Search (microbats)" on page 9 of '*Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method*,' in built structures to be impacted. The ecologist will have microbat experience.

While no caves or tunnels have been identified within the Project site, there is potential for breeding habitat to be present under other structures. The Project Ecologist will complete an inspection of these structures to identify any breeding habitat for the Large Bent-Winged Bat. If breeding habitat is identified, additional monitoring will be completed in accordance with the Section 2.8 and 3.4 of the '*Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method*'. This may include acoustic detectors (anabatic monitoring) and/or harp traps as determined by the Project Ecologist.

Microbat surveys will also record any potential habitat features that may require further targeted inspection, including any evidence of microbats and/or microbat use. Microbat surveys may also include dusk surveys to check for emerging bats, carried out for a minimum of one hour following sunset using ultrasonic bat detectors and spotlights at locations nominated by the ecologist.

All surveys would be carried out during favourable weather conditions and will consider roosting behaviours as detailed in Table 6-1. Table 6-1 outlines the roosting behaviour or threatened microbat species recorded adjacent to the Project footprint during the EIS surveys.

As shown in Table 6-1, the pre-construction surveys will be designed to target the Large Bent-winged Bat which is the only microbat species recorded onsite as part of the EIS/MDP. However, during the pre-construction survey, if additional microbat species are observed, or there is evidence suggesting their presence, the Unexpected Fauna Finds Procedure (Appendix C) will be implemented. Additional mitigation measures or monitoring for that specific microbat species may then be required as determined by the Project Ecologist.

**Table 6-1:** Roosting behaviour of recorded threatened microbat species

Common name	Scientific name	Roosting behaviour
Large Bent-winged Bat (previously known as Eastern Bentwing-Bat)	<i>Miniopterus orianae oceanensis</i> (previously known as <i>Miniopterus schreibersii oceanensis</i> )	Mating occurs in May to June. Females congregate in October into maternity colonies to give birth in December to Mid-January. Mothers return to winter roosts in March, with the maternity roosts deserted by April. Roost structures include caves and cave like structures (culverts, cellars etc).

A microbat habitat assessment and presence/absence survey report will be produced documenting the findings of the survey. The survey report will detail measures to avoid and minimise impacts on microbats. A copy of the pre-construction surveys of the microbats (including any measures to avoid and minimise impacts on microbats) will be provided to EESG and DPIE prior to works which have the potential to impact on microbat habitat for information.

In the event the ecologist advises additional mitigation is required to minimise impacts on microbat habitats, this Plan will be updated to include the additional measures.

Pre-clearing surveys will also detail the extent and type of noxious and priority weeds present within the Project footprint and ensure that any previously unidentified noxious and priority weeds are incorporated into the Weed Management Protocol outlined in Appendix D.

Sensitive Area Plans and vegetation maps will be updated if required by the above surveys.

## 6.2 Fauna Rescue and Release Procedure

Any displaced or injured fauna encountered during the Project, would be managed in accordance with the Project Fauna Handling and Rescue Procedure outlined in to Appendix E.

## 6.3 Weed and Pathogen Control Procedure

Weeds within the construction footprint would be managed in accordance with the Weed Management Protocol for the Project outlined in Appendix D.

## 6.4 Translocation of habitat features

Where appropriate and feasible based on site conditions, the Project Ecologist will provide advice on the potential re-use of felled trees and woody debris and bushrock as per the *Biodiversity Guidelines* (RTA 2011).

In addition, in accordance with Condition E85, JHSW will consult with the local community restoration/ rehabilitation groups, Landcare groups, EESG, Sydney Water and relevant Councils prior to removing any native trees not to be reused by the Project, to determine if there is an interest for the reuse of suitable timber and root balls in habitat enhancement and rehabilitation work. This is detailed further in the Tree Management Strategy in Appendix F.

The above requirements are detailed in mitigation measures FF9 and FF22 in Table 6-2 below.

## 6.5 Unexpected threatened species finds

In the event that a newly discovered threatened species is unexpectedly encountered during construction, the Unexpected Threatened Species Finds Procedure will be followed as outlined in Appendix C.

## 6.6 Rehabilitation and landscaping

Rehabilitation and landscaping will be progressive, with the first stage involving sterile cover crops to stabilise disturbed construction areas for erosion and sediment control and weed control. The Place, Design and Landscape Plan will present an integrated urban and landscape design for the Project.

In accordance with UMM LV4 a Tree Management Strategy (refer Appendix F) will guide the management of the loss of trees through design and construction. This strategy addresses the requirements of CoA E83 and E85.

In accordance with E84, JHSWJV will prepare a Landscape Strategy Report which utilises the finds and outputs of the Tree Management Strategy to detail the type, size, number and location of replacement trees. The report will be submitted to the Planning Secretary for information no later than nine months following commencement of operation.

Table 6-2: Flora and fauna management and mitigation measures

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
GENERAL						
FF1	A Construction Flora and Fauna Management Plan would be prepared in accordance with the RTA (2011) Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects and to meet the requirements of the Airport Environment Strategy.	This Plan	Construction	Environment Manager	UMM – BD3 CoA C5, C10	This Plan
FF2	Training will be provided to relevant Project personnel, including relevant sub-contractors on flora and fauna requirements from this plan through inductions, toolboxes and targeted training.	Training Materials	Prior to construction	Environmental Coordinator	Best practice	Training records
FF3	Any work required outside the construction footprint will be referred to the Environment & Sustainability Manager for advice on further assessment and approval requirements.	Project induction Sensitive Area Plans Fencing and Signage Protocol (Appendix B) EWMS	Construction	All staff	UMM – BD1, BD2, LV4 CoA E83 Appendix B Best practice	Consistency Assessments (if required) will document the assessment of any proposed works outside the construction footprint.



ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF4	An appropriately qualified Project Ecologist will be appointed prior to the commencement of construction.	Project Ecologist	Prior to construction	Environment Manager	Best practice	Pre-Clearing Survey Reports
VEGETATION CLEARING, PROTECTION AND MANAGEMENT						
FF5	JHSWJV will consider the retention of vegetation in the design of the Project's construction and ancillary facilities, with the aim of minimising disturbance and reducing impacts to flora and fauna species and ecological communities to the greatest extent practicable.	Ecologist's pre-clearing survey report Design of JHSWJV's ancillary facilities	Construction	Area Manager Environment Manager	UMM – BD1, BD2, LV4 CoA E83 Best practice	Ecologist's pre-clearing survey report Refer to the details in Appendix F Tree Management Strategy
FF6	Any clearing of vegetation will be in accordance with the Vegetation Clearing Procedure included in Appendix B. Vegetation clearing will be limited to the minimum necessary to construct the Project. A Project specific EWMS will be developed for vegetation clearing activities and no clearing will be undertaken until a Vegetation Clearing Permit is approved.	EWMS This Plan	Pre-construction	Environment Manager	G36 G40 Appendix B	Refer to Appendix B Vegetation Clearing Procedure Clearing & Grubbing EWMS Ecologist's pre-clearing survey report Vegetation Clearing Permit

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
<b>FAUNA MANAGEMENT</b>						
FF7	<p>Prior to impacting any built structures, a pre-construction survey of potential roost sites in accordance with "Standard survey methods - Roost Search (microbats)" on page 9 of 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method,' will be conducted to confirm the presence or absence of roosting habitat.</p> <p>In the event that microbats or evidence of roosting are identified within built structures during pre-construction surveys, JHSWJV will seek further advice from the Project Ecologist to avoid and minimise impacts on microbats.</p>	Project Ecologist	Prior to Construction	Foreman Project Ecologist	CoA C10 (b)	<p>Pre-Construction Survey Reports- refer to the details and methods in Section 6.1.1.</p> <p>Note- copy of reports to be provided to EESG for information.</p>
FF8	Any displaced or injured fauna encountered during the Project, would be managed in accordance with the Fauna Rescue and Release procedure (Appendix E of this FFMP).	Fauna Handling and Rescue Procedure Project Ecologist	Prior to construction Construction	Foreman Project Ecologist Environmental Coordinator	FFMP Appendix E G36	Project Ecologist Reports Refer to the requirements included in Appendix E Fauna Rescue and Release Procedure

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF9	Where practicable coarse, woody debris, bushrock and tree hollows that require removal will be relocated to retained bushland within or bordering the Project footprint. Advice on the placement of these features will be made by the Project Ecologist	Project Ecologist	Construction	Environmental Manager and Project Ecologist	Good practice Roads and Maritime Biodiversity Guidelines (RTA 2011)  CoA E85	Ecologist Report (as required)
<b>PESTS AND DISEASES</b>						
FF10	Weeds within the construction footprint would be managed in accordance with the Weed Management Protocol (Appendix D of this FFMP). This includes management prior to vegetation clearing and during construction, disposal of cleared weed material to a facility licenced to receive green waste or managed in accordance with local council requirements, and monitoring weed growth within and directly adjacent to Project areas.	Weed Management Protocol	Prior to construction Construction	Environmental Coordinator	G40 FFMP Appendix D	Refer to the requirements included in Appendix D Weed Management Protocol Environmental Inspection Checklists

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF11	Machinery will be checked to ensure free from mud and vegetation prior to entering the Project construction sites to prevent the spread of weeds or pathogens. Equipment not found in a clean state will not be permitted to be used on site.	Plant Inspection Checklists	Construction	Foreman Plant Manager	Best practice	Plant Inspection Checklists will be completed prior to machinery being brought onto site
<b>AQUATIC MANAGEMENT</b>						
FF12	Ensure soil and water management measures are implemented and maintained in accordance with the Soil and Water Management Plan.	Soil Conservationist	Prior to construction Construction	Environment Manager Environmental Coordinator Foreman	Best practice	Progressive Erosion and Sediment Control Plans (PESCP) SWMP Daily Pre-Start Inspections Environmental Inspection Checklists
FF13	Drainage and flood management infrastructure will be managed during construction to minimise the risk of attracting wildlife.	Plant Inspection Checklists	Prior to construction Construction	Environmental Coordinator Foreman	UMM - AS10	Progressive Erosion and Sediment Control Plans (PESCP) Environmental Inspection Checklists

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF14	All works within or adjacent to Alexandra Canal will be managed in accordance with the principles outlined in Guidelines for Controlled Activities on Waterfront Land – Riparian corridors (Department of Industry, 2018).	Soil Conservationist	Prior to construction Construction	Environmental Coordinator Foreman	UMM – SW5	Progressive Erosion and Sediment Control Plans (PESCP) Refer to the Contaminated Aquatic Sediments in Alexandra Canal Management Plan for further details. Environmental Inspection Checklists EWMS
FF15	In the event of marine vessels being used for works within the Alexandra canal, implement weed hygiene protocols for aquatic weed management	Weed Hygiene Protocol	Prior to and during construction	Environmental Coordinator Foreman	Biosecurity Act 2015	Environmental Inspection Checklist Weed Hygiene Protocol Plant Checklist
NOISE, VIBRATION, LIGHT, DUST AND WASTE						

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF16	Ensure environmental controls to minimise noise, vibration, light and dust are in place at all compound sites, particularly compounds operating on a 24-hour basis.	Site Plans	Construction	Environmental Coordinator Foreman	Best practice	Environmental Inspection Checklists Environmental Audit Checklists
FF17	Lighting of work areas, compounds, and work sites will be oriented to minimise glare and light spill impact on adjacent receivers.	Site Plans	Construction	Environmental Coordinator Foreman	UMM - LV10	Environmental Inspection Checklists Environmental Audit Checklists
FF18	<p>The following measures would be implemented during works at the former Tempe landfill to avoid attracting wildlife:</p> <ul style="list-style-type: none"> <li>• Staging the excavation to minimise the amount of exposed waste at any one time</li> <li>• Minimising the size and area of exposed stockpiles</li> <li>• Ensuring material that has been disturbed, uncapped, or temporarily stockpiled is suitably covered at the end of each day.</li> </ul>	Stockpile Management Plan	Construction	Environmental Coordinator Foreman	UMM – WM5	Progressive Erosion and Sediment Control Plans (PESCP) SWMP Environmental Inspection Checklists Environmental Audit Checklists
<b>REHABILITATION</b>						

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF19	The CSSI must be designed to retain as many existing trees as possible. Replacement trees and plantings must deliver a net increase in trees and tree canopy and aim to enhance the relevant council's position in respect of the Sydney Green Grid.	Final Design Fencing and Signage Protocol	Pre-construction Construction	Environment Manager Design Team	CoA E82	Refer to Appendix F Tree Management Strategy for detailed requirements for replacement trees/off-setting  As-Built Drawings

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF20	<p>Replacement trees must:</p> <p>(a) be located on public land and prioritised within 500 metres of the Construction Boundary in consultation with the relevant council and the Airport Operator;</p> <p>(b) comply with the <i>National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports</i>;</p> <p>(c) meet the requirements for quality tree stock specified in the <i>AS2303:2018 Tree Stock for Landscape Use</i>;</p> <p>(d) be provided no later than six (6) months following the commencement of operation; and</p> <p>(e) have a minimum pot size of 100 litres or 150 litres for safe clear trunk views at road verges unless a different pot size is specified in the relevant council's plans / programs / strategies for vegetation management, street planting, or open space landscaping, or as agreed by the relevant council(s) and Airport Operator.</p>		<p>Construction</p> <p>Post-construction</p>	Environment Manager Design Team	CoA E83	Refer to Appendix F Tree Management Strategy for detailed requirements for replacement trees/off-setting



ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF21	A Landscape Strategy Report must be submitted to the Planning Secretary which details the type, size, number and location of replacement trees. The report must demonstrate how any replacement plantings are consistent with the requirements of Condition E83. The report must be submitted to the Planning Secretary for information no later than nine months following the commencement of operation.		Post-construction	Environment Manager Design Team	CoA E84	A Place, Design and Landscape Plan will be developed in accordance with CoA 76 which will also address this requirement
FF22	The Proponent must consult with local community restoration/rehabilitation groups, Landcare groups, EESG, Sydney Water, and relevant councils prior to removing any native trees not to be reused by the CSSI, to determine if there is an interest for the reuse of suitable timber and root balls in habitat enhancement and rehabilitation work. If there is an interest, native trees that are removed for the construction of the CSSI and that are greater than 25-30 centimetres in diameter and three metres in length are to be salvaged and provided to the group(s) and/or relevant councils or agencies referred to in this condition as agreed.		Construction	Environment Manager	CoA E85	Refer to Appendix F Tree Management Strategy for detailed requirements for replacement trees/off-setting
SUSTAINABILITY						

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference	Evidence
FF23	<p>The ecological value of the infrastructure site is maintained and where possible enhanced.</p> <p>Strategies will be developed to rehabilitate, regenerate or revegetate disturbed areas with a diversity of appropriate local native species establish a new landscape after completion of the works</p>	Project Ecologist	Pre-construction Construction	Sustainability Manager	V1.2 IS Technical Manual – Eco-1 Ecological value	<p>Ecological Assessment Drawings showing area impacted.</p> <p>This Plan.</p> <p>CoA E76 Place, Design and Landscape Plan</p>
FF24	<p>The existing degree of habitat connectivity is maintained (offsetting allowed) and where possible enhanced.</p>	Project Ecologist	Pre-construction Construction	Sustainability Manager	V1.2 IS Technical Manual - Eco-2 Habitat connectivity	<p>Ecology reports Offset reports CV of suitably qualified professional</p> <p>This Plan</p> <p>CoA E76 Place, Design and Landscape Plan</p> <p>(noting that the ability to revegetate along the canal is limited by the ATL and NASAF Guidelines.)</p>

## 7 Compliance management

### 7.1 Roles and responsibilities

The JHSWJV Project Team's organisational structure and overall roles and responsibilities are outlined in Section 3.3 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Chapter 8 of this Plan.

### 7.2 Training

All employees, contractors, sub-contractors and utility staff working on site will undergo site induction training that includes construction flora and fauna management issues. The induction training will address elements related to flora and fauna management including:

- Requirements of this sub-plan
- Relevant legislation
- Specific species likely to be affected by the construction work and how these species can be recognised
- Fauna rescue requirements
- Weed control measures
- General flora and fauna management measures
- Specific responsibilities for the protection of flora and fauna.

Further details regarding staff induction and training are outlined in Section 3.6 of the CEMP.

### 7.3 Monitoring and inspections

Weekly and other routine inspections by the JHSWJV Environment Team, TfNSW, ERG representatives and ER will occur throughout construction. Detail on the nature and frequency of these inspections are documented in Section 3.10 of the CEMP.

Section 6.1.1 also refers to the pre-clearing inspections required.

### 7.4 Auditing

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

Audit requirements are detailed in Section 3.9 of the CEMP.

### 7.5 Reporting

Reporting requirements and responsibilities are documented in Section 3 of the CEMP. There are specific reporting requirements associated with additional survey work and monitoring including the results of pre-clearing surveys. This is detailed in Section 6.1.1 above.

Any incidents relating to flora and fauna will be reported in accordance with the TfNSW Environmental Incident Classification and Reporting Procedure as per Appendix A7 of the CEMP.

## 8 Review and improvement

### 8.1 Continuous improvement

Continuous improvement of this plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement. The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

### 8.2 Plan update and amendment

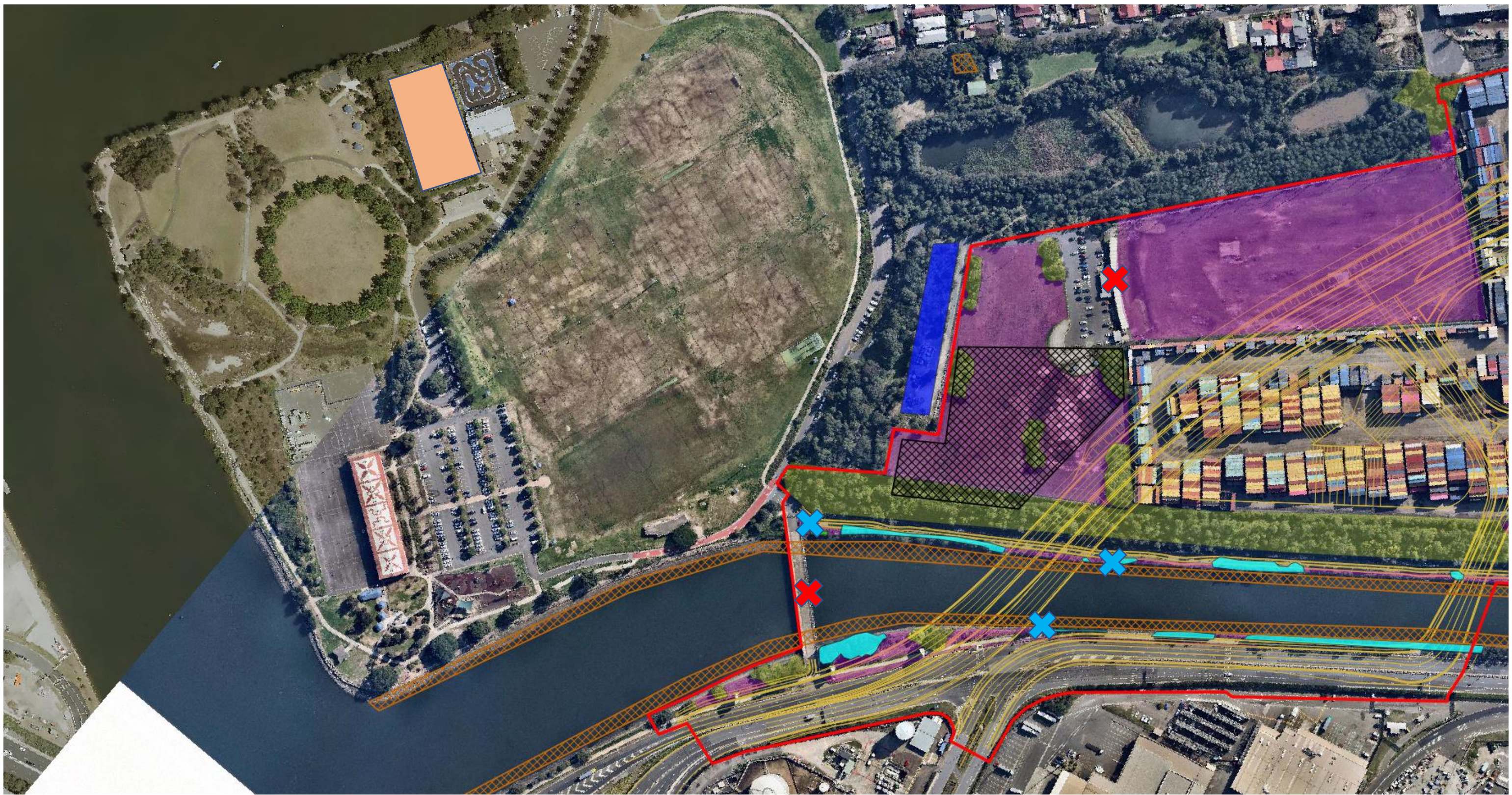
The processes described in Section 3.9 to Section 3.13 of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

Any revisions to the FFMP will be in accordance with the process outlined in Section 1.5 of the CEMP.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to 3.11.2 of the CEMP.

## Appendix A – Sensitive Area Plans





- |   |   |
|---|---|
| Project Boundary                                    | Dog Park  |
| Design Footprint                                    | Leachate Treatment Plant                                    |
| Site Compound - Proposed                            | <b>Vegetation Layers</b>                                    |
| Aboriginal Heritage                                 | Urban exotic / native landscape plantings                   |
| Non-aboriginal Heritage                             | Highly disturbed areas with no or limited native vegetation |
| Potential Microbat Habitat - Culvert                | PCT 1232 Swamp Oak Forest                                   |
| Potential Microbat Habitat - Bridges and Structures | PCT 920 Mangrove Forests                                    |



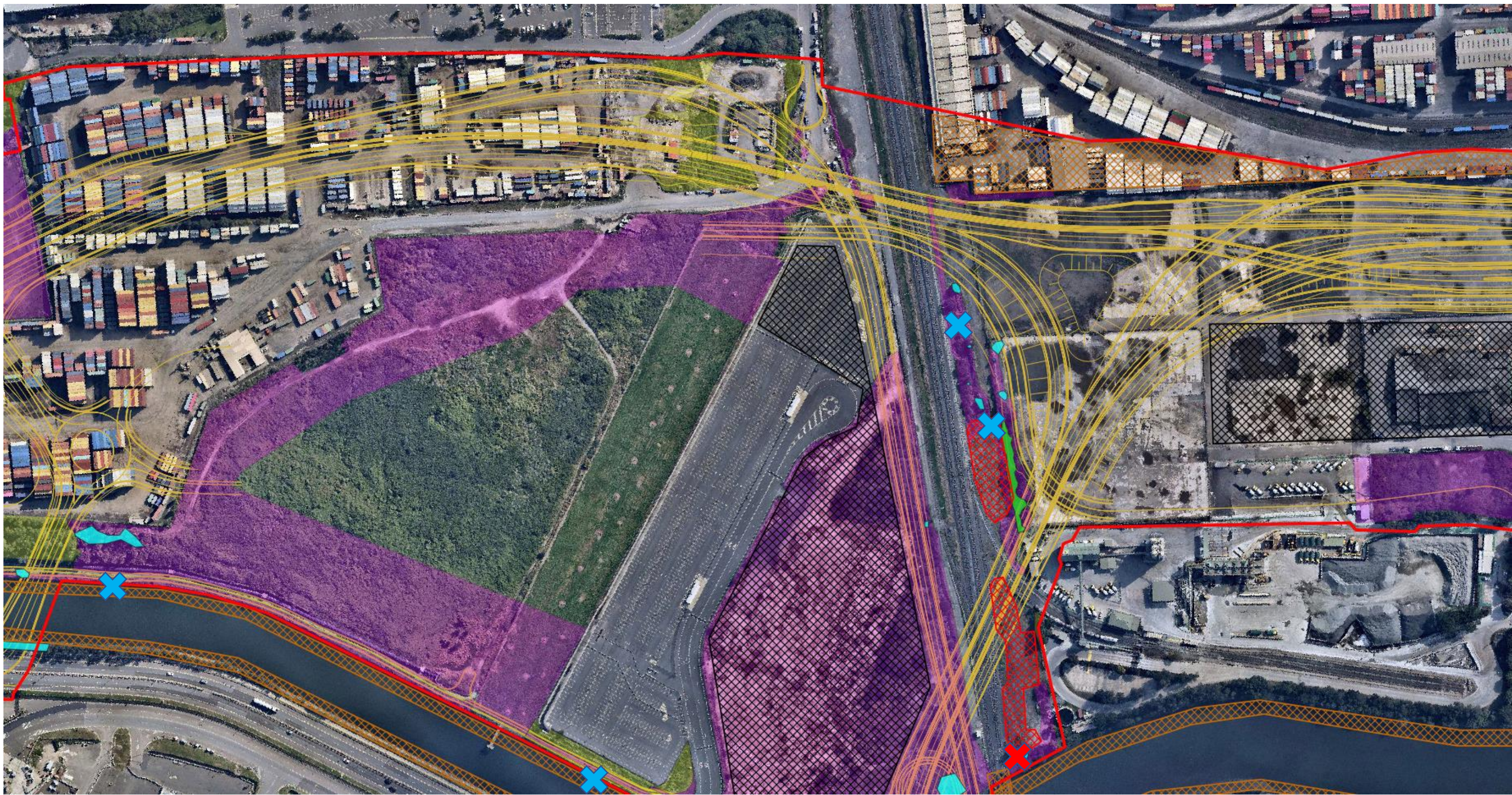
**SYDNEY GATEWAY**

A Joint Venture Project

**JOHN  
HOLLAND**

**SEYMOUR  
WHYTE**





- |   |   |
|---|---|
| Project Boundary                                    | Dog Park  |
| Design Footprint                                    | Leachate Treatment Plant                                    |
| Site Compound - Proposed                            | <b>Vegetation Layers</b>                                    |
| Aboriginal Heritage                                 | Urban exotic / native landscape plantings                   |
| Non-aboriginal Heritage                             | Highly disturbed areas with no or limited native vegetation |
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**SEYMOUR  
WHYTE**





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JOHN  
HOLLAND





- |   |   |
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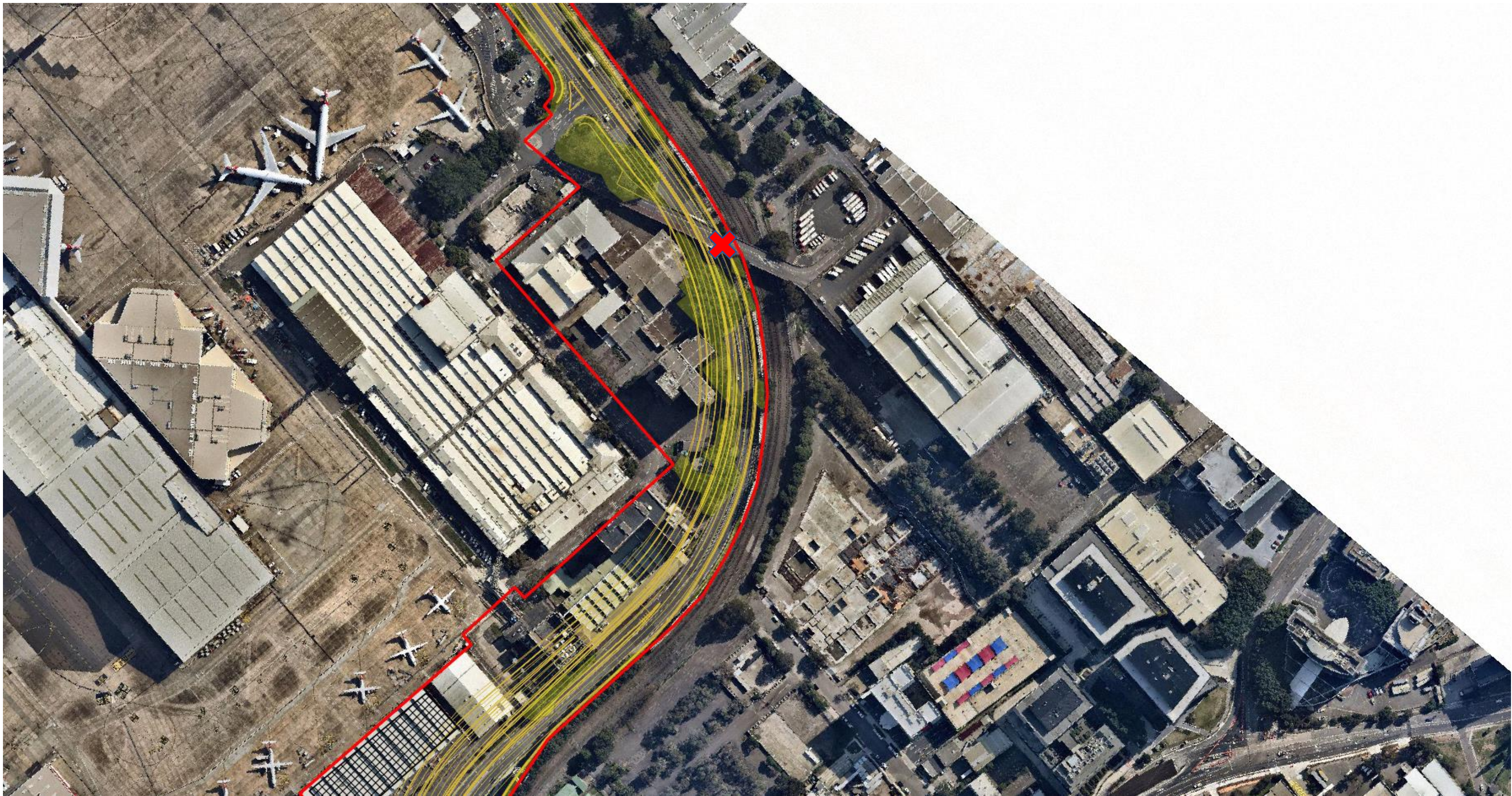
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A Joint Venture Project

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WHYTE**





- |   |   |
|---|---|
| Project Boundary                                    | Dog Park  |
| Design Footprint                                    | Leachate Treatment Plant                                    |
| Site Compound - Proposed                            | <b>Vegetation Layers</b>                                    |
| Aboriginal Heritage                                 | Urban exotic / native landscape plantings                   |
| Non-aboriginal Heritage                             | Highly disturbed areas with no or limited native vegetation |
| Potential Microbat Habitat - Culvert                | PCT 1232 Swamp Oak Forest                                   |
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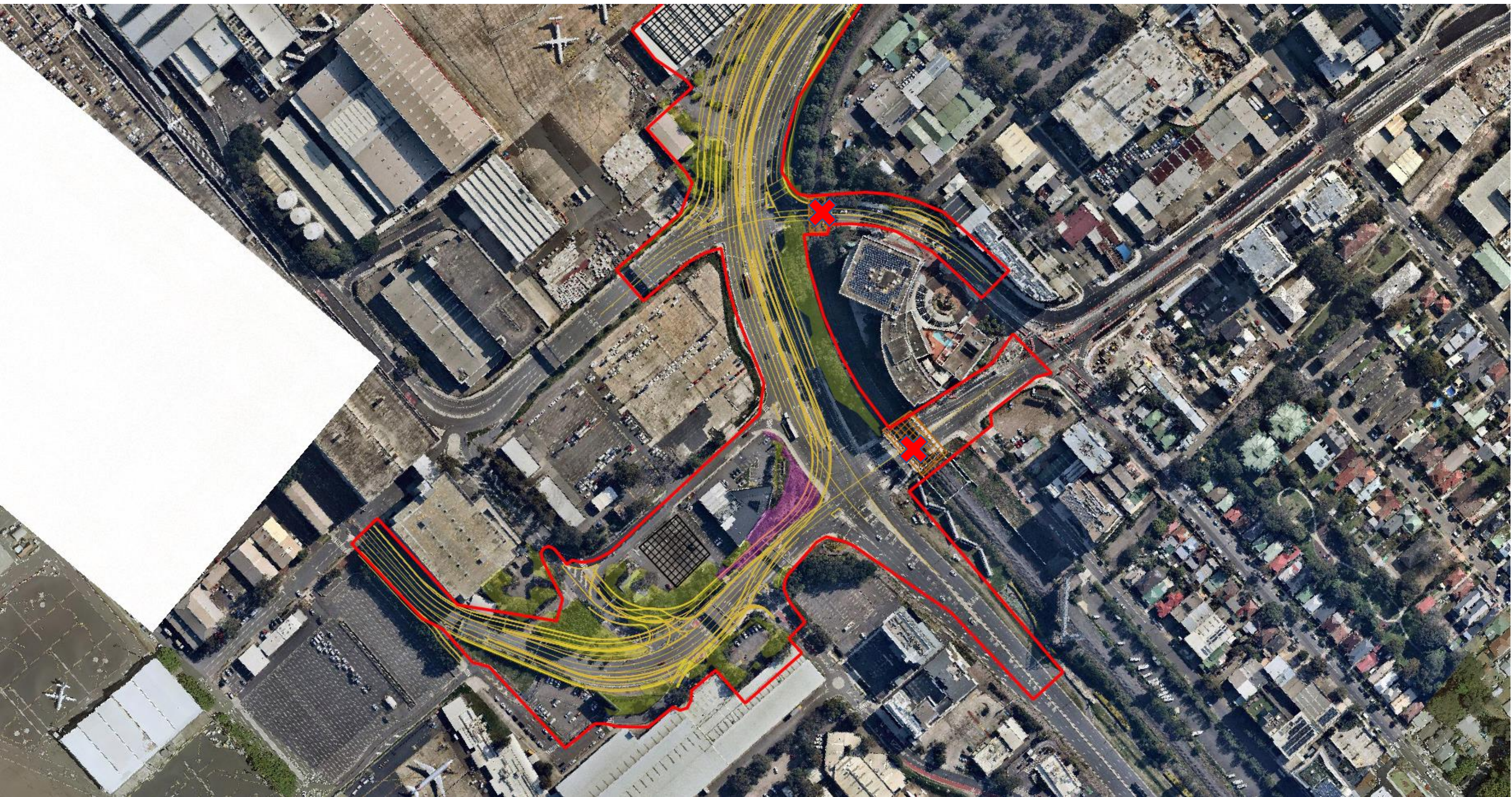
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HOLLAND**

**SEYMOUR  
WHYTE**





- Project Boundary
- Design Footprint
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**SYDNEY GATEWAY**

A Joint Venture Project

**JOHN HOLLAND**

**SEYMOUR WHYTE**



## Appendix B – Vegetation Clearing Procedure

# **Vegetation Clearing Procedure**

Flora and Fauna Management Sub-Plan  
(State) – SSI 9737

Sydney Gateway Road Project

April 2021



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# 1 Purpose

A vegetation clearing procedure is required for the project in accordance with:

- Guides 1, 2, 4 and 5 of the RTA Biodiversity Guidelines (RTA 2011)
- G36 Environmental Protection specification; and
- G40 Clearing and Grubbing specification.

This procedure explains the processes and procedures to be carried out for any vegetation clearing operations associated with construction activities.

# 2 Induction / Training

Personnel involved in any aspect of activities that involve the clearing of vegetation will be trained in the requirements of this procedure. Training will include inductions, toolbox talks, pre-starts and targeted training as required. Records of all training, including inductions, will be maintained. Records will include the name and role of the attendee as well as the name of the course.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

# 3 Scope

This procedure includes site specific advice and control measures relating to vegetation to be cleared associated with construction activities. It is intended that the environmental safeguards outlined in this plan will be incorporated into the pre-construction and construction phases of the project. Biodiversity management and mitigation will be undertaken in accordance with the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011) and the associated management plans and procedures for the project.

# 4 Procedure

## 4.1 Terrestrial vegetation

JHSWJV will limit clearing of native vegetation:

- i. for the Works, to within the approved Project footprint
- ii. for Services, to the minimum clearing extents required by the relevant Authority
- iii. for fencing, including boundary fencing to the extents required by Specification R201 and the Scope of Works and Technical Criteria

The following safeguards are to be implemented to protect vegetation surrounding the project footprint during vegetation clearing works.



#### 4.1.1 Hold Point Release

In line with Specification G40 a hold point will be raised prior to the clearing of any vegetation. The following supporting information will be provided for the release of this hold point at least 7 days prior to commencement of clearing:

- clearing and grubbing plan
- report on the presence of weeds and unsound trees.

#### 4.1.2 Vegetation Clearing Permit

A clearing permit will be prepared, which involves the following steps:


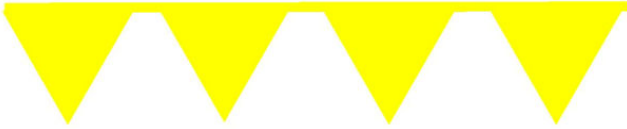

- the Survey Manager will approve the clearing pegged out is an approved string
- the Environmental team will check and ensure temporary fencing is in place
- the Environmental Coordinator, Project Engineer responsible for the works, Ecologist and clearing contractor will walk the area to be cleared, and point out habitat features, watercourses and items of note
- a toolbox meeting will be conducted for the clearing operation.

Prior to the commencement of vegetation clearing works, temporary fencing is to be installed around the vegetation to be retained to minimise the probability of accidental vegetation removal or damage.

The alignment of this perimeter fence will be done in accordance with the Australian Standard for the Protection of Trees on Development Sites (AS4970-2009) and incorporate the relevant tree protection zones for trees to be retained.

The fencing of high-risk areas will be constructed of, as a minimum, capped star pickets and high visibility para webbing and have appropriate signage stating that it is an environmentally sensitive area to educate construction personnel. A flagging protocol will be employed to identify clearing limits, project boundaries and habitat trees.

Table 4-1: Fencing and signage protocol

Flag Type	Meaning
	Project Boundary – Environmental Protection Boundary (DO NOT CROSS)
	Clearing Limits. No clearing outside this flagging at any time during the project
	Habitat Tree. (Do not remove without ecologist consent)

Ongoing site awareness will be maintained via toolbox talks on the extents of clearing and the flagging protocol. Site Environmental Plans would be prominently displayed to reinforce limits of construction.

#### 4.1.3 Habitat trees

Prior to undertaking vegetation clearing at any location or time, a pre-clearing assessment must be undertaken by an appropriately qualified and experienced ecologist so as to:



- identify all habitat trees (i.e. hollow bearing trees, potential hollow bearing trees, other fauna habitat trees, including trees with nests, dreys and termitaria etc.) within the clearing limits, including those not previously identified during the project approval assessments or pre-clearing surveys
- assess all habitat trees for the likely presence or evidence of fauna (including fresh scats, scratches and remains of prey)
- demarcation of all habitat trees, including known and potential hollow bearing trees with nests and dreys, likely to be occupied by fauna and key habitat resources such as hollow logs or large rocks will be carried out prior to the commencement of clearing
- all habitat trees must be marked prior to the commencement of clearing in a manner which clearly identifies and demarcates the trees as supporting fauna habitat
- notify local wildlife groups such as WIRES and local vets prior to clearing.

A suitably qualified ecologist will undertake pre-clearing surveys for native fauna immediately prior to clearing activities which will be consistent with Roads and Maritime *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA projects* (RTA, 2011a), and the ecologist will be present during the removal of all identified habitat trees.. All hollow-bearing trees will be removed in accordance with Roads and Maritime *Biodiversity Guidelines* (RTA 2011). Clearing will involve a two-stage clearing process as detailed below:

### Stage 1 clearing

- assess the tree to identify and locate the type of habitat features present, tree-hollow or nest for example
- remove surrounding non-habitat vegetation. This can be carried out without supervision by the Ecologist
- leave habitat tree for a minimum of 24 hours following non-habitat vegetation removal, allowing fauna to vacate the site
- a suitable release location is to be determined by the Ecologist prior to the removal of habitat trees for any fauna captured during the habitat tree removal.

### Stage 2 clearing

Habitat trees must be felled under the supervision of an ecologist, and undertaken as follows:

- prior to the clearing of any habitat trees a local vet and/or wildlife rescue representative is to be contacted and “put on stand-by” to receive any injured fauna
- ecologist to carry out final inspection of habitat trees for evidence of fauna occupation
- the excavator operator is to “knock” or disturb the habitat tree prior to felling, with the intent to encourage the movement of fauna out of hollows/nests
- once confirmed OK to re-commence by the ecologist, the tree will be removed as carefully as possible and placed on the ground, with consideration for removing the habitat feature prior to felling.
- machinery is then to be made safe while the ecologist undertakes a thorough inspection of the felled tree and the habitat features present for any fauna that may still be present.
- Any fauna displaced will be captured and inspected for injury prior to relocation in the pre-determined area
- hollow sections of the tree are to remain undisturbed on the ground for at least 24 hours if the ecologist determines that fauna may still potentially be present following felling.

Injured or orphaned fauna are to be taken to a local vet, or a wildlife rescue representative (e.g. WIRES) is to be contacted as soon as possible. If wildlife is discovered during the clearing of habitat tree vegetation the following steps will be taken:

- stop all work in the vicinity of the fauna and immediately notify the site foremen (or similar) and Environment team

- ideally the animal will relocate by itself, however, if it is injured or suspected injured contact will be made with a licensed fauna handler (or the project ecologist)
- the project ecologist must manage and supervise all fauna protection including rescue tasks to minimise the impacts on fauna. Wildlife rescue organisations may be used to assist in fauna rescue, but must not be permitted to manage the process
- injured fauna will be delivered to a local vet for treatment
- non-injured fauna will be released into a suitable nearby location that has been identified as such by the project ecologist or, if juvenile, presented to an appropriate wildlife carer (such as WIRES)
- keep records of fauna captured and relocated and report any injury or death to TfNSW and other agencies as required.

Where the use of a crane and/or elevated work platform are required due to the presence of fauna within trees to be felled, the above process is to be modified as required to ensure impacts to fauna are minimised.

#### **4.1.4 Translocation of habitat features**

Where appropriate and feasible based on site conditions, the project ecologist will provide advice on the potential re-use of felled trees and woody debris and bushrock as per the *Biodiversity Guidelines* (RTA 2011).

#### **4.1.5 Threatened species**

In the unlikely event that threatened species are identified on site during vegetation clearing activities, work surrounding the area will stop. For detailed procedures and advice relevant to threatened species, refer to Appendix C - Unexpected Threatened Species Finds Procedure.

## Appendix C – Unexpected Threatened Species Finds Procedure

# **Unexpected Threatened Species Finds Procedure**

Flora and Fauna Management Sub-Plan  
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Sydney Gateway Road Project

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## 1 Purpose

An unexpected threatened species finds procedure is required under Guide 1: Pre-clearing Process of the RTA Biodiversity Guidelines (RTA 2011) as well as the G36 Environmental Protection specification and G40 Clearing and Grubbing specification. The unexpected threatened species finds procedure will be followed if additional threatened species or communities are identified that have not been considered in the environmental assessment. This procedure has been developed to satisfy these requirements and details the actions to be taken when a threatened species or Endangered Ecological Community (EEC) is unexpectedly encountered during project activities.

## 2 Induction / Training

Where required, personnel will be inducted on the identification of potential threatened species and EECs occurring on site and the relevant actions for them with regards to this procedure during the project induction, site inductions and regular toolbox meetings. Records of all training, including inductions, will be maintained. Records will include the name and role of the attendee as well as the name of the course.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

## 3 Scope

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

Refer to Figure 4.1 for unexpected threatened species / EECs finds procedure flow chart.



## 4 Procedure

### 1. Threatened species unexpectedly encountered during project activities

If a threatened species or EEC is unexpectedly encountered during project activities:

- **STOP ALL WORK** immediately in the vicinity of the find
- Immediately notify the Environment Manager (EM), or Environmental Coordinator who will notify the Project Ecologist, TfNSW representative and EESG.
- Identify any recommended mitigation measures required as instructed by Project Ecologist (such as no-go zones, offset distances, etc.)

### 2. Assessment of Impact

- An assessment is to be undertaken by the EM and the Project Ecologist to determine the likely impact to the threatened species or EEC and appropriate management options will be developed in consultation with TfNSW.
- If a significant impact is likely to occur, consultation will be undertaken with the EESG and DPI as appropriate.

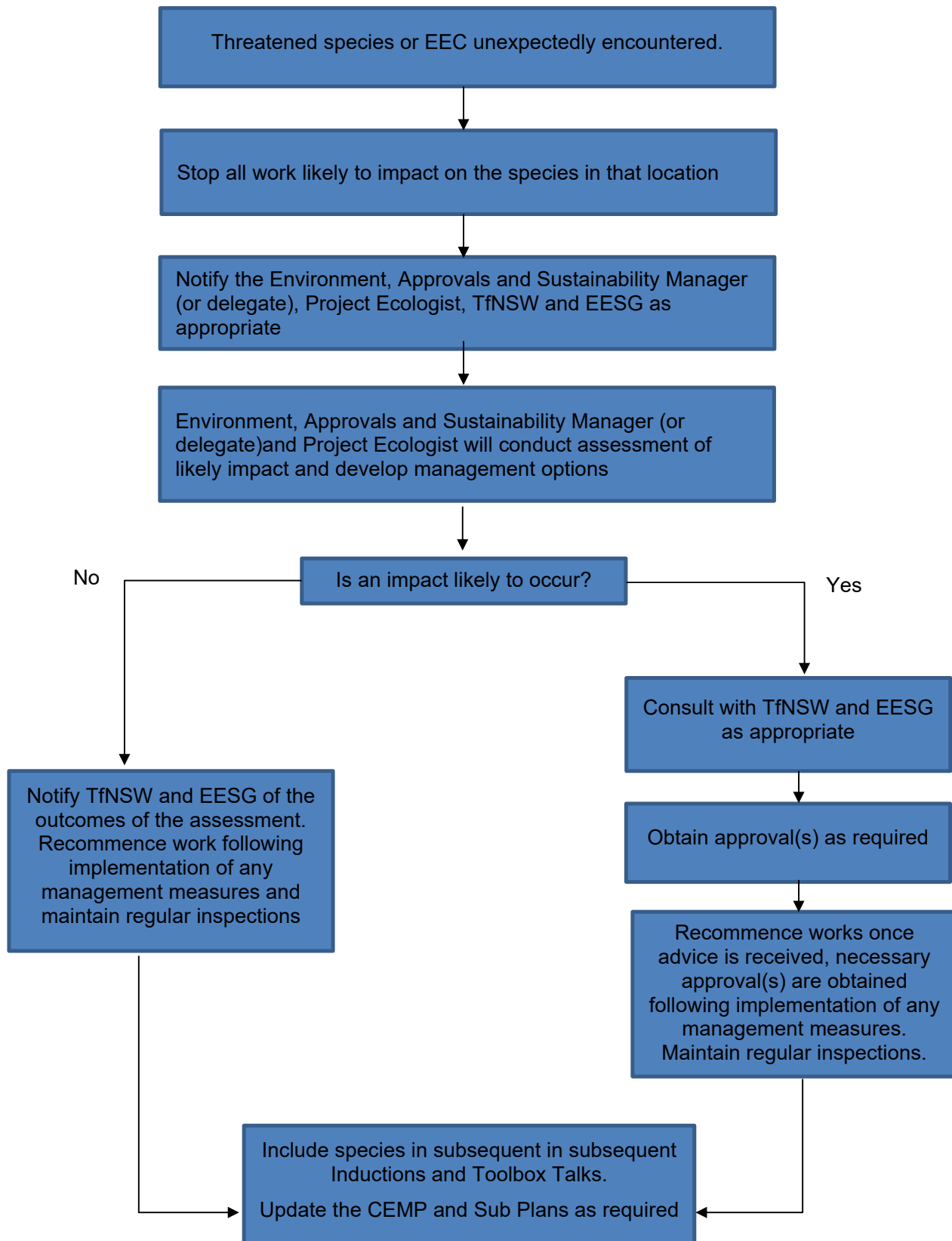
### 3. Approvals

- Obtain any relevant licences, permits or approvals required if the species or EEC is likely to be significantly impacted.
- Update any relevant ecological monitoring programs and/or biodiversity offset requirements.
- Update CEMP and Sub Plans.

### 4. Recommencement of works

- Works will recommence once necessary advice has been sought and approval obtained if required.
- Include threatened species or EEC in subsequent project inductions and toolbox talks.

Figure 4-1: Unexpected threatened species / EEC find procedure flow chart



## Appendix D – Weed Management Protocol

# **Weed Management Protocol**

Flora and Fauna Management Sub-Plan  
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5	Environment Manager	

## 1 Purpose

This procedure details the weed management and control practices to be implemented throughout the construction phase of the project, to minimise the threat to remnant vegetation within the project area and other remnant vegetation in the local area.

## 2 Induction / Training

All project personnel are to be inducted on the existence of this procedure during the Project Induction and in more detail as required in Site Inductions and regular Toolbox Talks.

All personnel managing and using pesticides will receive appropriate training prior to commencing work. Records of all training, including inductions, will be maintained. Records will include the name and role of the attendee as well as the name of the course.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

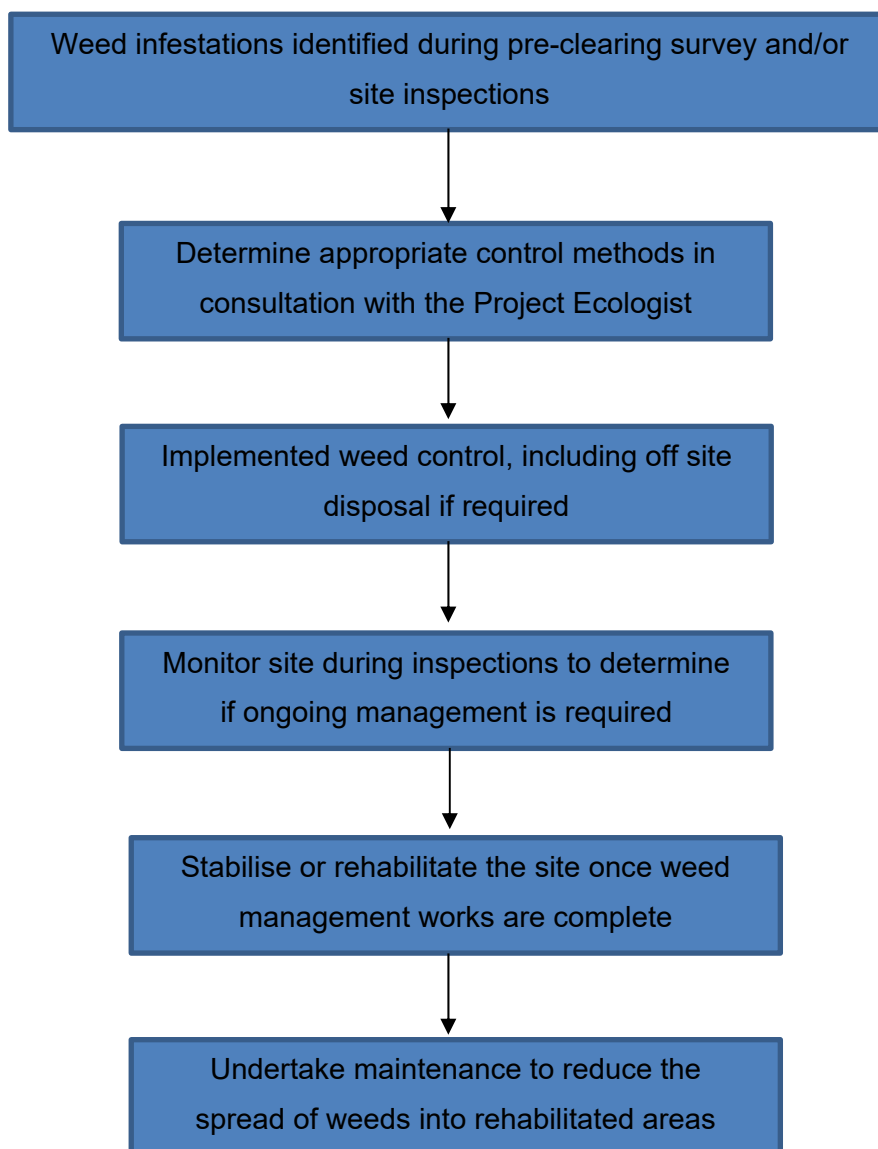
## 3 Scope

The project footprint consists of areas which are highly modified due to urban development, and other areas supporting disturbed native vegetation and weeds. Vegetation, including weeds and exotics, will be cleared to facilitate construction of the project. Therefore, this procedure focuses on weed control prior to vegetation clearance, weed management during clearing, and progressive weed control throughout the construction phase.

Weed management within the project site will be developed in consultation with the Project Ecologist to ensure the most appropriate methods are developed.

The flow chart below in Figure 3-1 outlines the weed management process.

Figure 3-1: Weed management process





## 4 Procedure





1. Pre-clearing surveys undertaken by the Project Ecologist will identify weeds requiring specific management, such as large infestations and/or weeds of national significance, prior to and during vegetation clearing.
2. Weeds of national significance will be identified and mapped within a preclearing report, which will also outline appropriate control methods for specific areas and weed species. No specific treatment is proposed for other weed species that do not pose a threat to areas of remnant native vegetation.
3. Public notification of pesticide use must be in accordance with Specification G36 Annexure G36/H.
4. Weed control will ideally be undertaken where possible prior to the development of seed, which generally occurs during the summer period. Where this is not possible seeds should be removed from plants wherever practicable, and contained prior to disposal.
  - Control methods include hand removal, herbicide application, and mechanical removal. Weeds requiring hand or mechanical removal, including contaminated topsoil, will require disposal by encapsulation (deep burying) or to an approved green waste management facility
  - When pesticides are to be used adjacent to, or across the road from a 'sensitive place'
    - i. Carry out mechanical means of pest control (such as mowing or slashing) where feasible; or
    - ii. Carry out hand-held application of pesticides where mechanical means of pest control are not feasible.
  - Only pesticides registered for use near water may be used near water
  - Avoid applying pesticides;
    - i. On hot days when plants are stressed
    - ii. After the seed has set
    - iii. Within 24 hours of rain or when rain is imminent
    - iv. When winds will cause drift of pesticides into non-target areas.
  - Any machinery arriving to site will be inspected to ensure they are free of soil or vegetative matter. Machinery involved in weed management activities will be thoroughly cleaned to remove any plant material or soil, prior to the commencement of construction.
5. The project area will be continually monitored for weed invasion during weekly site inspections, and any other inspections or audits undertaken as part of CEMP requirements. The presence of weed infestations will be reported as part of the inspection process, and include actions to be undertaken to manage these infestations.
6. Following weed removal, any exposed areas will be stabilised any/or rehabilitated to reduce erosion, and minimise the potential for further weed invasion.





## 5 Identified Weeds

Weeds are common throughout the study area, and include environmental weeds and weeds with formal control measures identified.

During field surveys, 163 species of plant were recorded. Of these 33 were native and 130 were introduced species. Of the 130 introduced species recorded within the project site, 12 species were listed under the NSW *Biosecurity Act 2015* as priority weeds for the Greater Sydney region (DPI 2018) while eight (8) are also listed as Weeds of National Significance (Australian Weeds Committee, 2018). The weeds listed as Weeds of National Significance are outlined below in Table 5-1.

Table 5-1: Weeds of national significant recorded

Scientific name	Common name	Duty under the Biosecurity Act	Weed of national significance?	Photo
<i>Anredera cordifolia</i>	Madeira Vine	Prohibition on dealings: Must not be imported into the State or sold	Yes	
<i>Asparagus aethiopicus</i>	Ground Asparagus	Prohibition on dealings: Must not be imported into the State or sold	Yes	
<i>Asparagus plumosus</i>	Climbing Asparagus Fern	Prohibition on dealings: Must not be imported into the State or sold	Yes	
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i>	Bitou Bush	Prohibition on dealings: Must not be imported into the State or sold Biosecurity Zone: The Bitou Bush Biosecurity Zone is established for all land within the State except land within 10 kilometres of the mean high water mark of the Pacific Ocean between Cape Byron in the north and Point Perpendicular in the south (includes the project site).	Yes	

Scientific name	Common name	Duty under the Biosecurity Act	Weed of national significance?	Photo
<i>Lantana camara</i>	Lantana	Prohibition on dealings: Must not be imported into the State or sold	Yes	
<i>Opuntia</i> sp.	Prickly Pear	Prohibition on dealings: Must not be imported into the State or sold	Yes	
<i>Rubus fruticosus</i> agg.	Blackberry	Prohibition on dealings: Must not be imported into the State or sold	Yes	
<i>Senecio madagascariensis</i>	Fireweed	Prohibition on dealings: Must not be imported into the State or sold	Yes	

There are a number of other weeds present within the project study area, predominantly on roadsides. Active management of these species is not required under the *Biosecurity Act 2015*, however their extent of occurrence and incidences of new infestations will be recorded as part of the project weed monitoring program.

## Appendix E - Fauna Rescue and Release Procedure

# **Fauna Rescue and Release Procedure**

Flora and Fauna Management Sub-Plan  
(State) – SSI 9737

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## 1 Purpose

This procedure explains the actions to be taken in the event fauna (included injured, shocked, juvenile or other animal) are discovered on the project site that require handling or rescue during vegetation and soil clearance and ongoing construction activities.

## 2 Induction / Training

All site personnel and subcontractors will be made aware of the actions to be taken in the event that fauna is discovered on the project. This training will occur on site during the Project induction and as required in toolbox talks. Records of all training, including inductions, will be maintained. Records will include the name and role of the attendee as well as the name of the course.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

## 3 Scope

This procedure is applicable to all native and introduced fauna species that are found on the project site.

If there is an unexpected threatened species finding, the unexpected threatened species finds procedure outlined in Appendix C will be followed.

## 4 Procedure

If wildlife is discovered on the project site during site construction activities that may harm the animal or pose 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 is then to notify the Environment Manager (EM) or Environmental Coordinator. The EM is then to notify the Project Ecologist to discuss the best course of action, eg if animal is injured then take to wildlife rescue organisation or closest Veterinary clinic.
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)

Call the appropriate rescue agency immediately and follow any advice provided by the agency. Once the rescue agency arrives at site they are responsible for the animal. Any decisions regarding the care of the animal would be made by the rescue agency. The licenced fauna ecologist, rescue services and local veterinary surgery's contact details are below.

Agency/business	Contact number
Project Ecologist (EMM Consulting)	02 9493 9500
WIRES (to be called if Project Ecologist is not available)	1300 094 737
Mascot Veterinary Hospital	02 9317 3337



In the event the rescue service and/or local veterinary service cannot be contacted, the injured animal will be delivered to the relevant agency as soon as practically possible.

3. Where necessary, to minimise stress to native fauna and/or remove the risk of further injury before the appropriate rescue agency arrives onsite, the Environmental Coordinator shall:
  - a. Cover the animal with a towel or blanket and place in a cardboard box and/or hessian bag. Appropriate temporary housing for fauna is species dependent. Gliders, possums, bats, snakes, lizards and frogs can be held individually in a calico bag until release in adjacent habitat. Nestling birds and eggs are best placed in a covered cardboard box equipped with soft cloth.
  - b. Place small animals in a cotton bag, tied at the top
  - c. Rescued fauna must be protected from exposure to heat and removed from the areas undergoing clearing activities to minimise exposure to noise. Keep the animal in a quiet, warm, ventilated and dark place. A designated site would be decided upon in advance of any construction work.
  - d. Aquatic fauna to be placed in a plastic aquaria or plastic bag with sufficient amount of water sourced from point of collection. Frogs would be transported without water or debris in recognition of the risk of transporting disease and the minimal transport time. Any frog handling would be undertaken in accordance with the Hygiene Protocol for the Control of Disease in Frogs (DECC 2008).
  - e. Some animals require particular handling (e.g. venomous reptiles, raptors) and should only be handled by appropriately qualified personnel.
  - f. If handling bats, the handler must be vaccinated against the Australian Bat Lyssavirus (ABL), which is a form of rabies.
  - g. Equipment for fauna rescue (hessian sack, calico bags, gloves and transport boxes) will be kept in designated locations for emergency use by site staff if required. The fauna specialist will carry a fauna rescue kit in a site vehicle, and an additional kit would be located in the site office.
4. If the animal cannot be handled, excluder personnel from the vicinity, record the exact location of the animal and contact the rescue agency
5. If the fauna species is identified as a threatened species that is not a species identified in the FFMP, the EM must:
  - a. Immediately cease all work likely to affect the threatened species
  - b. If the fauna is injured, call the rescue agency and notify Project Ecologist
  - c. Implement the Unexpected Threatened Species Find procedure in Appendix C
6. If the fauna is to be released, the Project Ecologist must identify suitable fauna release locations within or near the Project site.
7. All relevant project documentation would be updated to display the new findings and subsequent management measures where required. This would include such documents as Flora and Fauna Management Plan (and associated documents) and Sensitive Area Plans (Appendix A6 of the Construction Environmental Management Plan (CEMP)).

## Appendix F – Tree Management Strategy

# **Tree Management Strategy**

**SGWPW-JHSW-NWW-PM-PLN-000523**

**Flora and Fauna Management Sub-Plan  
(State) – SSI 9737**

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## Glossary/ Abbreviations

Abbreviations	Expanded Text
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
DP&E	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
EMS	Environmental management system
Environmental aspect	Defined by AS/NZS ISO 14001:2015 as an element of an organisation's activities, products or services that can interact with the environment.
Environmental impact	Defined by AS/NZS ISO 14001:2015 as any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects.
EMM	Environmental Management Measure
Environmental objective	Defined by AS/NZS ISO 14001:2015 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.
Environmental target	Defined by AS/NZS ISO 14001:2015 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
ER	Environmental Representative
ERG	Environmental Review Group
EWMS	Environmental Work Method Statements
Feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. Feasible relates to engineering considerations and what is practical to build. Reasonable relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community views and nature and extent of potential improvements.
SRZ	Structural Root Zone
TMS	Tree Management Strategy
TPZ	Tree Protection Zone
UMMs	Updated Management Measures

# 1 Introduction

## 1.1 Scope of the Strategy

This Tree Management Strategy (TMS) has been developed for the Sydney Gateway Project to cater for trees located on Commonwealth Land including Sydney Airport Precinct & NSW State land under approval SSI 9737, which, is administered by the NSW Department of Planning, Industry and Environment (DPIE).

# 2 Purpose and objectives

## 2.1 Purpose

The purpose of this TMS is to describe how the JHSWJV proposes to identify trees that can potentially be retained, manage tree impacts and provide a net increase in tree canopy.

## 2.2 Objectives

The key objective of the TMS is to ensure all CoA, environmental management measures and licence/permit requirements are described, scheduled and assigned responsibility as outlined in:

- The combined Environmental Impact Statement (EIS) / Major Development Plan (MDP) prepared for the Sydney Gateway Project – Stages 1 & 3.
- Conditions of Approval for SSI 9737 issued by the Minister for Planning and Public Spaces (NSW), on 27 August 2020.
- Updated/Revised Environmental Management Measures (REMM's) detailed in the Response to Submissions Report.
- Roads and Maritime specifications G36, G38 and G40.
- The Project's Environmental Protection Licence (EPL).
- The Greater Sydney Green Grid.
- Relevant legislation and other requirements described in this Plan.

## 2.3 Targets

The following targets have been established for the management of Trees during the delivery of the Project:

- Ensure compliance with the relevant legislative requirements, CoA and REMM.
- Effective management to achieve related landscape amenity objectives.
- Identify trees that can potentially be retained
- Ensure training is provided in the form of inductions to relevant Project personnel relating to Tree Management procedures before they begin work on site.
- Identify the type and location of the existing tree species.
- Record the general characteristics of existing tree species
- Assess their location during detailed design.
- Identify existing tree species for retention, translocation, and removal.

- Identify tree species that require the presence of a Spotter Catcher / Ecologist.
- Consider design alterations to maximise tree retention and associated functions.
- Ensure safety and prevent any damage from the tree removal practices.
- Provide councils with relevant information trees of interest for reuse.
- Ensure the future safety of buildings and surrounding residence from falling trees / limbs
- Provide justification for tree removal works
- Implement reasonably practicable measures to minimise potential tree impacts.
- Replacement trees and locations must meet commonwealth jurisdiction specifications and OLS requirements
- Replacement trees and plantings must deliver a future net increase in trees and tree canopy.

### 2.3.1 Legislation

All legislation relevant to this TMS and overarching legislation is included in Section 3.2.2 of the CEMP.

### 2.3.2 Guidelines

The main guidelines, specifications, and policy documents relevant to this TMS include:

- Sydney Airports Wildlife Management Plan
- National Airports Safeguarding Framework Guideline C: Managing Risk of Wildlife Strikes in the Vicinity of Airports
- Transport for NSW - Vegetation Management (Protection and Removal) Guideline
- Transport for NSW (TfNSW) Specifications D&C G40 Clearing & Grubbing
- Transport for NSW (TfNSW) Specifications D&C G38 Soil & Water Management
- Transport for NSW (TfNSW) Specifications D&C G36 Environmental Protection
- The Green Grid. Creating Sydney's Open Space Network, The NSW Government Architects Office
- Inner West Council – Marrickville Urban Forest Strategy 2014.
- Inner West Council – Marrickville Street Tree Master Plan 2014.
- Inner West Council 2.20 Generic Provisions Tree Management Adopted 11 February 2020.
- Bayside City Council - Regulations for Pruning and Removing Trees 2020
- Australian Standard AS 4970 – Protection of Trees on Development Sites.

## 2.4 Tree Survey Assessment

A preliminary tree survey assessment of the general project area was completed by WSP in April 2019 on behalf of TfNSW. A follow up tree survey was conducted 3 February 2021 by JHSWJV. Figure 1-1 below shows the area covered by the survey. These two information sets have been combined to produce the Tree Survey as a component of the Tree Management Strategy (Appendix C). The tree survey provides individual assessment of trees and their GPS locations on the project site. This report includes tree species lists, maps, and tree protection strategies to satisfy TfNSW and meet the objectives of the TMS, the CoA, and UMMS to ensure compliance.





Figure 1-1: Subject site & tree survey area

The survey is provided as a spatial design layer. This will assist the design team and ensure potential tree conservation principles are adopted in the design rationale. The tree locations and design layer will provide a trigger to meet the CoA BD2 for Micro-siting of trees and future construction. This micro siting may be required during detailed design to further minimise or avoid impacts on existing trees, where practicable.

Where the design is in close proximity to the Tree Protection Zone (TPZ), then micro-siting is considered. This activity maps the trees TPZ and Structural Root Zone (SRZ) of the tree. The micro siting allows intensive assessment by the Level 5 consulting arborist with specific recommendations to be outlined depending on tree species type, growth morphology, slope angles and other considerations to maximise the Projects ability to conserve the tree. For example: utilities works have recently been located within the TPZ (due to the approved utility design), the arborist was consulted on specific work methods to minimise impact to the TPZ.

The tree survey recorded the relevant information, as follows:

- GPS Location
- Tree Species
- Tree Diameter (at 1.5m high height)
- Tree Height
- Canopy Spread (m)
- Habitat Features (eg hollows, nest, loose bark etc)

This survey and associated design information will ensure the Project complies with CoA E82 which requires the CSSI must be designed to retain as many existing trees as possible. Replacement trees and plantings must deliver a net increase in trees and tree canopy and aim to enhance the relevant council's position in respect of the Sydney Green Grid (Appendix A).

## 2.5 Assessment Methodology and Limitations

The tree surveys conducted consisted of non-invasive; ground based visual inspections that utilise internationally accepted techniques for tree surveys. The survey of existing trees on the site will be reviewed for potential retention and modifications of impacts during detailed design.

The recommendations contained within this strategy are based on the observations made at the time of the onsite inspection. Any changes to trees on the site due to adverse weather, community impacts, vandalism or changes to the growing condition may affect the validity of the conclusions and further assessment and management procedures may be required.

## 3 Tree Translocation

There are 9 *Livistonia Australis* (Cabbage Tree Palm) located near the Sydney Airport entrance to Terminals 2/3 (refer Figure 2-1 below). They are a suitable species for transplanting and have a moderate to high success rate.



Figure 2-1: Cabbage tree palm allocated for relocation

The potential for these Palms to be translocated will be discussed with SYD and the AEO in the event that these Palms are impacted by the Works. If impacted, consultation will be undertaken to determine if a suitable location can be found. Consideration needs to be given to receiver sites, OLS restrictions and airport operating parameters.

In the event that translocation is determined to be feasible, the process set out in Section 3.1 and 3.2 below will be followed.

In the event that translocation is determined not to be feasible, the palms will be removed and appropriately disposed of.

### 3.1 Translocation process

The process for translocation is as follows:

- Identify a suitable replanting location as outlined in Figure 3-3. Prepare the receiver site prior to any tree removal works. This will include size and correct install of planting holes and availability suitable organic soil backfill. Replanting is to be conducted in accordance with AS and carried out by a suitably qualified horticulturalist.
- Set up surface water run off containment zones and use a sucker truck to recollect the water. Implement high pressure water cutters around the root ball. This is an effective method for cutting through the roots and reduces the length of time for root re-generation. Other advantages of water-cutting is the elimination of the large trenches and piles of earth which are incurred with normal digging which increases risk of damage to underground structures.
- After water cutting the root ball the palm tree can be lifted on to a flatbed trailer with a Hiab or mobile crane using correct tree slings and rigging.
- Ensure that the root ball is wrapped in a hessian cloth and kept moist until time of planting.
- If possible, install the palm tree at the receiver site on the same day.
- Plant the palm tree at the receiver site in accordance with the landscape planting & maintenance specifications. Including tree supports during establishment.



Figure 3-2: Example of water cutting tree roots and equipment

### 3.2 Ex-ground Cabbage Palm Tree Replanting Procedure

Ex-ground Cabbage Palm Trees would generally be replanted in accordance with the below:

- Mature trees must only be handled and moved into position by a certified tree sling
- The planting receiver site must be installed and set up with all material prior to the tree removal process.



- Trees are to be planted on the same day or within a few days of the trees being removed.
- All trees must be heavily watered in at time of planting
- Tree protection and delineation zones must be installed after planting
- All works are to be supervised by a suitably qualified arborist or horticulturalist.
- Tree will be maintained and monitored as required.
- After 12 months trees will be assessed for successful establishment requirements.

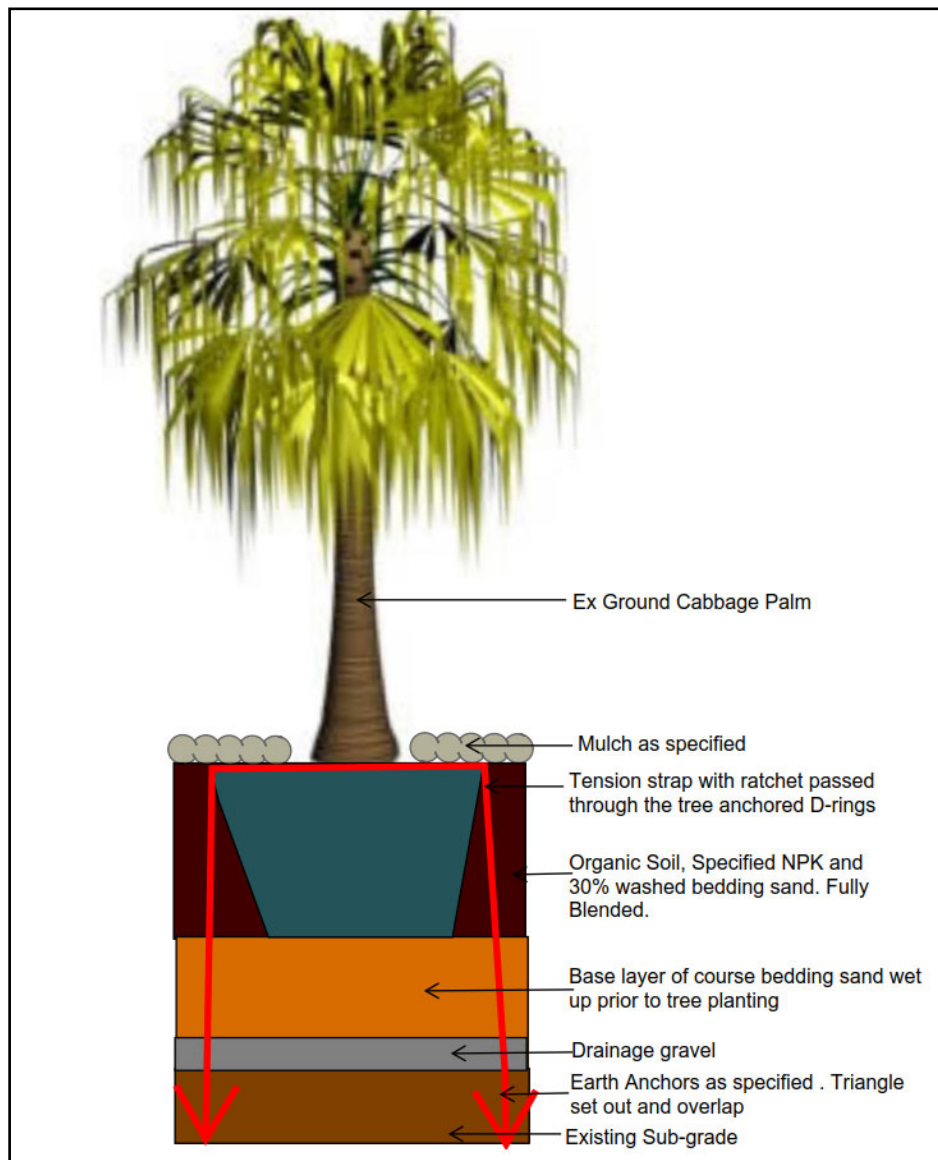


Figure 3-4: Tree Relocation Planting Procedures (To be confirmed by detailed landscape specifications)

## 4 Replacement Trees & Off Set Locations

Due to the specific tree design considerations and tree spacing requirements within the Sydney Airport Precincts, limited tree offset potential occurs within this precinct. As such, the tree impact offset strategy and replacement tree locations will focus on State land, however consultation will be undertaken with SYD and the AEO to determine any potential offset areas within Commonwealth land. The tree species list developed for the Project has been based on various selection criteria and has referenced local Council landscape & tree management strategies to ensure alignment with local land use characters & reduced ongoing maintenance considerations. All Tree species offset locations must meet the Obstacle Limitation Surface (OLS) requirements.

In accordance with CoA E83, replacement trees will:

- (a) be located on public land and prioritised within 500 metres of the Construction Boundary in consultation with the relevant council and the Airport Operator;
- (b) comply with the National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports;
- (c) meet the requirements for quality tree stock specified in the AS2303:2018 Tree Stock for Landscape Use;
- (d) be provided no later than six (6) months following the commencement of operation; and
- (e) have a minimum pot size of 100 litres or 150 litres for safe clear trunk views at road verges unless a different pot size is specified in the relevant council's plans / programs / strategies for vegetation management, street planting, or open space landscaping, or as agreed by the relevant council(s) and Airport Operator.

Preliminary tree offset totals have been provided to the Landscape Architects. These tree removal totals were formulated from the Project Arborist Assessment during the EIS. This allows the Landscape Design team to consider the total tree offset requirements within the tree offset strategy and the Place, Urban Design and Landscape Plan required by CoA E76.

In addition, each vegetation clearing permit records the actual number of trees to be removed under each permit. This allows the project to confirm exact quantities of tree impacts and associated offsets during the construction phase.

The Project will prioritise achieving the tree offset strategy within the Project Boundary (as part of the Place, Urban Design and Landscape Plan. If required, offsets will also be substituted by potential local bioregional tree plantings within the local council areas. The strategy includes communication with the local councils on preferred locations for Project tree offsets. This combined approach will ensure that the Project meets its offset obligations.

### 4.1 Commonwealth Jurisdiction

The following will be used as guidance when planting offsets within the Commonwealth jurisdiction:

- Do not use plants that produce attractive fruits (eg fig, lilipily, commercial fruit trees, palms)
- Do not use plants that produce attractive flowers (eg eucalypt, melaleuca, grevillea)
- When planting trees along access and other roads on the airport:
  - do not plant species that exceed 10m when mature
  - do not plant more than five trees in any one group
  - the average interval between tree groups should not be less than 200m
  - single trees should not be planted closer than 50m to any other single tree or tree groups

- trees should make up no more than five per cent of total tree/shrub plantings
- When planting shrubs:
  - species should not to exceed 5m mature height.
  - shrubs which produce nectar, fruits or seed should not be planted in groups of more than five per group and such groups shall not be planted closer than 50m to specimens of the same species or groups of any species which may similarly attract birds or flying-fox at the same time of the year.

All Angiosperm trees produce flowers and fruit. The tree species listed below are tree species that generally meet the intent of the Sydney Airport tree specifications. Gymnosperms (Cycads) are slow growing seed-bearing plants, they have characteristics that allow green canopy outcomes and reduced wildlife attraction. They have also been listed for detailed design consideration.

Table 4-1: Commonwealth Jurisdiction Tree Species (Tree Species to guide the detailed landscape design)

Botanical Name	Common Name	Canopy Size	Origin	Locally Native	Type
<b>Trees</b>					
<i>Angophora hispida</i>	Dwarf Apple	Small	Native	Yes	Evergreen
<i>Backhousia citriodora</i>	Lemon Scented Myrtle	Small	Native		Evergreen
<i>Banksia serrata</i>	Old Man Banksia	Small	Native	Yes	Evergreen
<i>Buckinghamia celsissima</i>	Ivory Curl Flower	Small	Native		Evergreen
<i>Leptospermum petersonii</i>	Lemon-scented Tea Tree	Small	Native		Evergreen
<i>Synoum glandulosum</i>	Scentless Rosewood	Small	Native	Yes	Evergreen
<i>Xanthostemon chrysanthus</i>	Golden Penda	Small	Native		Evergreen
<i>Acacia binervia</i>	Coastal Myall	Medium	Native	Yes	Evergreen
<i>Banksia integrifolia</i>	Coast Banksia	Medium	Native	Yes	Evergreen
<i>Brachychiton acerifolius</i>	Illawarra Flame Tree	Medium	Native	Yes	Deciduous
<i>Casuarina glauca</i>	Swamp She-Oak	Medium	Native	Yes	Evergreen
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Medium	Native	Yes	Evergreen
<i>Glochidion ferdinandi</i>	Cheese Tree	Medium	Native	Yes	Evergreen
<i>Harpullia pendula</i>	Tulipwood	Medium	Native		Evergreen
<i>Tristanopsis laurina</i>	Water Gum	Medium	Native	Yes	Evergreen
<b>Cycads</b>					
<i>Aloe dichotoma</i>	Tree Aloe	Small	Exotic		Evergreen
<i>Cycas revoluta</i>	Cycad	Small	Exotic		Evergreen
<i>Cycas thouarsii</i>	Cycad	Small	Exotic		Evergreen
<i>Dioon Spinulosa</i>	Cycad	Small	Native		Evergreen
<i>Lepidozamia peroffskyana</i>	Shinning Burrawong	Small	Native		Evergreen
<i>Macrozamia moorei</i>	Macrozamia	Small	Native		Evergreen
<i>Macrozamia miquelli</i>	Native Cycad	Small	Native		Evergreen
<i>Zamia furfuracea</i>	Cardboard Cycad	Small	Native		Evergreen



## 4.2 NSW Jurisdiction (State Land)

The Project area under NSW Jurisdiction currently contains many tree species that contribute to multiple benefits including ecological values, habitat connectivity, Sydney green grid contributions and landscape amenity. The TMS will focus on this NSW jurisdiction, it must also comply with OLS requirements.



Figure 4-1: NSW Jurisdiction, Tree Replacement Areas

The Tree species listed in Table 4-2 are species preferred by the Local Governments and will achieve the objectives of the TMS, including opportunities for high quality streetscapes and for accelerated canopy re-establishment.

Table 4-2: NSW Jurisdiction Tree Species (Tree Species to guide the detailed landscape design)

Botanical Name	Common Name	Canopy Size	Origin	Locally Native	Type
<i>Acmena smithii</i> + <i>minor</i>	Dwarf Creek Lilly-Pilly	Small	Native	Yes	Evergreen
<i>Angophora hispida</i>	Dwarf Apple	Small	Native	Yes	Evergreen
<i>Backhousia citriodora</i>	Lemon Scented Myrtle	Small	Native		Evergreen
<i>Banksia serrata</i>	Old Man Banksia	Small	Native	Yes	Evergreen
<i>Buckinghamia celsissima</i>	Ivory Curl Flower	Small	Native		Evergreen
<i>Callistemon viminalis</i>	Bot le brush	Small	Native		Evergreen
<i>Ceratopetalum gummiferum</i>	N S W Christmas Bush	Small	Native	Yes	Evergreen
<i>Elaeocarpus reticulatus</i>	Blueberry Ash	Small	Native	Yes	Evergreen
<i>Leptospermum petersonii</i>	Lemon-scented Tea Tree	Small	Native		Evergreen

Botanical Name	Common Name	Canopy Size	Origin	Locally Native	Type
<i>Melaleuca linariifolia</i>	Snow In Summer	Small	Native	Yes	Evergreen
<i>Synoum glandulosum</i>	Scentless Rosewood	Small	Native	Yes	Evergreen
<i>Xanthostemon chrysanthus</i>	Golden Penda	Small	Native		Evergreen
<i>Acacia binervia</i>	Coastal Myall	Medium	Native	Yes	Evergreen
<i>Acmena smithii</i>	Creek Lilly-Pilly	Medium	Native	Yes	Evergreen
<i>Angophora costata</i>	Sydney Red Gum	Medium	Native	Yes	Evergreen
<i>Angophora floribunda</i>	Rough-barked Apple	Medium	Native	Yes	Evergreen
<i>Banksia integrifolia</i>	Coast Banksia	Medium	Native	Yes	Evergreen
<i>Brachychiton acerifolius</i>	Illawarra Flame Tree	Medium	Native	Yes	Deciduous
<i>Calistemon salignus</i>	Willow Bottlebrush	Medium	Native	Yes	Evergreen
<i>Casuarina glauca</i>	Swamp She-Oak	Medium	Native	Yes	Evergreen
<i>Corymbia eximia</i>	Yellow Bloodwood	Medium	Native	Yes	Evergreen
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Medium	Native	Yes	Evergreen
<i>Elaeocarpus eumundi</i>	Eumundi Quandong	Medium	Native		Evergreen
<i>Eucalyptus haemastoma</i>	Scribbly Gum	Medium	Native	Yes	Evergreen
<i>Eucalyptus robusta</i>	Swamp Mahogany	Medium	Native	Yes	Evergreen
<i>Glochidion ferdinandi</i>	Cheese Tree	Medium	Native	Yes	Evergreen
<i>Harpullia pendula</i>	Tulipwood	Medium	Native		Evergreen
<i>Melaleuca bracteata</i>	Black Tea Tree	Medium	Native		Evergreen
<i>Melaleuca styphelioides</i>	Prickly Paperbark	Medium	Native	Yes	Evergreen
<i>Stenocarpus sinuatus</i>	Firewheel tree	Medium	Native		Evergreen
<i>Syzygium luehmannii</i>	Riberry	Medium	Native		Evergreen
<i>Syzygium paniculatum</i>	Magenta Cherry	Medium	Native	Yes	Evergreen
<i>Tristanopsis laurina</i>	Water Gum	Medium	Native	Yes	Evergreen
<i>Agathis robusta</i>	Queensland Kauri Pine	Large	Native		Evergreen
<i>Brachychiton discolor</i>	Queensland Lacebark	Large	Native		Deciduous
<i>Corymbia citriodora</i>	Lemon Scented Gum	Large	Native		Evergreen
<i>Corymbia maculata</i>	Spotted gum	Large	Native	Yes	Evergreen
<i>Eucalyptus microcorys</i>	Tallowwood	Large	Native		Evergreen
<i>Eucalyptus paniculata</i>	Grey Ironbark	Large	Native	Yes	Evergreen
<i>Eucalyptus tereticornis</i>	Forest Red Gum	Large	Native	Yes	Evergreen
<i>Eucalyptus sideroxylon</i>	Mugga Ironbark	Large	Native	Yes	Evergreen
<i>Ficus rubiginosa</i>	Port Jackson Fig	Large	Native	Yes	Evergreen
<i>Lophostemon confertus</i>	Brush Box	Large	Native		Evergreen
<i>Syncarpia glomulifera</i>	Turpentine	Large	Native	Yes	Evergreen
<i>Waterhousea floribunda</i> 'Green Avenue'	Green Avenue Lilly Pilly	Large	Native		Evergreen

Extract from *Marrickville Street Tree Master Plan 2014*

### 4.3 Tree Canopy Survey

The Sydney Gateway Project area currently contains approximately 9.4% tree canopy cover. This is formulated from 7.45 ha (approx.) of existing tree canopy cover within the 79.12 ha (approx.) of the Project area (refer to Appendix B).



Implementation of this TMS will achieve long-term net gain of tree canopy cover and will ensure that the Project complies with UMM LV4. In doing so there must be an understanding from all stakeholders that replacement trees will require growing time. To provide assurance to TfNSW of this long-term beneficial outcome the strategy includes:

- 1) 12-month 'establishment phase' for replanted tree species. The establishment phase will be signed off by inspection from the environmental representative / ecologist. This will include the trees reaching a stage of vegetative growth that assures long term survival.
- 2) Allocate tree replacement species in accordance with CoA E83.
- 3) Identify suitable tree offset locations outside of the project area, if required.

## 4.4 Tree Survey Results

The tree survey report will be produced prior to the completion of the detailed design to ensure all efforts have been made to identify trees that can be retained on site or reused by councils. Trees will be categorised into the following categories:

- **Tree** - Native and exotic long-lived perennial plant greater than 3 meters in height with one or relatively few main trunks. These trees contribute to the green space, canopy cover and Sydney's Green Grid.
- **Tree of Interest** - Native trees that are removed for the construction of the Project and that are greater than 25-30 centimetres in diameter and three metres in length are to be salvaged and provided to the group(s) and/or relevant councils or agencies referred to in this condition as agreed. These trees have been identified and mapped (Refer to Appendix 3).
- **Habitat Trees** –Trees with significant ecological functions, hollows, or nests.

JHSWJV will consult with local community restoration/rehabilitation groups, Landcare groups, EESG, Sydney Water, and relevant councils prior to removing any native trees not to be reused by the CSSI, to determine if there is an interest for the reuse of suitable timber and root balls in habitat enhancement and rehabilitation work. If there is an interest, native trees that are removed for the construction of the CSSI and that are greater than 25-30 centimetres in diameter and three metres in length are to be salvaged and provided to the group(s) and/or relevant councils or agencies referred to in this condition as agreed.

To manage this process, the tree survey (refer Appendix C) has located the trees with these specific characteristics. The stakeholders will be contacted and a collaborative group presentation will be provided. This approach will allow JHSWJV to identify opportunities to maximize beneficial reuse and assist ecological enhancement projects.

Community feedback and complaints relating to tree management procedures will be dealt with in accordance with the Community Communications Strategy (CCS) and the Complaints Management System.

## 5 Tree Protection Measures

Prior to commencing construction, the design documentation will identify trees that must be removed to allow construction to proceed. The site and the tree clearing drawings will be inspected by the supervisor and environmental representative. For all other trees to be retained around the construction area, the following tree protection measures will be implemented:

- Trees that require removal will be confirmed by detailed survey. They will be clearly identified on site by a large red X. This will be clearly communicated to the construction site teams as 'trees approved to be removed'.
- Trees allocated for retention will be identified and tree protective fencing and signage will be installed.
- Trees allocated for retention that require specific treatment to protect the tree during construction will be identified with highly visible green survey tape. These trees may require, canopy pruning, installation of ground protection techniques etc. These requirements will be clearly communicated to the construction site teams prior to commencement of construction.
- Requirement for tree relocation strategies, remedial works and temporary protection measures will in place and undertaken ahead of the construction program.
- All on site personnel will be informed at induction & prestart sign on of their responsibilities in relation to tree protection.

### 5.1 Tree Protection Zones (TPZ)

Trees are to be protected by the provision of highly visible 1.2m high protection flagging fence. The protective fencing is to be erected as specified on the Flora & Fauna Management Plan and in accordance with the Australian Standard 'Protection of Trees on development sites' AS 4970-2009.

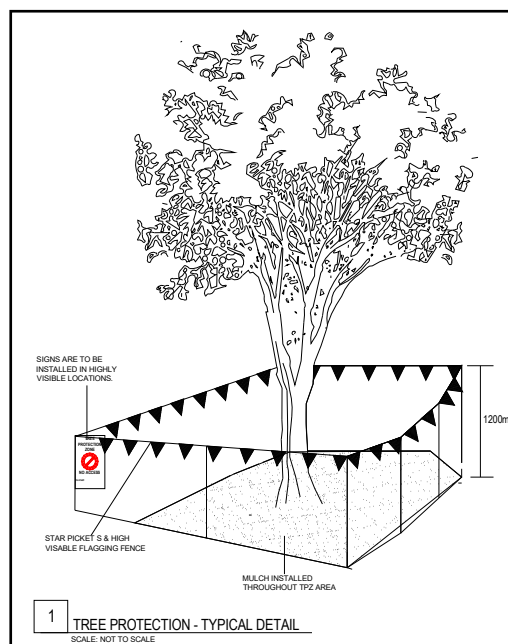


Figure 5-1: Individual Tree Protection Flagging Typical Detail

The allocated trees are to be protected by the following measures and managed according to their individual assessment reports:

- All on site personnel are to be properly inducted onto the Sydney Gateway Project
- All relevant personal will be trained and signed on the EWMS for Clearing & Grubbing
- All machine operators are to have an on-site meeting with the supervisor, and environmental representative prior to commencement of works.
- Review the TMS and review individual tree survey report
- Implement all requirements of the Individual Tree Survey report prior to the commencement of works.
- Woodchip or segment the felled vegetation
- Load the vegetation debris onto suitable trucks for removal or stockpile the wood-chipped vegetation in suitable temporary stockpile sites for use as mulch for erosion and sediment control or on future landscape areas
- Stump grind remains or remove from ground with an excavator.
- Foot traffic and frequent machinery movement is to be avoided around protected trees, to minimise soil compaction or tree root damage during construction operations.
- The following activities (without tree specific protection measures) are prohibited to occur within the tree protection zones or drip-line of trees marked for retention:
  - Machinery or vehicle parking
  - Disposal of liquids of any type
  - Repairs or refuelling
  - Earthworks
  - Temporary sheds
  - Stockpiling
- Any required excavation in or around the protection barrier to accommodate underground services, footings, fences, etc. should be indicated on the EMWS and done by hand under the supervision of the Environmental Representative .
- Trees inside the protection zone should be cared for throughout the construction process, i.e., they must be watered sufficiently, particularly if a portion of the tree's root system has been pruned or disturbed.
- Inspection and monitoring by the environmental representative on the retained vegetation to ensure continued health and vigour.

## **5.2 Canopy Pruning**

### **5.2.1 Reasons for Pruning**

Canopy pruning is an effective way to retain tree species and allow construction works. Any cut to the tree has the potential to change the growth of the tree, therefore no branch should be removed without a reason. Common reasons for pruning are to remove dead branches, to remove crowded or rubbing limbs, eliminate hazards and allow construction access. All works will be conducted in accordance with EWMS – Clearing and Grubbing.

### 5.2.2 Pruning Cuts

All pruning is to be in accordance with the Australia standard guide for pruning. AS 4373-2007 Pruning of amenity trees and will be undertaken by a qualified Arborist.

Branches should be cut cleanly with a proper saw or shears, depending on the size of the branch. The cut should be located adjacent to a node (swelling) in the branch. Along the tree trunk, branches should be cut just outside the swelling at the base of the branch (i.e. branch collar), not flush to the tree trunk. The branch collar contains trunk or parent branch tissue and should not be damaged or removed.

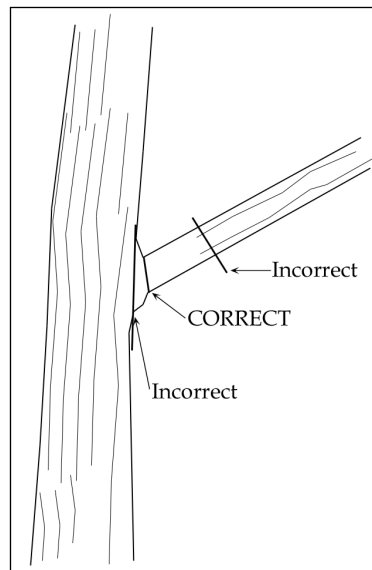


Figure 5-2: Correct pruning technique

### 5.2.3 Dead Limb Removal

If the tree is to be conserved and is adjacent to future pedestrians or traffic, the dead limb of the retained tree is to be removed, make the cut just beyond the collar. Do not cut the collar. This will improve safety and tree species disease resilience for long term survival.

### 5.2.4 Pruning Large Limbs

If a large limb is to be removed, its weight should first be reduced. This is done by making an undercut about 30-45cm from the limb's point of attachment. Make a second cut from the top, directly above or a few inches farther out on the limb. Doing so removes the limb, leaving the 30-45cm stub. Remove the stub by cutting back to the branch collar. This technique reduces the possibility of tearing the bark.

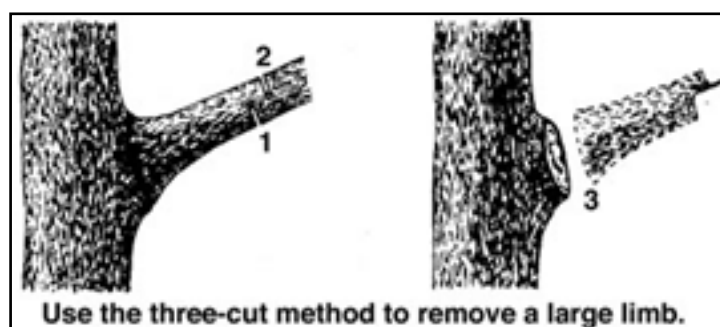


Figure 5-3: Pruning Large Limbs

### 5.2.5 Pruning Techniques

Tree specific pruning techniques may be used to assist retention of existing trees and allow construction. Specific types of pruning may be necessary to maintain a mature tree in a healthy, safe, and attractive condition.

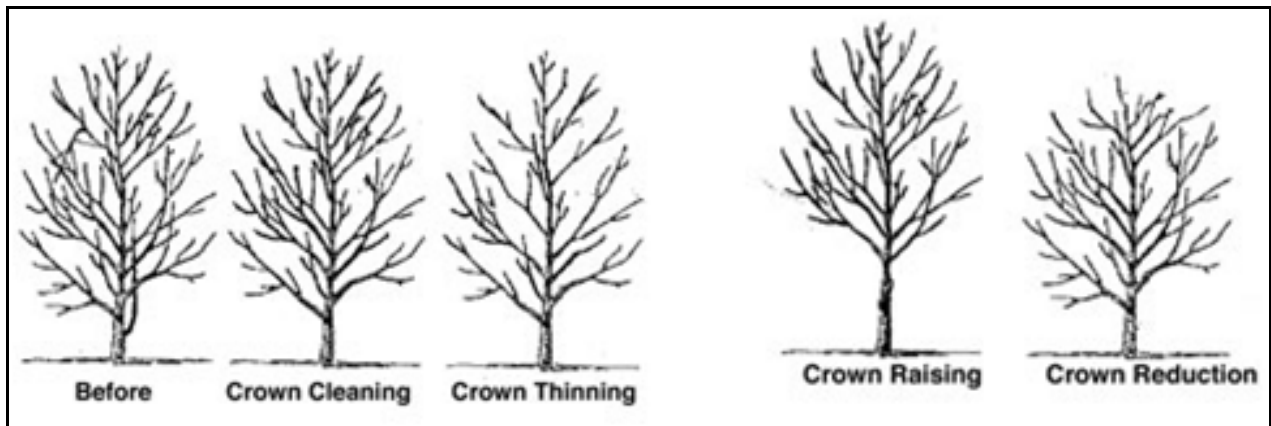


Figure 5-4: Pruning Techniques

- **Cleaning** - is the removal of dead, dying, diseased, crowded, weakly attached and low-vigour branches from the crown of a tree.
- **Thinning** - is the selective removal of branches to increase light penetration and air movement through the crown. Thinning opens the foliage of a tree, reduces weight on heavy limbs, and helps retain the tree's natural shape.
- **Raising** - removes the lower branches from a tree in order to provide clearance for machine access, buildings, vehicles, pedestrians.
- **Reduction** - reduces the size of a tree, often for clearance for utility lines. Reducing the height or spread of a tree is best accomplished by pruning back the leaders and branch terminals to lateral branches that are large enough to assume the terminal roles (at least one-third the radius of the cut stem). Compared to topping, reduction helps maintain the form and structural integrity of the tree. The success of reduction pruning is dependent on the species and the form and structure of the individual tree.

### 5.3 Root Pruning

Root pruning is the practice of removing a portion of a tree's root system to conserve and protect the tree, allow construction, and maintain long term health and vitality. Root pruning sometimes becomes necessary in order to accommodate construction, trenches, footings, built structures and landscape features such as walks, retaining walls, drains, fencing or utilities. Other reasons for root pruning may include transplanting and undesirable growth patterns. After micro siting of at risk trees, root pruning may be require to conserve the tree species and allow construction.

The following general guidelines for root pruning should be considered:

- A tree should be root pruned only if the problem can be solved by removing less than 33 percent of the tree's roots, with no more than 25 percent from one side.



- For trees 30 cm in radius and less, roots should not be removed within 1.2 m of the outer edge of the tree base. Trees with radius over 30 cm should be allowed an additional 30 cm for every extra 7.5 cm of trunk radius measured at a point 1.4 m above ground.
- Cut roots cleanly after excavation with water cutter, or clean, sharp tools, to promote callous formation and wound closure.
- Backfill the excavation as soon as possible and water the soil around roots to avoid leaving air pockets.
- Mix soil improvements (e.g. peat moss) with fill soil to promote new root growth, especially if the existing soil is of poor quality. Do not add fertilizers until improved tree growth is noticed, generally after 6 to 8 weeks during a growing season.
- Surface roots, which interfere with other elements can be removed under the supervision or instruction from the Arborist.

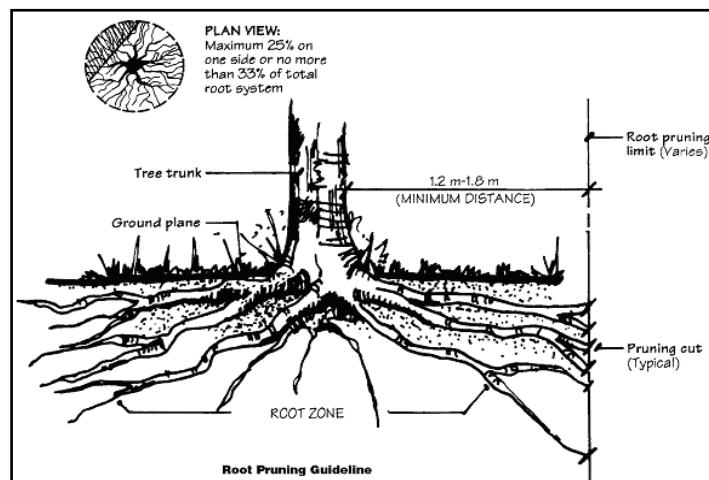


Figure 5-5: Root pruning guidelines

## 5.4 Root Protection

Root protection is where required within Root Protection Zones (RPZ) to allow construction activities and access to sites. This requires installation of measures to reduce soil compaction and surface root damage and conserve the tree species. These measures are only for short-term use and are to be removed as soon as they are no longer required:

- Lay geo-textile fabric over the area requiring tree root protection
- Lay mulch over the fabric at a minimal spread of 100mm thick (this is **not** to be done using machinery)
- Steel plates or rumble boards can then be laid on top of the mulch to provide temporary access to the site through RPZs.

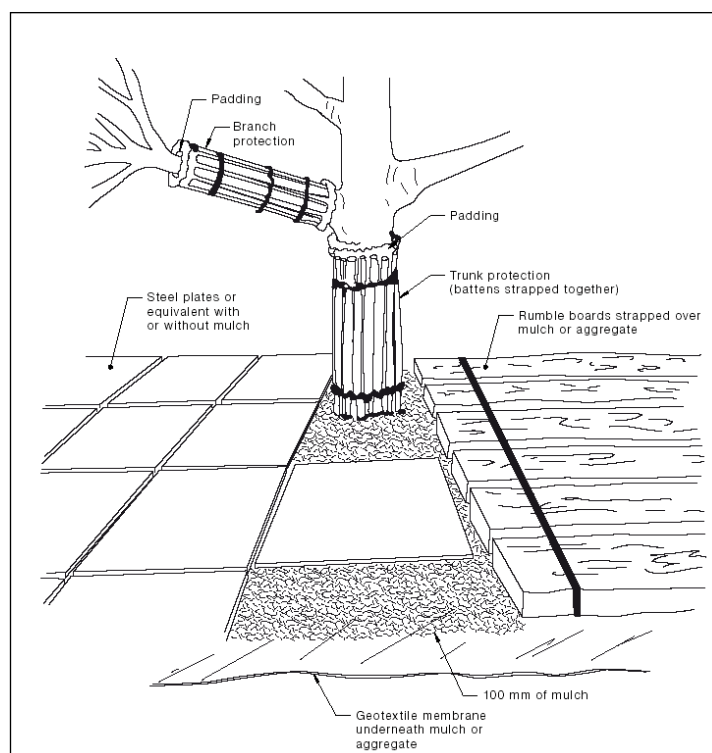


Figure 5-6: Ground protection techniques

## Appendix A Sydney Green Grid Site Examples

The Sydney Gateway Project TMS will ensure all efforts are made to contribute to the Greater Sydney Green Grid which has been created over time by past investments.

The Greater Sydney Green Grid connects communities to the landscape. It is a long-term vision for a network of high-quality green areas, that connect centres, public transport and public spaces to green infrastructure and landscape features it includes enhanced waterway corridors, transport routes, suburban streets, footpaths and cycleways. The Greater Sydney Green Grid offers a network of green spaces that is far greater than the sum of its parts.

By retaining and offsetting the trees removed, the Sydney Gateway Project will assist in keeping the region cool, encourage healthy lifestyles, support walking and cycling, provide better access to open spaces, enhance landscapes and support ecological resilience.



Figure A-1: Project example enhanced foot paths and pedestrian connectivity



Figure A-2: Project example shading and cooling



Figure A-3: Project example ecological functions



Figure 3 Project example waterway corridors



Figure A-5: Project example green backdrops and landscape amenity



## Appendix B Sydney Gateway Tree Canopy Plan

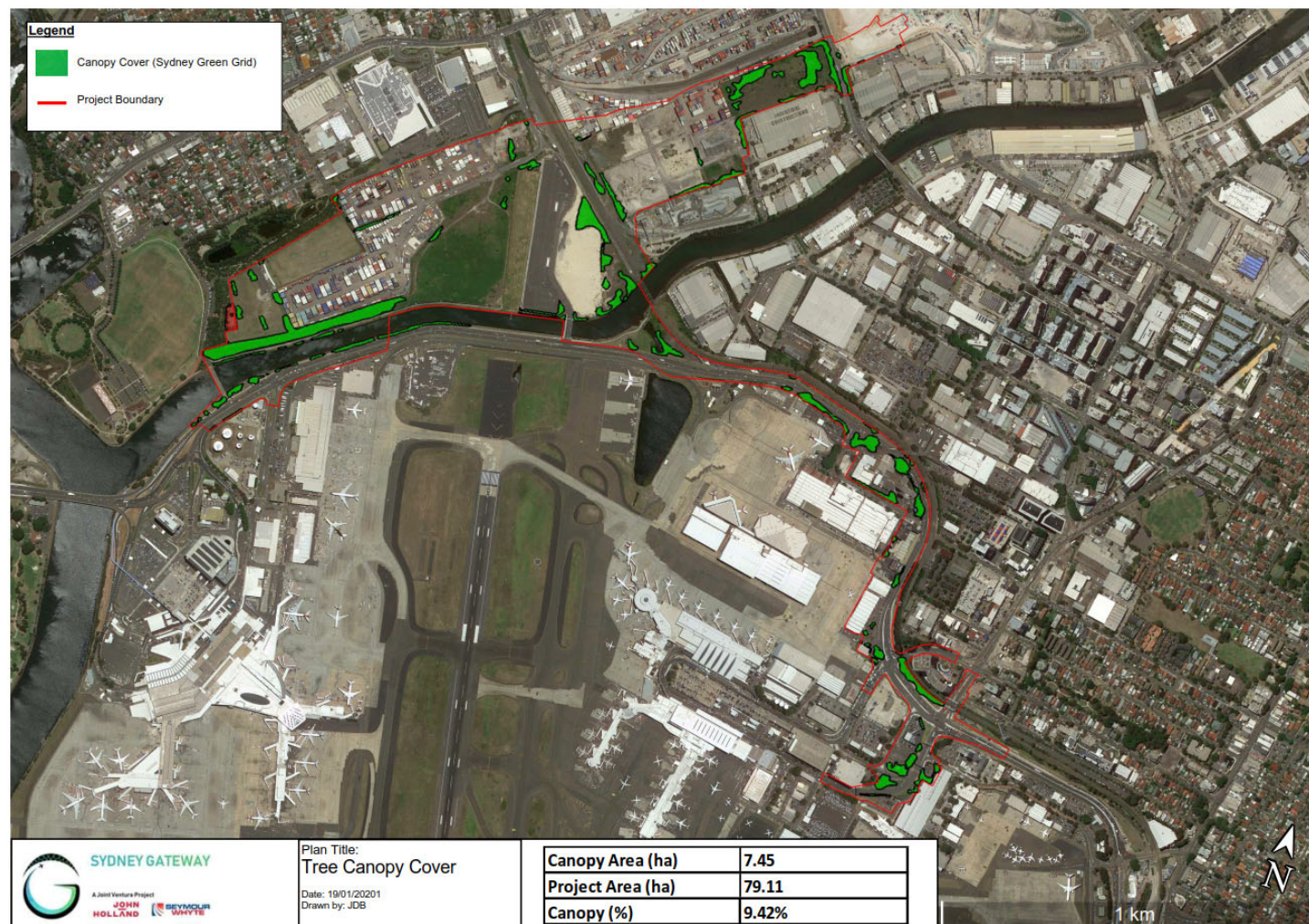


Figure B-1: Sydney Gateway Tree Canopy Plan





## Appendix G – Species List (extract from Appendix B of TWP 14)



## B1. Flora surveys

Flora species recorded during field surveys

RM – recorded during random meander survey

Q1-Q6 – recorded during vegetation integrity plot surveys

Family	Species	Common name	RM	Q1	Q2	Q3	Q4	Q5	Q6
Acanthaceae	<i>Avicennia marina</i> subsp. <i>australasica</i>	Grey Mangrove							x
Acanthaceae	<i>Thunbergia alata</i> *	Black-eyed Susan	x			x	x		
Agavaceae	<i>Agave americana</i> *	Century Plant	x						
Alliaceae	<i>Agapanthus praecox</i> subsp. <i>orientalis</i> *	Agapanthus	x						
Aloeaceae	<i>Aloe</i> sp.*	-	x						
Anacardiaceae	<i>Harpephyllum caffrum</i> *	Kaffir Plum					x		
Apiaceae	<i>Daucus carota</i> *	Wild Carrot	x						
	<i>Foeniculum vulgare</i> *	Fennel							x
	<i>Hydrocotyle bonariensis</i> *	A Pennywort							x
Apocynaceae	<i>Araujia sericifera</i> *	Moth Vine	x			x		x	
	<i>Gomphocarpus fruticosus</i> *	Narrow-leaved Cotton Bush	x						
	<i>Nerium oleander</i> *	Oleander	x						
Arecaceae	<i>Phoenix canariensis</i> *	Canary Island Date Palm					x		
	<i>Syagrus romanzoffiana</i> *	Cocos Palm	x						
Asparagaceae	<i>Asparagus aethiopicus</i> *	Asparagus Fern	x			x			
Asparagaceae	<i>Asparagus plumosus</i> *	Climbing Asparagus Fern		x					







Family	Species	Common name	RM	Q1	Q2	Q3	Q4	Q5	Q6
Asteraceae	<i>Ageratina riparia</i> *	Mistflower	x						
	<i>Aster subulatus</i> *	Wild Aster	x						
	<i>Bidens pilosa</i> *	Cobbler's Pegs	x	x	x	x		x	
	<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> *	Bitou Bush	x						
	<i>Cirsium vulgare</i> *	Spear Thistle	x	x				x	x
	<i>Conyza bonariensis</i> *	Flaxleaf Fleabane	x						
	<i>Conyza sumatrensis</i> *	Tall Fleabane	x		x			x	
	<i>Gamochaeta americana</i> *	Cudweed	x					x	
	<i>Hypochaeris radicata</i> *	Smooth Catsear	x						
	<i>Senecio madagascarensis</i> *	Fireweed	x					x	
	<i>Sigesbeckia orientalis</i> subsp. <i>orientalis</i>	Indian Weed							x
	<i>Soliva sessilis</i> *	Bindii	x						
	<i>Sonchus asper</i> *	Prickly Sowthistle	x						
	<i>Sonchus oleraceus</i> *	Common Sowthistle	x	x		x		x	
	<i>Tagetes minuta</i> *	Stinking Roger	x						
	<i>Taraxacum officinale</i> *	Dandelion	x						
Basellaceae	<i>Anredera cordifolia</i> *	Madeira Vine	x	x					
Bignoniaceae	<i>Jacaranda mimosifolia</i> *	Jacaranda	x						
Brassicaceae	<i>Brassica rapa</i> *	Field Mustard	x		x	x			
	<i>Capsella bursa-pastoris</i> *	Shepherd's Purse	x						
	<i>Cardamine flexuosa</i> *	Wood Bittercress	x						
Casuarinaceae	<i>Casuarina glauca</i>	Swamp Oak	x		x	x	x	x	





Family	Species	Common name	RM	Q1	Q2	Q3	Q4	Q5	Q6
Chenopodiaceae	<i>Chenopodium album</i> *	Fat Hen	x	x					
	<i>Sarcocornia quinqueflora</i> subsp. <i>quinqueflora</i>	Samphire							x
	<i>Suaeda australis</i>	Austral Seablite							x
Convolvulaceae	<i>Ipomoea cairica</i> *	Coast Morning Glory	x	x		x			
	<i>Ipomoea indica</i> *	Blue Morning Glory	x			x		x	
Crassulaceae	<i>Bryophyllum delagoense</i> *	Mother of millions	x						
Cyperaceae	<i>Cyperus eragrostis</i> *	Umbrella Sedge	x						
	<i>Cyperus polystachyos</i>	A Sedge	x						
Euphorbiaceae	<i>Euphorbia peplus</i> *	Petty Spurge	x						
	<i>Homalanthus populifolius</i>	Bleeding Heart	x						
	<i>Ricinus communis</i> *	Castor Oil Plant		x					
Fabaceae (Caesalpinioideae)	<i>Senna pendula</i> var. <i>glabrata</i> *		x						
Fabaceae (Faboideae)	<i>Erythrina crista-galli</i> *	Cockspur Coral Tree	x						
	<i>Genista monspessulana</i> *	Montpellier Broom	x					x	
	<i>Melilotus indicus</i> *	Hexham Scent	x		x				
	<i>Trifolium pratense</i> *	Red Clover	x					x	
	<i>Trifolium repens</i> *	White Clover	x						
	<i>Vicia sativa</i> subsp. <i>sativa</i> *	Common Vetch	x					x	





Family	Species	Common name	RM	Q1	Q2	Q3	Q4	Q5	Q6
Fabaceae (Mimosoideae)	<i>Acacia decurrens</i>	Green Wattle					x		
	<i>Acacia floribunda</i>	White Sally	x						
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sydney Golden Wattle							
	<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Coastal Wattle	x		x				x
	<i>Acacia parramattensis</i>	Parramatta Wattle							
	<i>Acacia saligna</i> *	Golden Wreath Wattle	x			x	x	x	
Fumariaceae	<i>Fumaria muralis</i> *		x						
Gentianaceae	<i>Centaurium erythraea</i> *	Common Centaury	x						
Geraniaceae	<i>Geranium molle</i> subsp. <i>molle</i> *	Cranesbill Geranium	x						
Iridaceae	<i>Crocasmia X crocosmiiflora</i> *	Montbretia	x						
	<i>Freesia hybrid</i> *	Freesia	x						
	<i>Gladiolus sp.</i> *	Gladiolus	x						
Iridaceae	<i>Romulea minutiflora</i> *	Small-flowered Onion Grass	x						
Juncaceae	<i>Juncus acutus</i> *	Sharp Rush	x						
	<i>Juncus continuus</i>	A Rush	x						
	<i>Juncus kraussii</i> subsp. <i>australiensis</i>	Sea Rush							x
Juncaginaceae	<i>Triglochin striata</i>	-	x						x
Lamiaceae	<i>Prunella vulgaris</i> *	Self-heal				x	x		
	<i>Stachys arvensis</i> *	Stagger Weed	x						
Lauraceae	<i>Cinnamomum camphora</i> *	Camphor Laurel	x						
Malaceae	<i>Rhaphiolepis indica</i> *	Indian Hawthorn	x						





Family	Species	Common name	RM	Q1	Q2	Q3	Q4	Q5	Q6
Malvaceae	<i>Abutilon grandifolium</i> *		x						
	<i>Modiola caroliniana</i> *	Red-flowered Mallow		x					
	<i>Sida rhombifolia</i> *	Paddy's Lucerne	x			x	x		
Meliaceae	<i>Melia azedarach</i>	Meliaceae	x						
Moraceae	<i>Ficus microcarpa</i> var. <i>hillii</i> *	Small-fruited Fig	x						
	<i>Ficus pumila</i> *	Climbing Fig	x						
	<i>Ficus rubiginosa</i>	Port Jackson Fig	x						
Myrsinaceae	<i>Anagallis arvensis</i> *	Scarlet/Blue Pimpernel	x						
Myrtaceae	<i>Agonis flexuosa</i> *	Willow Myrtle	x						
	<i>Angophora costata</i>	Smooth-barked Apple	x						
	<i>Callistemon citrinus</i>	Crimson Bottlebrush	x						
	<i>Callistemon salignus</i>	Willow Bottlebrush	x						
	<i>Callistemon</i> sp. (Cultivar)*	-	x						
	<i>Corymbia citriodora</i> *	Lemon-scented Gum	x						
	<i>Corymbia maculata</i>	Spotted Gum	x						
	<i>Eucalyptus</i> sp. (Planted)*	Eucalyptus	x			x	x		
	<i>Eucalyptus tereticornis</i>	Forest Red Gum					x		
	<i>Leptospermum polygalifolium</i> subsp. <i>polygalifolium</i>	Yellow Tea-tree					x		
	<i>Melaleuca styphelioides</i>	Prickly-leaved Tea Tree	x			x			
Oleaceae	<i>Ligustrum lucidum</i> *	Large-leaved Privet	x		x				
	<i>Ligustrum sinense</i> *	Small-leaved Privet	x						
	<i>Olea europaea</i> subsp. <i>cuspidata</i> *	African Olive			x		x		x







Family	Species	Common name	RM	Q1	Q2	Q3	Q4	Q5	Q6
Oxalidaceae	<i>Oxalis corniculata</i> *	Creeping Oxalis	x						
	<i>Oxalis pes-caprae</i> *	Soursob	x						
Passifloraceae	<i>Passiflora subpeltata</i> *	White Passionflower	x						
Pinaceae	<i>Pinus</i> sp*	Pine							x
Pittosporaceae	<i>Bursaria spinosa</i> subsp. <i>spinosa</i>	Native Blackthorn	x			x	x		
Plantaginaceae	<i>Plantago lanceolata</i> *	Lamb's Tongues	x		x			x	
Plantaginaceae	<i>Plantago major</i> *	Greater Plantain			x				
Poaceae	<i>Andropogon virginicus</i> *	Whisky Grass	x						
	<i>Anthoxanthum odoratum</i> *	Sweet Vernal Grass	x						
	<i>Arundo donax</i> *	Giant Reed	x						
	<i>Avena fatua</i> *	Wild Oats	x						x
	<i>Axonopus fissifolius</i> *	Narrow-leaved Carpet Grass	x						
	<i>Briza maxima</i> *	Quaking Grass	x						
	<i>Briza minor</i> *	Shivery Grass	x						
	<i>Briza subaristata</i> *	-	x						
	<i>Bromus catharticus</i> *	Prairie Grass	x						
	<i>Cenchrus clandestinus</i> *	Kikuyu Grass	x	x		x			
	<i>Chloris gayana</i> *	Rhodes Grass	x		x			x	
	<i>Cortaderia selloana</i> *	Pampas Grass	x	x	x			x	
	<i>Cynodon dactylon</i>	Common Couch	x		x		x		x





Family	Species	Common name	RM	Q1	Q2	Q3	Q4	Q5	Q6
Poaceae	<i>Digitaria ciliaris</i> *	Summer Grass	x						
	<i>Digitaria sanguinalis</i> *	Summer Grass, Crab Grass	x						
	<i>Echinochloa crus-galli</i> *	Barnyard Grass	x				x		
	<i>Ehrharta erecta</i> *	Panic Veldtgrass	x			x	x	x	
	<i>Ehrharta longiflora</i> *	Annual Veldtgrass	x						
	<i>Eleusine indica</i> *	Crowsfoot Grass	x						
	<i>Eragrostis curvula</i> *	African Lovegrass	x		x				
	<i>Microlaena stipoides</i> var. <i>stipoides</i>	-	x			x			
	<i>Paspalum dilatatum</i> *	Paspalum	x						x
	<i>Paspalum quadrifarium</i> *	Tussock Paspalum	x						
	<i>Paspalum urvillei</i> *	Vasey Grass	x						
	<i>Poa annua</i> *	Winter Grass	x						
	<i>Setaria parviflora</i> *	Slender Pigeon Grass	x						
	<i>Sporobolus africanus</i> *	Parramatta Grass	x						
	<i>Sporobolus virginicus</i>	Marine Couch							x
	<i>Stenotaphrum secundatum</i> *	Buffalo Grass				x			
	<i>Vulpia myuros</i> *	Rat's Tail Fescue	x						
Polygonaceae	<i>Persicaria lapathifolia</i>	Pale Knotweed							x
Polygonaceae	<i>Rumex brownii</i>	Swamp Dock	x						
	<i>Rumex crispus</i> *	Curled Dock	x						
Proteaceae	<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coastal Banksia	x						





Family	Species	Common name	RM	Q1	Q2	Q3	Q4	Q5	Q6
Rosaceae	<i>Cotoneaster</i> sp.*	Cotoneaster	x		x				
	<i>Prunus persica</i> *	Peach					x		
	<i>Rubus fruticosus</i> agg.*	Blackberry	x						
Rubiaceae	<i>Galium aparine</i> *	Goosegrass	x						
	<i>Richardia brasiliensis</i> *	Mexican Clover	x						
	<i>Richardia stellaris</i> *		x						
Salicaceae	<i>Salix babylonica</i> *	Weeping Willow							x
Sapindaceae	<i>Cardiospermum grandiflorum</i> *	Balloon Vine	x						
	<i>Dodonaea triquetra</i>	Large-leaf Hop-bush					x		
Solanaceae	<i>Cestrum parqui</i> *	Green Cestrum	x				x		x
	<i>Salpichroa organifolia</i> *	Pampas lily-of-the-valley		x					
	<i>Solanum nigrum</i> *	Black-berry Nightshade	x	x					
	<i>Solanum sisymbriifolium</i> *	Viscid Nightshade	x						
Sterculiaceae	<i>Brachychiton acerifolius</i> *	Illawarra Flame Tree	x						
Thelypteridaceae	<i>Christella dentata</i>	-	x						
Tropaeolaceae	<i>Tropaeolum majus</i> *	Nasturtium	x						
Ulmaceae	<i>Celtis sinensis</i> *	Chinese Nettle Tree	x	x	x		x		x
	<i>Ulmus parvifolia</i> *	Chinese Elm	x						
Urticaceae	<i>Parietaria judaica</i> *	Asthma Weed	x			x			x
Verbenaceae	<i>Lantana camara</i> *	Lantana	x	x	x	x	x	x	x
	<i>Verbena bonariensis</i> *	Purpletop	x		x			x	
	<i>Verbena officinalis</i> *	Common Verbena	x						
	<i>Verbena rigida</i> *	Veined Verbena		x					

Key: \* exotic species





## B2. Fauna surveys

Fauna species recorded during field surveys

Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Alexandra Canal	Tempe Lands	Tempe Wetland
<i>Limnodynastes peronii</i>	Brown-striped Frog						O
<i>Crinia signifera</i>	Common Eastern Froglet						W
<i>Litoria fallax</i>	Eastern Dwarf Tree Frog						O
<i>Litoria peronii</i>	Peron's Tree Frog						O
<i>Sphecotheres vieilloti</i>	Australasian Figbird						O
<i>Cracticus tibicen</i>	Australian Magpie					O	
<i>Corvus coronoides</i>	Australian Raven					O	
<i>Threskiornis molucca</i>	Australian White Ibis				O		
<i>Sturnus tristis</i>	Common Myna	*				O	
<i>Sturnus vulgaris</i>	Common Starling	*				O	
<i>Ocyphaps lophotes</i>	Crested Pigeon					O	
<i>Gallinula tenebrosa</i>	Dusky Moorhen						O
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill					O	
<i>Fulica atra</i>	Eurasian Coot						O
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo					W	
<i>Colluricincla harmonica</i>	Grey Shrike-thrush						W
<i>Aythya australis</i>	Hardhead						O
<i>Chalcites basal</i>	Horsfield's Bronze-Cuckoo					O	
<i>Ardea intermedia</i>	Intermediate Egret				O		







Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Alexandra Canal	Tempe Lands	Tempe Wetland
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant				O		
<i>Egretta garzetta</i>	Little Egret				O		
<i>Grallina cyanoleuca</i>	Magpie-lark					O	
<i>Falco cenchroides</i>	Nankeen Kestrel					O	
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater					O	O
<i>Manorina melanocephala</i>	Noisy Miner					O	
<i>Anas superciliosa</i>	Pacific Black Duck						O
<i>Phalacrocorax varius</i>	Pied Cormorant				O		
<i>Strepera graculina</i>	Pied Currawong					O	
<i>Porphyrio porphyrio</i>	Purple Swampphen						O
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet					O	O
<i>Anthochaera carunculata</i>	Red Wattlebird						O
<i>Neochmia temporalis</i>	Red-browed Finch					O	
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	*				O	O
<i>Columba livia</i>	Rock Dove					O	
<i>Chroicocephalus novaehollandiae</i>	Silver Gull				O		
<i>Zosterops lateralis</i>	Silvereye					O	
<i>Turdus philomelos</i>	Song Thrush						O
<i>Pardalotus punctatus</i>	Spotted Pardalote						W
<i>Streptopelia chinensis</i>	Spotted Turtle-dove	*				O	
<i>Butorides striatus</i>	Striated Heron				O		
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo					O	





Scientific Name	Common Name	Exotic	NSW Status	EPBC Status	Alexandra Canal	Tempe Lands	Tempe Wetland
<i>Malurus cyaneus</i>	Superb Fairy-wren					O	O
<i>Podargus strigoides</i>	Tawny Frogmouth					O	
<i>Hirundo neoxena</i>	Welcome Swallow					O	O
<i>Sericornis frontalis</i>	White-browed Scrubwren					O	O
<i>Ardea pacifica</i>	White-necked Heron				O		
<i>Ptilotula penicillatus</i>	White-plumed Honeyeater						O
<i>Rhipidura leucophrys</i>	Willie Wagtail				O	O	O
<i>Caligavis chrysops</i>	Yellow-faced Honeyeater						O
<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum						O
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-Bat		V				D
<i>Mormopterus ridei</i>	Eastern Free-tailed Bat						PR
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat						D
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox		V	V			O
<i>Vespadelus sp.</i>	Unidentified Eptesicus						
<i>Austronomus australis</i>	White-striped Freetail-Bat						D
<i>Tiliqua scincoides</i>	Eastern Blue-tongue						O
<i>Intellagama lesueurii</i>	Eastern Water Dragon						O
<i>Eulamprus quoyii</i>	Eastern Water-Skink						O
<i>Lampropholis guichenoti</i>	Pale-flecked Garden Sunskink					O	

Key: \* - exotic; D – definite call (Anabat); PR – probable call (Anabat); V – vulnerable, O – observed, W – heard



## Appendix H – Pre Clearing Inspection Areas





**Legend**

- Areas requiring pre-clearing inspection
- Commonwealth Land
- Project Boundary
- State Land

**SYDNEY GATEWAY STAGES 1 AND 3**

Areas requiring pre-clearing surveys

Site Overview

DOCUMENT NO:

SGWPW-JHSW-NWW-EN-ECM-000001

Page 1 of 5

Revision – 001

DRAFTED:	Ryan Maxwell
DELEGATE:	
REVIEWED:	Rob Muir
DELEGATE:	
APPROVED:	Rob Muir
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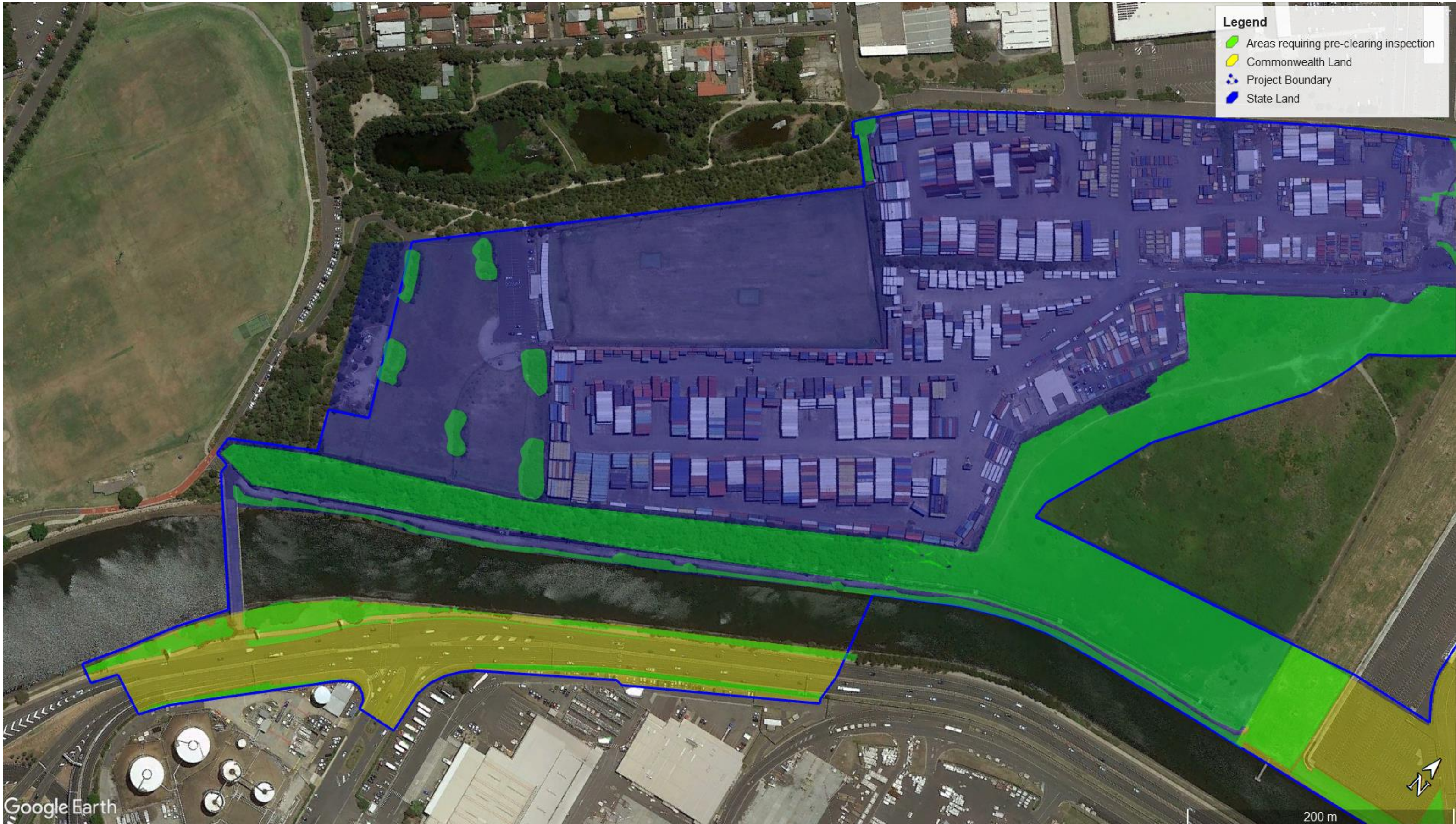


**SYDNEY GATEWAY**

A Joint Venture Project







- Legend**
- Areas requiring pre-clearing inspection
  - Commonwealth Land
  - Project Boundary
  - State Land

**SYDNEY GATEWAY STAGES 1 AND 3**  
Areas requiring pre-clearing surveys  
Tempe Lands

DOCUMENT NO:  
SGWPW-JHSW-NWW-EN-ECM-000001

Page 2 of 5  
Revision – 001

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**SYDNEY GATEWAY**

A Joint Venture Project

**JOHN HOLLAND** **SEYMOUR WHYTE**





**Legend**

- Areas requiring pre-clearing inspection
- Commonwealth Land
- Project Boundary
- State Land

**SYDNEY GATEWAY STAGES 1 AND 3**

Areas requiring pre-clearing surveys

Northern Lands

DOCUMENT NO:

SGWPW-JHSW-NWW-EN-ECM-000001

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Revision – 001

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<b>SYDNEY GATEWAY STAGES 1 AND 3</b>
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Qantas Drive
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