



Yanchep Railway Extension: Part 2 – Eglinton to Yanchep

Construction Environmental Management Plan

Public Transport Authority Western Australia

DOCUMENT TRACKING

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Template 2.8.1

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Abbreviations

Abbreviation	Description
BRMP	Bushfire Risk Management Plan
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CoW	City of Wanneroo
DBCA	Department of Biodiversity, Conservation and Attractions
DoEE	Department of the Environment and Energy
DoW	Department of Water
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EP Act	<i>Environmental Protection Act 1986</i>
ERD	Environmental Review Document
ESD	Environmental Scoping Document
MRS	Metropolitan Region Scheme
NMP	Noise Management Plan
NSHA	Noongar Standard Heritage Agreement
PEC	Priority Ecological Community
PER	Public Environmental Review
PSP	Principal Shared Path
PTA	Public Transport Authority of Western Australia
QREG	Quinns Rock Environmental Group
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i>
SCP	Swan Coastal Plain
SRE	short range endemic
TEC	Threatened Ecological Community
UBC	Urban Bushland Council
WQPN	Water Quality Protection Note
YRE	Yanchep Rail Extension

1. Introduction and summary

The Public Transport Authority of Western Australia (PTA) is developing the Yanchep Rail Extension (YRE) Project as part of the Western Australian Government’s METRONET program of works. The YRE Project is an extension to the Northern Suburbs Railway (also known as the Joondalup line) in Perth’s northern suburbs, 40 km north of the Perth central business district (CBD). The YRE Project includes the construction of 14.5 km of railway beyond the existing Butler Station, new stations at Alkimos, Eglinton and Yanchep, and associated infrastructure.

The Proposal described in this document is Part 2 of the YRE Project, Eglinton Station to Yanchep Station, located within the City of Wanneroo (CoW). YRE Part 2 includes the northern portion of the YRE Project which commences to the north of the proposed Eglinton Station to north of the proposed Yanchep Station.

Following referral of the Proposal to the Environmental Protection Authority (EPA) under Section 38 of the *Environmental Protection Act 1986* (EP Act), the EPA determined on 25 August 2018 to set the level of assessment as Public Environmental Review (PER) with a public review period of six weeks. The PTA has prepared an Environmental Review Document (ERD) setting out the Proposal’s potential environmental impacts and their assessment. As outlined in the ERD, this construction environmental management plan (CEMP) provides the management and mitigation measures for residual environmental impacts identified within the ERD. This document addresses management of impacts during construction only, not during operation. A summary of this plan is provided in Table 1-1 below.

Table 1-1: Summary of this plan

Item	Detail	
Title of Proposal	Yanchep Rail Extension: Part 2 – Eglinton to Yanchep	
Proponent	Public Transport Authority of Western Australia	
Ministerial Statement No.	Not applicable – Proposal is under assessment	
Purpose of this CEMP	To support the ERD and manage and mitigate potential environmental impacts	
Key environmental factors considered in this Proposal	Key environmental factor	Objective
	Flora and Vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.
	Landforms	To maintain the variety and integrity of significant physical landforms so that environmental values are protected.
	Terrestrial Fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.
	Subterranean Fauna	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.
	Inland Waters	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.
	Social Surroundings	To protect social surroundings from significant harm.
Key provisions in the plan	See Schedule 1: CEMP provisions	

The structure of this CEMP is as follows:

- Section 1 – Introduction and summary.
- Section 2 – Further context and rationale for the CEMP and the provisions being proposed.
- Section 3 – Summary of provisions of this CEMP, i.e. the management, monitoring and reporting framework being proposed.
- Section 4 – Provisions for adaptive management and review.
- Section 5 – Details of stakeholder consultation.
- Schedule 1 – Detailed provisions of the CEMP.

2. Context, scope and rationale

2.1 Description of the Proposal

The Proposal described in this document is Part 2 of the YRE Project from north of the future Eglinton Station to north of the proposed Yanchep Station in the City of Wanneroo, approximately 40 km north of the Perth CBD. The 72.86 ha development envelope is comprised of four physical elements as shown in **Figure 1**: the railway extension; Yanchep Station; construction and access areas of; and road bridges at Yanchep Beach Road, 'Tokyu 3' Road and Torepango Drive.

A total of 7.2 km of narrow-gauge dual track will start approximately 700 m north of the future Eglinton Station, heading generally north following the land reserved 'Railways' in the Metropolitan Region Scheme (MRS) before terminating north of the proposed Yanchep Station. The majority of the railway will be constructed in a cutting averaging approximately 6 m below surrounding ground level. The Proposal also includes permanent infrastructure for maintenance and emergency vehicle access, drainage, overhead electrification for traction, signalling, communications and other services, access roads and pathways, and access control (e.g. fences and gates). The new station at Yanchep will include intermodal interchanges for bus services, 'park and ride', 'kiss and ride', active mode (cycling and walking) facilities and associated infrastructure. A Principal Shared Path (PSP) will also be constructed alongside the railway (outside the railway corridor fencing) to provide transport facilities for pedestrians and cyclists. In Ningana Bushland, the PSP will be located on the western side of the railway, while an access track will be included on the eastern side.

2.2 Key environmental factors

The Environmental Scoping Document (ESD) identified six preliminary key environmental factors that are relevant to the Proposal (EPA 2018). The following key environmental factors relevant to the construction phase which are addressed within this CEMP are as follows:

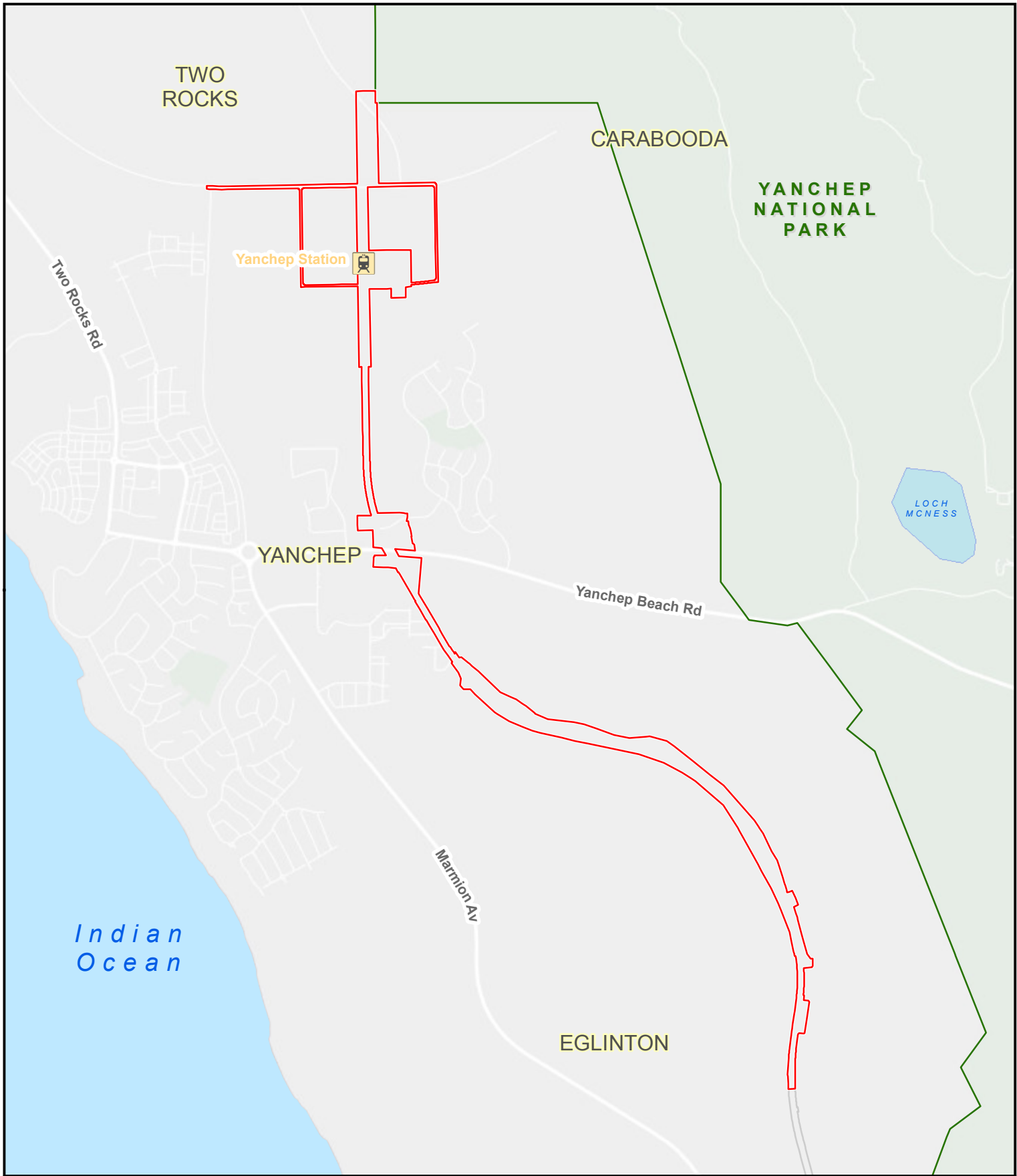
- Flora and Vegetation
- Landforms
- Terrestrial Fauna
- Subterranean Fauna
- Inland Waters
- Social Surroundings

The ERD identified several key environmental issues with the potential to cause significant residual impact to the key environmental factors if not properly managed. These include, but are not limited to:

- Clearing of 49.17 ha native vegetation including:
 - 8.13 ha of *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed Banksia dominated woodlands of the Swan Coastal Plan (SCP) Threatened Ecological Community (TEC).
 - 0.05 ha of State listed *Melaleuca huegelii* – *M. systema* shrublands on limestone ridges (SCP 26a) TEC.
 - 28.82 ha of Bush Forever site 289 (Ningana Bushland).
- Loss of 56.31 ha of foraging habitat and loss of 45 potential breeding trees for Carnaby's Black Cockatoo.

Due to the presence of the Aquatic Root Mat Community in Caves of the Swan Coastal Plain Threatened Ecological Community outside the development envelope in the Yanchep National Park, the PTA modified the Proposal in May 2019 to remove the requirement for groundwater abstraction.

All potential impacts of the Proposal are outlined in **Table 2-1**.



Yanchep Rail Extension (Part 2)
Figure 1 Project location

Legend

- Development Envelope
- YRE Part 1
- National Park
- Surface Water Feature
- Proposed Station



Public Transport Authority

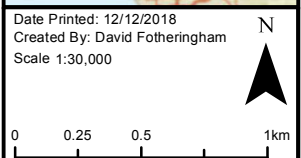


Table 2-1: Summary of the environmental factors, Proposal activities, affected environmental values and potential impacts of the Proposal

Key environmental factor	Proposal activity with potential to impact factor	Affected environmental values	Potential impacts	Activity or threatening process
Flora and Vegetation	Clearing of native vegetation	Native vegetation Threatened and Priority Ecological communities (TEC and PECs) Priority flora Bush Forever site	Clearing of 49.17 ha of native vegetation in Excellent to Degraded condition, including areas of Ningana Bushland, State listed TECs/PECs and up to 8.13 ha of Banksia dominated woodlands of the SCP TEC. Fragmentation of contiguous vegetation of Ningana Bushland.	Clearing of native vegetation. Clearing of TECs/PECs Clearing of Bush Forever. Severance of ecological linkages and Bush Forever.
	Vehicle and machinery movement	Native vegetation TECs and PECs Bush Forever Site	Degradation of vegetation adjacent to the development envelope.	Introduction and spread of <i>Phytophthora</i> dieback and weeds. Unauthorised access to adjacent vegetation by vehicles or on foot. Dust deposition and emissions.
Landforms	Earthworks	Quindalup parabolic dune landforms	Clearing and potential destabilisation and erosion of the parabolic dune formation.	Alteration of the shape of the parabolic dune formation.
Terrestrial Fauna	Clearing of native vegetation	Fauna habitat Fauna species (including Threatened and Priority species)	Loss of up to 61.68 ha of fauna habitat including 56.31 ha of Carnaby's Black Cockatoo foraging habitat and 45 potential breeding trees. Mortality/injury of fauna. Fragmentation of habitat.	Clearing of fauna habitat. Severance of ecological linkages and Bush Forever.
	Vehicle and machinery movement	Fauna habitat Fauna species (including Threatened and Priority species)	Degradation of fauna habitat adjacent to the development envelope. Mortality/injury of fauna.	Introduction and spread of <i>Phytophthora</i> dieback and weeds. Unauthorised access to adjacent vegetation.

Key environmental factor	Proposal activity with potential to impact factor	Affected environmental values	Potential impacts	Activity or threatening process
			Disturbance and disruption.	Noise and vehicle/dust emissions.
Subterranean Fauna	Earthworks - cutting	Subterranean fauna species and habitat	Loss of potential or actual habitat. Mortality of troglofauna species (if present).	Disturbance or destruction of small voids close to the surface.
	Use and storage of fuel/chemicals for vehicle and machinery use	Subterranean fauna species and habitat	Mortality of subterranean fauna species (if present), degradation of habitat.	Contamination from spills, such as from refuelling and plant and vehicle fluid leaks during earthworks.
Inland Waters	Use and storage of fuel/chemicals for vehicle and machinery use	Groundwater quality	Reduction in the quality of the superficial aquifer.	Contamination from spills, such as from refuelling and plant and vehicle fluid leaks.
	Vegetation clearing and earthworks	Hydrological processes	Alteration of surface water flow paths and recharge locations.	Alteration of the shape of the landscape.
Social Surroundings	Vegetation clearing and earthworks Vehicle and machinery movement	Aboriginal heritage	Damage or destruction to sites of Aboriginal heritage value or previously unidentified Aboriginal objects.	New Aboriginal objects unearthed or identified during vegetation clearing and earthworks or unauthorised vehicle and personnel access.
	Vegetation clearing and earthworks Vehicle movement Stockpiles and cleared land	Amenity (air quality)	Elevated dust levels in adjacent residential areas could irritate the public and reduce visibility.	Dust generated from stockpiles/cleared areas/material transport and during vehicle movements.
	Vegetation clearing and earthworks Vehicle movement Use of power tools and machinery	Amenity (noise and vibration)	Noise and vibration may be a nuisance to adjacent residential areas.	Noise and vibration generated by construction activities. Noise and vibration impact from operations are addressed in a separate Noise and Vibration Management Plan.
	Vehicle movement Use of power tools and machinery	Amenity (bushfire)	Bushfire ignition resulting in damage to people, property or infrastructure.	Ignition sources created by construction activities, particularly hot works.

2.3 Rationale and approach

The results of the baseline environmental assessments and a review of the anticipated project activities inform the management approach for meeting the management provisions outlined in **Section 3.2** and **Schedule 1**. The identified management actions, management targets and proposed review and revision of management actions are aligned with the overall management approach and are designed to meet the environmental objectives for each key environmental factor.

To supplement the management approach identified in this CEMP, a contractor CEMP will be developed and implemented, and will include more detailed instruction on day to day management and accountabilities.

2.3.1 Findings from studies and surveys

Numerous environmental studies have been undertaken within the development envelope for the six key environmental factors. The key findings of these studies are outlined in **Table 2-2**.

Table 2-2: Key environmental studies undertaken for the Proposal

Key environmental factor	Report	Key findings
Flora and Vegetation	Northern Suburbs Railway Alignment Butler to Yanchep Environmental Investigation (GHD 2012)	Reconnaissance and detailed surveys were undertaken to assess the native flora and vegetation values present. Vegetation condition varied from Excellent to Completely Degraded. One Priority flora species was observed. Six Declared Pest species were recorded. Three State-listed PECs, one State-listed TEC and a Federally listed TEC are present within the development envelope. One Bush Forever Site intersects the development envelope. Two dieback assessments have been undertaken; no dieback was recorded. In Glevan (2017), 33% of the broader Part 1 and Part 2 project area that was interpretable was disease-free. More than half of the project area (57%) was uninterpretable. All uninfested and uninterpretable areas are considered protectable and have very low likelihood of dieback presence due to presence of calcareous soils and limestone. One Bush Forever Site No 289 (Ningana Bushland) intersects the development envelope in mostly Good to Very Good condition, providing a valuable ecological corridor from the coast to Yanchep National Park.
	Yanchep Rail Extension Part 2 Biological Assessment (GHD 2018a)	
	Yanchep Rail Extension Part 2, Biological Factors – Context and Impact Assessment (GHD 2019)	
	Environmental (Bush Forever Site 289) Candidate Offset Site Investigation, Yanchep Railway Extension (ELA 2018)	
	Northern Suburbs Railway, Alkimos to Yanchep, <i>Phytophthora cinnamomi</i> occurrence assessment (Glevan Consulting 2011)	
Yanchep Rail Extension, <i>Phytophthora</i> dieback Occurrence Assessment (Glevan Consulting 2017)		
Landforms	Northern Suburbs Railway Alignment Butler to Yanchep Environmental Investigation (GHD 2012)	Various assessments described the geological profile and provided an interpretation of the geotechnical engineering implications for construction. Parabolic and nested parabolic dunes intersect the development envelope in five areas.
	Northern Suburbs Railway Extension Alignment (R. & E. O'Connor Pty Ltd 2017a)	
	Geotechnical Investigation Report – Yanchep Rail Extension (Advisian 2017)	

Key environmental factor	Report	Key findings
	<p>Yanchep Rail Extension Biological Assessment (GHD 2018c)</p> <hr/> <p>Aboriginal Heritage Survey of Proposed Northern Suburbs Railway Extension Alignment (R. & E. O'Connor Pty Ltd 2017a)</p> <hr/> <p>Environmental Impact Assessment – Yanchep Rail Extension, Part 2 – Eglinton Station to Yanchep Station (RPS 2018a)</p> <hr/> <p>Yanchep Rail Extension Biological Factors – Additional Information (GHD 2018b)</p>	
Terrestrial Fauna	<p>Report for Northern Suburbs Railway Alignment from Romeo Road (Alkimos) to Yanchep, Graceful Sun-moth Survey (GHD 2011)</p> <hr/> <p>Northern Suburbs Railway Alignment Butler to Yanchep Environmental Investigation (GHD 2012)</p> <hr/> <p>Yanchep Rail Extension Part 2 Biological Assessment (GHD 2018a)</p> <hr/> <p>Yanchep Rail Extension Part 2 Biological Factors – Context and Impact Assessment (GHD 2019)</p> <hr/> <p>Environmental (Bush Forever site 289) Candidate Offset Site Investigation, Yanchep Railway Extension (ELA 2018)</p> <hr/> <p>Yanchep Rail Extension Part 2 Fauna Desktop Study (Bamford 2019a)</p> <hr/> <p>Fauna Underpass Assessment Statement (Bamford 2019b)</p>	<p>Level 1 and targeted Black Cockatoo surveys were undertaken to assess the fauna and habitat values present, with approximately 77% of the development envelope identified as suitable foraging habitat for Carnaby’s Black Cockatoo. Seven fauna habitats were mapped in the development envelope, with the balance comprised of highly disturbed areas (cleared) that provided limited foraging and shelter values. Four conservation listed fauna species were recorded, with a further five considered likely to occur.</p>
	<p>Desktop Review and Risk Assessment of Short Range Endemic (SRE) Invertebrates for the Yanchep Rail Extension, Western Australia (Invertebrate Solutions 2018a)</p>	<p>A desktop review was undertaken of previous SRE invertebrate fauna assessments, suitable habitats, direct and indirect impacts and significance of impacts. This review identified three SREs as likely to occur within the development envelope and a further four SREs with the potential to occur. SRE habitats were determined to be of moderate or lesser suitability, with no SREs restricted to the development envelope.</p>
Subterranean Fauna	<p>Northern Suburbs Railway Alignment Butler to Yanchep Environmental Investigation (GHD 2012)</p> <hr/> <p>Geotechnical Investigation Report – Yanchep Rail Extension (Advisian 2017)</p>	<p>Assessments on the likelihood of subterranean fauna, subterranean fauna habitat and/or karst formations being present. No significant habitat for subterranean fauna were identified, and it was considered that there was a low risk that subterranean fauna were present in smaller voids.</p>

Key environmental factor	Report	Key findings
	<p>Desktop Review and Risk Assessment of Subterranean Fauna for the Yanchep Rail Extension, Western Australia (Invertebrate Solutions 2018b)</p>	<p>A desktop review of subterranean fauna to assess the likelihood of subterranean fauna occurring in the development envelope and to consider the potential impacts of the Proposal to subterranean fauna.</p> <p>The Proposal intersects areas of low value habitat to subterranean fauna. The Proposal does not include groundwater dewatering and abstraction, and therefore no impacts to groundwater levels are predicted.</p>
Inland Waters	<p>METRONET – YRE Hydrology Assessment (RPS 2018b)</p>	<p>The desktop study assessed the ground and surface water values and connectivity within the development envelope. The development envelope is located in the Perth Basin, with the Superficial, Leederville and Yarragadee North aquifers underlying the development envelope. Average depth to groundwater level fluctuates from approximately 11 m in the south to approximately 32 m to the east. The development envelope is within the Priority 3 Perth Coastal Underground Water Pollution Control Area; the land uses ‘Railway’ and ‘Railway Station’ are considered ‘Acceptable’ and ‘Compatible with Conditions’ within Priority 3 areas respectively. The wellhead protection zone of an existing production bore, and three proposed bores intersect the development envelope.</p> <p>There are no surface water features within the development envelope.</p>
Social Surroundings	<p>Report on an Archaeological Survey of the Butler to Yanchep Railway Alignment (John Cecchi Heritage Management Consulting (JCHMC 2013)</p> <hr/> <p>Aboriginal Heritage Survey of Proposed Northern Suburbs Railway Extension Alignment (R. & E. O’Connor Pty Ltd 2017a)</p> <hr/> <p>Addendum to report on the Aboriginal Heritage Survey of the Northern Suburbs Railway Extension (R. & E. O’Connor Pty Ltd 2017b)</p> <hr/> <p>Transportation Noise and Vibration Assessment, METRONET – Yanchep Rail Extension (Lloyd George Acoustics 2018)</p>	<p>A desktop assessment and two archaeological surveys have been undertaken within the development envelope to identify if any Aboriginal heritage sites or isolated artefacts were present. No sites of potential heritage value were identified within the development envelope</p> <p>There are no listed natural or historic (European) heritage places within the development envelope.</p> <p>Dust, noise and vibrations are likely to be generated during construction activities.</p> <hr/> <p>An assessment has been undertaken to quantify the noise and vibration emissions due to the operation of the Proposal. The report indicated that the noise target will be exceeded at a number of sensitive premises during rail operation and it recommended noise mitigation measures.</p> <p>The vibration criterion is predicted to be marginally exceeded at a number of locations along the railway alignment during rail operation. Ballast matting is recommended to be installed adjacent all existing and future residential developments.</p>

2.3.2 Management approach

The management approach has been informed by best practice and recent experience on similar linear infrastructure projects in Western Australia, including alignment with the YRE Part 1 – Butler to Eglinton CEMP. The hierarchical approach taken focuses first on avoiding impacts to the key environmental factors, with focus on the actions of the construction of the YRE which have potential to cause significant residual impacts to the key environmental factors. Where impacts are unavoidable, management aims to minimise the duration, intensity and/or extent of impacts on key environmental factors during construction.

2.3.3 Rationale for choice of provisions

There are several existing *Environmental Protection Act 1986* (EP Act) and EPBC Act environmental approvals and associated management plans that are relevant to the Proposal. Management provisions considered relevant to the construction phase of the Proposal have been considered during the preparation of this CEMP to ensure consistency between these documents. These existing approvals and management plans include:

- Ministerial Statement No. 722 – Alkimos-Eglinton Metropolitan Region Scheme Amendment 1029/33 (EPA 2006).
- EPBC 2011/6021 – LandCorp – Eglinton/South Yanchep Residential Development – 45 km North-West of Perth, WA (DSEWPC) 2013, including:
 - Eglinton/South Yanchep Clearing and Revegetation Management Plan 2014 (Strategen 2014).
 - Eglinton/South Yanchep Conservation Management Plan 2015 (Strategen 2015).
- Clearing Permit CPS 7843-1 (Government of Western Australia 2018).
- The authority for constructing the railway conferred by the *Railway (METRONET) Act 2018*.

The management provisions detailed in this plan align with the mitigation measures outlined in the *Yanchep Rail Extension: Part 2 – Eglinton to Yanchep. Environmental Review Document* (ELA 2019) submitted to the EPA in January 2019. These mitigation measures also align generally with the existing EP Act and EPBC Act approvals and management plans.

Six Water Quality Protection Notes (WQPN) published by the former Department of Water (DoW) have been considered to ensure that relevant water quality management measures are incorporated into the CEMP to manage potential contamination risks:

- WQPN 10: Contaminant spills – emergency response (DoW 2006a)
- WQPN 44: Roads near sensitive water resources (DoW 2006b)
- WQPN 51: Industrial wastewater management and disposal (DoW 2009)
- WQPN 60: Tanks for mobile fuel storage in Public Drinking Water Source Areas (DoW 2013a)
- WQPN 68: Mechanical equipment was down (DoW 2013b)
- WQPN 83: Infrastructure corridors near sensitive water resources (DoW 2007).

2.3.4 Key assumptions

The key assumptions within this plan include:

- Key environmental factors Flora and Vegetation and Terrestrial Fauna have the greatest risk of significant environmental impacts; thus, the management of the potential impacts from the Proposal to these key environmental factors has been prioritised.
- The Proposal will result in some areas of the development envelope being planted with vegetation. This will typically be for targeted purposes such as landscaping in proximity to Yanchep station, stabilisation of batters around cuttings and embankments, and in association with fauna crossings (where applicable) and drainage structures such as drainage basins. While these vegetation works may include native species and result in the revegetation of areas cleared during construction, they are not attempting to restore the vegetation communities that existed prior to clearing but rather establish plantings sympathetic to the surrounding vegetation and landform. The embankments of the railway reserve resulting from the cut into the parabolic dune formation are subject to detailed engineering design following further geotechnical investigations. Where embankments are of a suitable material and angle and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species and/or bioengineering controls.
- The Proposal does not include rehabilitation of the construction and access areas, as these are wholly within areas that are intended for future urban development (done so to avoid unnecessary additional impacts). See **Section 2.3.3** for a discussion of approvals relating to future development surrounding the railway.
- In relation to timeframes for management actions or monitoring, the term 'construction' is used to refer to the period from which construction works and/or ground disturbance are substantially commenced (i.e. not including preliminary site investigative works, for example) until the substantial completion of such 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 with respect to the provisions in this plan.
- 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

This section of the CEMP sets out the provisions that will be implemented as part of this plan.

3.1 Outcome-based provisions

No outcome-based provisions are proposed.

3.2 Management-based provisions

The CEMP provisions for each of the key environmental factors that form the key component of this CEMP are identified in **Sections 3.2.1 to Section 3.2.6** below and in **Schedule 1** attached.

3.2.1 Flora and Vegetation

Table 3-1: Management-based provisions for Flora and Vegetation

Activity	Management actions	Management Targets	Monitoring	Reporting
Flora and Vegetation				
EPA objective: <i>to protect flora and vegetation so that biological diversity and ecological integrity are maintained</i>				
Outcomes: Clearing and fragmentation of native vegetation.				
Key environmental values: Remnant native vegetation, TECs and PECs, Bush Forever site.				
Key impacts and risks: Loss of 49.17 ha of native vegetation in Excellent to Degraded condition; loss of 0.05 ha of <i>Melaleuca huegelii</i> – <i>M. systema</i> shrublands on limestone ridges (Gibson et al. 1994 SCP 26a) TEC; loss of 8.76 ha of Banksia dominated woodlands of the Swan Coastal Plain IBRA Region PEC including 8.13 ha of Banksia dominated woodlands of the Swan Coastal Plain (SCP) Woodlands TEC; loss of 28.82 ha of Bush Forever Site 289 (Ningana Bushland) and loss of 2.13 ha of Tuart (<i>Eucalyptus gomphocephala</i>) woodlands of the Swan Coastal Plain PEC. Fragmentation of Bush Forever Site 289 and introduction or spread of weeds and/or dieback.				
Vegetation Clearing	<ul style="list-style-type: none"> Provide GPS co-ordinates of areas approved to be cleared to the contractor to prevent unapproved clearing. Demarcate the development envelope (e.g. via installation of temporary fencing) to prevent clearing outside of approved areas. Identify trees to be kept, where applicable. 	<ul style="list-style-type: none"> No clearing of vegetation to occur outside of the development envelope during and attributable to construction. Clearing of native vegetation within the development envelope will not exceed 49.17 ha, and not include more than 0.05 ha of <i>Melaleuca huegelii</i> – <i>M. systema</i> TEC (SCP 26a), 8.13 ha of Banksia dominated woodlands TEC and 28.82 ha of Bush Forever Site 289 (Ningana Bushland), during and attributable to construction. 	<ul style="list-style-type: none"> Daily on ground, visual inspection during clearing activities of the condition of boundary demarcation and the location of the vegetation cleared to confirm no clearing outside of the development envelope. Daily on ground, visual inspection of clearing extents to confirm that total area of native vegetation cleared does not exceed the identified targets. 	<ul style="list-style-type: none"> Report unauthorised clearing to the Department of Water and Environmental Regulation (DWER) as soon as practicable. Annual reporting of the area and location of vegetation cleared to the PTA.
Weeds	<ul style="list-style-type: none"> All vehicles entering and exiting the development envelope to be clean on entry and exit; and implementation of washdown of vehicles as required. 	<ul style="list-style-type: none"> No introduction of new weed species into the development envelope during and attributable to construction. 	<ul style="list-style-type: none"> Weekly visual inspections for evidence of unauthorised access, attributable to the construction to the 	<ul style="list-style-type: none"> Report increase in weed species, density and/or numbers from pre-construction monitoring

Activity	Management actions	Management Targets	Monitoring	Reporting
	<ul style="list-style-type: none"> • Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed control measures. • As far as practicable, inspect imported fill, limestone, gravel and topsoil or other materials for visible evidence of weeds. • 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. • Manage the six Declared Pests ¹ recorded in the development envelope and any other newly identified declared weeds, environmental weeds and/or Weeds of National Significance in accordance with the <i>Biosecurity and Agriculture Management Act 2007</i> and subsidiary regulations. • Undertake regular weed spraying in areas of weed infestation along the edge of the development envelope and within cleared areas. • Require all personnel to complete a site induction that will include hygiene training with regards to weed management requirements. • Restrict unauthorised access to and from the development envelope by installing temporary fencing or barriers and signage as required. <p>Note:</p> <p>1. Six Declared Pests recorded in the development envelope include <i>Gomphocarpus fruticosus</i> (narrowleaf cottonbush), <i>Moraea flaccida</i> (One-leaf Cape Tulip), <i>Solanum linnaeanum</i> (apple of Sodom), <i>Zantedeschia aethiopica</i> (Arum Lily), <i>Lantana camara</i> (common lantana) and <i>Asparagus asparagoides</i> (bridal creeper).</p>	<ul style="list-style-type: none"> • No introduction or spread of weed species into surrounding retained native vegetation during and attributable to construction. • No evidence of vegetation condition decline from significant weeds or pests as a result of the Proposal within five years from the commencement of construction. 	<p>surrounding native vegetation from the development envelope, e.g. observations of vehicles or machinery, vehicle tracks, damage to fencing or vegetation.</p> <ul style="list-style-type: none"> • Weekly spot checks of vehicle compliance with clean on entry/exit procedures throughout the duration of construction activities at each entry and exit point. • Monthly visual inspections for weeds along the clearing edge, adjacent to native vegetation, commencing at the commencement of clearing activities, and to continue for the duration of construction. • Establish vegetation monitoring quadrats within remnant native vegetation adjacent to the development envelope in Ningana Bushland prior to the commencement of clearing and construction to enable assessment of baseline and: <ul style="list-style-type: none"> ○ Six-monthly levels of weed abundance and density ○ For the duration of construction activities and for one year subsequent to the 	<p>observations within the development envelope and surrounding native vegetation monthly/annually.</p> <ul style="list-style-type: none"> • Maintain records of all weed inspections of vehicles, machinery, equipment, fill and other weed mediums • Report results of spot checks of vehicle compliance with clean on entry/exit procedures monthly. • Compliance with these measures to be documented and reported annually.

Activity	Management actions	Management Targets	Monitoring	Reporting
<p><i>Phytophthora</i> Dieback</p>	<ul style="list-style-type: none"> • If practicable, conduct ground disturbance activities in dry months to reduce the risk of spreading disease. • Inspect and verify all vehicles and machinery to be free of plant material and soil prior to entering the development envelope. • Avoid topsoil movement from uninterpretable areas to uninfested areas. • All imported materials will be certified dieback free. • Install a temporary fence or appropriate buffer to prevent access to surrounding vegetation. • Require all personnel to complete a site induction that will include hygiene training with regards to dieback hygiene management requirements, the environmental implications of the introduction and spread of dieback and obligations to follow this CEMP. 	<ul style="list-style-type: none"> • <i>Phytophthora</i> dieback is not introduced to vegetation surrounding the development envelope attributable to construction activities as observed within five years from the commencement of construction 	<p>completion of construction.</p> <ul style="list-style-type: none"> • Weekly spot checks of vehicle and machinery compliance with clean on entry/exit procedures throughout the duration of construction activities at each entry and exit point. • Conduct annual spring dieback assessments in identified uninfested areas of native vegetation adjacent to the development envelope (0-10 m from the boundary) and in established vegetation monitoring quadrats with interpretable remnant native vegetation of the development envelope prior to the commencement of clearing and construction to enable assessment of baseline. • The assessment will include dieback occurrence mapping, conducted by an accredited person in accordance with DBCA’s Manual for detecting <i>Phytophthora</i> dieback disease (Procedures for the Department of Biodiversity, Conservation and Attractions (DBCA) managed lands) (2013) including: <ul style="list-style-type: none"> ○ identifying visible 	<ul style="list-style-type: none"> • Report identified incidences of <i>Phytophthora</i> dieback introduced to vegetation surrounding the development envelope attributable to construction activities to PTA monthly and regulators, where required. • Maintain records of all weed inspections of vehicles, machinery, equipment, fill and other weed mediums. • Compliance with these measures to be documented and reported annually.

Activity	Management actions	Management Targets	Monitoring	Reporting
			<ul style="list-style-type: none"> symptoms of disease in species susceptible to <i>Phytophthora</i> dieback <ul style="list-style-type: none"> confirming disease presence through laboratory analysis of soil and plant tissues. 	
Topsoil	<ul style="list-style-type: none"> Topsoil will be stripped to a depth of approximately 50 mm and no greater than 100 mm to prevent dilution of the topsoil seed bank. Salvaged topsoil will be directly transferred to an identified receiving site if there are such sites available at time of stripping. If direct transfer is not possible, topsoil will be stockpiled in a dieback free area to a maximum height of 1.5 m. 	<ul style="list-style-type: none"> Topsoil from areas of known dieback infestation will not be reused in construction. Any topsoil known to be dieback infested may be buried onsite in a suitable location or disposed of at landfill, in accordance with regulatory requirements. 	<ul style="list-style-type: none"> Weekly visual monitoring of topsoil salvage during clearing activities, to confirm compliance with the relevant management actions. Weekly visual monitoring of topsoil handling during revegetation activities, to ensure topsoil is spread in accordance with the relevant management actions. 	<ul style="list-style-type: none"> Document topsoil salvage including date of salvage, area cleared (ha), volume of topsoil, location of salvage, duration of storage and end use of topsoil. A summary of topsoil salvage, storage and spreading will be reported monthly and annually.
Seed collection	<ul style="list-style-type: none"> Staged collection of seed from areas within the development envelope. Harvesting will occur prior to clearing, and/or from felled vegetation by collecting fruit and drying and/or soaking/burning as required for each species, to release the seed. Harvested seed will be placed in labelled containers indicating species name, date of collection, location of source and number of plants collected. Seed will be heat sealed into suitable bags and, where required, treated with CO₂. Seed not required on site will be provided to DBCA for offsite land rehabilitation. 	<ul style="list-style-type: none"> Collect seed from vegetation prior to clearing. Collected seed to be used as part of the revegetation within the development envelope and direct seeded, where practicable. Provide remaining collected seed to DBCA for offsite land rehabilitation. 	<ul style="list-style-type: none"> Visual monitoring of seed harvest, to confirm that harvest is in accordance with the identified seed harvest management actions. 	<ul style="list-style-type: none"> Document seed collection including date of collection, volume, location and allocate an identifier. Document and report the provision of seed to PTA and DBCA.

Activity	Management actions	Management Targets	Monitoring	Reporting
Revegetation	<ul style="list-style-type: none"> • Should batters be of a suitable gradient and material and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species or direct seeding of collected seed where possible and/or bioengineering controls. • Revegetation measures to include: <ul style="list-style-type: none"> ○ preparation of the site to ease compaction ○ sourcing of reused topsoil from the same area where consistent with dieback and weed control objectives ○ spreading of topsoil to a desired depth of 20 mm to 50 mm where achievable ○ potential application of soil stabilisers to revegetation areas to improve vegetation success. • Prior to topsoil spreading in areas intended for revegetation, the site will be prepared to ease compaction. • Topsoil for use in revegetation works will be spread to a maximum depth of 100 mm, with a desired depth of 20 mm to 50 mm where achievable. • Soil stabilisers may be applied to revegetation areas following spreading of topsoil and planting to improve revegetation success. 	<ul style="list-style-type: none"> • Native plant species are used. • Collected seed to be direct seeded as part of revegetation, where practicable. • Reused topsoil is sourced from same area where consistent with dieback and weed control objectives. 	<ul style="list-style-type: none"> • Confirmation of native species in planting lists and/or seed sources used in revegetation works. • Visually monitor and document revegetation success and survival rates, six-monthly during construction. • Post Construction: Visually monitor and document revegetation success and survival rates six monthly, for five years post construction. 	<ul style="list-style-type: none"> • Maintain records of topsoil stripping during initial vegetation clearing and ground disturbance. • Maintain records of topsoil reuse including date of spreading, location, volume. • Report revegetation measures and success and survival rates to PTA via monthly and annual reports.

3.2.2 Landforms

Table 3-2: Management-based provisions for Landforms

Activity	Management actions	Management Targets	Monitoring	Reporting
Landforms				
EPA objective: <i>to maintain the variety and integrity of distinctive physical landforms so that environmental values are protected</i>				
Outcomes: Alteration of the Quindalup dune system including removal of parabolic dune formations.				
Key environmental values: Phase 1 (Q1) and Phase 2 (Q2) parabolic dune formations				
Key impacts and risks: Alteration of 12.59 ha of Quindalup dune system				
Revegetation	<ul style="list-style-type: none"> Implement structural controls to stabilise the landform, including battering the excavation or using retaining walls, informed by the geotechnical investigation and detailed engineering design. Stabilise affected parabolic dune formations by the planting of locally endemic flora species, spraying of collected seed or bioengineering controls, as practicable. Should batters be of a suitable gradient and material and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species where possible and/or bioengineering controls. Revegetation measures to include: <ul style="list-style-type: none"> preparation of the site to ease compaction sourcing of reused topsoil from the same area where consistent with dieback and weed control objectives spreading of topsoil to a desired depth of 20 mm to 50 mm where achievable potential application of soil stabilisers to revegetation areas to improve vegetation success. 	<ul style="list-style-type: none"> Final landform is stable at completion of construction. No alteration to the parabolic dune’s morphology, beyond that currently proposed, at completion of construction. 	<ul style="list-style-type: none"> Monthly visual inspections for evidence of erosion of parabolic dune formation outside the development envelope (inspections of first 10 m outside development envelope), for the duration of construction. Inspection of landforms following large rainfall events, throughout the construction phase, to assess erosion impacts. 	<ul style="list-style-type: none"> Maintain inspection records. Monthly and annual reporting to the PTA on the success of the stabilisation controls.

3.2.3 Terrestrial Fauna

Table 3-3: Management-based provisions for Terrestrial Fauna

Activity	Management actions	Management Targets	Monitoring	Reporting
Terrestrial Fauna				
EPA objective: <i>to protect terrestrial fauna so that biological diversity and ecological integrity are maintained</i>				
Outcomes: Loss of fauna habitat including foraging and breeding habitat for conservation significant species; injury and mortality of fauna during construction.				
Key environmental values: Bush Forever site 289; Carnaby’s Black Cockatoo breeding and foraging habitat.				
Key impacts and risks: Loss of 61.68 ha of fauna habitat including 47.45 ha of high value and 14.23 ha of medium value habitat; 28.82 ha of Bush Forever Site 289 (Ningana Bushland); loss of 56.31 ha of Carnaby’s Black Cockatoo habitat (including 22.57 ha of high value and 33.76 ha of medium value foraging habitat) and 45 potential breeding trees.				
Vegetation clearing	<ul style="list-style-type: none"> Undertake progressive clearing over a maximum duration of three (3) months within the development envelope to allow fauna to move away from clearing activities. Within seven days prior to clearing of native vegetation, a qualified fauna expert will undertake a trapping and relocation program for conservation significant vertebrate fauna in accordance with a licence to take fauna for education or public purpose issued under Part 4 of the BC Act Conduct fauna trapping and relocation in accordance with DBCA's Standard Operating Procedures (SOPs) or permit conditions. Contact DBCA prior to the trapping and relocation program to assist with the identifying suitable relocation sites. Implement the trapping and relocation for five consecutive nights prior to clearing activities in areas containing native vegetation. Within seven days following clearing activities, install fences between cleared areas and adjacent native vegetation to limit opportunities for fauna to return to the cleared area. 	<ul style="list-style-type: none"> No avoidable deaths of/injury to fauna during vegetation clearing for construction. Clearing of fauna habitat to remain within approved limits. 	<ul style="list-style-type: none"> Conduct walkover inspection for fauna species during vegetation clearing activities (minimum daily frequency). Twice daily inspections of trenches in the morning and afternoon to identify trapped fauna and to enable capture and relocation. All staff to report if non-avian native vertebrate fauna are observed within the development envelope during construction activities. 	<ul style="list-style-type: none"> Record known injuries to, or deaths of fauna species in an Incident Register as soon as practicable after the injury or death is identified (preferably on the same day) and provide to PTA in monthly report, including species, cause of injury or cause of death, location and date of incident and response actions. Prepare a report on the trapping program, providing details of the methods used, number of animals caught and relocated, and location of where they were released.

Activity	Management actions	Management Targets	Monitoring	Reporting
	<ul style="list-style-type: none"> Require that fauna spotters are present during clearing of native vegetation to supervise dispersal/relocation of remnant fauna, and identification of potential injured fauna. Undertake vegetation clearing commencing from a disturbed edge, where practicable, to encourage remaining mobile fauna to naturally relocate to areas of adjacent vegetation. Visually inspect fencing and trenches within the development envelope during clearing activities for isolated or trapped macrofauna (Western Brush Wallaby, Emus etc.) and reptiles in temporary construction infrastructure. Facilitate the relocation of trapped fauna. Any identified injured fauna to be taken to a qualified wildlife carer for treatment. Require that all personnel complete a site induction that will address fauna values within and adjacent to the development envelope. 			
Black Cockatoos	<ul style="list-style-type: none"> 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 an appropriately qualified terrestrial fauna spotter has verified that the hollow(s) are no longer being used by the black cockatoos. 	<ul style="list-style-type: none"> No disturbance of active Black Cockatoo nests (if found) during and attributable to construction. 	<ul style="list-style-type: none"> Monthly visual observations of marked breeding tree hollows (if found) for signs of disturbance and breeding activity throughout the duration of construction. Conduct monthly walkover inspections of applied 10 m buffers around marked breeding trees for signs of disturbance, such as temporary fence moved, prematurely vacated nests, broken eggs, and injured or dead fledglings. If breeding activity is observed, inspect the tree weekly until fledglings leave the nest. 	<ul style="list-style-type: none"> Report monthly and annually to the PTA on: <ul style="list-style-type: none"> 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.

3.2.4 Subterranean Fauna

Table 3-4: Management-based provisions for Subterranean Fauna

Activity	Management actions	Management Targets	Monitoring	Reporting
Subterranean Fauna				
EPA objective: <i>to protect subterranean fauna so that biological diversity and ecological integrity are maintained</i>				
Outcomes: Minimal loss of low value troglofaunal habitat and no loss of stygofauna habitat; retention of vertical extent of troglofaunal habitat so that continuity of habitat is retained across the alignment; no potential impacts to groundwater with no significant impact to habitat outside of the development envelope.				
Key environmental values: No stygofauna or troglofaunal records are present within the development envelope. High value habitat is present in adjacent conservation areas.				
Key impacts and risks: Loss of habitat from excavation and construction activities, alteration of surface hydrology, fragmentation of habitat and contamination of habitat from spills.				
Subterranean Fauna	<ul style="list-style-type: none"> No groundwater dewatering or abstraction is proposed for this Proposal. Review the geotechnical investigation results to identify previously unidentified karst or cave formations which may provide suitable subterranean fauna habitat, and to inform detailed design of key project elements. Temporarily suspend construction activities if significant caves or voids are encountered during construction, to assess potential impacts. In the event that significant caves or voids are encountered during construction, the proponent will consult with DBCA and/or the WA Museum before recommencing construction activities at this location. If significant caves or voids cannot be avoided, collection of specimens and genetic material for deposition into the WA Museum collections will be undertaken by a suitably qualified person, on the advice of DBCA. Fuel and other chemicals will be stored in correctly labelled containers and used in designated areas only (see Inland Waters for further detail). 	<ul style="list-style-type: none"> Avoid impact to significant caves or voids where practicable. No spills of hazardous materials within the development envelope. Compliance with AS 1940:2017 The storage and handling of flammable and combustible liquids. 	<ul style="list-style-type: none"> Weekly visual inspection of hazardous materials storage use and disposal to ensure compliance with safe use practices. 	<ul style="list-style-type: none"> Maintain an inventory of the type and volumes of hazardous materials stored and Material Safety Data Sheets for all hazardous materials stored. Maintain a register of hazardous material spills and leaks including date and location of spillage, name of chemical, volume spilt, and remedial action taken and report to the PTA monthly. Above items to be reported to the PTA in a monthly report.

Activity	Management actions	Management Targets	Monitoring	Reporting
	<ul style="list-style-type: none"> • Disposal of hazardous materials to be in accordance with regulatory requirements. • Spill kits will be located at all designated storage and use areas. • All personnel involved in handling hazardous materials will undergo induction training in the safe use, handling and disposal of hazardous materials. 			

3.2.5 Inland Waters

Table 3-5: Management-based provisions for Inland Waters

Activity	Management actions	Management Targets	Monitoring	Reporting
Inland Waters				
EPA objective: <i>to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected</i>				
Outcomes: No significant impacts to environmental values, GDEs or other groundwater users; no significant changes to existing local hydrological regimes; no significant impact to groundwater quality.				
Key environmental values: Unconfined superficial aquifer; Wetlands within Yanchep National Park, outside and east of the development envelope; Priority 3 Perth Coastal Underground Water Pollution Control Area				
Key impacts and risks: Alteration of the landscape within the development envelope during construction which could potentially alter local surface water flows and recharge.				
Contamination and spills	<ul style="list-style-type: none"> • Install drainage diversion around chemical storage areas. • Implement drainage controls to prevent offsite discharge of runoff. • Implement sediment control measures to prevent offsite sedimentation. • Ensure all relevant employees and contractors are trained on safe handling procedures, and incident response. • No fuel or chemical storage in well head protection zones unless approved by the Water Corporation. • 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. • Place fuel or chemicals in bunds capable of storing at least 110% of the capacity of the largest storage tank as per AS 1940:2017: The storage and handling of flammable and combustible liquids. • Secondary spill containment around tanks (with a perimeter bund) should have sufficient freeboard capacity to contain all captured rainwater from a 20-year average return interval, 72-hour storm. • Report significant fuel or other chemical spill to the environment to DWER within 24 hours. 	<ul style="list-style-type: none"> • No unintentional spills or leaks of hazardous materials in the development envelope (or immediate vicinity) during construction. 	<ul style="list-style-type: none"> • Weekly visual inspections of hazardous materials storage, use, and disposal to ensure compliance with safe use practices. In the event that a major spill occurs, undertake groundwater and/or surface water monitoring in consultation with the relevant agencies. 	<ul style="list-style-type: none"> • 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. • A summary of spills and leaks to be reported to the PTA monthly.

Activity	Management actions	Management Targets	Monitoring	Reporting
	<ul style="list-style-type: none"> • The site operator should inspect spill containment compounds as soon as practicable after any significant rainfall event and following tank refuelling. Any liquids including rainwater captured within the tank containment compound should be professionally tested for the presence of petroleum hydrocarbons. If no petroleum hydrocarbons (or other toxic materials) are present, then the stormwater may be discharged to soakage. If petroleum hydrocarbons or other potentially harmful fluids are detected, all liquid within the compound should be transferred by a licensed waste disposal contractor. • Implement a spill response procedure, which may include groundwater or surface water monitoring or soil testing as required. • Spill kits to be located in storage and refuelling areas. 			
Surface Water management	<ul style="list-style-type: none"> • Stormwater and surface water management measures and controls will be implemented during construction to minimise/prevent unauthorised offsite discharges during construction. These measures will consider best practice water sensitive urban design principles., e.g.: <ul style="list-style-type: none"> ○ Diversion of surface water around laydown or chemical / hazardous material storage areas ○ Facilitate infiltration at-source rather than directing to large drainage basins ○ Control of offsite sedimentation from runoff ○ Prevent unauthorised discharges offsite. 	<ul style="list-style-type: none"> • No unauthorised offsite discharges. 	<ul style="list-style-type: none"> • Visual inspection of offsite discharges following rainfall events. 	<ul style="list-style-type: none"> • Inspection results reported to the PTA monthly.

3.2.6 Social Surroundings

Table 3-6: Management-based provisions for Social Surroundings

Activity	Management actions	Management Targets	Monitoring	Reporting
Social Surroundings				
EPA objective: <i>to protect social surroundings from significant harm</i>				
Outcomes: No disturbance to registered Aboriginal heritage sites or natural or historic heritage values. No exceedance of noise or vibration criteria.				
Key environmental values: No registered Aboriginal heritage sites are located within the development envelope. No natural or historic heritage values are located within the development envelope; residential development.				
Key impacts and risks: Potential impact to previously unidentified artefacts of Aboriginal cultural significance; bushfire impacts to people, property and infrastructure; noise, vibration and dust disturbance to sensitive receptors				
Dust	<ul style="list-style-type: none"> Implement dust suppression measures on unsealed roads and access tracks, cleared areas and at other locations at times of high dust risk, including: <ul style="list-style-type: none"> Use water carts on unsealed roads and tracks Use water-assisted dust sweeper(s) on access and local roads to remove material, as necessary. Enforce speed limits in construction areas. Apply hydromulch or similar soil stabiliser if stockpiles will remain for extended periods. Install wind break fencing to prevent dust spreading in high-risk areas. Review daily weather forecasts, and limit construction activities during high wind conditions, where practicable. Limestone crushing to be operated in accordance with a Part V Licence should limestone crushing be required onsite. 	<ul style="list-style-type: none"> No fugitive dust emissions outside of the development envelope. 	<ul style="list-style-type: none"> Daily visual monitoring of airborne dust to confirm no offsite dust impacts and efficacy of dust control measures. 	<ul style="list-style-type: none"> Establish a complaint register and record details of the complaint including date, time, location, nature of complaint and complainant details. 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. Document and report dust-related complaints and summarise the outcome of the investigation and resolution of complaints, including the management measures implemented monthly to the PTA.

Activity	Management actions	Management Targets	Monitoring	Reporting
Aboriginal heritage	<ul style="list-style-type: none"> • Comply with Section 18 Notices under the <i>Aboriginal Heritage Act 1972</i>. • Only clear within the approved limits of impact to minimise disturbance to previously undiscovered or buried artefacts or other items of Aboriginal cultural significance. • Existing tracks will be used and widened where required (within development envelope) to support construction vehicles. • Ensure monitors are onsite for clearance and initial groundworks for the development envelope to assist with the identification and management of any Aboriginal objects identified or unearthed during construction. • Stop construction as soon as practicable if Aboriginal objects are identified or unearthed in the absence of monitors and report the findings to the Department of Planning, Lands and Heritage (DPLH). 	<ul style="list-style-type: none"> • No avoidable disturbance to Aboriginal objects identified or unearthed during construction activities. 	<ul style="list-style-type: none"> • Daily monitoring during vegetation clearing and initial groundworks of the Development Envelope to identify any potential objects of Aboriginal cultural significance. 	<ul style="list-style-type: none"> • Report new Aboriginal objects identified during construction activities to the DPLH. • Report to DPLH in accordance with conditions of the Section 18 consent(s). • Compliance with these measures to be documented and reported to the PTA monthly and annually.

Activity	Management actions	Management Targets	Monitoring	Reporting
Noise	<ul style="list-style-type: none"> • Unless otherwise approved by the City of Wanneroo under a Noise Management Plan (NMP), 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. • Prepare an out-of-hours NMP if works are required outside of standard construction hours. The NMP shall be approved by the City of Wanneroo and will include information on: <ul style="list-style-type: none"> ○ the need and reasons for the construction work to be done out of hours ○ types and durations of activity likely to result in noise emissions above assigned noise levels ○ predictions of noise emission ○ control measures for noise emissions, including vibration ○ monitoring of noise emissions, including vibration ○ a protocol for receiving, handling and resolving complaints. • Implement noise and vibration controls in accordance with AS 2436-2010 (R2016) Guide to noise and vibration control on construction, demolition and maintenance sites. 	<ul style="list-style-type: none"> • No exceedance of construction noise limits in accordance with Environmental Protection (Noise) Regulations 1997. • No unauthorised out of hours construction work. 	<ul style="list-style-type: none"> • Observe noise volumes during approved out-of-hours work, to confirm compliance with the NMP. • Noise monitoring as per NMP for works outside of standard construction hours (if required). 	<ul style="list-style-type: none"> • Establish a complaint register to record noise and vibration complaints, including location, date, time, nature of complaint and complainant details • Complaints will be investigated, and the complainant contacted within seven days • The outcomes of the investigation to be recorded in the complaints register Include a summary of noise and vibration complaints and a summary of the outcomes of investigations and resolution of any complaints, including the management measures implemented in a monthly report to PTA. • Summarise the above in a monthly report to the PTA.
Fire	<ul style="list-style-type: none"> • Ensure that relevant management and mitigation measures proposed under the BRMP have been included in contractor requirements for construction activities, to minimise the risk of bushfire and maximise the rate of response in the event of a bushfire. 	<ul style="list-style-type: none"> • Contractor to comply with relevant management and mitigation measures proposed under the BRMP. 	<ul style="list-style-type: none"> • Monitoring undertaken of DFES Fire Danger Ratings (FDRs) to minimise risk of bushfire from construction activities. • Monthly monitoring of compliance with agreed management and mitigation measures. 	<ul style="list-style-type: none"> • In the event of a fire, contractor to provide reports and incident response reporting as soon as practicable after event.

3.3 Monitoring

To assess whether the management actions and the EPA’s objectives for each key environmental factor are being met, monitoring is proposed as set out in **Schedule 1**.

Table 3-7 is a summary of monitoring requirements from **Schedule 1** and is not intended to be exhaustive.

Table 3-7: Summary of monitoring provisions

Monitoring basis	Summary of monitoring provisions as a minimum
Daily	<ul style="list-style-type: none"> On ground visual inspection during clearing activities of the condition of boundary demarcation and the location of the vegetation cleared to confirm no clearing outside of the development envelope. On ground visual inspection of clearing extents to confirm that total area of native vegetation cleared does not exceed the identified targets. Walkover inspection for fauna species during vegetation clearing activities (minimum daily frequency) Twice daily inspections of trenches in the morning and afternoon to identify trapped fauna and to enable capture and relocation. Reporting of non-avian vertebrate native fauna sightings within the development envelope during construction activities. Visual monitoring of airborne dust to confirm no offsite dust impacts and efficacy of dust control measures. Monitoring during vegetation clearing and initial groundworks within the station footprints to identify any potential objects of Aboriginal cultural significance Monitoring of DFES Fire Danger Ratings to minimise risk of bushfire from construction activities.
Weekly	<ul style="list-style-type: none"> Visual inspection for evidence of unauthorised access attributable to construction, to the surrounding native vegetation from the development envelope. Spot checks of vehicle and machinery compliance with clean on entry/exit procedures throughout the duration of construction activities at each entry and exit point. Visual monitoring of topsoil salvage during clearing activities, to confirm compliance with the relevant management actions. Visual monitoring of topsoil handling during revegetation activities, to ensure topsoil is spread in accordance with the relevant management actions. Visual inspection of any active Black Cockatoo breeding trees identified during construction activities until fledglings leave the nest. Visual inspection of hazardous materials storage, use and disposal to ensure compliance with safe use practices.
Monthly	<ul style="list-style-type: none"> Visual inspections for weeds along the clearing edge adjacent to native vegetation, commencing at the commencement of clearing activities, and to continue for the duration of construction. Visual inspection for evidence of erosion of parabolic dune formation outside the development envelope, for the duration of construction. Visual observation of marked breeding tree hollows (if found) for signs of disturbance and breeding activity throughout the duration of construction. Walkover inspection of applied 10 m buffers around marked breeding trees for signs of disturbance, such as temporary fence moved, prematurely vacated nests, broken eggs, and injured or dead fledglings. Monitoring of compliance with agreed fire management and mitigation measures.

Monitoring basis	Summary of monitoring provisions as a minimum
Six-monthly	<ul style="list-style-type: none"> Monitoring levels of weed abundance and density in established vegetation monitoring quadrats within remnant native vegetation adjacent to development envelope within Ningana Bushland. Post Construction - Visually monitor and document revegetation success and survival rates six monthly, for five years post construction.
Annually	<ul style="list-style-type: none"> Spring dieback assessments in identified uninfested areas of native vegetation adjacent to the development envelope and in established vegetation monitoring quadrats with interpretable remnant vegetation of the development envelope prior to the commencement of clearing and construction to enable assessment of baseline.
Ad hoc or irregular	<ul style="list-style-type: none"> Confirmation of native species in planting lists and/or seed sources used in revegetation works. Inspection of landforms following large rainfall events, throughout the construction phase, to assess erosion impacts. Monitoring of groundwater and/or surface water monitoring following a major spill, in consultation with relevant agencies. Visual inspection of offsite discharges/erosion following rainfall events. Measure noise volumes during approved out-of-hours work, to confirm compliance with the NMP. Noise monitoring as per NMP for works outside of standard construction hours (if required).

Note: if there is any inconsistency between **Table 3-7** and **Schedule 1**, the monitoring provisions in **Schedule 1** prevail to the extent of the inconsistency.

3.4 Reporting

The contractor will prepare a monthly report for the PTA to document results of daily, weekly and monthly inspections and monitoring. This will also be compiled into an annual report, with relevant items included in the annual DWER Compliance Assessment Report.

Throughout the duration of construction activities, potential non-compliances or significant findings, will be documented and reported to the relevant authority, as required. This will include, but is not necessarily limited to:

- Unauthorised clearing
- Deaths of, or injuries to, native fauna
- Native fauna trapping and translocation activity
- Aboriginal heritage objects identified in the development envelope
- Disturbed, previously unidentified contamination in the development envelope
- Hazardous materials spills and leaks

The full suite of reporting commitments is identified in **Schedule 1**.

4. Adaptive management and review

4.1 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 objective. Example potential adaptive management actions are outlined in **Table 4-1** for the key environmental factors of Flora and Vegetation and Terrestrial Fauna, as the Proposal represents the highest risk to these factors.

Table 4-1: Potential adaptive management measures for flora and vegetation and terrestrial fauna

Management target	Potential adaptive management measures if target not met
Flora and vegetation	
No clearing of vegetation will occur outside of the development envelope, attributable to construction	<ul style="list-style-type: none"> Temporarily cease clearing activities Review clearing boundaries
Clearing of native vegetation within the development envelope will not exceed 49.17 ha and will not include more than 0.05 ha of SCP 26a.	<ul style="list-style-type: none"> 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 flagged Review training of personnel involved in clearing to avoid clearing outside of approved limits.
No introduction of new weed species in development envelope during and attributable to construction.	<ul style="list-style-type: none"> Quarantine affected areas Restrict access to quarantined areas
No evidence of vegetation decline from introduction or spread of weed and pest species into surrounding native vegetation during and attributable to construction.	<ul style="list-style-type: none"> Investigate cause or source of infestation and extent of vegetation decline Inspect 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; rabbit control) Monitor success of control actions.
No evidence of vegetation decline from the introduction of <i>Phytophthora</i> dieback to vegetation surrounding the development envelope attributable to construction.	<ul style="list-style-type: none"> Quarantine affected areas Restrict access to affected areas Investigate cause of infestation and extent of vegetation decline Inspect/survey surrounding area to assess extent of infestation Update mapped distribution of dieback affected areas Review dieback management measures for efficacy Review training and implementation of dieback management measures Consult with regulators on appropriate response actions Implement revegetation if applicable Monitor success of dieback control measures.
Terrestrial fauna	
No avoidable deaths of native fauna attributable to	<ul style="list-style-type: none"> Investigate cause Report to regulators as required

Management target	Potential adaptive management measures if target not met
vegetation clearing or construction.	<ul style="list-style-type: none"> • 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 any damaged or ineffective fauna fencing • Review management measures and update as required.
No disturbance of active Black Cockatoo nests (if found) during construction.	<ul style="list-style-type: none"> • 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.

4.2 Review of this CEMP

This plan will be reviewed:

- After the first twelve months of implementation
- If one or more management targets are not being met
- If adaptive management is required
- Where there is a significant change to the project and/or construction activities
- As required by DWER and the Department of the Environment and Energy (DoEE), if directed to do so.

The management actions and associated provisions in this plan may be required to be altered, due to:

- Changes to construction methods and timing
- Trends being observed in monitoring data that might indicate an issue
- New or revised information becoming available
- Other triggers of adaptive management.

The CEMP will be revised if the outcome of a review requires amendments to be made to the provisions in **Schedule 1**. It will also be revised if the DWER or DoEE directs the PTA to amend it. Revised versions of the plan will be submitted to DWER for comment.

5. Stakeholder consultation

The PTA has consulted with various stakeholders in the development of the Proposal, this CEMP and the wider YRE project, including fortnightly meetings with the DWER EPA Services. The key government and community stakeholders consulted by the PTA are shown in Table 5-1.

Table 5-1: Key stakeholders for the YRE Project

Stakeholder	Project role / interest
Commonwealth Government	
Department of the Environment and Energy	Assessment and approval of proposed actions significantly impacting on MNES under the EPBC Act
State Government	
Department of Water and Environmental Regulation	<ul style="list-style-type: none"> • Environmental assessment under the EP Act • Assistance with implementation of Water Sensitive Urban Design (WSUD) principles • Assistance with noise and vibration assessment and mitigation options
Environmental Protection Authority	<ul style="list-style-type: none"> • Environmental advice under the EP Act
Department of Biodiversity Conservation and Attractions	<ul style="list-style-type: none"> • Environmental offset advice • Advice on detailed flora, vegetation and fauna assessments and Bush Forever
Department of Planning, Lands and Heritage	<ul style="list-style-type: none"> • Land acquisition and MRS Amendment • Liaison with other landowners • Aboriginal heritage • Interface for wider infrastructure requirements
Western Australian Planning Commission	Rezoning and development application approval(s)
Water Corporation	Assistance with location of production bores and wellhead protection zones
Local Government	
City of Wanneroo	<ul style="list-style-type: none"> • Advocacy and community relations • Rezoning and development application approval(s) • Advice on local environmental values
Local Community	
South West Aboriginal Land and Sea Council (SWALSC) (on behalf of the Whadjuk people)	<ul style="list-style-type: none"> • Compliance with the state government's Noongar Standard Heritage Agreement (NSHA) • Coordination of Aboriginal heritage surveys
Whadjuk working group	<ul style="list-style-type: none"> • Compliance with the NSHA • Coordination of Aboriginal heritage surveys
Property developers	Project definition and delivery
Urban Bushland Council	Community organisation
Quinns Rocks Environmental Group (QREG)	Community group

A Communications and Stakeholder Engagement Plan has been developed by the PTA to guide the community relations activities for the various phases of the Proposal (i.e. planning, design and procurement, and construction and commissioning) of the YRE Project. Table 5-2 provides a summary of consultation with non-government stakeholders and the response to issues raised during these consultations.

Table 5-2: Summary of stakeholder consultation relevant to the CEMP

Stakeholder	Date	Summary of consultation	Proponent response/outcome
Rail construction industry	13 September 2017	Briefing provided to the Rail Construction Industry on METRONET, including the YRE Project.	Nil.
QREG	17 November 2017 21 September 2018	Review of the environmental context of the YRE Project. Concerns related to Lot 200 Alkimos Drive "Parks and Recreation" reservation, which relates to Part 1 and fragmentation of Bush Forever site No. 289: Ningana Bushland, Yanchep/Eglinton	The PTA committed to undertaking additional consultation with the QREG to inform detailed design for the YRE Project. PTA notes that concerns relating to the permanent loss of 28.82 ha of Ningana Bushland are considered in the ERD, through application of the EPA's mitigation hierarchy.
Whadjuk working group	2017 23 October 2017	Aboriginal heritage consultation and survey in consultation with consultant anthropologist Rory O'Connor. Additional inspection by the Whadjuk Working Group of the proposed YRE station sites and associated facilities in consultation with Rory O'Connor.	The Whadjuk representatives nominated by SWALSC pursuant to the NSHA provided support for the YRE Project, subject to conditions. The Whadjuk representatives supported the development and recommended that monitors should be present both for scrub clearance and for initial ground disturbance at the station sites.
Water Corporation	December 2017	Advice on Water Corporation production bores and WHPZ that could be impacted by the Proposal.	Water Corporation provided spatial data and advice and requested consultation is ongoing as the YRE Project progresses.
City of Wanneroo	7 December 2017 7 December 2018	Briefing on the YRE Project. Briefed the CoW on METRONET and the YRE project.	Supportive of and enthusiastic about the Proposal, as are their residents. Discussed potential offset options and management and applicable local government policy. The CoW are supportive of the development as the CoW residents are very enthusiastic and supportive. The CoW are eager for the development to progress.
Urban Bushland Council (UBC)	7 December 2017 14 February 2018 22	Review the environmental context of the YRE Project. Key consideration related to clearing of native vegetation within Bush Forever site No. 289: Ningana Bushland, Yanchep/Eglinton. Additional METRONET briefing also delivered at the Urban Bushland Council's general meeting on 14 February 2018 UBC raised concerns regarding the	The PTA committed to undertaking additional consultation with the Urban Bushland Council to inform detailed design for the YRE Project. PTA notes that concerns relating to the permanent loss of 28.82 ha of Ningana Bushland are considered in the ERD, through application of the EPA's mitigation hierarchy The PTA are continuing to investigate

Stakeholder	Date	Summary of consultation	Proponent response/outcome
	November 2018	alignment through Bush Forever site No. 289 and the associated impacts to the ecological linkage and fragmentation.	mitigation options (e.g. fauna crossings) through the Bush Forever Site to maintain ecological connectivity.
Industry briefing – 309 attendees	18 July 2018	Employment and supply opportunities.	Nil.
Community Information Session - Oldham Park Clubrooms, 91 Lagoon Drive, Yanchep – 190 stakeholders attended	21 July 2018	General presentation on METRONET and the YRE Project.	Local community generally supportive of the Proposal.
Community Information Session - Pop-up Library, Turnstone Street, Alkimos 49 stakeholders attended.	31 July 2018	General presentation on METRONET and the YRE Project	Local community generally supportive of the Proposal.
Community Information Session - Alkimos Showcase Event - at the Lighthouse Play Centre, Alkimos. 400 to 450 stakeholders attended.	19 August 2018	General presentation on METRONET and the YRE Project.	Local community generally supportive of the Proposal.
South West Aboriginal Land and Sea Council (SWALSC)	5 October 2018	Briefed SWALSC on METRONET and the draft METRONET Aboriginal Engagement Strategy.	PTA to further consult with SWALSC to seek general acceptance of the METRONET Aboriginal Engagement Strategy. METRONET to present the strategy to the Whadjuk Working Party.

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Schedule 1: CEMP provisions

Table S 1: Management-based provisions

Activity	Management actions	Management Targets	Monitoring	Reporting
<p>Flora and Vegetation</p> <p>EPA objective: to protect flora and vegetation so that biological diversity and ecological integrity are maintained</p> <p>Outcomes: Clearing and fragmentation of native vegetation.</p> <p>Key environmental values: Remnant native vegetation, TECs and PECs, Bush Forever site.</p> <p>Key impacts and risks: Loss of 49.17 ha of native vegetation in Excellent to Degraded condition; loss of 0.05 ha of <i>Melaleuca huegelii</i> – <i>M. systema</i> shrublands on limestone ridges (Gibson et al. 1994 SCP 26a) TEC; loss of 8.76 ha of Banksia dominated woodlands of the Swan Coastal Plain IBRA Region PEC including 8.13 ha of Banksia dominated woodlands of the Swan Coastal Plain (SCP) Woodlands TEC; loss of 28.82 ha of Bush Forever Site 289 (Ningana Bushland) and loss of 2.13 ha of Tuart (<i>Eucalyptus gomphocephala</i>) woodlands of the Swan Coastal Plain PEC. Fragmentation of Bush Forever Site 289 and introduction or spread of weeds and/or dieback.</p>				
Vegetation Clearing	<ul style="list-style-type: none"> Provide GPS co-ordinates of areas approved to be cleared to the contractor to prevent unapproved clearing. Demarcate the development envelope (e.g. via installation of temporary fencing) to prevent clearing outside of approved areas. Identify trees to be kept, where applicable. 	<ul style="list-style-type: none"> No clearing of vegetation to occur outside of the development envelope during and attributable to construction. Clearing of native vegetation within the development envelope will not exceed 49.17 ha, and not include more than 0.05 ha of <i>Melaleuca huegelii</i> – <i>M. systema</i> TEC, 8.13 ha of Banksia dominated woodlands TEC and 28.82 ha of Bush Forever Site 289 (Ningana Bushland), during and attributable to construction. 	<ul style="list-style-type: none"> Daily on ground, visual inspection during clearing activities of the condition of boundary demarcation and the location of the vegetation cleared to confirm no clearing outside of the development envelope. Daily on ground, visual inspection of clearing extents to confirm that total area of native vegetation cleared does not exceed the identified targets. 	<ul style="list-style-type: none"> Report unauthorised clearing to the Department of Water and Environmental Regulation (DWER) as soon as practicable. Annual reporting of the area and location of vegetation cleared to the PTA.
Weeds	<ul style="list-style-type: none"> All vehicles entering and exiting the development 	<ul style="list-style-type: none"> No introduction of new 	<ul style="list-style-type: none"> Weekly visual inspections for 	<ul style="list-style-type: none"> Report increase in weed

Activity	Management actions	Management Targets	Monitoring	Reporting
	<p>envelope to be clean on entry and exit; and implementation of washdown of vehicles as required.</p> <ul style="list-style-type: none"> • Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed control measures. • As far as practicable, inspect imported fill, limestone, gravel and topsoil or other materials for visible evidence of weeds. • 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. • Manage the six Declared Pests ¹ recorded in the development envelope and any other newly identified declared weeds, environmental weeds and/or Weeds of National Significance in accordance with the <i>Biosecurity and Agriculture Management Act 2007</i> and subsidiary regulations. • Undertake regular weed spraying in areas of weed infestation along the edge of the development envelope and within cleared areas. • Require all personnel to complete a site induction that will include hygiene training with regards to weed management requirements. • Restrict unauthorised access to and from the development envelope by installing temporary fencing or barriers and signage as required. <p>Note:</p> <ul style="list-style-type: none"> • 1. Six Declared Pests recorded in the development envelope include <i>Gomphocarpus fruticosus</i> (narrowleaf cottonbush), <i>Moraea flaccida</i> (One-leaf Cape Tulip), <i>Solanum linnaeanum</i> (apple of Sodom), <i>Zantedeschia aethiopica</i> (Arum Lily), <i>Lantana camara</i> (common lantana) and <i>Asparagus asparagoides</i> (bridal creeper). 	<p>weed species into the development envelope during and attributable to construction.</p> <ul style="list-style-type: none"> • No introduction or spread of weed species into surrounding retained native vegetation during and attributable to construction. • No evidence of vegetation condition decline from significant weeds or pests as a result of the Proposal within five years from the commencement of construction. 	<p>evidence of unauthorised access, attributable to construction to the surrounding native vegetation from the development envelope, e.g. observations of vehicles or machinery, vehicle tracks, damage to fencing or vegetation.</p> <ul style="list-style-type: none"> • Weekly spot checks of vehicle compliance with clean on entry/exit procedures throughout the duration of construction activities at each entry and exit point. • Monthly visual inspections for weeds along the clearing edge, adjacent to native vegetation, commencing at the commencement of clearing activities, and to continue for the duration of construction. • Establish vegetation monitoring quadrats within remnant native vegetation adjacent to the development envelope in Ningana Bushland prior to the commencement of clearing and construction to enable assessment of baseline and: <ul style="list-style-type: none"> ○ Six-monthly levels of weed abundance and density 	<p>species, density and/or numbers from pre-construction monitoring observations within the development envelope and surrounding native vegetation annually.</p> <ul style="list-style-type: none"> • Maintain records of all weed inspections of vehicles, machinery, equipment, fill and other weed mediums • Report results of spot checks of vehicle compliance with clean on entry/exit procedures monthly. • Compliance with these measures to be documented and reported annually.

Activity	Management actions	Management Targets	Monitoring	Reporting
			<ul style="list-style-type: none"> ○ For the duration of construction activities and for one year subsequent to the completion of construction. 	
<p><i>Phytophthora</i> Dieback</p>	<ul style="list-style-type: none"> • If practicable, conduct ground disturbance activities in dry months to reduce the risk of spreading disease. • Inspect and verify all vehicles and machinery to be free of plant material and soil prior to entering the development envelope. • Avoid topsoil movement from uninterpretable areas to uninfested areas. • All imported materials will be certified dieback free. • Install a temporary fence or appropriate buffer to prevent access to surrounding vegetation. • Require all personnel to complete a site induction that will include hygiene training with regards to dieback hygiene management requirements, the environmental implications of the introduction and spread of dieback and obligations to follow this CEMP. 	<ul style="list-style-type: none"> • <i>Phytophthora</i> dieback is not introduced to vegetation surrounding the development envelope attributable to construction activities as observed within five years from the commencement of construction 	<ul style="list-style-type: none"> • Weekly spot checks of vehicle and machinery compliance with clean on entry/exit procedures throughout the duration of construction activities at each entry and exit point. • Conduct annual spring dieback assessments in identified uninfested areas of native vegetation adjacent to the development envelope (0-10 m from the boundary) and in established vegetation monitoring quadrats with interpretable remnant native vegetation of the development envelope prior to the commencement of clearing and construction to enable assessment of baseline. • The assessment will include dieback occurrence mapping, conducted by an accredited person in accordance with DBCA's Manual for detecting <i>Phytophthora</i> dieback disease (Procedures for the 	<ul style="list-style-type: none"> • Report identified incidences of <i>Phytophthora</i> dieback introduced to vegetation surrounding the development envelope attributable to construction activities to PTA monthly, where required. • Maintain records of all weed inspections of vehicles, machinery, equipment, fill and other weed mediums. • Compliance with these measures to be documented and reported annually.

Activity	Management actions	Management Targets	Monitoring	Reporting
			<p>Department of Biodiversity, Conservation and Attractions (DBCA) managed lands) (2013) including:</p> <ul style="list-style-type: none"> ○ identifying visible symptoms of disease in species susceptible to <i>Phytophthora</i> dieback ○ confirming disease presence through laboratory analysis of soil and plant tissues. 	
Topsoil	<ul style="list-style-type: none"> • Topsoil will be stripped to a depth of approximately 50 mm and no greater than 100 mm to prevent dilution of the topsoil seed bank. • Salvaged topsoil will be directly transferred to an identified receiving site if there are such sites available at time of stripping. If direct transfer is not possible, topsoil will be stockpiled in a dieback free area to a maximum height of 1.5 m. 	<ul style="list-style-type: none"> • Topsoil from areas of known dieback infestation will not be reused in construction. • Any topsoil known to be dieback infested may be buried onsite in a suitable location or disposed of at landfill, in accordance with regulatory requirements. 	<ul style="list-style-type: none"> • Weekly visual monitoring of topsoil salvage during clearing activities, to confirm compliance with the relevant management actions. • Weekly visual monitoring of topsoil handling during revegetation activities, to ensure topsoil is spread in accordance with the relevant management actions. 	<ul style="list-style-type: none"> • Document topsoil salvage including date of salvage, area cleared (ha), volume of topsoil, location of salvage, duration of storage and end use of topsoil. • A summary of topsoil salvage, storage and spreading will be reported monthly and annually.
Seed collection	<ul style="list-style-type: none"> • Staged collection of seed from areas within the development envelope. Harvesting will occur prior to clearing, and/or from felled vegetation by collecting fruit and drying and/or soaking/burning as required for each species, to release the seed. • Harvested seed will be placed in labelled containers indicating species name, date of collection, location of source and number of plants collected. • Seed will be heat sealed into suitable bags and, where 	<ul style="list-style-type: none"> • Collect seed from vegetation prior to clearing. • Collected seed to be used as part of the revegetation within the development envelope and direct seeded, where practicable. • Provide remaining collected seed to DBCA for 	<ul style="list-style-type: none"> • Visual monitoring of seed harvest, to confirm that harvest is in accordance with the identified seed harvest management actions. 	<ul style="list-style-type: none"> • Document seed collection including date of collection, volume, location and allocate an identifier. • Document and report the provision of seed to PTA and DBCA.

Activity	Management actions	Management Targets	Monitoring	Reporting
	<p>required, treated with CO₂.</p> <ul style="list-style-type: none"> Seed not required on site will be provided to DBCA for offsite land rehabilitation. 	<p>offsite land rehabilitation.</p>		
<p>Revegetation</p>	<ul style="list-style-type: none"> Should batters be of a suitable gradient and material and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species or direct seeding of collected seed where possible and/or bioengineering controls. Revegetation measures to include: <ul style="list-style-type: none"> preparation of the site to ease compaction sourcing of reused topsoil from the same area where consistent with dieback and weed control objectives spreading of topsoil to a desired depth of 20 mm to 50 mm where achievable potential application of soil stabilisers to revegetation areas to improve vegetation success. Prior to topsoil spreading in areas intended for revegetation, the site will be prepared to ease compaction. Topsoil for use in revegetation works will be spread to a maximum depth of 100 mm, with a desired depth of 20 mm to 50 mm where achievable. Soil stabilisers may be applied to revegetation areas following spreading of topsoil and planting to improve revegetation success. 	<ul style="list-style-type: none"> Native plant species are used. Collected seed to be direct seeded as part of revegetation, where practicable. Reused topsoil is sourced from same area where consistent with dieback and weed control objectives. 	<ul style="list-style-type: none"> Confirmation of native species in planting lists and/or seed sources used in revegetation works. Visually monitor and document revegetation success and survival rates, six-monthly during construction. Post Construction: Visually monitor and document revegetation success and survival rates six monthly, for five years post construction. 	<ul style="list-style-type: none"> Maintain records of topsoil stripping during initial vegetation clearing and ground disturbance. Maintain records of topsoil reuse including date of spreading, location, volume. Report revegetation measures and success and survival rates to PTA via monthly and annual reports.

Activity	Management actions	Management Targets	Monitoring	Reporting
<p>Landforms</p> <p>EPA objective: <i>to maintain the variety and integrity of distinctive physical landforms so that environmental values are protected</i></p> <p>Outcomes: Alteration of the Quindalup dune system including removal of parabolic dune formations.</p> <p>Key environmental values: Phase 1 (Q1) and Phase 2 (Q2) parabolic dune formations</p> <p>Key impacts and risks: Alteration of 12.59 ha of Quindalup dune system</p>				
<p>Revegetation</p>	<ul style="list-style-type: none"> • Implement structural controls to stabilise the landform, including battering the excavation or using retaining walls, informed by the geotechnical investigation and detailed engineering design. • Stabilise affected parabolic dune formations by the planting of locally endemic flora species, spraying of collected seed or bioengineering controls, as practicable. • Should batters be of a suitable gradient and material and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species where possible and/or bioengineering controls. • Revegetation measures to include: <ul style="list-style-type: none"> ○ preparation of the site to ease compaction ○ sourcing of reused topsoil from the same area where consistent with dieback and weed control objectives ○ spreading of topsoil to a desired depth of 20 mm to 50 mm where achievable ○ potential application of soil stabilisers to revegetation areas to improve vegetation success. 	<ul style="list-style-type: none"> • Final landform is stable at completion of construction. • No alteration to the parabolic dune's morphology, beyond that currently proposed, at completion of construction. 	<ul style="list-style-type: none"> • Monthly visual inspections for evidence of erosion of parabolic dune formation outside the development envelope (inspections of first 10 m outside development envelope), for the duration of construction. • Inspection of landforms following large rainfall events, throughout the construction phase, to assess erosion impacts. 	<ul style="list-style-type: none"> • Maintain inspection records. • Monthly and annual reporting to the PTA on the success of the stabilisation controls.

Activity	Management actions	Management Targets	Monitoring	Reporting
<p>Terrestrial Fauna</p> <p>EPA objective: <i>to protect terrestrial fauna so that biological diversity and ecological integrity are maintained</i></p> <p>Outcomes: Loss of fauna habitat including foraging and breeding habitat for conservation significant species; injury and mortality of fauna during construction.</p> <p>Key environmental values: Bush Forever site 289; Carnaby’s Black Cockatoo breeding and foraging habitat.</p> <p>Key impacts and risks: Loss of 61.68 ha of fauna habitat including 47.45 ha of high value and 14.23 ha of medium value habitat; 28.82 ha of Bush Forever Site 289 (Ningana Bushland); loss of 56.31 ha of Carnaby’s Black Cockatoo habitat (including 22.57 ha of high value and 33.76 ha of medium value foraging habitat) and 45 potential breeding trees.</p>				
<p>Vegetation clearing</p>	<ul style="list-style-type: none"> • Undertake progressive clearing over a maximum duration of three (3) months within the development envelope to allow fauna to move away from clearing activities. • Within seven days prior to clearing of native vegetation, a qualified fauna expert undertakes a trapping and relocation program for conservation significant vertebrate fauna in accordance with a licence to take fauna for education or public purpose issued under Part 4 of the BC Act • Conduct fauna trapping and relocation in accordance with DBCA’s Standard Operating Procedures (SOPs) or permit conditions. • Contact DBCA prior to the trapping and relocation program to assist with the identifying suitable relocation sites. • Implement the trapping and relocation for five consecutive nights prior to clearing activities in areas containing native vegetation. • Within seven days following clearing activities, install fences between cleared areas and adjacent native vegetation to limit opportunities for fauna to return to the cleared area. • Require that fauna spotters are present during clearing of native vegetation to supervise dispersal/relocation of remnant fauna, and 	<ul style="list-style-type: none"> • No avoidable deaths of/injury to fauna during vegetation clearing for construction. • Clearing of fauna habitat to remain within approved limits. 	<ul style="list-style-type: none"> • Conduct walkover inspection for fauna species during vegetation clearing activities (minimum daily frequency) • Twice daily inspections of trenches in the morning and afternoon to identify trapped fauna and to enable capture and relocation • All staff to report if non-avian native vertebrate fauna are observed within the development envelope during construction activities. 	<ul style="list-style-type: none"> • Record known injuries to, or deaths of fauna species in a Fauna Interaction Register as soon as practicable after the injury or death is identified (preferably on the same day) and provide to PTA/regulators in monthly report, including species, cause of injury or cause of death, location and date of incident and response actions. • Prepare a report on the trapping program, providing details of the methods used, number of animals caught and relocated, and location of where they were released. • Monthly reporting on compliance with above measures and the adaptive management measures implemented.

Activity	Management actions	Management Targets	Monitoring	Reporting
	<p>identification of potential injured fauna.</p> <ul style="list-style-type: none"> Undertake vegetation clearing commencing from a disturbed edge, where practicable, to encourage remaining mobile fauna to naturally relocate to areas of adjacent vegetation. Visually inspect fencing and trenches within the development envelope during clearing activities for isolated or trapped macrofauna (Western Brush Wallaby, Emus etc.) and reptiles in temporary construction infrastructure. Facilitate the relocation of trapped fauna. Any identified injured fauna to be taken to a qualified wildlife carer for treatment. Require that all personnel complete a site induction that will address fauna values within and adjacent to the development envelope. 			
Black Cockatoos	<ul style="list-style-type: none"> 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 an appropriately qualified terrestrial fauna spotter has verified that the hollow(s) are no longer being used by the black cockatoos. 	<ul style="list-style-type: none"> No disturbance of active Black Cockatoo nests (if found) during and attributable to construction 	<ul style="list-style-type: none"> Monthly visual observations of marked breeding tree hollows (if found) for signs of disturbance and breeding activity throughout the duration of construction. Conduct monthly walkover inspection of applied 10 m buffers around marked breeding trees for signs of disturbance, such as temporary fence moved, prematurely vacated nests, broken eggs, and injured or dead fledglings. If breeding activity is observed, inspect the tree weekly until fledglings leave the nest. 	<ul style="list-style-type: none"> Report monthly and annually to the PTA on: <ul style="list-style-type: none"> 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.

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<p>Subterranean Fauna</p> <p>EPA objective: <i>to protect subterranean fauna so that biological diversity and ecological integrity are maintained</i></p> <p>Outcomes: Minimal loss of low value troglofaunal habitat and no loss of stygofauna habitat; retention of vertical extent of troglofaunal habitat so that continuity of habitat is retained across the alignment; no potential impacts to groundwater with no significant impact to habitat outside of the development envelope.</p> <p>Key environmental values: No stygofauna or troglofaunal records are present within the development envelope. High value habitat is present in adjacent conservation areas.</p> <p>Key impacts and risks: Loss of habitat from excavation and construction activities, alteration of surface hydrology, fragmentation of habitat and contamination of habitat from spills.</p>				
<p>Construction</p>	<ul style="list-style-type: none"> No groundwater dewatering or abstraction is proposed for this Proposal. Review the geotechnical investigation results to identify previously unidentified karst or cave formations which may provide suitable subterranean fauna habitat, and to inform detailed design of key project elements. Temporarily suspend construction activities if significant caves or voids are encountered during construction, to assess potential impacts. In the event that significant caves or voids are encountered during construction, the proponent will consult with DBCA and/or the WA Museum before recommencing construction activities at this location. If significant caves or voids cannot be avoided, collection of specimens and genetic material for deposition into the WA Museum collections will be undertaken by a suitably qualified person, on the advice of DBCA. Fuel and other chemicals will be stored in correctly labelled containers and used in designated areas only (see Inland Waters for further detail). Disposal of hazardous materials to be in accordance with regulatory requirements. Spill kits will be located at all designated storage and use areas. 	<ul style="list-style-type: none"> Avoid impact to significant caves or voids where practicable. No spills of hazardous materials within the development envelope. Compliance with AS 1940:2017 The storage and handling of flammable and combustible liquids. 	<ul style="list-style-type: none"> Weekly visual inspection of hazardous materials storage use and disposal to ensure compliance with safe use practices. 	<ul style="list-style-type: none"> Maintain an inventory of the type and volumes of hazardous materials stored and Material Safety Data Sheets for all hazardous materials stored. Maintain a register of hazardous material spills and leaks including date and location of spillage, name of chemical, volume spilt, and remedial action taken and report to the PTA monthly. Above items to be reported to the PTA in a monthly report.

Activity	Management actions	Management Targets	Monitoring	Reporting
	<ul style="list-style-type: none"> All personnel involved in handling hazardous materials will undergo induction training in the safe use, handling and disposal of hazardous materials. 			
<p>Inland Waters</p> <p>EPA objective: <i>to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected</i></p> <p>Outcomes: No significant impacts to environmental values, GDEs or other groundwater users; no significant changes to existing local hydrological regimes; no significant impact to groundwater quality.</p> <p>Key environmental values: Unconfined superficial aquifer; Wetlands within Yanchep National Park, outside and east of the development envelope; Priority 3 Perth Coastal Underground Water Pollution Control Area</p> <p>Key impacts and risks: Alteration of the landscape within the development envelope during construction which could potentially alter local surface water flows and recharge.</p>				
Contamination and spills	<ul style="list-style-type: none"> Install drainage diversion around chemical storage areas. Implement drainage controls to prevent offsite discharge of runoff. Implement sediment control measures to prevent offsite sedimentation. Ensure all relevant employees and contractors are trained on safe handling procedures, and incident response. No fuel or chemical storage in well head protection zones unless approved by the Water Corporation. 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. Place fuel or chemicals in bunds capable of storing at least 110% of the capacity of the largest storage tank as per AS 1940:2017: The storage and handling of flammable and combustible liquids. Secondary spill containment around tanks (with a perimeter bund) should have sufficient freeboard capacity to contain all captured rainwater from a 20- 	<ul style="list-style-type: none"> No unintentional spills or leaks of hazardous materials in the development envelope (or immediate vicinity) during construction. 	<ul style="list-style-type: none"> Weekly visual inspections of hazardous materials storage, use, and disposal to ensure compliance with safe use practices. In the event that a major spill occurs, undertake groundwater and/or surface water monitoring in consultation with the relevant agencies. 	<ul style="list-style-type: none"> 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. A summary of spills and leaks to be reported to the PTA monthly.

Activity	Management actions	Management Targets	Monitoring	Reporting
	<p>year average return interval, 72-hour storm.</p> <ul style="list-style-type: none"> • Report significant fuel or other chemical spill to the environment to DWER within 24 hours. • The site operator should inspect spill containment compounds as soon as practicable after any significant rainfall event and following tank refuelling. Any liquids including rainwater captured within the tank containment compound should be professionally tested for the presence of petroleum hydrocarbons. If no petroleum hydrocarbons (or other toxic materials) are present, then the stormwater may be discharged to soakage. If petroleum hydrocarbons or other potentially harmful fluids are detected, all liquid within the compound should be transferred by a licensed waste disposal contractor. • Implement a spill response procedure, which may include groundwater or surface water monitoring or soil testing as required. • Spill kits to be located in storage and refuelling areas. 			
Surface water management	<ul style="list-style-type: none"> • Stormwater and surface water management measures and controls will be implemented during construction to minimise/prevent unauthorised offsite discharges during construction. These measures will consider best practice water sensitive urban design principles, e.g.: <ul style="list-style-type: none"> ○ Diversion of surface water around laydown or chemical / hazardous material storage areas ○ Facilitate infiltration at-source rather than directing to large drainage basins ○ Control of offsite sedimentation from runoff • Prevent unauthorised discharges offsite. 	<ul style="list-style-type: none"> • No unauthorised offsite discharges. 	<ul style="list-style-type: none"> • Visual inspection of offsite discharges following rainfall events. 	<ul style="list-style-type: none"> • Inspection results reported to the PTA monthly.

Activity	Management actions	Management Targets	Monitoring	Reporting
<p>Social Surroundings</p> <p>EPA objective: <i>to protect social surroundings from significant harm</i></p> <p>Outcomes: No disturbance to registered Aboriginal heritage sites or natural or historic heritage values. No exceedance of noise or vibration criteria.</p> <p>Key environmental values: No registered Aboriginal heritage sites are located within the development envelope. No natural or historic heritage values are located within the development envelope; residential development.</p> <p>Key impacts and risks: Potential impact to previously unidentified artefacts of Aboriginal cultural significance; bushfire impacts to people, property and infrastructure; noise, vibration and dust disturbance to sensitive receptors</p>				
Dust	<ul style="list-style-type: none"> • Implement dust suppression measures on unsealed roads and access tracks, cleared areas and at other locations at times of high dust risk, including: <ul style="list-style-type: none"> ○ Use water carts on unsealed roads and tracks ○ Use water-assisted dust sweeper(s) on access and local roads to remove material, as necessary. • Enforce speed limits in construction areas. • Apply hydromulch or similar soil stabiliser if stockpiles will remain for extended periods. • Install wind break fencing to prevent dust spreading in high-risk areas. • Review daily weather forecasts, and limit construction activities during high wind conditions, where practicable. • Limestone crushing to be operated in accordance with a Part V Licence should limestone crushing be required onsite. 	<ul style="list-style-type: none"> • No fugitive dust emissions outside of the development envelope. 	<ul style="list-style-type: none"> • Daily visual monitoring of airborne dust to confirm no offsite dust impacts and efficacy of dust control measures. 	<ul style="list-style-type: none"> • Establish a complaint register and record details of the complaint including date, time, location, nature of complaint and complainant details. • 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. • Document and report dust-related complaints and summarise the outcome of the investigation and resolution of complaints, including the management measures implemented monthly to the PTA.
Aboriginal heritage	<ul style="list-style-type: none"> • Comply with Section 18 Notices under the <i>Aboriginal Heritage Act 1972</i>. • Only clear within the approved limits of impact to minimise disturbance to previously undiscovered or buried artefacts or other items of Aboriginal cultural 	<ul style="list-style-type: none"> • No avoidable disturbance to Aboriginal objects identified or unearthed during construction activities. 	<ul style="list-style-type: none"> • Daily monitoring during vegetation clearing and initial groundworks of the Development Envelope to identify any potential objects of Aboriginal cultural 	<ul style="list-style-type: none"> • Report new Aboriginal objects identified during construction activities to the DPLH. • Report to DPLH in accordance with conditions of the Section 18 consent(s).

Activity	Management actions	Management Targets	Monitoring	Reporting
	<p>significance.</p> <ul style="list-style-type: none"> Existing tracks will be used and widened where required (within development envelope) to support construction vehicles. Ensure monitors are onsite for clearance and initial groundworks for the development envelope to assist with the identification and management of any Aboriginal objects identified or unearthed during construction. Stop construction as soon as practicable if Aboriginal objects are identified or unearthed in the absence of monitors and report the findings to the Department of Planning, Lands and Heritage (DPLH). 		<p>significance.</p>	<ul style="list-style-type: none"> Compliance with these measures to be documented and reported to the PTA monthly and annually.
Noise	<ul style="list-style-type: none"> Unless otherwise approved by the City of Wanneroo under a Noise Management Plan (NMP), 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. Prepare an out-of-hours NMP if works are required outside of standard construction hours. The NMP shall be approved by the City of Wanneroo and will include information on: <ul style="list-style-type: none"> the need and reasons for the construction work to be done out of hours types and durations of activity likely to result in noise emissions above assigned noise levels predictions of noise emission control measures for noise emissions, including vibration monitoring of noise emissions, including vibration a protocol for receiving, handling and resolving complaints. 	<ul style="list-style-type: none"> No exceedance of construction noise limits in accordance with Environmental Protection (Noise) Regulations 1997. No unauthorised out of hours construction work. 	<ul style="list-style-type: none"> Observe noise volumes during approved out-of-hours work, to confirm compliance with the NMP. Noise monitoring as per NMP for works outside of standard construction hours (if required). 	<ul style="list-style-type: none"> Establish a complaint register to record noise and vibration complaints, including location, date, time, nature of complaint and complainant details Complaints will be investigated, and the complainant contacted within seven days The outcomes of the investigation to be recorded in the complaints register. Include a summary of noise and vibration complaints and a summary of the outcomes of investigations and resolution of any complaints, including the management measures implemented in a monthly report to PTA.

Activity	Management actions	Management Targets	Monitoring	Reporting
	<ul style="list-style-type: none"> Implement noise and vibration controls in accordance with AS 2436-2010 (R2016) Guide to noise and vibration control on construction, demolition and maintenance sites. 			<ul style="list-style-type: none"> Summarise the above in a monthly report to the PTA.
Fire	<ul style="list-style-type: none"> Ensure that relevant management and mitigation measures proposed under the BRMP have been included in contractor requirements for construction activities, to minimise the risk of bushfire and maximise the rate of response in the event of a bushfire. 	<ul style="list-style-type: none"> Contractor to comply with relevant management and mitigation measures proposed under the BRMP. 	<ul style="list-style-type: none"> Monitoring undertaken of DFES Fire Danger Ratings (FDRs) to minimise risk of bushfire from construction activities. Monthly monitoring of compliance with agreed management and mitigation measures. 	<ul style="list-style-type: none"> In the event of a fire, contractor to provide reports and incident response reporting as soon as practicable after event.

