Appendix U Construction Environmental Management Plan

Malaga to Ellenbrook Rail Works

Construction Environmental Management Plan

July 2020

Assessment Number 2238

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Abbreviations and Definitions

Item	Details
ASS	Acid Sulfate Soils
ASSMS	Acid Sulfate Soils Management Strategy
BC Act	Biodiversity Conservation Act 2016
CBD	Central Business District
CCW	Conservation Category Wetland
CEMP	Construction Environmental Management Plan
DAWE	Commonwealth Department of Agriculture, Water and the Environment.
DBCA	The Department of Biodiversity, Conservation and Attractions, or the state government agency responsible for the administration of the *Conservation and Land Management Act 1985*.
DE	Development Envelope. The area within which activities associated with the construction and operation of the Proposal can occur
DFES	The Department of Fire and Emergency Services
DPaW	The Department of Parks and Wildlife (now DBCA)
DPLH	The Department of Planning, Lands and Heritage
DWER	The state government Department of Water and Environmental Regulation
EP Act	Environmental Protection Act 1986
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPA	Environmental Protection Authority. The Authority responsible for assessing the environmental impacts of development proposals.
ESA	Environmentally sensitive area as defined under the *Environmental Protection Act 1986* (EP Act), including defined wetlands, areas within 50 m of rare flora, area covered by a threatened ecological community (TEC), Bush Forever Site.
ESD	Environmental Scoping Study
ERD	Environmental Review Document
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
Fauna habitat	The natural environment of an animal or assemblage of animals, including biotic and abiotic elements, that provides a suitable place for them to live (e.g. breed, forage, roost or seek refuge).
FDR	Fire Danger Rating
GDE	Groundwater Dependent Ecosystem
GDP	Ground Disturbance Permit
GLOS	Groundwater Licence Operating Strategy
ha	Hectare
km	Kilometre

Item	Details
Management action	Identified actions undertaken to mitigate the impacts of implementation of a proposal on the environment and achieve the condition environmental objective.
Management target	A measurable boundary of acceptable impact with proposal or site-specific parameters, that assesses the efficacy of management actions against the condition environmental objective and beyond which management actions have to be reviewed and revised. Proposal- or site-specific parameters may include location, scale, time period, specific species/population/community and a relative benchmark (e.g. baseline or reference).
MEL	Morley Ellenbrook Line
MNES	Matters of National Environmental Significance
MUW	Multiple Use Wetland
NVMP	Noise and Vibration Management Plan
NVRA	Native Vegetation Retention Area
PASS	Potential Acid Sulfate Soils
PEC	Priority Ecological Community
PDWSA	Public Drinking Water Source Area
Potential breeding tree	Any existing tree of a species known to support breeding which either has a hollow or has a diameter at breast height of 500 millimetres or greater and therefore may develop a nest hollow.
Proposal	The Malaga to Ellenbrook Rail Works Proposal, the subject of this Threatened Ecological Community Management Plan.
PTA	Public Transport Authority of Western Australia
QA/QC	Quality Analysis/Quality Control
REW	Resource Enhancement Wetland
RIWI Act	Rights in Water and Irrigation Act 1914
TEC	Threatened Ecological Community
TECMP	Threatened Ecological Community Management Plan
UWPCA	Underground water pollution control area.
WAPC	The Western Australian Planning Commission; or statutory authority of the Government of Western Australia with functions and authority to undertake and regulate land use planning and development established under the *Planning and Development Act 2005.*

Summary

Item	Detail	
Title of Proposal	METRONET Malaga to Ellenbrook Rail Works	
Short Description	The Proposal is to construct and operate a 13 km new dual railway track, which connects to the Bayswater to Malaga Rail Works. The Proposal includes the construction and operation of three new stations at Malaga, Whiteman Park and Ellenbrook, with provision for a future Bennett Springs East Station.	
Proponent	Public Transport Authority of Western Australia.	
Ministerial Statement No.	Not applicable – Proposal is under assessment.	
Scope and Purpose of this CEMP	To support the Environmental Review Document (ERD) in minimising the duration, intensity and/or extent of impacts on key environmental factors during construction. This CEMP outlines the management actions, management targets, monitoring and contingency actions designed to meet the environmental objectives for each key environmental factor identified for the Proposal. This CEMP will be implemented through the Construction Contractor's CEMP and related plans.	
Key environmental factors considered in this CEMP	**Key Environmental Factor**	**EPA Objective**
	Flora and Vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained
	Terrestrial Fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained
	Terrestrial Environmental Quality	To maintain the quality of land and soils so that environmental values are protected
	Inland Waters	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected
	Social Surroundings	To protect social surroundings from significant harm
Other environmental factors and matters	Matters of National Environmental Significance – addressed as part of the Flora and Vegetation and Terrestrial Fauna factors.	
Environmental objectives	Environmental objectives are detailed within **Section 3** CEMP Provisions **Table 3** and **Schedule 1** CEMP Provisions Summary Table.	
Key provisions in the plan	Key provisions are detailed in **Section 2** CEMP provisions and **Schedule 1** CEMP Provisions Summary Table.	

Signature of duly authorised proponent representative (i.e. PTA's Representative):

1. Introduction

1.1. Proposal overview

1.1.1. Description of Proposal

The Public Transport Authority of Western Australia (PTA) is proposing to develop the Malaga to Ellenbrook Rail Works (the Proposal) in the north-eastern suburbs of Perth as part of the new Morley-Ellenbrook Rail line. The Proposal is one of several METRONET projects which aim to improve and integrate the public transport network and align with the State Government's vision for future land use planning in Western Australia. The rail line will be constructed from the new Malaga train station and terminate at the new Ellenbrook train station.

The Proposal is to construct and operate a 13 kilometre (km) new dual railway track, which spurs off the proposed Bayswater to Malaga Rail Works line, and includes the construction and operation of three new stations at Malaga, Whiteman Park and Ellenbrook with intermodal rail, bus, carpark, and active mode (cycling and walking) facilities at each station. A potential future station is also proposed at Bennett Springs.

1.1.2. Location

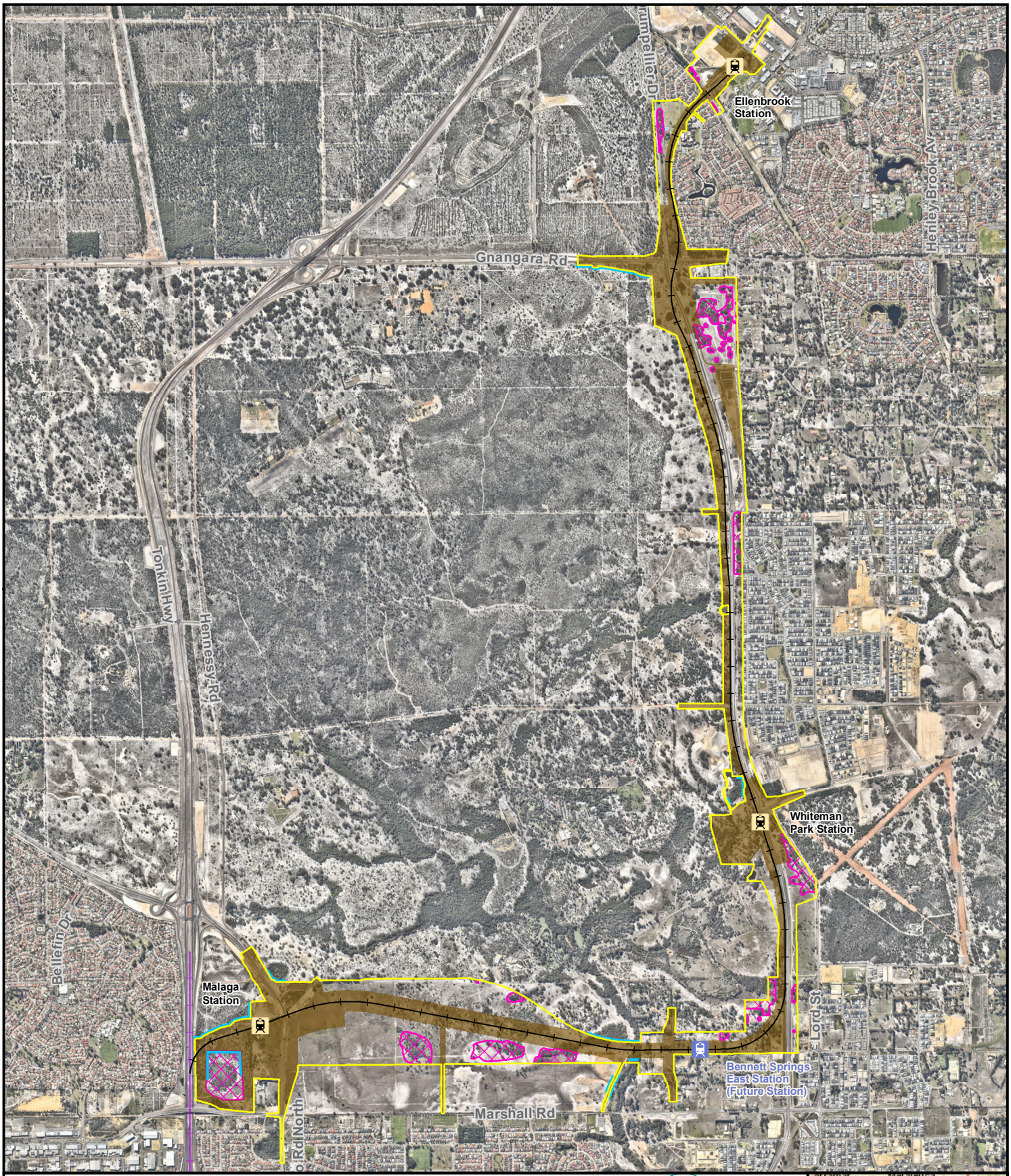
The regional location and the Development Envelope encompassing the physical elements of the proposal is indicated in **Figure 1**. The Proposal is located between 12 to 22 kilometres (km) north-east of the Perth CBD, within the City of Swan. The Proposal connects to the proposed Bayswater to Malaga railway line at the eastern edge of the Tonkin Highway road reserve.

The Proposal involves clearing and disturbance of no more than 249 ha that includes up to 59.9 ha of native vegetation in Good - Degraded or better condition and 92.2 ha of vegetation in Completely degraded or worse condition within a 464 ha Development Envelope.

1.2. Purpose of this plan

The purpose of this Construction Environmental Management Plan (CEMP) is to provide information to support the referral, by providing the management and mitigation measures for the environmental impacts identified as significant within the Environmental Review Document (ERD). The CEMP addresses management of impacts during construction only and not during the operational phase of the project.

This plan has been developed with consideration of the Environmental Protection Authority (EPA) Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EPA 2020).

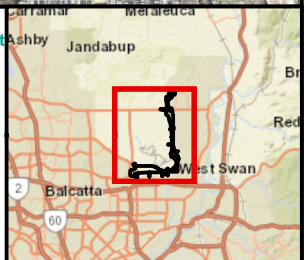


METRONET | Malaga to Ellenbrook Rail Works - Environmental Review Document
Figure 1 **The Proposal**

Public Transport Authority

Legend

- Development Envelope
- Indicative Footprint
- Native Vegetation Retention Area
- Potential indirect impacts outside Footprint
- Proposed Railway Station
- Proposed Railway Station (Future)
- Indicative Railway Alignment



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1.3. Scope of this plan

This CEMP has been prepared by the PTA provide management measures for construction phase activities of the Proposal. Such activities comprise the following:

- Clearing of native vegetation.
- Cut and fill works including excavation, soil disturbance, compaction, movement and stockpiling from construction of railway and hardstand areas.
- Construction of permanent and temporary infrastructure including, but not limited to, rail, stations, roads, car parks, buildings, hard stand and laydown areas, bridges and culverts. Associated alteration of landscape.
- Operation, movement and refuelling of plant, machinery and vehicles.
- Temporary dewatering and groundwater abstraction for construction water supply and temporary dewatering for construction purposes.
- Waste disposal, including discharge of dewatering effluent.
- Storage and handling of chemicals and fuels.
- Hot works (e.g. welding, grinding and the use of power tools).

The CEMP addresses the management and mitigation of direct and indirect impacts of these construction activities within and adjacent to the Proposal Development Envelope, including within Native Vegetation Retention Areas (NVRAs). The PTA has nominated NVRAs with the objective of protecting native vegetation containing environmental values (**Figure 1**).

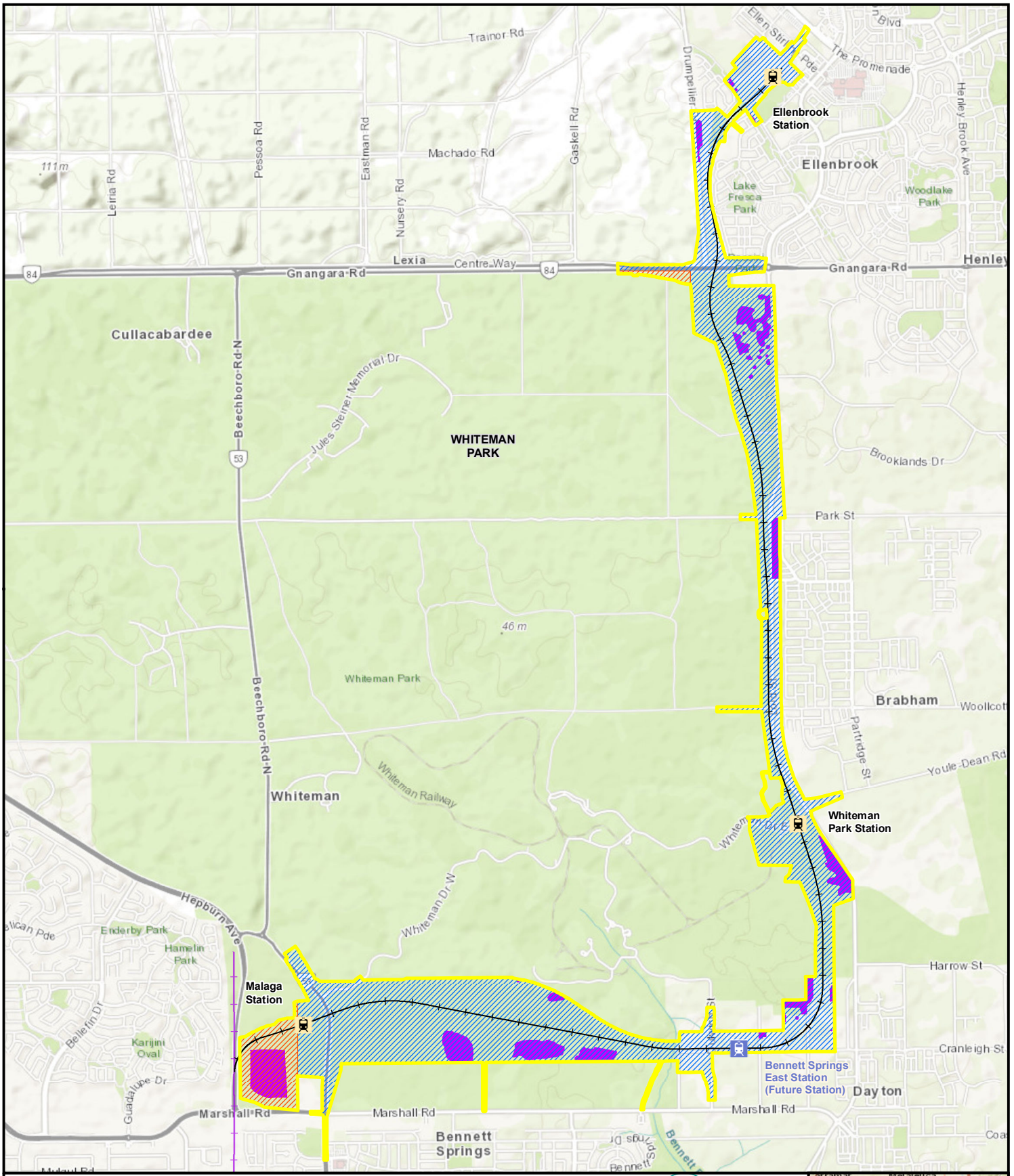
The CEMP is one of three Management Plans prepared by the PTA that will be implemented to address the key construction environmental risks associated with the Proposal.

The Patch 1/Patch 5 Banksia Woodland Threatened Ecological Community Management Plan (TECMP) addresses the key risk of the Proposal, which is the potential for indirect impacts on areas of TEC at Patch 1 and Patch 5, specifically the potential impacts and management requirements on the two identified Banksia Woodland TECs, known as Patch 1 and Patch 5 TEC, which occur either within or adjacent to the Development Envelope. These TECs are also synonymous with a State listed Priority Ecological Community (PEC). **Figure 2** illustrates the area where this management plan is implemented. This CEMP has been prepared to manage the potential impacts of construction on environmental values in areas not covered by the TECMP. Where the environmental impact assessment for the Proposal has demonstrated a lower risk of indirect impacts as a result of construction of the Proposal, **Figure 2** illustrates the area where this management plan is implemented.

A Noise and Vibration Management Plan (NVMP) for the Proposal is also attached to the ERD to address the Proposal's noise and vibration impacts to sensitive receptors at specific locations adjacent to the Development Envelope.

Once detailed design for the Proposal is complete, as guided by this CEMP, the Construction Contractor will prepare a CEMP and associated plans (such as Dewatering Plans, Acid Sulfate Soils Management Plan, etc) to be approved by the PTA. The Construction Contractor CEMP and associated plans will include more detailed instruction on day to day site-specific management of construction activities.

This CEMP does not address the management of environmental offsets, which are detailed in the Offsets Strategy for the Proposal attached to the ERD.



METRONET | Malaga to Ellenbrook Rail Works

Figure 2 **Management Plan Application Areas within the Development Envelope**

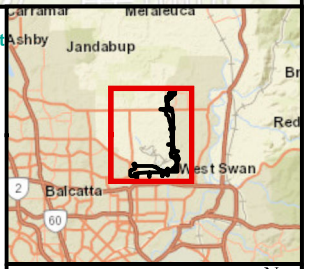
Public Transport Authority

Legend

- Development Envelope
- Native Vegetation Retention Area
- Proposed Railway Station
- Proposed Railway Station (Future)
- Indicative Railway Alignment

Management Plan

- CEMP
- TECMP



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2. Context, scope and rationale

2.1. Key environmental factors

The ERD identifies five preliminary key environmental factors that are relevant to the construction phase of the Proposal, as follows:

- Flora and Vegetation.
- Terrestrial Fauna.
- Terrestrial Environmental Quality.
- Inland Waters.
- Social Surroundings.

The key environmental factors, EPA objectives and activities of the Proposal relevant to the factors are summarised in **Table 1**.

Table 1: Key environmental factors, EPA objectives and relevant activities of the Proposal

Factor	EPA objective	Proposal activity
Flora and vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	• Clearing of native vegetation. • Cut and fill works including excavation, soil disturbance, compaction, movement and stockpiling. • Construction of permanent and temporary infrastructure (and alteration of landscape) • Operation and refuelling of plant, machinery and vehicles (including dust). • Temporary dewatering and/or groundwater abstraction. • Hot works (e.g. welding, grinding and use of power tools).
Terrestrial Fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	• Clearing of native vegetation. • Cut and fill works including excavation, soil disturbance, compaction, movement and stockpiling • Construction of permanent and temporary infrastructure • Operation and refuelling of plant, machinery and vehicles (including the generation of dust and noise emissions) • Hot works (e.g. welding, grinding and use of power tools). • Lighting and noise during construction.

Factor	EPA objective	Proposal activity
Terrestrial Environmental Quality	To maintain the quality of land and soils so that environmental values are protected.	• Clearing of native vegetation. • Cut and fill works including excavation, soil disturbance, compaction, movement and stockpiling. • Construction of permanent and temporary infrastructure (and alteration of landscape). • Operation and refuelling of plant, machinery and vehicles. • Temporary dewatering and/or groundwater abstraction. • Waste Disposal and discharge of dewatering effluent. • Storage and handling of chemicals and fuels.
Inland Waters	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.	• Clearing of native vegetation. • Cut and fill works including excavation, soil disturbance, compaction, movement and stockpiling. • Construction of permanent and temporary infrastructure (and alteration of landscape). • Operation and refuelling of plant, machinery and vehicles). • Temporary dewatering and/or groundwater abstraction. • Waste Disposal and discharge of dewatering effluent. • Storage and handling of chemicals and fuels.
Social Surroundings	To protect social surroundings from significant harm.	• Clearing of native vegetation. • Cut and fill works including excavation, soil disturbance, compaction, movement and stockpiling. • Construction of permanent and temporary infrastructure (and alteration of landscape). • Operation and refuelling of plant, machinery and vehicles (including the generation of dust and noise emissions)

2.2. Other environmental factors or matters

The ERD identifies the following other environmental factors or matters relevant to the Proposal:

- Air Quality.
- Principle of Waste Minimisation.
- Matters of National Environmental Significance (MNES).

Air Quality and the Principle of Waste Minimisation are not within the scope of this CEMP. However, the management and disposal of wastes addressed in Terrestrial Environmental Quality and Inland Waters factors of the ERD are included in **Section 2.3** and in the Provisions sections (**Section 3** and **Schedule 1**).

The management of MNES are covered in the Flora and Vegetation and Terrestrial Fauna key environmental factors in **Section 2.3** and in the Provisions sections (**Section 3** and **Schedule 1**).

2.3. Environmental Surveys

Numerous environmental studies have been undertaken within the Development Envelope relating to the five key environmental factors. The key findings of these studies are outlined in the ERD and in the management plans and strategies listed in **Section 2.5**. These findings have been used to inform the development of appropriate management actions to minimise environmental impacts of the Proposal.

2.4. Significant Environmental Values, Aspects and Impacts

The ERD identifies predicted impacts that the Proposal's activities may have on the environmental factors and matters described above. The location and distribution of environmental values and environmental conditions affected by the Proposal are shown in numerous figures within the ERD.

The activities, aspects, affected environmental values and potential impacts are presented in **Table 2** with an overview of the key aspects requiring management provided below.

2.4.1. Flora and Vegetation

The Proposal will result in the loss of 59.9 ha of intact native vegetation (native vegetation that has been assessed to be in Degraded condition or better), which includes portions of the Commonwealth listed Banksia Woodlands of the Swan Coastal Plain TEC, Conservation Category Wetlands, Groundwater Dependant Vegetation and regionally significant vegetation within Bush Forever Site 304 of Whiteman Park. No impacts to Threatened or Priority species will occur as a result of the Proposal, although the Proposal will result in permanent loss of some inferred suitable *Caladenia huegelii* habitat.

Potential indirect impacts to flora and vegetation include reduction in vegetation health beyond the Development Envelope as a result of impacts associated with groundwater drawdown for construction purposes, the potential for dieback and weeds to be spread to currently uninfested areas and surface water runoff, sedimentation and erosion. Management measures have been identified that will assist PTA to avoid and minimise impacts to flora and vegetation, and where practicable, rehabilitation is proposed to restore temporary impacts. The inclusion, and ongoing protection, of Native Vegetation Retention Areas (NVRAs) throughout the Development Envelope is a key feature of PTA's management strategy for managing impacts to flora and vegetation and fauna habitat.

2.4.2. Terrestrial Fauna

The Proposal will result in the loss of 81.4 ha of Black Cockatoo foraging habitat, 30.3 ha potentially suitable roosting habitat and 423 Black Cockatoo potential breeding trees, including 33 with hollows that have been assessed as not suitable for breeding. PTA has designed the Footprint to avoid Black Cockatoo habitat wherever practicable. NVRAs will protect 25 ha of foraging habitat and 201 Black Cockatoo potential nesting trees, including 4 with hollows.

Potential impacts to Carter's freshwater mussels (*Westralunio carteri*) have been assessed as unlikely to occur due to the distance of the Proposal from any recorded populations and the low likelihood that populations would occur within the Footprint. Dewatering will not cause any known habitat to dry, and the proposal will not increase salinity or nutrient loads that would cause habitat quality to decline. However, the CEMP includes measures to manage the risk of accidental spills, including requirements that hazardous chemicals and fuels are stored away from water ways, and sedimentation risk from Bennett Brook Bridge construction.

The Proposal area has been identified as potentially suitable for supporting Black-stripe Minnow (*Galaxiella nigrostriata*) habitat. The Black-stripe Minnow preferred habitat includes shallow, seasonal, tannin stained waters. Although some suitable habitat has been identified within and adjacent to the Development Envelope, the species is believed to be locally extinct and as such, the proposal is not expected to have an impact on this species.

Other potential direct and indirect impacts to fauna include fauna injury from strikes by vehicles and machinery during construction and degradation of habitat due to altered surface and groundwater conditions or spread of weeds and disease.

2.4.3. Terrestrial Environmental Quality

The Proposal has the potential to disturb Potential Acid Sulfate Soils as a result of excavations for construction purposes. Disturbance of PASS can impact environmental values through the acidification of ground and surface water and mobilisation of metals, which can then impact wetlands and native vegetation. There is a low risk of encountering contaminated soils or groundwater during construction activity. PTA has prepared an ASS Management Strategy that will be used to guide the Construction Contractor's approach to management of excavations and potential ASS risk during construction. The PTA's Unexpected Finds Procedure will manage environmental impacts associated with encountering hazardous materials or chemicals of concern as a result of historical fly tipping or land use practices. The CEMP also includes measures to manage the risk of accidental spills during construction activities, including the management of hazardous chemicals and fuels.

2.4.4. Inland Waters

The Proposal lies above the southern flank of the Gnangara Groundwater System. The system contains a shallow, unconfined superficial aquifer (commonly referred to as the Gnangara Mound), overlying the deep mostly confined Leederville aquifer overlying the deepest confined Yarragadee aquifer. The Gnangara groundwater mound provides a significant resource of drinking water for the Perth metropolitan region and as such is proclaimed as a Public Drinking Water Source Area (PDWSA) and an underground water pollution control area (UWPCA) (WAPC 2003). The Development Envelope intercepts Priority 1, 2 and 3 PDWSA areas. Management measures have been identified that will assist PTA to avoid and minimise impacts to the Gnangara Mound groundwater resource.

Water abstraction for construction water and dewatering for construction activities below groundwater levels have the potential to impact groundwater dependant ecosystems such as wetlands and phreatophytic vegetation. PTA has assessed the extent of drawdown likely to be required for construction of elements of the Proposal, including the dive structure at Tonkin Highway, bridge crossings at Bennett Brook and Gnangara Road and at the proposed stations. Drawdown is considered manageable, with drawdown beyond the Development Envelope limited to levels comparable to current seasonal groundwater variations. PTA will prepare Dewatering Plans for any dewatering activities, which will include provisions for monitoring the extent and depth of drawdown at sensitive receptors.

The most significant surface water features within and close to the Development Envelope are Bennett Brook and wetlands within its 217 km^2 catchment. The positioning of a linear embankment across the landscape has the potential to impact surface water movement across the Proposal, which has the potential for indirect impacts to wetlands and other surface water features, including Bennett Brook, Horse Swamp and associated riparian vegetation. The design will incorporate adequate drainage to ensure surface water can continue to move across the landscape in such a way as to maintain existing environmental values outside the Development Envelope. The potential impacts to Bennett Brook and wetlands such as Horse Swamp, including surface runoff, erosion and siltation arising from construction activities such as Bennett Brook Bridge and Whiteman Park car park, will be controlled through the implementation of this CEMP.

Several Conservation Category and Resource Enhancement Wetlands will be directly impacted by the Proposal as a result of clearing. Indirect impacts associated with impacts to ground and surface water movement will be managed through appropriate measures including minimising the duration of activities resulting in groundwater drawdown, positioning groundwater bores a sufficient distance from Conservation Category and Resource Enhancement Wetlands and reinjecting dewater as close to abstraction as practicable. Surface water movement and quality will be maintained through appropriate drainage design, including appropriately sized and positioned culverts, gross pollutant traps and oil water separators.

2.4.5. Social Surrounds

Direct impacts to Aboriginal Heritage sites have been avoided wherever practicable, with unavoidable impacts identified in Section 18 consent applications submitted to the Department of Aboriginal Affairs. PTA has amended the design to minimise impacts on these sites, including the realignment of the rail access road around a part of Site 551 considered to contain significant heritage values. Noise and vibration impacts from construction are anticipated to be managed to an acceptable level via the implementation of the NVMP, the CEMP and out of hours noise management plans by the Construction Contractor. Given the urban context of the development, the Proposal's construction activities are not expected to have significant visual amenity impacts.

Table 2: Summary of the environmental factors, Proposal activities, affected environmental values and potential impacts of the Proposal

Activity with potential to impact factor	Aspect / Sub Activity or threatening Process (item reference in Schedule 1)	Affected environmental values and existing conditions	Potential impacts and risks
Flora and Vegetation			
Clearing of vegetation **Vehicle and machinery use and movement** **Earthworks and construction** **Dewatering and/or groundwater abstraction**	• Clearing of vegetation (FV1) • Construction of permanent and temporary infrastructure including rail, roads, buildings, hard stand, carparks and laydown areas (FV1) • Revegetation (FV5). • Introduction and spread of weeds, new Declared Weed infestations (FV2) • Introduction and spread of *Phytophthora* dieback (FV3) • Movement and stockpiling of topsoil, mulch and imported fill (FV4) • Unauthorised access to adjacent vegetation by vehicles or on foot (FV2 & 3) • Generation of dust (FV6) • Activities which may cause bushfire e.g. hot works (FV7). • Drawdown and alteration of hydrology (FV8).	• Intact native vegetation in Native Vegetation Retention Areas (NVRAs). • Threatened and Priority Ecological communities (TEC and PEC). – Banksia Woodland of the Swan Coastal Plain TEC – Low-lying *Banksia attenuata* woodlands or shrublands (FCT21c, FCT23b PEC) • Threatened and Priority flora - • *Anigozanthos humilis* subsp. *chrysanthus* (Priority 4) • Bush Forever Site 304 Whiteman Park. • Geomorphic wetlands and riparian corridors: – three Conservation Category Wetlands (CCWs) - Bennett Brook, Horse Swamp, Mussel Pool – four Resource Enhancement Wetlands (REW) • Two ecological linkages (Greenways 13 and 32) • Wetland and terrestrial Groundwater Dependent Ecosystems (GDEs).	Direct Impacts: • Permanent loss of vegetation in the Footprint including: – Bush Forever site 304 Whiteman Park including native vegetation associated with CCW wetlands, Bennett Brook and wetland GDEs. – Banksia Woodland of the Swan Coastal Plain TEC listed as Endangered under the EPBC Act and listed as Banksia Dominated Woodlands of the Swan Coastal Plain Priority 3 by DBCA. – Other Intact native vegetation. – Other wetland GDEs and terrestrial GDEs both which provide important ecological functions for wetland systems. – Inferred suitable *Caladenia huegelii* habitat. Indirect Impacts: • Introduction and spread of declared pests and other weed species to adjacent native vegetation. • Introduction and spread of *Phytophthora* dieback to adjacent native vegetation. • Decline in wetland and terrestrial GDE, riparian vegetation, TEC and PEC condition as a result of contamination, altered surface water runoff, sedimentation and erosion (e.g. Bennett Brook construction). • Decline in condition of wetland and terrestrial GDEs including TEC/PEC, as a result of drawdown and alteration of hydrology. • Dust deposition on surrounding vegetation.
Terrestrial Fauna			
Clearing of vegetation **Vehicle and machinery use and movement** **Earthworks and construction** **Dewatering and groundwater abstraction**	• Clearing of native vegetation (fauna habitat) (TF1, TF4). • Vehicle collisions with fauna (TF2). • Introduction and spread of Phytophthora dieback and weeds (TF2). • Unauthorised access to adjacent vegetation by vehicles or on foot (TF2). • Cut and fill works, including excavations and trenches (TF3). • Construction of permanent and temporary infrastructure including rail, roads, buildings, hard stand, laydown areas and fencing (TF3). • Activities which may cause bushfire e.g. hot works (TF5) • Lighting (and noise) during construction and operation (TF3) • Drawdown and alteration of hydrology (TF6)	• Four species of conservation significance have been recorded within the Development Envelope: – Carnaby's Cockatoo (*Calyptorhynchus latirostris)* (Endangered) – Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable) – Quenda (*Isodon obesulus*) – Rainbow Bee-eater (*Merops ornatus*). • Six conservation significant fauna species have the potential to occur in the Development Envelope (ELA 2020): – Baudin's Cockatoo (vagrant) (*Calyptorhynchus baudinii*) – Western Brush Wallaby (*Macropus Irma*) – Water Rat, Rakali (*Hydromys chrysogaster*) – Black-striped Snake (*Neelaps calonotos*) – Jewelled Sandplain (*Ctenotus gemmule*) – Peregrine Falcon (*Falco peregrinus*)	Direct Impacts: • Direct and indirect impacts to fauna habitat due to clearing and construction of infrastructure. – Permanent loss of Black Cockatoo foraging and roosting habitat and potential breeding trees: – 81.4 ha of Carnaby's Black Cockatoo foraging habitat. – 68.1 ha of Forest Red-tailed Black Cockatoo foraging habitat. – Removal of 423 Black Cockatoo potential breeding trees. – Fragmentation of fauna habitat within the Development Envelope, particularly within the Marshall Paddocks area of Whiteman Park. • Injury or mortality to fauna from vehicle and machinery movement. • Indirect Impacts: • Injury or mortality to fauna entering excavated areas • Short term impacts from noise, vibration, dust and light during construction to fauna numbers, movement and behaviour. • Changes in feral animal abundance and/or movement. • Degradation of fauna habitat due to introduction and spread of declared pests and other weed species and/or *Phytophthora* dieback. • Habitat degradation through altered hydrology and edge effects. • Reduction in quality of aquatic fauna habitats downstream of proposed works and permanent infrastructure from contamination of surface water, increased sediment loads, altered surface hydrology. • Reduction in extent of aquatic habitat as a result of dewatering. • Disruption or disturbance to fauna as a result of noise, vibration, light and dust emissions.

Activity with potential to impact factor	Aspect / Sub Activity or threatening Process (item reference in Schedule 1)	Affected environmental values and existing conditions	Potential impacts and risks
		• Foraging and roosting habitat suitable for all three Black Cockatoo species - 680 Black Cockatoo potential breeding trees within the Development Envelope, including 40 with hollows. • Listed migratory species - Glossy Ibis (*Plegadis falcinellus*). • Ecological connectivity - Kangaroo population movement. • Potential habitat for conservation significant aquatic fauna species Carter's Freshwater Mussel and Black-stripe Minnow.	
Terrestrial Environmental Quality			
Clearing of vegetation and earthworks **Dewatering and/or groundwater abstraction** **Use and storage of fuel and chemicals and waste handling**	• Disturbance of Acid Sulfate Soils (ASS) (TEQ1) • Disturbance of known or suspected contaminated sites (TEQ2) • Stockpiling activities (TEQ3) • Temporary dewatering of ASS (TEQ6) • Drawing in of contaminated groundwater (TEQ7) • Discharge of dewatering effluent (TEQ4) • Contamination from spills, such as from refuelling and plant and vehicle fluid leaks (TEQ5) • Inappropriate waste storage or disposal (TEQ4).	• Soil quality: – Acid Sulfate Soils (ASS) present between Malaga Station and Bennett Springs Station and north of Whiteman Park Station to south of Ellenbrook Station – Potential soil contamination at Swan Valley Egg Farm. • Groundwater quality: – Gnangara groundwater mound proclaimed Public Drinking Water Source Area (PDWSA), including a declared underground water pollution control area (UWPCA). – Contaminated groundwater plume at former Lexia Landfill.	Direct: • Excavation of ASS resulting in contamination of soils and groundwater • Disturbance of known or suspected contaminated sites resulting in contamination of soils • Localised contamination of soils from stockpiling activities • Contamination from the release of waste products (including dewatering effluent) • Localised and temporary dewatering of ASS resulting in contamination • Dewatering near known or suspected contaminated sites resulting in the spread of contamination • Leaks and spills from storage and handling of fuels and chemicals resulting in contamination of soils. Indirect: • Impacts to groundwater users caused by groundwater contamination • Loss of biodiversity in GDEs.
Inland Waters			
Construction water supply abstraction **Dewatering abstraction** **Earthworks and construction**	• Temporary abstraction for construction supply purposes (IW1) • Excavation and construction of roads, buildings and other hard stand areas (IW1, IW5, IW6) • Construction of rail formation, bridges and culverts (IW1, IW5, IW6) • Temporary abstraction for dewatering purposes (IW2 - IW4) • Temporary reinjection of dewatering effluent (IW4) • Excavation and construction of roads, buildings and other hard stand areas (IW1, IW5, IW6) • Construction of rail formation, bridges and culverts. (IW1, IW5, IW6).	• Hydrological processes • Groundwater resource (level and quality) in superficial aquifer – Gnangara groundwater mound proclaimed Public Drinking Water Source Area (PDWSA), including a declared underground water pollution control area (UWPCA). • Bennett Brook surface water quality and quantity -. • Geomorphic wetlands and riparian corridors - five Conservation Category Wetlands (CCWs), four Resource Enhancement Wetlands (REWs) and eight Multiple Use Wetlands (MUWs). • Groundwater dependent ecosystems, riparian vegetation.	Direct: • Decrease of groundwater availability to existing users and GDEs. • Interruption of or changes to surface water flows (e.g. Bennett Brook and Horse Swamp). • Decrease in the quality of surface water due to contamination from spills, incidents or uncontrolled surface water flows. • Changes in wetland hydrology resulting from dewatering or inappropriate stormwater management. • Loss of CCW and REW habitats within the Development Envelope. Indirect: • Degradation of CCWs and REWs (e.g. Bennett Brook and Horse Swamp) though sedimentation, weed infestation from adjacent ground disturbance, and changes in water quality or hydrological regimes. • Potential impacts to groundwater levels and quantity due to potential dewatering and/ or groundwater abstraction • Temporary change in groundwater levels associated with construction activities. • Temporary changes to the groundwater quality within the Gnangara UWPCA.

Activity with potential to impact factor	Aspect / Sub Activity or threatening Process (item reference in Schedule 1)	Affected environmental values and existing conditions	Potential impacts and risks
			• Changes to surface water flows or hydrological regimes in riparian areas. • Degradation of CCW and REW habitats adjacent to the Development Envelope.
Social Surroundings			
Vegetation clearing and earthworks **Vehicle and machinery use and movement** **Construction**	• Clearing of native vegetation (SS1) • Cut and fill works including temporary impacts associated with excavation activities, soil movement and stockpiling (SS1) • Construction activities associated with building the railway including rail infrastructure, stations, roads, buildings and other hard stand areas (SS1, SS2, SS3) • Operation of plant, machinery and service vehicles (SS1, SS3) • Soil compaction (SS1, SS3) • Closure of some ungazetted access tracks into Whiteman Park (SS2).	• Aboriginal Heritage Sites – Registered Aboriginal Heritage Site ID 551, Site ID 552, Site ID 3692 (Bennett Brook in Toto). • Historical and Natural Heritage – Whiteman Park recreational/ tourism value. • Noise and Vibration – sensitive receptors in residential and recreational areas near the railway and associated infrastructure.	Direct: • Direct and potential indirect impacts to Registered Aboriginal Heritage Sites • Decrease in operational area of Whiteman Park • Potential for increased risk of bushfire due to construction and operation of the electrified railway and changes to emergency access to Whiteman Park. • Restriction of access to Whiteman Park cultural and recreational facilities. • Noise disturbance to recreational and tourism areas in Whiteman Park • Temporary exposure to construction noise and vibration for sensitive receptors in residential areas near the railway and associated infrastructure. • Temporary exposure to construction noise and vibration for users of recreational areas near the railway and associated infrastructure. Indirect: • Increased noise from vehicle movements during construction impacting the amenity of landowners and users of nearby recreational areas. • Temporary changes to recreation visual amenity, access pathways and function of social, recreational and tourism areas during construction.

2.5. Management approach

This CEMP has been developed to minimise impacts from the Proposal's construction activities on the five key environmental factors identified in **Section 2.1**, through targeted management of these activities,.

The general approach for managing any potential construction impacts has been informed by the results of the environmental studies, surveys and assessments undertaken to support the Proposal, as reported in the ERD (see **Section 2.3**), as well as anticipated project activities (**Section 2.6**). The management approach has also been informed by best practice and recent experience with the management of similar linear infrastructure projects in Western Australia.

PTA's environmental management approach applies the mitigation hierarchy and is risk-based. Management focuses first on avoiding significant residual impacts to the key environmental factors caused by construction of the Proposal. Where impacts are unavoidable, management measures aim to minimise the duration, intensity and/or extent of construction impacts to key environmental factors.

This CEMP outlines the management actions, management targets, monitoring and contingency actions designed to meet the environmental objective for each key environmental factor.

The ERD also identifies that where aspects of the Proposal result in significant residual impacts, PTA will counter-balance these impacts by implementing an Offsets Strategy. The management of offsets is not directly addressed by this CEMP.

As discussed in **Section 1.3**, the key risk of the Proposal (the potential for direct and indirect impacts on areas of TEC at Patch 1 and Patch 5), has been managed by the development of the Patch 1/Patch 5 Banksia Woodland TECMP. This CEMP has been prepared to manage the potential construction impacts on environmental values in portions of the Development Envelope not covered by the TECMP (**Figure 2**).

To supplement this CEMP, a Construction Contractor CEMP will be developed and implemented, as well as other supporting plans, which will include more detailed instruction on day to day management of construction activities and the systems and processes in place to facilitate management of environmental impacts.

The PTA Major Projects Division also has a number of procedures that provide a standard process for environmental management during rail construction projects. These procedures will be referenced and utilised by the Construction Contractor as part of the proponent's adaptive management system and include:

- Environmental Spatial Data Procedure (7310-000-002).
- Ground Disturbance Procedure (7310-000-001).
- Unexpected Finds Procedure (73100-000-003).
- Spill Response Framework and Procedure (Environmental Management System Manual – 5.2 Storage and Handling of Hazardous Substances and Dangerous Goods).
- Incident Reporting Procedure (7210-000-003).
- Environmental Obligations Register Template (7303-000-001).
- Contractor Monthly Environmental Report Template (7360-000-003).

2.6. Key assumptions and uncertainties

The key assumptions within this plan include:

- The CEMP is one of three Management Plans prepared by the PTA that will be implemented to address the key construction environmental risks associated with the Proposal, the others being the Patch 1/Patch 5 Banksia Woodland TECMP and the NVMP.
- This CEMP does not address the management of environmental offsets, which will be addressed in the Offsets Strategy for the Proposal.
- This CEMP does not include detailed instruction on day to day site-specific management of construction activities and the systems and processes in place to facilitate management of environmental impacts. These will be addressed in a Construction Contractor CEMP and associated plans that will be approved by the PTA.
- Timeframes for management actions or monitoring are based on the period of 'construction' the period from when construction works and/or ground disturbance are substantially commenced (i.e. not including preliminary site investigative works, for example) until the substantial completion of the works. The term 'substantial completion' recognises that the change from construction to operations is a transition over a period of time and may occur at different times in different places within the Development Envelope, requiring interpretation on a case by case basis.
- If there is any inconsistency between **Schedule 1** and any other part of this document, **Schedule 1** prevails to the extent of the inconsistency.

3. CEMP Provisions – Management and Response Framework

The provisions within this CEMP have been developed following the outcome of several environmental studies, surveys and assessments undertaken to support the Proposal, as well as regulatory guidance and leading practice environmental management on linear infrastructure projects in Western Australia, as described in **Section 1.4.1**. The provisions were developed in accordance with EPA instructions (EPA, 2020).

The provisions outlined in **Schedule 1** are predominantly management-based and comprise the following for each key environmental factor:

- EPA objective.
- Affected environmental values.
- Environmental aspects (activities or conditions) of the Proposal.
- Objectives defined for the Proposal.
- Management measures to be implemented for each aspect of the Proposal, comprising:
    - Management actions
    - Management targets, thresholds and triggers
    - Monitoring methods
    - Reporting
    - Contingency actions to be implemented only if target(s) are not met
    - Applicable PTA plans and procedures.

Where higher risks have been identified, such as management of potential impacts to the TECs as described in the TECMP, the provisions are outcome-based, where, in order to determine the success of management actions in achieving the environmental objective, trigger and threshold criteria are defined.

Monitoring, reporting and adaptive management are addressed in the following sections as well as in **Schedule 1**.

The objectives, targets, thresholds and triggers for each factor are listed in **Table 3**, and **Schedule 1** should be referred to for details relating to the management measures in place to address these objectives.

Table 3: Key environmental factors, EPA objectives and objectives of the Proposal

Factor	EPA Objective	Proposal Objectives
Flora and vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	• To avoid unapproved clearing of native vegetation outside the Development Envelope or within Native Vegetation Retention Areas. • To ensure that Dieback (*Phytophthora cinnamomi*) is not introduced into disease free areas by construction activities. • To ensure that construction impacts to flora and vegetation due to the introduction or spread of weeds are minimised as far as practicable. • To ensure that construction impacts to flora and vegetation from dust and fire are minimised as far as practicable. • Construction groundwater abstraction and drawdown be managed to avoid any impacts on wetland (riparian) vegetation, Banksia Woodlands TEC or other GDEs outside the Development Envelope wherever practicable. • Avoid the risk of indirect impacts to Whiteman Park, in particular to regionally significant vegetation (degraded or better condition). This includes dieback (where protectable), weed incursion, water runoff, sedimentation and erosion.
Terrestrial Fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	• To protect existing native fauna, avoiding injury or death wherever possible. • To avoid unapproved clearing of Black Cockatoo potential breeding trees and foraging habitat. • Minimise the depth and duration of drawdown at wetlands and permanent pools supporting fauna populations, where practicable.
Terrestrial Environmental Quality	To maintain the quality of land and soils so that environmental values are protected.	• To prevent significant acidification or release of contaminants to the surrounding environment. • To avoid, or where necessary contain and remediate, spills or leaks of fuels, chemicals and wastes to prevent impact to soil, surface water or groundwater.

Factor	EPA Objective	Proposal Objectives
Inland Waters	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected	• To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected: – Groundwater abstraction and drawdown to be managed to avoid any impacts on wetland (riparian) vegetation, Banksia Woodlands TEC or other GDEs outside the Development Envelope wherever practicable. – Protect nearby surface water features, and associated wetland vegetation. – Avoid risks of impacts to Bennett Brook, particularly impacts to riparian vegetation (prevent construction activities in the Brook) and indirect impacts (turbidity, sedimentation, weeds). – Avoid risks of indirect impacts to Horse Swamp (as a result of hydrological changes from surface water quality changes from the addition of the Whiteman Park carpark). – Avoid risks of indirect impacts on Carters Mussel (sedimentation risk from Bennett Brook construction). – Ensure construction activities do not adversely impact Public Drinking Water Areas, particularly within the P1 and Wellhead Protection zone areas. – Reduce the likelihood of ASS activation. – Reduce mobilisation of contaminated groundwater, if present.
Social Surrounds	To protect social surroundings from significant harm.	• To avoid unauthorised access and/or impacts to Registered Heritage Sites. • To avoid permanent restriction of public access to Whiteman Park during construction. • To avoid increased bushfire risk to Whiteman Park resulting from construction activities.

4. Monitoring

To determine whether the management actions and the EPA's objectives for each preliminary key environmental factor are being met, environmental monitoring is proposed as set out in **Schedule 1** and summarised in **Table 4** below.

Detailed monitoring programmes will be defined as part of the Construction Contractor CEMP.

Table 4: Summary of monitoring provisions

Monitoring Frequency	Summary of Monitoring
Ongoing	Flora and vegetation • Monitoring by construction personnel of DFES Fire Danger Ratings (FDRs) during bushfire season to minimise risk of bushfire from construction activities. • Monitoring by the Construction Contractor of vehicle, machinery, equipment, fill/topsoil/mulch compliance with hygiene procedures for the period of construction activities. • Topsoil handling during clearing and revegetation activities, to ensure topsoil is salvaged and spread in accordance with the relevant management actions. Terrestrial Fauna • Inspection by the Construction Contractor for trapped fauna (e.g. fauna trapped in excavations) for the period of construction activities. Terrestrial Environmental Quality • Visual monitoring by the Construction Contractor during the period of construction activities to ensure any potential source of contamination is identified and managed. • Dewatering effluent monitoring by the Construction Contractor in accordance with ASS guidelines. Inland Waters • Quantity of daily abstraction, both instantaneous and cumulative, will be monitored by the Construction Contractor using flow meter readings and inspections. • While dewatering is ongoing, groundwater level and quality monitoring will be undertaken in accordance with ASS guidelines by the Construction Contractor. Social Surrounds • Visual monitoring by the Construction Contractor during the period of construction activities to ensure any potential items of Aboriginal heritage significance identified during construction activities are reported to the Construction Contractor's environment representative.
Weekly	Flora and Vegetation • Weekly visual inspections for evidence of: – the condition of boundary demarcation (including exclusion areas such as NVRAs) compliance with native vegetation clearing controls. – Unauthorised access or clearing, e.g. observations of vehicles or machinery, vehicle tracks, damage to fencing or vegetation. – Vehicle, machinery, equipment, fill/topsoil/mulch compliance with hygiene measures. – The introduction of weeds into sensitive areas. Terrestrial Environmental Quality • Weekly inspections of hazardous materials storage and handling to assess compliance.

Monitoring Frequency	Summary of Monitoring
Monthly	Terrestrial Fauna • Monthly visual observations of marked breeding tree hollows (if found) for signs of disturbance and breeding activity throughout the duration of construction. • Monthly walkover inspections of applied buffers around marked breeding trees (if found) for signs of disturbance, such as temporary fence moved, prematurely vacated nests, broken eggs, and injured or dead fledglings. Inland Waters • On cessation of abstraction from a production well, groundwater level monitoring will continue for a minimum period of 6 months at monthly gauging events.
Six-monthly	Flora and Vegetation • Twice yearly (spring/autumn) visual observations for project attributable spread of: – Arum Lily in Wetlands including Bennett Brook and CCWs impacted by the Proposal. – Cape Tulip in areas of native vegetation including Banksia Woodlands TEC and NVRA at Malaga.
Annually	Flora and Vegetation • *Phytophthora* dieback occurrence mapping to be completed using DPaW (2015) interpreter's manual at the boundary of un-infested areas, Banksia Woodlands TEC and NVRA mapped as un-infested for the construction period.
As required	Flora and Vegetation • Pre-clearing and post-clearing photographs of vegetation cleared. • On ground measurement (by surveyor) of clearing locations and extents. • Imported fill will be managed using a material tracking system, comprising a register with details relating to the material including but not limited to, import and export volumes, reuse locations, importation/quarry certificates and sample locations and results (if required). Terrestrial Fauna • Black Cockatoo potential breeding trees to be inspected prior to clearing to identify any resident Black Cockatoo's. • Vegetation to be cleared shall be searched by a fauna specialist prior to clearing Terrestrial Environmental Quality • Treated ASS will be tested by the Construction in accordance with ASS guidelines. • The Construction Contractor shall maintain a register of stockpile locations, the origin, relevant sample locations and results and transport details for offsite disposal. • The Construction Contractor shall track waste management through implementation of a waste register including waste locations, origin and transport details for offsite disposal. • The Construction Contractor shall inspect spill containment compounds for presence of spills or contaminated rainwater, as soon as practicable after any significant rainfall event and following tank refuelling. • In the event that a major spill occurs, the Construction Contractor shall consider groundwater and/or surface water monitoring in consultation with the relevant agencies. • The Construction Contractor shall monitor dewatering effluent in accordance with ASS guidelines. • The Construction Contractor shall test sediments prior to decommissioning settlement ponds, to determine suitable uses for the materials. Inland waters • The Construction Contractor shall monitor construction water supply wells for groundwater level and quality as per the 5C licence to take water and associated GLOS.

Monitoring Frequency	Summary of Monitoring
	• The Construction Contractor shall monitor surface water levels and water quality at identified surface water features. • The Construction Contractor shall conduct visual inspection of embankments during construction for evidence of erosion or surface water damming and existing drainage paths and channels to ensure they are not unnecessarily blocked or restricted. • The Construction Contractor shall monitor flow rate and water quality at any point where water discharges off-site or to a recognised wetland (e.g. project stormwater runoff, dewatering effluent disposal). Social Surrounds • The PTA Communications Manager shall track community feedback for the duration of construction activities. • The Construction Contractor shall monitor noise and vibration emissions during construction. • The Construction Contractor shall monitor noise levels for works outside of standard construction hours (if required) in accordance with an Out of Hours NVMP.

Note: if there is any inconsistency between **Table 4** and **Schedule 1**, the monitoring provisions in **Schedule 1** prevail to the extent of the inconsistency.

5. Reporting

5.1. Contractor reporting

The Construction Contractor will prepare a monthly report for the PTA to document results of weekly and monthly inspections and monitoring, in accordance with the PTA Contractor Monthly Environmental Report Template (7360-000-003).

Throughout the duration of construction activities, potential non-compliances or significant findings, will be documented and reported to the relevant authority, as required by the PTA Environmental Manager.

Reporting commitments are identified in the monitoring column within the tables in **Section 3** and **Schedule 1**.

5.2. Regulator reporting

The Construction Contractor will report all environmental incidents to the PTA and where appropriate the PTA will report environmental incidents and occurrences to the relevant regulators, in accordance with **Schedule 1** and the Construction Contractor CEMP.

5.3. Public availability

PTA will ensure the CEMP is made publicly available.

5.4. Auditing

This CEMP will be audited annually during construction to ensure compliance with and relevance of the proposed management actions, or in response to a significant incident or non-conformance.

6. Adaptive management and review

6.1. Adaptive management

The PTA will implement adaptive management to respond to issues identified in the implementation of management measures, monitoring and evaluation against the management targets, to more effectively meet the environmental objectives.

Adaptive management specific to each of the identified key environmental factors is described in the contingency actions provided in **Section 3** and **Schedule 1**.

6.2. Review of this CEMP

The PTA is committed to providing the highest standard of environmental management to construct the Proposal. This CEMP will be monitored, reviewed and amended to achieve leading practice environmental management. The commitment for review of this CEMP occurs:

- After the first twelve months of implementation.
- If one or more management targets are not being met and adaptive management is required.
- Where there is a significant change to the project and/or construction activities.

The management actions and associated provisions in this plan may need to be modified, due to:

- Changes to construction methods and timing.
- Trends being observed in monitoring data indicating a risk to meeting any EPA key environmental factor objective. Improved environmental management techniques or methods.
- New or revised information becoming available.
- Changes in regulatory or corporate requirements.
- If directed by DWER or DAWE.
- Other triggers of adaptive management.

7. Roles and responsibilities

A summary of the key personnel involved in implementation of the CEMP and their roles and responsibilities is provided in **Table 5**. Roles and responsibilities more specific to the implementation of management measures outlined in **Section 3** and **Schedule 1** will be addressed in the Construction Contractor CEMP.

Table 5: Roles and responsibilities

Role	Responsibility
PTA	• Overall responsibility for the implementation of this CEMP. • Audit compliance of the Construction Contractor and other delegates with the requirements of this CEMP including the implementation of any contingency actions. • Regulatory reporting.
Construction Contractor	• Overall accountability for auditing and compliance assessment of alignment with this CEMP to ensure objectives and targets are achieved • Preparation of a comprehensive, targeted and site-specific Construction Contractor CEMP to specifically address all requirements of this CEMP. • Undertaking ongoing monitoring and documenting monitoring results • Assess the performance against targets. • Liaise with stakeholders and technical advisors for advice and resolution of management aspects/objectives as required. • Review and close out any contingency actions. • Report as required to regulating authorities. • May delegate all or part responsibility to an appropriately qualified person. • Provide immediate incident reporting to PTA and monthly project environmental performance reporting to PTA. • Comply with all legal requirements and the requirements of this CEMP. • Ensure staff employed are adequately trained in CEMP requirements. • Ensure all personnel involved in the project will adhere to CEMP requirements. • Seek advice from PTA when in doubt about requirements.
All personnel	• Must receive induction prior to commencement of work on site. • Comply with all legal requirements and the requirements of this CEMP. • Report incidents to their Construction Contractor supervisor or PTA Project Manager. • Attend environmental inductions and any other training required. • Participate in toolbox meetings and suggest improvements to the CEMP.

8. References

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9. Schedule 1 – CEMP Provisions Summary

Flora and Vegetation

EPA's objective: to protect flora and vegetation so that biological diversity and ecological integrity are maintained.

Affected values:

- Native vegetation – The Proposal includes clearing 59.8 ha of intact native vegetation, with the remaining 189.2 ha mapped as Completely Degraded or Cleared.
- Threatened and Priority Ecological communities (TEC and PEC) - Two Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia Woodlands TEC) patches have been mapped within and adjacent to the Development Envelope (RPS 2020). This TEC is synonymous with the Banksia Dominated Woodlands of the SCP PEC:
  - at the proposed Malaga Station (Patch 1 Malaga TEC/PEC).
  - in the vicinity of Gnangara Road (Patch 5 Gnangara TEC/PEC).
  - one occurrence of FCT23b Northern *Banksia attenuate – Banksia menziesii* woodlands within the Gnangara TEC/PEC.
- Threatened and Priority flora - One population of *Anigozanthos humilis* subsp. *chrysantha* (Priority 4) occurs in the Development Envelope.
- Bush Forever site 304 Whiteman Park will be reduced by 64.7 ha of which 17.1 ha is in Good to Degraded or better condition and likely to reflect regional significant vegetation.
- Two ecological linkages (Greenways 13 and 32) are intersected by the Proposal including 0.77 ha of Greenways 13 (Bennett Brook) and 3.18 ha of Greenways 32.
- Direct loss of 13.6 ha of wetland Groundwater Dependent Ecosystems (GDEs) and 15.9 ha of terrestrial GDEs.
- Two Declared Pest infestations including Arum Lily (**Zantedeschia aethiopica*) at Bennett Brook and Cape Tulip (**Moraea flaccida*) in Whiteman Park paddocks.

Environmental aspects:

- FV1 – Clearing of native vegetation and ground disturbance.
- FV2 – Vehicle and machinery use and movement introducing or spreading weeds, New Declared Weed infestations.
- FV3 – Vehicle and machinery use and movement introducing or spreading *Phytophthora* dieback.
- FV4 – Topsoil, mulch and imported fill.
- FV5 – Revegetation of Bennett Brook temporary construction area.
- FV6 – Dust deposition on vegetation.
- FV7 – Bushfire.
- FV8 – Dewatering and abstraction impacting wetland (riparian) vegetation, Banksia Woodlands TEC or other GDEs

Proposal Objectives:

- To avoid unapproved clearing of native vegetation outside the Development Envelope or within Native Vegetation Retention Areas.
- To ensure that Dieback (*Phytophthora cinnamomi*) is not introduced into disease free areas by construction activities.
- To ensure that construction impacts to flora and vegetation due to the introduction or spread of weeds are minimised as far as practicable.
- To ensure that construction impacts to flora and vegetation from dust and fire are minimised as far as practicable.
- Construction groundwater abstraction and drawdown be managed to avoid any impacts on wetland (riparian) vegetation, Banksia Woodlands TEC or other GDEs outside the Development Envelope wherever practicable.

ID and Aspect	Management action	Management Target, Threshold, Trigger[1]	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
FV1 – Clearing of native vegetation and ground disturbance	• Manage clearing of vegetation in accordance with the **PTA Ground Disturbance Procedure** (7310-000-001) and **PTA Environmental Spatial Data Procedure** (7310-000-002). • No land clearing or ground disturbance work is to be undertaken until a Ground Disturbance Permit (GDP) has been signed and issued by PTA. • Coordinates for clearing extents will be provided to the Construction Contractor. • The extent of works shall be pegged by qualified surveyors in the field.	• No clearing of vegetation outside the Development Envelope and within NVRAs. • No clearing of native vegetation exceeding specified amounts (ha) of clearing (as per approval). • No CCW wetland will be permanently removed in its entirety.	• Weekly visual inspections for evidence of: – the condition of boundary demarcation (including exclusion areas such as NVRAs) compliance with native vegetation clearing controls. – Unauthorised access or clearing, e.g. observations of vehicles or machinery, vehicle tracks, damage to fencing or vegetation.	• All clearing breaches will be reported to PTA immediately as an incident in accordance with the **Incident Reporting Procedure** (7210-000-003). • Report unauthorised clearing to the Department of Water and Environmental Regulation (DWER) as soon as practicable.	• Temporarily cease clearing activities. • Review clearing boundaries • Investigate cause and extent of over clearing • Report over clearing to regulators • Determine and implement mitigation of impacts in consultation with regulators • Confirm all areas to be retained are clearly identified	• PTA Environmental Spatial Data Procedure (7310-000-002) • PTA Ground Disturbance Procedure (7310-000-001) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003)

[1] All targets apply to impacts attributable to construction only.

ID and Aspect	Management action	Management Target, Threshold, Trigger[1]	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• Activities near environmentally sensitive areas (ESAs) (including the Banksia Woodland TEC, Conservation Category and Resource Enhancement Wetlands, Bush Forever Site 304) shall be closely reviewed. Where possible, setbacks or adjustments to reduce impacts shall be agreed in the field. • Native Vegetation Retention Areas (NVRAs) have been designated within the Development Envelope and are excluded from the indicative Disturbance Footprint. The purpose of these areas is to retain patches of native vegetation within the Development Envelope. • Avoidance sites (including NVRAs and ESAs adjacent to the Development Envelope such as the TECs) must be clearly and effectively delineated and sign posted, where applicable. • The Development Envelope and NVRAs to be marked on all design drawings as site boundaries. • Cleared areas will be utilised for laydown and temporary construction where practicable. • Areas cleared for the Proposal within the riparian zone of Bennett Brook not required for permanent infrastructure or ongoing management of the railway will be rehabilitated.		• Pre-clearing and post-clearing photographs of vegetation cleared. • On ground measurement (by surveyor) of clearing locations and extents within a week of any clearing event.	• A Project Clearing Permit Register will be maintained and record the total disturbance (hectares) and track against clearing limits. • Shape files and spatial data of clearing will be submitted to PTA in accordance with **Environmental Spatial Data Procedure** (7310-000-002). • Construction Contractor to report clearing data to PTA in monthly environmental reporting.	• Review training of personnel involved in clearing to avoid clearing outside of approved limits •	• Construction Contractor CEMP (to be developed)
FV2 – Vehicle and machinery use and movement introducing or spreading weeds, **New Declared Weed infestations**	• Manage weeds in accordance with the **PTA Ground Disturbance Procedure** (7310-000-001). • Identify weed management zones aligned with significant weed infestations. • Control the infestation of Arum Lily (**Zantedeschia aethiopica*) at Bennett Brook and Cape Tulip (**Moraea flaccida*) in portions of Whiteman Park paddocks within the Development Envelope in accordance with DPIRD guidelines. • Construction Contractor to develop and implement a hygiene management process to control access and movement of vehicles and construction personnel to prevent the introduction and spread of weeds into weed free areas. This process should: – Identify and demarcate areas infested with declared weeds on all drawings. – Control access to areas mapped as infested. – Restrict unauthorised access to and from the Development Envelope by installing temporary fencing, barriers or signage as required. – Ensure all vehicles and machinery observe appropriate hygiene measures as identified in the **Construction Contractor CEMP**. • Require all personnel to complete a site induction that will include hygiene training, including the environmental implications of the introduction and spread of weeds and associated obligations. • Movement of topsoil restricted to within the same weed interpretation mapping. • Source clean fill, gravel and topsoil or other materials from suppliers with appropriate weed control measures.	• No new declared weed species introduced into the development envelope or adjacent environmentally sensitive areas by construction activities. • No weeds introduced or spread by construction activities to weed-free areas in the development envelope and adjacent environmentally sensitive areas.	• Twice yearly (spring/autumn) visual observations for spread of: – Arum Lily in Wetlands including Bennett Brook and CCWs impacted by the Proposal. – Cape Tulip in area of native vegetation including Banksia Woodlands TEC and NVRA at Malaga. • Quarterly vegetation health monitoring (including weeds) to be conducted by a botanist: – Permanent photopoint and 2x2m quadrat (1m radius) around permanent photopoint. – Impact point to be from perimeter of Development Envelope. Reference point to be 50m from impact point. • Weekly visual inspections and spot checks for evidence of:	• Construction Contractor to report identified incidences of spread of weeds or New Declared Pest infestations or other inspection data and non-conformances to PTA in monthly environmental reporting. • Report new incidences of Declared Pest infestations to regulators, as required. •	• Quarantine affected areas (e.g. fencing, signage) • Restrict access to quarantined areas • Investigate cause or source of infestation and extent of vegetation decline • Inspect/survey surrounding area to assess extent of infestation • Review weed hygiene measures for efficacy • Review training and implementation of, weed hygiene measures • Implement control (e.g. spraying, removal) in consultation with regulators • Monitor success of control actions. • For fill, limestone, gravel and topsoil or other materials infested with weed or weed seed, either treat prior to use, reuse at least a depth of 1.5 m under fill, or dispose of appropriately offsite.	• Ground Disturbance Procedure (7310-000-001) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed)

ID and Aspect	Management action	Management Target, Threshold, Trigger[1]	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• Control surface water runoff from infested areas.		– Unauthorised access, e.g. observations of vehicles or machinery, vehicle tracks, damage to fencing or vegetation. – Vehicle, machinery, equipment, fill/topsoil/mulch compliance with hygiene procedures. – The presence of weeds.			
FV3 – Vehicle and machinery use and movement introducing or spreading *Phytophthora* dieback	• Manage dieback in accordance with the **PTA Ground Disturbance Procedure** (7310-000-001). • Construction Contractor to develop and implement a hygiene management process to control access and movement of vehicles and construction personnel into uninfested - protectable areas. This should: – Identify and demarcate areas uninfested with dieback and protectable (Patch 1 Malaga and Patch 5 Gnangara TECs, Glevan 2020) on all drawings. – Control entry and exit to areas mapped as uninfested – protectable – Restrict unauthorised access to and from protectable areas by installing temporary fencing, barriers or signage as required. – Ensure all vehicles and machinery observe appropriate hygiene measures as identified in the **Construction Contractor CEMP**. • Require all personnel to complete a site induction that will include hygiene training with regards to dieback, the environmental implications of the introduction and spread of dieback and obligations. • Movement of topsoil restricted to within the same *Phytophthora* dieback interpretation mapping unit. • All imported materials will be certified dieback free within protectable areas.	• No project attributable introduction of *Phytophthora* dieback into disease-free areas by construction activities. •	• *Phytophthora* dieback occurrence mapping to be completed using DPaW (2015) interpreter's manual at the boundary of uninfested areas, Banksia Woodlands TEC and NVRA mapped as uninfested, annually during construction. • Weekly visual inspections and spot checks for evidence of: – Unauthorised access, e.g. observations of vehicles or machinery, vehicle tracks, damage to fencing or vegetation. – Vehicle, machinery, equipment, fill/topsoil/mulch compliance with hygiene procedures. – Surface water flowing from construction activities into sensitive areas and beyond development envelope.	• Construction Contractor to report incidences of *Phytophthora* dieback or other inspection data and non-conformances to PTA in monthly environmental reporting. • Report new incidences of *Phytophthora* dieback to regulators, as required. •	• Quarantine affected areas • Restrict access to quarantined areas • Investigate cause or source of infestation and extent of vegetation decline • Inspect/survey surrounding area to assess extent of infestation • Update mapped distribution of dieback affected areas • Review weed and dieback hygiene measures for efficacy • Review training and implementation of, weed and dieback hygiene measures •	• Ground Disturbance Procedure (7310-000-001) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed)
FV4 – Topsoil, mulch and imported fill	• Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed and dieback control measures • As far as practicable, inspect imported fill, limestone, gravel and topsoil or other materials for visible evidence of weeds. • All imported materials to be used in protectable areas shall be certified dieback free. • Any topsoil used within an area that is protectable will be sourced either from uninfested areas or from certified dieback free suppliers.	• No topsoil from areas of known dieback infestation reused in uninfested areas.	• Weekly visual monitoring of topsoil handling during clearing and revegetation activities, to ensure topsoil is salvaged and spread in accordance with the relevant management actions	• Shape files and spatial data of clearing, topsoil and spoil stockpile locations and volumes will be submitted to PTA in accordance with **Environmental Spatial Data Procedure** (7310-000-002)	• Implement standard incident response and follow up procedures in accordance with the Construction Contractor CEMP.	• Ground Disturbance Procedure (7310-000-001) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003)

ID and Aspect	Management action	Management Target, Threshold, Trigger[1]	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• Any topsoil known to be dieback infested to be reused in infested areas, buried onsite in a suitable location or disposed of at landfill, in accordance with regulatory requirements.		• Imported fill will be managed using a material tracking system, comprising a register with details relating to the material including but not limited to, import and export volumes, reuse locations, importation/quarry certificates and sample locations and results (if required).	• Construction Contractor to report to PTA in monthly environmental reporting.		• Construction Contractor CEMP (to be developed)
FV5 – Revegetation of Bennett Brook temporary construction area	• Riparian vegetation clearing will be minimised within the Bennett Brook riparian zone. • Areas cleared within the riparian zone of Bennett Brook that are not required for permanent infrastructure or ongoing maintenance of the railway will be revegetated post construction. • No Black Cockatoo foraging species will be planted near the rail corridor.	• To successfully revegetate temporarily cleared areas within five years from the commencement of construction • Only native plant species are used for revegetation • Reused topsoil is sourced from same area where consistent with dieback and weed control.	• Confirmation of native species in planting lists and/or seed sources used in revegetation works • Visually monitor and document revegetation success and survival rates, quarterly during construction and six-monthly for five years post construction	• Maintain records of topsoil stripping during initial vegetation clearing and ground disturbance. • Maintain records of topsoil reuse including date of spreading, location, volume • Construction Contractor to report revegetation measures and success and survival rates to PTA in monthly environmental reporting.	• Implement standard incident response and follow up procedures in accordance with the Construction Contractor CEMP.	• Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed)
FV6 – Dust deposition on vegetation	• Implement dust suppression measures outlined in the **PTA Ground Disturbance Procedure** (7310-000-001). • Dust suppression measures will be utilised at locations of high dust risk including internal construction roads, cleared areas, batters and stockpiles. • Dust suppression measures will be implemented where dust generation is visible, except during topsoil stripping. • Vegetation clearing and exposed surfaces will be kept to a minimum wherever practicable. • Vehicle speeds on construction roads will be reduced where necessary to minimise dust emissions. • Vehicles will remain within designated roads and park only in allocated areas. • Vegetation clearing and earthworks will be avoided during high winds wherever practicable.	• No degradation or loss of vegetation in environmentally sensitive areas from dust generated by construction activities.	• Quarterly visual observations by botanist of dust deposition on vegetation at permanent photo points aligned with weed monitoring to include: – Visual observations – Photographic evidence.	• Construction Contractor to report vegetation health to PTA in monthly environmental reporting. • See the **TECMP** for details regarding the Malaga and Gnangara TECs.	• Quarantine affected areas • Restrict access to quarantined areas • Investigate cause or source of dust and extent of affected vegetation • Review dust management measures for efficacy. • Implement appropriate controls.	• Ground Disturbance Procedure (7310-000-001) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed)
FV7 – Bushfire	• The Contractor will develop and implement bushfire management measures in line with the PTA Bushfire Management Strategy (PTA 2018) and in consultation with Whiteman Park and the City of Swan, to align with the risks identified in the Whiteman Park Bushfire Management Plan and any relevant existing local government Bushfire Management Plans.	• No bushfire damage to native vegetation directly caused by construction works	• Record Bushfire occurrence within Development Envelope. • Monitoring by construction personnel of DFES Fire Danger Ratings (FDRs) during bushfire season to minimise risk of bushfire from construction activities.	• Construction Contractor to report any fire incidences to PTA in monthly environmental reporting.	• Implement standard incident response and follow up procedures in accordance with the PTA Bushfire Management Strategy and Construction Contractor CEMP.	• Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003)

ID and Aspect	Management action	Management Target, Threshold, Trigger[1]	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• Require all personnel to complete a site induction that will include information on prevention of fires, including designated smoking areas, no fires permitted in workplace, use of extinguishers, hot works procedures • Working fire extinguishers to be fitted to all mobile plant equipment • All fuel stored on site to be in a secure bund with fuel storage to be minimised where possible • Refuelling of equipment and machinery to be completed in the early morning where possible • Machinery (chainsaws etc.) not to be placed on the ground where long grass exists following use • Approved Hot works permit to be in place for all 'hot work' (e.g. grinding / welding) • The area immediately surrounding 'hot work' to be dampened with water if vegetated and vegetation is not already naturally damp. • See **Social Surrounds SS2 – Historical and Natural Heritage -- Whiteman Park (Park Access and Bushfire**) for management of bushfire affecting amenity.	• Bushfire management measures implemented in line with Whiteman Park Bushfire Management Plan and PTA Bushfire Management Strategy.		• In the event of a fire, Construction Contractor to provide reports and incident response reporting to PTA as soon as practicable after event.		• Construction Contractor CEMP (to be developed) • PTA Bushfire Management Strategy
FV8 – Dewatering and abstraction impacting wetland (riparian) vegetation, Banksia Woodlands TEC or other Groundwater Dependent Ecosystems (GDEs)	• The impact of dewatering and abstraction on riparian vegetation, Banksia Woodlands TEC or other Groundwater Dependent Ecosystems (GDEs) will be managed in accordance with management measures outlined in **Inland Waters IW1 – IW4.** • Standard construction management measures for surface water and stormwater will be implemented to maintain the hydrological conditions of wetlands as far as practicable and avoid inflow of disturbed or contaminated waters, in accordance with management measures outlined in **Inland Waters IW5** and **IW6.**	• No impacts due to groundwater abstraction on Banksia Woodlands TEC or other GDEs outside the Development Envelope wherever practicable • See **IW1 – IW6**.	• See **IW1 – IW6**.	• See **IW1 – IW6**.	• See **IW1 – IW6**.	• See **IW1 – IW6**.

Terrestrial Fauna

EPA's objective: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained

Affected values:

- **Four species of conservation significance have been recorded within the Development Envelope -**
  - **Carnaby's Cockatoo (*Calyptorhynchus latirostris)* (Endangered)**
  - **Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso)* (Vulnerable)**
  - **Quenda (*Isodon obesulus)***
  - **Rainbow Bee-eater (*Merops ornatus)*.**
- **Six conservation significant fauna species have the potential to occur in the Development Envelope (ELA 2020):**
  - **Baudin's Cockatoo (*Calyptorhynchus baudinii*)**
  - Western Brush Wallaby (***Notamacropus Irma***)
  - Water Rat, Rakali (***Hydromys chrysogaster***)
  - Black-striped Snake (***Neelaps calonotos***)
  - Jewelled Sandplain (***Ctenotus gemmule***)
  - Peregrine Falcon (***Falco peregrinus***)
- Foraging and roosting habitat suitable for all three Black Cockatoo species – 680 Black Cockatoo potential breeding trees within the Development Envelope, including 40 with hollows.
- Listed migratory species - Glossy Ibis (*Plegadis falcinellus*).
- Ecological connectivity - Kangaroo population movement.
- **Potential habitat for conservation significant aquatic fauna species Carter's Freshwater Mussel and Black-stripe Minnow.**

Environmental aspects:

- **TF1 – Clearing of native vegetation and ground disturbance (fauna injury and loss of habitat)**
- **TF2 – Vehicle use and movement (fauna injury)**
- **TF3 – Trenches, fencing and infrastructure (entrapment and loss of ecological connectivity)**
- **TF4 – Clearing or disturbance of Black Cockatoos (loss of habitat)**
- **TF5 – Bushfire (fauna injury and loss of habitat)**
- **TF6 – Dewatering and abstraction (impact on habitat).**

Proposal Objectives:

- **To protect existing native fauna, avoiding injury or death wherever possible.**
- **To avoid unapproved clearing of Black Cockatoo potential breeding trees and foraging habitat.**
- **Minimise the depth and duration of drawdown at wetlands and permanent pools supporting fauna populations, where practicable.**

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
TF1 – Clearing of vegetation and ground disturbance	• Manage clearing of vegetation in accordance with the **PTA Ground Disturbance Procedure** (7310-000-001) and **PTA Environmental Spatial Data Procedure** (7310-000-002). • The impact of clearing on fauna habitat will be managed in accordance with **Flora and Vegetation FV1** – Clearing, as well as the following measures specific to fauna: • Vegetation to be cleared will be searched by a fauna specialist prior to clearing and any fauna individuals found will be relocated. • Any trees to be retained must be clearly identified and protected from construction activities, including Black Cockatoo breeding trees	• No avoidable deaths of / injury to fauna	• Details of any trapped fauna are recorded. • Record any known injuries or mortalities of fauna. • Black Cockatoo potential breeding trees to be inspected prior to clearing. • Vegetation to be cleared will be searched by a fauna specialist prior to clearing.	• Record any known injuries to, or deaths of fauna as soon as possible as the injury or death is identified (when attributable to construction) preferably on the same day. • A report on the trapping program will be prepared, providing details of the methods used, number of animals caught and relocated, and location of where they were released. This report will be attached to the Contractors Monthly Reporting.	• Investigate cause • Report to regulators as required and implement appropriate mitigation measures on advice of regulators, as required • Review training and update as required • Undertake targeted trapping and relocation if animals cannot egress fenced Development Envelope • Inspect and repair or modify any damaged or ineffective fauna fencing or fauna crossings • Review management measures and update as required	• Ground Disturbance Procedure (7310-000-001) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed)

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• If required by project approvals, fauna trapping and relocation shall be undertaken by suitably qualified personnel in accordance with Department of Biodiversity, Conservation and Attractions (DBCA) Standard Operating Procedures no more than seven days prior to clearing, in accordance with a licence to take fauna for education or public purpose issued under the Biodiversity Conservation Act 2016 (BC Act) from DBCA. DBCA are to be consulted and provide the approved locations to relocate any trapped fauna. • Install fences between cleared areas and adjacent native vegetation to limit opportunities for fauna to return to the cleared area. Where practicable, install fences at time of trapping or within 7 days of clearing activities. • Ensure fauna spotters/handlers are present/on call during clearing of native vegetation to supervise dispersal/ relocation of any remnant fauna, and identification of any potential injured fauna. • Undertake progressive vegetation clearing commencing from a disturbed edge, where practicable, to encourage remaining mobile fauna to naturally relocate to areas of adjacent vegetation. • No Black Cockatoo foraging species will be planted near the rail corridor (to deter use of these areas by Black Cockatoos).			• Monthly reporting on the number of fauna relocated, injured or killed, and the adaptive management measures implemented in Construction Contractor Monthly Environmental Reporting to PTA. • Fauna mortality from construction activities or vehicle strike will be reported to the DBCA.		
TF2 – Vehicle use and movement	• Require that all personnel complete a site induction that will address fauna values within and adjacent to the Development Envelope. • Enforce construction site speed limits to minimise potential fauna strikes. • The impact of the introduction of weeds and dieback on fauna habitat will be managed in accordance with **Flora and Vegetation FV2** – Vehicle and machinery use and movement introducing or spreading weeds, New Declared Weed infestations and **FV3** – Vehicle and machinery use and movement introducing or spreading *Phytophthora* dieback. • See **Terrestrial Environmental Quality TEQ5 –** Contamination of soils from fuel and chemical storage leaks for management of fuel, chemicals and waste to minimise impacts on fauna and fauna habitat.	• No avoidable deaths of / injury to fauna	• Record any known injuries or mortalities of fauna.	• Record any known injuries to, or deaths of fauna as soon as possible after the injury or death is identified (when attributable to construction), preferably on the same day.	• Investigate cause • Report to regulators as required and implement appropriate mitigation measures on advice of regulators, as required • Review and enforce construction site speed limits • Review training and update as required • Undertake targeted trapping and relocation if animals cannot egress fenced Development Envelope • Inspect and repair or modify any damaged or ineffective fauna fencing or fauna crossings • Review management measures and update as required	• Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed)
TF3 – Trenches, fencing and infrastructure **Construction of permanent and temporary infrastructure including rail, roads, buildings, hard stand and laydown areas**	• Minimise the duration that excavations remain open, as far as practicable • Provide soil ramps, egress points and/or fauna refuges that provide suitable shelter from the sun and predators for trapped fauna in open trenches at intervals not exceeding 50m. • Ensure trench lengths do not exceed a length capable of being inspected and cleared by appropriately qualified and licensed fauna rescue personnel.	• No avoidable deaths of / injury to fauna	• Inspection by the Construction Contractor for trapped fauna (e.g. fauna trapped in excavations) for the period of construction activities Details of any trapped fauna are recorded. • Record any known injuries or mortalities of fauna.	• Record any known injuries to, or deaths of fauna as soon as possible after the injury or death is identified (when attributable to construction), preferably on the same day.	• Investigate cause • Report to regulators as required and implement appropriate mitigation measures on advice of regulators, as required • Review and enforce construction site speed limits • Review training and update as required	• Ground Disturbance Procedure (7310-000-001) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003)

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
Lighting, vibration and noise	• Visually inspect fencing and trenches twice daily within the Development Envelope during clearing and trenching activities for isolated or trapped macrofauna. The first inspection is to be conducted no more than 3 hours after sunrise and the second inspection between 3pm and 6pm. Facilitate the relocation of trapped macrofauna as soon as practicable. Open trenches must be inspected no more than 1 hour prior to backfilling. • Install temporary fencing and gates prior to construction along the edges of Whiteman Park to minimise fauna, particularly Kangaroos exiting the park onto busy surrounding roads. • Install permanent kangaroo fencing along the rail corridor through Marshall Paddocks and where necessary for other portions of the alignment. • Construction of Bennett Brook bridge will be planned and undertaken in a manner that manages and avoids impacts to the water course, water quality and potential impacts to downstream populations of Carter's Freshwater Mussel. See **Inland Waters IW5 – Construction Activities Impacting Surface Water**. • Transverse drainage will be designed to maintain fish passage through the drainage network/impacted drainage and wetland area. • Use of lighting and noisy machinery will be minimised where possible to reduce impacts on native fauna. See **Social Surrounds SS3 – Noise and Vibration** for management of noise and vibration.		• Twice daily monitoring (early morning and late afternoon) of trenches that have been left open overnight, with recording, removal and release of macrofauna. • Bennett Brook water monitoring – see **Inland Waters IW5 – Construction Activities Impacting Surface Water**.	• Monthly reporting on the number of fauna relocated, injured or killed, and the adaptive management measures implemented in Construction Contractor Monthly Environmental Reporting to PTA. • Fauna mortality from clearing and construction activities or vehicle strike will be reported to the DBCA.	• Undertake targeted trapping and relocation if animals cannot egress fenced Development Envelope • Inspect and repair or modify any damaged or ineffective fauna fencing or fauna crossings • Review management measures and update as required	• Construction Contractor CEMP (to be developed)
TF4 – Clearing or disturbance of Black Cockatoos	• An appropriately qualified person will inspect potential Black Cockatoo breeding trees no more than seven days prior to vegetation clearing during the Black Cockatoo breeding season (July to December) • If breeding activity is identified, demarcate trees with active nests (eggs, chicks or fledglings) and apply a 10 m buffer around the tree using temporary fencing • Postpone clearing within 10 m of active nests until DBCA advises it is suitable to continue. • No Black Cockatoo foraging species will be planted near the train corridor (within the rail reserve / 20 m of the rail track) for landscaping / revegetation to deter use of these areas by Black Cockatoo • If breeding trees have to be cleared, consider options to install nesting boxes within suitable species at height and design specification	• No disturbance of active Black Cockatoo breeding trees	• Monthly visual observations of marked breeding tree hollows (if found) for signs of disturbance and breeding activity throughout the duration of construction • Monthly walkover inspections of applied buffers around marked breeding trees for signs of disturbance, such as temporary fence moved, prematurely vacated nests, broken eggs, and injured or dead fledgling • If breeding activity is observed, inspect the tree weekly until fledglings leave the nest. • Black Cockatoo potential breeding trees to be inspected prior to clearing to identify any resident Black Cockatoo's.	• Report to PTA in the Contractor Monthly Reporting on: – Results of the potential breeding tree assessment, including the qualifications of the inspector – Number of trees with active nests (if any) – Outcome e.g. clearing postponed if found and area avoided until fledglings left the nest – Any signs of disturbance to active nests.	• Upon identification of disturbance, temporarily cease construction works in proximity to nest • Investigate cause • Report disturbance to regulators and implement appropriate mitigation measures on advice of regulators, as required • Review training on avoiding disturbance to active nests and amend training procedures as required • Increase buffer distance around breeding trees • Assess the efficacy of temporary fencing around breeding trees and adjust as required. • If breeding trees have to be cleared, consider options to install nesting boxes within suitable species at height and design specification	• Ground Disturbance Procedure (7310-000-001) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed)

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
TF5 – Bushfire	The impact of bushfire on fauna habitat will be managed in accordance with **Flora and Vegetation FV7 – Bushfire**.	See **FV7**.	See **FV7**.	See **FV7**.	See **FV7**.	See **FV7**.
TF6 – Dewatering and abstraction impacting fauna habitat	• The impact of dewatering and abstraction on fauna habitat will be managed in accordance with management measures outlined in **Inland Waters IW1 – IW4.** • Standard construction management measures for surface water and stormwater will be implemented to maintain the hydrological conditions of wetlands and aquatic fauna habitat as far as practicable and avoid inflow of disturbed or contaminated waters, in accordance with management measures outlined in **Inland Waters IW5 – IW6.**	See **IW1 – IW6**.	See **IW1 – IW6**.	See **IW1 – IW6**.	See **IW1 – IW6**.	See **IW1 – IW6**.

Terrestrial Environmental Quality

EPA's objective: To maintain the quality of land and soils so that environmental values are protected.

Affected values:

- **Soil quality –**
  - **Acid Sulfate Soils (ASS) present between Malaga Station and Bennett Springs Station and north of Whiteman Park Station to south of Ellenbrook Station.**
  - **Potential soil contamination at Swan Valley Egg Farm.**
- Groundwater quality –
  - **Gnangara groundwater mound proclaimed Public Drinking Water Source Area (PDWSA), including a declared underground water pollution control area (UWPCA).**
  - **Contaminated groundwater plume at former Lexia Landfill.**

Environmental aspects:

- TEQ1 – Contamination of soil from excavation of ASS
- TEQ2 – Disturbance of known or suspected contaminated sites resulting in contamination of soils
- TEQ3 – Contamination of soils from stockpiling activities
- TEQ4 – Contamination of soils from the release of waste products (including dewatering effluent)
- **TEQ5 – Contamination of soils from fuel and chemical storage leaks**
- **TEQ6 – Localised and temporary dewatering of ASS resulting in contamination**
- **TEQ7 – Drawing in of contaminated groundwater.**

Objectives:

- **To prevent significant acidification or release of contaminants to the surrounding environment.**
- **To avoid, or where necessary contain and remediate, spills or leaks of fuels, chemicals and wastes to prevent impact to soil, surface water or groundwater.**

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
TEQ1 – Contamination of soil from excavation of ASS	• The disturbance of ASS will be managed in accordance with the **Malaga to Ellenbrook Acid Sulfate Soil Management Strategy** (**ASSMS**) and PTA **Ground Disturbance Procedure** (7310-000-001). • An **ASS Management Plan** (**ASSMP**) will be implemented by the Construction Contractor. The ASSMP will comply with DWER guidelines for management of ASS (DER, 2015b). • No land clearing or ground disturbance work is to be undertaken until a Ground Disturbance Permit (GDP) is in place (see **Flora and Vegetation - FV1**). • Where required, additional ASS investigations will be conducted to identify ASS that need to be managed in excavations deeper than 9 mbgl. If this cannot be practicably achieved, then as a precaution soils associated with coffee rock encountered at these depths will be managed as ASS. • Excavated soil to be managed in accordance in accordance with the ASSMS and ASSMP, including segregation, treatment and disposal or re-use of soil. • If contamination attributable to ASS disturbance is detected, then the construction contractor will conduct remediation in accordance with the ASSMP. • Treated ASS can be reused on site or disposed of at a facility licenced to receive and treat ASS. It is preferred for these materials to be reused on-site, where practicable. Soils to be reused on site should be tested to confirm the soils have been adequately treated prior to reuse. • Untreated ASS may be removed off-site to a licenced treatment facility as 'ASS special waste'.	• Appropriate treatment of all excavated ASS prior to reuse on site. • Appropriate treatment of dewatering effluent prior to discharge to the environment. • No significant changes to surface water or groundwater quality attributable to disturbance of ASS during construction. • No complaints from other groundwater users attributable to ASS disturbance e.g. deterioration of water quality.	• Treated ASS will be tested (for pHF and pHFOX; and 25% to undergo confirmatory analysis via SPOCAS) and validated prior to reuse on site using field testing at a sampling intensity consistent with the DWER Landfill Waste Classification and Waste Definitions (DER 1996). • Groundwater and surface water quality will be monitored prior to construction, during construction and post construction to determine potential impacts to sensitive groundwater receptors as defined in the **Inland Waters IW1 – IW4** and the Construction Contractor's **ASSMP**.	• Any disturbance of ASS will be reported in Construction Contractor Monthly Environmental Reporting to PTA. • Compliance monitoring and reporting requirements will be defined in the Construction Contractor's **ASSMP**.	• The Construction Contractor's ASSMP will include contingency that will be implemented if monitoring indicates that performance targets are not being achieved. Contingencies should be specific to performance criteria for example if soil validation or dewatering effluent monitoring indicates that ASS parameters are not sufficiently neutralised then liming / dosing rates should increase. • All registered complaints will be investigated and complainants contacted within seven days of complaint.	• Ground Disturbance Procedure (7310-000-001) • Acid Sulfate Soil Management Strategy (ASSMS) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor ASSMP (to be developed)

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
TEQ2 – Disturbance of known or suspected contaminated sites resulting in contamination of soils **TEQ3 – Contamination of soils from stockpiling activities**	• Remove illegally dumped material in the Development Envelope prior to the commencement of vegetation clearing activities and dispose of to an appropriate facility in accordance with the **PTA Ground Disturbance Procedure** (7310-000-001). • Manage any contaminated or suspected contaminated material or soil disturbed during construction activities and report in compliance with the *Contaminated Sites Act 2003*. • Implement the **PTA Unexpected Finds Procedure** (3100-000-003) and the Unexpected Finds Procedure in the **Construction Contractor CEMP** if additional contaminated sites are identified, including consultation with DWER with DWER and local government and the parties responsible for contamination (if identified). • Potentially contaminated material will be tested and if unable to be reused or remediated for reuse will be disposed of at an appropriately licenced facility. • Appropriate management of excavated soil in accordance with the **Construction Contractor CEMP**, such as: – Material of unknown contamination status that is awaiting sampling will be bunded and kept separate from other material until it has been sampled and classified; – Appropriate management of excavated soil in accordance with the CEMP, such as limiting height of stockpiles, bunding of limestone pads and installation and installation of leachate collection systems to contain potentially contaminated stockpile runoff. – Segregate clean and contaminated excavated soil (where practicable); – Maintain a register of stockpile locations, the origin, relevant sample locations and results and transport details for offsite disposal – Restrict the maximum height of a stockpile to be generally less than 3 metres and/or lower than the boundary fence – Sampling of material to be conducted in accordance with relevant guidelines and classification to be derived from appropriate assessment criteria for reuse potential – Maintain appropriate soil moisture content to reduce dust emissions (particularly during handing). • Upon completion of works, any stockpile or treatment pad areas will be appropriately decommissioned, comprising validation, and if required remediation of the ground surface where the treatment pad and associated infrastructure was located.	• No disturbance of potential contamination relating to Swan Valley Egg Farm or Lexia Landfill. • No significant changes to surface water or groundwater quality attributable to disturbance of contaminated sites during construction.	• Daily visual monitoring by the Construction Contractor during the period of construction activities to ensure any potential source of contamination is identified and managed. • Monitoring of groundwater levels and water quality in accordance with **Inland Waters IW1 – IW6** and the **Construction Contractor's CEMP**. • If other contamination is encountered during construction, monitoring may be developed as part of a strategy for dealing with the contamination in consultation with DWER and the parties responsible for the contamination (if they can be identified). • Maintain a register of stockpile locations, the origin, relevant sample locations and results and transport details for offsite disposal.	• Report in accordance with the PTA Unexpected Finds Procedure (3100-000-003) if additional contaminated sites are identified, including consultation with DWER and local government and the parties responsible for contamination (if identified). • Construction Contractor to report any disturbance of contamination to PTA in monthly environmental reporting.	• Implement the PTA Unexpected Finds Procedure (3100-000-003) and the Unexpected Finds Procedure (to be developed by the Construction Contractor) referenced in the Construction Contractor CEMP. If additional contaminated sites are identified, consult with DWER and local government and the parties responsible for contamination (if identified). • The Contractor Unexpected Finds Protocol will include: – Methods for identification, assessment of risk and required management procedures on a case specific basis. – Information on the appropriate disposal of waste and impacted soil. – Soil and groundwater validation testing (required) – Triggers for consultation with DWER, local government, and the parties responsible for the contamination (if they can be identified).	• Ground Disturbance Procedure (7310-000-001) • Unexpected Finds Procedure (3100-000-003) • Incident Reporting Procedure (7210-000-003) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed).

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
TEQ4 – Contamination of soils from the release of waste products (including dewatering effluent)	**Waste** • Risks associated with waste and provisions for management measures will be managed in accordance with the **Construction Contractor CEMP**, with reference to the **PTA Ground Disturbance Procedure** (7310-000-001) and the **PTA Unexpected Finds Procedure** (3100-000-003). • Remove any pre-existing waste (e.g. uncontrolled wastes / fly tipping) encountered in the Development Envelope prior to the commencement of clearing activities and dispose of to an appropriate facility, in accordance with the **PTA Unexpected Finds Procedure** (3100-000-003). • General construction waste such as inert and domestic waste streams will be managed in accordance with the waste hierarchy. The ability to reduce, reuse and recycle these items will be considered before disposal to landfill. • Preference will be given to reuse suitable materials within the Development Envelope. • Wastes will be appropriately contained (with bins, skips, etc.) and segregated for collection by waste contractors licensed for the classes of waste. • Hazardous materials such as waste oils, lubricants, paints, thinners and acids will be appropriately stored whilst in use on-site, with disposal undertaken by a licensed waste management contractor at a landfill facility appropriately licensed for the particular waste class. • Putrescible wastes will be contained in bins with secure lids to so that animals are not encouraged to forage. • Contaminated or hazardous wastes will be kept in secondary containment. • Upon completion of construction, wastes generated by the Proposal will be appropriately removed or disposed of, and if required remediation of the ground surface will be implemented. **Imported Fill** • Avoid importation and use of contaminated fill but reuse suitable fill within the Development Envelope wherever practicable, to minimise the creation of waste. • If material is to be imported, it is to be verified as suitable for the intended use. • See **Flora and Vegetation FV4 – Topsoil, mulch and imported fill** for further details. **Stockpiles** • See **TEQ3 – Contamination of soils** from stockpiling activities above. **Dewatering Effluent** • Minimise potential for contamination of land and water from release of acidic dewatering effluent by testing and treatment dewatering effluent to ensure it meets DWER ASS criteria prior to being released to the environment.	• No unauthorised offsite discharges. • No unintentional spills or leaks of hazardous materials in the Development Envelope (or vicinity) during construction.	• The Construction Contractor shall track waste The management of wastes will be tracked through implementation of a waste register including waste locations, origin and transport details for offsite disposal • Imported fill will be managed by the Construction Contractor using a material tracking system, comprising a register with details relating to the material including but not limited to, import and export volumes, reuse locations, importation/quarry certificates and sample locations and results (if required). • Dewatering effluent monitoring by the Construction Contractor in accordance with ASS guidelines. • . See **Inland Waters IW4 – Dewatering Effluent Disposal** for further details on management of dewatering effluent.	• Construction Contractor to report any release of waste products to PTA in monthly environmental reporting. • See **Inland Waters IW4 – Dewatering Effluent Disposal** for further details on management of dewatering effluent.	• Uncontrolled release of waste will be attended to immediately via the use of onsite spill response protocols detailed in the **Construction Contractor CEMP**, including the following: – Immediately contain release – Demarcate and restrict access where necessary – Clean up spills where possible – Investigate cause – Ensure incident is reported to regulators, as required and by the appropriate party, and implement appropriate mitigation measures on advice of regulators, as required – Any contaminated soil will be contained, and appropriately remediated or disposed. – Inspect and repair or modify any damaged or ineffective waste storage facilities • Review management measures training and update as required • See **Inland Waters IW4 – Dewatering Effluent Disposal** for further details on management of dewatering effluent.	• Ground Disturbance Procedure (7310-000-001) • Unexpected Finds Procedure (3100-000-003) • Acid Sulfate Soil Management Strategy (ASSMS) • PTA Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed) • Construction Contractor ASSMP (to be developed)

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• Potential acidity in dewatering effluent will be managed in accordance with the **Malaga to Ellenbrook Acid Sulfate Soil Management Strategy** (**ASSMS**), **PTA Ground Disturbance Procedure** (7310-000-001) and the **Construction Contractor's ASSMP.** • See **Inland Waters IW4 – Dewatering Effluent Disposal** for further details on management of dewatering effluent. **Sewage** • Sewage produced within temporary or ablution facilities during construction will be collected by a licensed waste management contractor for disposal at a licenced facility licensed for the class.					
TEQ5 – Contamination of soils from fuel and chemical storage leaks	• Hazardous chemicals will be managed in accordance with the Construction Contractor's CEMP. • Chemicals will be stored in bunded self-contained storage areas in accordance with any applicable Dangerous Goods Licence. • Hydrocarbons such as fuels will be stored in accordance with Australian Standard AS 1940:2017: The storage and handling of flammable and combustible liquids. • There will be no bulk storage or transfer of fuel within Priority 1 PDWSAs. • Bulk fuel storage will be limited to a centralised construction area away from wetlands and TECs. • Where practicable, construction chemicals that are biodegradable and/or less hazardous will be used. • Chemical storage areas will be bunded to ensure that pollutants are not washed into adjacent areas during rainfall events. • Implement drainage and sediment controls to prevent offsite discharge of runoff and sedimentation. • Ensure all relevant employees and contractors are trained on safe handling procedures and incident response, including spill containment, clean-up and reporting procedures. • Establish fuel and chemical storage tanks on stable soil in an area not subject to flooding. • Unless otherwise approved, all fuel or chemical supply lines shall be above ground, so leaks are detectable. • Implement a spill response procedure, which may include groundwater or surface water monitoring or soil testing as required, in accordance with the **PTA Spill Response Framework and Procedure**. • Spill kits to be located in storage, vehicle maintenance and refuelling areas.	• No unauthorised offsite discharges. • No un-remediated spills or leaks of hazardous materials in the Development Envelope (or vicinity) during construction.	• The Construction Contractor shall undertake weekly inspections of hazardous materials storage, handling and disposal to assess compliance • The Construction Contractor shall inspect spill containment compounds for presence of spills or contaminated rainwater, as soon as practicable after any significant rainfall event and following tank refuelling • In the event that a major spill occurs, the Construction Contractor shall consider groundwater and/or surface water monitoring in consultation with the relevant agencies.	• Report significant fuel or other chemical spills to the environment to DWER within 24 hours. • Maintain an inventory of hazardous materials storage including type of material, volume stored, and Material Safety Data Sheets. • Maintain a register of spills and leaks including location, date, nature of material spilt, and remedial action taken. • Construction Contractor to report any spills and leaks products to PTA in monthly environmental reporting	• Uncontrolled release of chemicals (leak or spill) will be attended to immediately via the use of onsite spill response protocols detailed in the **Construction Contractor CEMP**, in accordance with the **PTA Spill Response Framework and Procedure**, including the following: – Immediately contain leak / spill – Demarcate and restrict access where necessary – Clean up spills where possible – Investigate cause – Report to regulators, as required, and implement appropriate mitigation measures on advice of regulators, as required – Any contaminated soil will be contained, and appropriately remediated or disposed. – Inspect and repair or modify any damaged or ineffective fuel, chemical or waste storage facilities • Review management measures training and update as required.	• PTA Ground Disturbance Procedure (7310-000-001) • Contractor Monthly Environmental Report Template (7360-000-003) • PTA Spill Response Framework and Procedure • Construction Contractor CEMP (to be developed)

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
TEQ6 – Localised and temporary dewatering of ASS resulting in contamination	• The disturbance of ASS will be managed in accordance with the **Malaga to Ellenbrook Acid Sulfate Soil Management Strategy** (**ASSMS**). • An **ASS Management Plan** (**ASSMP**) will be implemented by the construction contractor. The ASSMP will comply with DWER guidelines for management of ASS (DER, 2015b). • Where practicable, dewatering will be staged to minimise oxidation of ASS. • Dewatering effluent should be monitored in accordance with Table 6 of DER (2015b), with appropriate contingencies in place to manage changes in effluent quality. • No effluent should be discharged to adjacent water bodies or stormwater drainage without prior regulatory approval. • The size of the dewatering settlement basin should be sufficient to hold the calculated volume of water and provide a minimum retention time of six hours. • Effluent should be returned to the shallow aquifer where practicable, however alternative discharge strategies (e.g. discharge to sewer) may be utilised where approval is in place to do so. In the event that space constraints limit the use of shallow infiltration basins, or offsite disposal to sewer is inadequate to manage dewatering volumes, consideration of alternative methodologies (including aquifer recharge) will be made on a case by case basis. • A groundwater (and if required, surface water) monitoring programme should be undertaken to detect changes in water level and quality related to the site works, and inform the deployment of contingency measures, if required. • Prior to decommissioning settlement ponds used for treated effluent, sediments that accumulate in the pond should be tested to determine suitable disposal options. • See Inland Waters section of this Schedule **IW6 – Construction Activities Impacting Local Groundwater Quality** for further details on management of dewatering.	• Appropriate treatment of dewatering effluent prior to discharge to the environment. • No complaints from other groundwater users attributable to ASS disturbance e.g. deterioration of water quality.	• Dewatering effluent will be monitored by the Construction Contractor to determine if it requires treatment. When dewatering effluent is treated it will be monitored before and after treatment to determine if treatment has effectively neutralised acidity in the water. • To ensure acidic effluent is not being generated by the Proposal, dewatering effluent monitoring will include daily monitoring for field parameters and fortnightly laboratory analysis of pH, EC and total titratable acidity. Results will be compared against DWER ASS criteria (DER, 2015b). • The Construction Contractor shall test sediments prior to decommissioning settlement ponds, to determine suitable uses for the materials. • Groundwater (and if required, surface water) monitoring will be undertaken at the site to assess water level and quality against defined performance criteria for the protection of relevant receptors. The programme will include a baseline assessment to identify appropriate performance criteria, followed by monitoring during and post construction, to be defined in the **Contractor's ASSMP** as per **Inland Waters IW1 – IW6**.	• Construction Contractor to report any disturbance of ASS due to dewatering to PTA in monthly environmental reporting • Compliance monitoring and reporting requirements will be defined in the **Construction Contractor's ASSMP**	• The **Construction Contractor's ASSMP** will include contingencies that will be implemented if monitoring indicates that performance targets are not being achieved. Contingencies should be specific to performance criteria for example if soil validation or dewatering effluent monitoring indicates that ASS parameters are not sufficiently neutralised then liming / dosing rates should increase.	• Acid Sulfate Soil Management Strategy (ASSMS) • PTA Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed) • Construction Contractor ASSMP (to be developed)
TEQ7 – Drawing in of contaminated groundwater	• Abstraction of contaminated groundwater is unlikely, however where a risk of this occurring has been identified (for example at Gnangara Road as a result of the plume from the former Lexia Landfill site) dewatering will be managed appropriately (e.g. infiltration or reinjection of groundwater effluent) to reduce drawdown and prevent interactions with the existing contamination plume, based on the recommendations of hydrogeological assessments.	• No disturbance of potential contamination relating to Swan Valley Egg Farm or Lexia Landfill. • No release of contaminants to the surrounding environment.	• Monitoring of groundwater levels and water quality in accordance with the Inland Waters section of this Schedule **IW1 – Abstraction for Construction Supply** and **IW2 – Abstraction for Dewatering**	• Construction Contractor to report any disturbance of contamination to PTA in monthly environmental reporting	• The **Construction Contractor's CEMP** will include contingencies that will be implemented if monitoring indicates that drawdown is occurring.	• Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed)

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• Where appropriate, monitoring and management measures will be incorporated into the **Construction Contractor CEMP** and **Dewatering Management Plan (DP)** to minimise the dewatering cone of depression to avoid drawing contaminated groundwater from these sites (and avoid the requirement to manage potentially contaminated dewatering effluent). • Management strategies may include strategic placement of dewatering bores, reinjection of contaminated groundwater near the source. • See Inland Waters section of this Schedule **IW1 – Abstraction for Construction Supply** and **IW2 – Abstraction for Dewatering** for further details on management of drawdown.		• If other contamination is encountered during construction, monitoring may be developed as part of a strategy for dealing with the contamination in consultation with DWER and the parties responsible for the contamination (if they can be identified).		• Contaminated groundwater would be appropriately stored and transported off-site if required, following appropriate investigation.	• Construction Contractor Dewatering Management Plan (s) (to be developed)

Inland Waters

EPA's objective: To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.

Affected values:

- **A regionally significant groundwater resource within the Gnangara groundwater mound, which is a proclaimed Public Drinking Water Source Area (PDWSA) that includes a declared underground water pollution control area (UWPCA).**
  - **Development Envelope intercepts the Priority 1, 2 and 3 PDWSA areas.**
  - **Three operating bores screened in the superficial aquifer are within, or close to, the Development Envelope (bores M27, M40 and M50 are 700m, 470m and 670m respectively from the proposed Malaga Station), two of which are in Priority 1 and Priority 3 PDWSA areas.**
  - **While bore M40 is not within a declared DPWSA, it is protected by a disturbance protection buffer (typically 100m around the bore and associated infrastructure).**
- **Existing groundwater users including the Water Corporation, council bores and private bores used as water supplies for a variety of purposes.**
- **Wetlands that may be directly or indirectly dependent on groundwater, seasonally or permanently.**
- **Creek lines that carry discharging groundwater and surface water supporting dependent ecologies along riparian corridors.**

Environmental aspects:

- **IW1 – Abstraction for Construction Supply Impacting Groundwater Levels, Water Quality and Availability**
- **IW2 – Abstraction for Dewatering Purposes Impacting Groundwater Levels and Availability**
- **IW3 – Dewatering Impacting Groundwater Quality – Dewatering Effluent Treatment**
- **IW4 – Dewatering Impacting Groundwater Quality – Dewatering Effluent Disposal**
- **IW5 – Construction Impacting Surface Water**
- **IW6 – Disturbance to Wetlands**

Objectives:

- **To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected**
  - **Achieve the conservation of water through minimising abstraction rates, and treatment and recharge or re-use of dewatering effluent wherever possible.**
  - **Protect nearby surface water features, and associated wetland vegetation.**
  - **Reduce the likelihood of ASS activation.**
  - **Reduce mobilisation of contaminated groundwater, if present.**
  - **Minimise impacts to nearby superficial aquifer groundwater users.**
  - **Groundwater abstraction and drawdown to be managed to avoid any impacts on wetland (riparian) vegetation, Banksia Woodlands TEC or other GDEs outside the Development Envelope wherever practicable.**

ID and Aspect	Management action	Management Target, Trigger	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
IW1 – Abstraction for Construction Supply Impacting Groundwater Levels, Water Quality and Availability	• Assess the possible use of existing licenced abstraction wells to minimise on ground impacts of installing new wells (i.e. existing wells installed for the Ellenbrook Rapid Transit project). • Abstraction for water supply will only take place within wellhead protection zones with regulatory consent and provided that no viable water supply alternatives are available. • Locate all new production wells to minimise impacts on other users and GDEs. • Target only the Superficial Aquifer for all water supply requirements. • Not locating production bores at distances that drawdown interference effects are seen, thus increasing the drawdown impact. • Prior to undertaking temporary dewatering activities, if required, at a minimum: – Apply for a 26D licence, issued under the provisions of the Rights in Water and Irrigation Act 1914 to construct or alter wells. – All water supply production bores to be installed in accordance with the Minimum construction requirements for water bores in Australia (2012).	• Monitoring targets will be guided by triggers and thresholds developed following final Proposal designs. • Groundwater level drawdown does not propagate outside management category buffer ranges. • Groundwater levels are consistent with predicted estimations. • Abstracted water meets the minimum quality requirements for construction use	The Construction Contractor shall monitor construction water supply wells for groundwater level, quality and quantity (including frequency), as per the 5C licence to take water and associated GLOS. • A regional surface water and groundwater monitoring network will be installed to monitor the effects of temporary groundwater abstraction during the construction of the Proposal. • Triggers and thresholds will be based on final designs; however, groundwater levels will be monitoring at a minimum, weekly, in construction water supply monitoring bores.	• Reporting of monitoring will be completed as per the regulatory requirements of the 5C licence to take water and the supporting GLOS. • Construction Contractor to report Groundwater level monitoring data to PTA in monthly environmental reporting	• Contingency responses will be guided by triggers and thresholds developed following final Proposal designs. • If monitoring indicates construction water abstraction is not in compliance with license conditions, quality is deteriorating due to acidification or is being used for unlicensed purposes then abstraction will cease immediately from that location. • Abstraction will not re-commence until the issue is resolved to the satisfaction of the Construction Contractor and PTA.	• Contractor Monthly Environmental Report Template (7360-000-003)

ID and Aspect	Management action	Management Target, Trigger	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	– All monitoring bores to be installed in accordance with Water Quality Protection note No. 30; Groundwater monitoring bores (2006). – Completion of either a H1 - desktop assessment, or H2 level desktop assessment including test pumping in accordance with Operational Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence (2009). – Development of a Groundwater Licence Operating Strategy (GLOS) in accordance with Operational Policy 5.08 – Use of Operating Strategies in Water Licencing Process (2019). – Apply for a 5C licence, issued under the provisions of the Rights in Water and Irrigation Act 1914 to take water for temporary construction water supply purposes. • Develop and implement management measures and controls, to ensure Project-related disturbances do not impact Bore M40, which is protected by a disturbance protection buffer.	• In Acid Sulfate Soil (ASS) areas, groundwater quality is not showing indicators of acidification. • Abstraction does not exceed DWER license allocation. • Water is used efficiently for construction purposes, and not being wasted or used for unlicensed purposes •	• Abstracted water quality will be periodically monitored by the Construction Contractor (weekly, as a minimum) • Quantity of daily abstraction, both instantaneous and cumulative, will be monitored by the Construction Contractor using flow meter readings and inspections • On cessation of abstraction from a production well, monitoring will continue for a minimum period of 6 months at monthly gauging events.	• Results will be submitted to DWER as part of annual groundwater monitoring summary. This report will be guided by *Operational Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence*, (Department of Water, 2009).		
IW2 – Abstraction for Dewatering Purposes Impacting Groundwater Levels and Availability	• Monitoring and management measures will be incorporated into the **Construction Contractor CEMP** and **Dewatering Management Plan(s)** (DPs). • Implement established construction methods based on the dewatering requirements (i.e. depth and duration) to minimise impacts of dewatering (e.g. diaphragm walls). • Implement a staged dewatering approach during major construction activities such as the Tonkin Highway dive structure construction. • Locate infiltration basins, trenches and/ or reinjection wells to minimise impacts on other users and GDEs • Re-use excess abstracted dewater where possible to minimise offsite discharge. • Only target the Superficial Aquifer for dewatering. • Develop site specific construction dewatering management plans as needed. • Prior to undertaking temporary dewatering activities, if required, at a minimum: – Assess the extent and duration of the temporary dewatering activity following the Water quality protection note No. 13 - Dewatering of soils at construction sites (2012). – Completion of either a H1 - desktop assessment, H2 level desktop assessment including test pumping or H3 level desktop assessment including test pumping and modelling in accordance with Operational Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence (2009), as required. – All dewatering wells to be installed in accordance with the Minimum construction requirements for water bores in Australia (2012). – All monitoring bores to be installed in accordance with Water Quality Protection note No. 30; Groundwater monitoring bores (2006).	• Monitoring targets will be guided by triggers and thresholds developed following final Proposal designs. • The dewatering system is operating as per design. • Groundwater levels are consistent with predicted estimations. • Groundwater meets the minimum quality requirements for construction use. • In ASS areas, groundwater quality is not showing indicators of acidification • Abstraction does not exceed DWER license allocation. • Water is used efficiently for construction purposes, and not being wasted or used for unlicensed purposes.	• Construction dewatering wells will be monitored by the Construction Contractor for groundwater level, quality and quantity, as per the 5C licence to take water and associated GLOS. • Groundwater monitoring wells will be required to be installed around the dewatering areas to monitor the potential groundwater impact from temporary dewatering. The number of monitoring bores will be dependent of the location of the dewatering activity, based on the environmental management categories and the required level of drawdown and duration. • Triggers will be based on final designs, however, prior to dewatering, groundwater levels at the nominated sites should be recorded on a weekly basis. While dewatering is ongoing, groundwater level monitoring should be undertaken daily. • At a minimum, groundwater quality will be periodically (weekly) monitored by the Construction Contractor.	• Reporting of monitoring will be completed as per the regulatory requirements of the 5C licence to take water and the supporting GLOS. • Construction Contractor to report groundwater abstraction volumes (instantaneous and cumulative volumes) to PTA in monthly environmental reporting. • Results will be submitted to DWER as part of annual groundwater monitoring summary. This report will be guided by *Operational Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence*, (Department of Water, 2009).	• Monitoring targets will be guided by triggers and thresholds developed following final Proposal designs. • If monitoring indicates that excavation zone groundwater levels show excessive drawdown, if practicable, available management actions are (in order of preference): – Adjust pumping rates; – Reduce the number of pumps operating; – Increase re-injection/ infiltration; and – Temporary provision of water supply if other groundwater users' supply is impacted. • If management responses prove to be insufficient to achieve and maintain the target levels, excavations may be slowed or suspended to enable contingencies to be implemented including (in order of preference): – Construction of additional dewatering wells, spears or sumps; – Construction of additional groundwater control structures;	• PTA Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor Dewatering Management Plan(s) (to be developed)

ID and Aspect	Management action	Management Target, Trigger	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	– Development of a Groundwater Licence Operating Strategy (GLOS) in accordance with Operational Policy 5.08 – Use of Operating Strategies in Water Licencing Process (2019). – Apply for a 5C licence, issued under the provisions of the *Rights in Water and Irrigation Act 1914* to take water for temporary construction water supply purposes. • A site-specific Dewatering Permit will be initiated to ensure that risks are managed, detailing: – Areas affected, nearest sensitive receptors and other groundwater users; – Expected flow volumes; – Durations and expected treatment needs; and – Details of approved effluent disposal/recharge methods to be used. • To limit delays in construction progress, dewatering shall commence at least one week prior to excavation activities.		• At a minimum, quantity of daily dewatering abstraction, both instantaneous and cumulative, will be monitored by the Construction Contractor using flow meter readings and inspections. • The required monitoring network and frequency of monitoring will be outlined in site-specific GLOS/ dewatering plans that will be prepared as part of the RIWI Act Section 5C licence application.		– Sub-surface polymer-based grout systems or similar to limit groundwater inflows through the excavation floor; and – Additional cut-off walls or similar could be installed to further restrict the inflow of groundwater to the excavation zone. • Excavation would resume when the drawdown is able to be managed.	
IW3 – Dewatering Impacting Groundwater Quality – Dewatering Effluent Treatment	• Where treatment of groundwater is necessary, the installation, commissioning and operation of the water treatment system will be the responsibility of the dewatering contractor(s). • Dewatering treatment will be implemented as per the **Construction Contractor CEMP**, **Dewatering Management Plan(s)** and **ASSMP**, including: – Assess the extent and duration of the temporary dewatering activity following the Water quality protection note No. 13 - Dewatering of soils at construction sites (2012). – Water treatment will occur, where required, using techniques such as settlement basins, treatment basis, dosing plants, filtration plants or packaged water treatment units, which will be detailed in the area specific management plans, and consistent with in accordance with DWER Guidance Statements and Water Quality Protection Notes. • A site-specific Dewatering Permit will be initiated to ensure that risks are managed.	• Monitoring targets will be guided by triggers and thresholds developed following final Proposal designs. • Acceptable water quality is maintained during dewatering. • Changes in groundwater quality can be managed by treatment systems. • Re-injection systems are not compromised by changes in water quality. • Alternative use of dewatering effluent (e.g. construction water supply) is not compromised by changes in water quality.	• Triggers and thresholds will be based on final locations and designs, however, based on regulatory guidelines, groundwater quality of abstracted water should be monitoring at a minimum, every two days • Additional trigger levels may be appropriate in areas where background groundwater quality is poor (e.g. exceeds health or environmental guidelines), as identified by baseline groundwater quality monitoring.	• Reporting of monitoring will be completed as per the regulatory requirements of the 5C licence to take water and the supporting GLOS. • Construction Contractor to report groundwater quality data to PTA in monthly environmental reporting. Results will be submitted to DWER as part of annual groundwater monitoring summary. This report will be guided by *Operational Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence*, (Department of Water, 2009).	• Contingency responses will be guided by triggers and thresholds developed following final Proposal designs. • At a minimum, an exceedance of a trigger level will result in the following: – Confirmation of water quality results through review of supporting laboratory analysis, review of QA/QC and possibly additional sampling; – Assessment of the exceedance against trends and variation in inflow water quality; and – Investigation as to the likely cause of the exceedances, and rectification where possible. • Furthermore, short term management responses to mitigate the risk of any trigger level exceedances while water treatment adjustments are made, may include: – Store untreated groundwater in buffer storage ponds; – Temporary reduction of dewatering flow rates; and • Use of recharge/infiltration system with untreated or partially treated groundwater.	• Acid Sulfate Soil Management Strategy (ASSMS) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor Dewatering Management Plan(s) (to be developed).

ID and Aspect	Management action	Management Target, Trigger	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
		• Treated dewatering water will achieve minimum water quality targets consistent with DWER ASS guidelines (pH in the range 6-8; Total Titratable Acidity less than 40 mg/L (as $CaCO_3$)				
IW4 – Dewatering Impacting Groundwater Quality – Dewatering Effluent Treatment Disposal	• Dewatering management measures and remedial actions will be implemented as per the **Construction Contractor CEMP**, **Dewatering Management Plan(s)** and **ASSMP**, including: – Where practicable, as a priority, groundwater abstracted as part of dewatering activities will be re-injected back into the aquifer to minimise local drawdown impacts on environmental receptors and other groundwater users. – Excess groundwater not re-injected will form part of the construction water supply requirements to minimise Proposal wide abstraction requirements and off-site discharges – Water disposal will occur, using methods consistent with industry practice and regulatory requirements using techniques such as settlement basins, treatment basins, dosing plants and filtration plants. – Infiltration structures will be placed strategically as part of groundwater flow management (e.g. to mound groundwater), and limit off-site impacts, particularly near protected or sensitive wetlands. – Where infiltration basins are not practical (e.g. due to space constraints), groundwater recharge wells may be installed. – The PTA will minimise impacts by directing excess dewatering effluent to temporary ponds where the quality can be monitored and, if required, released to surface waterways in accordance with current DWER guidelines. – In most cases, recharge will occur within the planned Proposal's indicative footprint. In some cases, it may be possible (and preferable) to infiltrate treated dewatering water in naturally vegetated depressions or directly to surface water bodies. Water can then be resupplied directly to areas at most risk of ecological stress due to temporary lowered groundwater levels. This will only occur if water quality is consistently below trigger levels for discharge to the natural environment. • Prior to undertaking temporary dewatering effluent re-injection activities, if required, at a minimum, assess the activities in accordance with DWER Guidance Statements and Water Quality Protection Notes.	• Monitoring targets will be guided by triggers and thresholds developed following final Proposal designs. • The dewatering re-injection system operates as per design • Groundwater levels are consistent with predicted estimations • No direct disposal of dewatered effluent to wetlands or Bennett Brook.	• Triggers and thresholds will be based on final locations and designs, however, based on regulatory guidelines, however quality will be periodically (weekly) monitored to ensure it is not showing indicators of acidification in acid sulfate soil areas. • Quantity of re-injected water will be monitored by flow meter readings (both instantaneous and cumulative) and inspections. • On cessation of dewatering and re-injection activities, monitoring will continue for a minimum period of 6 months at monthly intervals to assess any residual impacts to groundwater levels and/ or quality. • During and immediately after periods of high rainfall, it is possible some unavoidable mixing of stormwater and treated dewatering effluent may occur due to short-term localised flooding. At these times, monitoring of the construction site runoff will occur by the Construction Contractor.	• Reporting of monitoring will be completed as per the regulatory requirements of the 5C licence to take water and the supporting GLOS. • Construction Contractor to report groundwater level, quality and injection rates (instantaneous and cumulative volumes) data to PTA in monthly environmental reporting. • Results will be submitted to DWER as part of annual groundwater monitoring summary. This report will be guided by *Operational Policy 5.12 – Hydrogeological reporting associated with a groundwater well licence*, (Department of Water, 2009).	• Contingency responses will be guided by triggers and thresholds developed following final Proposal designs. • If monitoring indicates re-injection is not in compliance with licence conditions, quality is deteriorating due to acidification, then re-injection will cease immediately from that location. Re-injection will not re-commence until the issue is resolved to the satisfaction of the Contractor and PTA. • If the re-injection system is not able to dispose of all the dewatering discharge in a controlled manner, management actions will be triggered such as: – Investigation of the main cause of the loss of recharge capacity (e.g. poor water quality or high sediment loads). – Increase the frequency of cleaning of infiltration basins or redevelopment of recharge wells. – If the problems are with recharge wells, consider chemical dosing to prevent or manage clogging due to scale or biological fouling. – Adjust/improve the water treatment system to provide better quality water for infiltration (e.g. lower iron and sediment content). • If monitoring indicates that re-injected groundwater levels show excessive change, if practicable, available management actions are (in order of preference): – Adjust re-injection rates;	• Acid Sulfate Soil Management Strategy (ASSMS) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor Dewatering Management Plan(s) (to be developed).

ID and Aspect	Management action	Management Target, Trigger	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
					– Modify the number and location of operating re-injection bores/ trenches; – Increase re-injection/ infiltration; and – Temporary provision of water supply if other groundwater users supply is impacted. • If during dewatering it is evident that the planned infiltration or recharge capacity is not sufficient, contingency options include: – Reduce the rate of dewatering (e.g. by reducing the area under dewatering management. – Construction of additional infiltration basins, trenches or recharge wells. – Disposal to stormwater drains (if available in the vicinity). – Disposal to sewer (if available in the vicinity). • Water will not be disposed of to the stormwater or sewer systems unless it is an emergency situation and all other contingency options have been exhausted. This would be done on a temporary basis only, following notification of the asset owner and relevant regulatory/advisory bodies.	
IW5 – Construction Activities Impacting Surface Water **e.g. stormwater, washdown, refuelling, stockpiles, ASS**	• Impacts of construction activities on potentially affected surface water features (e.g. Bennett Brook and Horse Swamp) will be managed in accordance with the **Construction Contractor CEMP**, **Dewatering Management Plan(s)** and **ASSMP**, including: • Stormwater will be held within the construction sites where practicable and released beyond the footprint if water quality criteria are met. • On site stormwater storage criteria to be defined and agreed as part of construction management. • Where practicable, runoff from disturbed areas will be diverted away from existing waterways and wetlands. • Management of surface water and wetlands will be undertaken in accordance with relevant regulatory legislation, policies and guidelines including applicable Water Quality Protection notes. • Temporary infiltration and retention basins will be adequately sized to minimise risk to adjacent wetlands and water courses.	• Acceptable surface water quality is maintained during temporary construction related activities. • No direct disposal of dewatered effluent to wetlands or Bennett Brook. • No unauthorised offsite discharges	• The Construction Contractor shall monitor surface water levels at identified surface water features. • Field and laboratory analysis of water quality from identified surface water features by the Construction Contractor. • Visual inspection of embankments during construction for evidence of erosion or surface water damming by the Construction Contractor.	• Construction Contractor to report surface water levels and quality, and any discharge data to PTA in monthly environmental reporting • Reporting to regulatory authority as per licensing requirements, as required	• Contingency responses will be guided by triggers and thresholds developed following final Proposal designs. • As a minimum, stormwater and runoff contingency management will include: • Level 1 Response – confirmation and background data review – Re-sample within 7-days – Review results against site short-term and long-term trends – Report the event in the next annual monitoring report • Level 2 Response – impact identification and mitigation – Review results to identify impact risk	• Acid Sulfate Soil Management Strategy (ASSMS) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed). • Construction Contractor Dewatering Management Plan(s) (to be developed).

ID and Aspect	Management action	Management Target, Trigger	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• Distances between temporary surface water control infrastructure such as infiltration and retention basins to nearby surface water features such as wetlands and other forms of riparian vegetation will be based upon risk assessment • Construction planning will incorporate planning and controls (water quality and erosion) for major rainfall events (up to 1% AEP rainfall event) during all phases of construction. • Wash down bays will be managed to prevent environmental impacts. Wash down bay water will be discharged at least 50 m from Conservation Category or Resource Enhancement wetlands and areas of threatened flora or communities. • There will be no bulk storage, transfer of fuel and other potential chemicals, or refuelling within PDWSA Priority 1 areas or wellhead protection zones. • Spill kits will be in place for the construction period. The location and size of the spill kit will be based upon a risk assessment of construction activities. • Road verges and batters will be temporarily stabilised where necessary and then revegetated to minimised runoff and erosion. • Soils with the potential to produce acid sulfate contaminated surface runoff and infiltration into nearby the surface water features and groundwater will be tested and managed in accordance with the **Construction Contractor ASSMP** and DWER Guidelines. • All stockpiles within 15 m of a surface water feature will be bunded to stop run-off entering the channel. • Stormwater management will include the use of low bunds, silt fencing, bales or other erosion and siltation prevention equipment where necessary. The diversion of any open drains will be avoided during construction wherever possible. • Construction staging will have consideration for ensuring appropriate surface water management such as culverts and drainage diversions are installed prior to the wet season wherever practicable. • No works will be permitted within or below Bennett Brook and that no access into or across Bennett Brook is permitted during construction work. • Where practicable, the PTA will schedule construction across waterways in the dry season. • See **Terrestrial Environmental Quality TEQ5** – Contamination of soils from fuel and chemical storage leaks for further management of fuel, chemicals and waste.		• The Construction Contractor shall monitor flow rate and water quality monitoring at any point where water discharges off-site or to a recognised wetland (e.g. project stormwater runoff, dewatering effluent disposal). • The Construction Contractor shall conduct visual inspections of existing drainage paths and channels to ensure they are not unnecessarily blocked or restricted. • Site specific water quality criteria for nutrients, metals and physical surface water characteristics for the management of surface water during construction will be developed prior to construction • The duration and intensity of the water quality monitoring and visual inspection surveys will be based upon an adaptive approach.		– Continue monitoring if the change is not expected to result in an impact – If guideline trigger is breached, re-sample within 7-days. – If change is likely to have an adverse impact, develop a mitigation plan and seek approval from regulatory authority – Implement the approval mitigation plan and continue to monitor. • Level 3 Response – unplanned leaks, spills and emergency response. – Manage in accordance to the PTA Spill Response Framework and Procedure – Identify if the release is a sudden occurrence or slow release. • Control and contain the release as per regulatory guidelines (e.g. Contaminated Sites Guideline (DWER, 2017)).	

ID and Aspect	Management action	Management Target, Trigger	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
IW6 – Construction Activities Impacting Wetlands	• Impacts of construction activities on potentially affected wetland features will be managed in accordance with the **Construction Contractor CEMP**, including: • Implement established construction methods based on the dewatering requirements (i.e. depth and duration) to minimise impacts of dewatering (e.g. diaphragm walls). • Implement a staged dewatering approach during major construction activities such as the Tonkin Highway dive structure construction. • Locate infiltration basins, trenches and/ or reinjection wells to minimise impacts on wetlands. • Re-use excess abstracted dewater where possible to minimise offsite discharge. • Management of wetlands will be undertaken in accordance with relevant regulatory legislation, policies and guidelines including applicable Water Quality Protection notes. • Use of dust suppression during construction to minimise dust migrating to nearby wetlands. • No refuelling will take place within 50 m of a wetland • No chemical storage and ASS stockpiles will be located within 50 m of a wetland • A map showing restricted areas will be provided for each construction zone. These will indicate all wetland areas. • Existing vegetation around wetlands will be maintained in as undisturbed a state as possible to provide a buffer against disturbance of the wetland. • Surface water run-off from construction areas into wetlands, with the potential to carry sediment and weed seeds, will be managed in accordance with **IW5 — Construction Activities Impacting Surface Water** (see above). • The impact of abstraction and dewatering drawdown on wetlands will be managed in accordance with **IW1 – Construction Water Supply Abstraction Impacting Groundwater Levels** and **IW2 – Dewatering Abstraction Impacting Groundwater Levels** (see above). • See **Terrestrial Environmental Quality TEQ5 –** Contamination of soils from fuel and chemical storage leaks for further management of fuel, chemicals and waste.	• Acceptable water quality is maintained during temporary construction related activities. • No direct disposal of dewatered effluent to wetlands or Bennett Brook. • No unauthorised offsite discharges	• Construction abstraction and dewatering wells will be monitored by the Construction Contractor for groundwater level, quality and quantity, as per the 5C licence to take water and associated GLOS. • Groundwater monitoring wells will be required to be installed between key construction related activities and receptors to monitor the potential groundwater impact from temporary dewatering. • Triggers will be based on final designs, however, prior to dewatering, groundwater levels at the nominated sites should be recorded on a weekly basis. While dewatering is ongoing, groundwater level monitoring should be undertaken daily. • The Construction Contractor shall undertake visual inspections of identified wetland areas for evidence of disturbance and indirect impact. • The Construction Contractor shall monitor surface water levels at identified surface water features. • Field and laboratory analysis of water quality from identified surface water features. • The Construction Contractor shall monitor flow rate and water quality at any point where water discharges off-site or to a recognised wetland (e.g. project stormwater runoff, dewatering effluent disposal).	• Construction Contractor to report wetland monitoring data to PTA in monthly environmental reporting • Reporting to regulatory authority as per licensing requirements, as required.	• Contingency responses will be guided by triggers and thresholds developed following final Proposal designs. • As a minimum, stormwater and runoff contingency management will include: • Level 1 Response – confirmation and background data review – Re-sample within 7-days – Review results against site short-term and long-term trends – Report the event in the next annual monitoring report • Level 2 Response – impact identification and mitigation – Review results to identify impact risk – Continue monitoring if the change is not expected to result in an impact – If guideline trigger is breached, re-sample within 7-days. – If change is likely to have an adverse impact, develop a mitigation plan and seek approval from regulatory authority – Implement the approval mitigation plan and continue to monitor. • Level 3 Response – unplanned leaks, spills and emergency response. – Manage in accordance to the PTA Spill Response Framework and Procedure – Identify if the release is a sudden occurrence or slow release. • Control and contain the release as per regulatory guidelines (e.g. Contaminated Sites Guideline (DWER, 2017)).	• Acid Sulfate Soil Management Strategy (ASSMS) • Contractor Monthly Environmental Report Template (7360-000-003) • Construction Contractor CEMP (to be developed).

Social Surrounds

EPA's objective: To protect social surroundings from significant harm.

Affected values:

- **Aboriginal Heritage – Registered Aboriginal Heritage Site ID 551, Site ID 552, Site ID 3692 (Bennett Brook in Toto).**
- **Historical and Natural Heritage – Whiteman Park recreational/tourism value.**
- **Noise and Vibration – sensitive receptors in residential and recreational areas near the railway and associated infrastructure.**

Environmental aspects:

- **SS1 – Ground Disturbance of Aboriginal Heritage.**
- **SS2 – Historical and Natural Heritage -- Whiteman Park (Park Access and Bushfire).**
- **SS3 – Noise and Vibration.**
- **SS4 – Visual Amenity.**

Objectives:

- **To avoid unauthorised access and/or impacts to Registered Heritage Sites.**
- **To avoid permanent restriction of public access to Whiteman Park during construction.**
- **To avoid increased bushfire risk to Whiteman Park resulting from =construction activities.**

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
SS1 – Ground Disturbance of Aboriginal Heritage	• The Proposal will be implemented in accordance with the overarching METRONET Aboriginal Engagement Strategy (commonly referred to as the 'Gnarla Biddi' Strategy) and the Noongar Sense of Place Interpretative Statement. • A Noongar Cultural Context Document will be developed by the METRONET Office with input from the METRONET Noongar Reference Group for the MEL project prior to the commencement of the project design development phase. • PTA will continue consultation with the Whadjuk Working Party to minimise impacts to heritage values. • Seek s18 approval for disturbance to Registered Aboriginal Sites required to be disturbed for the Proposal. • Comply with any Section 18 Notices under the *Aboriginal Heritage Act 1972*. • Ensure Noongar monitors are onsite for clearance and initial groundworks in areas which have previously been undisturbed or are registered heritage sites to assist with the identification and management of any Aboriginal objects identified or unearthed during construction. • Implement the **PTA Unexpected Finds Procedure** (3100-000-003), Heritage Finds Protocol and/or Human Skeletal Finds Protocol, if potential Aboriginal sites/artefacts/remains are identified during works.	• Disturbance to registered or potential heritage site does not exceed approved limits. • No avoidable disturbance to Aboriginal objects identified or unearthed during construction activities.	• Visual monitoring by the Construction Contractor during the period of construction activities to ensure any potential items of Aboriginal heritage significance identified during construction activities are reported to the Construction Contractor's environment representative. • Record number and description of any Aboriginal objects identified during construction activities. •	• If objects are discovered during ground disturbance, works shall immediately cease and the Contractor and PTA will be notified within 24 hours. • In the event of finding Aboriginal artefacts/objects report findings to the Department of Planning, Lands and Heritage (DPLH), the WA Museum and the WA Police if any skeletal material is found. • Construction Contractor to report unexpected finds to PTA in monthly environmental reporting.	• If objects are discovered during clearing, works shall cease as soon as possible, until investigation is completed and any adaptive management is implemented	• METRONET Aboriginal Engagement Strategy (the 'Gnarla Biddi' Strategy) • Noongar Cultural Context Document (to be developed) • Unexpected Finds Procedure (3100-000-003) • Ground Disturbance Procedure (7310-000-001) • Contractor Monthly Environmental Report Template (7360-000-003)
SS2 – Historical and Natural Heritage -- Whiteman Park (Park Access and Bushfire)	• PTA will continue consultation with the Western Australian Planning Commission (WAPC), DPLH and Whiteman Park operators to minimise impacts to park access. • Public access to Whiteman Park will be maintained throughout construction and operation of the Proposal. Where an existing public access option is restricted, either temporarily or permanently, alternative access routes will be established.	• Public access into Whiteman Park is retained.	• The PTA Communications Manager shall track community feedback for the duration of construction activities. • Record consultation with Whiteman Park.	• Construction Contractor to report Community consultation and bushfire incidences to PTA in monthly environmental reporting.	• All registered complaints will be investigated and complainants contacted within seven days of complaint. • Investigate requirement for additional consultation.	• PTA Bushfire Management Strategy

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
	• Install signage to inform of road and access track closures. • Provide contact number for community feedback on signage. • Access for Whiteman Park management and Emergency Services will be reinstated following completion of construction. • The Contractor will develop and implement bushfire management measures in line with the **PTA Bushfire Management Strategy** (PTA 2018) and in consultation with Whiteman Park and the City of Swan, to align with the risks identified in the Whiteman Park Bushfire Management Plan and any relevant existing local government Bushfire Management Plans. • See **Flora and Vegetation FV7 – Bushfire** for further bushfire management actions	• Bushfire management measures implemented in line with Whiteman Park Bushfire Management Plan and PTA Bushfire Management Strategy.	• Monitoring by construction personnel of DFES Fire Danger Ratings (FDRs) during bushfire season to minimise risk of bushfire from construction activities. • Record Bushfire occurrence within Development Envelope.	• In the event of a fire, Contractor to provide reports and incident response reporting to PTA as soon as practicable after event.	• Review Bushfire management measures and contingency measures to be undertaken in line with Whiteman Park Bushfire Management Plan and **PTA Bushfire Management Strategy**.	
SS3 – Noise and Vibration	• Unless otherwise approved by the local government authorities, undertake all construction works during standard construction hours only, defined as 7 a.m. to 7 p.m. on days other than Sundays and public holidays. • The Construction Contractor will prepare a NVMP in accordance with AS24360-2010 (R2016) Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites. The NVMP shall be approved by the PTA and DWER, and will include information on: – Equipment choices based on noise and vibrations levels and noise reduction devices that can be fitted to equipment; – If and when acoustic screens may be used; – Low vibration work practices; – Time restrictions on processes involving exposure to potentially hazardous vibration; – Signposting of vibration hazard areas; – Mobile equipment to be inspected and maintained regularly to ensure noise levels are minimised. • If works are required outside of standard working hours, an **Out of Hours Noise and Vibration Management Plan** (OHNMP) is required to be approved by the PTA and local government authority. The management plan is to include: – The need and reasons for the construction work to be done; – Types and durations of activity likely to result in noise emissions above assigned noise levels; – Predictions of noise emissions; – Control measures for noise emissions, including vibration; and – A protocol for receiving, handling and resolving complaints.	• No exceedance of construction noise limits in accordance with *Environmental Protection (Noise) Regulations 1997*. • No unauthorised out of hours noise associated with construction.	• The Construction Contractor shall monitor noise and vibration emissions during construction. • . • Noise monitoring for works outside of standard construction hours (if required) in accordance with the Out of Hours NVMP.	• Establish a complaints register and record details of the complaint including date, time, location, nature of complaint and complainant details. • Construction Contractor to report Noise monitoring results and complaints to PTA in monthly environmental reporting.	• All registered complaints will be investigated and complainants contacted within seven days of complaint. • The outcomes of the investigation will be recorded in the register and reported in Construction Contractor Monthly Environmental Reporting to PTA. • Other contingency management actions in accordance with the NVMP.	• Noise and Vibration Management Plan (NVMP) (to be developed) • Construction Contractor CEMP (to be developed)

ID and Aspect	Management action	Management Target	Monitoring method	Reporting	Contingency actions (if target(s) not met)	PTA plans and procedures
SS4 – Visual Amenity	• Implementation of the **Construction Contractor CEMP** to control construction visual impact associated with clearing, storage areas, spoil and fill stockpiles and trenches.	• No complaints relating to visual amenity impacts from construction	• Ongoing tracking of community feedback.	• Install signage to inform of community contact information.	• Respond to community complaints in a timely manner • Investigate requirement for additional consultation.	• Construction Contractor CEMP (to be developed).