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Kwinana Freeway Upgrade (Roe Highway to Mortimer Road)

MNES Environmental Management Plan

Environment Protection and Biodiversity Conservation Act 1999

D26#117139
April 2026

GLOSSARY

Abbreviation/Term	Definition
Banksia TEC	Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community
EMP	Environmental Management Plan
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DBH	Diameter Breast Height
DFES	Department of Fire and Emergency Services
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPIRD	Department of Primary Industries and Regional Development
EPA	Environmental Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FRTBC	Forest Red Tailed Black Cockatoo
LGA	Local Government Authority
Main Roads	Main Roads Western Australia
MNES	Matters of National Environmental Significance
PAA	Proposed Action Area
SMART performance standards	Specific, Measurable, Achievable, Relevant and Time-bound performance standards
Suitably qualified person	A person who has professional qualifications and at least three years of relevant work experience surveying for the relevant MNES and who can give authoritative assessment, advice and analysis on performance relative to the subject matter using relevant protocols, standards, methods or literature. If the person does not have appropriate professional qualifications, the person must have at least five years of work experience related to the subject matter and can give an authoritative assessment, advice and analysis on performance relative to the subject matter using relevant protocols, standards, methods or literature.
Tuart TEC	Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain ecological community
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Community
WA	Western Australia
WoNS	Weeds of National Significance

Contents

DOCUMENT CONTROL

Report Compilation & Review	Author	Approved	Document Revision	Date
Approved for use	WR IPT		REV 0	13/04/2026

1 Purpose and context

1.1 Purpose

This Matters of National Environmental Significance (MNES) Environmental Management Plan (EMP) has been prepared as part of the Preliminary Documentation to support assessment of the Kwinana Freeway Upgrade (Roe Highway to Mortimer Road) (EPBC 2025/10266, the Proposed Action) under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Preliminary Documentation has been prepared in response to a request by Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 5th November 2025, for additional information to inform the assessment of the relevant impacts of the Proposed Action to MNES

The structure and content of the EMP have been prepared in accordance with Attachment A of DCCEEW's request for additional information.

1.2 Location and nature of relevant action activities

Main Roads Western Australia (Main Roads) proposes to widen and upgrade approximately 20 kilometres of the Kwinana Freeway between Roe Highway and Mortimer Road (the Proposed Action). Figure 1 presents the Proposed Action location and Proposed Action Area (PAA). The PAA comprises an area of approximately 174.5 ha and represents the preliminary impact footprint.

The Proposed Action include the construction of:

- Additional lanes in each direction
- Freeway ramp upgrades
- Noise walls, Principal Shared Paths.
- Other road infrastructure such as safety barriers, drainage structures and landscaping.

1.3 Schedule of action phases

1.3.1 Pre-Construction

The design will continue to be refined during the pre-construction phase, in order to minimise the environmental impacts where possible, while maintaining or improving safety and usability.

1.3.2 Construction

Construction of the Proposed Action is planned to commence in late 2026 with construction completion to be completed in 2029. Commencement of the Proposed Action is subject to approvals and refinement of the preferred design option.

Construction will be undertaken using traditional earth-moving equipment and construction techniques. The road formation will be built using both imported fill and minimal cut-to-fill materials from the DE.

Lay down areas for materials will be established by the Contractor in consultation with Main Roads and the Local Government Authority. All laydown areas, stockpiles and access tracks will be constructed within existing cleared areas or within the permanent footprint of the works. No native vegetation will be cleared for temporary works outside the permanent footprint

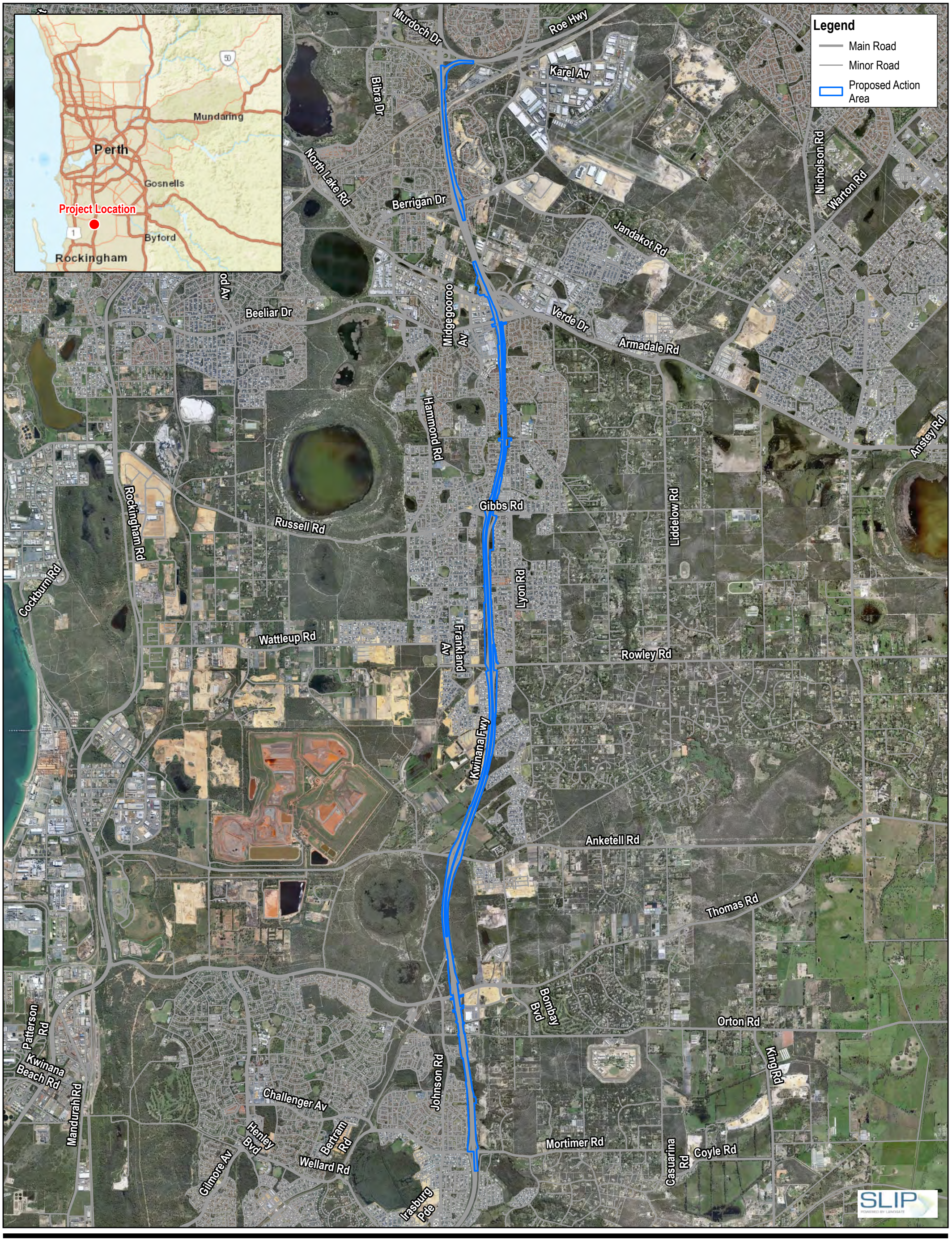
Temporary and targeted dewatering may be required to install some road structures such as bridges infrastructure over the rail south of Roe Highway and utility corridors that intersect the

Kwinana Freeway.

1.3.3 Operation

The Proposed Action relates to the construction of the Kwinana Freeway upgrades. The normal routine, recurrent and periodic maintenance of the roads within the PAA will be undertaken in a manner consistent with the maintenance of the existing freeway. Once completed, the operation of the upgraded freeway is unlikely to have any impact on MNES, noting the current infrastructure already in place. The day-to-day operation and maintenance of the freeway itself following construction is therefore not considered to be included in the Proposed Action.

Figure 1 Proposed Action location and Proposed Action Area



Paper Size ISO A3

0 0.5 1 1.5 2

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

N

GHD

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
Preliminary Documentation

Proposed Action location and Proposed Action Area

Project No. **12657323**
Revision No. **2**
Date **12/01/2026**

FIGURE 1

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Print date: 12 Jan 2026 - 17:21

Data source: Landgate_Subscription_Imagery\WANow: World Street Map: Esri, HERE, Garmin, NGA, USGS. Created by: dchan3

1.4 Protected Matters

1.4.1 Information on MNES

The PAA comprises and lies adjacent to land that supports the following MNES:

- Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia TEC) (Endangered)
- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plan Threatened Ecological Community (Tuart TEC) (Critically Endangered)
- Carnaby's Black Cockatoo (*Zanda latirostris*) (Endangered)
- Forest Red Tailed Black Cockatoo (FRTBC) (*Calyptorhynchus banksii naso*) (Vulnerable).

Banksia TEC

The Banksia TEC is a woodland community dominated by a prominent Banksia tree layer, with scattered eucalypts and other species often emerging above the canopy. Its understorey is diverse, comprising sclerophyllous shrubs, graminoids, and forbs.

This TEC is confined to Western Australia's Swan Coastal Plain and nearby areas, including the Dandaragan Plateau to the north and the Darling Scarp to the east. The Banksia TEC is biodiverse and provides critical habitat for threatened species such as Black Cockatoos. Major threats include habitat clearing and fragmentation, altered fire regimes, climate change, invasive species, and Phytophthora dieback (DCCEEW, 2016).

Tuart TEC

The Tuart TEC consists of woodlands or forests dominated by *Eucalyptus gomphocephala* (Tuart) in the upper canopy. The Tuart TEC includes the assemblage of plants and animals that occur in association with the tuart canopy (TSSC, 2019).

Tuart TEC occurs on the Swan Coastal Plain, Western Australia, from Jurien to the Sabina River near Busselton. Historically, its distribution was almost continuous from the Sabina River to Lancelin, with denser woodlands in the south. Northern areas near Cervantes are naturally sparse and isolated (TSSC, 2019). Tuart TEC is strongly associated with calcareous soils near the coast, where areas are mainly sandy and well-drained. Tuart TEC can also be found in swales, wetlands, riverbanks, and limestone slopes (Keighery & Longman, 2002).

Current threats stem from historical grazing and clearing, urban development, altered fire regimes, invasive species, disease, 'Tuart decline', and poor recruitment of canopy and understorey plants. It is highly susceptible to land clearing, climate variability, altered vegetation structure, hydrological changes, and weed invasion, with these threats interacting rather than acting independently (TSSC, 2019).

Black Cockatoos

Carnaby's Black Cockatoo is a large black cockatoo with distinctive white markings. It nests in hollows of live or dead trees such as Jarrah, Flooded Gum, and Marri (DAWE, 2022). Breeding mainly occurs from July to mid-December. The species feeds in both canopy and understorey, consuming Banksia, Marri, Jarrah, and occasionally non-native Pine. Major threats include habitat loss from clearing or degradation, nest competition, and vehicle strikes (Department of Parks and Wildlife, 2013).

Forest Red-tailed Black Cockatoo is a large black cockatoo, distinguished by red markings. Its breeding is irregular, peaking between April–June and August–October. It primarily nests in hollows of large mature Marri trees, and to a lesser extent in Jarrah, Blackbutt, Bullich, and Wandoo (Johnstone, Kirby, & Sarti, 2013). The species feeds in the canopy, mainly on seeds of Marri and Jarrah, and more recently Cape Lilac (Johnstone, Kirkby, & Sarti, 2017)). Key threats include forest habitat loss, shortage of nesting sites, and competition for hollows (Department of Environment and Conservation, 2008).

1.4.2 Location and baseline condition

Biological surveys

The location and baseline condition of MNES within the PAA and on adjacent land has been determined through biological surveys as follows:

- GHD (2025) conducted various biological surveys over a 285.44 ha Survey Area comprising the PAA and surrounding land, including:
  - Detailed and Targeted Flora and Vegetation Survey in accordance with WA Environmental Protection Authority (EPA) guidance (EPA, 2016),
  - Floristic Community Type Assessment (FCT),
  - Basic Fauna Survey in accordance with WA EPA guidance (EPA, 2020),
  - Targeted Black Cockatoo Habitat Assessment in accordance with EPBC Act referral guidelines (DAWE, 2022),
- GHD (2025b) Targeted Orchid Survey of 25.43 ha to assess vegetation/revegetation types considered potential/may be potential habitat for one or more target orchids.

Banksia TEC

Figure 2 and Table 1 present the extent and baseline condition of patches of Banksia TEC within the Survey Area and PAA.

Table 1 Banksia TEC Patch Extent and Baseline Condition within and adjacent to the PAA

Patch No.	Vegetation condition					Extent of Patch within PAA (ha)	Total extent of Patch (ha)	Patch area within Survey Area remaining outside of PAA (ha)
	Excellent – Very Good	Very Good	Good	Degraded	Completely Degraded			
BT02	-	0.86	0.61	0.41	-	1.88	14.27	12.39
BT03	-	0.35	1.16	1.03	0.04	2.54	9.01	6.47
BT04	0.86	0.49	-	1.30	-	2.65	62.59	59.94
BT05	-	-	0.08	1.03	-	1.10	7.15	6.05
BT06	-	-	0.33	1.16	0.04	1.54	51.94	50.40
TEC extent within PAA (ha)	0.86	1.70	2.19	4.93	0.08	9.71	144.96	135.25

Tuart TEC

Figure 3 and Table 2 present the extent and baseline condition of patches of Tuart TEC within the Survey Area and DE.

Table 2 Tuart TEC Patch Extent and Baseline Condition within and adjacent to the PAA

Patch No.	Vegetation Condition			Total extent of Patch (ha)	Patch area within PAA (ha)	Patch area within Survey Area remaining outside of PAA (ha)
	Very Good	Degraded	Completely Degraded			
RoeTT01	0.87	-	0.79	4.94	1.66	1.66
TT01	-	0.68	-	11.08	0.68	0.68
TT02	-	0.70	-	8.12	0.70	0.7
TEC extent within PAA (ha)	0.87	1.38	0.79	24.14	3.04	21.1

Black Cockatoos

Figure 4, Figure 5; and Table 3 and

Table 4 present the extent and condition of Black Cockatoo breeding and foraging habitat within the DE. Black Cockatoo habitat is also located in native vegetation on land adjacent to the DE.

In summary, the Proposed Action will cause direct impacts to the following Black Cockatoo habitat within the DE:

- Up to 16 potential breeding trees (>500 mm Diameter at Breast Height (DBH)) for Black Cockatoo species, none of which contain hollows suitable for nesting by Black Cockatoos
- Clearing of up to 0.15 ha of Moderate – High, and 21.06 ha of Moderate quality foraging habitat for Carnaby's Cockatoo
- Clearing of up to 1.52 ha of Moderate – High, 9.52 ha of Low – Moderate and 9.14 ha of Low-quality foraging habitat for Forest Red-tailed Black Cockatoo (FRTBC).

Table 3 Black Cockatoo potential breeding trees within and adjacent to the DE

Tree species	Number of potential breeding trees within PAA (DBH > 500)	Number of suitable hollows
Marri	10	0
Jarrah	2	0
River Red Gum	2	0
Flooded Gum	1	0
Tuart	1	0
Total	**16**	**0**

Table 4 Black Cockatoo foraging habitat within the DE

Habitat score/value	Carnaby's Cockatoo foraging habitat (ha)	Forest Red-tailed Black Cockatoo foraging habitat (ha)
5: Moderate to High	0.15	1.52
4: Moderate	21.06	0
3: Low to Moderate	0	9.52
2: Low	0	9.14
1: Negligible	0	0
0: Nil	0	0
Total	**21.21**	**20.18**

Significant weeds

Sixty-four (64) introduced taxa, including six taxa that are listed as Declared Pests under the Western Australian Biosecurity and Agriculture Management Act 2007 (BAM Act) and/or Weed of National Significance (WoNS) were recorded during the survey (GHD Pty Ltd , 2025)

- **Asparagus asparagoides* (bridal creeper) – Declared Pest and WoNS
- **Opuntia stricta* (Prickly Pear) - Declared Pest and WoNS
- **Moraea flaccida* (one-leaf cape tulip) – Declared Pest
- **Gomphocarpus fruticosus* – Declared Pest
- **Solanum linnaeanum* – Declared Pest
- **Zantedeschia aethiopica* – Declared Pest.

1.4.3 Management objectives

This EMP has been prepared with the objective that impacts of the Proposed Action to MNES are acceptable, minimised and managed. It is a 'management-based' EMP to document management actions required during Proposed Action construction and operation. Management measures within this EMP are specific to the Proposed Action.

- Manage MNES clearing within the PAA and prevent unauthorised clearing of MNES ecological communities or habitat outside of the PAA.
- Prevent edge impacts into adjacent Banksia TEC, Tuart TEC, Black Cockatoo habitat and other MNES values adjacent to the PAA
- Prevent additional impacts above and beyond the existing road in relation to surface water runoff from road surfaces causing erosion, sedimentation and/or contamination
- Accidental spills or leaks of potentially contaminating liquids is appropriately managed to contain and minimise the risk to MNES
- Avoid injury or mortality to Black Cockatoos during construction.

2 Performance standards

2.1 SMART performance standards

SMART performance standards are measurable (numerical) values which can be applied to a Proposed Action, rather than qualitative management/monitoring actions. Table 5 presents the SMART performance standards that relate to the measurable impacts of the Proposed Action. These SMART performance standards complement the management actions and performance targets; monitoring actions and corrective actions as identified in Table 10.

The threshold criteria and completion criteria are considered to be achievable, with the risk potential of not achieving the proposed SMART performance standards captures by the risk assessment presented in Table 9.

As the proposed SMART performance standards for threshold criteria and completion criteria relate to physical measures, which can be readily controlled via standard construction management processed, it is therefore considered the proposed SMART performance standards have a low level of uncertainty, with additional margins for safety not required.

The SMART performance standards proposed do not require detailed statistical analysis to determine if the threshold criteria and completion criteria have been met, nor require statistical power to detect change (for example, climatic or seasonal variability), or control of reference sites for comparative purposes).

Table 5 Smart Performance Standards

Threshold criteria	Performance indicators	Corrective actions	Corrective Action Responsibility	Completion criteria
Clearing of 3.04 ha of Tuart TEC	Area (ha) of Tuart TEC cleared	Clearing will cease immediately if trigger is met. Clearing will not recommence until no-go areas have been reviewed and confirmed to be in place correctly and Main Roads Superintendent provides approval to recommence Environmental incident will be recorded and the cause investigated. The incident will be reported to DCCEWW along with the cause identified from the investigation. Incorrectly cleared areas will be assessed for potential remediation in consultation with DCCEEW.	Construction Contractor Main Roads Superintendent	No more than 3.04 ha of Tuart TEC cleared
Clearing of 10.58 ha of Banksia TEC	Area (ha) of Banksia TEC cleared			No more than 10.58 ha of Banksia TEC cleared
Clearing of 0.15ha of Moderate – High and 21.06 ha of Moderate quality foraging habitat for Carnaby's Cockatoo	Area (ha) of Carnaby's foraging habitat cleared			No more than 0.15ha of Moderate – High and 21.06 ha of Moderate quality foraging habitat for Carnaby's Cockatoo cleared
Clearing of 1.52 ha of Moderate – High, 9.52 ha of Low – Moderate and 9.14 ha of Low-quality foraging habitat for FRTBC	Area (ha) of FRTBC foraging habitat cleared			No more than 1.52 ha of Moderate – High, 9.52 ha of Low – Moderate and 9.14 ha of Low-quality foraging habitat for FRTBC cleared
Clearing of 16 potential Black Cockatoo breeding trees, without hollows	Number of trees with a suitable DBH cleared			No more than 16 potential Black Cockatoo breeding trees, without hollows cleared
No clearing of MNES ecological communities or habitat outside of the PAA	Area (ha or count) of MNES cleared outside the PAA			No MNES ecological communities or habitat cleared outside of the PAA

3 RISK ASSESSMENT

A risk assessment has been undertaken of the potential impacts identified for the Proposed Action construction and operational phases. The risk assessment adopts likelihood and consequence criteria and a risk matrix presented in Table 6, Table 7 and Table 8, consistent with the EMP Criteria (Attachment A to DCCEEW request for additional information).

Table 9 presents the risk assessment results, incorporating a summary of mitigation measures to generate a residual risk outcome for each identified risk. Details of mitigation measures including monitoring and corrective actions are presented in the Section 4.

Table 6 Likelihood criteria

Likelihood	Criteria
Highly likely	Is expected to occur during the construction/operation period
Likely	Will probably occur during the construction/operation period
Possible	Might occur during the construction/operation period
Unlikely	Could occur during construction/operation but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Table 7 Consequence criteria

Consequence	Criteria
Minor	Minor environmental impact that can be reversed
Moderate	Isolated but substantial environmental impact that could be reversed with intensive efforts
High	Substantial environmental impact that could be reversed with intensive efforts
Major	Major loss of environmental value and real danger of continuing
Critical	Severe widespread loss of environmental value and irrecoverable environmental damage

Table 8 Risk rating matrix

Likelihood	Consequence				
	Minor	Moderate	High	Major	Critical
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Table 9 Risk assessment of Proposed Action to MNES

Impact	Cause	Is the scale and/or nature of the impact unknown, unpredictable or irreversible? Level of uncertainty	Summary of Mitigation	Residual Risk		
				Likelihood	Consequence	Risk rating
Direct impact causing loss of up to: • 3.04 ha Tuart TEC • 10.58 ha Banksia TEC • 0.15ha of Moderate – High and 21.06 ha of Moderate quality foraging habitat for Carnaby's Cockatoo • 1.52 ha of Moderate – High, 9.52 ha of Low – Moderate and 9.14 ha of Low-quality foraging habitat for FRTBC • 16 Potential Black Cockatoo trees, without hollows	Authorised clearing of vegetation and fauna habitat with the PAA.	The scale and nature of the potential impact is known and predictable based on surveys within the PAA, undertaken in accordance with EPA and Commonwealth guidance (GHD Pty Ltd , 2025; 2025). High confidence in prediction of direct impacts within PAA. Potential to reduce clearing impacts during detailed design, planning and construction; however, this cannot be quantified at this stage.	Reduction of direct impacts through planning, design and construction to minimise impacts to MNES within the PAA.	Likely	Moderate	Medium
Direct impact causing loss exceeding: • 3.04 ha of Tuart TEC • 10.58 ha of Banksia TEC • 0.15ha of Moderate – High and 21.06 ha of Moderate quality foraging habitat for Carnaby's Cockatoo • 1.52 ha of Moderate – High, 9.52 ha of Low – Moderate and 9.14 ha of Low-quality foraging habitat for FRTBC • 16 Potential Black Cockatoo trees, without hollows	Unauthorised clearing of native vegetation outside of PAA.	The nature of potential impact is known and predictable based on surveys in land adjacent to the PAA, undertaken in accordance with EPA and Commonwealth guidance (GHD Pty Ltd , 2025; 2025). The scale of potential impacts is unpredictable as it relates to unauthorised clearing; however, should it occur it is only likely to be isolated and of a much smaller scale than the authorised clearing. Rehabilitation will be undertaken in impacted areas, so the impacts are reversed. Black Cockatoo foraging habitat is expected to establish within rehabilitated areas in the mid-term (10+ years) and breeding trees in the long term (100+ years). Tuart TEC and Banksia TEC can be established in the mid-term (15-20 years). High confidence in prediction of nature of impacts and moderate confidence in prediction of scale of impacts.	Identification and demarcation of clearing area boundaries. Pre-clearing inspection of boundaries prior to clearing works. Temporary construction areas will be located in existing cleared areas, areas to be cleared for permanent works, or in areas devoid of MNES.	Unlikely	Minor	Low
Indirect impacts to condition of adjacent native vegetation including: • Tuart TEC • Banksia TEC • Organic Mounds TEC • Habitat for Black Cockatoos	Construction plant, equipment and soil movement introducing or spreading weeds to uninfested vegetation. Unauthorised site access introducing or spreading weeds to uninfested vegetation.	The nature of potential impact is known and predictable based on surveys undertaken in PAA and Contextual area (GHD Pty Ltd , 2025; 2025). GHD identified Declared Plants, WONS and environmental weeds, and mapped locations of Declared Plants and WONS within the PAA. There is an existing high weed load in the local environment. The scale of the potential impact is expected to be within the area of vegetation that lies between the PAA and un-vegetated areas (e.g. roads, cleared land) in the urban environment. The impact from weeds is reversible with using established methods (e.g. mechanical removal, targeted herbicide, replanting native species). High confidence in prediction of nature of impacts and moderate confidence in prediction of scale of impacts.	Declared Plants within the PAA will be treated according to WA Government advice, with the aim of eradication where possible but as a minimum prevent off site movement. WoNS and environmental weeds within the PAA will be treated according to Weeds Australia guidance with the aim of controlling off-site movement. Topsoil containing Declared Pests or WoNS will not be reused in landscaping or revegetation, without prior treatment. Hygiene controls will be applied to machinery and vehicles to manage spread of weeds within and outside the PAA.	Unlikely	Minor	Low
Indirect impacts to condition of adjacent native vegetation including: • Tuart TEC • Banksia TEC • Habitat for Black Cockatoos	Construction plant, equipment and soil movement introducing or spreading dieback to uninfested vegetation. Unauthorised site access introducing or spreading dieback to uninfested vegetation.	The nature of potential impact is known and predictable as a dieback survey was been undertaken for PAA and adjacent land. The scale of the potential impact is expected to be within the area of native vegetation that lies adjacent to and offsite from the PAA. The impact from dieback is considered effectively irreversible. Phosphite treatment is effective at controlling the spread and impact of dieback in infested areas for periods of up to five years. Low confidence in prediction of nature of impacts and low confidence in prediction of scale of impacts.	Hygiene controls will be applied to machinery and vehicles (including inspection and preventative treatment) to manage to potential spread of dieback containing material (vegetation and soil).	Unlikely	Moderate	Low

Indirect impacts to condition of adjacent native vegetation including: • Banksia TEC • Organic Mounds TEC • Habitat for Black Cockatoos	Construction water abstraction and dewatering causing groundwater drawdown.	The nature of the potential impact is known as Conservation Advice (DCCEEW, 2016) states the dominant Banksia species of the Banksia TEC are vulnerable to impact from groundwater lowering. Assemblages associated with Organic Mounds TEC are also vulnerable to decline in groundwater levels (DCCEEW, Approved Conservation Advice for the Assemblages of plants and invertebrate animals of tumulus (organic mound) springs of the Swan Coastal Plain, 2023) The impact is expected to be temporary only and reversible as groundwater levels will recover once groundwater abstraction and/or dewatering ceases. Water abstraction and dewatering is not expected within proximity to adversely impact Organic Mounds TEC in proximity to the PAA. Potential impacts to ecological communities are expected to recover as groundwater levels return to baseline levels within intensive efforts. Moderate confidence in prediction of nature and scale of impacts.	Groundwater level baseline monitoring is occurring with the PAA to inform construction methods and management requirements. Required licence applications for groundwater abstraction and dewatering will consider potential impacts. Construction groundwater abstraction will not occur within 800 m of the Organic Mounds TEC occurrence Wandi01 or CSQ2 to ensure a negligible impact occur. If groundwater drawdown is found to be adversely impacting ecological communities, remedial measures (e.g. infiltration trenches, diaphragm walls) will be implemented to restore groundwater levels.	Unlikely	Minor	Low
Indirect impacts to condition of adjacent native vegetation including: • Tuart TEC • Banksia TEC • Organic Mounds TEC • Habitat for Black Cockatoos	Surface water runoff and spills during construction causing erosion, sedimentation and/or contamination.	The nature of the potential impact is known as construction will involve ground disturbance, generation of wastes and use of hazardous materials (e.g. diesel fuel), and may occur adjacent to MNES habitat. The scale of the potential impact is unpredictable as it relates to major storm or spill events, however it is expected to be localised to land in the vicinity of the PAA and readily manageable as impacts will be immediately evident. The impact is expected to be reversible as erosion; sediment deposition and contamination can be remediated with established technologies. Moderate confidence in prediction of nature and scale of impacts.	Temporary erosion and sediment controls will be maintained within the PAA during construction to prevent stormwater runoff from construction areas from eroding or causing sediment deposition in adjacent native vegetation. Waste and hazardous materials management measures will be implemented in construction to prevent contaminant discharges to adjacent native vegetation. No storage of waste or hazardous materials within 50 m of drainage lines to avoid potential for impact in an unplanned event (e.g. spill or storm).	Unlikely	Minor	Low
Indirect impacts to condition of adjacent native vegetation including: • Tuart TEC • Banksia TEC • Organic Mounds TEC • Habitat for Black Cockatoos	Accidental fires caused by construction activities.	The nature of the potential impact is known, as the Banksia TEC are known to be vulnerable to more frequent/intense fire regimes. Organic Mounds TEC as also sensitive to altered fire regimes. Other MNES are expected to be resilient to fire in the urban environment. The scale of the potential impact is expected to be within vegetated areas immediately adjacent and connected to the PAA, with un-vegetated areas (e.g. roads, cleared land) acting as an effective firebreak and fire suppression lines in the urban environment. Construction fires resulting from hot works are expected to be immediately bought under control with standard construction site and procedural controls. The locality of the PAA is such that fire emergency response for large scale fires would be prompt so as to minimise the risk of a large-scale bushfire. The impact from fires is expected to be reversible through recovery of most vegetation that is adapted to fires. Moderate confidence in prediction of nature and scale of impacts.	Hot work will be undertaken in accordance standard construction site procedures. Vehicles, plant and equipment to be fitted with fire extinguishers and restricted to designated cleared areas unless involved in clearing operations. Fire danger ratings and Local Government vehicle movement bans will be followed during the construction works. These ratings and bans are not relevant to operation.	Rare	Minor	Low
Indirect impacts to condition of adjacent native vegetation including: • Tuart TEC • Banksia TEC • Habitat for Black Cockatoos	Disturbance of known or existing ASS and/or contaminated sites caused by construction activities.	The nature of the potential impact is known as existing contaminated sites and areas of high-risk ASS are known within the PAA and are adjacent to MNES habitat. There is no known contamination present in the PAA, and any present is likely to be associated with fly tipping based on land use adjacent to the PAA. The scale of the potential impact is unpredictable for ASS as it is dependent on the location and extent of excavation, dewatering and groundwater abstraction activities in relation to higher risk ASS occurrence. However, the scale of the impact is expected to be localised to land in the vicinity of the PAA and managed with established methodology. The impact is expected to be reversible as ASS (and contamination) can be remediated/managed with established technologies. Moderate confidence in prediction of nature and scale of impacts.	Excavation and dewatering will be avoided where possible in areas of high-risk ASS. Where these activities are required, appropriate controls will be incorporated to manage potential adverse impacts. Construction bore locations to be outside of high and moderate risk areas. Unexpected contamination finds will trigger an appropriate response consistent with the *Contaminated Sites Act 2003* (WA).	Unlikely	Minor	Low
Injury or mortality to Black Cockatoo individuals.	Vehicle collision with birds during construction.	The nature of the potential impact is known, as the PAA contains and lies adjacent to Black Cockatoo habitat, and Black Cockatoos have been known to be killed through vehicle strike. The potential scale of the impact is unpredictable as it relates to unplanned events and bird/flock behaviour. Collisions are expected to impact individuals or small	Speed limits between 40-60km/hr will be applied throughout the construction site for safety purposes which will consequently reduce the risk of fauna strikes during construction.	Unlikely	Minor	Low

		numbers of birds; however, the number of collisions is unpredictable. Construction controls such as limiting vehicles speeds and reducing water pooling on site are effective at reducing the likelihood and consequence of vehicle strike. The loss of a limited number of birds to mortality/injury over a temporary period is considered reversible, as the population is expected to recover over time once construction is completed. Moderate confidence in prediction of nature and scale of impacts.	A list of local wildlife rescue organisations and carers will be maintained on site to contact in the event of fauna injury. Induction of construction personnel on reducing the risk of fauna injury and the procedure in the event of fauna injury or death.			
Injury or mortality to Black Cockatoo individuals.	Clearing of active breeding trees during construction.	The nature of the potential impact is known, as the PAA contains no trees with hollows suitable for Black Cockatoo nesting that could potentially be used during construction. Furthermore, there are no known breeding records within the proximity of the PAA that are likely to be impacted by the Proposed Action. The scale of the potential impact is considered insignificant given the lack of breeding records in the vicinity. The likelihood of the of unknown Black Cockatoo breeding occurring is expected to be rare. The low risk of loss of a small numbers of birds to mortality/injury over a temporary period is considered reversible, as the population is expected to recover over time once construction is completed. High confidence in prediction of nature and scale of impacts.	Fauna observers will be employed for vegetation clearing.	Rare	Minor	Low
Disturbance of Black Cockatoo individuals.	Construction activities causing noise, light, vibration and dust emissions.	The nature of the potential impact is known as the PAA is adjacent to Black Cockatoo habitat and construction activities will result in noise, light, vibration and dust emissions. The scale of the potential impact is predictable as no Black Cockatoo breeding activity nor definitive evidence of breeding was observed within the PAA or surrounds during the surveys (GHD Pty Ltd , 2025; 2025). It is unlikely breeding will occur in adjacent vegetation during construction. Furthermore, no evidence of roosting was recorded within the PAA, with only one roost tree identified near the northern extent of the PAA, so limited exposure to the majority of the construction works. The disturbance of a limited number of birds from noise, light, vibration and dust emissions over a temporary period is considered reversible, as no population impacts are expected. High confidence in prediction of nature and scale of impacts.	Construction works will be undertaken in accordance with the Environmental Protection (Noise) Regulations 1997. Lighting will be directed toward the construction area and not into adjacent native vegetation, particularly The Spectacles. Dust emissions will be controlled through appropriate measures where practicable including hydro mulch, water application through water carts and chemical dust suppressants.	Possible	Minor	Low
Indirect impacts to condition of adjacent native vegetation including: • Tuart TEC • Banksia TEC • Organic Mounds TEC • Habitat for Black Cockatoos	Surface water runoff from road surface during operation causing erosion, sedimentation and/or contamination (additional impact above and beyond existing road).	The nature of the potential impact is known as the PAA will comprise upgraded freeway that will generate stormwater runoff, and lie adjacent to MNES habitat. The scale of the potential impact is unpredictable as it relates to major storm or spill events, however it is expected to be localised to land in the vicinity of the PAA, with the design giving consideration to infrequent storm events. The impact is expected to be reversible as erosion; sediment deposition and contamination can be remediated with established technologies and maintenance works. Moderate confidence in prediction of nature and scale of impacts.	Drainage design will integrate Water Sensitive Urban Design principles. Drainage design will be implemented to maintain existing modified hydrological flow regimes and control stormwater run-off.	Rare	Minor	Low
Indirect impacts to condition of adjacent native vegetation including: • Tuart TEC • Banksia TEC • Organic Mounds TEC • Habitat for Black Cockatoos	Fires intensity increased by weed growth or fuel build up in road verge during operation.	The nature of the potential impact is known, as the Banksia TEC and Organic Mounds TEC are known to be vulnerable to more frequent fire regimes. Other MNES are expected to be resilient to fire in the urban environment. The scale of the potential impact is expected to be within vegetated areas immediately adjacent and connected to the PAA, with un-vegetated areas (e.g. roads, cleared land) acting as an effective firebreak and fire suppression lines in the urban environment. The locality of the PAA is such that fire emergency response for large scale fires would be prompt so as to minimise the risk of a large-scale bushfire. The impact from fires is expected to be reversible through recovery of most vegetation that is adapted to fires. Moderate confidence in prediction of nature and scale of impacts.	Regular maintenance of road verge during operations to treat weeds and reduce fuel build up consistent with current maintenance programs. Incorporation of Intelligent Transport Systems in the freeway network, including the Proposed Action will improve response times for notifying and information emergency fire services.	Rare	Minor	Low
Injury or mortality to Black Cockatoo individuals	Vehicle collision with birds during operations	The nature of the potential impact is known, as the PAA lies adjacent to Black Cockatoo habitat and Black Cockatoos have been known to be killed through vehicle strike.	Revegetation within the PAA that is within 10 m of the road seal will not be planted with Black Cockatoo foraging species.	Unlikely	Minor	Low

	(additional impact above and beyond existing road)	The scale of the potential impact is unpredictable as it relates to unplanned events and bird/flock behaviour. Collisions are expected to impact individuals or small numbers of birds; however, the frequency of collisions is unpredictable. The ongoing loss of birds to mortality/injury is considered to be effectively irreversible, as the population will be continually affected by vehicle movements over the long term. However, the additional impact above the existing road attributed to the Proposed Action is expected to be insignificant. Moderate confidence in prediction of nature and scale of impacts.	Road design will avoid water pooling on the road surface and shoulders to minimise vehicle aquaplaning, which will remove a potential water source for birds.			
Disturbance of Black Cockatoo individuals.	Operation of the road causing noise and light emissions (additional impact above and beyond existing road).	The nature of the potential impact is known as the PAA is adjacent to Black Cockatoo habitat and operation of the road will result in noise (traffic) and light (headlights and street lighting) emissions. No significant vibration or dust emissions are anticipated during operation. The scale of the potential impact is predictable as no Black Cockatoo breeding activity nor definitive evidence of breeding was observed within the PAA or surrounds during the surveys (GHD Pty Ltd , 2025; 2025). Furthermore, no evidence of roosting was recorded within the PAA, with only one roost tree identified near the northern extent of the PAA, in close proximity to the existing road. The ongoing disturbance is considered to be effectively irreversible, as the population will be continually affected by vehicle movements over the long term. However, the incremental increase in impact associated with the Proposed Action is considered negligible. High confidence in prediction of nature and scale of impacts.	Road lighting will be implemented in accordance with Main Roads Lighting Design Guideline for Roadway and Public Space and relevant Australian Standards.	Unlikely	Minor	Low

4 ENVIRONMENTAL MANAGEMENT ACTIONS

In order to comply with relevant environmental legislation and manage impacts to the local environment, Main Roads has defined objectives, outcomes and management based provisions to ensure that impacts to MNES are avoided and minimised as far as practicable during the implementation of the Proposed Action (Table 10).

Table 10 Management measures to mitigate impacts MNES

Management Objective/Desired Outcomes	Management Measures	Performance Target/Completion Criteria	Timing	Monitoring/Reporting Activity	Corrective action Trigger(s)	Corrective action	Corrective action responsibility
Manage MNES clearing within the PAA and prevent unauthorised clearing of MNES ecological communities or habitat outside of the PAA. Achieve SMART performance standards (Table 5)	• Vegetation to be retained will be clearly marked with flagging onsite. • All clearing areas will be marked with different flagging and approved by the Main Roads Superintendent prior to clearing commencing	• Drawings showing environmental no-go areas are provided to the Construction Contractor • All vegetation to be retained will be marked with flagging onsite • All areas to be cleared will be marked with different flagging on site	• Prior to staff/contractors commencing on-site • Prior to commencement of clearing	• Record of provision of drawings showing environmental no-go areas • Incident reporting • Monthly site inspections • Site inspections by Construction Contractor prior to and following clearing to confirm no-go areas are appropriately flagged/fenced, and that clearing remains within limits	Clearing more than; • 3.04 ha Tuart TEC • 9.71 ha Banksia TEC • 0.15 ha of Moderate – High and 21.06 ha of Moderate quality foraging habitat for Carnaby's Cockatoo • 1.52 ha of Moderate – High, 9.52 ha of Low – Moderate and 9.14 ha of Low-quality foraging habitat for FRTBC • 16 Potential Black Cockatoo trees, without hollows	• Clearing in the direct vicinity will cease immediately if trigger is met. Clearing will not recommence until no-go areas have been reviewed and confirmed to be in place correctly, and Main Roads Superintendent provides approval to recommence • Environmental incident will be recorded and the cause investigated • Incident will be reported to DCCEEW along with the cause identified from an investigation • Incorrectly cleared areas outside of the PAA will be assessed for potential remediation (in consultation with DCCEEW). Areas for remediation will be included in the Landscape and Revegetation Plan	• Construction Contractor • Main Roads superintendent
	• Additional areas required for construction such as laydown areas, stockpile areas and vehicle turn around, will be located in areas cleared for permanent works or areas that do not contain Banksia TEC, Tuart TEC, or Black Cockatoo habitat. • Clearing of Tuart TEC, Banksia TEC and Black Cockatoo habitat will be avoided for any temporary construction activities.	• Areas for ancillary services located in cleared areas or in areas that do not contain or lie adjacent Banksia TEC, Tuart TEC, or Black Cockatoo habitat.	• During construction	• Construction site plan showing ancillary areas not located on land containing Banksia TEC, Tuart TEC, Black Cockatoo habitat, threatened flora and fauna habitat • Monthly site inspections			
Prevent edge impacts into adjacent Banksia TEC, Tuart TEC, Black Cockatoo habitat and other MNES values adjacent to the PAA	Weed and disease management • During construction, Declared Pests and WoNS within the PAA will be treated according to their Control Codes and advice from the Department of Primary Industries and Regional Development (DPIRD) • Topsoil contained Declared Pests or WoNS will be treated, buried on site under at least 300mm of fill or disposed offsite • Dieback management will be carried out in accordance with DBCA's Phytophthora Dieback Management Manual 2020 including: – Minimise and manage access to protectable areas – Heavy plant and machinery entering the work site will be inspected and confirmed to be clean (free of vegetation and soil material) – Ensure drainage from infested areas is directed away from uninfested areas – Topsoil from infected or potentially infected dieback areas will be	• No new WoNS or Declared Pests identified in the PAA or vegetation adjacent to the PAA, attributable to the Proposed Action • Topsoil records show topsoil containing WoNS or Declared Pests was treated or appropriately disposed • Topsoil from infected or potentially infected dieback areas reused or disposed of appropriately	• All construction activities	Pre-construction • Baseline weed and dieback mapping During Construction • Monthly inspections to confirm compliance • Maintain maps and records of existing WoNS or Declared Pests and newly identified weeds through periodic inspections • Develop and implement a dieback hygiene program • Routine spot checks of vehicles and equipment compliance with cleaning Post-Construction • Weed and dieback survey	• Evidence of new Declared Pests or WoNs Identified in TEC vegetation • Topsoil from infested areas used in landscape or revegetation • Plant and machinery arriving on site without verification that it is clean of soil and vegetative matter	• Application of weed eradication techniques for the weed species • Topsoil removed from landscaping/revegetation areas and replaced with clean topsoil • Topsoil sampled for Phytophthora at sampling density according to WA contaminated site guidelines • Infested topsoil buried at depth of at least 300 mm or disposed at a licensed waste facility. • Plant and machinery sent off site and cleaned prior to re-entry to site.	Construction Contractor

Management Objective/Desired Outcomes	Management Measures	Performance Target/Completion Criteria	Timing	Monitoring/Reporting Activity	Corrective action Trigger(s)	Corrective action	Corrective action responsibility
	segregated and not used in uninfected areas						
	Fire Management • On-site refuelling of machinery and plant to occur on designated areas, subject to appropriate spill controls and at least 50m away from drainage lines/areas • Department of Fire and Emergency Services (DFES) and LGA restrictions on fire and machinery movements will be adhered to • Non-essential work is to be stopped or postponed in the even that a Total Fire Ban with Catastrophic fire danger rating or Emergency Warning is issued for the area • Hot work permits will be mandatory before commencing any hot work • Identify potential ignition sources and/or activities with the potential to lead to fire	• No fires in areas adjacent to the PAA attributable to the Proposed Action	• All construction activities	• Compliance with hot work permits	• Ignition/fire started as a result of hot work or, LGA/ DFES restricted activities	• Implement emergency evacuation and response plans • Investigate cause and raise an incident report • Review management procedures	• Construction Contractor • Main Roads superintendent
	Light • Ensure construction lighting within 50m of any recorded roosts is pointed away from roost.	• No excessive light nuisance events recorded	• All construction activities	• Compliance with Main Roads guidelines for lighting during construction of the Proposed Action	• Complaints from community or other stakeholders	• Undertake review of light spill outside construction areas on a regular basis and in response to community complaints • Review management procedures	Construction Contractor
	Dust • Use of water carts as required to wet down dust generation surfaces such as earthwork areas • Progressive construction and clearing, limiting the amount of exposed areas for extended periods of time	• No excessive dust nuisance events recorded	• During construction activities	• Visual dust observations by all project personnel	• Reports of visible dust plumes by project personnel. • Complaints from community or other stakeholders	Increased application rate/frequency for dust suppression methods (e.g water carts) will be implemented effective immediately of trigger being realized	Construction Contractor
Prevent impacts to Organic Mound TEC occurrences adjacent to the PAA.	• If groundwater abstraction is required for construction water, a hydrogeological assessment will be undertaken to the level of detail required by DWER for the assessment of the groundwater abstraction licence • Construction groundwater abstraction will not occur within 800 m of the Organic Mounds TEC occurrence Wandi01 or CSQ2 to ensure a negligible impact occur.	• No visible signs of impact to Organic Mound TEC occurrences adjacent to the PAA, due to potential construction dewatering	• During groundwater abstraction	• Visual inspections of Organic Mound TEC • Groundwater level monitoring during abstraction required by DWER groundwater abstraction licence,	• Organic Mound TEC exhibiting signs of impact from groundwater abstraction	• If Organic Mound TEC occurrences adjacent to the PAA are exhibiting signs of impacts from groundwater abstraction, remedial measures will be implemented to restore groundwater levels to pre-construction levels.	Construction Contractor Environmental Management Representative
Prevent additional impacts above and beyond the existing road in relation to surface water runoff from road surfaces causing erosion, sedimentation	• Drainage design will be implemented to maintain hydrological flow regimes and control stormwater run-off comparable with existing Kwinana Freeway • Stormwater drainage will be captured and infiltrated via basins/swales in the road reserve	• No erosion, sedimentation and/or contamination flow from the PAA • Spills/leaks cleaned up	• Prior to and during construction	• Recording of spills/leaks	• Evidence of erosion, sedimentation and/or contamination flow from the PAA	• Environmental incident will be recorded and the cause investigated • Impacted areas outside of the PAA will be assessed for potential remediation. Areas for remediation will be	Construction Contractor

Management Objective/Desired Outcomes	Management Measures	Performance Target/Completion Criteria	Timing	Monitoring/Reporting Activity	Corrective action Trigger(s)	Corrective action	Corrective action responsibility
and/or contamination	• Fuel and chemicals in bunded areas located away from drainage • General construction waste material appropriately managed and disposed of off-site at an appropriately facility					included in the Landscape and Revegetation Plan • Review management procedures.	
Accidental spills or leaks of potentially contaminating liquids is appropriately managed to contain and minimise the risk to MNES	• Site personnel to be inducted on environmental responsibilities, including storage of hydrocarbons and chemicals, bunding requirements, refuelling requirements and incident response measures in the event of a spill. • Spill management procedures to be developed prior to construction • Hazardous materials used during construction will be stored in compliance with the relevant Australian Standards and Regulations • On-site refuelling of machinery and plant to occur on designated areas, subject to appropriate spill controls and at least 50m away from drainage lines/areas • Major maintenance of vehicles and plant to be undertaken offsite • Provision of spill response kits at refuelling locations and any locations where hydrocarbons or chemicals are stored	• No uncontrolled pollution incidents	• All construction activities	• Site induction records • Record of storage and spill management procedures • Monthly inspections of hazardous materials and waste storage and handling areas to identify spills/leaks and discharges. In addition, check that storage, handling and signage is appropriate • Records of fuel storage	• Induction material does not contain information on management requirements and/or procedures • Evidence of discharge, spill or leak of construction wastes impacting MNES	• Investigate cause and raise and incident report • Implement waste clean-up/EMP • Induction material revised	Construction Contractor
Avoid injury or mortality to Black Cockatoos	• Fauna observers will be present during the clearing of Black Cockatoo habitat	• Black Cockatoo will not be injured during vegetation clearing in the PAA	• During construction	• Any death or injury of Black Cockatoos as part of the Proposed Action to be recorded and investigated to determine any potential future avoidance measures	• A list of local wildlife rescue organisations and carers is not on site • Wildlife rescue specialists not contacted immediately on discovery of an injured Black Cockatoo	• A list of local wildlife rescue organisations and carers is obtained by site immediately	• Construction Contractor • Main Roads superintendent
	• A list of contact information for local wildlife rescue organisations and carers will be maintained on site to contact in the event of a fauna injury	• Contact details of local wildlife rescue organisations and carers always maintained on site		• Monthly inspection			
	• Construction vehicle speeds will be limited to <40km /hr throughout the construction site, which will reduce the risk of Black Cockatoo strikes	• No incidents of speeding within the construction site boundary		• Any death or injury of Black Cockatoos as part of the Proposed Action to be recorded and investigated to determine any potential future avoidance measures	• Reported exceedance of site speed limits	• Instances of speeding are identified, and offenders will be asked to immediately reduce speed • Repeat offenders (ie. Caught speeding more than 2 times) will undergo further refresher training	
	• Landscaping shall not include Black Cockatoo foraging habitat within 10m of the road	• Landscaping designs exclude foraging or breeding plant species within 10m of the road	• Prior to commencement of revegetation	• Landscape design drawings showing location of revegetation and summarising plant species mix	• Landscape designs include foraging or breeding plant species within 10 m of the road	• Design drawings amended to exclude revegetation with foraging or breeding plant species within 10 m of the road	

Management Objective/Desired Outcomes	Management Measures	Performance Target/Completion Criteria	Timing	Monitoring/Reporting Activity	Corrective action Trigger(s)	Corrective action	Corrective action responsibility
					• Foraging or breeding plant species planted within 10 m of the road.	• Foraging or breeding plant species removed from within 10 of the road and replaced with non-habitat species.	

5 ADAPTIVE MANAGEMENT

This EMP adopts an 'adaptive management' approach which seeks to embed a cycle of monitoring, reporting and implementing change, where required. Accordingly, it is intended that this EMP may be updated (as required) over the life of the Proposed Action to reflect changes in monitoring and management practices, subject to the results of the monitoring to identify that the environmental objectives are being achieved. The EMP may also be revised to address learnings from the implementation of corrective actions, should this occur.

In addition, auditing and review schedules are necessary to embed a formal process to identify and consider any need to update the EMP in order to achieve improved environmental performance (which may not otherwise be triggered by management or monitoring outcomes).

5.1 Environmental auditing

This EMP will be audited annually by Main Roads during construction for the Proposed Action to ensure the implementation of the management and monitoring measures, and to confirm the management measures specified are achieving the environmental outcomes.

The proposed auditing schedule for this EMP is identified in Table 11.

Table 11 Environmental audit schedule

Timing	Action	Schedule
Pre-construction	Review of construction procedures to ensure EMP management / monitoring actions are incorporated within works procedures	Prior to construction (single event)
Construction	Inspections by site environmental personnel to identify compliance with EMP	Periodic (monthly)
	Annual audit for assessment of compliance with EMP	Annually (once per calendar year)

The results of the construction and post construction audit findings will be reported to DCCEEW as part of annual compliance reporting as outlined within Section 7.

5.2 Management review program

Main Roads proposes to review this EMP annually in order to consider:

- Management and monitoring actions
- Opportunities for improvement in environmental performance (for example, changes to construction methodology or timing)
- Identify a need to update this EMP to capture changes to the management and/or monitoring actions
- Identify any general need to update this EMP (for example, to capture new information on relevant MNES knowledge or management, or updates to the EPBC Act or Policy Statements).

Main Roads acknowledge that a revision to this EMP may trigger a need for additional approval by DCCEEW prior to implementing any changes to the specified management or monitoring actions.

The proposed EMP review schedule for the Proposed Action is identified in Table 12. The proposed review will be undertaken by a suitably qualified ecologist or relevant expert.

Table 12 EMP review schedule

Timing	Action	Schedule
• Pre-construction • Post construction (up to three calendar years from completion	• Review of EMP management and monitoring actions • Review of opportunities for an improvement in environmental performance • Address learnings from corrective actions • Revise EMP (if appropriate) and seek approval of DCCEEW for revised EMP	Annually (once per calendar year)

6 MONITORING PROGRAM AND DATA MANAGEMENT

6.1 Monitoring program

Key monitoring actions have been identified to monitor the potential impacts of the Proposed Action to MNES and habitat during and post construction. These encompass monitoring of both direct and indirect impacts of the Proposed Action. Monitoring will be undertaken by suitably qualified individuals for the methodology type specified. The proposed monitoring program for the Proposed Action is identified in Table 13.

6.2 Data Management

Main Roads will maintain records on the implementation of this EMP in accordance with Main Roads' corporate standard document control procedures. The retention of records held by Main Roads will be maintained and managed in accordance with the Western Australian State Records Act 2000 (WA).

6.3 Baseline data

Appendix A presents baseline data of relevant MNES Extents and condition, developed from on-ground surveys, namely:

- Figure 2 Banksia Woodland of the Swan Coastal Plain TEC
- Figure 3 Tuart woodlands and forests of the Swan Coastal Plain TEC
- Figure 4 Carnaby's Cockatoo habitat
- Figure 5 Forest Red-tailed Black Cockatoo habitat
- Figure 6 Significant weeds and vegetation condition
- Figure 7 Dieback occurrence

Table 13 Proposed monitoring program

Management Objective/Desired Outcomes	Performance Target/ Completion Criteria	Monitoring/Reporting Activity	Monitoring Method	Monitoring Area	Frequency
Manage MNES clearing within the PAA and prevent unauthorised clearing of MNES ecological communities or habitat outside of the PAA. Achieve SMART performance standards (Table 5)	Drawings showing environmental no-go areas are provided to the Construction Contractor	Record of provision of drawings showing environmental no-go areas	Review of written records	n/a	• Prior to commencement of clearing
	• All vegetation to be retained will be marked with flagging onsite • All areas to be cleared will be marked with different flagging on site	• Incident reporting • Monthly site inspections • Site inspections by Construction Contractor prior to and following clearing to confirm no-go areas are appropriately flagged/fenced, and that clearing remains within limits	• Visual inspection , pedestrian walk through • Photographic record, GPS of non-conformance	Environmental no-go areas	• Prior to commencement of clearing • Monthly
	• Areas for ancillary services located in cleared areas or in areas that do not contain or lie adjacent Banksia TEC, Tuart TEC, or Black Cockatoo habitat.	• Construction site plan showing ancillary areas not located on land containing Banksia TEC, Tuart TEC, Black Cockatoo habitat, threatened flora and fauna habitat • Monthly site inspections	• Written record • Visual inspection , pedestrian walk through • Photographic record, GPS of non-conformance	Ancillary service areas	• Prior to development of ancillary areas • Monthly
Prevent edge impacts into adjacent Banksia TEC, Tuart TEC, Black Cockatoo habitat and other	• No new WoNS or Declared Pests identified in the PAA or vegetation adjacent to the PAA, attributable to the Proposed Action	Pre-construction • Baseline weed and dieback mapping During Construction • Monthly inspections to confirm compliance	• Visual inspection , pedestrian walk through • Photographic record, GPS of non-conformance	• Construction site area and boundary	• Monthly • At completion of construction works

MNES values adjacent to the PAA	• Topsoil records show topsoil containing WoNS or Declared Pests was treated or appropriately disposed • Topsoil from infected or potentially infected dieback areas reused or disposed of appropriately	• Maintain maps and records of existing WoNS or Declared Pests and newly identified weeds through periodic inspections • Develop and implement a dieback hygiene program (if required) Routine spot checks of vehicles and equipment compliance with cleaning •	• Written records		
	No fires in areas adjacent to the PAA attributable to the Proposed Action	Compliance with hot work permits	• Written record • Visual inspection	PAA and surrounding areas	monthly
	No excessive noise nuisance events recorded	Compliance with Main Roads and local government guidelines for noise and vibration during construction of the Proposed Action	• Review of written record • Review of stakeholder/community feedback records		
	No excessive dust nuisance events recorded	Visual dust observations by all project personnel			
Prevent impacts to Organic Mound TEC occurrences adjacent to the PAA.	No visible signs of impact to Organic Mound TEC occurrences adjacent to the PAA, due to potential construction dewatering	• Visual inspections of Organic Mound TEC • Groundwater level monitoring during abstraction required by DWER groundwater abstraction licence,	• Review of written record • Groundwater bore upgradient at boundary of Organic Mound TEC • Visual inspection by qualified botanist, photographic record and GPS of condition assessment	• Organic Mound TEC occurrences adjacent to the PAA	• Prior to groundwater abstraction • Weekly GWL measurement
Prevent additional impacts above and	• No erosion, sedimentation and/or	• Visual inspections of Organic Mound TEC and	Visual inspection, pedestrian walkthrough	PAA and immediate surrounds	• Monthly • After major storm

beyond the existing road in relation to surface water runoff from road surfaces causing erosion, sedimentation and/or contamination	contamination flow from the PAA • Spills/leaks cleaned up	associated soil stabilisation and sediment controls and stormwater drainage structures (particularly during rainfall events) to ensure they remain effective during construction. This is to be undertaken fortnightly during winter or following a significant storm event • Monthly inspections to ensure appropriate spill response equipment remains available in the vicinity of The Spectacles • Recording of spills/leaks			
Accidental spills or leaks of potentially contaminating liquids is appropriately managed to contain and minimise the risk to MNES	No uncontrolled pollution incidents	• Site induction records • Record of storage and spill management procedures • Monthly inspections of hazardous materials and waste storage and handling areas to identify spills/leaks and discharges. In addition, check that storage, handling and signage is appropriate • Records of fuel storage	• Review induction material • Visual inspection • Photographic record, GPS of non-conformance • Review of written records	PAA and immediate surrounds	• Prior to construction (single event) • Monthly inspections of hazardous materials and waste storage
Avoid injury or mortality to Black Cockatoos	Black Cockatoo will not be injured during vegetation clearing in the PAA	Any death or injury of Black Cockatoos as part of the Proposed Action to be recorded and investigated to	• Written record of incident	PAA and immediate surrounds	• Prior to commencement of clearing

		determine any potential future avoidance measures	• Review of written records • Visual monitoring by all construction personnel		• Monthly
	Contact details of local wildlife rescue organisations and carers always maintained on site	Monthly inspection			
	No incidents of speeding within the construction site boundary	Any death or injury of Black Cockatoos as part of the Proposed Action to be recorded and investigated to determine any potential future avoidance measures			
	Landscaping designs exclude foraging or breeding plant species within 10m of the road	Landscape design drawings showing location of revegetation and summarising plant species mix	Review of written record	n/a	Prior to revegetation commencing

7 REPORTING

Main Roads will report to DCCEEW on the implementation of this EMP as part of annual compliance reporting under the conditions of approval for the Proposed Action.

Where compliance audits undertaken by Main Roads identify the environmental management actions and/or the environmental objectives are not being achieved (i.e. non-compliance or an environmental incident), Main Roads will notify DCCEEW in accordance with the EPBC approval condition requirements. Consistent with standard document control procedures, Main Roads will maintain copies of all reports submitted to DCCEEW. The reporting requirements for this EMP are identified in Table 14.

Table 14 Reporting requirements

Aspect	Report from	Report to	Reporting Frequency
Implementation of EMP.	Main Roads	DCCEEW	Annually (as part of annual compliance reporting).
Non-compliance with EMP or Environmental Incident that adversely impacts the Banksia TEC and Tuart TEC.	Main Roads	DCCEEW	In accordance with EPBC approval timeframes

The format and content of annual reporting will be in accordance with the requirements of the annual reporting conditions. The format and content of reporting of a non-compliance event or an environmental incident will be subject to the nature of the non-compliance/incident and will include all requested information from DCCEEW.

8 ROLES AND RESPONSIBILITIES

This EMP identifies the environmental management of activities to be undertaken by Main Roads in implementation of the Proposed Action. Main Roads acknowledges that the environmental management actions contained within this EMP are legal requirements to be met.

The Manager Environment at Main Roads will maintain responsibility for implementation of the management actions outlined within this EMP, on behalf of Main Roads' Managing Director. Management actions may be undertaken by employees and/or contractors of Main Roads on behalf of Managing Director.

Where management actions are undertaken by employees and/or contractors of Main Roads, these will be communicated and documented to the relevant personnel through relevant environmental training.

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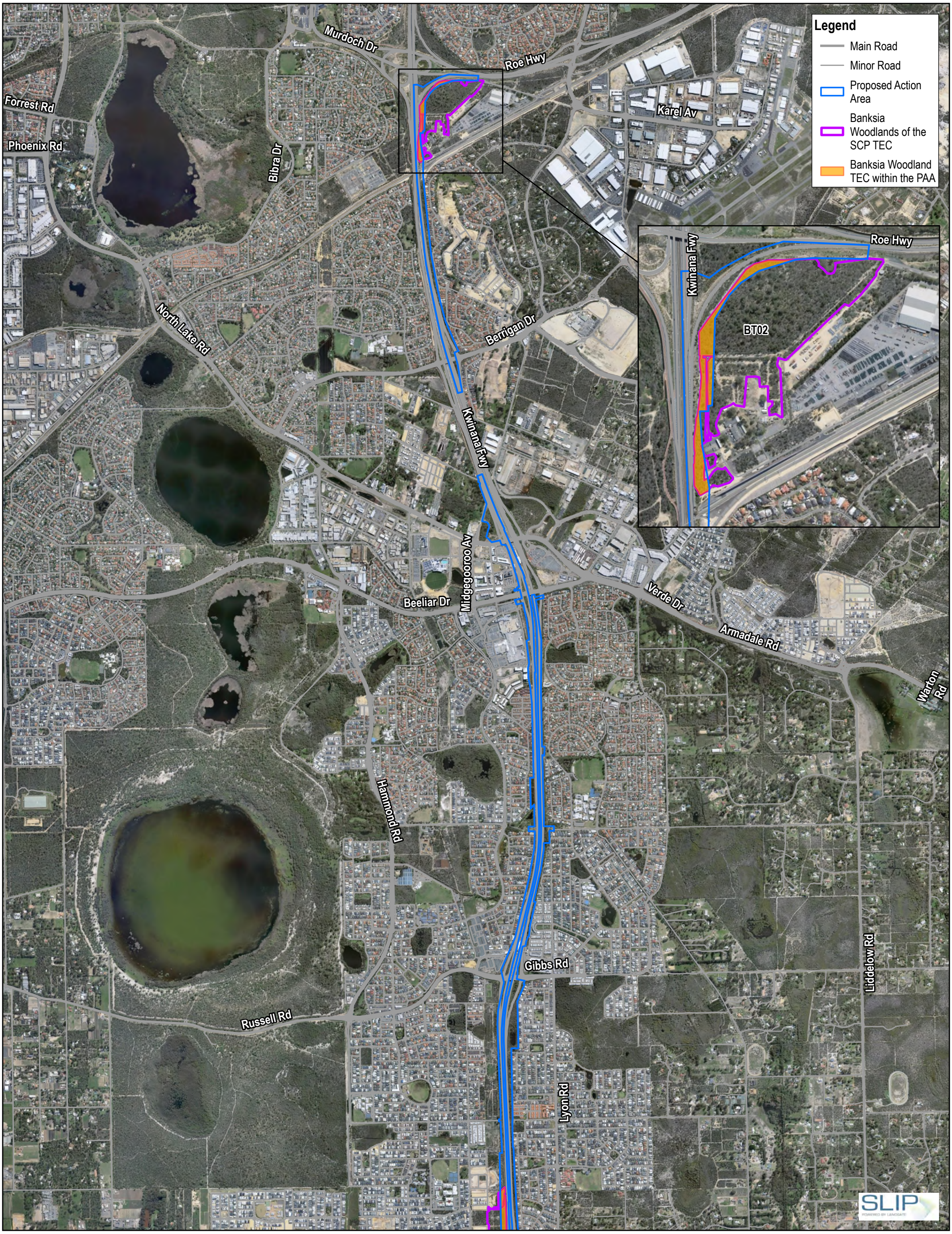
TSSC. (2019). *Approved Conservation Advice (incorporating listing advice) for the Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain ecological community. .* Retrieved from Department of the Environment and Energy:

https://environment.gov.au/biodiversity/threatened/communities/pubs/153-conservation-advice.pdf

Appendix 1



Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

N

GHD

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Banksia Woodland of the Swan Coastal Plain TEC

Project No. **12657323**
Revision No. **2**
Date **27/03/2026**

FIGURE 2

G:\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_014_BanksiaWoodlandsTEC_Rev2_Page1
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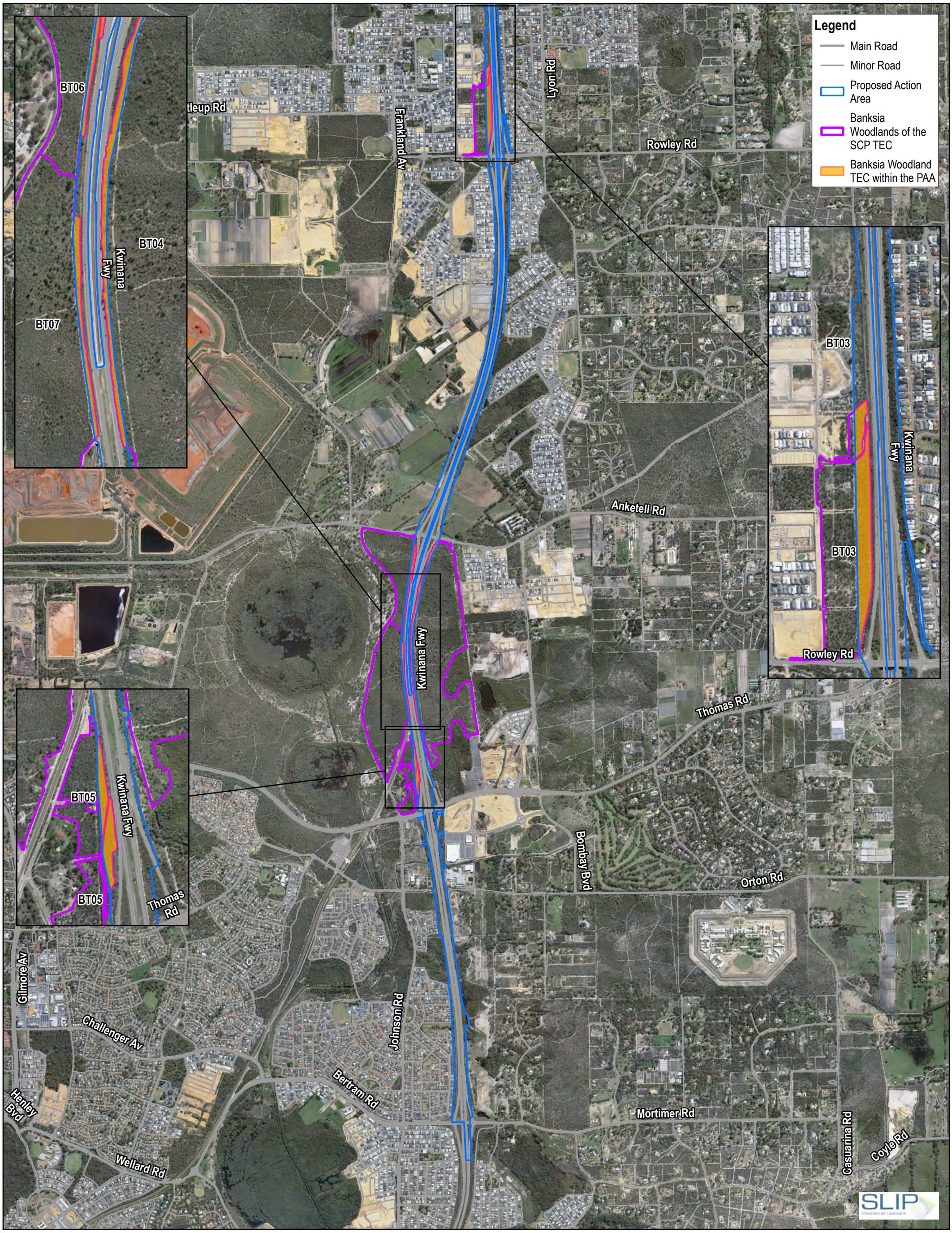

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Meters

Map Projection: Transverse Mercator
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Grid: GDA2020 MGA Zone 50

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Banksia Woodland of the Swan Coastal Plain TEC

Project No. **12657323**
Revision No. **2**
Date **27/03/2026**

Page 2 of 2
FIGURE 2

G:\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_014_BanksiaWoodlandsTEC_Rev2_Page2
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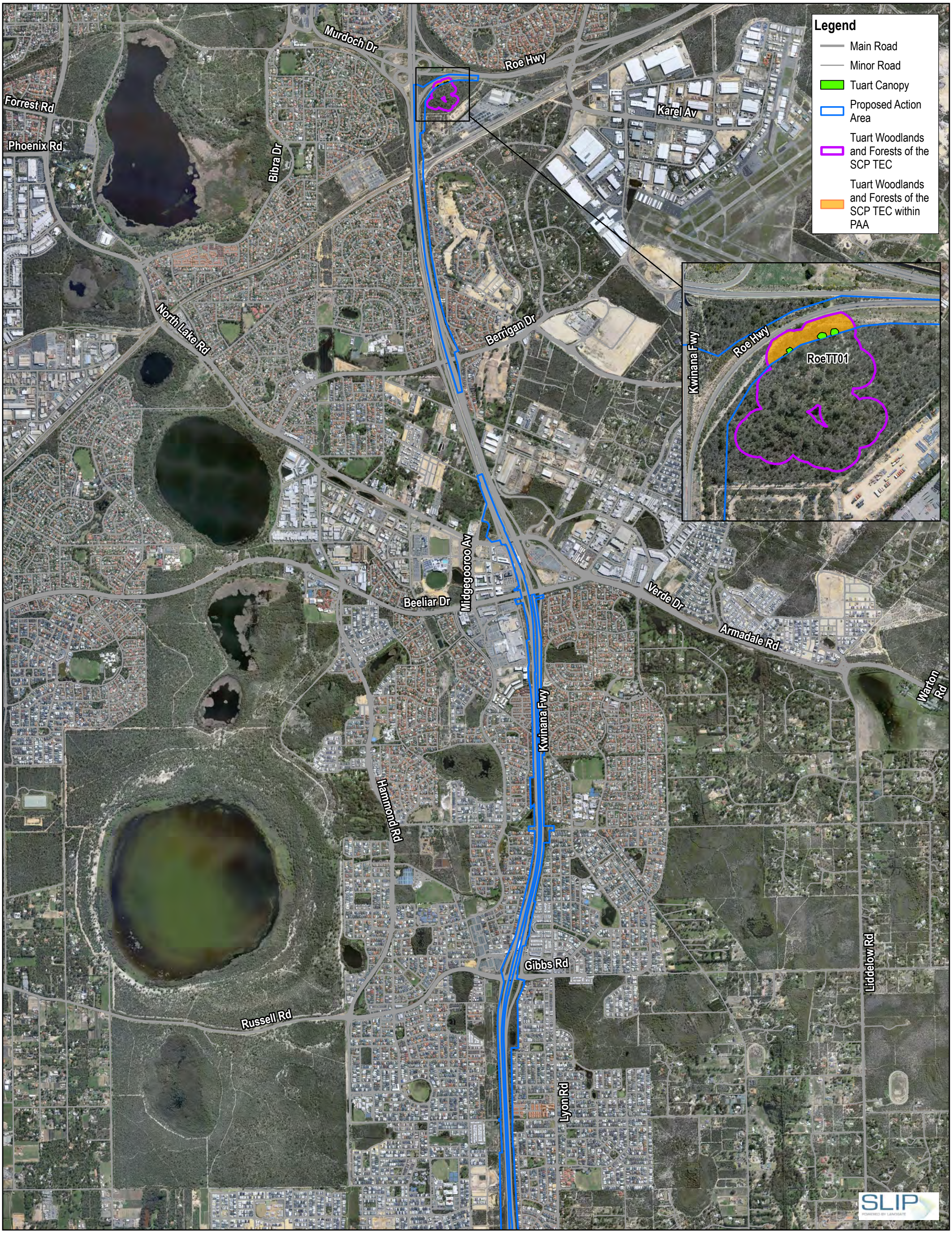

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Meters

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Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Tuart woodlands and forests of the Swan Coastal Plain TEC

Project No. **12657323**
Revision No. **2**
Date **13/01/2026**

FIGURE 3

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_012_TuartWoodlandsTEC_Rev2_Page1
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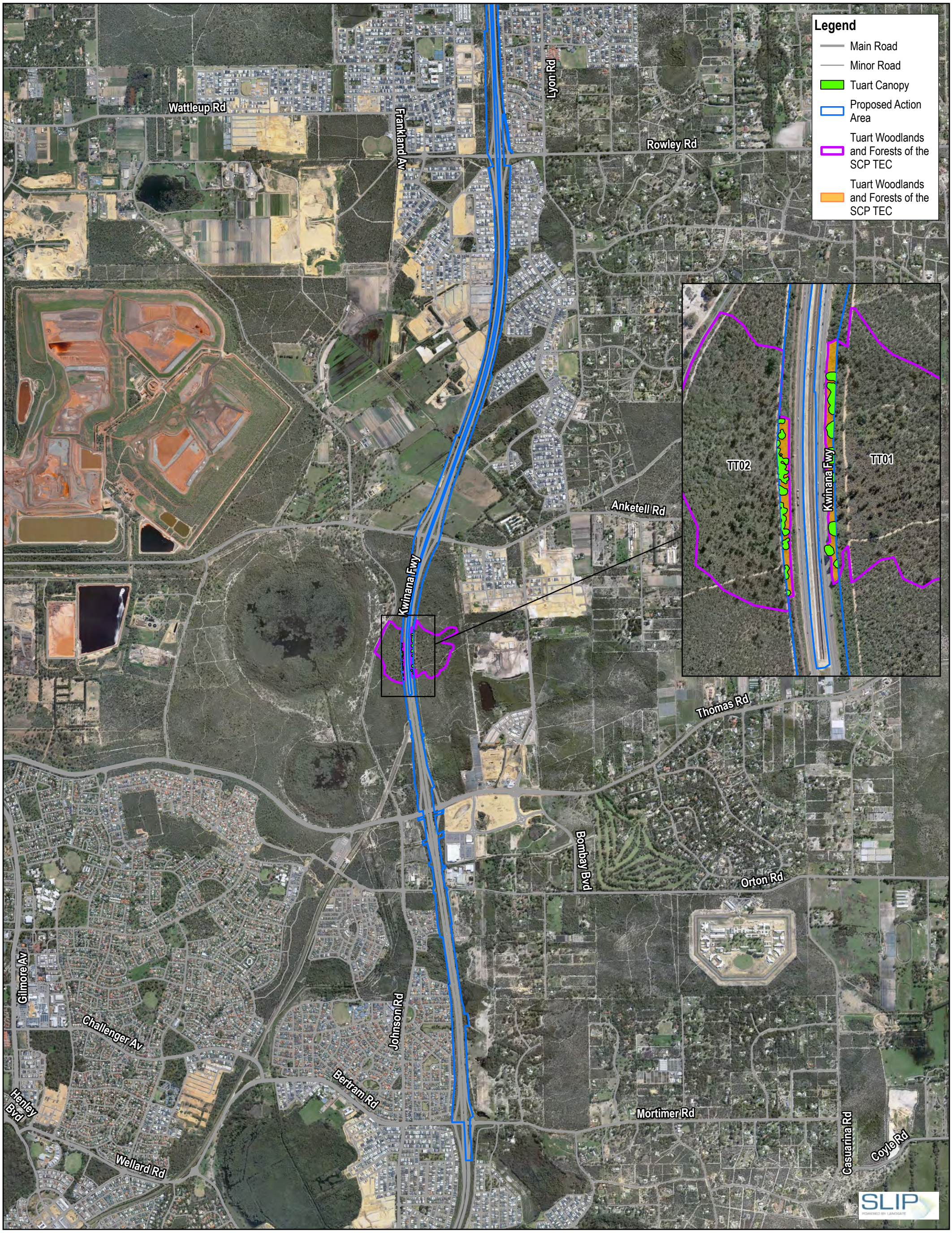

Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Tuart woodlands and forests of the Swan Coastal Plain TEC

Project No. **12657323**
Revision No. **1**
Date **08/07/2025**

Page 2 of 2
FIGURE 3

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_012_TuartWoodlandsTEC_Rev2_Page2
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Kilometers

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Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Carnaby's Cockatoo habitat

Project No. **12657323**
Revision No. **2**
Date **13/01/2026**

FIGURE 4

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_016_CBCForagingHabitat_Rev2
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Kilometers

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Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Carnaby's Cockatoo habitat

Project No. **12657323**
Revision No. **2**
Date **13/01/2026**

FIGURE 4

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Kilometers

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Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Carnaby's Cockatoo habitat

Project No. **12657323**
Revision No. **2**
Date **13/01/2026**

FIGURE 4

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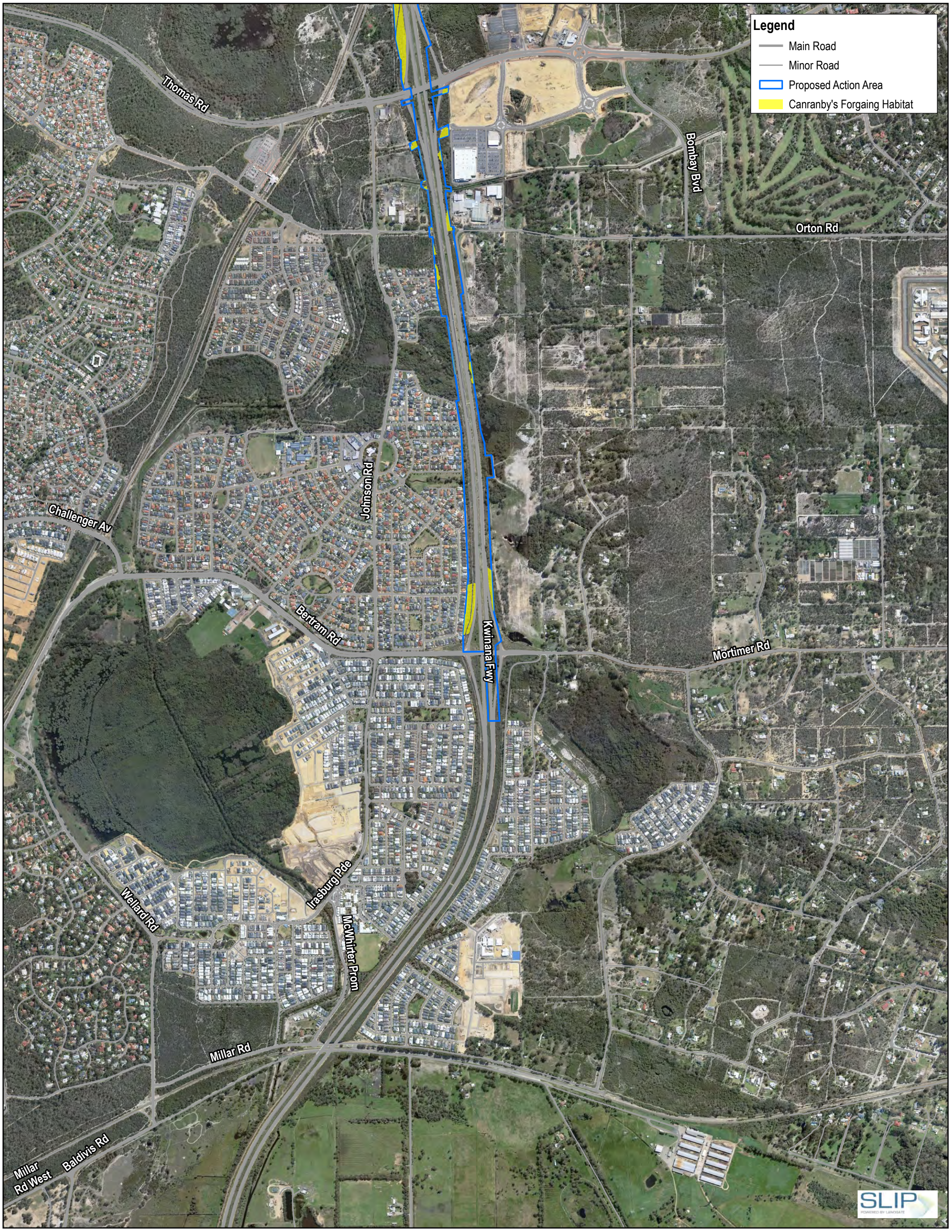

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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Carnaby's Cockatoo habitat

Project No. **12657323**
Revision No. **2**
Date **13/01/2026**

FIGURE 4

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Forest Red-tailed Black Cockatoo habitat

Project No. **12657323**
Revision No. **1**
Date **13/01/2026**

FIGURE 5

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_018_FRTBCForagingHabitat_Rev1
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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Forest Red-tailed Black Cockatoo habitat

Project No. **12657323**
Revision No. **1**
Date **13/01/2026**

FIGURE 5

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Forest Red-tailed Black Cockatoo habitat

Project No. **12657323**
Revision No. **1**
Date **13/01/2026**

FIGURE 5

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_018_FRTBCForagingHabitat_Rev1
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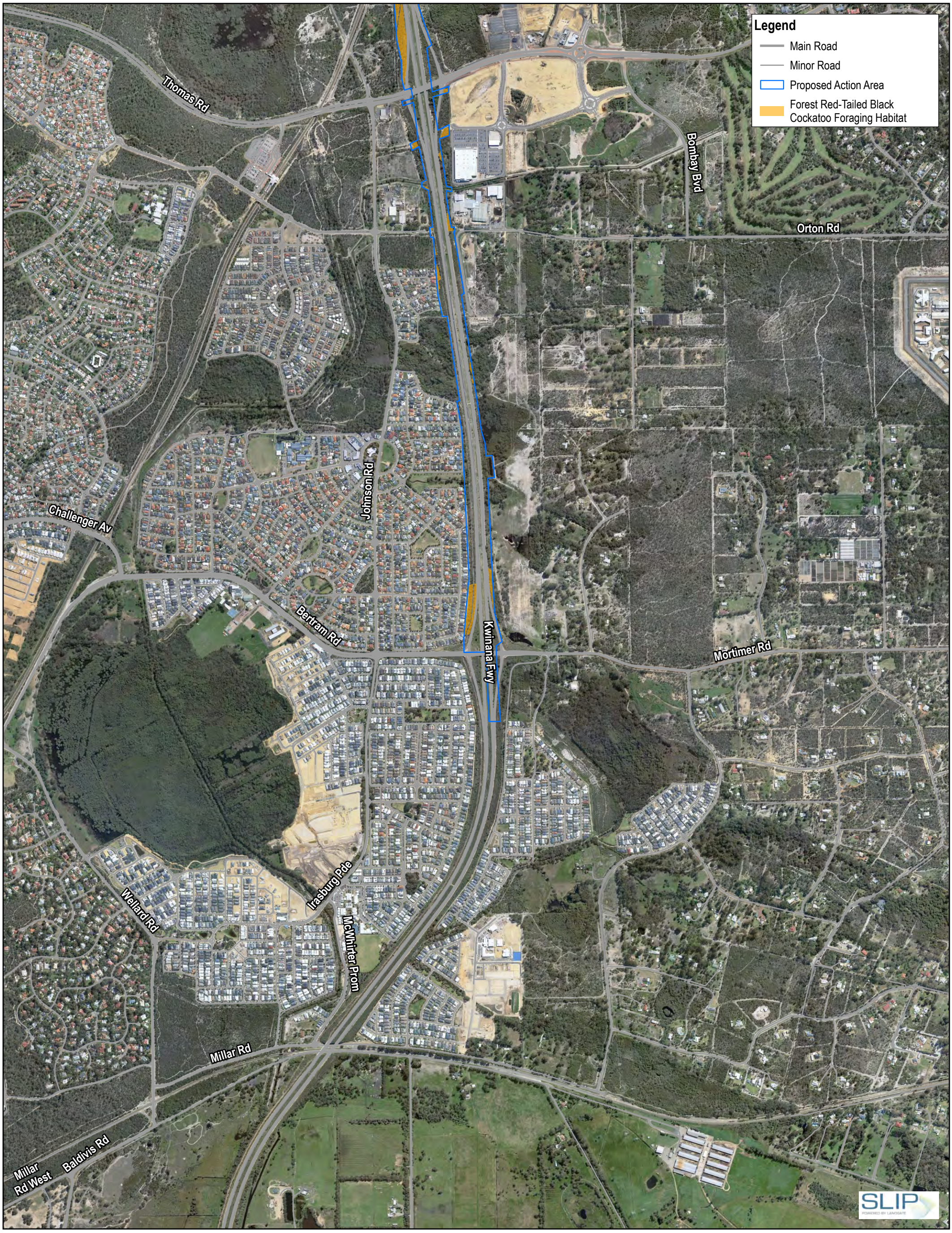

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Forest Red-tailed Black Cockatoo habitat

Project No. **12657323**
Revision No. **1**
Date **13/01/2026**

FIGURE 5

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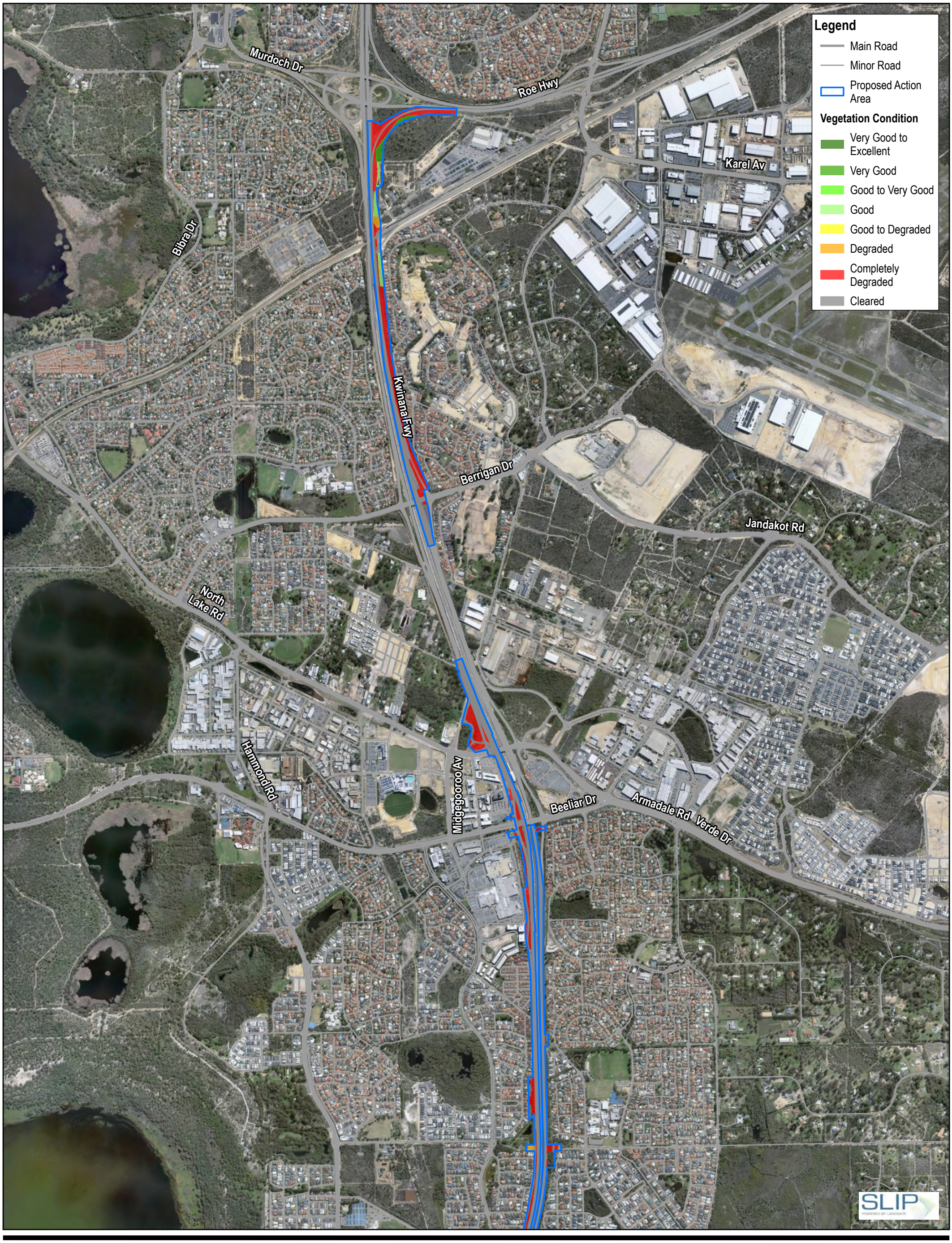

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Meters

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Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Vegetation condition

Project No. **12657323**
Revision No. **2**
Date **9/04/2026**

FIGURE 6

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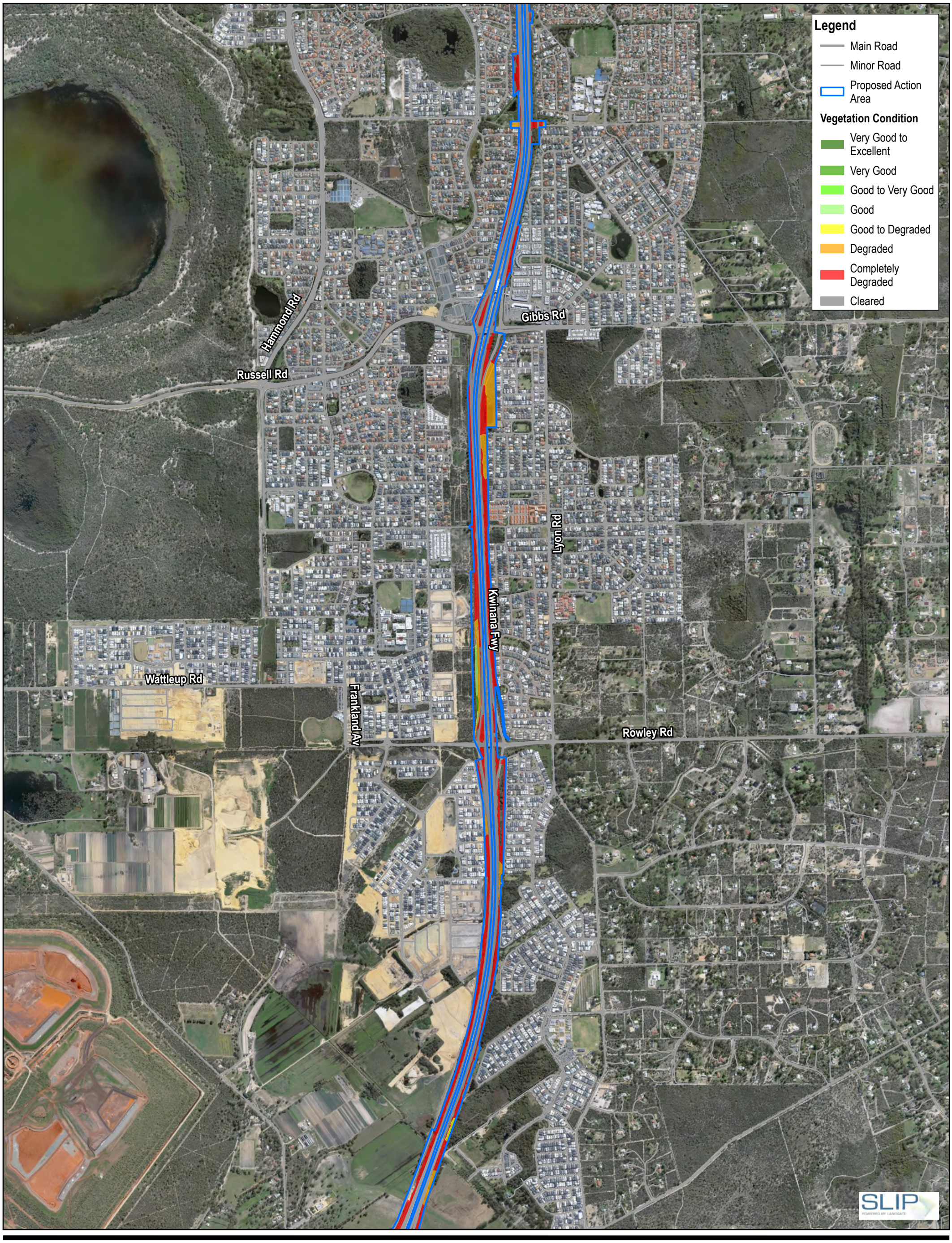

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Grid: GDA2020 MGA Zone 50

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Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Vegetation condition

Project No. **12657323**
Revision No. **2**
Date **9/04/2026**

FIGURE 6

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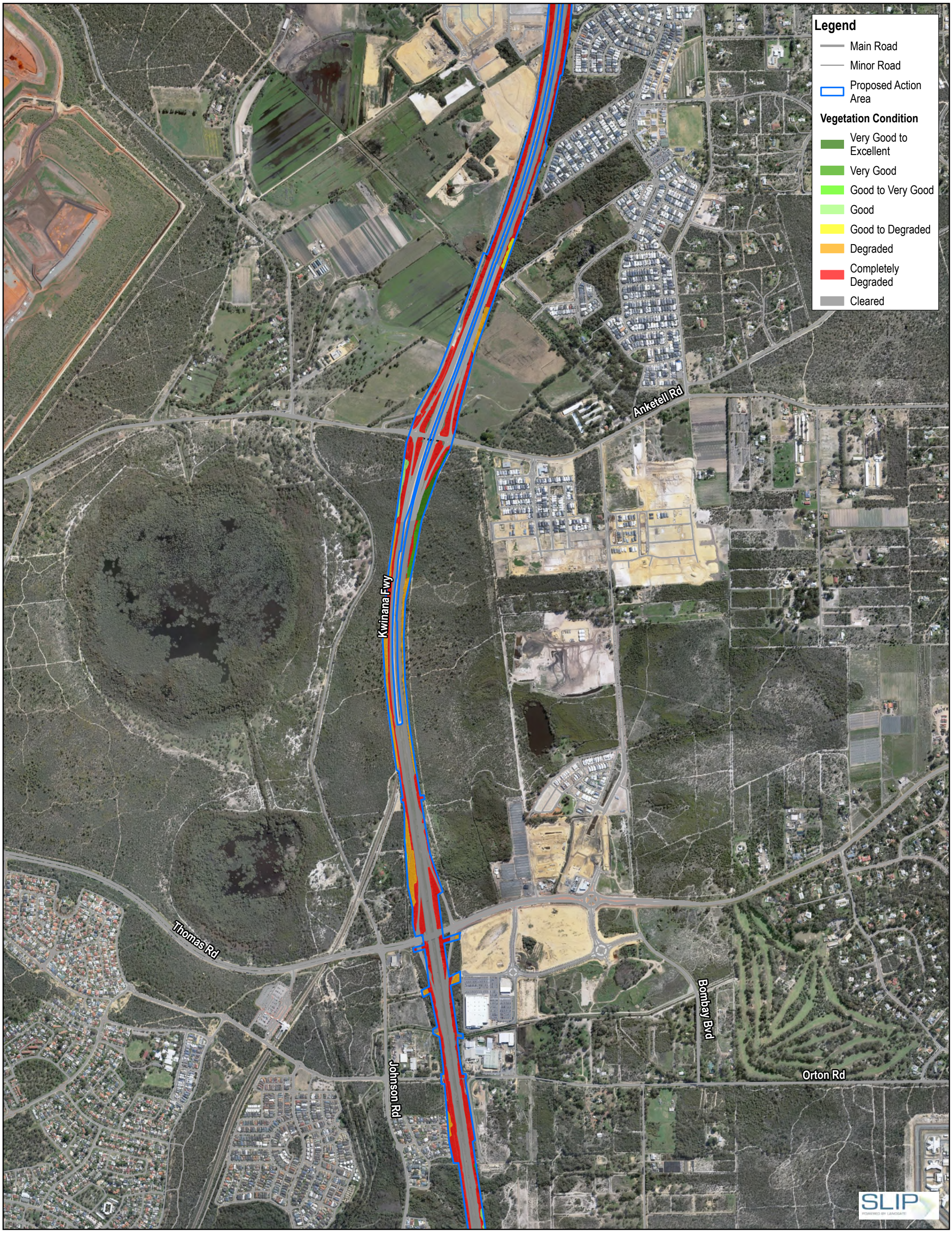

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Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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GHD

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Vegetation condition

Project No. **12657323**
Revision No. **2**
Date **9/04/2026**

FIGURE 6

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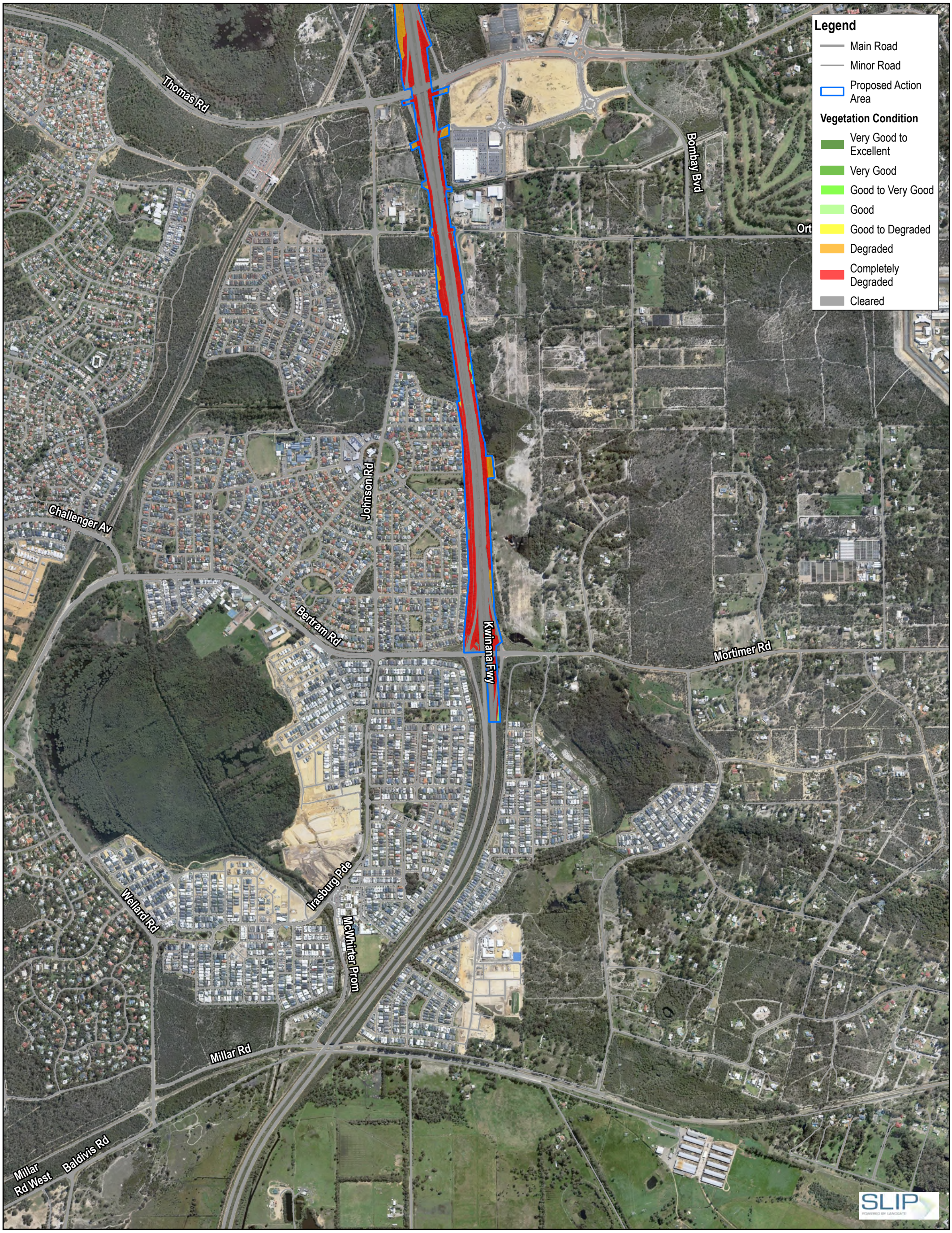

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Map Projection: Transverse Mercator
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Grid: GDA2020 MGA Zone 50

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GHD

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Vegetation condition

Project No. **12657323**
Revision No. **2**
Date **9/04/2026**

FIGURE 6

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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GHD

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Dieback occurrence

Project No. **12657323**
Revision No. **2**
Date **9/04/2026**

FIGURE 7

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_008b_PrelimDieback_Rev0
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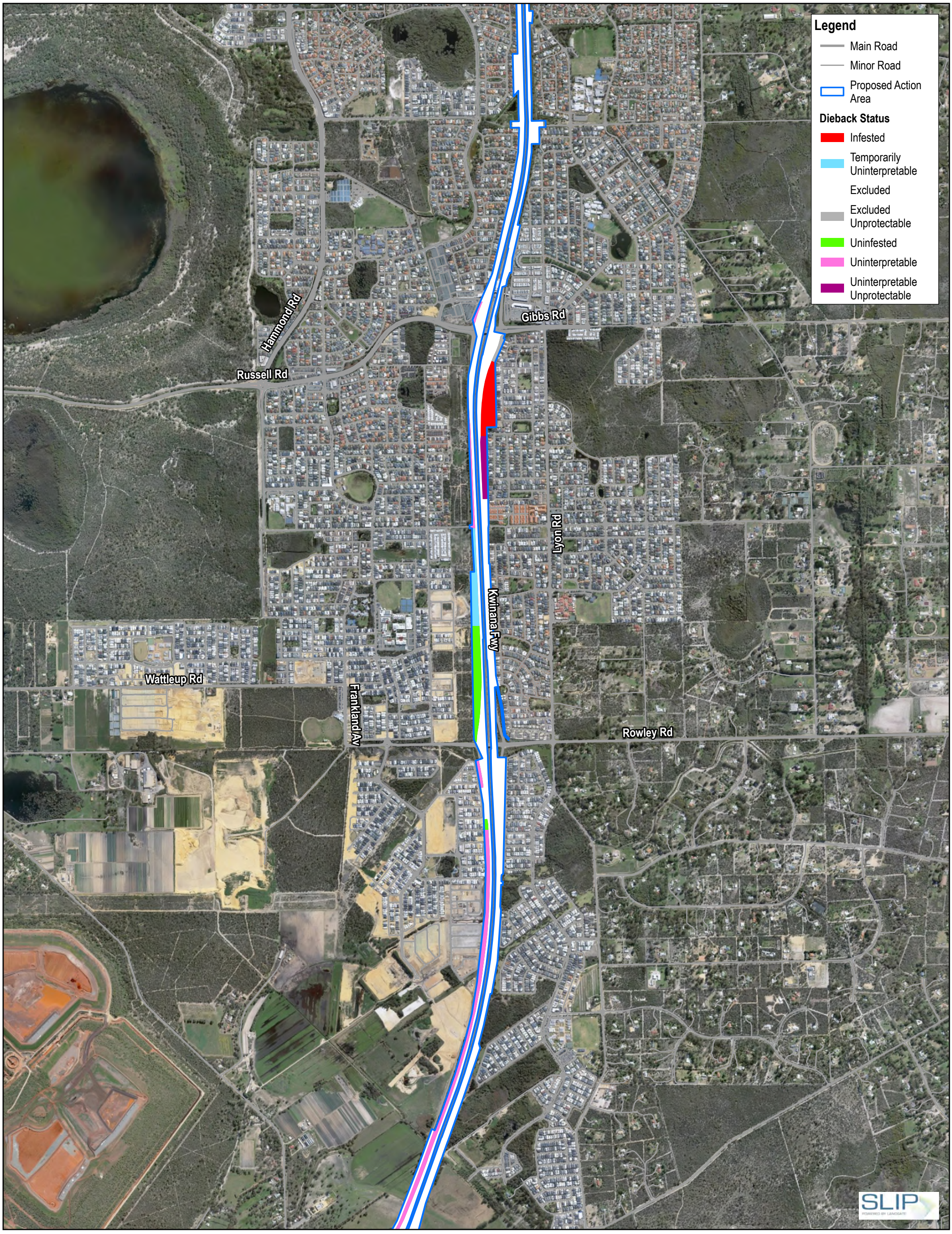

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Meters

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Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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GHD

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Dieback occurrence

Project No. **12657323**
Revision No. **2**
Date **9/04/2026**

FIGURE 7

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_008b_PrelimDieback_Rev0
Print date: 09 Apr 2026 - 11:34

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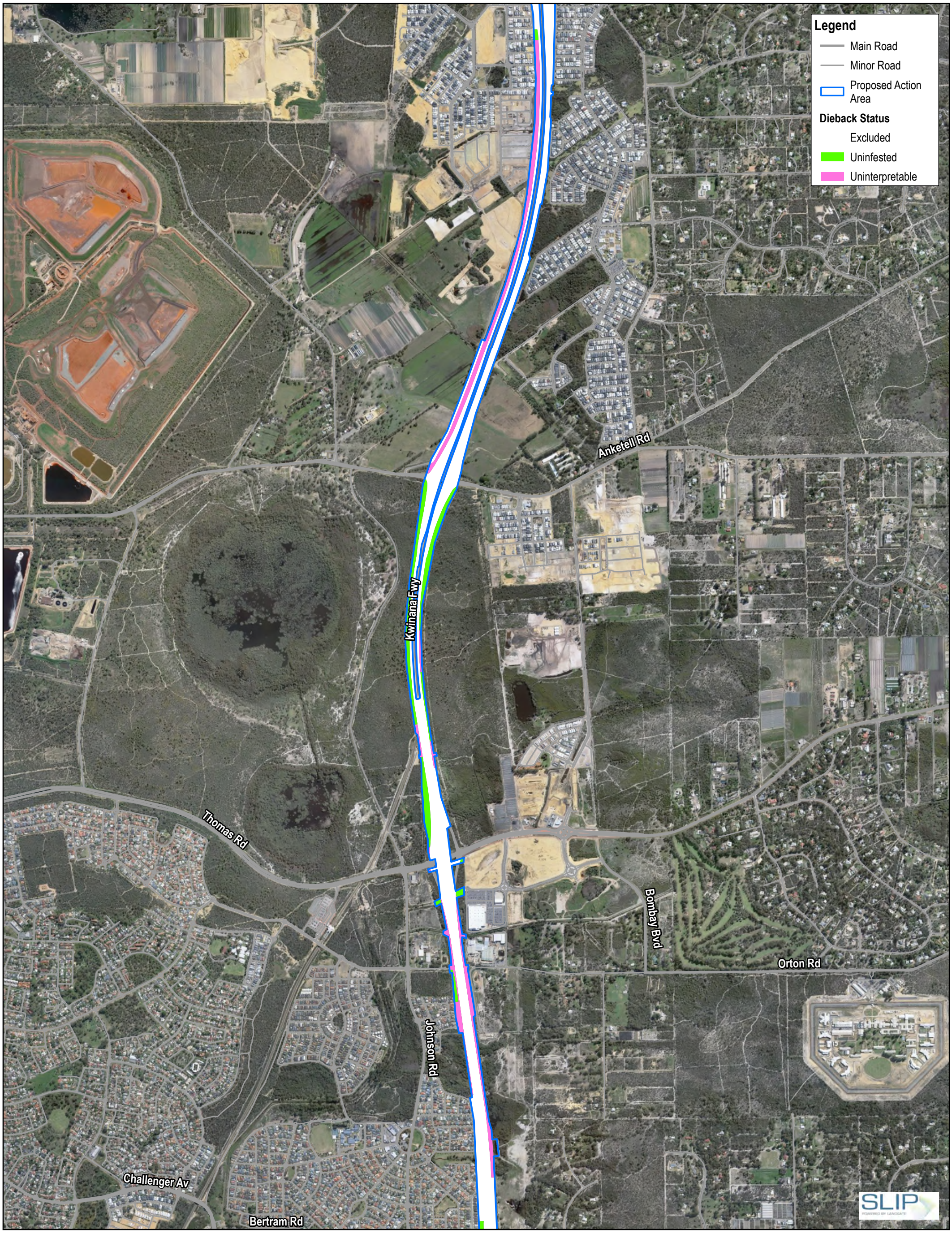

Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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GHD

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Dieback occurrence

Project No. **12657323**
Revision No. **2**
Date **9/04/2026**

FIGURE 7

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_008b_PrelimDieback_Rev0
Print date: 09 Apr 2026 - 11:34

Data source: Landgate_Subscription_Imagery\WANow: World Street Map: Esri, HERE, Garmin, NGA, USGS. Created by: mmikkonen

Paper Size ISO A3

0 200 400 600 800

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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GHD

Main Roads Western Australia
Kwinana Freeway Widening – Roe Highway to Mortimer Road
MNES Environmental Management Plan

Dieback occurrence

Project No. **12657323**
Revision No. **2**
Date **9/04/2026**

FIGURE 7

\\ghdnet\ghd\AU\Perth\Projects\61\12657323\GIS\Maps\Working\12657323_KwinanaFwyEPBC_PD_Figures\12657323 Kwinana Fwy EPBC PD.aprx - 12657323_008b_PrelimDieback_Rev0
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