

Sydney Metro - Western Sydney Airport

EPBC Biodiversity Offset Strategy for off-airport lands

October 2024

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Client:

Sydney Metro

ABN: 12354063515

October 2024

Quality Information

Document title EPBC Biodiversity Offset Strategy for off-airport lands

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Accepted on behalf of
Sydney Metro by

Revision History

Rev	Prepared by	Reviewed by	Issued for	Date of issue
0.0	Julia Emerson	Alex Cockerill Andrew Cook	Sydney Metro review	August, 2021
0.1	Julia Emerson	Alex Cockerill Andrew Cook	Sydney Metro review	November, 2021
0.2	Julia Emerson Alex Cockerill	Alice Pryke Cathy Lestrangle	Sydney Metro review	November, 2021
0.3	Julia Emerson Alex Cockerill	Alice Pryke Cathy Lestrangle	Sydney Metro review	December, 2021
0.4	Julia Emerson Alex Cockerill	Alice Pryke Cathy Lestrangle	Sydney Metro review	December, 2021
0.5	Julia Emerson Alex Cockerill	Alice Pryke Cathy Lestrangle	Sydney Metro review	December, 2021
0.6	Julia Emerson Alex Cockerill	Alice Pryke Cathy Lestrangle	Final	February, 2022
0.7	Imogen Krause	Alice Pryke	Final – updates to project boundary	May, 2022
0.8	Cathy Lestrangle	Hugh Chapman	Final – updates of package scope	October 2024

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Glossary and terms of abbreviation

Term	Definition
AEW	Advanced and Enabling Work
BAAS	Biodiversity Assessor Accreditation System
BAM	Biodiversity Assessment Method 2017
BAM-C	Biodiversity Assessment Method Calculator
BC Act	NSW Biodiversity Conservation Act 2016
BCF	Biodiversity Conservation Fund
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
Biodiversity credits	Ecosystem credits or species credits
BOS	Biodiversity Offset Strategy
BSA	Biodiversity Stewardship Agreement
CEMF	Construction Environmental Management Framework
CoA	Conditions of Approval
DAWE (Former)	Former Commonwealth Department of Agriculture, Water and the Environment
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPI	NSW Department of Primary Industries
DPIE (Former)	Former NSW Department of Planning, Industry and Environment
DPHI	NSW Department of Planning, Housing and Infrastructure
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
Ecosystem credit species	A measurement of the value of threatened species habitat for species that can be reliably predicted to occur with a PCT (OEH, 2017).
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FAW	Finishing Auxillary Works
IBRA	Interim Biogeographically Regionalisation of Australia
LGA	Local Government Area
MNES	Matters of National Environmental Significance
Off-Airport Biodiversity Management Plan	This Biodiversity Management Plan deals specifically with the management of Commonwealth biodiversity protected matters in the off-airport component of the construction footprint
PCT	Plant Community Type
SBT	Station Box and Tunnelling
SCAW	Surface and Civil Alignment Works
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.

Term	Definition
Species credit species	Threatened species that are assessed in accordance with section 6.4. of the BAM
SSI	State Significant Infrastructure
SSTOM	Stations, Systems, Trains, Operations and Maintenance
TEC	Threatened ecological community

Certification Page

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Management Plan^[1] Sydney Metro - Western Sydney Airport EPBC Biodiversity Offset Strategy is complete, current and correct.
2. I am duly authorised to sign this declaration on behalf of the approval holder.
3. I am aware that:
 - a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.
 - b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.
 - c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed



Alex Cockerill

WSP

3/2/2022

^[1] Sydney Metro - Western Sydney Airport EPBC Biodiversity Offset Strategy for off-airport lands, Version 0.6, February 2022

1. Introduction

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. 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.

1.1 Scope and objectives of the Biodiversity Offset Strategy

This Biodiversity Offset Strategy (BOS) has been prepared to address 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 Revised Biodiversity Development Assessment Report (Revised BDAR) (Sydney Metro 2021a). and the Threatened Flora pre-clearance surveys (Sydney Metro, 2021b) have been listed in the BOS with Commonwealth listed entities highlighted throughout.

The purpose of the BOS is to provide:

- a method for offsetting project impacts (including EPBC Act listed biodiversity) which cannot be avoided, minimised or mitigated
- a strategy consistent with the principles of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Environmental Offsets Policy to meet the project's off-airport biodiversity credit obligations identified in the Revised BDAR and Threatened Flora pre-clearance surveys
- address the requirements of the Conditions of Approval for EPBC 2020/8687, specifically Conditions 18, 19, 20 and 21.

The project's offset requirements will be delivered through purchase and retirement of available credits and payment into the Biodiversity Conservation Fund (BCF) under the NSW Biodiversity Offset Scheme. It should be noted that the Commonwealth Government's Assessment Bilateral Agreement endorses the NSW Biodiversity Offsets Scheme and NSW Biodiversity Assessment Method (BAM) (OEH, 2017) for Matters of National Environmental Significance (MNES).

The final design of the project may result in reduced or increased impacts to biodiversity and as such these changes would need to be quantified. The number and class of biodiversity credits required to offset the impacts of the project on biodiversity values may vary from that reported here. As such, Section 8 of this BOS outlines a process for review and revision of this BOS when required.

1.2 Background

1.2.1 Revised BDAR

The Revised BDAR (Sydney Metro, 2021a) for the project was finalised in March 2021. The Revised BDAR was prepared in accordance with s7.9 of the NSW *Biodiversity Conservation Act 2016* (BC Act) and includes information detailed in s6.12 of the Act, cl6.8 of the *Biodiversity Conservation Regulation 2017* and the NSW Biodiversity Assessment Method (BAM).

The Revised BDAR assesses potential biodiversity impacts of the project, sets out measures to avoid and minimise impacts to biodiversity and quantifies unavoidable impacts through the number and class of biodiversity credits which are required to be offset through the NSW Biodiversity Offset Scheme.

The Revised BDAR is an appendix that forms part of the project's EPBC Act Final Environmental Impact Assessment of off-airport proposed action (EPBC 2019/8541) (Sydney Metro, 2021a) and has been prepared by an accredited assessor in accordance with section 6.12 of the BC Act and the BAM.

The unavoidable residual impacts assessed within the Revised BDAR for the off-airport components of the project on relevant to MNES listed under EPBC Act included:

- 4.94 ha of Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community
- 5.87 ha of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.
- A total of nine threatened flora species listed under the EPBC Act were considered to have a moderate or higher likelihood of occurrence within the off-airport study area. Due to limited access to private residential properties for project field surveys, a conservative assessment was applied, and nine threatened flora species were assumed present based on presence of associated habitat.
- One threatened fauna species, Grey-headed Flying-fox as listed under the EPBC Act (were recorded or assumed present) within the off-airport study area. The Grey-headed Flying-fox is an ecosystem credit species that doesn't require specific species credits for offsetting purposes in accordance with the BAM.

No threatened fauna listed under the EPBC Act were identified in the Revised BDAR as requiring offsetting in accordance with BAM.

No threatened fish species listed under the NSW Fisheries Management Act or EPBC Act were recorded or considered likely to occur within the off-airport study area and as such impacts to any threatened aquatic species or their habitats are considered unlikely.

Biodiversity offset requirements for the on-airport component of the Sydney Metro – Western Sydney Airport project are not covered by this strategy.

1.2.2 Pre-clearance surveys for threatened flora

Threatened flora pre-clearance surveys in areas not able to be accessed as part of the field surveys which informed the Revised BDAR were carried out in November 2021 to address Condition 3, 4 and 5 of the NSW EPBC Conditions of Approval (2020/8687) (Sydney Metro, 2021b).

These surveys targeted the nine threatened flora species listed in condition 3 assumed to be present in the Revised BDAR (refer to Table 1-1).

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

Scientific name	Common name	BC Act ¹	EPBC Act ¹
<i>Acacia bynoeana</i>	Bynoe's Wattle	E	V
<i>Acacia pubescens</i>	Downy Wattle	V	V
<i>Allocasuarina glareicola</i>	-	E	E
<i>Cynanchum elegans</i>	White-flowered Wax Plant	E	E
<i>Grevillea parviflora</i> subsp. <i>Parviflora</i>	Small-flower Grevillea	V	V
<i>Micromyrtus minutiflora</i>	-	E	V
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	V	V
<i>Pimelea spicata</i>	Spiked Rice-flower	E	E
<i>Pultenaea parviflora</i>	-	E	V

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

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

Pre-clearance field survey in the November 2021 study area recorded 14 individuals of one threatened flora species that is listed on the EPBC Act, being *Pultenaea parviflora*. No other species listed in Condition 3 were recorded or considered to be present.

This BOS has incorporated results from the pre-clearance surveys to inform revised credit calculations and offset obligations. These additional targeted surveys have confirmed a reduction in the projects impacts to threatened species previously assumed to be present.

2. Legislative, planning and policy context

2.1 Sydney Metro – Western Sydney Airport planning approvals

The three principal statutory schemes that govern the planning and assessment process for the project are:

- the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) - applies to works located on State land outside the boundary of Western Sydney International (off-airport)
- the Airports Act - applies to works located within the boundary of Western Sydney International (on-airport)
- EPBC Act:
 - for works located north of Western Sydney International (off-airport), assessment and approval is required under Part 8 and 9 of the EPBC Act to address impacts on listed threatened species and communities and Commonwealth land
 - for the lands located south of Western Sydney International (off-airport), impacts on MNES and Commonwealth land have already been assessed and approved under a strategic assessment in accordance with Part 10 of the EPBC Act.

Figure 2.1 shows the statutory approval regime applicable to different areas of the project. This strategy addresses requirements of the off-airport components under the Part 8 and 9 of the EPBC Act.

2.2 NSW State legislation and policy

2.2.1 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act), together with the Biodiversity Conservation Regulation 2017 (BC Regulation), outlines the framework for assessment and approval of biodiversity impacts associated with developments that require consent under the EP&A Act. It introduces a Biodiversity Offsets Scheme, a framework to avoid, minimise and offset impacts on biodiversity from development and clearing.

The BDAR uses the Biodiversity Assessment Method (BAM) established under these biodiversity reforms to provide a methodology for determining the number and type of biodiversity credits required to offset biodiversity impacts.

Section 6.2 of the BC Act details the Biodiversity Offsets Scheme which is endorsed by the Commonwealth Government's Assessment Bilateral Agreement and impacts to Commonwealth-listed biodiversity can be offset using this framework.

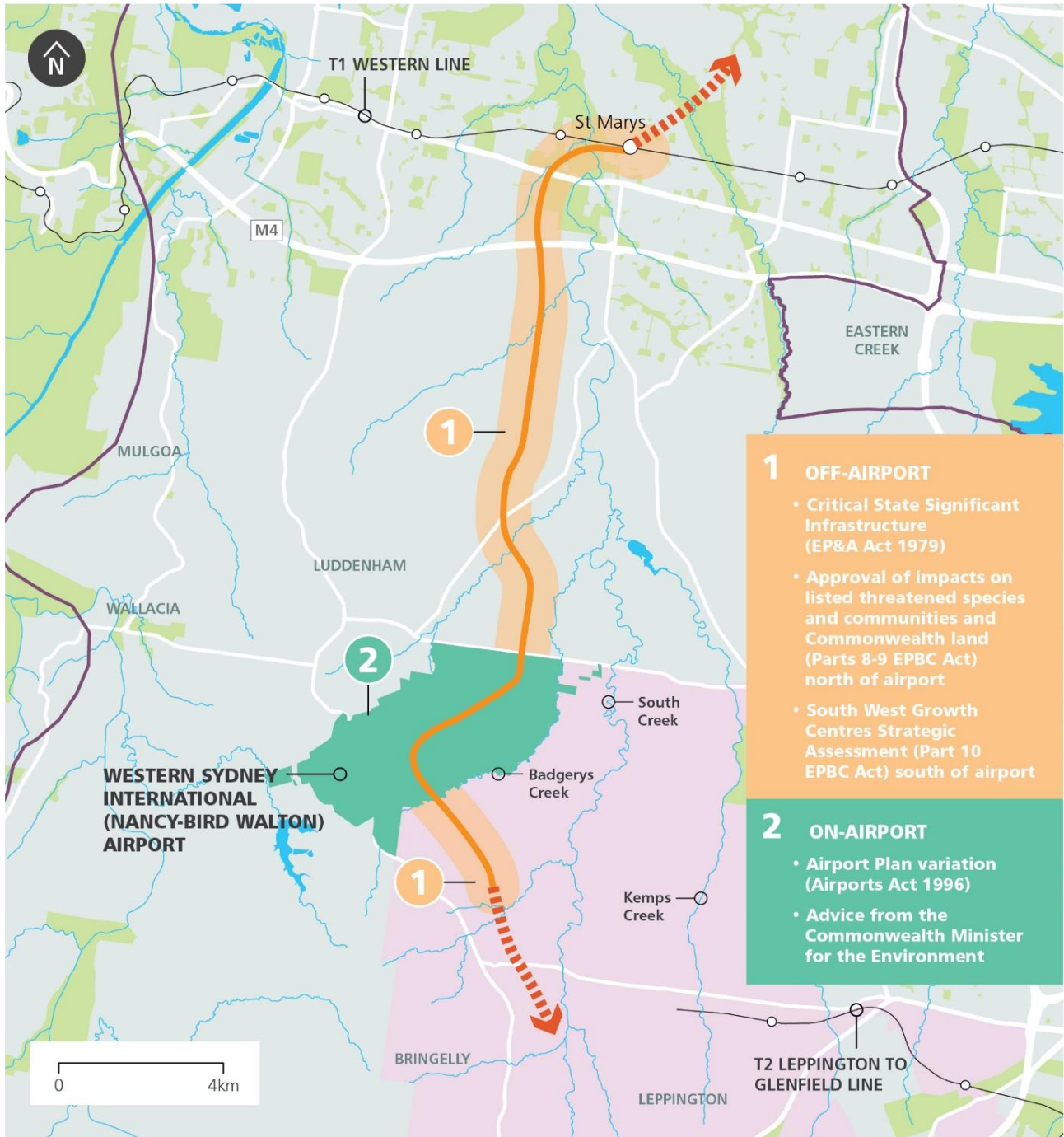


Figure 2.1 Sydney Metro Western Sydney Airport planning approval strategy

2.3 Biodiversity Offset Framework

The New South Wales Biodiversity Offsets Scheme creates a transparent, consistent and scientifically based approach to biodiversity assessment and offsetting for development that is likely to have a significant impact on biodiversity.

The EPBC Conditions of Approval 2020/8687 requires the BOS to be consistent with the Revised BDAR and the principles of the EPBC Act Environmental Offsets Policy.

The BAM and accompanying Biodiversity Assessment Method Operational Manual – Stage 2 outline the required approach to assessment and calculation of the biodiversity credit requirements. The BAM provides a prescribed method to robustly quantify biodiversity values.

Once Stage 2 of the BAM is complete the proponent must consider how to meet any offset obligations. The biodiversity credit class assigned to ecosystem credits determines the type of credits that can be used to offset the impacts of developments via application of the offset rules.

The offset rules are established through the BC Regulation and include:

- retiring credits based on the like-for-like rules
- funding a biodiversity conservation action that benefits the threatened entity impacted by the development. The action must be listed in the Ancillary rules: Biodiversity conservation actions and meet the other requirements set out by the rules
- making a payment into the BCF, managed by the BCT. The responsibility for delivering credit requirements is then transferred to the BCT. The like-for-like rules seek to ensure biodiversity values lost from development are offset with the same or very similar biodiversity. The ecosystem credit rules require that:
 - impacts on native vegetation must be offset with vegetation that is in the same area as the impact (based on near or adjacent IBRA subregion) and:
 - if a TEC was impacted, the offset must be for the same TEC
 - if native vegetation that is not a TEC was impacted, the offset must be vegetation that is the same vegetation class and in the same or higher offset trading group (defined in Table 5 of the BAM).

In addition, if the impacted vegetation contained hollow bearing trees, this will appear on the credit profile and can only be matched with credits generated at a biodiversity stewardship site that also contains hollow bearing trees.

Species credits must be offset with the same threatened species that was impacted and may be sourced from a biodiversity stewardship site located anywhere in New South Wales.

The BC Regulation also contains variation rules that provide some flexibility by allowing offsetting within a broader suite of biodiversity that is the same, or more threatened, than that impacted. The use of variations rules must be approved by the consent authority through conditions of consent.

The Biodiversity Offsets Scheme is endorsed by the Commonwealth Government's Assessment Bilateral Agreement and impacts to Commonwealth-listed biodiversity can be offset using this framework.

2.3.1 Certification of the BDAR and preparation of the BOS by a suitably qualified expert

The Revised BDAR was prepared in accordance with the BAM 2017 by Alex Cockerill, a BAM accredited assessor (BAAS17020). All work was carried out under the appropriate licences, including a scientific licence as required under Part 2 of the BC Act (Licence Number: SL100630) and an Animal Research Authority issued by the NSW Department of Primary Industries and Regional Development.

Condition 19 of the EPBC Conditions of Approval states that the BOS must be prepared by a suitably qualified ecologist. This condition has been met by Alex Cockerill who has more than 20 years' experience in botanical and terrestrial ecological research, ecological impact assessment and conservation landscape management. He is responsible for managing large scale environmental impact assessment projects, including the coordination of field staff, preparation of reports, agency negotiations and ongoing facilitation of projects towards positive outcomes.

Alex is an Accredited BAM Assessor and recognised expert in the application of the BAM in NSW, regularly providing support to the NSW Government as a third-party reviewer. He has acted as an independent ecological expert participating in compliance audits on behalf of State and Commonwealth governments and as an Expert Witness on flora and vegetation matters in the NSW Supreme Court, NSW Land and Environment Court and the Victorian Civil and Administrative Tribunal.

2.4 Compliance matrices

2.4.1 Conditions of Approval for EPBC 2020/8687

The EPBC CoA issued in June 2021 which are relevant to this Biodiversity Offset Strategy include Condition 18, 19, 20 and 21. Each condition has been listed and addressed in Table 2-1

Table 2-1 EPBC CoA relevant to the Biodiversity Offset Strategy

Condition	Details	Section addressed
18	The approval holder must submit a Biodiversity Offset Strategy for the Minister's approval, prior to clearing of protected matters identified in condition 2.	This BOS has been prepared to address this requirement
19 (a)	The Biodiversity Offset Strategy must: Be prepared by a suitably qualified ecologist;	Section 2.3.1
19 (b)	Be prepared in accordance with the NSW Biodiversity Assessment Method;	This BOS has been prepared in accordance with the BAM 2017
19 (c)	Be based on and consistent with the Biodiversity Development Assessment Report at Appendix A of the EIA;	The offset obligations outlined in this BOS are consistent proportional impact on EPBC Act listed ecosystems within the Revised BDAR and Threatened flora pre-clearance surveys (Sydney Metro, 2021b)
19 (d)	Be consistent with the principles of the <i>Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy</i> (October 2012); and	Appendix A
19 (e)	Provide for the number of individuals identified in accordance with condition 3; and	Section 1.2.2
19 (f)	Set out: <ul style="list-style-type: none"> i. The process used for quantifying the impacts to protected matters based on the final design of the action, with quantification of the final number and class of biodiversity credits required to offset the residual impacts of action on protected matters; ii. Details of how the credit requirement to offset the impacts from each stage of construction (defined in the Staging Plan) will be determined and reported; and iii. How offset requirements will be satisfied, including the timeframes by which offsets must be secured in relation to each stage of construction as defined within the Staging Plan. 	<ul style="list-style-type: none"> i. Section 6.1 ii. Section 5.2 for staged credit liabilities and Section 7 for reporting iii. Section 6 for how offset will be satisfied and Section 5.2.1 for timing
20	The approval holder must not commence the action unless the Minister has approved the Biodiversity Offset Strategy in writing.	This BOS has been prepared to address this requirement
21	If the Minister approves the Biodiversity Offset Strategy then the Biodiversity Offset Strategy must be implemented.	

2.4.2 EPBC Act Environmental Offsets Policy 2012

The offset requirements detailed in the EPBC Act Environmental Offsets Policy 2012 and how they have been addressed in this BOS is summarised in Table 2-2. Appendix A provides more detail on how each of these overarching requirements are addressed.

Table 2-2 Compliance with EPBC Act Environmental Offsets Policy

Offset requirements	Detail	How this requirement has been addressed
1	Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter	Biodiversity offsets obligations are met based on like-for-like trading rules under the NSW Biodiversity Offsets Scheme
2	Suitable offsets must be built around direct offsets but may include other compensatory measures	The retirement of like-for-like credits and payment into the BCF provides direct offsets
3	Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	Credit obligations will be met based on like-for-like rules and are in proportion to the level of statutory protection that applies to the protected matter.
4	Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter	
5	Suitable offsets must effectively account for and manage the risks of the offset not succeeding	Retirement of credits and payment into the BCF under the NSW Biodiversity Offsets Scheme has a low risk of not succeeding
6	Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	Offsets have been determined using the NSW Biodiversity Offsets Scheme, established under the BC Act. This approach is effective, timely, transparent, scientifically robust and reasonable.
7	Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	
8	Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	Biodiversity offsets obligations are to be met through the NSW Biodiversity Offsets Scheme which will incorporate the retirement of credits from Biodiversity Stewardship Sites or through payment into the BCF for the BCT to source and retire the equivalent credit requirement. Under the NSW Biodiversity Offsets Scheme, credits are created following establishment of a Biodiversity Stewardship Agreement (BSA) which incorporates transparent governance arrangements and mandatory obligations for the management and monitoring of the offset, including compliance and legal enforcement by the BCT. This ensures permanent protection and management of the site.

2.4.3 Environmental performance outcomes and mitigation measures

Biodiversity related performance outcomes and mitigation measures are included in the Revised BDAR and will be implemented to mitigate and manage potential impacts of the project. This BOS is consistent with the project biodiversity performance outcome which commits to offsetting impacts on threatened ecological communities and threatened species in accordance with the requirements of the BAM.

Mitigation measures are included in the Revised BDAR and will be implemented to mitigate and manage potential impacts of the project. These measures are included in the Off-Airport Biodiversity Management Plan which and has been compiled with reference to Sydney Metro-Western Sydney Airport Construction Environmental Management Framework (CEMF) (Sydney Metro, 2021d).

The preparation of mitigation measures is not only a requirement of the BAM but also in line with the NSW Biodiversity Offset Scheme and EPBC Environmental Offset Policy objectives where impacts are avoided, minimised and mitigated prior to offsetting.

3. Project overview

3.1 Land to which this Biodiversity Offset Strategy applies

The land to which this BOS applies is the off-airport components of the project assessed within the Revised BDAR and located north of Western Sydney International as shown in Figure 3.1.

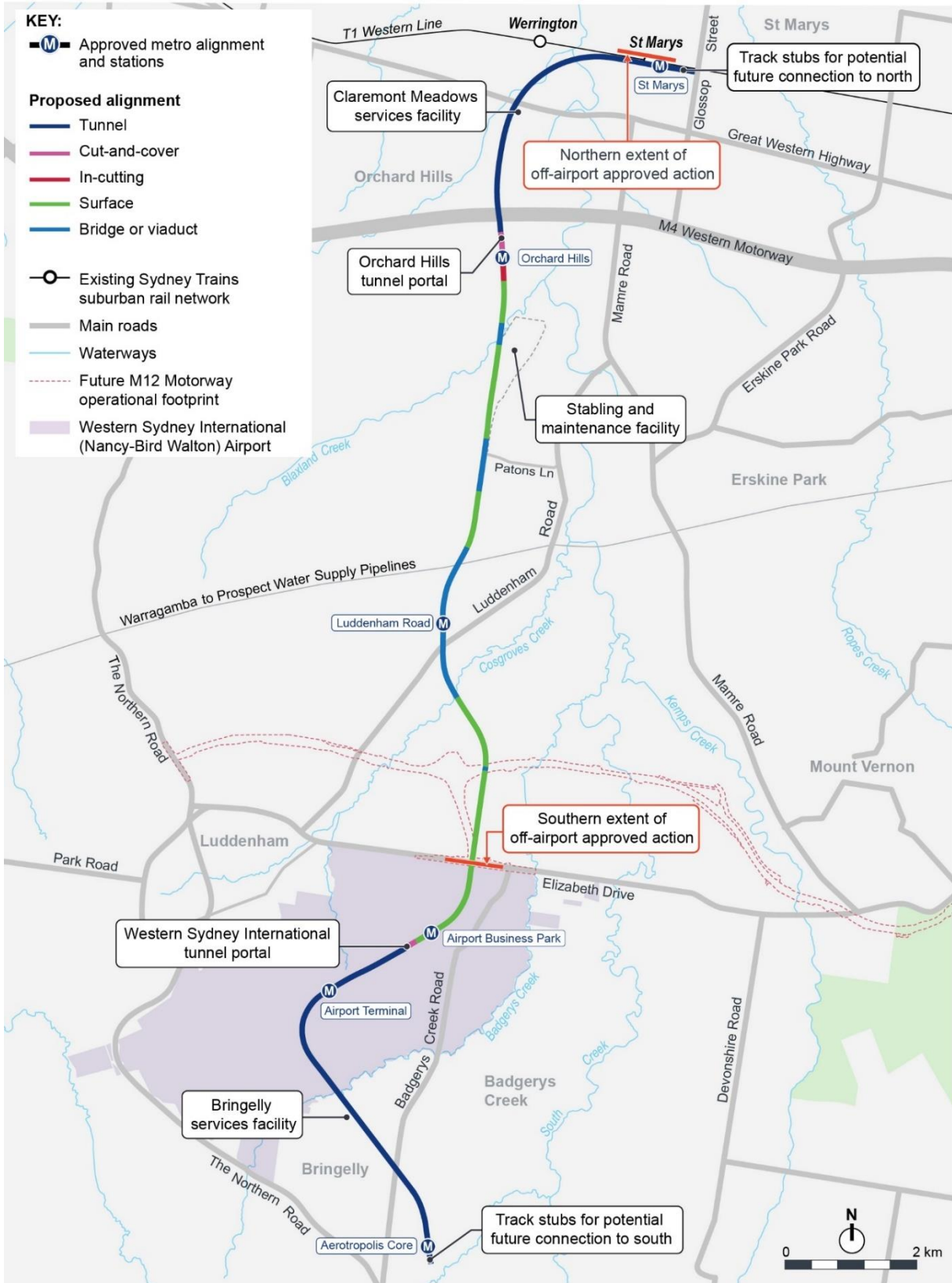


Figure 3.1 Overview of the Off-airport component of the project

3.2 Key project features

Sydney Metro – Western Sydney Airport (the project) will involve a new metro railway line around 23 kilometres in length between St Marys in the north and the Aerotropolis Core precinct in the south (the area to be called Bradfield). This will include a section of the alignment which passes through and provides access to Western Sydney International (Nancy-Bird Walton) Airport (Western Sydney International), (see Figure 3.1) currently under construction. 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).

3.2.1 Off-airport project components

The off-airport components of the project 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 services facilities and a tunnel portal.

For the area to the north of Western Sydney International the key project features 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 (the southern extent of the proposed action), consisting of a combination of viaduct and surface rail alignment
- three new metro stations:
 - St Marys (providing interchange with the existing Sydney Trains suburban rail network)
 - Orchard Hills
 - Luddenham Road
- modifications to the existing Sydney Trains station and rail infrastructure at St Marys (where required) to support interchange and customer transfer between the new metro station and the existing Sydney Trains suburban rail network
- 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 and Elizabeth Drive
 - crossings of Blaxland Creek, Cosgroves Creek and other small waterways to provide flood immunity for the project
- a stabling and maintenance facility and operational control centre located to the south of Blaxland Creek and east of the proposed metro track
- one services facility located at Claremont Meadows
- 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
- all operational systems and infrastructure such as crossovers, rail sidings, signalling, communications, overhead wiring, power supply, lighting, fencing, security and access tracks/paths.

The projects off-airport components south of Western Sydney International are subject to a separate approval process and not considered further within this BOS.

3.2.2 On-airport project components

The on-airport components of the project would include the track alignment and associated operational systems and infrastructure within Western Sydney International, two metro stations and a tunnel portal.

The on-airport components are subject to a separate approval process and not considered further within this BOS.

4. Project offset requirements

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).

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.

Therefore, for the purposes of this BOS, the offset credit requirement for impacted EPBC Act listed Threatened ecological communities has been determined, as a proportion of the total credit liability for corresponding PCTs being offset across the project, in accordance with BAM.

Similarly, the species offset credit requirements for the BC Act listed *Grevillea juniperina subsp. juniperina* included within the Revised BDAR was calculated for the total area of impact across the off-airport components of the project. The number of individuals of *Grevillea juniperina subsp. juniperina* included within EPBC Condition of Approval 2e were provided to Department of Climate Change, Energy, the Environment and Water (DCCEE) during the assessment of the project and represent the proportion of the total number of individuals recorded on Commonwealth land as assessed in the Revised BDAR. The associated credit liability in Table 4-2 below has been calculated using this proportion of the total number of individuals.

Impacts on MNES that require offsets are shown on Figure 5.1. The estimated maximum EPBC Act listed ecosystem credit and species credit requirements are outlined in Table 4-1 and Table 4-2 respectively. The total impacted area and corresponding credit requirement for relevant PCT assessed in the Revised BDAR under the BC Act is also provided as a reference to the estimated credits for MNES. Noting that the threatened flora credit requirements have been updated following Threatened flora pre-clearance surveys undertaken in November 2021.

It should be noted that Sydney Metro is seeking to reduce impacts through mitigation measures, construction planning and detailed design. This is discussed further in section 8.

The final quantification and delivery of offset liability will be determined based on a vegetation clearing report, final design and construction plan.

Table 4-1 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 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
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

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
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 (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland	5.38	4.94	181	166
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 4-2 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, 2021b)
- 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

4.2 Staging of biodiversity offsets

Sydney Metro's Off-Airport Biodiversity Staging Report documents the biodiversity offset requirements within each construction stage for the purposes of mapping and delineation.

The key component stages of the construction include:

- Advanced and Enabling Works (AEW)
- Station Box and Tunnelling (SBT)
- Surface and Civil Alignment Works (SCAW)
- Stations, Systems, Trains, Operations and Maintenance (SSTOM)
- Finishing Auxillary Works (FAW).

All construction stages will have a varying level of interaction with EPBC Act listed vegetation or impacts for which biodiversity offsets are required as quantified in the Revised BDAR and updated in accordance with the Threatened flora pre-clearance surveys.

The vast majority of vegetation clearing which will require biodiversity offsets will occur in the SBT and SCAW construction stages

Each construction stage is shown in Figure 4.1, with the SSTOM & FAW boundary being contained within the SBT and SCAW areas after the SBT and SCAW construction stages are complete.

4.2.1 Project off-airport construction stages overview

Each stage will have differing levels of biodiversity impact. This BOS outlines the specific impact from each stage and the subsequent credit requirement to ensure that the appropriate offsets are secured for each stage. The breakdown of impact for all biodiversity and offset requirement per stage is outlined in Section 5.2.

To meet condition 18 and 19 of the EPBC Conditions of Approval, the strategy proposed in this BOS must be submitted and approved by the Minister prior to any clearing of EPBC listed biodiversity.

Section 5.2 outlines the offsets required for each stage of the project.

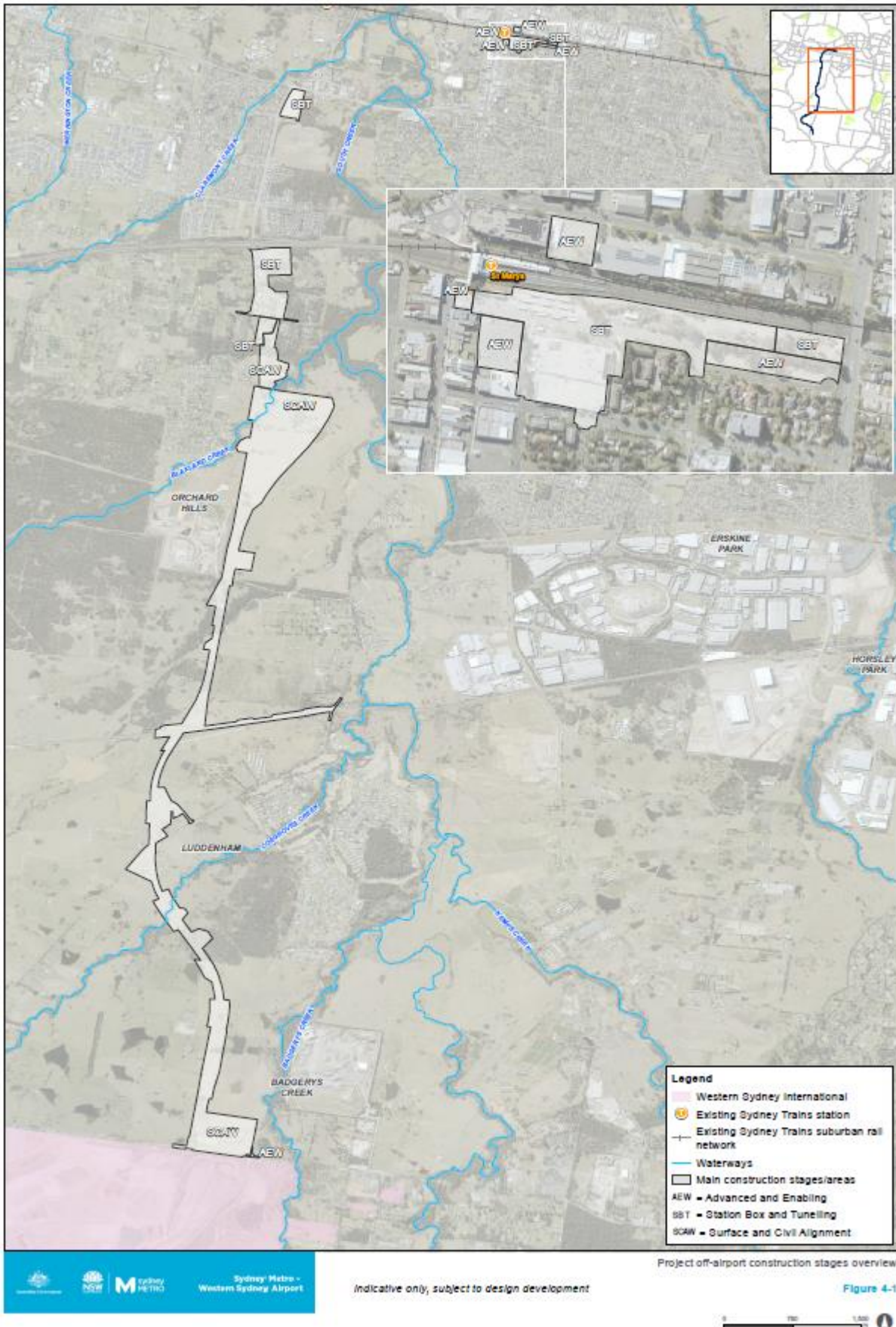


Figure 4.1 Project off-airport construction stages overview

*The SSTOM & FAW boundaries are contained within the SBT & SCAW areas but occur after the SBT and SCAW stages are complete

5. Biodiversity Offset Strategy

5.1 Project offset strategy

As outlined in the Revised BDAR, the biodiversity offset strategy for this project has been developed in accordance with the NSW Biodiversity Offset Scheme and comprises two options:

- the purchase and retirement of existing biodiversity credits currently available on the biodiversity credit register (refer to section 6.2).
- making a payment into the BCF (refer to section 6.3).

The purchase and retirement of existing biodiversity credits is required to be undertaken based on like-for-like trading rules as outlined under the Biodiversity Conservation Regulation 2017 and as identified by the BAM calculator output for the project.

The use of these two options will ensure that all credit obligations will be met.

5.2 Securing biodiversity offsets per construction stage

A summary of EPBC Act listed biodiversity credits required per construction stage have been provided for ecosystem credit in Table 5-1 and species credits in Table 5-2. To calculate the credit requirements per construction stage, the proportion of each impacted vegetation type has been applied to final credit requirements of corresponding PCT. To minimise impacts to EPBC Act listed vegetation or impacts for which biodiversity offsets are required, each construction stage will only clear vegetation to meet their design requirements. This may result in some minor clearing for the SSTOM and FAW stages, but these will be within the SBT and SCAW boundaries and have been accounted for within these package estimates.

5.2.1 Timeframes

Biodiversity offsets for EPBC-listed entities must be secured prior to the commencement of construction of each stage. Commencement dates as outlined in the EPBC off-airport Biodiversity Staging Plan (Sydney Metro, 2021c) and total biodiversity credit requirements for each stage is provided for ecosystem credit in Table 5-1 and species credits in Table 5-2. It is acknowledged that construction commencement dates are indicative only.

Table 5-1 Construction stages and biodiversity impacts – ecosystem credits

Construction stage	Construction commencement date*	EPBC TEC Coastal Swamp Oak credits	EPBC TEC Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest credits	Total ecosystem credit requirements **
SBT	Q1 2022	0	117	117
SCAW	Q3 2023	166	34	200
SSTOM & FAW	Q4 2024	Ecosystem credits accounted for within the SBT and SCAW impacts		
Total for EPBC-listed ecosystem credits		166	151	317

* Indicative future dates that are subject to change

** Proportion of credits has been rounded to one decimal place and total credit requirements have been rounded to the nearest whole number.

Table 5-2 Construction stages and biodiversity impacts – species credits

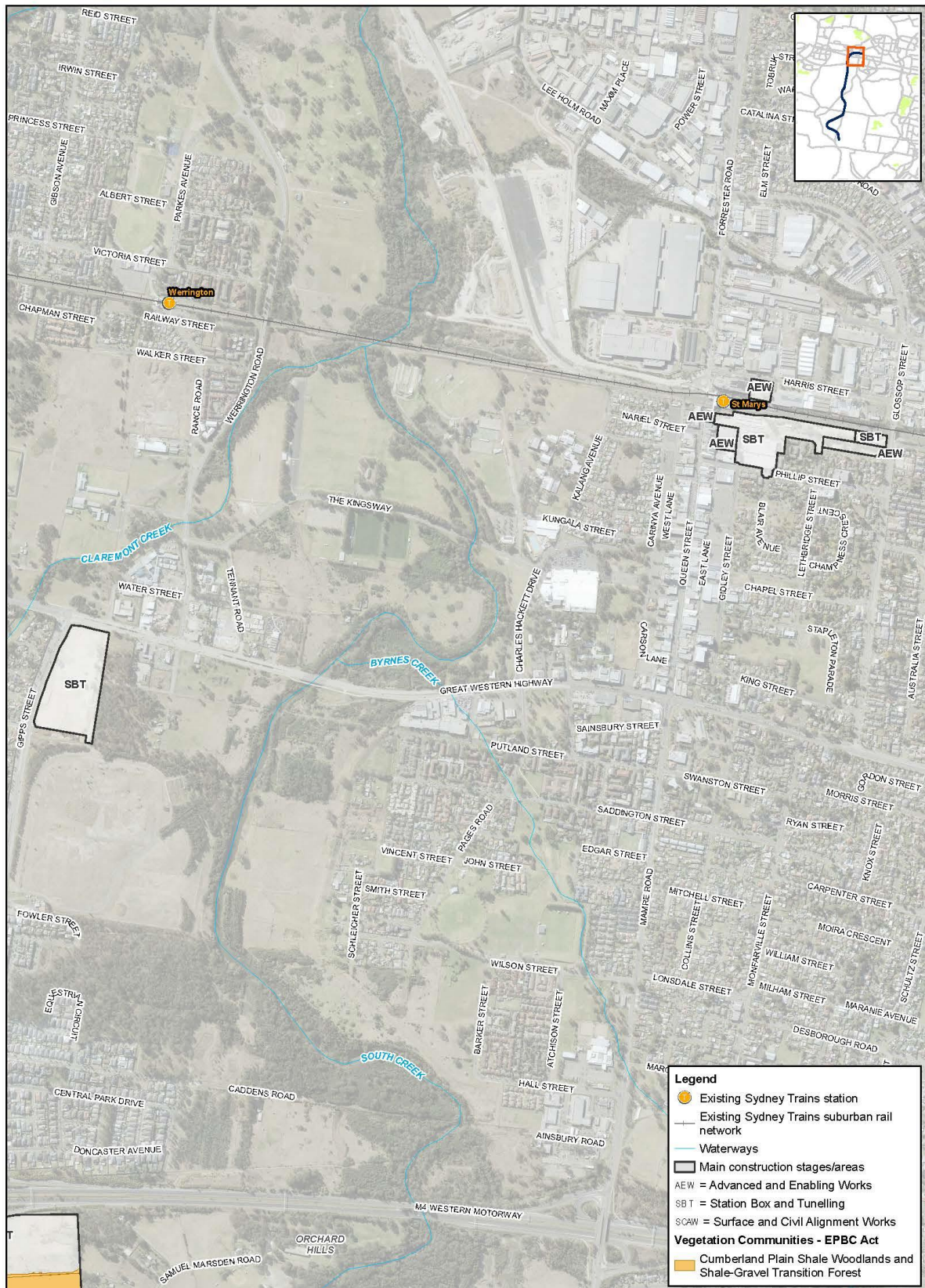
Construction stage	Construction commencement date*	Threatened flora species				Total
		<i>Pultenaea parviflora</i>		<i>Grevillea juniperina subsp. juniperina</i>		
		Species polygon per area (Ha) ¹	Credit requirements per area	Proportion of count on Commonwealth land ^{1,2}	Estimated credit requirements per area	
SBT	Q1 2022	0.34	10	-	-	10
SCAW	Q3 2023	-	-	335	15	15
SSTOM & FAW	Q4 2024	Ecosystem credits accounted for within the SBT and SCAW impacts				
Total for EPBC-listed species credit species		0.34	10		15	25

* Indicative future dates that are subject to change

1 Threatened flora credit requirements are based on updated survey results obtained from Sydney Metro (November, 2021b)

2 As recorded on the Defence Establishment Orchard Hills site (Lot 1 DP 629326 and Lot 2 DP 242968) in condition 2.e) and in Commonwealth Approval (EPBC 2020/8687)

Note: Proportion of credits has been rounded to the nearest per cent and total credit requirements have been rounded to the nearest whole number.



Project off-airport construction stages/areas and biodiversity values to be offset

Indicative only, subject to design development

Figure 5-1a
 (sheet 1 of 4)



Figure 5.1a Project off-airport construction stages/areas and biodiversity values to be offset

*The SSTOM & FAW boundaries are contained within the SBT & SCAW areas but occur after the SBT and SCAW stages are complete

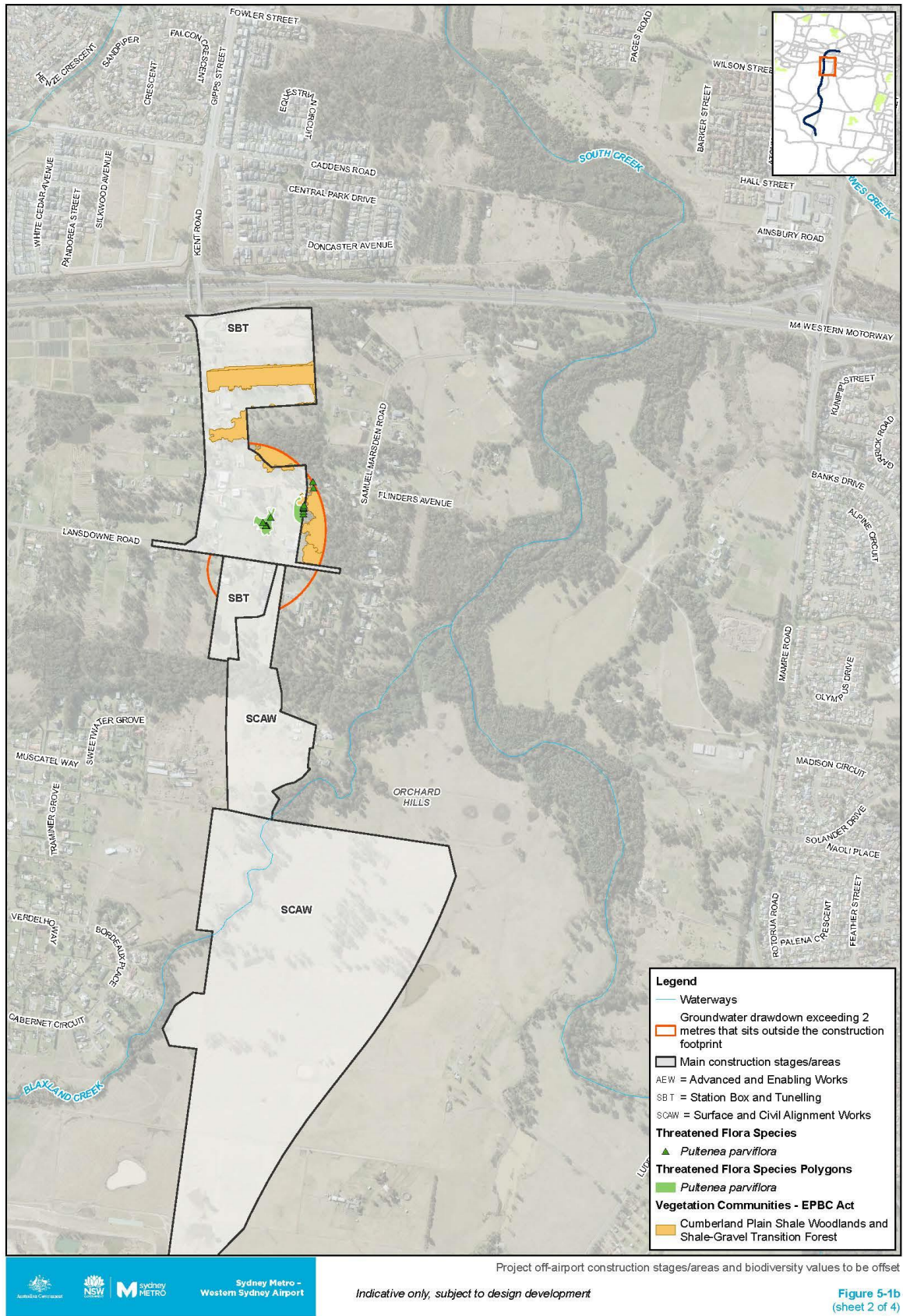


Figure 5.1b Project off-airport construction stages/areas and biodiversity values to be offset

*The SSTOM & FAW boundaries are contained within the SBT & SCAW areas but occur after the SBT and SCAW stages are complete

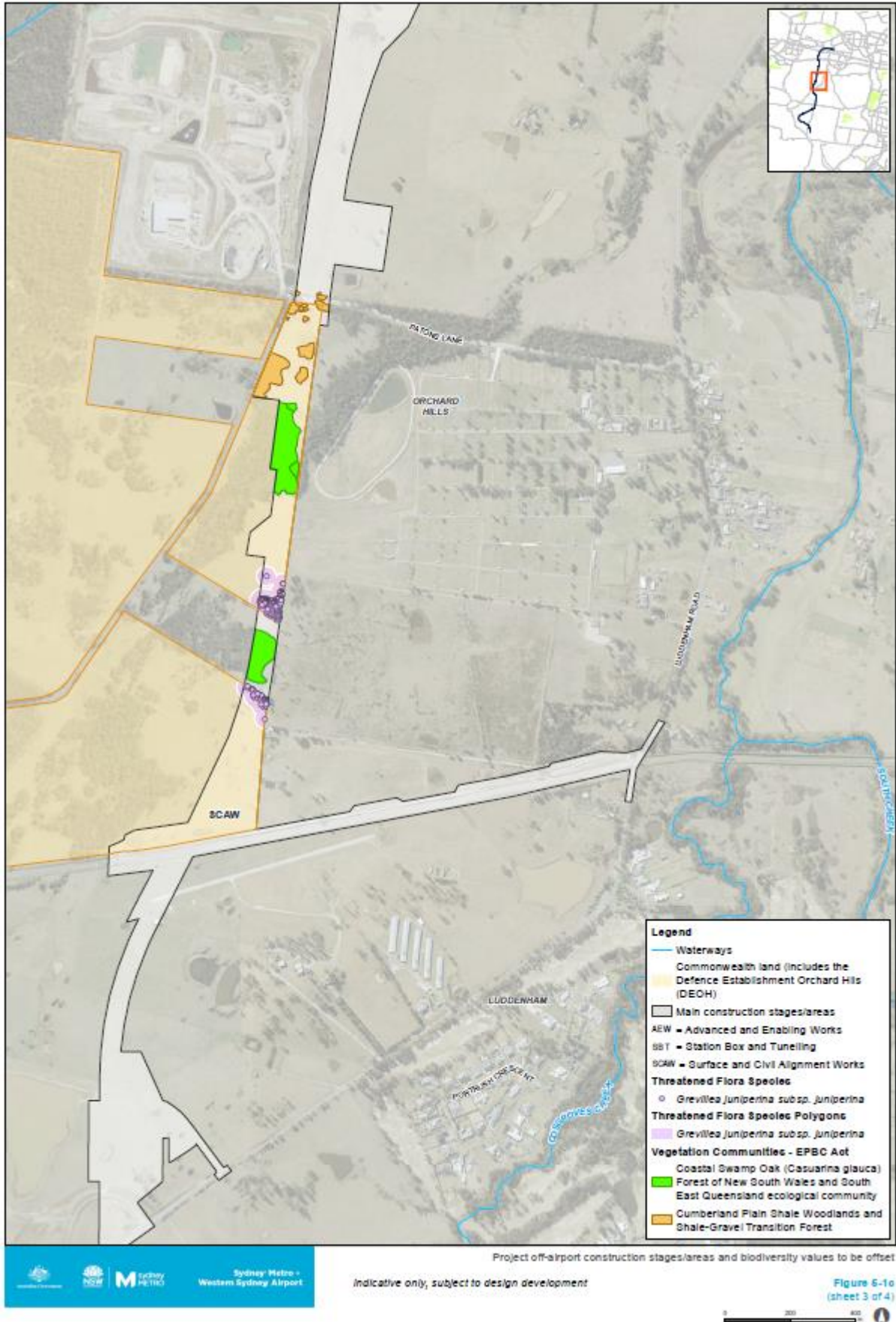
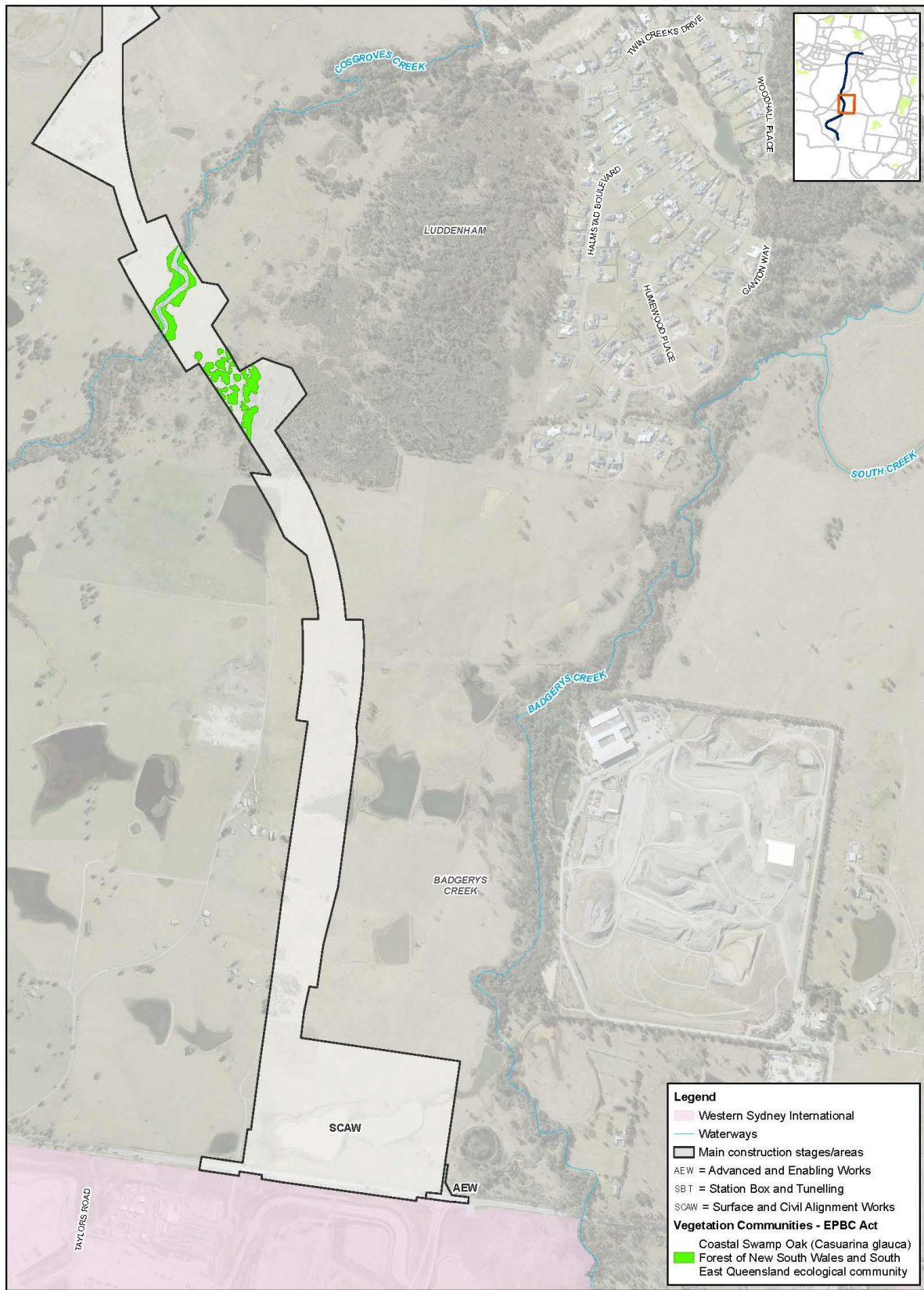


Figure 5.1c Project off-airport construction stages/areas and biodiversity values to be offset

*The SSTOM & FAW boundaries are contained within the SBT & SCAW areas but occur after the SBT and SCAW stages are complete



Project off-airport construction stages/areas and biodiversity values to be offset



Indicative only, subject to design development

Figure 5-1d
 (sheet 4 of 4)



Figure 5.1d Project off-airport construction stages/areas and biodiversity values to be offset*
 The SSTOM & FAW boundaries are contained within the SBT & SCAW areas but occur after the SBT and SCAW stages are complete

6. Implementation of the Biodiversity Offset Strategy

6.1 Quantifying impacts to biodiversity

The project's predicted impacts to biodiversity were quantified in the Revised BDAR, updated in accordance with the Threatened flora pre-clearance surveys (Sydney Metro, 2021b) and have been separated into stages in Section 5.2 of this BOS. Through the detailed design process, the predicted impacts to biodiversity may be revised further through detailed design and construction planning, including the implementation of mitigation measure FF1.

During construction pre-clearing inspections in accordance with the Sydney Metro – Western Sydney Airport CEMF (Sydney Metro, 2021d) will be undertaken to check on the physical demarcation of the limit of clearing and document the final area of vegetation to be cleared for each construction stage. Pre-clearing inspection records will be used to confirm credit offset requirements including, where required, revised BAM-C calculations undertaken in accordance with the BAM. The required number of credits for each construction stage will then be retired prior to commencing construction for that stage. A post clearance report will be produced that validates the type and area of vegetation cleared.

Verification surveys and reports will be required where additional areas of vegetation or threatened species habitat are proposed for clearing above that outlined in this BOS. Recalculation of the offset credit requirement will be required to ensure that any additional impacts are captured. The EPBC off-airport Biodiversity Staging Plan (Sydney Metro, 2021c) which has been prepared to address condition 12, 13 and 14 of the EPBC Conditions of Approval will also be updated to reflect any relevant changes.

6.2 Purchase and retirement of existing biodiversity credits

6.2.1 Credit purchase

The NSW Biodiversity Offsets Scheme provides for conservation of offset sites under a BSA. Sydney Metro can purchase biodiversity credits from a BSA site to meet their offset requirement.

To purchase credits Sydney Metro must:

- identify like-for-like credits in the market through the NSW Biodiversity Offset Scheme public registers or other means such as reverse tenders. The like-for-like ecosystem credit class options for each biodiversity offset credit obligation are summarised in Table 12.12 of the Revised BDAR
- negotiate a sale agreement with the vendor
- purchase the appropriate credits from the vendor and start the transfer process.

6.2.2 Credit transfer

Once sale of the biodiversity credits has been agreed the credits will need to transfer from the vendor to Sydney Metro.

To transfer biodiversity credits the following must occur:

- complete and submit the transfer form including any accompanying documentation to NSW Department of Planning, Housing, and Infrastructure (DPHI)
- pay the transfer fee. This may also include a payment towards the total fund deposit for the stewardship site which the vendor pays
- DPHI will process the application and the credit owner will be notified when the transfer has been approved
- the Biodiversity Offset Scheme public registers will be updated.

6.2.3 Credit retirement

Before development works start the credits must be retired to offset impacts on biodiversity values. To retire biodiversity credits the following must occur:

- complete and submit the retirement form including any accompanying documentation to DPHI
- pay the retirement fee
- DPHI will process the application and the credit owner will be notified when retirement of the credits has been completed
- within three months of retiring credits the approval holder must submit evidence of the retirement to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Retired credits are removed from the market and can no longer be traded. Once the necessary credits have been retired for a particular stage Sydney Metro can proceed with works for that stage in accordance with their approval.

6.3 Purchase of credits from the Biodiversity Conservation Fund

The NSW Biodiversity Offset Scheme provides an option of making a payment into the BCF which is managed by the BCT. The responsibility for delivering credit requirements is then transferred to the BCT.

Sydney Metro would make a payment into the BCF prior to the commencement of construction of the relevant construction stage where this option is implemented.

To retire credits through the BCF Sydney Metro must:

- use the offsets payment calculator to determine the cost of the credit obligation
- pay this amount into the BCF. The BCT is then responsible for identifying and securing the credit obligation.
- within three months of purchasing credits the approval holder must submit evidence of the purchase to the DCCEEW.

Payment into the fund is available as an option as soon as a development has been approved and there is a legal requirement to retire credits.

Once the offsets requirement for a particular stage have been paid for Sydney Metro can proceed with project works for that stage in accordance with their approval.

7. Reporting

7.1 Reporting of retirement or purchase

In accordance with CoA 17, within three months of retiring, or purchasing, credits the approval holder must submit evidence of the retirement, or purchase, to DCCEEW.

7.2 Reporting on the final offset obligations

The final quantification of and delivery of offset liability in accordance with BAM will be determined based on a vegetation clearing report supporting the final design and construction plan. During design development for the project the biodiversity impacts, offset obligations and credit calculations will be reviewed, and if necessary updated.

7.3 Completion Report

In accordance with CoA 40, within 20 business days after the completion of the action, the approval holder must notify DCCEEW in writing and provide completion data.

Completion data includes:

- an environmental report detailing how the conditions of the EPBC Approval (EPBC 2020/8687) have been met
- shapefiles of the study area shown in the EPBC Act Final Environmental Impact Assessment of off-airport proposed action and Revised BDAR with a comparison to the actual total cleared areas
- details of the total area and type of vegetation cleared within the study area
- final quantification of biodiversity offset requirements.

8. Review, revision and approval of the Biodiversity Offset Strategy

Through the detailed design process, it is likely that the impacts to biodiversity as outlined in Section 5.2 of this BOS will change. The BOS will be reviewed, and if necessary, revised, to account for reduced or additional impacts through the detailed design phase. Amendment of impact assessment and offset requirement will be necessary via verification surveys and reports.

The criteria for approval of the BOS as outlined in Condition 19 of EPBC 2020/8687 will be accounted for in any revision of the BOS.

9. References

Commonwealth of Australia (2012). *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy, available: <https://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy>

Department of Infrastructure and Regional Development (2016). Western Sydney Airport - Environmental Impact Statement, Biodiversity Assessment, Prepared by GHD

Department of Planning, Industry and Environment (2019). Biodiversity Assessment Method Operational Manual Stage 2, accessed 06/04/2021, Available: <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-operational-manual-stage-2-190512.pdf>

Department of Planning, Industry and Environment (2021). Biodiversity Offset Scheme Credit Supply Register, accessed 06/07/2021, available: <https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/offset-obligations-and-credit-trading/biodiversity-offsets-scheme-public-registers>

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

Office of Environment & Heritage (2017). Biodiversity Assessment Method: 1-126.

Sydney Metro (2021a). Sydney Metro – Western Sydney Airport EPBC Act Final Environmental Impact Assessment of off-airport proposed action (EPBC 2019/8541) Volume 2, Appendix A Revised Biodiversity Assessment Report, prepared by M2A, Available: <https://www.sydneymetro.info/sites/default/files/2021-11/EPBC-Act-Final-Off-Airport-EIA-Vol-2-App-A.pdf>

Sydney Metro (2021b). Sydney Metro - Western Sydney Airport – St Marys to Elizabeth Drive, NSW EPBC Approval (2020/8687) Conditions 3-5 flora pre-clearance surveys, unpublished memo prepared by M2A

Sydney Metro (2021c) Sydney Metro – Western Sydney Airport - EPBC off-airport Biodiversity Staging Plan Draft 1.1, Unpublished report prepared by M2A

Sydney Metro (2021d) Sydney Metro – Western Sydney Airport Construction Environmental Management Framework, Unpublished document prepared by Sydney Metro

Appendix A

Compliance with EPBC Act Environmental Offsets Policy 2012

Appendix A Compliance with EPBC Act Environmental Offsets Policy 2012

Any significant residual impacts on EPBC Act MNES within off-airport sections of the project would be offset in accordance with the EPBC Environmental Offsets Policy 2012 and offset assessment guide, or other endorsed offset framework (for example the NSW BAM). The BAM provides a prescribed method to robustly quantify and deliver offsets that provide appropriate environment gains targeted at the biodiversity values to be impacted. Sydney Metro is committed to delivering an offset strategy that meets the quantum of the offset requirement in accordance with BAM.

The EPBC Act Environmental Offset Policy 2012 sets out several overarching requirements to ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act (Commonwealth of Australia, 2012). Each of these specific requirements is addressed below.

1 Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter

The New South Wales Biodiversity Offsets Scheme creates a transparent, consistent and scientifically based approach to biodiversity assessment and offsetting for development that is likely to have a significant impact on biodiversity. The BC Act, together with the BC Regulation, outlines the framework for addressing impacts on biodiversity from development or activity and the resultant clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the NSW Biodiversity Offsets Scheme.

For the project, biodiversity offsets provided under the BAM and NSW Biodiversity Offsets Scheme should satisfy the biodiversity offset requirements at a Commonwealth level.

As outlined in the Revised BDAR, the BOS for this project is composed of the dual approach of:

- the purchase and retirement of existing biodiversity credits currently available on the biodiversity credit register
- through making a payment into the BCF.

This approach will ensure that the credit obligations will be met based on like-for-like rules.

1 Suitable offsets must be built around direct offsets but may include other compensatory measures

The retirement of like-for-like credits and payment into the BCF provides direct offsets. All credit obligations are able to be met through like-for-like trading of biodiversity credits.

2 Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter

As outlined in the Revised BDAR, the biodiversity offset strategy for this project is composed of the dual approach of:

- the purchase and retirement of existing biodiversity credits currently available on the biodiversity credit register
- through making a payment into the BCF.

This approach will ensure that the credit obligations will be met based on like-for-like rules and are in proportion to the level of statutory protection that applies to the protected matter.

3 Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter

The NSW Biodiversity Offsets Scheme has been employed to ensure offsets are proportional to the impacts of the project. The biodiversity values of project impacts and offsetting requirements have been measured by BAM and calculated using the BAM-C. Biodiversity credits identified through the Biodiversity Offset Credit

Supply Register have been generated from 'like for like' vegetation on existing Biodiversity Stewardship sites or sites which are pending review from the BCT.

4 Suitable offsets must effectively account for and manage the risks of the offset not succeeding

The EPBC offsets will be delivered through the retirement of credits and payment into the BCF under the NSW Biodiversity Offsets Scheme which provides in-perpetuity funding for management actions that are tied to a strong regulatory framework of monitoring and auditing. Therefore, the offsets proposed are deemed to be low risk of not succeeding.

5 Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs

Offsets have been determined using the NSW Biodiversity Offsets Scheme, established under the BC Act.

6 Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable

Through the retirement of biodiversity credits and payment into the BCF it is considered that this approach is effective, timely, transparent, scientifically robust and reasonable.

7 Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced

All NSW Biodiversity Stewardship Sites are bound in a BSA which are managed by the BCT. These agreements are established under part 5 of the BC Act and ensures permanent protection and management of the site. Annual monitoring and independent auditing of Biodiversity Stewardship Sites is enforceable under the BC Act.