

21 Biodiversity

21.1 Introduction

This chapter summarises the potential impacts on biodiversity from the construction and operation of the proposal. A Biodiversity Development Assessment Report (BDAR) has been prepared and is included as **Technical report Q**.

The methodology for the BDAR included:

- Creating the study area to be used for the BDAR which included a 1500m buffer surrounding the proposal site
- Gaining a clear understanding of the existing environment and biodiversity values through a desktop review of publicly available spatial datasets and documents and site assessments, to confirm habitat suitability for potentially occurring threatened species and ecological communities
- Conducting onsite surveys of native vegetation, threatened ecological communities, habitats for flora and fauna and targeted surveys of potential threatened/migratory fauna and threatened flora species
- Assessing the impacts of the proposal on existing biodiversity values
- Development of measures to avoid, mitigate or offset biodiversity impacts.

The BDAR was prepared following the NSW Biodiversity Assessment Method (BAM).¹

21.2 Existing environment

The existing environment was derived from onsite targeted surveys and publicly available spatial datasets. Biodiversity features discovered in the study area are summarised below and shown on **Figure 21.1**.

¹ OEHL, 2017.

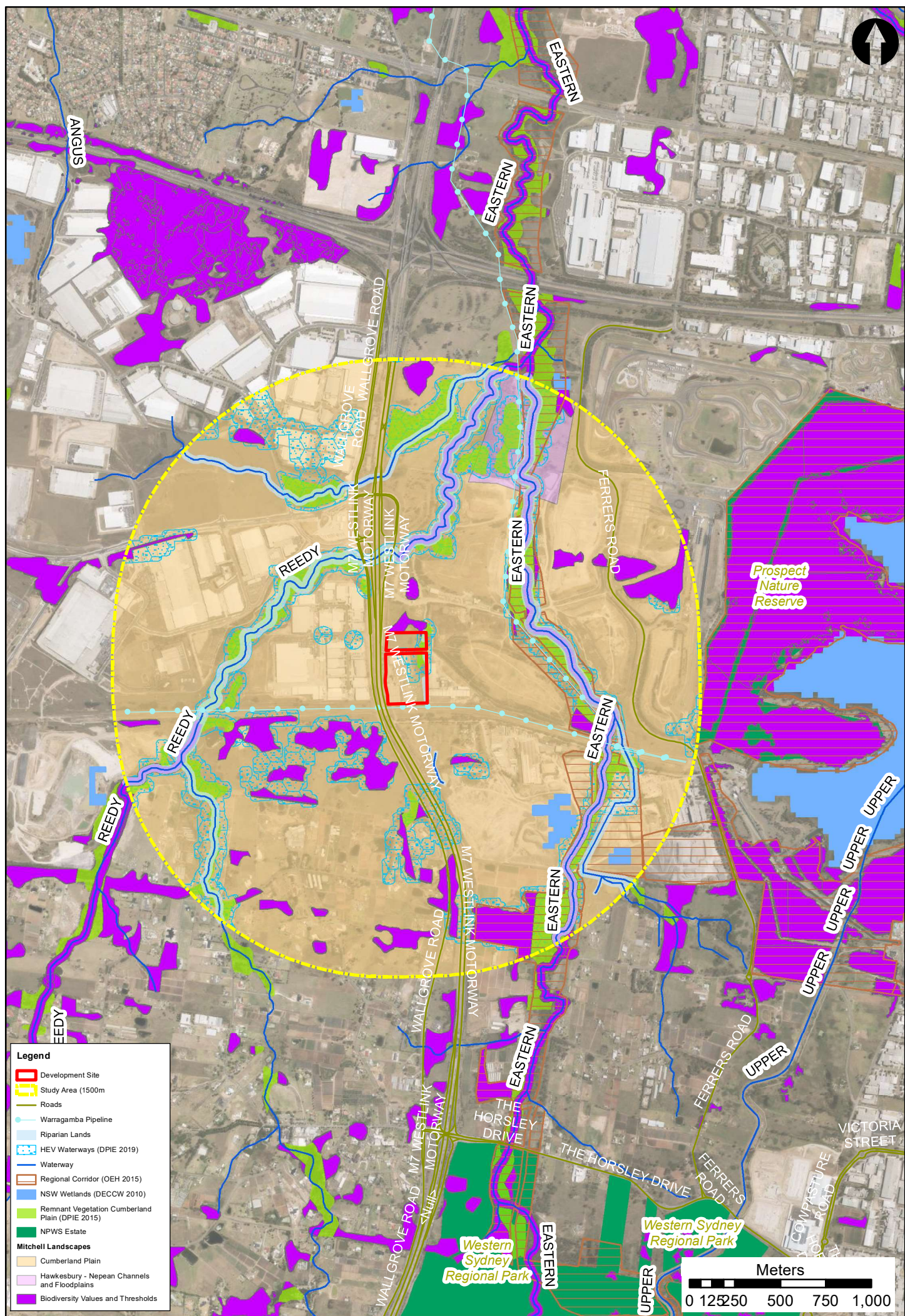


Figure 21.1: Biodiversity features in the surrounding environment

21.2.1 Bioregion and underlying geology

Australia is categorised into bioregions depending on landscape types. The study area is located within the Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) bioregion and the Cumberland IBRA subregion². The geology of the study area is underlain by Cumberland Plain and Hawkesbury–Nepean Channels and Floodplains soil types.

21.2.2 Waterways

The study area is located within the Hawkesbury–Nepean River catchment, which covers about 21,400km². This catchment includes the coastal areas from Turmetta Headland to Barrenjoey near its mouth, and catchments for the Warragamba, the Upper Nepean and the Mangrove Creek dams that are the main water supply reservoirs for the Sydney Metropolitan Area, including Gosford and Wyong.

Although no watercourses are mapped for the proposal site, an overland flow path exists within low-lying areas adjacent to the eastern property boundary. This overland flow path is referred to as a stream in the BDAR. The BDAR classifies this stream as an unmapped first-order stream according to Strahler stream classification³. The Hydrology and Flooding Assessment (**Technical report H**) does not classify this stream as a defined watercourse in line with the NSW Office of Water Guidelines for Riparian Corridors on Waterfront Land 2012. For the remainder of this chapter, the stream will be referred to as an overland flow path.

The site drains to Eastern Creek, which is about 500m to the east, which drains north to Hawkesbury River. Reedy Creek is located to the west and joins Eastern Creek about 1.5km north of the proposal site. Both waterways are mapped as key fish habitats⁴.

According to the DPIE, the study area supports High Ecological Value (HEV) waterways and water-dependent ecosystems. These are mapped for Reedy Creek, Eastern Creek and the existing farm dam and adjacent vegetation within the proposal site.

² Commonwealth Department of Agriculture, Water and Environment.

³ DoI, 2018.

⁴ DPI Fisheries, 2007.

21.2.3 Wetlands

No Ramsar wetlands or Nationally Important Wetlands have been mapped within the study area. A review of the NSW Wetlands spatial layer indicates two wetlands are located south-east of the proposal, within the Austral Bricks property boundary. Aerial imagery indicates an unmapped wetland is also located within the Austral Bricks site, about 160m south of the proposal site. Following heavy rainfall, this wetland is likely to drain to the north, across the Warragamba Pipeline Corridor and through eastern parts of the proposal site.

21.2.4 Biodiversity corridors

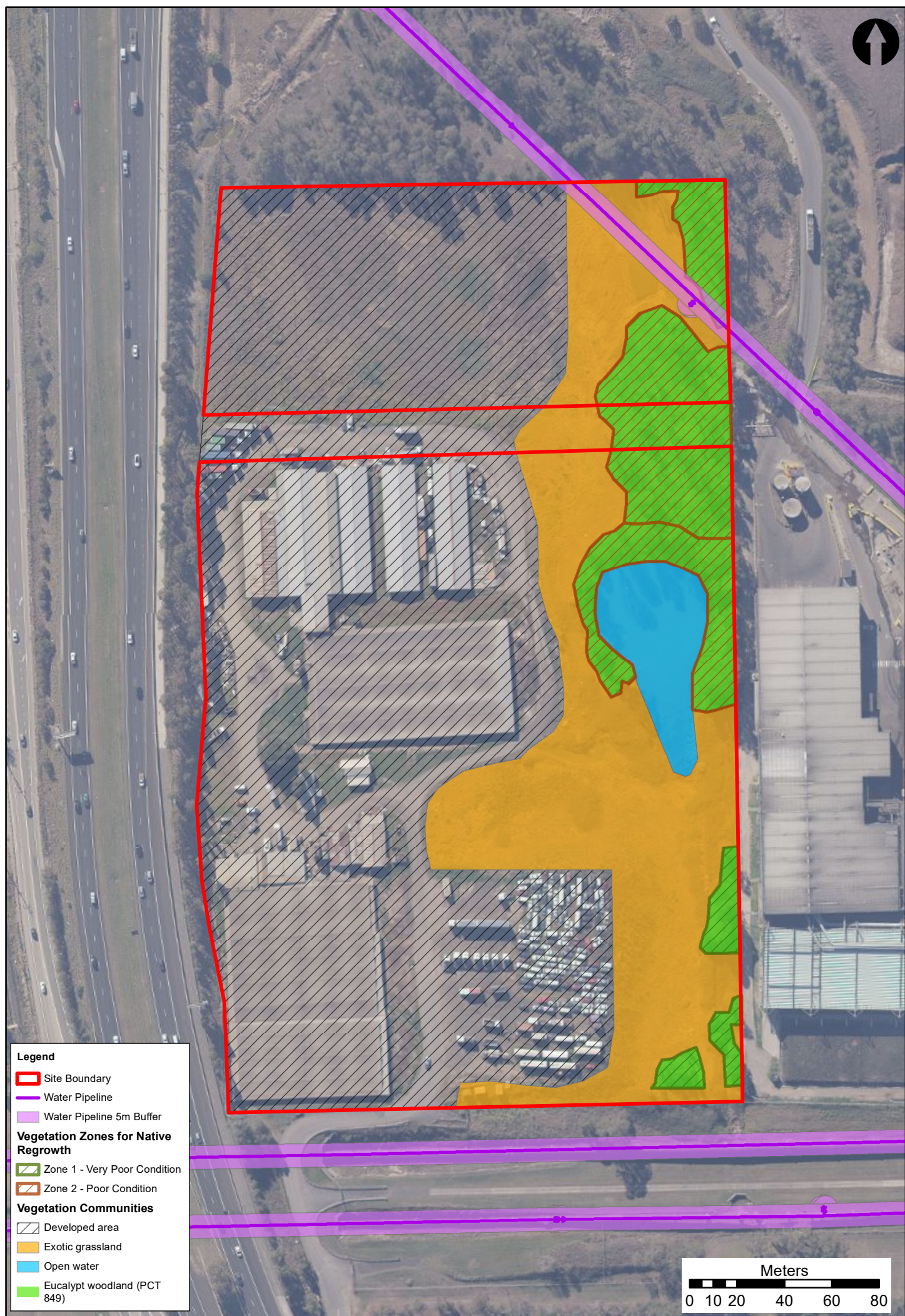
Biodiversity corridors are landscape connections between larger areas of fauna habitat. BIO Map regional biodiversity corridor mapping⁵, shows that riparian vegetation associated with Eastern Creek forms a regionally significant biodiversity corridor connecting Prospect Reservoir (about 1.5km to the east) with Western Sydney Parklands. Existing vegetation associated with Reedy Creek also offers some north-south connectivity with Eastern Creek and provides a connection between Eastern Creek and Ropes creek to the west.

Smaller areas of vegetation and scattered trees are located within the proposal site and southern parts of the study area, offering connectivity between adjacent waterways and larger vegetated areas to the north and south.

21.2.5 Native vegetation

A combination of site surveys and online spatial datasets was used to determine the spatial location of vegetation on the proposal site. There are two areas of vegetation as shown on **Figure 21.2** below.

⁵ OEH, 2015.



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Figure 21.2: Mapped vegetation on the proposal site

21.2.6 Plant community types

Plant community types are a vegetation mapping classification tool used for planning and assessment in New South Wales. The proposal site supports about 0.88ha of native vegetation comprising one Plant Community Type (PCT) with varying levels of disturbance and condition. Native vegetation within the proposal site generally comprises isolated patches of regrowth Cumberland Shale Plains Woodland (PCT 849) within low-lying areas along the eastern property boundary (as shown on **Figure 21.2**).

Vegetation within the site is subject to high levels of disturbance due to historical land clearing, agricultural land uses and ongoing industrial and transport activities.

21.2.7 Threatened ecological communities

Threatened ecological communities are ecological communities listed within Australian environmental law which are under threat and are given a status ranging from critically endangered to vulnerable. The Cumberland Shale Plains Woodland found on the proposal site is consistent with the NSW *Biodiversity Conservation Act 2016* (BC Act) listed Cumberland Plains Woodland critically endangered ecological community. The vegetation within the proposal site does not meet the EPBC Act requirements as a listed TEC due to the poor condition of the vegetation and the small area of the woodland. A detailed assessment of the key thresholds for determining whether the vegetation meets the EPBC Act requirements is covered in Section 3.3 of the BDAR.

21.2.8 Groundwater dependent ecosystems

The proposal site does not support vegetation reliant on groundwater. During site surveys, only exotic grassland was found. While there are some groundwater-dependent ecosystems (GDEs) mapped for the proposal site, site surveys confirmed that these features comprised exotic grasslands only and were not GDEs.

21.2.9 Threatened species

Flora

There were no threatened flora species found during site surveys. Areas of native vegetation at the site are highly degraded and dominated by exotic species. Habitat quality for the threatened flora species was generally poor.

Fauna habitats

Native vegetation within the proposal site consists of small patches of regenerating eucalypt woodland (about 0.88ha) which is subject to high levels of weed, noise and light disturbance due to historical and ongoing adjacent land uses. The eucalypt woodland would likely serve as habitat for magpie, little raven, lorikeet and noisy miner species. Dense thickets of blackberry and African boxthorn underneath the eucalypt woodland may also serve as habitat for small birds such as red-browed finch and superb fairy wren.

Waterbirds including Australian white ibis, cattle egret and dusky moorhen may use riparian environments associated with the farm dam. Bulrushes and sedges within the overland flow path and at the periphery of the farm dam may also offer potential habitat for green and golden bell frogs.

Exotic grasslands and other developed areas of the site offer little value for native fauna. The vegetation on site offers limited connectivity to larger intact areas of habitat in the wider region.

Targeted survey results

Surveys for terrestrial threatened fauna were conducted between 17 and 23 February 2020. Full details of these surveys are available in Section 4 and 5 of the BDAR.

The surveys included the following methods for targeting candidate species:

- Ultrasonic call detection for micro bat species
- Habitat assessment for:
 - Grey-headed flying fox (presence of camps)
 - Masked owl (tree hollows suitable for breeding)
 - Micro bats (tree hollows suitable for roosting, caves housing breeding colonies, man-made habitat features including buildings, drainage structures and bridges)
 - Little eagle and square-tailed kite (stick nests)
- Observation of disused structures during bat fly-out
- Spotlighting for nocturnal arboreal fauna
- Active searches and call playback for Green and Golden Bell Frog.

Six threatened fauna species were recorded during the field surveys, of which five are listed under the BC Act and two are listed under the EPBC Act as shown in **Table 21.1** below.

Table 21.1: Threatened fauna species recorded during field surveys

Common name	Scientific name	Status	
		BC Act	EPBC Act
White-throated needletail	<i>Hirundapus caudacutus</i>	-	V ⁶
Eastern coastal free-tailed bat	<i>Micronomus norfolkensis</i>	V	-
Large bent-winged bat	<i>Miniopterus orianae oceanensis</i>	V	-
Southern myotis	<i>Myotis macropus</i>	V	-
Grey-headed flying fox	<i>Pteropus poliocephalus</i>	V	V
Greater broad-nosed bat	<i>Scoteanax rueppellii</i>	V	-

The results from the targeted microbat surveys showed that the site has limited roosting opportunities for microbats. No microbat calls were recorded near the existing southern poultry shed, suggesting buildings on site are not being used as roosting sites.

The overall number of microbat calls recorded was relatively low for the length of the sampling period (only 394 calls over 18 survey nights). However, it is possible that microbat activity, is higher for the study area than the survey data indicated due to existing background noise inhibiting data collection.

A lack of leaf litter and woody debris was noted within the site during the survey indicating habitat is marginal for Cumberland Plain land snail and Dural land snail. No green or golden bell frogs were recorded during site surveys. Marginal habitat for the green and golden bell frog was observed within bulrushes and sedges associated with the overland flow path and at the periphery of the farm dam. However, these were very sparse and did not offer a large extent of potential habitat. Connectivity to larger areas of potential habitat upstream and downstream of the site is also limited indicating the site is unlikely to offer vital habitat for these species.

Aquatic habitats and threatened species

A survey of the existing aquatic features on site was conducted on 19 February 2020. The details of the methods used for this assessment are available in Section 5 of the BDAR.

A farm dam and an overland flow path are located within the eastern part of the site. The farm dam and overland flow path are not connected, but it is likely that in large storm events there is mixing between the farm dam and the overland flow path.

⁶ V: Vulnerable

The overland flow path discharges to Reedy Creek 600m to the north of the site. The overland flow path is characterised by a discontinuous channel with some areas inundated by exotic vegetation (for example, blackberry thickets) or supporting overland flow only.

The overland flow path and the farm dam are manmade, supporting generally stable banks, with few areas susceptible to erosion and the beds are primarily silt. Some native macrophytes (aquatic plants) were present at the margins of the farm dam, serving as amphibian habitat.

A discontinuous and degraded riparian zone was observed dominated by exotic shrubs, grasses and forbs and supporting some scattered native canopy trees. The width of the riparian corridor generally varied from 0m to 10m, with some areas north of the dam being about 35m wide.

No mapped habitat for threatened fish was found within or adjacent to the site. However, turtles and elvers were observed during the targeted surveys for candidate threatened fauna species. These species are commonly associated with disturbed freshwater environments and are not listed as threatened.

Observed aquatic habitats do not meet the definition of Key Fish Habitat, as defined by the policy and guidelines for fish habitat conservation and management⁷.

21.2.10 Matters of National Environmental Significance

The EPBC Act lists Matters of National Environmental Significance (MNES) including biodiversity species, which are protected by federal law. Two threatened fauna species and one marine fauna species listed under the EPBC Act were recorded on the proposal site during field surveys, these were the grey-headed flying fox, white-throated needletail and cattle egret.

As stated in **Section 21.2.7**, Cumberland Plains Woodland does not meet the EPBC Act requirements (see also Section 3.3 of BDAR).

Section 6 of the BDAR concludes that due to the lack of habitat present within the study area, any proposal impacts to EPBC Act listed species are negligible and do not meet any significant impact criteria, as defined by the Commonwealth Significant Impact Guidelines (DoE, 2013) (refer to Appendix F of the BDAR). As such, works associated with the development do not require Commonwealth referral.

⁷ DPI, 2013.

21.3 Assessment

Biodiversity impacts are described using four impact categories:

- Direct – an impact as a direct result of action (for example, vegetation loss from clearing)
- Indirect – an impact as a result of an indirect action (noise, light, litter, dust, air quality impacts)
- Prescribed – an impact that may affect biodiversity values in addition to, or instead of, impacts from clearing vegetation
- Aquatic – impacts on aquatic environments and aquatic species.

The assessment of both construction and operation impacts from the proposal are assessed for each impact category.

Table 21.2 summarises the types of impacts and whether they will occur during construction or operation of the proposal.

Table 21.2: Biodiversity impacts

Biodiversity value	Potential impact	Proposal phase	
		Construction	Operation
Direct impacts			
Native vegetation	Loss of 0.45ha of Cumberland Shale Plains Woodland (PCT849)	✓	
Threatened ecological communities	Loss of 0.45ha of BC Act listed Cumberland Plain Woodland	✓	
Threatened species	Loss of 0.45ha of habitat for southern myotis	✓	
Indirect impacts			
Native vegetation, threatened ecological communities and habitat for threatened species	Disturbance from noise, light and litter	✓	✓
	Edge effects and impacts to habitat viability	✓	✓
	Dust and other air quality impacts	✓	✓
	Disturbance from weeds, pests and pathogens	✓	
Prescribed impacts			
Native vegetation, threatened ecological communities and habitat for threatened species	Loss of habitat connectivity	✓	
	Impacts to hydrology and water quality	✓	
	Impacts to groundwater	✓	
	Fauna injury/mortality due to vehicle strike	✓	✓

Biodiversity value	Potential impact	Proposal phase	
		Construction	Operation
Other impacts			
Aquatic habitats	Impacts to the downstream receiving environment habitat and water quality	✓	
	Impacts to hydrology	✓	
	Displacement of aquatic fauna (native and exotic)	✓	
	Impacts to water quality	✓	✓

21.3.1 Direct impacts

Direct impacts associated with the proposal are mainly related to the proposed site clearing works. An area of 0.45ha of native vegetation will be cleared during construction of the proposed EfW facility and associated infrastructure.

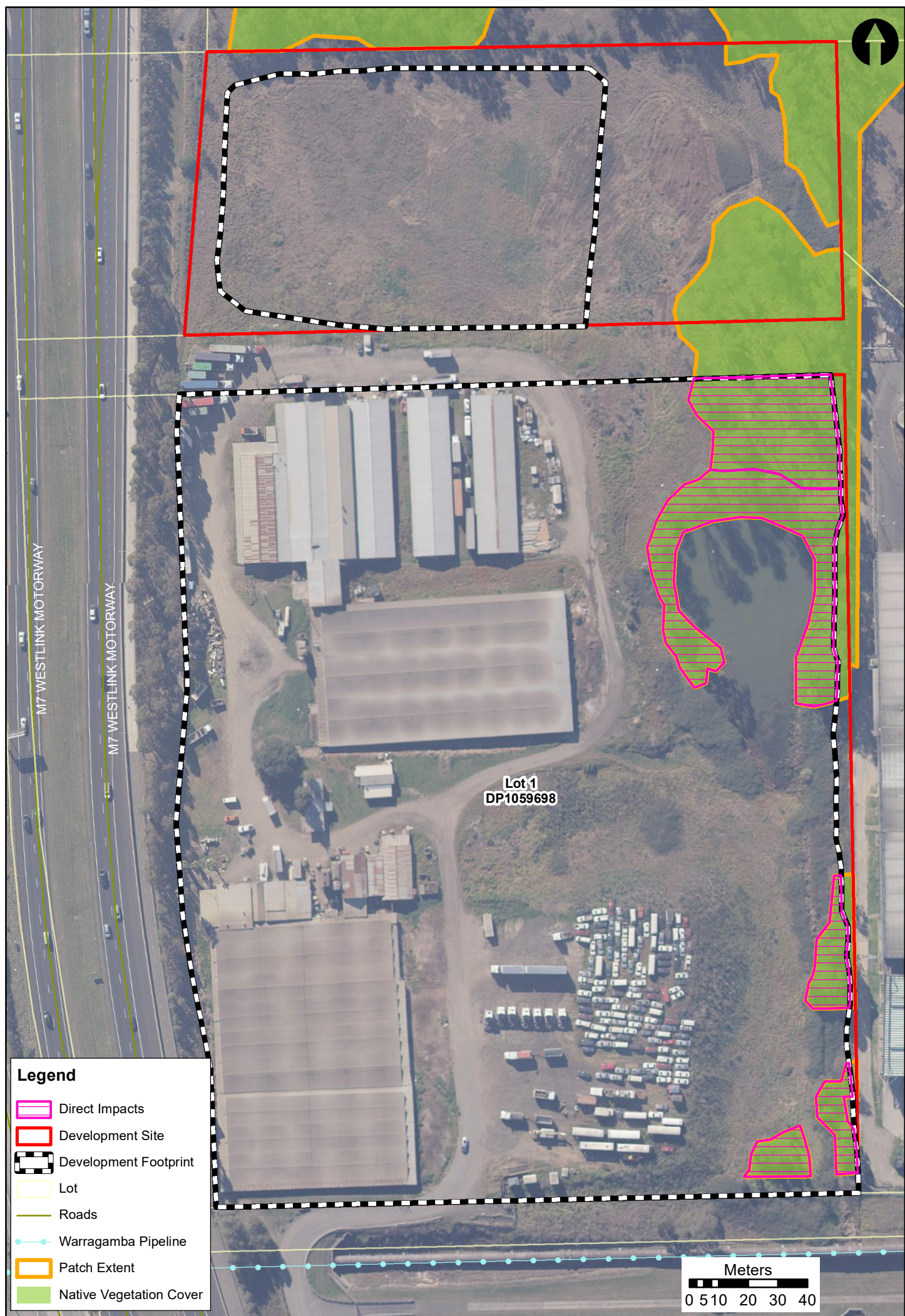
Table 21.3 covers the extent of impacts including predicted change in vegetation integrity for vegetation communities within the development footprint.

Table 21.3: Impacts to native vegetation

PCT	Condition	Proposed clearing extent (ha)	Current vegetation integrity score	Future vegetation integrity score	Regional extent	
					Estimate extent remaining ⁸	Estimate % cleared ⁹
PCT 849 Cumberland Shale Plains Woodland	Very Poor	0.09	20.6	0	6800ha	93%
PCT 849 Cumberland Shale Plains Woodland	Poor	0.36	31	0	6800ha	93%

⁸ Estimate of pre-European extent remaining modelled from known site or polygon data.

⁹ Percent of pre-European extent cleared.



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Figure 21.3: Proposal impacts to biodiversity values

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The proposal will result in a loss of 0.45ha of Cumberland Plain Woodland, listed as critically endangered under the BC Act. This will result in 0.45ha loss of Eucalypt woodland offering foraging and marginal roosting opportunities for southern myotis, listed as vulnerable under the BC Act. Foraging habitats for other fauna species will also be lost. No threatened flora species will be impacted as a result of the proposal.

Site landscaping and restoration of cleared native vegetation communities, ecological communities and impacted aquatic habitats is proposed following construction of the facility to minimise impacts to biodiversity. Details of the proposed restoration are shown in **Table 21.4** and **Figure 21.4**, and in the Vegetation Management Plan included as Appendix G to the BDAR.

Table 21.4 Proposed restoration

RTZ	Treatment	Target community	Approximate area (ha)
1	Reconstruction	Species generally representative of PCT849 Cumberland Shale Plains Woodland	0.65
2	Reconstruction	Native grasses and riparian plants appropriate for predicted water levels at the edges of the bioretention basin and OSD basin	0.31
3	Reconstruction	Ephemeral swale	0.18
4	Rehabilitation	Species generally representative of PCT849 Cumberland Shale Plains Woodland	0.37
5	Rehabilitation	Shrubs buffer	0.04
6	Rehabilitation	Ephemeral swale	0.16
7		Groundcovers (grasses and sedges) around the Sydney Water pipeline and in right of carriageway	0.18
Total			1.89ha

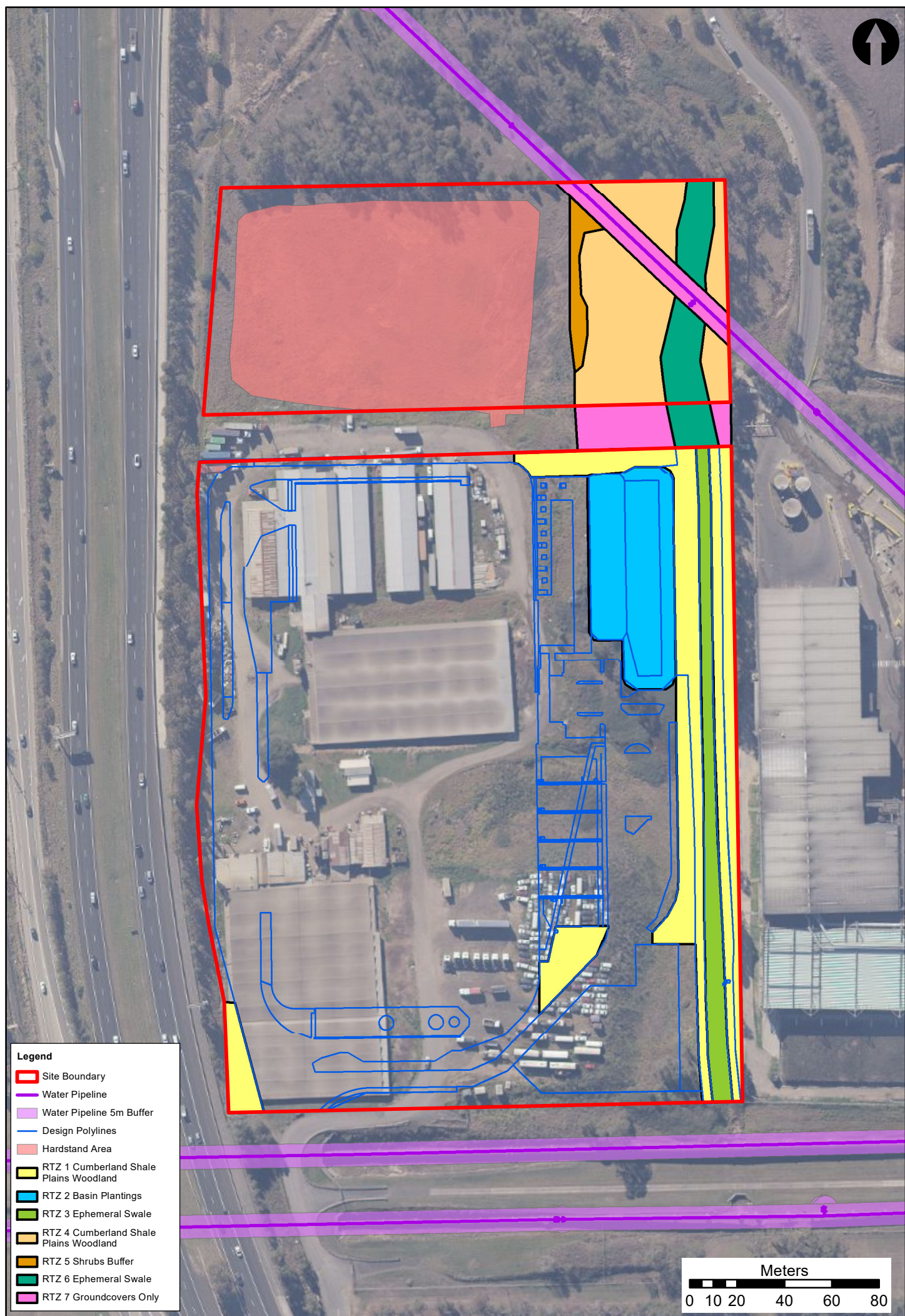


Figure 21.4: Proposed vegetation restoration

21.3.2 Indirect impacts

Indirect impacts from the proposal would include noise, light and litter impacts, impacts to habitat viability, dust and air quality impacts and impacts from weeds, pests and pathogens. These impacts are generally considered to be negligible with the application of suitable design measures and construction controls.

21.3.2.1 Disturbance of remaining habitats due to increased noise, light and litter

Habitats within and near to the proposal site are already subject to considerable disturbance as a result of adjacent industrial and transport land uses. This includes noise and light pollution from the adjacent lands to the east and the M7 Motorway to the west. Despite this, habitats within the accessway and northern portion of the site adjacent to the proposal footprint are likely to be subject to some increased disturbance.

Operation of the facility will be 24 hours and will involve the use of machinery and equipment likely to generate noise. Trucks will also be delivering waste to the site during daylight hours. Based on the results of the noise assessment, operational noise impacts will be generally low, not exceeding 74dB as a worst-case scenario at the eastern site perimeter.

Noise impacts associated with construction are likely to be higher than during operation, with construction involving the use of loud activities, such as piling and rock hammering. This will be limited to daytime hours for the duration of the construction period.

Operation of the facility is likely to result in some increased light pollution for habitats immediately adjacent to the development footprint. However, this will be minimised wherever possible using sensor lighting and/or directional lighting for more heavily used parts of the facility. Construction activities will be carried out during daylight hours and are unlikely to need additional lighting.

Litter is currently being deposited within the proposal site from surface water runoff from the facility to the east. These waste materials pose a risk to water quality and the health of common terrestrial and aquatic fauna likely to use habitats within the site. Construction of the facility and ongoing site operations could increase litter as described in **Chapter 10 Waste management**.

21.3.2.2 Edge effects and impacts to habitat viability

Flora and fauna habitats immediately adjacent to the proposal site could be impacted by the proposal. However, these impacts are considered negligible given the existing high levels of disturbance due to historical clearing and weed invasion within areas supporting native vegetation.

Restoration activities proposed following construction of the facility would improve the viability and ecological function of remaining habitats through weed management and improvements to vegetation communities.

21.3.2.3 Dust and other air quality impacts

During construction, dust and airborne particulates could temporarily impact vegetation and remaining habitats adjacent to the development footprint. However, these impacts will be managed through erosion and sediment control measures during construction.

Existing levels of dust and other particulates (such as PM_{2.5} and PM₁₀) within the site were determined to already exceed recommended criteria, and an increase of less than 1% is predicted as a result of proposed operations.

Modelled emission levels during operation will not exceed guideline limits, and proposed mitigation measures for human health concerns are appropriate to address any risks to retained vegetation communities and habitats within and adjacent to the development footprint.

21.3.2.4 Disturbance from weeds, pests and pathogens

There is the potential for the introduction and spread of weeds and pathogens during construction as a result of machinery movements, increased foot traffic and landscaping activities.

There are at least seven high threat weed species confirmed for the site. These weeds would be initially controlled and then managed during construction, to prevent further spread.

Pathogens, including root rot, myrtle rust and chytrid fungus, have the potential to be introduced to the site during construction, which could impact terrestrial and aquatic habitats.

However, the potential risks associated with pathogen introduction are considered relatively low-risk and will be managed through construction hygiene protocols. The ongoing operation of the facility will pose little risk to biodiversity from pathogens as operations will be contained within developed areas of the site. Permanent fencing, buffer plantings and batters would be used to delineate the extent of developed area from other vegetated parts of the site.

Habitats within the proposal site are already likely to be subject to disturbance from pest species including fox and feral cat. Development activities are unlikely to result in any increased risk of predation or pests within retained habitats.

21.3.3 Prescribed impacts

Prescribed impacts are listed in section 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). Potential prescribed impacts associated with the development are discussed below include:

- Impacts on the connectivity of different areas of habitat of threatened species that supports the movement of those species across their range
- Impacts on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities
- Impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.

21.3.3.1 Loss of habitat connectivity and impacts to flight paths

Existing vegetation and habitats within the proposal site are already subject to high levels of fragmentation due to historical clearing and land uses. However, there are scattered vegetation and trees within the site which do give some connectivity between adjacent waterways and other vegetated areas.

These connectivity pathways have the potential to be used by southern myotis and other threatened bat species. There is potential for the proposal to impact habitat connectivity in this respect. An assessment of impacts on habitat connectivity was carried out (see Section 7.2.3 of the BDAR). The results of the assessment indicate habitat connectivity will be enhanced through the increase of native vegetation cover along the eastern property boundary. Proposed restoration treatments are likely to improve the structure of target vegetation communities and will support increased habitat function and movement opportunities for fauna.

The proposed height of the stack structure will be about 75m above ground level, with an associated plume. This could affect the flight paths for birds and bats. However, no observed or predicted flight paths for threatened birds or bats were found within the proposal site.

Habitat within and adjacent to the site is generally marginal for these species and any potential fauna movements are likely to involve north-south movement between habitat fragments along vegetation within the eastern part of the site (not the location of the stack).

21.3.3.2 Impacts to hydrology and water quality

Construction and operation of the proposal could cause changes in water quality and impacts to native vegetation, habitats and ecological communities.

Construction activities could result in the movement of soils and suspended solids, leading to increased turbidity. These impacts would be managed through the application of construction controls outlined in **Section 21.4**.

The existing overland flow path is proposed to be realigned and restored with additional planting. This will occur after construction and be carried out as a staged approach to enable the successful uptake of plantings. Details are available in the Vegetation Management Plan (VMP) included as Appendix G to the BDAR. This realignment and replanting of the overland flow path will have positive impacts for water quality and flooding.

21.3.3.3 Impacts to groundwater

Site-based soil and water investigations and conceptual modelling indicate a shallow/perched groundwater layer may be intercepted during construction of the waste bunker. The extremely low permeability of the underlying geology means that the potential for significant drawdown is likely to be low and intermittent (see **Technical report F Soils and Water Assessment Report**). The soils and water assessment in **Chapter 11 Soils and water** and **Technical report F** conclude that the proposal will not result in a significant increase in hardstand and so will not interfere with groundwater recharge. The proposed waste bunker it is not expected to interfere or intercept groundwater flows within the deeper regional groundwater table.

Overall, construction activities and groundwater impacts are considered to pose a low risk to ecological communities and associated habitats.

21.3.3.4 Fauna injury/mortality due to vehicle strike

The proposal will increase the risk of fauna injury or death as a result of collision with vehicles and/or machinery during the construction and operation of the facility. Permanent fencing will be installed at the interface between natural habitats and operational areas of the site and will help in minimising any risk of fauna injury or death. Similarly, temporary fencing will be installed during construction to minimise the risk of vehicle strike as well as entrapment in deep excavations.

21.3.3.5 Summary of prescribed impacts

Overall, with appropriate mitigation measures, these prescribed impacts have a negligible impact on biodiversity values within and adjacent to the proposal site.

21.3.4 Aquatic impacts

There will be some impacts to aquatic habitats and fauna from the realignment of the overland flow path and the removal of the farm dam. Although there are no listed aquatic species on site, there is still potential for fauna to be displaced, and habitat to be lost.

The proposal includes a realignment of the overland flow path and two bioretention basins, which are designed to meet the relevant stormwater design guideline requirements and where possible apply principles of Water Sensitive Urban Design as described by Blacktown City Council. The proposed realignment of the overland flow path will cause temporary loss of aquatic habitats and displacement of aquatic fauna. However, a riparian corridor will be re-established after construction, incorporating improvements to stream connectivity and the restoration of riparian vegetation and aquatic habitats. The width of the restored riparian corridor will be about 9–11m, increasing to 76m wide in some locations. Connectivity will be restored from the southern boundary of the property through to the northern property boundary, with proposed restoration works (including weed management and restoration of riparian vegetation).

The removal of the farm dam will result in habitat removal for aquatic and other species that rely on the access to water. The use of water for dust control or during dewatering process could also mobilise sediments into the receiving environment. Baseline soil samples showed elevated levels of ammonia, copper, zinc and polycyclic aromatic hydrocarbons and disturbing these sediments could cause impacts to species habitat. A Dewatering Management Plan would be carried out so that these impacts are avoided.

The farm dam contains aquatic fauna both of native and exotic species. The native species should be relocated to a suitable habitat and the exotic species should be removed from the system to avoid the release of exotic species, such as the mosquitofish, into the receiving environment.

21.3.5 Serious and irreversible impacts

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct. Principles for determining potential serious and irreversible impacts (SAII) are specified in clause 6.7 of the BC Regulation 2017.

The impacts to the Cumberland Plain Woodland are potentially SAIL. However, no SAIL thresholds have currently been set for the Cumberland Plain Woodland. The Cumberland Plain Recovery Plan (DECCW, 2011) and the NSW Scientific Committee final determination for the ecological community have been used to assess proposal impacts against each of the SAIL principles (see **Table 28 of Technical Report Q**). The results of the assessment indicate that the impacts of the proposal to the TEC are unlikely to constitute a SAIL.

Southern myotis is not a potential SAIL entity and impacts to the species as a result of the proposal are unlikely to contribute to any increased risk of extinction.

21.3.6 Offsetting

Section 8.1 of the BDAR outlines the tests for determining whether biodiversity offsets are needed. In summary, while 0.45ha of Cumberland Woodland will be cleared, the clearing impacts will not exceed the area-based threshold of 0.5ha relevant to the minimum lot size for the site as set by section 7.1 of the BC Act, nor will any biodiversity listed on the biodiversity values map (BVP) be impacted.

Under section 7.3 of the BC Act, offsets may also be necessary for a development where it is likely to have a significant effect on threatened species or ecological communities, or their habitats. The BDAR concludes that the proposal is not likely to result in any significant impacts to these matters.

As such, the proposal does not trigger any offset requirements under the NSW Biodiversity Offset Scheme.

21.4 Mitigation

Measures to avoid impacts on biodiversity values were considered during a detailed site selection process and during design of the proposal as outlined in Section 7 of the BDAR. Mitigation measures outlined in other chapters and technical reports of this EIS are also relevant for mitigating biodiversity impacts. These include management plans for construction noise and vibration, air quality, soil and water, erosion and sediment, groundwater, waste and dewatering. Further measures to mitigate and manage impacts to biodiversity are outlined in **Table 21.5**.

Table 21.5: Biodiversity impact mitigation measures

ID	Impact	Mitigation measures
Design embedded mitigation measures		
BD1	Disturbing biodiversity values	The size and layout of the proposal has been consolidated to minimise disturbance of existing biodiversity values.
Construction mitigation measures		
BD2	General construction impacts on flora and fauna	A Flora and Fauna Management Plan would be prepared and carried out. The Flora and Fauna Management Plan would include appropriate controls to manage biodiversity during construction and avoid impacts on biodiversity values.
BD3	Unexpected finds	As part of the CEMP, an unexpected finds procedure would be prepared and applied to describe the process for discovering, dealing with, and managing any unexpected threatened flora or fauna.
BD4	Noise impacts on fauna	Noise activities such as piling, and rock hammering should be limited to daytime hours for the duration of the construction period. These measures will be included in the Construction Noise and Vibration Management Plan.
BD5	Waste/litter	A Waste Management Plan would be prepared as part of the CEMP to manage waste during construction and would include measures to avoid impacts on biodiversity.
BD6	Impacts on aquatic fauna and water quality	A Dewatering Management Plan would be prepared as part of the CEMP outlining strategies for the use of the water within the dam, controls for reducing contamination risk in the form of suspended solids impacting on the receiving environment and completing an aquatic fauna/fish salvage.
BD7	Changes to the aquatic habitats on site and loss of vegetation	A Vegetation Management Plan will be prepared, carried out and audited as a part of the CEMP and will outline proposed measures for the restoration of native vegetation, ecological communities and associated habitats within the development site. The plan will be generally in keeping with the Vegetation Management Plan (Appendix A of the BDAR). Site landscaping and habitat restoration will include restoration of the riparian corridor, 0.6ha of plantings including trees, shrubs and grasses generally representative of a Cumberland Shale Woodland ecological community. The Vegetation Management Plan will include any measures for ongoing management and monitoring of restoration outcomes.
BD8	Vegetation selection	Vegetation proposed as part of the Vegetation Management Plan will consider the location of infrastructure and selection of species to avoid impacts on infrastructure.
BD9	Weeds, pests and pathogens	Management measures would be prepared, applied and audited to avoid and minimise the environmental risks associated with weeds, pests and pathogen. A Weed Management Plan would be incorporated as part of the Vegetation Management Plan.
BD10	Lighting impacts on fauna	Lighting impacts are to be minimised as much as possible using sensor lighting and/or directional lighting for more heavily use parts of the facility.
Operation mitigation measures		
BD11	Pathogens and pests	Operations will be contained within developed areas of the site, with permanent fencing, buffer plantings and batters delineating the extent of these areas from other vegetated parts of the site.