

Sydney Metro – Western Sydney Airport

EPBC Approval 2020/8687 – Off-airport Biodiversity
Management Plan

December 2023

Sydney Metro – Western Sydney Airport

Off-airport Biodiversity Management Plan

December 2023

Client: Sydney Metro

ABN: 12354063515

Details

Approval:	Sydney Metro Western Sydney Airport - St Marys to Elizabeth Drive, NSW (EPBC 2020/8687)
Person to whom the approval is granted (approval holder):	Sydney Metro
Location of the action:	St Marys to Elizabeth Drive, NSW
The approved action:	To construct and operate a rail link in Western Sydney from St Marys to Elizabeth Drive, located approximately 46 kilometres west of Sydney's centre, NSW (See EPBC Act referral 2020/8687).

Quality Information

Document EPBC Biodiversity Management Plan

Ref Final

Date December 2023

Prepared by M2A & Sydney Metro

Reviewed by Alex Cockerill, Hugh Chapman, Alice Pryke, and Christian Berg.

Revision History

Rev	Prepared by	Reviewed by	Issued by	Issued for	Date of issue
0	Alice Pryke	Alex Cockerill	Sydney Metro	Technical review	21-Sep-21
0.1	Alice Pryke	Alex Cockerill, Andrew Cook	Sydney Metro	Technical Review	20-Oct-21
0.2	Cathy Lestrage	Alex Cockerill, Andrew Cook Alice Pryke	Sydney Metro	Update with field investigation data	14-Dec-21
0.3	Alice Pryke	Hugh Chapman	Sydney Metro	Final review	15-Dec-21
0.4	Alice Pryke	Hugh Chapman	Sydney Metro	Final	23-Dec-21
0.5	Alice Pryke	Hugh Chapman	Sydney Metro	Response to DAWE comments	23-Mar-22
0.6	Cathy Lestrage	Jeremy Slattery	Sydney Metro	Minor updates	17-Jun-22
0.7	Cathy Lestrage	Alex Cockerill	Sydney Metro	Annual Review	21-Dec-23

Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.


Signed:	
Full name and position:	Christian Berg, Senior Manager Environment Environment, Sustainability & Planning – SM-WSA
Organisation:	Sydney Metro
Date:	21/12/2023

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Glossary and terms and abbreviations

Term	Definition
AFFMP	Aquatic Flora and Fauna Management Plan
BAM	NSW Biodiversity Assessment Method
BAM-C	NSW Biodiversity Assessment Method Calculator
BC Act	NSW Biodiversity Conservation Act 2016
BCF	Biodiversity Conservation Fund
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
BOS	Biodiversity Offset Strategy
BSA	Biodiversity Stewardship Agreement
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
Construction footprint	The total extent of land required for the construction of the project, including ancillary facilities, services and land temporarily required for construction (incorporating construction elements such as compounds, access tracks and worksites)
DAWE	Former Commonwealth Department of Agriculture Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEC	Former NSW Department of Environment and Conservation
DECCW	Former NSW Department of Environment, Climate Change and Water
DEWHA	Former Commonwealth Department of the Environment, Water, Heritage and the Arts
DPI	NSW Department of Primary Industry
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
FFMP	Flora and Fauna Management Plan
HMP	Habitat Management Plan
Impact	Influence or effect exerted by the project or other activity on the natural, built and community environment
KTP	Key Threatening Process
LGA	Local Government Area
MMs	Mitigation measures

Term	Definition
MNES	Matters of national environmental significance
NSW	New South Wales
NWPS	NSW National Parks and Wildlife Service
OEH	Former NSW Office of Environment and Heritage
PCT	Plant Community Type
POs	Performance outcomes
RAMP	Revised Action Management Plan
Revised BDAR	Revised Biodiversity Development Assessment Report
SEWPaC	Former Commonwealth Department of Sustainability, Environment, Water, Population and Communities
SMP	Sustainability Management Plan
SPA	Seed Protection Area
SM-WSA	Sydney Metro - Western Sydney Airport (the project). The Sydney Metro - Western Sydney Airport runs between St Marys and Western Sydney Aerotropolis and comprises a new north-south metro railway around 23 kilometres in length, creating passenger rail access to Western Sydney Airport, the Aerotropolis and a connection with the existing T1 Western Line
TEC	Threatened ecological community
TFSTP	Threatened Flora Salvage and Translocation Plan
WDMP	Weed and Disease Management Plan
Weed	Exotic species that have a high capability of spreading and altering environmental conditions including species listed as either High Threat weeds under the NSW <i>Biodiversity Conservation Act 2016</i> (BC Act), Priority Weeds for the Greater Sydney region under the Commonwealth <i>Biosecurity Act 2015</i> or Weeds of National Significance.
Western Sydney Aerotropolis	This includes the land surrounding Western Sydney International (including Bringelly, Luddenham, Kemps Creek, Badgerys Creek and Rossmore) where commercial and residential property development is proposed, supported by key infrastructure. This will include commercial and industrial precincts, and agricultural land, as well as transport corridors
Western Sydney Airport	The Australian government-owned organisation responsible for delivering and operating Western Sydney International
Western Sydney International	Western Sydney International (Nancy-Bird Walton) Airport

1. Introduction

1.1 Project background

The Greater Sydney Region Plan (Greater Sydney Commission, 2018a) sets the vision and strategy for Greater Sydney to become a global metropolis of three unique and connected cities; the Eastern Harbour City, the Central River City and the Western Parkland City. The Western Parkland City incorporates the future Western Sydney International (Nancy-Bird Walton) Airport (hereafter referred to as Western Sydney International) and Western Sydney Aerotropolis (hereafter referred to as the Aerotropolis).

Sydney Metro – Western Sydney Airport (the project) is identified in the Greater Sydney Region Plan as a key element to delivering an integrated transport system for the Western Parkland City. The project will be located within the Penrith and Liverpool Local Government Areas (LGAs) and will involve the construction and operation of a new metro railway line around 23 kilometres in length between the T1 Western Line at St Marys in the north and the Aerotropolis in the south (Bradfield City Centre). This will include a section of the alignment which passes through and provides access to Western Sydney International.

The project is characterised into components that are located outside Western Sydney International (off-airport) and components that are located within Western Sydney International (on-airport), to align with their different planning approval pathways required under State and Commonwealth legislation.

1.2 Biodiversity Management Plan scope

Sydney Metro carries out the construction of its project in accordance with a range of management frameworks and strategies. The approach to environmental management, and the relationship to the planning approvals, during construction of the project is illustrated in Figure 1-1 below.

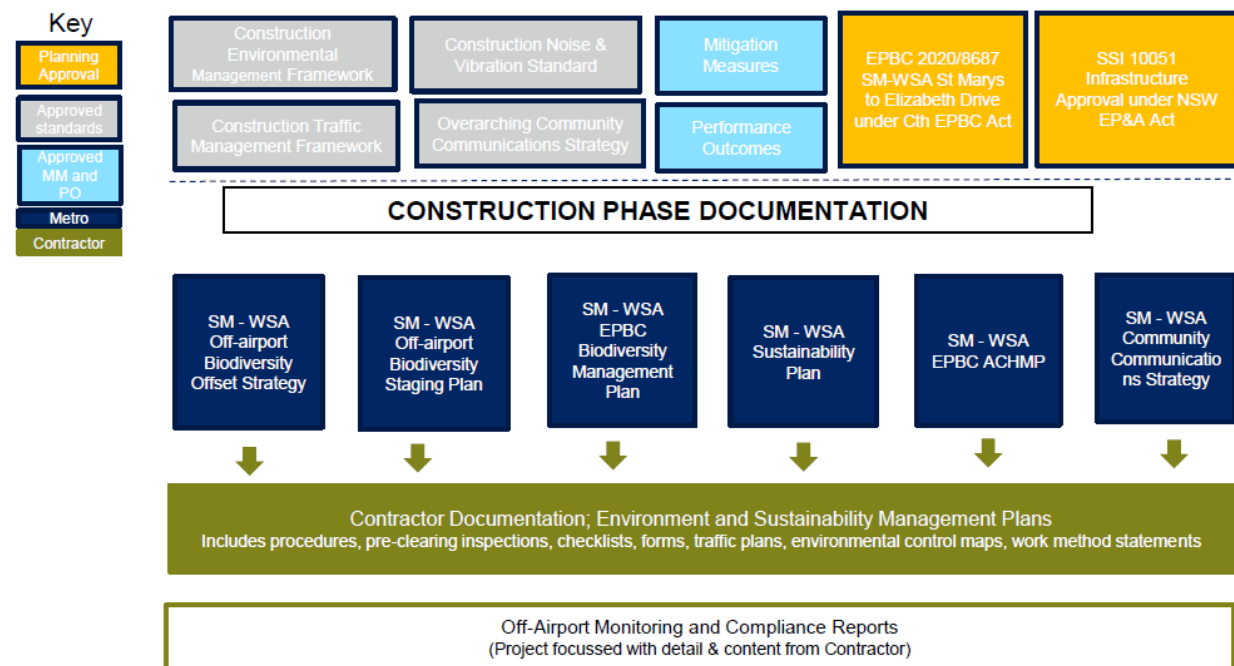


Figure 1-1 Construction environmental management approach

This Biodiversity Management Plan (BMP) deals specifically with the management of Commonwealth biodiversity protected matters in the off-airport component of the construction footprint and has been compiled with reference to Section 10 of the Sydney Metro-Western Sydney Airport Construction Environmental Management Framework (CEMF) (Sydney Metro, 2021a), which stipulates the minimum

content requirements for project-related Flora and Fauna/Biodiversity Management Plans (FFMPs/BMPs). It must be implemented for the duration of construction. It has been prepared to address the:

- Mitigation Measures (MMs) and Performance Outcomes (POs) detailed in the Revised Biodiversity Development Assessment Report (Revised BDAR) (Sydney Metro, 2021b) for the project
- Requirements of Section 10.2 of the CEMF
- Requirements of the off-airport EPBC approval (2020/8687).

In accordance with EPBC Condition of Approval 8 and the CEMF, contractors must prepare and implement Flora and Fauna Management Plans that are consistent with the requirements of this BMP. Table 1-3 sets out how the relevant CEMF requirements have been addressed within this BMP.

1.3 Context

A Revised BDAR (Sydney Metro, 2021b) was prepared as an appendix to the Final Environmental Impact Assessment of off-airport proposed action (EPBC 202/8687) (Final EIA) ((Sydney Metro, 2021c). The purpose of the Revised BDAR was to assess biodiversity impacts to Matters of National Environmental Significance and Matters of State Environmental Significance in accordance with Commonwealth and State legislation and incorporate outcomes of fieldwork undertaken since public exhibition of the Project Environmental Impact Assessment. The results of the Revised BDAR have informed the environmental management protocols outlined in this BMP.

1.4 Land to which this BMP applies

As indicated in Section 1.1, this BMP deals specifically with the management of Commonwealth biodiversity protected matters in the off-airport component of the construction footprint, including areas of Commonwealth land. Land to which this this BMP applies is shown on Figure 1-2. The construction boundaries shown are indicative only and are subject to construction planning and detailed design. Any changes as a result of construction planning and/or detailed design will trigger a review of this BMP, in accordance with Section 9.7 of this plan.

In May 2022, this plan was updated in accordance with Section 9.7 following further construction planning and detailed design within the Defence Establishment Orchard Hills (DEOH) project site. Revision to the construction footprint as a result of this further planning and design development are also shown on Figure 1-2b.

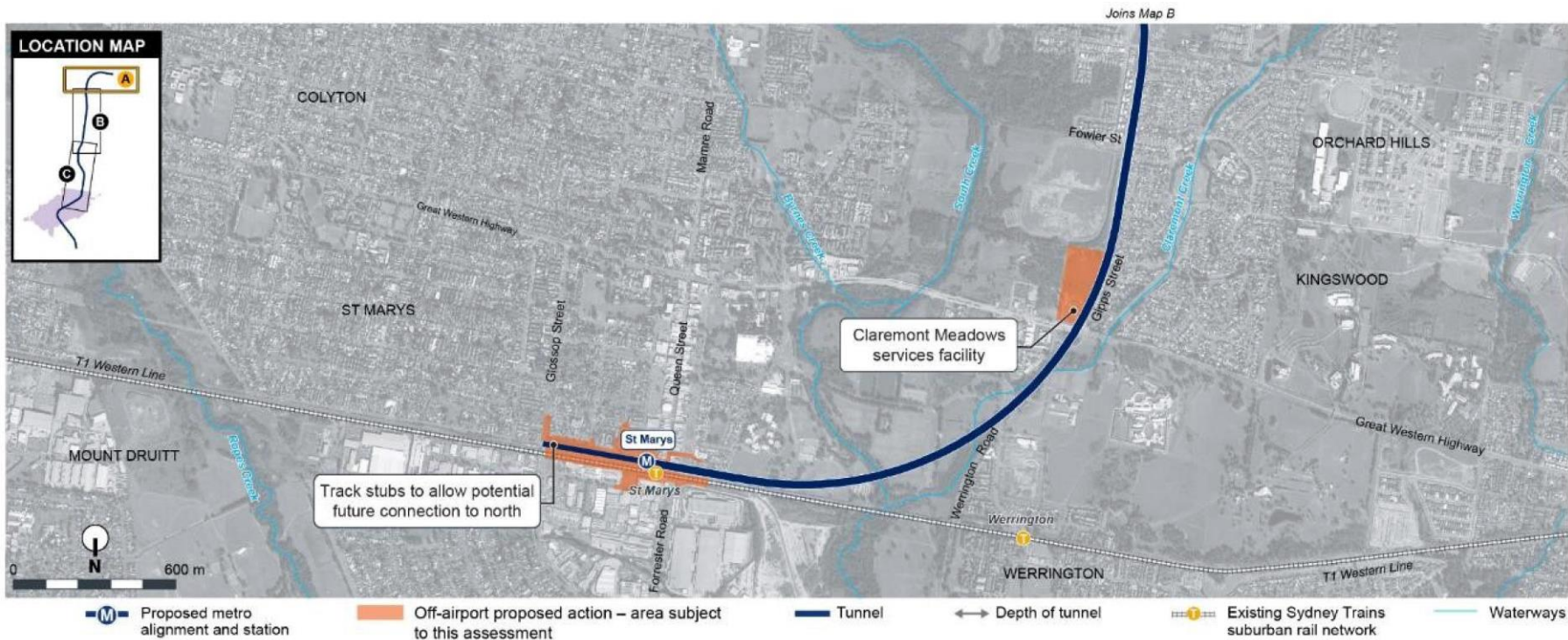


Figure 1-1a Land to which this BMP applies

Note: Indicative only, subject to design development.

Figure 1-2a Land to which this BMP applies

Sydney Metro – Western Sydney Airport
Biodiversity Management Plan

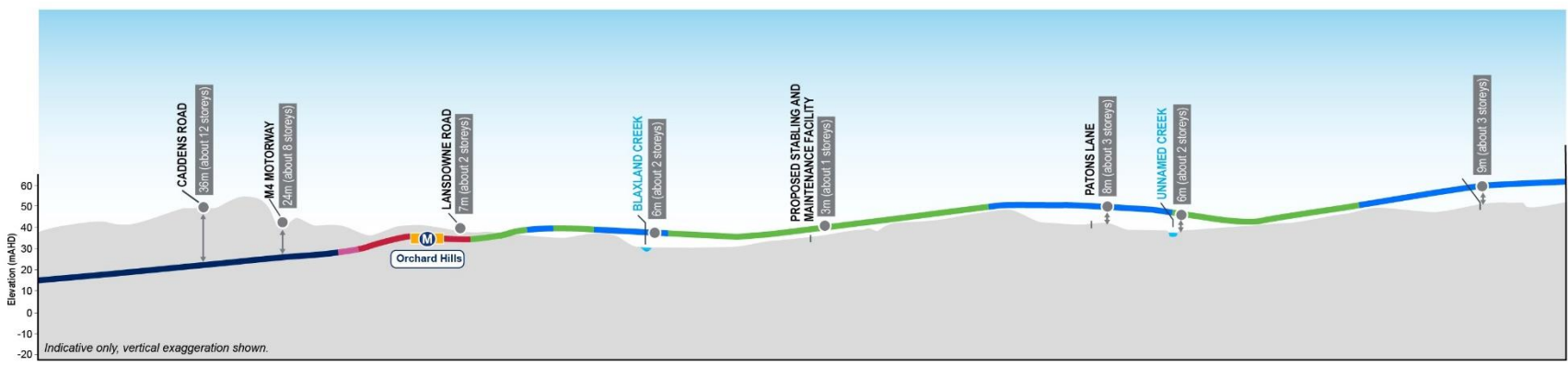
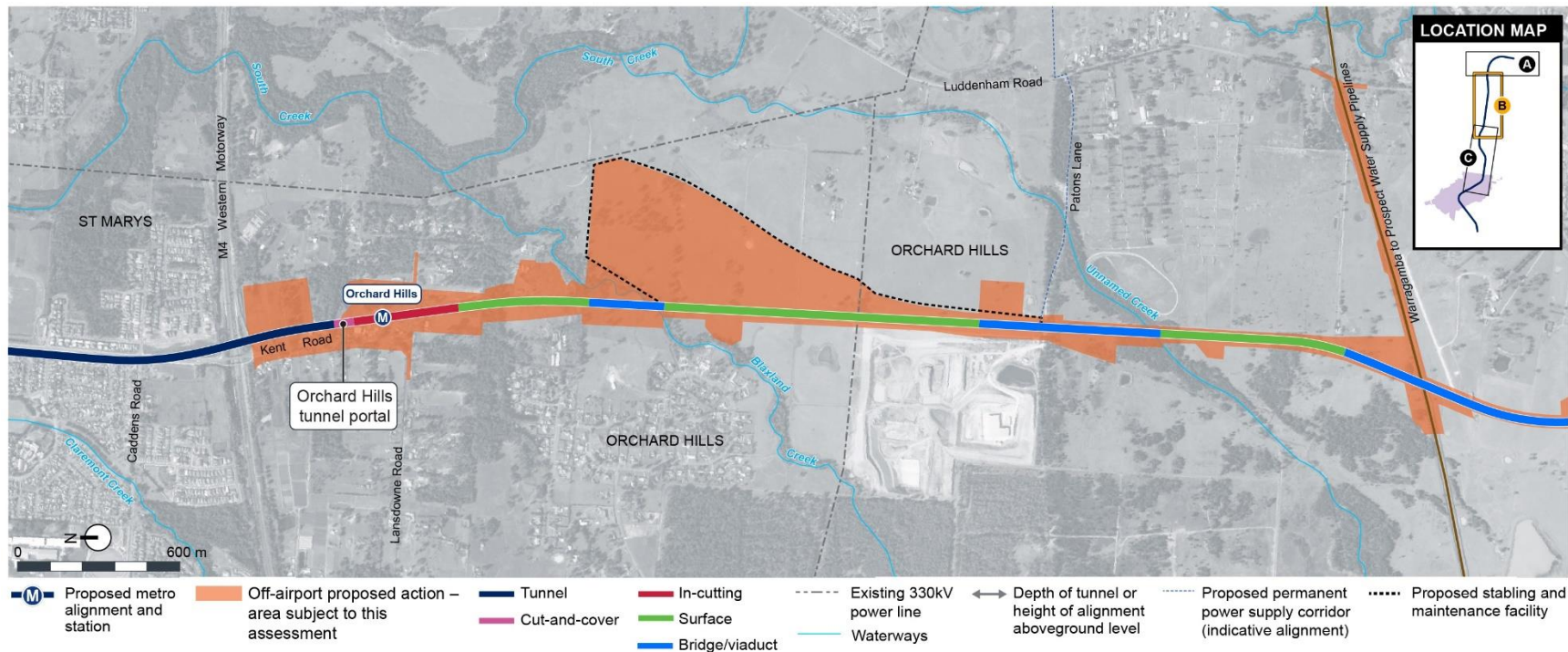


Figure 1-1b Land to which this BMP applies

Note: Indicative only. Subject to design development.

Figure 1-2b Land to which this BMP applies

Sydney Metro – Western Sydney Airport
Biodiversity Management Plan

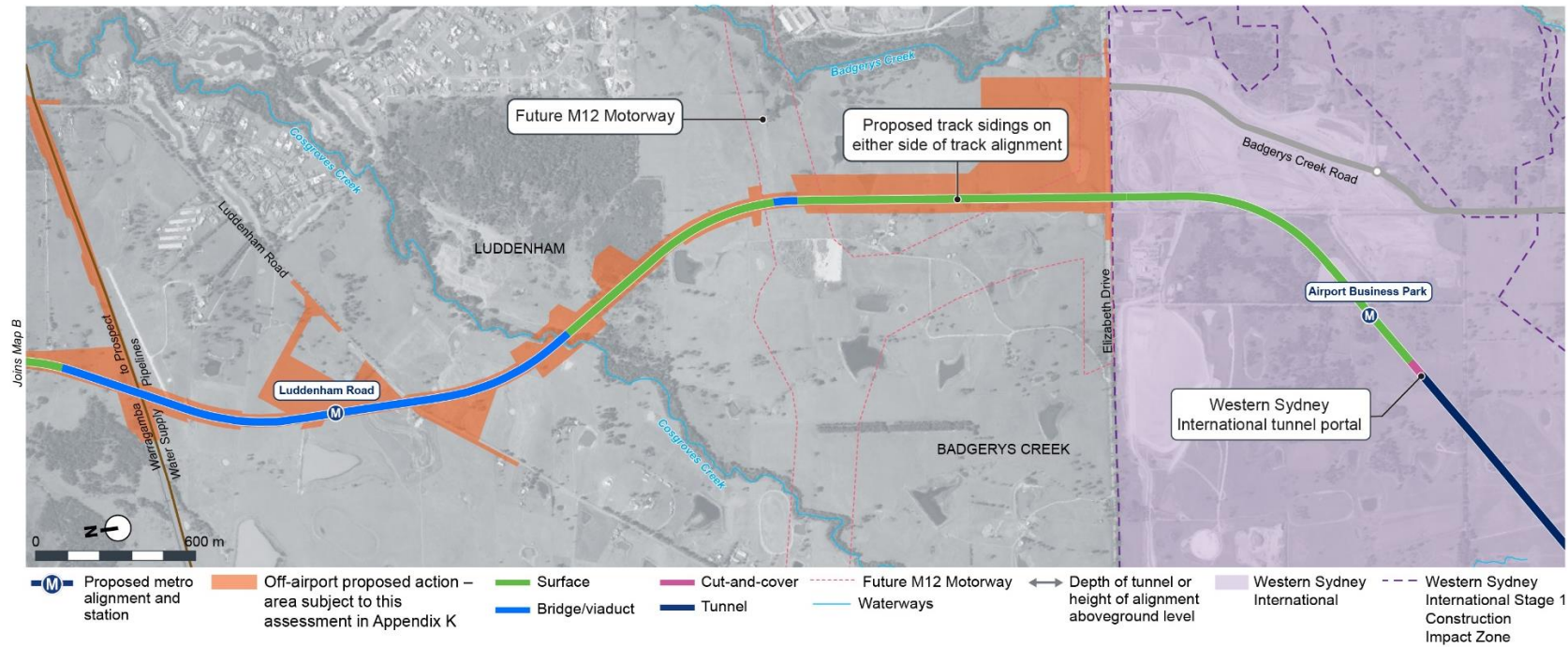


Figure 2-2c Project infrastructure and key features
Note: Indicative only, subject to design development.
Indicative final surface level shown within Western Sydney International.

Figure 1-2c Land to which this BMP applies

1.5 Compliance matrices

This BMP has been prepared to address the Mitigation Measures and Performance Outcomes detailed in the Revised BDAR for the project, as well as the requirements outlined in Section 10.2 of the project CEMF. As the BMP will be implemented during the construction phase of the project, the wording of each mitigation measure has been amended to ensure committed language is used. This BMP also addresses the relevant EPBC conditions of approval from EPBC 2020/8687, as approved on 3 June 2021.

Compliance matrices for each element are detailed in Table 1-1, Table 1-2, and Table 1-3. Compliance with the relevant EPBC conditions of approval are detailed in Table 1-4.

Table 1-1 Compliance matrix for revised construction performance outcomes

Project performance outcome	Timing	Relevant section (s) of this BMP
Impacts on threatened flora and fauna species, and ecological communities listed under the <i>Biodiversity Conservation Act 2016 (NSW)</i> and <i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i> are avoided or minimised, where practicable	Construction	Section 3.1 Section 3.2 Section 7.1
Groundwater drawdown at Orchard Hills is managed to avoid or minimise impacts on groundwater dependent ecosystems	Construction	Groundwater Management Plan which is not part of this BMP.
Impacts on threatened ecological communities and threatened species are offset in accordance with the requirements of the NSW Biodiversity Assessment Method (OEH, 2017)	Construction	Section 7.4

Table 1-2 Compliance matrix for off-airport revised mitigation measures

Ref	Mitigation measure	Relevant section (s) of this BHMP
FF1	<p>The Flora and Fauna Management Plan (off-airport) will be prepared by a suitably qualified and experienced person to minimise and manage the clearing of native vegetation and habitat by:</p> <ul style="list-style-type: none"> • Seeking to locate site offices, site compounds and ancillary facilities in areas where there are limited biodiversity values (e.g. Cleared orchard hills construction site off-airport construction corridor land) • Delaying the removal of vegetation until absolutely necessary • Avoiding the removal of hollow-bearing trees, where possible • Using a qualified surveyor and suitably qualified ecologist to mark out exclusion zones and clearing/project boundaries prior to construction • Providing contractors with regularly updated sensitive area maps (showing clearing boundaries and exclusion zones) • Investigating opportunities for salvage and storage of felled native trees for potential use in landscape design. <p>The Flora and Fauna Management Plan (off-airport) will be implemented throughout construction</p>	<p>This BMP sets out requirements for Flora and Fauna Management Plans prepared under the project's Construction Environmental Management Framework. Requirements that relate to FF1 are in section 7.1 Use of felled native trees in landscape design is covered by the Place, Urban Design and Corridor Landscape Plan (PUDCLP) which is separate to this BMP</p>
FF2	<p>A Nest Box Strategy will be prepared to minimise habitat loss to hollow-dependent fauna in accordance with the Flora and Fauna Management Plan and would include the following requirements:</p> <ul style="list-style-type: none"> • Hollow-bearing trees will be marked/tagged and mapped prior to their removal. The size, type, number and location of nest boxes required will be based on the results of the pre-clearing survey • About 70 per cent of nest boxes will be installed about one month prior to any vegetation removal to provide alternate habitat for hollow-dependent fauna displaced during clearing. 	<p>Requirements for FF2 are in section 7.2.1</p>
FF4	<p>A targeted microbat survey (including Eastern Coastal Free-tailed Bat, Large Bent-winged bat and Eastern False Pipistrelle) of dwellings and structures proposed for demolition, removal or modification will be undertaken in accordance with 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH, 2018) prior to disturbance.</p> <p>Other human-made structures such as culverts and other under-road structures within the construction footprint will be surveyed for threatened microbats (e.g. particularly the Southern Myotis) in accordance with the Biodiversity Assessment Method (OEH, 2018). If threatened microbats are detected, a Microbat Management Plan will be developed as part of the Flora and Fauna Management Plan and implemented by a suitably qualified bat specialist</p>	<p>Survey requirements are in Section 7.2.3</p>

Ref	Mitigation measure	Relevant section (s) of this BHMP
FF6	During construction, shading and artificial light impacts will be minimised in areas adjoining remnant bushland that is in intact condition	Section 7.1
FF7	Fish passage and fish habitat associated with Cosgrove Creek and Blaxland Creek will be protected in accordance with the <i>Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI (Fisheries NSW), 2013)	Section 7.2.2
FF8	A Dewatering Plan will be prepared and implemented for the dewatering of rural dams which are impacted as a result of the construction of the project. This will include measures to manage the transfer of native aquatic fauna, if required, prior to dewatering and removing of dams	Section 7.2.2
FF10	<p>The impact of Key Threatening Processes as a result of the project will be managed and minimised where possible through:</p> <ul style="list-style-type: none"> • Implementation of weed management measures to prevent the introduction and spread of weeds including exotic vines and scramblers, <i>Olea europaea</i> (African Olive), <i>Chrysanthemoides monilifera</i>, <i>Lantana camara</i>, and exotic perennial grasses • Implementation of pathogen management measures to prevent the introduction and spread of pathogens including amphibian chytrid, <i>Phytophthora implementa</i>, and Exotic Rust Fungi of the order Pucciniales. • Implementation of management measures to protect the riparian zone to ensure fish passage and protect fish habitat in accordance with the <i>Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI (Fisheries NSW), 2013), and minimisation of vegetation removal within the riparian zone where possible 	Section 7.3 Section 7.2.2
FF11	A native vegetation seed collection and salvage program will be developed prior to the commencement of construction and implemented during construction. The seed collection and salvage program would target native species prioritising the Cumberland Plain Woodland species to be utilised in landscaping for the project where possible. Opportunities for use of collected and salvaged seed outside of the project would also be investigated	Section 7.2.1 and the Sydney Metro - Western Sydney Airport Sustainability Plan

Table 1-3 Compliance matrix for CEMF requirements

CEMF reference	Requirement	Relevant section (s) of this BMP
Section 10.2 a. i	Principal Contractors will develop and implement a Flora and Fauna Management Plan for all off-airport works which will include as a minimum: The biodiversity mitigation measures as detailed in the planning approval documentation	This BMP sets out requirements for Flora and Fauna Management Plans prepared under the project's Construction Environmental Management Framework. Biodiversity mitigation measures are in section 1.5.
Section 10.2 a.ii	The responsibilities of key project personnel with respect to the implementation of the plan	Section 2
Section 10.2 a. iii	Procedures for the clearing of vegetation and the relocation of flora and fauna	Chapter 7
Section 10.2 a. iv	Details on the locations, monitoring program and use of nest boxes by fauna	Section 7.2.1
Section 10.2 a v	Procedures for the demarcation and protection of retained vegetation, including all vegetation outside and adjacent to the construction footprint, and the protection of retained vegetation within the environmental conservation zone on the airport site	Section 7.1
Section 10.2 a vi	Plans for impacted and adjoining areas showing vegetation communities; important flora and fauna habitat areas; locations where threatened species, populations or ecological communities have been recorded	Section 7.2.1
Section 10.2 a vii	Vegetation management plan(s) for sites where native vegetation is proposed to be retained	Section 7.1
Section 10.2 a viii	Identification of measures to reduce disturbance to sensitive fauna	Section 7.2
Section 10.2 a ix	Rehabilitation details, including identification of flora species and sources, and measures for the management and maintenance of rehabilitated areas (including duration of the implementation of such measures)	Section 7.2.1 Further details on rehabilitation is covered by the Place, Urban Design and Corridor Landscape Plan (PUDCLP) which is separate to this BMP
Section 10.2 a x	Weed and disease management measures focusing on early identification of invasive weeds and diseases. Protocols to address the effective management of these risks	Section 7.3
Section 10.2 a xi	A procedure for dealing with unexpected threatened species identified during construction, including cessation of work	Section 7.1

CEMF reference	Requirement	Relevant section (s) of this BMP
	and notification to the relevant government department for both on- and off-airport works. The procedure shall define how appropriate mitigation measures (including relevant relocation measures) and updating of ecological monitoring or off-set requirements	
Section 10.2 a xii	Details on the methodology for vegetation mapping and survey	Section 7.1
Section 10.2 a xiii	Ecological monitoring requirements	Section 9.3
Section 10.2 a xiv	Compliance record generation and management	Chapter 9
Section 10.2 b i	<p>Principal Contractors would undertake the following ecological monitoring as a minimum:</p> <p>A pre-clearing inspection will be undertaken prior to any native vegetation clearing by a suitable qualified ecologist and the Contractor's Environmental Manager (or delegate). The pre-clearing inspection will include, as a minimum:</p> <ul style="list-style-type: none"> • Identification of hollow bearing trees or other habitat features • Identification of any threatened flora and fauna • A check on the physical demarcation of the limit of clearing • An approved erosion and sediment control plan for the worksite • The completion of any other pre-clearing requirements required by any project approvals, permits or licences. 	Section 9.1
Section 10.2 b ii	The completion of the pre-clearing inspection will form a HOLD POINT requiring sign-off from the Contractor's Environmental Manager (or delegate) and a qualified ecologist	Section 9.1 Appendix C
Section 10.2 b iii	A post clearance report, including any relevant Geographical Information System files, will be produced that validates the type and area of vegetation cleared including confirmation of the number of hollows impacted and the corresponding nest box requirements to offset these impacts.	Section 9.1
Section 10.2 c	The Principal Contractor's regular inspections will include a check on the ecological mitigation measures and project boundary fencing	Section 9.2
Section 10.2 d i	The following compliance records will be kept by the Principal Contractor: Records of pre-clearing inspections undertaken	Section 9.1
Section 10.2 d ii	Records of the release of the pre-clearing hold point	Section 9.1
Section 10.2 d iii	Records of ecological inspections undertaken.	Section 7.1 Section 9.2
Section 10.3 a i	<p>The off-airport Flora and Fauna Management Plan will include the following flora and fauna mitigation measures as well as any relevant Conditions:</p> <p>Areas to be retained and adjacent habitat areas will be fenced off prior to works to prevent damage or accidental over clearing;</p>	Section 7.1
Section 10.3 a ii	Clearing will follow a two-stage process as follows:	Section 9.1

CEMF reference	Requirement	Relevant section (s) of this BMP
	<ul style="list-style-type: none"> • Non-habitat trees will be cleared first after sign-off of the pre-clearing inspection • Habitat trees will be cleared no sooner than 48 hours after non-habitat trees have been cleared. A suitably qualified ecologist will be present on site during the clearing of habitat trees. Felled habitat trees will be left on the ground for 24 hours or inspected by the ecologist prior to further processing. 	
Section 10.3 a iii	Weed management is to be undertaken in areas affected by construction prior to any clearing works. Off-airport weed management will be undertaken in accordance with the NSW Noxious Weeds Act 1993.	Section 7.3

Table 1-4 Compliance with EPBC conditions of approval relevant to the BMP

Topic	Reference	EPBC Condition of Approval	Relevant section (s) of this BMP
Clearing and pre-clearing	EPBC1	1. The approval holder must not clear outside the study area.	Section 7.1 Section 9.1
Clearing and pre-clearing	EPBC2	2. To minimise the impacts of the action on protected matters, the approval holder must not clear more than the following specified amounts within the study area: <ul style="list-style-type: none"> a. 5.87 hectares of Cumberland Plain Woodlands and Shale-Gravel Transition Forest threatened ecological community (TEC). b. 4.94 hectares of Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland TEC. c. 24.79 hectares of Grey-headed Flying-fox habitat. d. 7.3 hectares of native vegetation on the Defence Establishment Orchard Hills site (which may include threatened ecological communities in conditions 2a and 2b). e. 335 individuals of <i>Grevillea juniperina</i> subsp. <i>juniperina</i> on the Defence Establishment Orchard Hills site (Lot 1 DP 629326 and Lot 2 DP 242968). f. The number of individuals identified by pre-clearance surveys, undertaken in accordance with conditions 3 - 5. 	Section 7.1
Clearing and pre-clearing	EPBC3	3. To inform the preparation of the Biodiversity Management Plan required under conditions 8 and the Biodiversity Offset Strategy required under conditions 18, the approval holder must undertake pre-clearance surveys in areas not yet surveyed for the following species: <ul style="list-style-type: none"> a. Bynoe's Wattle. b. Downy Wattle. c. <i>Allocasuarina glareicola</i>. d. White-flowered Wax Plant. e. Small-flower Grevillea. f. <i>Micromyrtus minutiflora</i>. g. <i>Pimelea curviflora</i> var. <i>curviflora</i>. h. Spiked Rice-flower. i. <i>Pultenaea parviflora</i>. 	The pre-clearance surveys were completed in November 2021 and a copy of the results was sent to the Department in December 2021 (refer Appendix A). Section 5.2
Clearing and pre-clearing	EPBC4	4. Pre-clearance surveys in areas not yet surveyed must be undertaken in accordance with the NSW Biodiversity Assessment Method, or another methodology agreed to by the Department in writing.	Pre-clearance surveys in areas not yet surveyed were undertaken in accordance with the NSW Biodiversity Assessment Method. Section 5.2
Clearing and pre-clearing	EPBC5	5. The results of the pre-clearance surveys in areas not yet surveyed must be submitted to the	The pre-clearance

Topic	Reference	EPBC Condition of Approval	Relevant section (s) of this BMP
		<p>Department in writing prior to, or with, the submission of:</p> <ol style="list-style-type: none"> a. The Biodiversity Management Plan required under condition 8; and b. The Biodiversity Offset Strategy required under condition 18. 	<p>surveys were completed in November 2021 and a copy of the results was sent to the Department in December 2021 prior to the submission of the BMP (refer Appendix A).</p>
Biodiversity Management Plan	EPBC8	<p>8. For the protection of protected matters, the approval holder must submit to the Minister for approval a Biodiversity Management Plan that sets out requirements for Flora and Fauna Management Plans prepared and implemented under the project's Construction Environmental Management Framework.</p>	<p>This document is the BMP that sets out the requirements for Flora and Fauna Management Plans, including requirements in Table 1-3 (compliance with the CEMF)</p>
Biodiversity Management Plan	EPBC9	<p>9. The Biodiversity Management Plan must be consistent with the Department's Environmental Management Plan Guidelines (2014), and must include:</p> <ol style="list-style-type: none"> a. Environmental objectives, relevant protected matters, and a reference to EPBC Act approval conditions to which the Biodiversity Management Plan refers; b. A table of commitments made in the Biodiversity Management Plan to achieve the objectives, and a reference to where the commitments are detailed in the Biodiversity Management Plan; c. Reporting and review mechanisms, and documentation standards, to demonstrate compliance with the Biodiversity Management Plan; d. An assessment of risks to achieving Biodiversity Management Plan environmental objectives and risk management strategies that will be applied; e. Impact avoidance, mitigation and repair measures, and their timing; f. A monitoring program, which must include: <ol style="list-style-type: none"> i. measurable performance indicators; ii. trigger values for corrective actions; iii. the timing and frequency of monitoring to detect trigger values and changes in the performance indicators; and iv. proposed corrective actions, if trigger values are reached. g. Provide any links to other plans or conditions of approval for the action. 	<p>Section 4.1.1</p> <p>Section 1.5 Chapter 3</p> <p>Chapter 9</p> <p>Appendix B (Risk Assessment)</p> <p>Section 9.3</p> <p>EPBC BOS, EPBC Biodiversity Staging Plan, CEMF</p>

Topic	Reference	EPBC Condition of Approval	Relevant section (s) of this BMP
Biodiversity Management Plan	EPBC10	10. The approval holder must not commence the action unless the Minister has approved the Biodiversity Management Plan in writing.	This BMP has been prepared to address this requirement
Biodiversity Management Plan	EPBC11	11. If the Minister approves the Biodiversity Management Plan then the Biodiversity Management Plan must be implemented.	This BMP has been prepared to address this requirement. The approved BMP will be implemented
Staging Plan	EPBC12	12. The approval holder must submit to the Minister, for approval, a Staging Plan in relation to the construction of the action, prior to commencement of the action.	This sub-condition refers to the Staging Report which is not part of the BMP.
Staging Plan	EPBC13	13. The approval holder must implement the Staging Plan approved by the Minister.	This sub-condition refers to the Staging Report which is not part of the BMP.
Staging Plan	EPBC14	14. The Staging Plan must set out: <ul style="list-style-type: none"> a. how the construction of the action will be staged, including details of clearing and other activities to be carried out in each stage; b. mapping and delineation of the spatial location of each stage; and c. the planned timing of when construction of each stage will commence and finish. 	This sub-condition refers to the Staging Report which is not part of the BMP.
Compensation measures	EPBC15	15. Prior to the commencement of clearing of protected matters identified in condition 2 in each stage, as defined in the Staging Plan required under condition 12, the approval holder must: <ul style="list-style-type: none"> a. determine the offset requirement for protected matters identified in condition 2 to be cleared in that stage in accordance with the NSW Biodiversity Assessment Method and the process set out in the Biodiversity Offset Strategy required under condition 18. b. secure the required offsets for that stage. 	This sub-condition refers to the Staging Report which is not part of the BMP.
Compensation measures	EPBC16	16. The offsets must be secured in accordance with the NSW Biodiversity Offset Scheme.	The biodiversity offset strategy (BOS) for this project has been developed in accordance with the NSW Biodiversity Offset Scheme.
Compensation measures	EPBC17	17. Within 3 months of retiring credits or making a payment to secure offsets, the approval holder must submit evidence of the retirement or payment the Department.	Specific details regarding the purchase, transfer, and

Topic	Reference	EPBC Condition of Approval	Relevant section (s) of this BMP
			retirement of credits is outlined in the BOS.
Revision of action management plans	EPBC34	34. The approval holder may, at any time, apply to the Minister for a variation to an action management plan approved by the Minister under conditions 8 and 15, or as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the EPBC Act. If the Minister approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous action management plan.	Section 9.7
Revision of action management plans	EPBC35	35. The approval holder may choose to revise an action management plan approved by the Minister under conditions 18 and 15, or as subsequently revised in accordance with these conditions, without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the RAMP would not be likely to have a new or increased impact.	Section 9.7
Revision of action management plans	EPBC36	36. If the approval holder makes the choice under condition 35 to revise an action management plan without submitting it for approval, the approval holder must: <ul style="list-style-type: none"> a. notify the Department in writing that the approved action management plan has been revised and provide the Department with: <ul style="list-style-type: none"> i. an electronic copy of the RAMP ii. an electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP iii. an explanation of the differences between the approved action management plan and the RAMP iv. the reasons the approval holder considers that taking the action in accordance with the RAMP would not be likely to have a new or increased impact v. written notice of the date on which the approval holder will implement the RAMP (RAMP implementation date), being at least 20 business days after the date of providing notice of the revision of the action management plan, or a date agreed to in writing with the Department. b. subject to condition 38, implement the RAMP from the RAMP implementation date. 	Section 9.7
Revision of action management plans	EPBC37	37. The approval holder may revoke their choice to implement a RAMP under condition 35 at any time by giving written notice to the Department. If the approval holder revokes the choice under condition	Not specifically required to be addressed at this time.

Topic	Reference	EPBC Condition of Approval	Relevant section (s) of this BMP
		35. the approval holder must implement the action management plan in force immediately prior to the revision undertaken under condition 35.	
Revision of action management plans	EPBC38	38. If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of the action in accordance with the RAMP would be likely to have a new or increased impact, then: <ol style="list-style-type: none"> a. condition 35 does not apply, or ceases to apply, in relation to the RAMP b. the approval holder must implement the action management plan specified by the Minister in the notice. 	Not specifically required to be addressed at this time.
Revision of action management plans	EPBC39	39. At the time of giving the notice under condition 38, the Minister may also notify that for a specified period, condition 35 does not apply for one or more specified action management plans. Note: conditions 35, 36, 37, and 38 are not intended to limit the operation of section 143A of the EPBC Act which allows the approval holder to submit a revised action management plan, at any time, to the Minister for approval.	Not specifically required to be addressed at this time.
Completion of the action	EPBC40	40. Within 20 business days after the completion of the action, the approval holder must notify the Department in writing and provide completion data.	Not specifically required to be addressed at this time.

1.6 Key project features

Key operational features of the project are shown on Figure 1-2 and will include:

- Around 4.3 kilometres of twin rail tunnels (generally located side by side) between St Marys (the northern extent of the project) and Orchard Hills
- A cut-and-cover tunnel around 350 metres long (including tunnel portal), transitioning to an in-cutting rail alignment south of the M4 Western Motorway at Orchard Hills
- Around 10 kilometres of rail alignment between Orchard Hills and Western Sydney International, consisting of a combination of viaduct and surface rail alignment
- Around two kilometres of surface rail alignment within Western Sydney International
- Around 3.3 kilometres of twin rail tunnels (including tunnel portal) within Western Sydney International
- Around three kilometres of twin rail tunnels between Western Sydney International and the Aerotropolis Station (Bradfield City Centre)
- Six new metro stations:
 - Four off-airport stations:
 - St Marys (providing interchange with the existing T1 Western Line)
 - Orchard Hills
 - Luddenham Road
 - Aerotropolis
 - Two on-airport stations:
 - Airport Business Park
 - Airport Terminal
- Grade separation of the track alignment at key locations including:
 - Where the alignment interfaces with existing infrastructure such as the Great Western Highway, M4 Western Motorway, Lansdowne Road, Patons Lane, the Warragamba to Prospect Water Supply Pipelines, Luddenham Road, the future M12 Motorway, Elizabeth Drive, Derwent Road and Badgerys Creek Road
 - crossings of Blaxland Creek, Cosgroves Creek, Badgerys Creek and other small waterways to provide flood immunity for the project
- Modifications to the existing Sydney Trains station and suburban rail network at St Marys (where required) to support interchange and customer transfer between the new metro station and the T1 Western Line
- A stabling and maintenance facility and operational control centre located to the south of Blaxland Creek and east of the proposed metro track
- New pedestrian, cycle, park-and-ride and kiss-and-ride facilities, public transport interchange infrastructure, road infrastructure and landscaping as part of the station precincts.

The project will also include:

- Turnback track arrangements (turnbacks) at St Marys and Aerotropolis to allow trains to turn back and run in the opposite direction
- Additional track stubs to the east of St Marys Station and south of the Aerotropolis Station to allow for potential future extension of the line to the north and south respectively without impacting future metro operations
- An integrated tunnel ventilation system including services facilities at Claremont Meadows and at Bringelly, if required
- All operational systems and infrastructure such as crossovers, rail sidings, signalling, communications, overhead wiring, power supply, lighting, fencing, security and access tracks/paths
- Retaining walls at required locations along the alignment

- Environmental protection measures such as noise barriers (if required), on-site water detention, water quality treatment basins and other drainage works.

1.6.1 Off-airport project components

The off-airport components of the project will include the track alignment and associated operational systems and infrastructure north and south of Western Sydney International, four metro stations, the stabling and maintenance facility, two service facilities (if required) and a tunnel portal.

1.6.2 Project construction

The proposed construction activities that will be undertaken for the project include:

- Enabling works
- Main construction works including:
 - Tunnelling and associated works
 - Corridor and associated works
 - Stations and associated works
 - Ancillary facilities and associated works
- Rail systems fit out
- Finishing works and testing and commissioning.

These activities are described in more detail in the project EIS.

The indicative timeframe for the project is for main construction to commence in 2022 and take about five years to complete, with project opening anticipated to align with when Western Sydney International opens for passenger services. An indicative main construction program is provided in Figure 1-3.

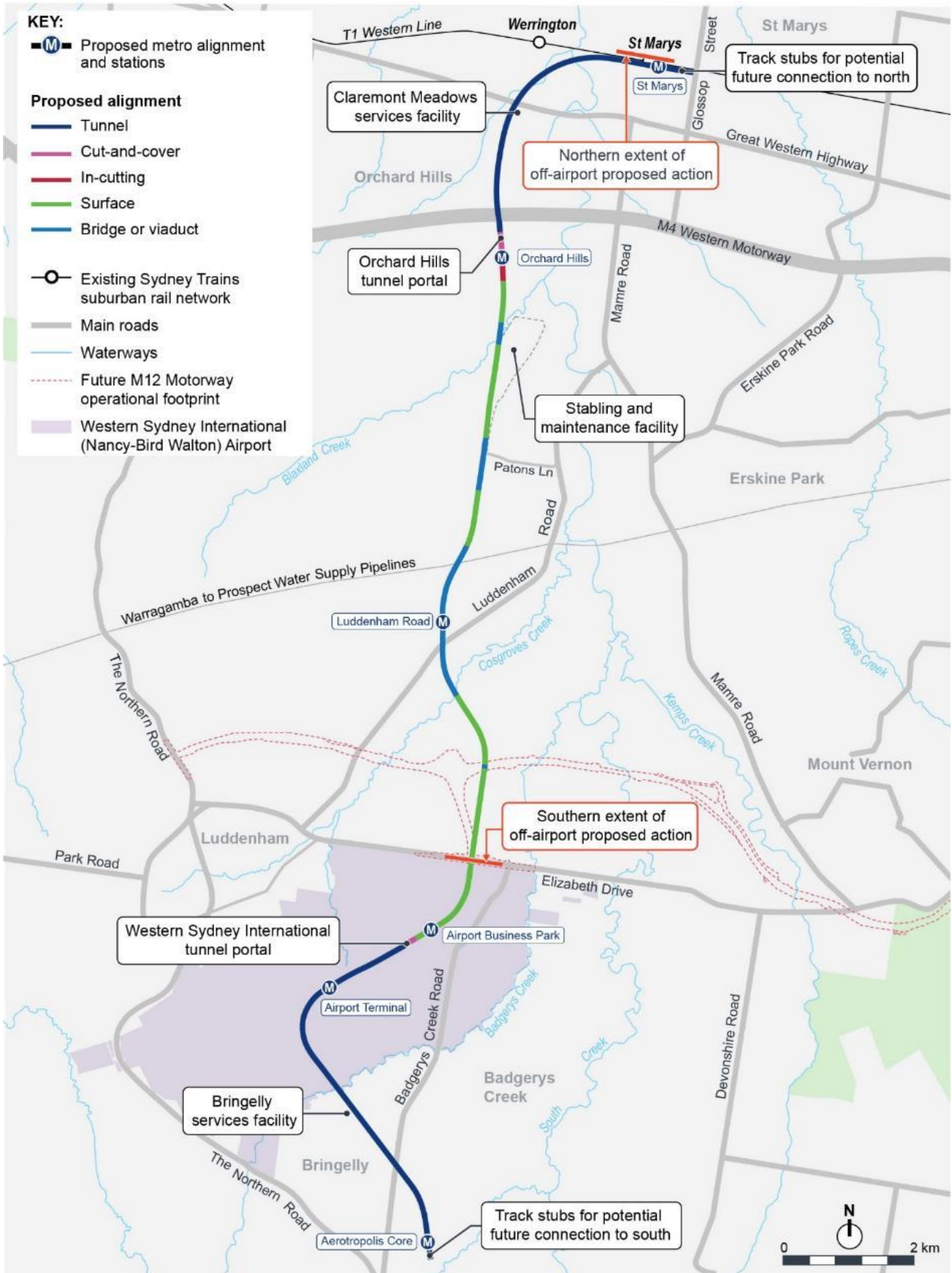


Figure 1-2 Project alignment and key features

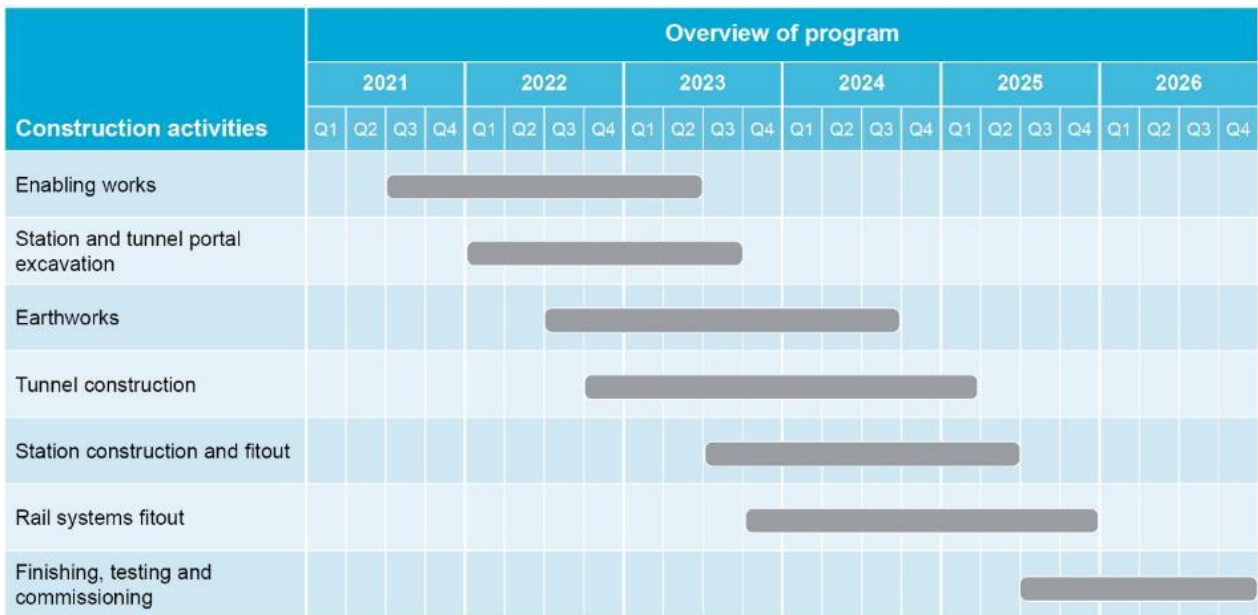


Figure 1-3 Indicative main construction program

2. Roles and responsibilities

Specific responsibilities for the implementation of this BMP and its associated management actions are presented in Table 2-1.

Table 2-1 BMP roles and responsibilities

Action	Personnel
Implementation of this BMP and/or as updated	Principal Contractor's Project Manager and Senior Environmental Officer
Protective Fencing and Signage	Principal Contractor's Senior Environmental Officer
Further investigations (survey within areas of assumed presence)	Principal Contractor's Senior Environmental Officer, and contractor's suitably qualified ecologist
Pre-clearing inspections	Principal Contractor's Senior Environmental Officer and contractor's suitably qualified ecologist
General translocation (if required)	Principal Contractor's Senior Environmental Officer and contractor's suitably qualified ecologist
Collection, handling and storing of aquatic fauna	Principal Contractor's Senior Environmental Officer and contractor's suitably qualified aquatic ecologist; operating under an approved Animal Research Authority scientific collection permit issued by the Secretary NSW Department of Industry
Install and monitor nest boxes	Principal Contractor's Senior Environmental Officer and contractor's suitably qualified ecologist
Supervise dam dewatering	Principal Contractor's Senior Environmental Officer and contractor's suitably qualified ecologist
Reporting, including post clearance report	Principal Contractor's Senior Environmental Officer
Management of Previously Unrecorded protected matters	Principal Contractor's Senior Environmental Officer, and contractor's suitably qualified ecologist
Biodiversity Awareness Training	Principal Contractor's Senior Environmental Officer and contractor's suitably qualified ecologist
BMP Review and Update (if required)	Principal Contractor's Project Manager and Senior Environmental Officer (for updates in response to an incident or any unexpected biodiversity finds within the Project's construction footprint) Sydney Metro's Senior Manager Environment (for all administrative updates)

3. Objectives and targets

3.1 Objectives

The overarching objective of this BMP is to ensure that native flora and fauna, including threatened species and endangered ecological communities, are protected to the greatest extent possible during construction of the project.

In accordance with Section 10.1 of the CEMF, the primary objectives are to:

- Minimise or avoid impacts on flora and fauna
- Design waterway modifications and crossings to incorporate best practice principles
- Retain and enhance existing flora and fauna habitat wherever possible
- Appropriately manage the potential spread of weeds and plant pathogens.

To achieve these objectives, the following will be undertaken:

- Definition of procedures for the management of the protected matters on land within the off-airport component of the construction footprint, including mitigation measures
- Identification and implementation of opportunities to reduce impacts from those predicted within the Revised BDAR
- Ensure adverse effects on biodiversity by construction activities is limited to those predicted within the Revised BDAR
- Ensure appropriate measures are implemented to address the performance outcomes and mitigation measures detailed in Tables 6-1, 6-2 of the EPBC Act Final Off-airport Environmental Impact Assessment
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in this plan.

3.2 Targets

Targets and performance criteria have been established for the management of biodiversity impacts during the construction phase of the works which have been, in part, derived from the Revised BDAR and performance criteria identified in the SM-WSA CEMF as presented in Table 3-1.

Table 3-1 Biodiversity objectives and targets

Objective	Target	Document reference
Minimising disturbance to terrestrial and aquatic flora and fauna in the construction footprint during construction	Negligible disturbance to native terrestrial and aquatic flora and fauna in the construction footprint	<ul style="list-style-type: none"> • Pre-clearing permits • Pre-clearing Hold Points • Environmental inspection checklist • Site Diary/ Pre-starts
Minimising adverse effects on terrestrial fauna by construction activities	Minimise adverse effects on terrestrial fauna by construction activities.	<ul style="list-style-type: none"> • Pre-clearing permits • Pre-clearing Hold Points • Environmental inspection checklist • Site Diary/ Pre-starts
Minimise or where possible avoid impacts on threatened flora and fauna species, and TECs)	Minimise adverse effects on terrestrial threatened flora and TECs by construction activities.	<ul style="list-style-type: none"> • Pre-clearing permits • Pre-clearing Hold Points • Environmental inspection checklist • Site Diary/ Pre-starts
Manage groundwater drawdown at Orchard Hills to avoid or minimise impacts on groundwater dependent ecosystems	Minimise adverse effects on groundwater dependent ecosystems by construction activities	<ul style="list-style-type: none"> • Groundwater Management Plan • Groundwater monitoring results

Objective	Target	Document reference
Impacts on threatened ecological communities and threatened species are offset in accordance with the requirements of the NSW Biodiversity Assessment Method (OEH, 2018)	A Biodiversity Offset Strategy has been developed and credits will be purchased and retired to ensure offset against TEC and Threatened species.	<ul style="list-style-type: none"> • EPBC Biodiversity Offset Strategy
Protecting areas outside the construction footprint that contain a listed Threatened Ecological Community or provide an important habitat for a listed threatened species during clearing activities	Ensure all areas outside the construction footprint that contain a listed threatened ecological community or provide important habitat for a listed threatened species are protected.	<ul style="list-style-type: none"> • Pre-clearing permits • Pre-clearing Hold Points • Environmental inspection checklist • Site Diary/ Pre-starts
Managing weed, pest species and plant pathogens spread	No introduction of weed, pest species and plant pathogens. No inadvertent spread of existing weed, pest species and pathogens	<ul style="list-style-type: none"> • Pre-clearing permits • Pre-clearing Hold Points • Environmental inspection checklist • Site Diary/ Pre-starts

The above targets in Table 3-1 have been set to provide a benchmark. Failure to achieve the targets will not be considered a non-compliance, but will prompt internal review of environmental management (as detailed further in environmental control measures in Table 1-1, Table 1-2 and Table 1-3 and assessment of potential improvement opportunities.

4. Legislative and policy context

This section describes legislation, planning instruments and policy documents considered during the development of this BMP.

4.1 Off-airport legislative and policy context

4.1.1 Commonwealth legislation and policy

Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) took effect on 16 July 2000. Under Part 9 of the EPBC Act, any action that is likely to have a significant impact on a matter of national environmental significance (MNES) may only progress with approval of the Commonwealth Minister for the Environment. An action is defined as a project, development, undertaking, activity, series of activities, or alteration. An action will also require approval if:

- It is undertaken on Commonwealth land and will have or is likely to have a significant impact
- It is undertaken outside Commonwealth land and will have or is likely to have a significant impact on the environment on Commonwealth land
- It is undertaken by the Commonwealth and will have or is likely to have a significant impact.

Under the EPBC Act, proposed actions (i.e. activities or projects) with the potential to significantly impact matters protected by the EPBC Act must be referred to the Commonwealth Minister for the Environment to determine whether they are controlled actions, requiring approval from the Minister. The following matters are defined as protected matters by Part 3 of the EPBC Act:

- MNES
- The environment of Commonwealth Land
- The environment in general if they are being carried out by a Commonwealth Government agency.

The following MNES are of relevance to this BMP:

- Threatened species and ecological communities
- Migratory species
- The environment of Commonwealth Land.

The off-airport components of the project located to the north of Western Sydney International were referred to the Minister in June 2020. On 14 July 2020, the Minister advised that the referred action, is a controlled action and the project will be assessed by preliminary documentation. On 3 June 2021, the Minister approved the action subject to conditions.

Australian Government Environmental Management Plan Guideline

The Australian Government's Environmental Management Plan Guideline (Commonwealth of Australia, 2014) identifies the information that should be included in Environmental Management Plans (EMPs) prepared for State significant projects. Section 3 of the guideline outlines the minimum content required for an EMP.

This BMP has been compiled with reference to the Australian Government EMP Guideline.

4.1.2 Project-specific policy

Sydney Metro – Western Sydney Airport Construction Environmental Management Framework (project CEMF)

Consistency in environmental management across the construction of the project will be achieved through the implementation of the *Sydney Metro – Western Sydney Airport Construction Environmental Management Framework* (CEMF) (Sydney Metro, 2021a). The CEMF formed part of the Sydney Metro –Western Sydney Airport planning approval documents and provides a linking document to Construction Environmental Management Plans (CEMPs) and Sustainability Management Plans (produced by contractors).

The CEMF details the environmental, stakeholder and community management systems and processes to be implemented throughout construction of the project. More specifically, it details Sydney Metro's minimum requirements for:

- CEMPs and sub-plans

- Sustainability Management Plans (SMPs) and sub-plans
- Other supporting documentation for each environmental management category (e.g. noise and vibration, visual amenity)
- Construction Workforce Development and Industry Participation Plan.

Compliance with the CEMF will help achieve the environmental performance outcomes for the project. These performance outcomes outline the broader objectives to be achieved by Sydney Metro in the design, construction and operation of the project.

Section 10 of the CEMF provides a framework for the management of project-related interactions with biodiversity values, both in on-airport and off-airport contexts. As indicated in Section 1.1, this BMP has been compiled with reference to Section 10.2 of the CEMF, which details the minimum content requirements for project-related FFMPs/BMPs. Contractors will be required to prepare and implement contract-specific Flora and Fauna Management Plans that are consistent with both the CEMF and this plan as approved.

4.1.3 Guidelines and standards

Guidelines and standards that are relevant to biodiversity management and this plan are summarised in Table 4-1.

Table 4-1 Relevant guidelines and standards

Guidelines and standards
Environmental Management Plan Guidelines (Commonwealth of Australia, 2014)
National Standards for the Practice of Ecological Restoration in Australia (Society for Ecological Restoration Australasia, Edition 2.2 2021)
Cumberland Plain Recovery Plan (DECCW, 2011)
NSW Department of Primary Industries, Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings, Fairfull and Witheridge, 2003
Fishnote – Policy and Guidelines for Fish Friendly Waterway Crossings – November 2003
Translocation operational policy (Office of Environment and Heritage, 2019)
Australian Network for Plant Conservation. 2018. Guidelines for the Translocation of Threatened Plants in Australia, 3rd Edition
Hygiene protocol for the control of diseases in Australian frogs (SEWPaC 2011)
Survey guidelines for Australia’s threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act (SEWPaC 2011),
Survey guidelines for Australia’s threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (DEWHA 2010)
Survey guidelines for Australia’s threatened frogs: Guidelines for detecting frogs listed as threatened under the EPBC Act (DEWHA 2010)
Survey guidelines for Australia’s threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act 1999 (SEWPaC 2011)
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (DEC 2004a),
Environmental impact assessment guidelines: Cumberland Plain Large Land Snail (NPWS 2000)
Environmental impact assessment guidelines: <i>Cynanchum elegans</i> (NPWS 2002)
Environmental impact assessment guidelines: <i>Dillwynia tenuifolia</i> (NPWS 2002)
Environmental impact assessment guidelines: <i>Grevillea juniperina subsp.</i> (NPWS 2002)
Environmental impact assessment guidelines: <i>Pultenaea parviflora</i> (NPWS 2002)
Environmental impact assessment guidelines: <i>Grevillea parviflora subsp.</i> (NPWS 2002)
Environmental impact assessment guidelines: <i>Acacia pubescens</i> (NPWS 2003)
National Recovery Plan for Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) (DECCW 2009)

5. Existing environment

5.1 Verified biodiversity values

5.1.1 Process of verification

The process to investigate and verify biodiversity values is described in detail in the Revised BDAR. The Revised BDAR was prepared using methodologies undertaken in accordance with the Biodiversity Assessment Method Order 2017 (BAM) (OEH, 2017). A summary of the process is provided below.

1. Desktop research

Desktop research was undertaken to identify threatened flora and fauna species, populations and ecological communities, Commonwealth listed migratory species or critical habitat recorded previously or predicted to occur in the locality of the project. These searches included:

- Landscape-scale features of the study area
- Site context of the study area that includes assessing vegetation cover and patch size
- The likely distribution of native vegetation and threatened ecological communities (TECs), based on previous mapping and aerial photograph interpretation, for targeted field verification
- A list of predicted and candidate threatened and migratory species and populations of flora and fauna to assess the habitat suitability and threatened biodiversity data collection
- Evaluate baseline information to determine whether additional field surveys, mapping and reporting is required to support project approval.

This allowed for known habitat characteristics of to be compared with those present within the study area to determine the likelihood of occurrence of each species or populations. These results informed the identification of appropriate field survey effort and the groups likely to occur.

The Revised BDAR also built upon up to 18 previous ecological investigations and reports undertaken across the study area. Comprehensive methodologies are detailed in the Revised BDAR.

2. Field surveys

Field verification and threatened terrestrial flora and fauna surveys included the following:

- Field verification of vegetation communities and State mapped plant community types (PCTs)
- Flora and fauna habitat assessments
- Vegetation condition plots in vegetation communities identified as potentially constituting the definition of TECs
- Targeted threatened flora and fauna surveys.

The survey methods and effort for the target species and ecological surveys were conducted in accordance with State and Commonwealth survey guidelines, based upon the study area location and respective biodiversity values.

Initial ecological field surveys were undertaken over a 16-day period between the 24-26 June 2019, 26 November 2019, 2-6 March 2020, 22-24 April 2020, and 10 June 2020. The results of these surveys were included in the initial BDAR to support the Environmental Impact Statement and Final EIA.

Additional surveys were undertaken in spring 2020 on the 15 October and 3, 9, 10, 16 and 20 November 2020, as access was gained to some previously inaccessible properties within the off-airport portion of the study area. The BDAR was revised in March 2021 to include the results of additional targeted survey work undertaken during the spring 2020 surveys. The Revised BDAR also included updates to respond to submissions received during the exhibition of the Project Environmental Impact Statement (EIS) and design changes for on-airport and off-airport.

5.2 Pre-clearing surveys for unverified biodiversity values

During assessment of the project, access was restricted within some private properties located within the study area and construction footprint and subsequently these areas could not be surveyed for the purposes of the BDAR or Revised BDAR. For these properties, a conservative approach was applied, and species are assumed to be present based on available habitat in accordance with the BAM.

In accordance with Condition 3 of the EPBC Approval, to inform the BMP and the Biodiversity Offset Strategy (BOS) pre-clearance surveys have now been undertaken in areas that were not surveyed for the following nine flora species listed as threatened under the EPBC Act:

- a. *Acacia bynoeana* (Bynoe's Wattle)
- b. *Acacia pubescens* (Downy Wattle)
- c. *Allocasuarina glareicola*
- d. *Cynanchum elegans* (White-flowered Wax Plant)
- e. *Grevillea parviflora* subsp. *parviflora* (Small-flower Grevillea)
- f. *Micromyrtus minutiflora*
- g. *Pimelea curviflora* var. *curviflora*
- h. *Pimelea spicata* (Spiked Rice-flower)
- i. *Pultenaea parviflora*.

In accordance with Condition 4 of the EPBC Approval, the pre-clearance surveys were undertaken in accordance with the NSW BAM and the results of the surveys have confirmed that the project's species credit requirements have either been reduced or species were not recorded or considered to be present.

Condition 5 states that the results of the pre-clearance surveys must be submitted to the Department in writing prior to, or with the submission of the Biodiversity Management Plan. The results were provided to the Department in December 2021, prior to finalisation and submission of this plan. These results are included within Appendix A of this plan.

5.3 Further investigation works

Defence Establishment Orchard Hills

Further background research and ecological field surveys were undertaken in May 2021 to determine the presence of native vegetation or other biodiversity values within the revised construction footprint on the DEOH project site.

The process used to investigate and verify biodiversity values is described in detail in the Revised BDAR. The Revised BDAR was prepared using methodologies undertaken in accordance with the Biodiversity Assessment Method Order 2017 (BAM) (OEH, 2017). A summary of the process is provided in Section 5.1.1 of this plan.

This further investigation work noted:

- No native vegetation PCTs were ground-truthed or observed within the revised construction footprint and the entire area is consistent with the non-native vegetation types assigned to a miscellaneous ecosystem class, being Miscellaneous ecosystem – highly disturbed areas with no or limited native vegetation
- Given the absence of any native vegetation or habitats for threatened species within the revised construction footprint, there are no further assessment or offset requirements and no need to modify the assessment contained within the Revised BDAR
- It is considered that the minor revision in the construction footprint would not result in a significant impact to relevant controlling provisions under the EPBC Act being listed threatened species and communities and Commonwealth land.

Luddenham

Further background research and ecological field surveys were undertaken in August 2022 to determine the presence of native vegetation or other biodiversity values within the revised construction footprint on the Luddenham project site. The survey involved a site walk over where vegetation within the additional areas were characterised and assigned to Plant Community Types (PCTs) and Vegetation Zones. A fauna habitat assessment was undertaken and threatened plant species were also targeted in the additional areas.

This further investigation noted:

- A small patch of PCT 849 Thinned (Cumberland shale plains woodland or Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion) was recorded within the revised construction footprint. This small patch was approximately 0.08 hectares (ha). The rest of the site

consisted of improved pasture (grazing paddocks) which were dominated by exotic species and a small row of planted *Eucalyptus microcorys* (Tallowwood) trees adjacent to Luddenham Road.

- The patch of PCT 849 thinned fails to meet the minimum condition thresholds of the Cumberland Plain Woodlands and Shale-Gravel Transition Forest threatened ecological community (TEC).
- under the EPBC Act as the patch size is 0.08 ha which is below the minimum patch size threshold of ≥ 0.5 ha and the ground layer is dominated by exotic species. There are no minimum condition thresholds for this critically endangered ecological community under the *Biodiversity Conservation Act 2016*.
- The change to construction footprint has resulted in an additional impact to 0.08 ha of PCT 849 Thinned (or approximately 3 credits) but reduced the impact to the 0.14 ha (or approximately 3 credits) of PCT 724 Thinned in the areas previously assessed within the revised BDAR.
- No threatened fauna species were observed in the additional areas during the field survey.

The minor revision in the construction footprint would not result in an impact to relevant controlling provisions under the EPBC Act being listed threatened species and communities and Commonwealth land. The above information has been included for completeness.

Additional individuals at Orchard Hills

The pre-clearance surveys undertaken in November 2021 identified 14 individuals of *Pultenaea parviflora* within the approved construction footprint. As part of a pre-clearance inspection (in accordance with the BMP) of Orchard Hills undertaken on 22 and 23 June 2022, further individuals of *Dilwynia tenuifolia* and two individuals of *Pultenaea parviflora* were identified outside the area which they were previously recorded in November 2021. *Pultenaea parviflora* is listed under the EPBC Act.

All targeted threatened flora surveys were completed in accordance with the Biodiversity Assessment Method (BAM). The additional two individuals of *Pultenaea parviflora* were rooted within exotic grassland cover which did not meet the threshold for further assessment as threatened species habitat in accordance with the BAM requirements. The two individuals did not result in changes to the required offsets for the project in accordance with BAM and as such were not reported as an unexpected find.

The total revised count of *Pultenaea parviflora* recorded within the construction footprint following pre-clearing surveys was 16. Following an assessment of these additional records against approved Revised BDAR and based on their distribution within the existing species polygon mapping and exotic vegetation, no additional species credits were required in accordance with the BAM. The above information has been included for completeness.

6. Environmental risk assessment

To address the requirements of Condition 8, a risk assessment has been undertaken as part of the development of this BMP to assess risks to achieving the objectives contained within the plan. This has been undertaken in accordance with a framework that includes the Sydney Metro Risk Management Standard and the *Environmental Management Plan Guidelines* (Commonwealth of Australia, 2014).

The risk assessment is documented in Appendix B.

7. Environmental management measures

As outlined in Section 6 of the Final EIA, the construction footprint has been refined to avoid direct impacts on vegetation and watercourse where possible. Design development has also considered maintenance of wildlife linkages and enable increased fauna connectivity. A range of measures for management of potential impacts which have not been avoided by construction are included within the CEMF, performance outcomes and mitigation measures included within the Final EIA and in Section 1.5 above.

In accordance with Condition 8 of the EPBC Approval (EPBC 2020/8687), the BMP sets out the requirements for Flora and Fauna Management Plans (FFMPs) to be prepared by Principal Contractors under the project's CEMF. The FFMPs will also be prepared in accordance with the conditions of approval for EPBC 2020/8687, the performance outcomes and mitigation measures included within the Final EIA and this BMP.

Additional management measures for specific aspects are described below.

7.1 Vegetation management

In accordance with EPBC Condition 2, the project must not clear more than the following specified amounts within the study area:

- 5.87 hectares of Cumberland Plain Woodlands and Shale-Gravel Transition Forest threatened ecological community (TEC)
- 4.94 hectares of Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland TEC
- 24.79 hectares of Grey-headed Flying-fox habitat
- 7.3 hectares of native vegetation on the Defence Establishment Orchard Hills site (which may include threatened ecological communities in conditions 2a and 2b)
- 335 individuals of *Grevillea juniperina subsp. juniperina* on the Defence Establishment Orchard Hills site (Lot 1 DP 629326 and Lot 2 DP 242968)
- The number of individuals identified by pre-clearance surveys, undertaken in accordance with conditions 3 – 5 and documented within Appendix A.

The contractor FFMP will be prepared to manage native vegetation within the approved impacts within the off-airport construction corridor, in accordance with the CEMF. The scope of the FFMP is to develop a framework for the management of native vegetation to be retained. The following will be included in the FFMP, as a minimum:

- Deferring vegetation removal until necessary
- Locating site offices and stockpiles in already cleared and disturbed areas where possible, to avoid further unnecessary removal or disturbance of native vegetation and hollow-bearing trees
- A requirement for providing maps to construction staff clearly showing vegetation clearing boundaries and exclusion/no-go zones
- Procedures for demarcation of retained vegetation, adjacent habitat areas and exclusion/no-go zones prior to works to prevent damage or accidental over clearing
- Minimisation of vegetation removal within the riparian zone where possible.
- A requirement for the earthworks contractors to engage a suitably qualified ecologist or environmental officer prior to any clearing works to clearly demarcate vegetation protection areas

- Pre-clearing inspections to be undertaken by a suitably qualified ecologist to inform the preparation of pre-clearing permit applications
- Implementing an unexpected finds protocol which details measures to be undertaken if threatened flora and fauna not previously recorded are detected, including stops works and notification to relevant parties
- A requirement to avoid unnecessary disturbance in nearby areas of retained vegetation outside of the construction corridor such as avoiding unnecessary shading, light spill and noise

7.2 Fauna management

7.2.1 Nest Box Strategy

A Nest Box Strategy will be prepared to minimise habitat loss for hollow dependent fauna. This Strategy will include

- Pre-clearing fauna habitat inspections to be conducted by a suitably qualified ecologist to mark and map hollow-bearing trees, logs, existing nest boxes, and other habitat features present (such as avian nests, borrows, dreys etc.) That would require fauna management during removal. These results will determine:
 - Establishing protocols for the staged clearing of vegetation (directional clearing and two-staged clearing) and safe tree felling and log removal to reduce the risk of fauna mortality
 - Protocols for the management of other habitat features such as active avian nests, dreys, and decorticating bark
 - Threatened species translocation requirements
 - Protocols for the capture and relocation of less mobile fauna (such as nestling birds and nocturnal fauna) by a trained fauna handler
 - Protocols for the appropriate management of injured or deceased individuals
- Maps and catalogued data to show hollow-bearing trees proposed to be removed and the number of hollows associated with each tree
- Provisions for the installation of nest boxes within pre-determined dedicated areas prior to clearing areas of native vegetation off-airport
- Reuse of hollows and fallen debris within conservation areas
- The location, number and type of nest boxes to be installed, commensurate with the number of hollows proposed to be removed (based on the results of the pre-clearing inspection)
- Provisions for salvage of native fauna from existing nest boxes prior to their removal and translocation
- A guide on the installation of nest boxes and the appropriate design specifications
- A monitoring program for the monitoring of the nest boxes
- Necessary rehabilitation activities to mitigate the risk of reduced reproductive success of biota
- Landscaping off-airport will utilise predominantly native vegetation endemic to the region, sourced from the local area through the seed collection and salvage program where possible.

For areas around new infrastructure such as metro stations and carparks, this will include:

- Planting of native grasses in open areas and
- The use of native vegetation in decorative gardens and plant screenings used to minimise visual impacts.

For re-vegetation of natural areas this will include:

- Native bushland revegetation in areas of temporary disturbance (e.g. temporary laydown areas adjacent to existing remnant/retained bushland).

7.2.2 Aquatic fauna

In accordance with REMMs FF8 and FF9, a Dewatering Plan will be prepared and implemented for the dewatering of rural dams. This would include measures to manage the transfer of native aquatic fauna, if required, prior to dewatering. The following will be included in the Dewatering Plan:

- Protocol for dam decommissioning/dewatering
- A requirement to progressively emptying dams over a number of days to allow fauna to relocate
- A requirement to avoid the nesting season of waterbirds, where possible. A pre-removal survey will be conducted to identify bird breeding locations
- A requirement to salvage and relocate aquatic vertebrate fauna, including frogs, turtles and eels, to areas of suitable adjacent retained habitat or nearby habitats, with regard to numbers and identification of suitable release sites
- Management measures to prevent the release of Eastern Gambusia (*Gambusia holbrooki*) and other noxious fish into local waterways as a result of the draining of farm dams. Eastern Gambusia will be eradicated from dams using humane methods, and
- Protocols for the humane euthanasia of aquatic fauna, including fish
- Identification of potential risks and mitigation measures for watercourse functionality, riparian and aquatic habitat and fish passage as a result of the design and construction of waterway crossings
- Weed management activities, and
- Schedules for inspection, monitoring, management and corrective actions.

The FFMP will also include management measures to protect the riparian zone to ensure fish passage and protect fish habitat in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI (Fisheries NSW,) 2013).

Additionally, a surface water quality monitoring program will be implemented to monitor water quality during construction. The program will be developed in consultation with (as relevant) Western Sydney Airport, NSW Environment Protection Authority (EPA), relevant sections of Department of Planning and Environment (DPE) and relevant local councils. The program would consider monitoring being undertaken as part of other infrastructure projects such as the M12 Motorway and Western Sydney International. The program would monitor all construction discharge locations. Water quality parameters and background levels will be documented in the Soil and Water Management Plans, also prepared by Principal Contractors in accordance with the CEMF.

7.2.3 Threatened fauna species

Fauna and migratory species surveys

Targeted fauna surveys (in suitable conditions) will be undertaken by a suitably qualified ecologist as part of the pre-clearing inspections to determine the presence of nesting migratory birds including Latham's snipe, White-bellied Sea-Eagle and the Satin Flycatcher. The White-throated Needletail is a non-breeding migrant to Australia, however surveys should also target individuals that may utilise woodland habitat and hollows for perching and roosting. Pre-clearing inspections for these species should be conducted in conjunction with any pre-clearing inspections required under State conditioned management plans for species listed as threatened under the *Biodiversity Conservation Act 2016* (BC Act), including microbats, Cumberland Plains Land Snail, Green and Golden Bell Frog, and Little Eagle nests.

Nocturnal vegetation clearing works will be avoided to avoid disturbance of Grey-headed Flying-foxes potentially foraging within the off-airport construction corridor. A protocol for the Grey-headed Flying-fox will be included in the Habitat Management Plan, outlining management and mitigation if lost or injured individuals are found or a roost is established within the construction works area prior to or during construction works.

Dwellings and other human made structures that will be demolished, removed or modified as part of the project must be surveyed by a suitably qualified ecologist for microbats including Eastern Coastal Free-tailed Bat, Large Bent-winged bat, Eastern False Pipistrelle and Southern Myotis, prior to demolition, removal or modification.

Other human-made structures such as culverts and other under-road structures within the construction footprint will be surveyed for threatened microbats (particularly the Southern Myotis) in accordance with the Biodiversity Assessment Method (OEH, 2018). If threatened microbats are detected, a Microbat Management Plan will be developed as part of the FFMP and implemented by a suitably qualified bat specialist.

These surveys will be undertaken in accordance with 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH, 2017).

Management protocols

If threatened species are present or likely to be present, the following will be prepared and implemented through the FFMP:

- Maps identifying locations of threatened species
- The scope and requirements for targeted surveys and pre-clearing surveys; including the Unexpected Finds Protocol
- Relocation to suitable habitat adjacent to or near the off-airport construction corridor
- Pre-clearing surveys for migratory birds' nests
- Hierarchy of controls to avoid, minimise, mitigate impact during vegetation clearing particularly the avoidance of breeding seasons for relevant threatened fauna species
- Targeted searches for threatened flora species in areas of appropriate habitat
- Vegetation and habitat clearing protocols and
- Reporting and adaptive management measures.

If threatened species are found by targeted surveys, specific management will be prepared and included in the Flora and Fauna Management Plan in accordance with the Revised Environmental Mitigation Measures and Conditions of Approval. These plans will be implemented by a suitable qualified specialist.

7.3 Weed and disease management

In accordance with the CEMF and REMM FF10, weed and disease management will be undertaken in areas within the off-airport construction corridor that are affected by construction. Weed and disease management will include the following:

- A requirement for implementing soil erosion and sediment control measures
- Weed management in accordance with the NSW *Noxious Weeds Act 1993*
- Identification and mapping of known NSW Department of Primary Industry (DPI) listed Priority Weeds and pathogens within the construction area and estimate of coverage
- Removing and controlling noxious weed species and prescribing suitable control measures and means of preventing spread
- Prevention of the introduction and spread of the Priority Weeds and pathogens
- Requirement for the appropriate disposal of weeds and weed-infested soils
- Stabilising disturbed areas following clearing to prevent weed spread
- Monitoring and adaptive management of weeds
- Reporting on the extent, composition and severity of weed infestations and adaptive management measures and
- The minimisation of impacts arising from Key Threatening Processes (KTP) including:
 - Implementation of weed management measures to prevent the introduction and spread of weeds including exotic vines and scramblers, *Olea europaea* (African Olive), *Chrysanthemoides monilifera*, *Lantana camara*, and exotic perennial grasses
 - Implementation of pathogen management measures to prevent the introduction and spread of pathogens including amphibian chytrid, *Phytophthora implementa*, and Exotic Rust Fungi of the order Pucciniales

7.4 Project offset requirements

The EPBC Biodiversity Offset Strategy (BOS) addresses the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) Conditions of Approval for EPBC 2020/8687. State and Commonwealth listed biodiversity which require biodiversity offsetting as identified in the Revised BDAR and the Threatened Flora pre-clearance surveys (Sydney Metro, 2021c) have been documented in the EPBC BOS with Commonwealth listed entities highlighted throughout.

7.4.1 Biodiversity offset requirements

The biodiversity offset requirements as reported in the Revised BDAR, and updated following Threatened flora pre-clearance surveys, have been quantified using BAM 2017 and calculated using the Biodiversity Assessment Method Calculator (BAM-C). Offset requirements are provided in Table 7-1 and Table 7-2.

The Revised BDAR assessment of PCTs and corresponding BAM-C calculation of residual ecosystem credit requirement to be offset was determined against each individual vegetation zone of similar condition, in accordance with BAM. However, not all PCT vegetation zone areas being offset in accordance with BAM meet the minimum condition and area criteria thresholds for the corresponding EPBC Act Threatened ecological communities as the Revised BDAR assesses both EPBC Act and BC Act listed PCTs and species.

For each credit type, the number of credits required have been calculated based on the maximum extent of the approved project impact. The final quantification and delivery of offset liability will be determined based on a vegetation clearing report and final design and construction plan. For the purposes of the EPBC Approval (2020/8687), the project offset obligation has been calculated to require the following biodiversity offsets:

Table 7-1 EPBC Act listed ecosystem credit offset requirements (off-airport) shown as a proportion of the corresponding BC Act ecosystem requirements assessed in the Revised BDAR

Vegetation type (PCT)	Corresponding EPBC listed Threatened ecological community	Extent off-airport land assessed under BAM for BC Act, including MNES (hectares) ¹	Extent off-airport land under EPBC Act (hectares) ²	Total credit requirements off-airport land under BAM for BC Act, including MNES requirements	Estimated MNES credit requirements ³
PCT 724 - Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	10.42	4.43	246	105
PCT 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	6.39	1.44 ¹	204	46
PCT 1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and	5.38	4.94	181	166

Vegetation type (PCT)	Corresponding EPBC listed Threatened ecological community	Extent off-airport land assessed under BAM for BC Act, including MNES (hectares) ¹	Extent off-airport land MNES under EPBC Act (hectares) ²	Total credit requirements off-airport land under BAM for BC Act, including MNES requirements	Estimated MNES credit requirements ³
	South East Queensland				
Total for EPBC Act -listed threatened ecological communities			10.80		317

- 1 Total area of impacted PCT being assessed and offset in accordance with BAM and BC Act (Refer to Table 12.4 and 12.7 of Revised BDAR).
- 2 Includes all areas of EPBC act listed TEC field verified by M2A in Revised BDAR and in areas without access EPBC TEC mapping for the Cumberland Plain Assessment Report prepared for the Strategic Assessment (Open Lines and Biosis, 2020) Refer to Table 7.1 of Revised BDAR.
- 3 Credits for MNES estimated as a proportion of total areas and credit liability for corresponding PCT being offset in accordance with BAM. Proportion of credits has been rounded to one decimal place and total credit requirements have been rounded to the nearest whole number.

Table 7-2 Species credit offset requirements (off-airport) shown as a proportion of the corresponding BC Act species requirements assessed in the Revised BDAR

Species	NSW listed	EPBC listed	Total Area / count (hectares) ¹	Proportion of individuals on Commonwealth land ²	Total credit requirements off-airport land under BAM for BC Act, including MNES requirements	Total estimated MNES credit requirements
<i>Pultenaea parviflora</i> – Flora	E	V	0.34	0	10	10
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	V	-	1,264	335	57	15
Total of EPBC-listed threatened flora						25

- 1 Threatened flora credit requirements are based on updated survey results obtained from Sydney Metro (November, 2021c)
- 2 As recorded on the Defence Establishment Orchard Hills site (Lot 1 DP 629326 and Lot 2 DP 242968) and specified in condition 2.e) of Commonwealth Approval (EPBC 2020/8687)

Note: E – Endangered, V = Vulnerable under both the BC Act and EPBC Act

Further detail on the project's off-airport EPBC biodiversity offset requirements and how they will be staged can be found in the EPBC BOS and Off-airport Biodiversity Staging Plan respectively.

8. Competence, awareness and training

To ensure this BMP is effectively implemented, each level of management is responsible for ensuring that all personnel reporting to them are aware of the requirements.

All competence, training and awareness requirements will be implemented as detailed in Section 3.11 of the CEMF. A summary of these requirements is provided in the following sections.

8.1 Environmental project induction

All personnel working on the project (including sub-contractors) are required to attend a compulsory Project induction prior to commencement of works on site, which will include:

- Summary of the significance of surrounding vegetation and fauna habitat in a regional context
- Location of mapping of environmentally sensitive areas marked as no-go zones
- Threatened species that may be encountered on site (where applicable)
- Points of contact for personnel if threatened species are encountered
- Descriptions or works where ecologists may be required to supervise or support personnel (where applicable)
- Overview of dam dewatering protocols (where applicable)
- Site weed and pathogen protocols
- Bushfire management procedures.

Short-term visitors to site for purposes such as deliveries will be required to be accompanied by inducted personnel at all times. A visitors' induction will also be undertaken for visitors onsite for short periods as agreed with the Principal Contractor's Safety Manager.

The Principal Contractor's Environment Manager (or delegate) will be responsible for providing the environmental component of the project inductions, ensuring that the environmental management requirements of this plan are incorporated.

An *Induction and Training Register* will be maintained at all times including the details of all personnel who have completed the project induction and any other pertinent environmental training and or awareness forums (workshops, presentations etc.).

8.2 Contractor specific site inductions

In addition to the project induction, Principal Contractors are responsible for determining the training needs of their personnel and the framework for this training in accordance with the CEMF and their scope of works.

A record of all environment inductions is to be maintained by the contractor and provided weekly to Sydney Metro.

8.3 Toolbox, training and awareness

Environmental issues associated with biodiversity management to be considered for toolbox talks may include (but are not limited to):

- Ensuring the location of sensitive areas are conveyed and understood by all site personnel, contractors and sub-contractors
- Compliance with designated no-go zones
- Observation of requirements regarding unexpected or anticipated threatened species finds and the action taken to resolve the situation.

For activities with high environmental risk (as identified through the risk assessment process undertaken as part of the BMP), targeted environmental awareness training must be provided.

The Principal Contractor's Environment Manager is responsible for establishing a schedule of environmental training and ensuring it is implemented, with appropriate records being kept.

8.4 Daily pre-start meetings

The pre-start meeting is a tool for informing the workforce of the day's activities, safe work practices, environmental protection practices, work area restrictions, activities that may affect the works, coordination issues with other trades, hazards and other information that may be relevant to the day's work.

Specifically with regards to this BMP, the daily pre-start forum will be used as an opportunity to discuss the following:

- Distribution of map of environmentally sensitive areas marked as no-go zones in immediate vicinity of works
- Threatened species that may be encountered on site
- Weed and pathogen management
- Points of contact for personnel if threatened species are encountered
- Introduction of ecologists that may be present to supervise or support personnel and
- Overview of dam dewatering protocols.

9. Compliance and complaints management

Monitoring, inspection and auditing will be undertaken to measure effectiveness and facilitate continuous improvement of biodiversity management and mitigation. General environmental monitoring, inspection and auditing requirements will be undertaken in accordance with Section 3.16 of the CEMF, as detailed in this plan and as incorporated into contractor's Flora and Fauna Management Plans in accordance with Condition 8.

9.1 Pre-clearing permits and hold points

In accordance with the CEMF, a pre-clearing inspection will be undertaken prior to any vegetation clearing. These inspections will be undertaken by a qualified ecologist and the contractor's Environmental Manager or delegate.

The pre-clearing inspection will be recorded and will include as a minimum:

- Location and extent of clearing, in relation to the approved project boundary
- Details of the vegetation to be removed, including PCT / species, identification of hollow bearing trees or other habitat features, identification of any threatened fauna
- Reasons for the removal and any alternatives that have been considered
- Method of removal
- Confirmation of the physical demarcation of the limit of clearing
- Associated management and mitigation such as erosion and sediment controls, weed management, replacement planting.

The pre-clearing inspection record will be completed by contractors and requires Sydney Metro's approval prior to vegetation removal commencing.

For clarity, the pre-clearing surveys required under Condition 3 and discussed in Section 5.2 of this plan are related to the verification of presence for the purposes of assessment and determination of associated biodiversity credit liability. The pre-clearing inspections discussed in this section are a subsequent step that will be implemented in order to release the hold point and approve the commencement of clearing activities.

Clearing will follow a two-stage process as follows:

- Non-habitat trees will be cleared first after sign-off of the pre-clearing inspection
- Habitat trees will be cleared no sooner than 48 hours after non-habitat trees have been cleared. A suitably qualified ecologist will be present on site during the clearing of habitat trees. Felled habitat trees will be left on the ground for 24 hours or inspected by the ecologist prior to further processing.

In accordance with the CEMF, a post clearance report will be undertaken after vegetation clearing to validate the area of vegetation cleared including confirmation of the type of vegetation cleared, the number of hollows impacted and whether the nest box requirements to offset these impacts have been met.

9.2 Site inspections

Project activities will be regularly reviewed to ensure compliance with this plan. A regular inspection program will be conducted, including:

- Daily inspections undertaken by the Principal Contractor's Site Supervisor which will be logged in their respective site diaries
- Routine weekly inspections will be conducted to monitor biodiversity management, project boundary fencing and implementation of this BMP at active worksites. Weekly inspections will be documented to maintain compliance and effectiveness of controls
- Items that require action will be documented on the site environmental inspection

- Items that require specific and detailed action will be recorded on the Project's Corrective Action Register, maintained by the Principal Contractor's Environmental Manager.

The findings of site inspections will be recorded on a Site Environmental Inspection Checklist.

Regular site inspections will be completed by the Principal Contractor and Sydney Metro representatives. These will be conducted at a frequency to be agreed with by all parties.

9.3 Monitoring

Baseline data and the condition of the environment prior to commencement of construction is detailed within Section 5 above.

9.3.1 Biodiversity monitoring

Biodiversity monitoring requirements, including timing and responsibilities, are included in Table 9-1. The results of any monitoring undertaken as a requirement of a license or permit can be provided upon request and as part of the Annual Compliance Report process.

Table 9-1 Biodiversity monitoring requirements

Monitoring Requirement	Location	Timing / Frequency	Method	Performance indicators	Corrective actions	Reporting	Responsibility
Vegetation clearing and retention	Site wide	Annually	Current aerial photograph interpretation (API) of the construction footprint with comparison to baseline mapping biodiversity mapping including results of pre-clearing surveys Ground truthing all site boundary fencing which are adjacent to areas of retained protected matters	Clearing of protected matters does not exceed the specified amounts within the study area (as per Condition 2) No clearing outside of approved clearing limits No breaches of site boundary fencing or impacts in designated no-go areas	Reporting non-compliance Recalculation of the offset credit requirement where additional areas of vegetation or threatened species habitat have been impacted	Annual compliance reports Completion report	Principal Contractor
Nest box monitoring and maintenance	Nest box placement areas	Six monthly (summer and winter) for	Visual inspection or use of a fibre-optic camera to check for occupancy and/or evidence of use. Ground assessment of deterioration of the nest box or maintenance required including pest species	Use of nest boxes by a wide range of native fauna Use of nest boxes designed for specific species by those species	Replacement of fallen, damaged or degraded nest boxes	Next box monitoring reports	Principal Contractor

9.3.2 Aquatic flora and fauna monitoring

Aquatic flora and fauna management monitoring is detailed in Table 9-2.

Table 9-2 Aquatic flora and fauna monitoring requirements

Monitoring Requirement	Location	Timing / Frequency	Method	Performance indicators	Corrective actions	Reporting	Responsibility
Pre-dewatering assessment	Farm dams and creek diversions	Prior to dewatering	Habitat assessment of the waterbody to be dewatered including size, species likely to be present and require relocation and assess risks of weeds, pest species and pathogens Habitat assessment proposed recipient waterbodies including evidence of weeds, pest species and pathogens	Pre-dewatering assessment completed prior to each dewatering event requiring relocation or native species and euthanasia of pest species	Cease or postpone dewatering	Aquatic Ecologists dewatering assessment report(s)	Principal Contractor
Fauna relocation and euthanasia of pest species	Farm dams and creek diversions	During dewatering for farm dam decommission or prior to construction within creek diversions	Count (estimate) of the number of each species relocated and pest species euthanasia Count of fauna fatalities Visual checks following release at the recipient site of any dead animals	Minimum fauna fatalities associated with dewatering or relocation	Cease dewatering Minimise the duration of holding animals in transportation tanks and review and improve aeration if required Removal of dead animals from recipient site	Aquatic Ecologist's dewatering report(s)	Principal Contractor
Water quality and dissolved oxygen during draining of the dams where water is being discharged to receiving water bodies	Dissolved oxygen during draining of the dams where water is being discharged to receiving water bodies	During dewatering for farm dam decommission or prior to construction within creek diversions	In-situ measurement of physico-chemical parameters using a calibrated multi-parameter water quality meter	Physico-chemical parameters remain within discharge criteria (refer to SWMP)	Cease dewatering until water quality meets the discharge criteria	Aquatic Ecologist's dewatering report(s)	Principal Contractor

9.3.3 Weed and pathogen monitoring

Table 9-3 provides the monitoring requirements for weeds and pathogens.

Table 9-3 Weed and pathogen monitoring requirements

Action	Location	Timing / Frequency	Method	Performance indicators	Corrective actions	Reporting	Responsibility
Prevent the spread of priority weeds and Phytophthora (<i>Phytophthora cinnamomi</i>) and Myrtle Rust (<i>Uredo rangelii</i>)	Site wide	Prior to site establishment or where identified during construction/operation	Identification of areas where Phytophthora (<i>Phytophthora cinnamomi</i>) and Myrtle Rust (<i>Uredo rangelii</i>) occur Identification of where priority weeds occur Visual assessment of dieback indicators Soil sampling in areas presenting visual indicators	Baseline weed mapping and/or identification of weed species estimated coverage and fungal disease prior to clearing (hold point) No spread of Phytophthora or Myrtle Rust within the project footprint and in adjacent bushland as a result of the Project	Reporting non-compliance where spread of priority weeds are as a result of project works Hygiene protocols developed and implemented for works in affected areas. Areas of dieback identified and quarantined prior clearing	Pre-clearance inspection report or other appropriate weed management form	Principal Contractor
Weed treatment	Areas of retained vegetation (including modified grasslands)	Every time weeds are treated	Records of the location, treatment technique (e.g. herbicide application) and weather conditions	Herbicide application in accordance with project label Accurate records maintained of all herbicide application	Incident or non-compliance reports	Herbicide application log	Principal Contractor
Monitoring of effectiveness of weed treatments	Areas of retained vegetation (including modified grasslands)	Six monthly throughout construction period	GPS mapping and/or estimated coverage of priority weeds upon completion of a stage of the project	No new or increase in priority weed infestations within the Project footprint and in adjacent bushland as a result of the Project. No increase in extent of existing priority weed infestations	New and existing priority weed infestations are treated and suppressed	Priority weed mapping	Principal Contractor
Monitoring of weed and pathogen management during rehabilitation, if rehabilitation is required	Rehabilitated sites	Post rehabilitation until site handover	Quarterly	Control of weed infestation during rehabilitation of sites. Assessment criteria: No uncontrolled weed infestations.	Weed management, such as removal, to be undertaken if required to manage any new infestations.	Site inspection reports	Principal Contractor

9.4 Auditing

Auditing will be undertaken in accordance with Section 3.16 of the CEMF and Conditions of Approval 31 - 33, including Sydney Metro audits, independent audits and audits to be undertaken by contractors.

9.5 Incidents and non-compliances

9.5.1 Incidents

Environmental incidents are classified into three classes that are based upon the consequence descriptors for environmental risks in the Sydney Metro Risk Matrix (refer to Sydney Metro Risk Management Standard). These classifications trigger a variety of management actions and/or legislative requirements depending on the severity of the consequence described where Class 3 represents minor consequences and Class 1 represents major consequences.

This matrix is further sub-divided into consequence ratings ranging from C6 (low impact) to C1 (high impact). An incident transitions between a Class 3 to a Class 2 incident once material harm has been caused, and transitions into a Class 1 incident once it is determined that the Environmental Harm caused in large-scale and cannot be remediated Table 9-4.

Table 9-4 Classification System for Environmental Incidents

Class 3			Class 2	Class 1	
C6	C5	C4	C3	C2	C1
No appreciable changes to environment and/or highly localised event	Change from normal conditions within environmental regulatory limits and environmental effects are within site boundaries	Short-term and/or well-contained environmental effects. Minor remedial actions probably required	Impacts external ecosystem and considerable remediation is required	Long-term environmental impairment in neighbouring or valued ecosystems Extensive remediation required	Irreversible large-scale environmental impact with loss of valued ecosystems

All incidents and complaints (including potential incidents) must be reported so that they can be investigated and prevented from recurring. An Incident Notification Report shall be completed and issued to the Principal Contractor's Project Director for all Potential or Actual Class 1 or Class 2 incidents. The completion Incident Notification Report for Class 3 incidents is at the discretion of the Principal Contractor's Project Director, however, it is expected that the person responsible for completing the Incident Notification Report makes appropriate enquiries to determine the likely causal factors involved and assigns effective corrective actions. Notwithstanding Class 1, Class 2 and Class 3 incidents are to be recorded.

When an environmental incident occurs which causes environmental harm, in all cases both verbal and written communication of the incident must be carried out immediately and within 48 hours respectively. For Class 1 and 2 Incidents the notification process shown in Figure 9-1 must be followed. Incident Notification Reports satisfy the requirement for written communication to Sydney Metro and are to be completed using the Environmental Incident and Non-compliance Notification Report (SM ES-FT-403) or a similar and consistent form approved by Sydney Metro.

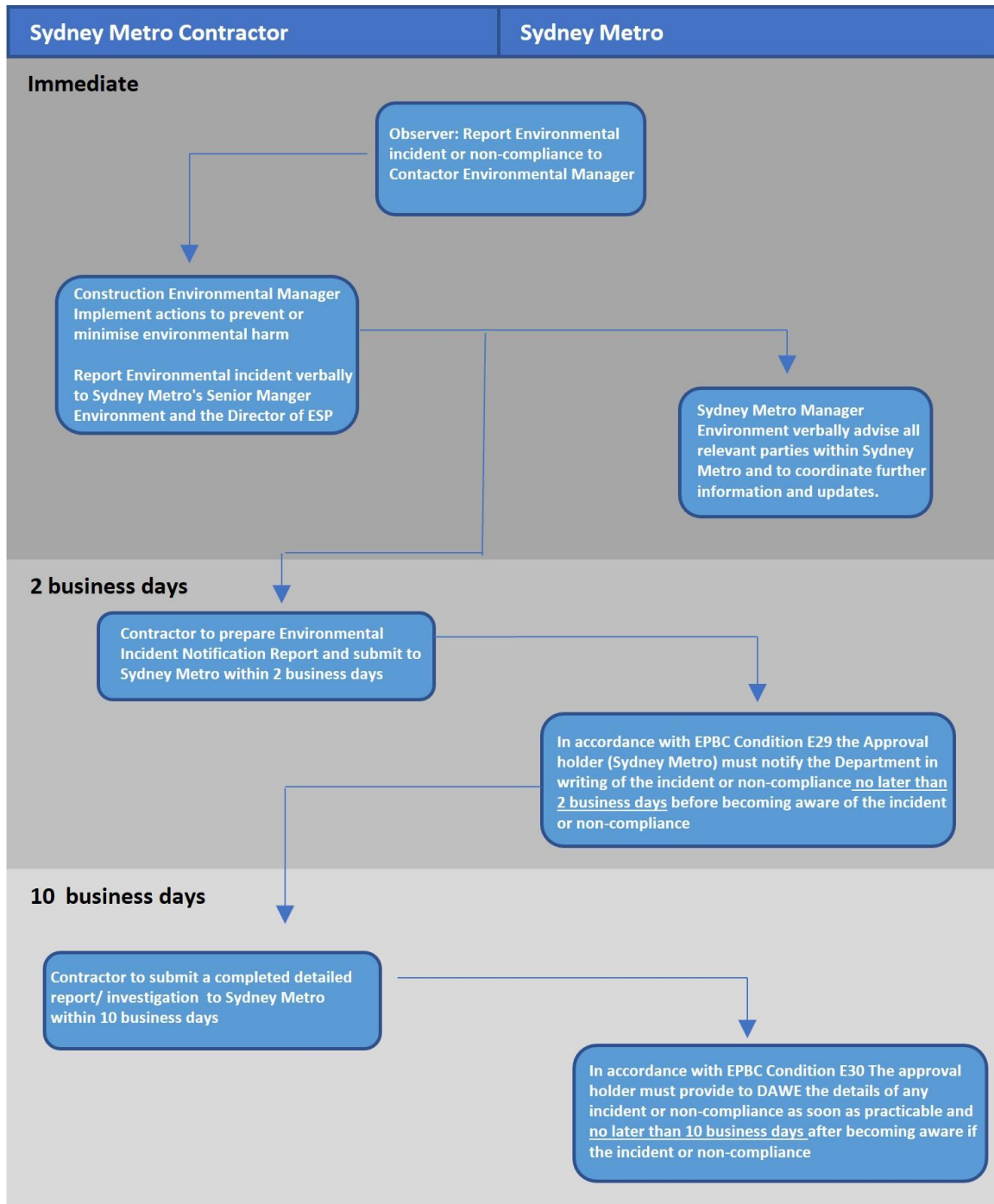


Figure 9-1 Notification process for environmental incidents

9.5.2 Non-compliances

An environmental non-compliance is a breach of an environmental requirement originating from Planning Approvals, environmental permits and licences, lease agreements, and other requirements documented in environmental management plans. Whether an event is classified as a Non-compliance or an Incident the process behind managing the event remains the same, with the following exceptions:

- Non-compliances are reported to have occurred on the day the breach was raised as opposed to the date when the requirement was breached
- Non-compliances are not divided into severity classes

- Non-compliances do not have the potential to trigger crisis or emergency management processes
- There is an informal notification process in the immediate timeframe following a Non-compliance being raised.

When an Environmental Event occurs that causes Environmental Harm and also breaches one or more Environmental Requirements, then an Incident Notification Report will be created which records what requirements were breached.

If a Non-compliance is identified then it must be raised using the Environmental Incident and Non-compliance Report Form within 48 hours by the party responsible for the breach.

9.5.3 Emergency contacts and procedures

Emergency management will be undertaken in accordance with the emergency response plan, which includes environmental emergencies. Procedures to be followed and notification/contact protocols are detailed within the plan.

9.5.4 Reporting of incidents and non-compliances

All incidents and non-compliances must be reported to the Environmental Representative and Sydney Metro in accordance with Sydney Metro Environmental Incident and Non-compliance Reporting Procedure SM-17-00000096. Sydney Metro will be responsible for reporting incidents and notifications to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW), under Conditions of Approval 29 and 30.

All incidents and non-compliances must also be reported to the relevant regulatory authorities, including DCCEEW, within the timeframes specified in any conditions of approval and legislative requirements.

9.6 Complaints management

Community liaison and complaints handling for the off-airport component of the project will be undertaken in accordance with Section 4.2 of the CEMF and the project's Overarching Community Communication Strategy (Sydney Metro, 2020).

9.7 Periodic review of BMP

A review of this BMP is to be conducted by a suitably qualified person in the following instances:

- At least every 12 months
- If recommended by an independent audit
- Within one month of changes to Project Approval, license conditions or relevant legislation relating to protected matters
- Within one month of any reportable biodiversity related incidents or any unexpected biodiversity finds within the Project's construction footprint.

The review will provide an opportunity to assess the effectiveness of the BMP. The review must consider the following:

- Works undertaken since the last review, including any completed survey and vegetation clearing activities
- The identification and management of any unexpected finds
- Any incidents and non-compliances that have occurred
- If all relevant requirements of this plan have been met.

The review will be documented and will rate the effectiveness of the BMP as a management tool against the above criteria. If the review finds effectiveness can be improved in any areas, this will be addressed in a revision to the BMP.

Revisions to this BMP, if required, must be authorised by the SM-WSA Senior Manager Environment . The SM-WSA Senior Manager Environment can approve minor changes to the BMP, where they are satisfied that the amendment to the BMP is necessary. Minor changes will typically include those that:

- Are administrative in nature (e.g., staff and agency/authority name changes)
- Do not noticeably increase the magnitude of impacts on the environment when considered individually or cumulatively
- Would not cause a new impact
- Are in response to audit findings or periodic reviews, subject to the significance of any audit or review findings
- Do not compromise the ability of the Project to meet legislative requirements and are consistent with terms of the approval and does not include any modifications to the terms of Project approval.

Where the SM-WSA Senior Manager Environment deems it necessary, the amended BMP will be forwarded for approval by the Minister.

Changes will also be communicated through toolbox talks to existing onsite personnel and incorporated into environmental induction materials.

If a minor revision to the approved BMP is required without submitting it for approval, the approval holder must:

- Notify DCCEEW in writing that the approved action management plan has been revised and provide DCCEEW with:
 - an electronic copy of the revised BMP
 - an electronic copy of the revised BMP marked up with track changes to show the differences between the approved BMP and the revised version
 - an explanation of the differences between the approved BMP and the revised version
 - the reasons the approval holder considers that taking the action in accordance with the revised BMP would not be likely to have a new or increased impact
 - written notice of the date on which the approval holder will implement the revised BMP, being at least 20 business days after the date of providing notice of the revision of BMP, or a date agreed to in writing with DCCEEW.
- Implement the revised BMP from the implementation date.

10. References

Commonwealth of Australia (2014). *Environmental Management Plan Guidelines, Commonwealth of Australia*, available at www.awe.gov.au/sites/default/files/documents/environmental-management-plan-guidelines.pdf .

NSW Fisheries (2013). Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (2013 update). NSW Department of Primary Industries, Fisheries NSW.

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Appendix A

Threatened species preclearance survey results

Our ref: SMWSA_EPBC CoA_Pre clearance survey memo_Nov 2021_V4 181121

AECOM – WSP JV
Sydney Metro Greater West Project Office
Level 25, 680 George Street
Sydney NSW 2000
Australia

To:	Alice Pryke
From:	Alex Cockerill
CC:	Andrew Cook
Date	18 November, 2021
Subject	Sydney Metro Western Sydney Airport – St Marys to Elizabeth Drive, NSW EPBC Approval (2020/8687) Conditions 3-5 flora pre-clearance surveys

Purpose of this memo

The following information is provided to Sydney Metro to detail ecological surveys undertaken in November 2021 to satisfy the EPBC Approval (2020/8687) conditions 3 to 5, which are reproduced below:

3. To inform the preparation of the Biodiversity Management Plan required under conditions 8 and the Biodiversity Offset Strategy required under conditions 18, the approval holder must undertake pre-clearance surveys in areas not yet surveyed for the following species:
 - a. Bynoe's Wattle.
 - b. Downy Wattle.
 - c. *Allocasuarina glareicola*.
 - d. White-flowered Wax Plant.
 - e. Small-flower Grevillea.
 - f. *Micromyrtus minutiflora*.
 - g. *Pimelea curviflora* var. *curviflora*.
 - h. Spiked Rice-flower.
 - i. *Pultenaea parviflora*.
4. Pre-clearance surveys in areas not yet surveyed must be undertaken in accordance with the NSW Biodiversity Assessment Method, or another methodology agreed to by the Department in writing.
5. The results of the pre-clearance surveys in areas not yet surveyed must be submitted to the Department in writing prior to, or with, the submission of:
 - a. The Biodiversity Management Plan required under condition 8; and
 - b. The Biodiversity Offset Strategy required under condition 18.

In the Revised Biodiversity Development Assessment Report (Revised BDAR) prepared by M2A (2021), the nine flora species listed on the EPBC Act (condition 3, above) were assumed to be present in the properties within the construction footprint at Orchard Hills that could not be accessed for ecological surveys (refer to Revised BDAR Figures 5.1c, 5.1d and 5.1f (M2A 2021)).

The requirement for pre-clearance surveys in the EPBC Approval Condition 3 only applies to the locations of assumed habitat for the species listed in the Condition 3 within the off-airport study area that could not be surveyed due to access restrictions (e.g. private properties) (refer to Revised BDAR Figures 5.1c, 5.1d and 5.1f (M2A 2021)).

In accordance with Condition 4 of the EPBC Approval, the pre-clearance surveys must be undertaken in accordance with the NSW Biodiversity Assessment Method (BAM), or another methodology agreed by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) in writing.

Condition 5 requires the results of the pre-clearance surveys to be submitted to DAWE in writing prior to, or with the submission of the Biodiversity Management Plan and Biodiversity Offset Strategy.

Pre-clearance survey undertaken (November 2021)

Pre-clearance field survey was undertaken by WSP ecologists on 3, 5 and 8 November 2021 in accordance with the NSW threatened plant survey guidelines for the BAM (DPIE 2020). Survey was only carried out within the previously unsurveyed properties (the November 2021 study area).

Survey comprised targeted threatened species searches using parallel field traverses through suitable habitat present in the November 2021 study area. Candidate threatened flora species targeted by surveys are listed in Table 1 and includes each of the species listed in Condition 3 and additionally two species listed only under the BC Act (shaded in grey). The inclusion of the two BC Act only listed species is provided to inform subsequent revised credit liabilities under the BAM and requirements of the State project approval (SSI 10051).

Table 1 Candidate threatened flora species targeted in pre-clearance surveys

Scientific name	Common name	Survey months ¹	BC Act ²	EPBC Act ²
<i>Acacia bynoeana</i>	Bynoe's Wattle	All year	E	V
<i>Acacia pubescens</i>	Downy Wattle	All year	V	V
<i>Allocasuarina glareicola</i>	-	All year	E	E
<i>Cynanchum elegans</i>	White-flowered Wax Plant	All year	E	E
<i>Dillwynia tenuifolia</i> ³	-	Aug-Oct ⁴	V	-
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> ³	Juniper-leaved Grevillea	All year	V	-
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	Aug-Nov	V	V
<i>Micromyrtus minutiflora</i>	-	All year	E	V
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	Oct-Mar	V	V
<i>Pimelea spicata</i>	Spiked Rice-flower	All year	E	E
<i>Pultenaea parviflora</i>	-	Sep-Nov	E	V

(1) Optimal survey months were obtained from the BAM-C and cross-referenced with the Threatened Biodiversity Data Collection (EES, 2021)

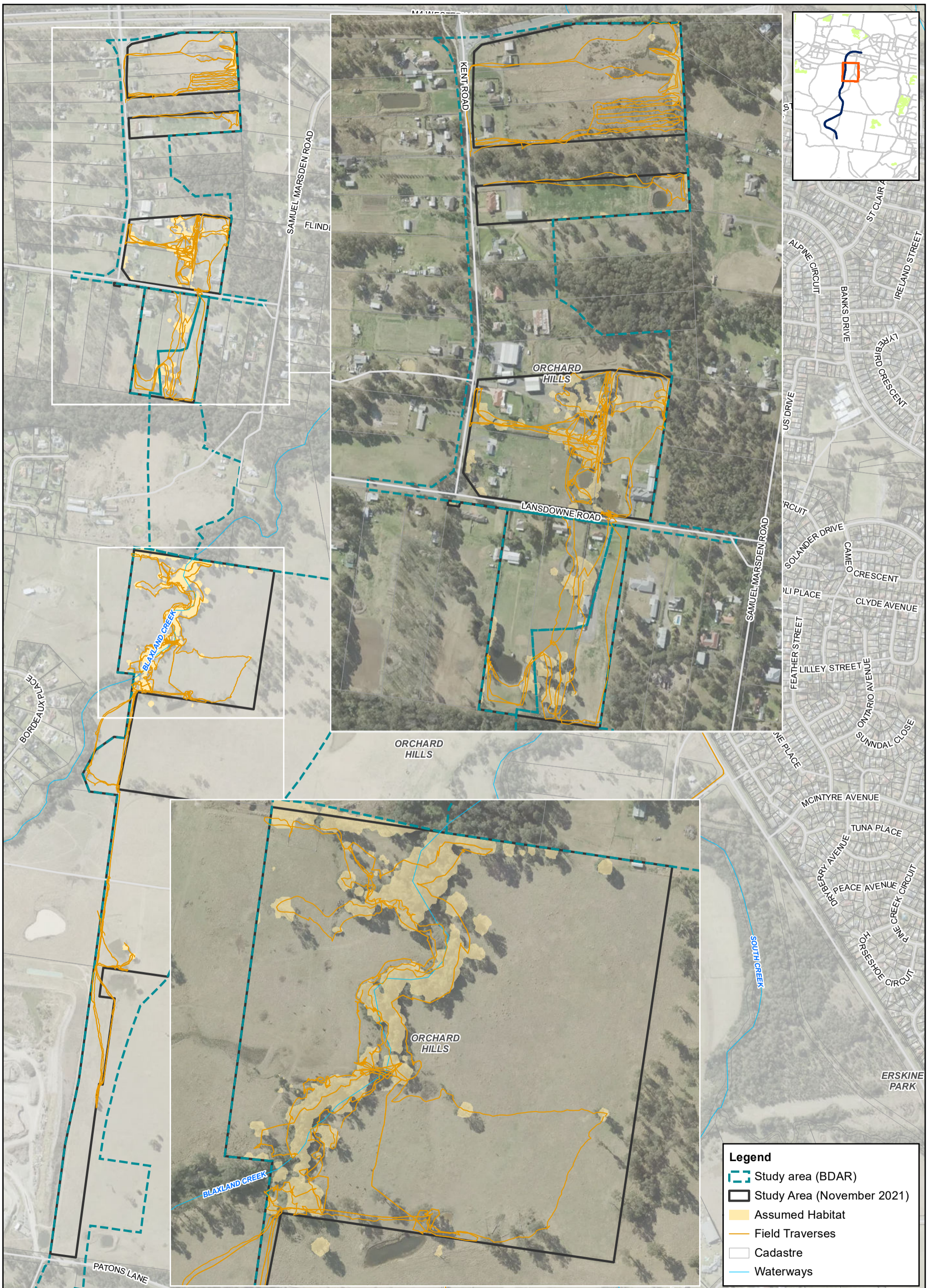
(2) V = Vulnerable, E = Endangered under the NSW BC Act and Commonwealth EPBC Act

(3) Not in EPBC Approval condition 3; however, was recorded during surveys

(4) Although surveyed in early November 2021, just outside of the Aug-Oct survey period, *Dillwynia tenuifolia* was recorded throughout the November 2021 study area in full flower and was therefore easy to detect. The above average seasonal conditions have extended the flowering period in 2021.

Survey effort comprised three days for teams of 2-4 ecologists. Weather conditions on 3 November were dry and clear with little or no wind, while the 5th and 8th of November were wet and/or overcast.

The locations of any threatened species detected in the November 2021 study area were recorded using a GPS coordinate and a count of individuals was taken. A GPS track log was recorded by each ecologist undertaking traverses, which are illustrated in Figure 1.1.



Flora Survey Effort - November 2021

Indicative only, subject to design development

Figure 1-1

Results of pre-clearance surveys

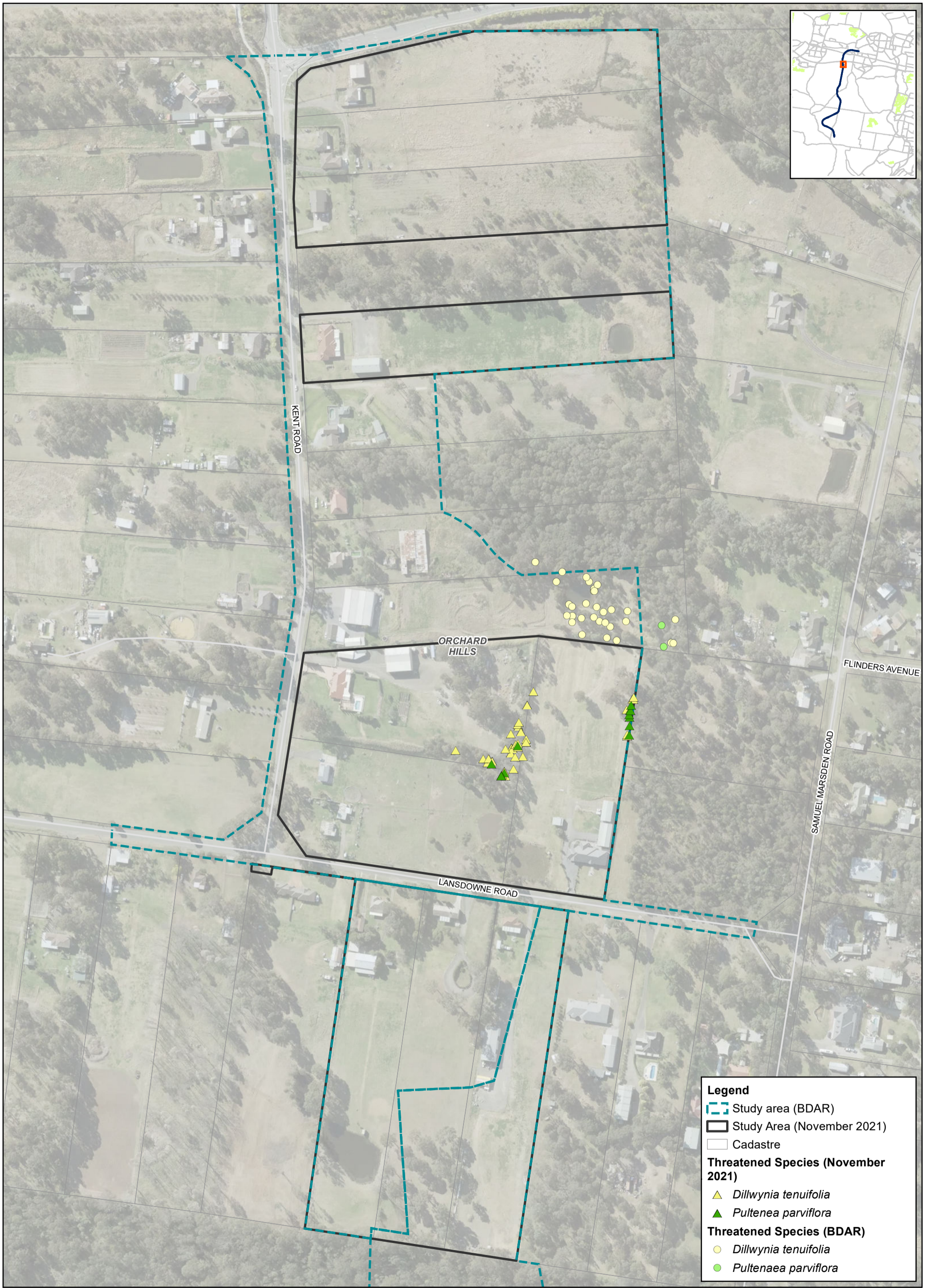
Pre-clearance field survey in the November 2021 study area recorded one threatened flora species that is listed on the BC Act and EPBC Act, being *Pultenaea parviflora*. No other species listed in Condition 3 were recorded or considered to be present. An additional two threatened flora species were recorded, which are listed only on the BC Act, being *Dillwynia tenuifolia* and *Grevillea parviflora* subsp. *parviflora* (refer to shaded rows in Table 2 below). These species were recorded within areas of assumed habitat as assessed within the Revised BDAR. The results of pre-clearance survey are provided in Table 2 and illustrated in Figures 2.1 and 2.2.

Table 2 Results of pre-clearance field survey in the November 2021 study area, Orchard Hills

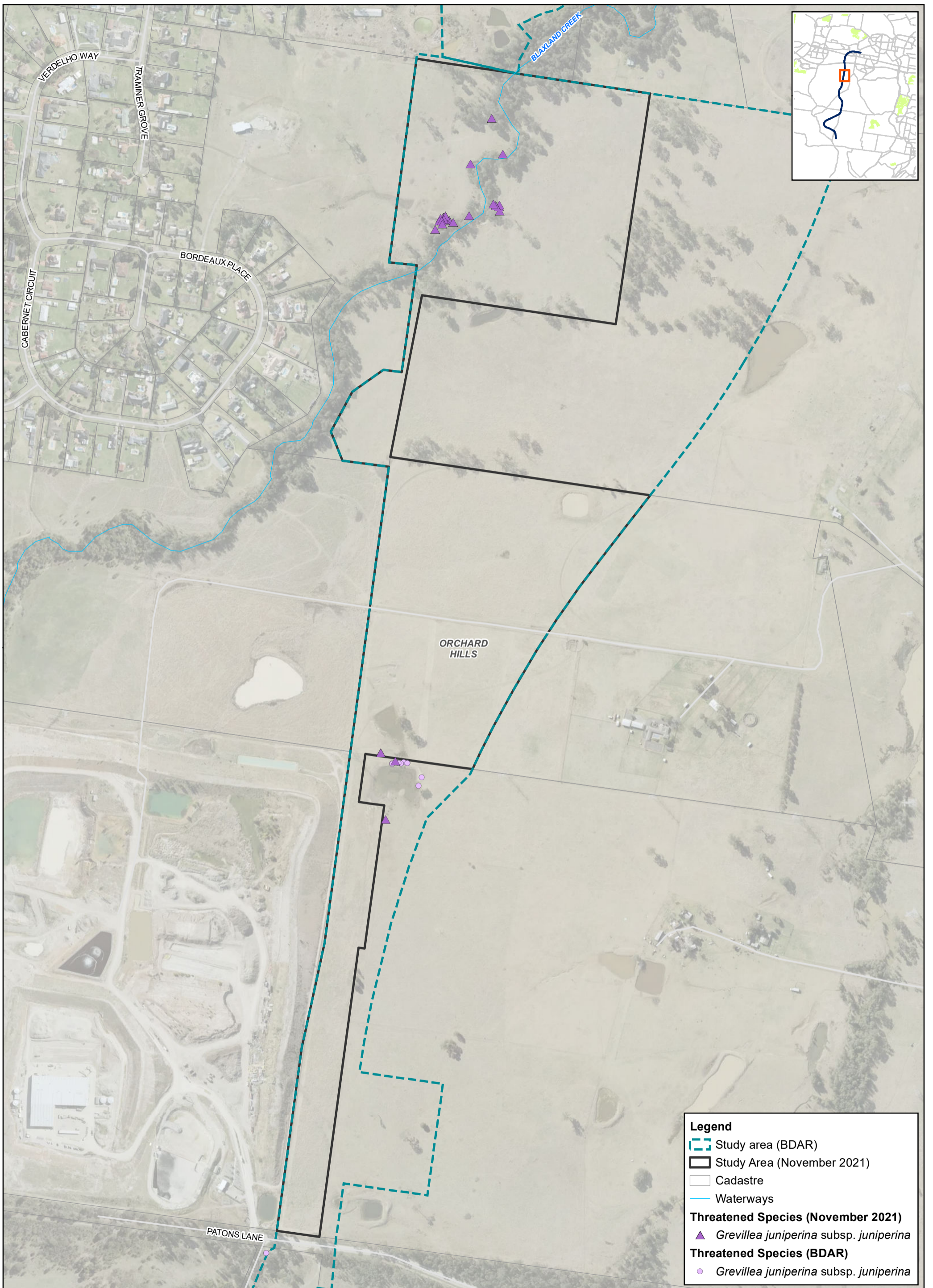
Scientific name	Common name	BC Act ¹	EPBC Act ¹	No. individuals recorded
<i>Acacia bynoeana</i>	Bynoe's Wattle	E	V	nil
<i>Acacia pubescens</i>	Downy Wattle	V	V	nil
<i>Allocasuarina glareicola</i>	-	E	E	nil
<i>Cynanchum elegans</i>	White-flowered Wax Plant	E	E	nil
<i>Dillwynia tenuifolia</i> ²	-	V	-	59
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> ²	Juniper-leaved Grevillea	V	-	39
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	V	V	nil
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> – (Endangered population <i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i>) ²	-	E	-	nil
<i>Micromyrtus minutiflora</i>	-	E	V	nil
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	V	V	nil
<i>Pimelea spicata</i>	Spiked Rice-flower	E	E	nil
<i>Pultenaea parviflora</i>	-	E	V	14

(1) V = Vulnerable, E = Endangered under the NSW BC Act and Commonwealth EPBC Act

(2) Not in EPBC Approval condition 3; however, were included in targeted species list for November 2021 study area and were included in BDAR (M2A 2021).



Flora Survey Results - November 2021



Flora Survey Results - November 2021

Threatened species polygons & species-credit species offset requirements

Following the results of pre-clearing surveys, revised threatened species polygons were created for each of the affected threatened flora species recorded in the November 2021 study area in accordance with BAM.

The identified species were:

- *Dillwynia tenuifolia*
- *Grevillea juniperina* subsp. *juniperina*
- *Pultenaea parviflora*

The unit of measure for each of these threatened flora species under BAM is area of habitat. To create the threatened species polygons (areas) for each species, a 30-metre buffer area was applied to individual plant records, which was then clipped to suitable habitat. The resultant threatened species polygons are shown on Figures 3.1 and 3.2.

A summary of the revised impacted areas, which has been used to generate credit requirements in accordance with BAM, is presented in Table 3. These data are compared to the assumed areas used in the Revised BDAR (M2A 2021) and corresponding species credit requirements.

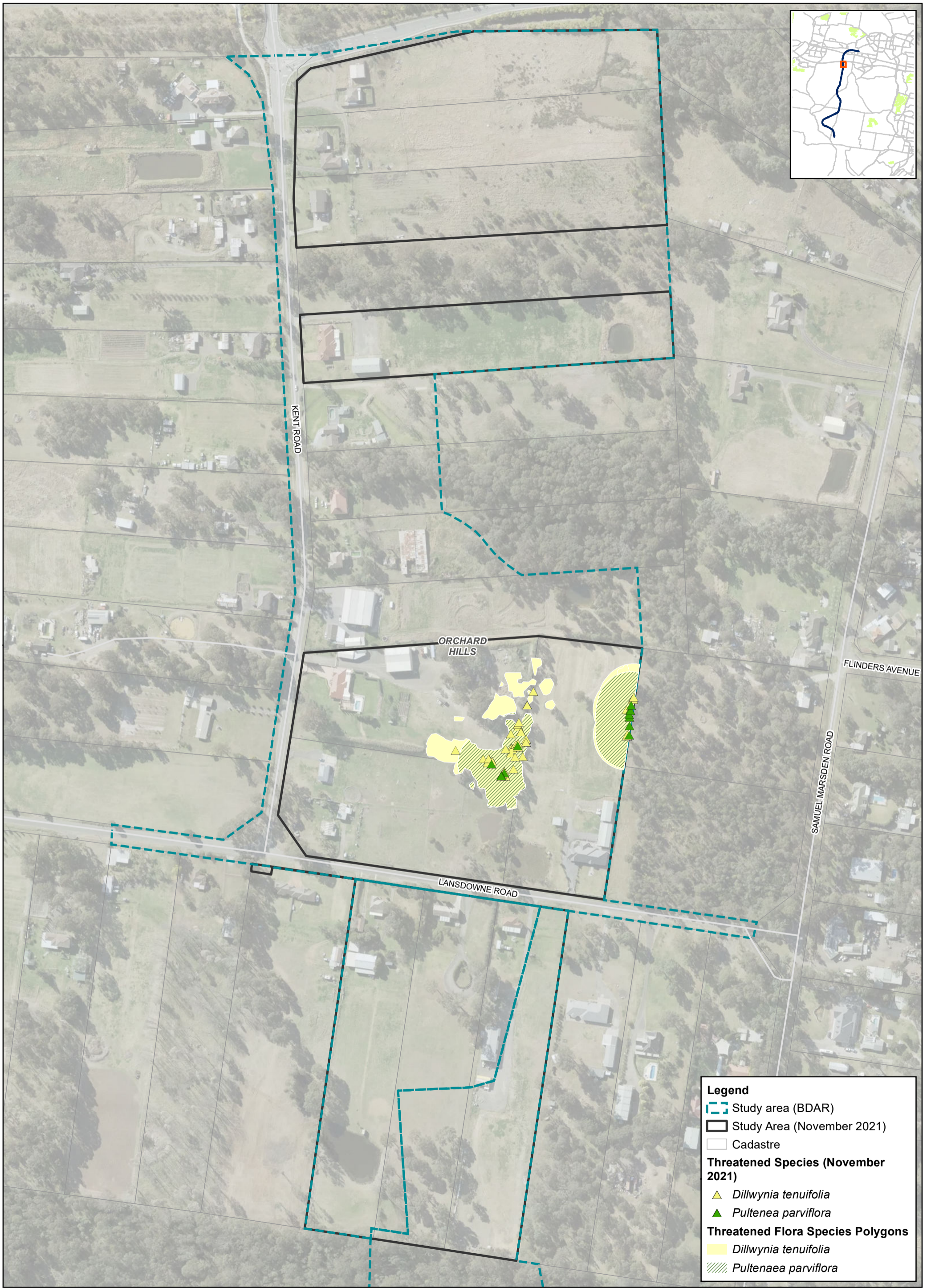
The new calculations in Table 3 for area (hectares) and credit requirements include the sum of species polygon areas of each recorded species in the November 2021 study area and the rest of the off-airport study area.

Table 3 Threatened flora species surveyed in the November 2021 study area and resultant species credit offset requirements in the off-airport study area

Scientific name	Common name	BDAR 2021 calculations – based on assumed presence		New calculations – using Nov. 2021 survey results	
		Area (ha)	Credit requirements	Area (ha) ¹	Credit requirements
<i>Acacia bynoeana</i>	Bynoe's Wattle	1.25	31	nil	nil
<i>Acacia pubescens</i>	Downy Wattle	2.24	54	nil	nil
<i>Allocasuarina glareicola</i>	-	1.25	47	nil	nil
<i>Cynanchum elegans</i>	White-flowered Wax Plant	0.57	18	nil	nil
<i>Dillwynia tenuifolia</i> ²	-	3.05	72	0.72	21
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> ²	Juniper-leaved Grevillea	6.38	153	2.64	57
<i>Grevillea parviflora</i> subsp. <i>Parviflora</i>	Small-flower Grevillea	1.27	32	nil	nil
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> – (Endangered population <i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i>)	-	4.23	137	nil	nil

Scientific name	Common name	BDAR 2021 calculations – based on assumed presence		New calculations – using Nov. 2021 survey results	
		Area (ha)	Credit requirements	Area (ha) ¹	Credit requirements
<i>Micromyrtus minutiflora</i>	-	1.25	47	nil	nil
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	0.57	18	nil	nil
<i>Pimelea spicata</i>	Spiked Rice-flower	3.66	22	nil	nil
<i>Pultenaea parviflora</i>	-	1.25	31	0.34	10
TOTAL		26.97	662	3.7	88

- (1) Includes the sum of species polygon areas in the November 2021 study area, and the rest of the off-airport study area (i.e. species polygon areas and credit requirements for the whole off-airport study area).
- (2) Not in EPBC Approval condition 3; however, were included in targeted species list for November 2021 study area and were included in BDAR (M2A 2021).
- (3)



Legend

- Study area (BDAR)
- Study Area (November 2021)
- Cadastre

Threatened Species (November 2021)

- ▲ *Dillwynia tenuifolia*
- ▲ *Pultenea parviflora*

Threatened Flora Species Polygons

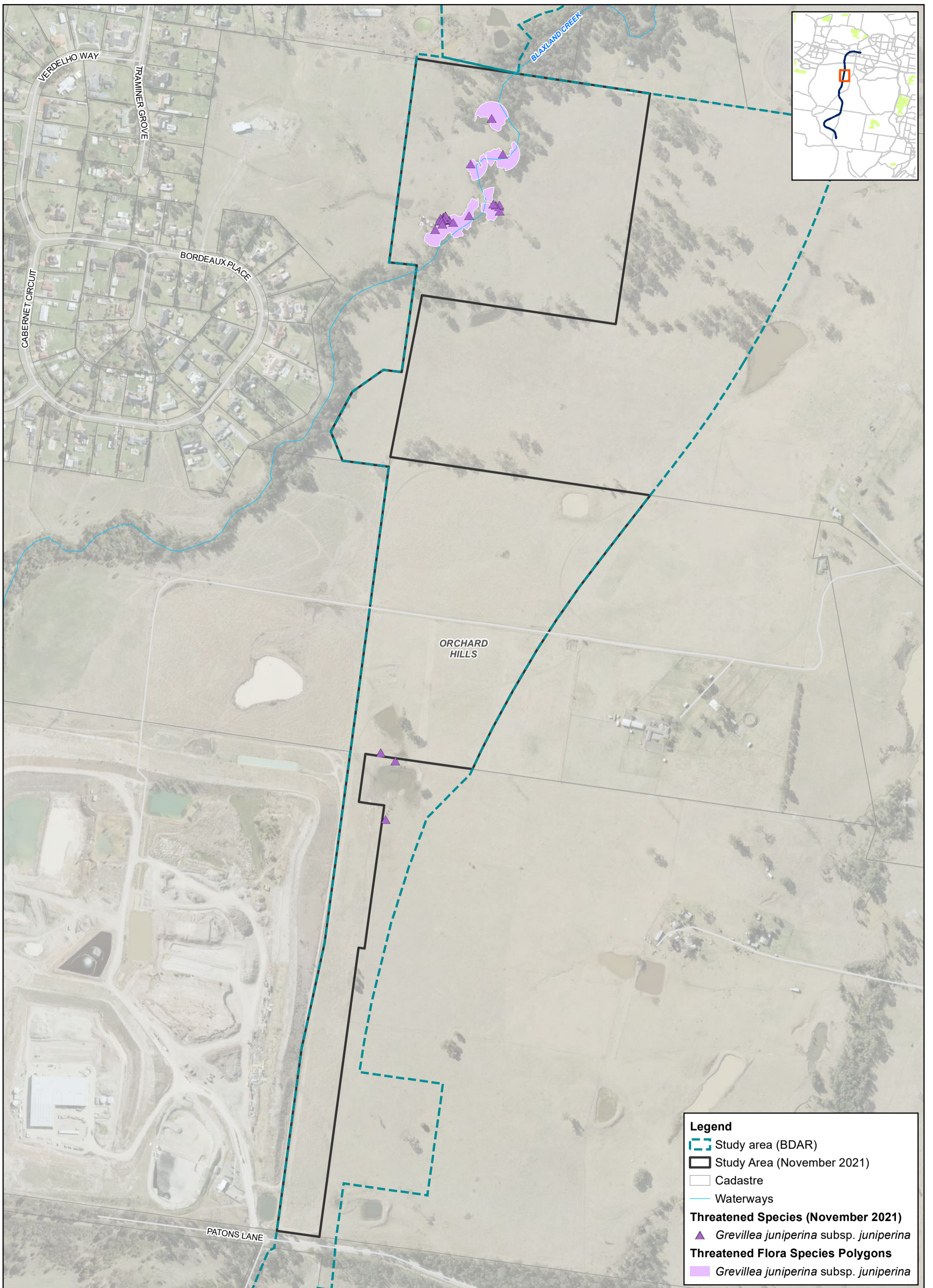
- Dillwynia tenuifolia*
- Pultenea parviflora*

Threatened Species Polygons - November 2021

Indicative only, subject to design development

Figure 3-1





Threatened Species Polygons - November 2021

Conclusion

In accordance with EPBC Approval (2020/8687) conditions 3 and 4, pre-clearance field survey for threatened flora species was carried out by M2A ecologists in November 2021, within the off-airport study area that had not been previously accessible for survey. The EPBC Approval condition 3 required survey to be undertaken for nine flora species that are listed as threatened under the EPBC Act. These species had been assumed present in previously inaccessible properties for the Revised BDAR (M2A 2021).

The pre-clearance surveys recorded two BC Act listed threatened flora (*Dillwynia tenuifolia* and *Grevillea juniperina subsp. juniperina*) and one BC Act and EPBC Act listed species (*Pultanea parviflora*) in the November 2021 study area (refer to Table 2).

Only one species (*Pultanea parviflora*) of the nine species listed in the EPBC Approval (2020/8687) Condition 3 was recorded.

The BAM offset credit requirements for the flora species that were recorded in the off-airport study area, were re-calculated based on the November 2021 survey findings. This resulted in a reduction in the total off airport credit requirements for threatened flora from 662 to 88 species credits (refer to Table 3). Of the total species credits requirements, only 10 species credits are relevant to the EPBC listed species, *Pultanea parviflora*.

In accordance with EPBC Approval (2020/8687) condition 5, results of the pre-clearance survey described herein must be submitted to DAWE in writing prior to, or with, the submission of the Biodiversity Management Plan and the Biodiversity Offset Strategy.

Alex Cockerill
Biodiversity Lead



References

DPIE (2020) Surveying threatened plants and their habitats, NSW survey guide for the Biodiversity Assessment Method. EES 2020/0146, The NSW Department of Planning, Industry and Environment, Parramatta.

Environment Energy and Science (EES) Group (2021). ASMS database threatened species information. From [BioNet Atlas \(nsw.gov.au\)](https://www.bionet.nsw.gov.au)

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Appendix B

Risk assessment

Risk Assessment

The below risk assessment has been completed to address condition 8d (EPBC 2020/8687): 'An assessment of risks to achieving Biodiversity Management Plan environmental objectives and risk management strategies that will be applied'.

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
Risk category			Insignificant C6 Minor C5 Moderate C4 Major C3 Severe C2 Catastrophic C1	Almost Unprecedented L6 Very Unlikely L5 Unlikely L4 Likely L3 Very Likely L2 Almost Certain L1	Very high High Medium Low		Insignificant C6 Minor C5 Moderate C4 Major C3 Severe C2 Catastrophic C1	Almost Unprecedented L6 Very Unlikely L5 Unlikely L4 Likely L3 Very Likely L2 Almost Certain L1	Very high High Medium Low	
MNES - Listed Threatened species and ecological communities	Direct Impacts	Clearing of native vegetation is not minimised during detailed design and construction	Moderate	Almost Certain	High	The concept design of the project has avoided biodiversity impacts where possible and detailed design will seek to reduce these impacts further. Prior to vegetation clearance, Principal Contractors will complete pre-clearing inspections in accordance with the project's Construction Environmental Management Framework (CEMF) prior to the vegetation clearing hold point being released.	Minor	Unlikely	Low	
		Clearing of Threatened Ecological Communities (TECs) beyond the approved limits	Severe	Almost Certain	Very high	The concept design of the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek) and designed these structures to maintain or enhance fauna connectivity. Flora and Fauna Management Plans prepared under the project's BMP and CEMF will be developed. The Biodiversity Offsets Strategy (BOS) will be implemented prior to any clearing works in that area.	Moderate	Very Unlikely	Low	The unexpected finds procedure will be used where there is an unexpected find.

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
		Removal of threatened species and/or their habitat (including riparian and aquatic habitat, nesting sites, and man-made habitat) beyond the approved limits	Severe	Almost Certain	Very high	The concept design of the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek) and designing these structures to maintain or enhance fauna connectivity. Flora and Fauna Management Plans prepared under the project's BMP and CEMF will be implemented. Principal Contractors will complete pre-clearing inspections and must provide certain documentation at hold points, prior to vegetation clearance.	Moderate	Very Unlikely	Low	
		Injury or death to native fauna from Project activities (e.g. vehicles strikes, dam dewatering and vegetation clearance)	Moderate	Likely	Medium	Flora and Fauna Management Plans prepared under the project's BMP and CEMF will be developed. Mitigation measures as detailed in the BMP, CEMF and the EPBC Act Final Environmental Impact Assessment of off-airport proposed action will be implemented, including fencing, pre-clearing surveys, toolbox talks, and having a suitably qualified ecologist present on site during the clearing of habitat trees and dam dewatering activities. Felled habitat trees will be left on the ground for 24 hours or inspected by the ecologist prior to further processing. Appropriate vehicle speeds will be applied on construction sites to minimise the risk of vehicle strikes.	Moderate	Unlikely	Medium	
	Indirect Impacts	Impacts extent beyond the construction footprint and reduce the viability of adjacent habitat due to edge effects. Edge effects may result in impacts such as changes to vegetation type and structure, increased growth	Moderate	Likely	Medium	Buffers have been incorporated into the construction footprint and the area of vegetation covered by these buffers is included in the calculations of impacted vegetation. The construction footprint used to calculate impact is therefore larger than the direct impact of the project. Accordingly, edge effects	Minor	Unlikely	Low	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
		of exotic plants or avoidance of habitat by native fauna.				are considered unlikely to extend beyond the project's construction footprint or would be avoided through implementation of the project mitigation measures. These include biodiversity, noise & vibration, landscape and visual impact mitigation measures.				
		Impacts extent beyond the construction footprint and reduce the viability of adjacent habitat due to noise, dust or light spill. These can result in: changes to behaviours such as foraging habits; disorientation of nocturnal species; attraction of and enhanced mortality of insects; increased risk of predation; and reduced reproductive success. These could have flow-on consequences at the population and ecosystem levels.	Moderate	Likely	Medium	The concept design of the project has avoided biodiversity impacts where possible and mitigation measures included in the BMP will be implemented to minimise the impacts created through construction.	Minor	Likely	Medium	
		Design does not consider habitat connectivity and increases fragmentation	Moderate	Unlikely	Medium	The concept design of the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek) and designing these structures to maintain or enhance fauna connectivity. Operational mitigation measures OFF1 and OFF2 will be implemented to further minimise impacts where possible.	Minor	Very Unlikely	Low	The approved action would not create new areas of fragmentation to the Cumberland Plain Woodland and only relatively small areas of additional fragmentation to the Coastal Swamp Oak Forest associated with the crossing of the unnamed riparian corridors which are already subject to disturbances and edge effects.
		Spread of weeds and plant pathogens are not appropriately managed	Moderate	Very Likely	High	The management of weeds and pathogens will be in accordance with the Flora and Fauna Management Plans prepared under the project's BMP and CEMF. Weed management will be undertaken in areas affected by	Minor	Unlikely	Low	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
						<p>construction prior to any clearing works.</p> <p>Off-airport weed management will be undertaken in accordance with the NSW <i>Noxious Weeds Act 1993</i>.</p>				
		Groundwater drawdown that is greater than the levels assessed in the EIA and has a greater impact to groundwater dependent ecosystems	Moderate	Likely	Medium	<p>The concept design of the project has minimised impacts to groundwater and groundwater dependant ecosystems. Potential risks would be temporary and would be mitigated once the construction of drained and undrained operational infrastructure is complete. The tunnel construction methodology would limit groundwater inflows given that tunnel lining is installed soon after tunnel excavation.</p> <p>Hydrogeological and geotechnical models for the project would be developed and updated as required.</p> <p>Groundwater will be managed through the management plans prepared in accordance with project's CEMF, including the preparation and implementation of a Groundwater monitoring program. Hydrogeological and geotechnical models for the project will be updated as monitoring data becomes available.</p>	Minor	Unlikely	Low	Should the groundwater drawdown exceed that assessed in the Environmental Impact Assessment (EIA) additional offsets may be required to offset additional impacts. This will be subject to appropriate assessment and approval, if required.
		Impacts from soil disturbance, erosion, sedimentation, enriched run-off and water quality extent beyond the construction footprint causing additional impacts to that assessed in the EIA	Major	Likely	High	<p>The concept design of the project has avoided impact to these sensitive environments using bridges and viaducts over creek lines (e.g. Cosgrove and Blaxland Creek).</p> <p>Buffers have been incorporated into the construction footprint and the area of vegetation covered by these buffers is included in the calculations of impacted vegetation. The calculated impact is therefore larger than the direct impact of the project which will reduce impacts</p>	Minor	Unlikely	Low	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
						on adjacent habitats outside the construction footprint. Risks would be effectively managed through implementation of the BMP and CEMF, standard soil and water mitigation measures, and other mitigation measures including relevant inductions, pre-start meetings, fencing of construction footprint, and compliance records.				
		Risk of starvation, exposure and loss of shade or shelter is not offset or minimised during detailed design and construction	Moderate	Very Likely	High	The concept design for the project has avoided biodiversity impacts where possible and will seek to reduce these impacts further during detailed design. Impacts would be limited to the construction footprint and mitigation measures implemented in accordance with the project's BMP and CEMF. Implementation of the project's approved Biodiversity Offset Strategy (BOS) will also minimise this risk.	Minor	Unlikely	Low	The project's credit liability is considered appropriate to offset this impact within the local landscape.
		Loss of breeding habitats such as hollow bearing trees and man-made structure (e.g. culverts and derelict buildings) causes flow-on consequences at the population and ecosystem levels.	Moderate	Likely	Medium	Implementation of the Principal contractors Flora and Fauna Management Plan which would include, avoiding removal of hollow bearing trees where possible, investigating opportunities for salvage and storage of felled native trees for potential use in landscape design, and a Nest Box Strategy to minimise habitat loss to hollow-dependent fauna. A targeted microbat survey will be undertaken for dwellings and structures proposed for demolition, removal or modification in accordance with 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH, 2018).	Minor	Unlikely	Low	The loss of breeding habitats is unlikely to extend beyond the project's construction footprint.

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
						Other human-made structures such as culverts and other under-road structures within the construction footprint would be surveyed for threatened microbats (e.g. particularly the Southern Myotis. If threatened microbats are detected, a Microbat Management Plan would be developed as part of the Flora and Fauna Management Plan and implemented by a suitably qualified bat specialist.				
		Improper management of water quality and hydrological processes that sustain and interact with the rivers, streams and wetlands	Major	Almost Certain	Very high	Implementation of the Surface water quality monitoring program and monitoring of all construction discharge locations. Water treatment plants would be designed to ensure that wastewater is treated to a level that is compliant with the ANZECC/ARMCANZ (2000), ANZG (2018) and draft ANZG (2020) default guidelines for 95 per cent species protection and 99 per cent species protection level for toxicants that bioaccumulate unless other discharge criteria are agreed with relevant authorities. Risks would be effectively managed through implementation of the project's CEMF and standard soil and water mitigation measures. The mobilisation of sediments would be contained within the construction footprint.	Minor	Unlikely	Low	
		Degradation and removal of native riparian vegetation along New South Wales water courses is not minimised	Major	Almost Certain	Very High	The concept design for the project avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek) and designing these structures to maintain or enhance fauna connectivity. Mitigation measures to minimise impact to riparian vegetation will be implemented through the contractor's Flora and Fauna	Moderate	Almost Certain	High	Blaxland Creek, Cosgroves Creek and associated native riparian vegetation would be modified and cleared.

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
						Management Plans prepared under the project's BMP and CEMF. Implementation of the project's BOS prior to clearing and rehabilitation along the corridor will occur as soon as possible following construction.				
		Bushfire management procedures are not implemented increasing the risk of bushfire caused by construction activities and equipment. Bushfire causing injury or death to native fauna and destruction of habitat.	Moderate	Unlikely	Medium	Construction planning and a bushfire management plan will be developed to manage and minimise bushfire risks during construction. The Plan would be prepared in consultation with the NSW Rural Fire Service.	Moderate	Very Unlikely	Low	
		Management measures do not consider flood events creating an increased risk of sedimentation and pollution of waterways including downstream impacts.	Major	Likely	High	<p>Construction sites are generally located outside of flood prone areas which would minimise potential flooding risks during construction. Construction activities would generally be carried out outside of the 1 in 20-year annual recurrence interval flood event, however there is the potential for inundation for larger events.</p> <p>Clearing works will be undertaken in a progressive manner so that areas of ground disturbance are reduced.</p> <p>Daily and continuous monitoring of weather forecasts and storm events, rainfall levels and water levels in key watercourses to identify potential flooding events and related flood emergency response.</p> <p>Risks would be managed through the soil and water mitigation measures implementation as part of the project's CEMF.</p>	Moderate	Unlikely	Medium	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
		Inappropriate waste management could lead to attraction of vermin (non-native rats and mice) which in turn could attract predators to the area and increase predation on local native fauna. Local native fauna may also experience increased competition for resources with these vermin.	Minor	Likely	Medium	A waste management plan would be prepared and implemented for the project in accordance with the project's CEMF. Appropriate waste receptacles will be provided onsite which will be collected on a regular basis with regular inspections to ensure vermin are not being attracted.	Minor	Unlikely	Low	
MNES - Commonwealth Land	Direct impacts	Clearing of native vegetation is not minimised during detailed design and construction	Moderate	Almost Certain	High	The concept design of the project has avoided biodiversity impacts where possible and detailed design will seek to reduce these impacts further. Clearing would be contained within the construction footprint and managed in accordance with the project's CEMF. Prior to vegetation clearance, Principal Contractors will complete pre-clearing inspections in accordance with the project's BMP and CEMF prior to the vegetation clearing hold point being released.	Minor	Unlikely	Low	The majority of the Commonwealth land [i.e. at the Defence Establishment Orchard Hills (DEOH site)] to be impacted by the approved action is dominated by exotic vegetation associated with historically cleared land. Fragmented patches of remnant vegetation are generally restricted to riparian areas. The approved action would remove approximately 7.3 hectares of native vegetation communities at the DEOH site.
		Clearing of Threatened Ecological Communities (TECs) beyond the approved limits	Severe	Almost Certain	Very High	The concept design of the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek) and designed these structures to maintain or enhance fauna connectivity. Mitigation measures to minimise impact to riparian vegetation will be implemented through the contractor's Flora and Fauna Management Plans prepared under the project's BMP and CEMF. Implementation of the project's BOS prior to clearing	Moderate	Very Unlikely	Low	4.79 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (PCT 724 and 849) as listed under the BC Act and incorporating 1.21 hectares of TEC under the EPBC Act 2.29 hectares Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland (PCT 1800) as listed under the BC Act and incorporating 1.85 hectares of TEC under the EPBC Act.

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
		Removal of threatened species and/or their habitat (including riparian and aquatic habitat, nesting sites, and man-made habitat) beyond the approved limits	Major	Very Unlikely	Medium	The concept design of the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek) and designing these structures to maintain or enhance fauna connectivity. Biodiversity mitigation measures to minimise impact to riparian vegetation will be implemented through the contractor's Flora and Fauna Management Plans prepared under the project's BMP and CEMF. Principal Contractors will complete pre-clearing inspections and must provide certain documentation at hold points, prior to vegetation clearance.	Moderate	Very Unlikely	Low	DEOH site does not contain any EPBC listed flora species. No threatened fish species listed under the EPBC Act were recorded or considered likely to occur within the DEOH site. The approved action would have a direct impact on a relatively small proportion (5.01 hectares) of the available foraging habitat area of the EPBC Act listed Grey-headed Flying-fox.
		Injury or death to native fauna from Project activities (e.g. vehicles strikes)	Moderate	Likely	Medium	Flora and Fauna Management Plans prepared under the project's CEMF will be developed. Mitigation measures as detailed in the BMP, CEMF and the EPBC Act Final Environmental Impact Assessment of off-airport proposed action will be implemented, including fencing, pre-clearing surveys, toolbox talks, and having a suitably qualified ecologist present on site during the clearing of habitat trees. Felled habitat trees will be left on the ground for 24 hours or inspected by the ecologist prior to further processing. Appropriate vehicle speeds will be applied on construction sites to minimise the risk of vehicle strikes.	Moderate	Unlikely	Medium	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
MNES - Commonwealth Land	Indirect impacts	Impacts extent beyond the construction footprint and reduce the viability of adjacent habitat due to edge effects. Edge effects may result in impacts such as changes to vegetation type and structure, increased growth of exotic plants or avoidance of habitat by native fauna.	Moderate	Unlikely	Medium	Buffers have been incorporated into the construction footprint and the area of vegetation covered by these buffers is included in the calculations of impacted vegetation. The construction footprint used to calculate impact is therefore larger than the direct impact of the project. Accordingly, edge effects are considered unlikely to extend beyond the project's construction footprint or would be avoided through implementation of the project mitigation measures. These include biodiversity, noise & vibration, landscape and visual impact mitigation measures.	Minor	Very Unlikely	Low	The approved action would not create new areas of fragmentation to the Cumberland Plain Woodland and only relatively small areas of additional fragmentation to the Coastal Swamp Oak Forest associated with the crossing of the unnamed riparian corridors already subject to disturbances and edge effects.
		Impacts extent beyond the construction footprint and reduce the viability of adjacent habitat due to noise, dust or light spill. These can result in: changes to behaviours such as foraging habits; increased risk of predation; and reduced reproductive success. These could have flow-on consequences at the population and ecosystem levels.	Moderate	Likely	Medium	The concept design of the project has avoided biodiversity impacts where possible and mitigation measures will be implemented to minimise the impacts created through construction.	Minor	Unlikely	Medium	
		Project design does not consider habitat connectivity and increases fragmentation	Moderate	Unlikely	Medium	The concept design of the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek) and designing these structures to maintain or enhance fauna connectivity. Operational mitigation measures OFF1 and OFF2 will be implemented to further minimise impacts where possible.	Minor	Very Unlikely	Low	The approved action would not create new areas of fragmentation to the Cumberland Plain Woodland and only relatively small areas of additional fragmentation to the Coastal Swamp Oak Forest associated with the crossing of the unnamed riparian corridors already subject to disturbances and edge effects. Additionally, existing Defence security fencing provides a barrier to fauna movement.

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
		Spread of weeds and plant pathogens are not appropriately managed.	Moderate	Very Likely	High	The management of weeds and pathogens will be in accordance with the Flora and Fauna Management Plans prepared under the project's BMP and CEMF. Weed management is to be undertaken in areas affected by construction prior to any clearing works. Off-airport weed management will be undertaken in accordance with the NSW <i>Noxious Weeds Act 1993</i> .	Minor	Unlikely	Low	
		Groundwater drawdown that is greater than the levels assessed in the EIA and has a greater impact to groundwater dependent ecosystems	N/A			Potential impacts resulting from groundwater drawdown at Orchard Hills do not occur within the Defence Establishment Orchard Hills site.				
		Impacts from soil disturbance, erosion, sedimentation, enriched run-off and water quality extent beyond the construction footprint causing additional impacts to that assessed in the EIA	Major	Likely	High	The concept design of the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek). Buffers have been incorporated into the construction footprint and the area of vegetation covered by these buffers is included in the calculations of impacted vegetation. The calculated impact is therefore larger than the direct impact of the project which will reduce impacts on adjacent habitats outside the construction footprint. Risks would be effectively managed through implementation of the project's CEMF, soil and water mitigation measures, and other mitigation measures including relevant inductions, pre-start meetings, fencing of construction footprint, and compliance records.	Minor	Unlikely	Low	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
		Risk of starvation, exposure and loss of shade or shelter is not offset or minimised during detailed design and construction	Minor	Unlikely	Low	The concept design of the project has avoided biodiversity impacts where possible and will seek to reduce these impacts further during detailed design. Impacts would be limited to the construction footprint and a relatively small area of vegetation would be impacted within the DEOH site. Implementation of the project's BOS will also minimise this risk.	Minor	Very Unlikely	Low	The project's credit liability is considered appropriate to offset this impact within the local landscape.
		Loss of breeding habitats such as hollow bearing trees and man-made structure (e.g. culverts and derelict buildings) causes flow-on consequences at the population and ecosystem levels.	Minor	Unlikely	Low	Implementation of the Principal contractors Flora and Fauna Management Plan which would include, avoiding removal of hollow bearing trees where possible, investigating opportunities for salvage and storage of felled native trees for potential use in landscape design, and a Nest Box Strategy to minimise habitat loss to hollow-dependent fauna. Other human-made structures such as culverts and other under-road structures within the construction footprint would be surveyed for threatened microbats. If threatened microbats are detected, a Microbat Management Plan would be developed as part of the Flora and Fauna Management Plan and implemented by a suitably qualified bat specialist.	Minor	Very Unlikely	Low	Approximately 25 hollow-bearing trees and dead trees were recorded within the DEOH site. The majority of hollows recorded were in the medium (6-15 centimetres), size class.
		Improper management of water quality and hydrological processes that sustain and interact with the rivers, streams and wetlands	Major	Almost Certain	Very High	Implementation of the Surface water quality monitoring program and monitoring of all construction discharge locations. Water treatment plants would be designed to ensure that wastewater is treated to a level that is compliant with the ANZECC/ARMCANZ (2000), ANZG (2018) and draft ANZG (2020) default guidelines for 95 per cent	Minor	Unlikely	Low	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
						species protection and 99 per cent species protection level for toxicants that bioaccumulate unless other discharge criteria are agreed with relevant authorities. Risks would be effectively managed through implementation of the project's CEMF and standard soil and water mitigation measures. The mobilisation of sediments would be contained within the construction footprint.				
		Degradation of native riparian vegetation along New South Wales or Crown water courses is not minimised	Moderate	Almost Certain	High	The concept design for the project avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian areas (e.g. Unnamed Creek) and designing these structures to maintain or enhance fauna connectivity. Mitigation measures to minimise impact to riparian vegetation will be implemented through the contractor's Flora and Fauna Management Plans prepared under the project's CEMF. Implementation of the project's BOS prior to clearing and rehabilitation along the corridor will occur as soon as possible following construction.	Minor	Very Likely	Medium	The unnamed riparian corridors within the DEOH site are already subject to disturbances and edge effects
		Bushfire management procedures are not implemented increasing the risk of bushfire caused by construction activities and equipment. Bushfire causing injury or death to native fauna and destruction of habitat.	Moderate	Unlikely	Medium	Construction planning and a bushfire management plan would minimise bushfire risks during construction. The Plan would be prepared in consultation with the NSW Rural Fire Service.	Moderate	Very Unlikely	Low	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
		Management measures do not consider flood events creating an increased risk of sedimentation and pollution of waterways including downstream impacts.	Major	Likely	High	Construction sites are generally located outside of flood prone areas which would minimise potential flooding risks during construction. Construction activities would generally be carried out outside of the 1 in 20-year annual recurrence interval flood event, however there is the potential for inundation for larger events. Clearing works would be undertaken in a progressive manner so that areas of ground disturbance are reduced. Daily and continuous monitoring of weather forecasts and storm events, rainfall levels and water levels in key watercourses to identify potential flooding events and related flood emergency response. Risks would be managed through the soil and water mitigation measures implementation as part of the project's CEMF.	Moderate	Unlikely	Medium	
		Inappropriate waste management could lead to attraction of vermin (non-native rats and mice) which in turn could attract predators to the area and increase predation on local native fauna. Local native fauna may also experience increased competition for resources with these vermin.	Minor	Likely	Medium	A waste management plan would be prepared and implemented for the project in accordance with the project's CEMF. Appropriate waste receptacles will be provided onsite which will be collected on a regular basis with regular inspections to ensure vermin are not being attracted.	Minor	Unlikely	Low	
MNES - Migratory species (Protected under international agreements)	Direct impacts	Impact on protected migratory species and/or their habitat (including riparian and aquatic habitat, nesting sites, and man-made habitat) is greater than that predicted in the EIA	Moderate	Unlikely	Medium	The concept design of the project has avoided biodiversity impacts where possible. Mitigation measures for managing impacts to biodiversity will be implemented through the Flora and Fauna Management Plans prepared under the project's BMP and CEMF.	Minor	Unlikely	Low	Potential migratory species within the approved action area include: <ul style="list-style-type: none"> • Latham's Snipe • White-bellied Sea-eagle • White-throated Needletail • Satin Fly-catcher. The BDAR states that the habitat use of each of these

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
						The project will seek to further reduce impacts to habitat during detailed design.				species is likely to be restricted to intermittent foraging habitat only.
	Indirect impacts	Migratory paths or local movement pathways are not considered in project design restricting fauna movement	Moderate	Likely	Medium	The concept design for the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian and high value areas and a tunnel underneath Badgerys Creek. The project has also included fauna crossings to maintain and enhance connectivity and fauna passage.	Minor	Unlikely	Low	
		Project causes serious, unidentified disruption to the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	Minor	Unlikely	Low	The concept design for the project has avoided biodiversity impacts where possible, by providing bridges/viaducts over riparian and high value areas and a tunnel underneath Badgerys Creek.	Minor	Unlikely	Low	Potential migratory species within the approved action area include: <ul style="list-style-type: none"> • Latham's Snipe • White-bellied Sea-eagle • White-throated Needletail • Satin Fly-catcher. The BDAR states that the habitat use of each of these species is likely to be restricted to intermittent foraging habitat only.
MNES - Wetlands of international importance (listed under the RAMSAR Convention)	Direct Impacts	N/A - due to distance to nearest site.	N/A	N/A	N/A	N/A - due to distance to nearest site. No wetlands of international importance have been identified within 10km of the project alignment. The nearest is Towra Point Nature Reserve which is located approximately 39km south-east of the Aerotropolis Core Station.	N/A	N/A	N/A	
	Indirect impacts	Impacts from soil disturbance, erosion, sedimentation, enriched run-off and water quality extent beyond the construction footprint and impact the water sources up-stream of a wetland of international importance.	N/A	N/A	N/A	N/A - SMWSA is within the Hawkesbury River catchment. Towra Point Nature Reserve is within the Botany Bay catchment and Georges River sub-catchment.	N/A	N/A	N/A	

Risk category	Impacts	Potential Risk (Impacts from BDAR)	Initial risk rating (unmitigated)			Risk management strategies	Residual risk rating			Notes
			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
All other MNES	Direct and indirect impacts	All other MNES are not applicable to this project and are not considered further	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Other risks to implementation of Biodiversity Management Plan objectives	Risks to implementation of Biodiversity Management Plan objectives	Unexpected Finds - Additional protected matters identified and additional offsets required.	Major	Unlikely	Medium	The project will seek to minimise impacts to biodiversity through construction planning and detailed design thus reducing impacts to protected matters and offset requirements. The project's construction footprint has been surveyed by a suitably qualified ecologist. Unexpected finds will be managed in accordance with the project's CEMF and contractor fauna and flora management plan.	Moderate	Very Unlikely	Low	
		Difficulty procuring offsets in a timely manner due to lack of supply.	Major	Likely	High	Application of the BOS and Off-airport Biodiversity Staging Plan.	Moderate	Very Unlikely	Low	
		Improper management of Biodiversity offsets purchased.	Major	Unlikely	Medium	Principal Contractors will complete pre-clearing inspections and must provide certain documentation at hold points, prior to vegetation clearance. Implement the BOS prior to any clearing works occurring in that area. Once credits are purchased the ongoing management is the responsibility of the landowner and compliance is managed by the Biodiversity Conservation Trust (BCT).	Moderate	Very Unlikely	Low	

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			Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating	
		Efficacy and implementation of management measures	Major	Unlikely	Medium	<p>Comprehensive mitigation measures have been developed to manage potential impacts of the project (including the approved action) on the environment and achieve the identified performance outcomes. The implementation of these mitigation and management measures has been shown to be proven and effective on previous construction projects.</p> <p>Construction sites management activities would ensure that environmental controls are in place such as inductions, daily site inspections and toolbox talks/pre-start meetings.</p>	Moderate	Very Unlikely	Low	