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Please provide your name, contact information, and a detailed description of the issue you encounter or the format you require.

Logan and Gold Coast Faster Rail

Application Number: **01570** Commencement Date: **08/12/2022** Status: **Locked**

1. About the project

1.1 Project details

1.1.1 Project title *

Logan and Gold Coast Faster Rail

1.1.2 Project industry type *

Transport - Land

1.1.3 Project industry sub-type

Railway

1.1.4 Estimated start date *

1/06/2024

1.1.4 Estimated end date *

31/12/2030

1.2 Proposed Action details

1.2.1 Provide an overview of the proposed action, including all proposed activities. *

Proposed action description

The State of Queensland, represented by the Department of Transport and Main Roads in Queensland (**TMR**) is proposing to duplicate the existing rail corridor between Kuraby and Beenleigh Station from two to four tracks, including associated station and rail system upgrades (the **proposed action**).

Key features of the **proposed action** include the construction of the following:

- Duplication of approximately 20 km of rail corridor and upgrades to associated rail systems between Kuraby and Beenleigh Stations resulting in an increase from two tracks to four tracks;
- Eight station upgrades including a station relocation (Trinder Park Station) to improve accessibility, safety and amenity, including platform straightening, and new pedestrian bridges;
- Park 'n' Ride upgrades, including a new multi-story Park 'n' Ride at Beenleigh Station with an integrated bus interchange;
- Extension of the cattle siding at Holmview Station;
- Potential duplication of the rail tunnel under Beenleigh Town Square;
- Dedicated active transport facilities and paths along the corridor;
- Dedicated rail maintenance access road adjacent to the rail corridor;
- Adjacent local road network alterations associated with the railway duplication;
- Public Utility Plant (PUP) relocations; and
- Removal of rail crossings at Woodridge (Railway Parade), Holmview (Spanns Road) and Beenleigh (Holmview Road).

Further information in relation to the proposed action is provided in **Attachment A** - Proposed action additional information, pages 1, 2 and 3.

The proposed action is currently at reference design phase. The design of the proposed action has been developed and refined to maximise the use of disturbed areas, and avoid and minimise further vegetation clearing wherever feasible. The majority of works will be undertaken in a highly urbanised, brownfield environment, and the alignment of the widened corridor has been developed considering rail design and operational requirements whilst minimising potential impacts to habitat, significant flora and fauna and the community. Avoidance has also included the designation of temporary footprint requirements, such as construction laydown areas, to maximise the use of previously cleared lots/areas and avoid High Value Regrowth adjacent to the corridor.

The proposed action is located within an area of 295 ha (the Project Area), made up of:

Approximately 42.55 ha of remnant, high value regrowth and regrowth vegetation made up of Eucalyptus woodland to open forest, complex notophhyll to microphyll vine forest and melaleuca, casuarina and eucalyptus open forest.

Approximately 166.3 ha of non-remnant vegetation, consisting of:

- Areas adjacent to wetlands and banks of waterways (approximately 5.9 ha)
- Areas of sparse foraging habitat, including scattered trees present in landscaped urban areas and residential backyards (approximately 160.4 ha)
- Non-remnant vegetation with no fauna habitat value made up of existing rail corridor, train station and cleared parcels of land (approximately 86.1 ha).

Purpose of proposed action

To support growing population and rail patronage demand between Brisbane, Logan and the Gold Coast, the number of Beenleigh and Gold Coast train services will need to double over the next 20 years. The rail line between Kuraby and Beenleigh is a key capacity bottleneck on the rail corridor. The Queensland Government, together with the Australian Government, has committed $2.6 billion towards increasing the number of tracks between Kuraby and Beenleigh from 2 to 4 tracks, with modernised rail systems, station upgrades and level crossing removals. Additional tracks will require a wider rail corridor and track straightening in some areas.

Proposed action activities

The proposed action includes the following construction activities:

- Site preparation works, including clearing and grubbing, earthworks, and establishment of temporary construction compounds and laydowns;
- PUP relocation works;
- Construction of new tracks, including bridges and associated drainage works;
- Roadworks (including minor road realignments resulting from track widening);
- Station rebuilds (including upgrade and relocation of stations).

All construction activities are within the proposed action disturbance footprint of 295 ha.

Proposed action potential impacts

The proposed action will result in potential direct and indirect impacts to ecological values within the Project Area. With the sensitive siting and design of the proposed action, impacts have been substantially reduced. Suitable avoidance, mitigation and management techniques have been developed to remove or further reduce impacts, particularly indirect impacts to ecological values; however, the proposed action will impact potential habitat for MNES.

Potential impacts to threatened and migratory species include:

Direct impacts:

- Vegetation clearing and loss or alteration of conservation significant flora and fauna habitat;
- Potential habitat fragmentation; and
- Potential injury or mortality of conservation significant fauna.

Indirect impacts:

- Potential impacts to waterways;
- Potential spread or exacerbation of weed spread;
- Potential for spread of invasive fauna species; and
- Potential disturbance of conservation significant fauna as a result of noise, lighting and dust.

Additional works not included in the proposed action

There are **additional works** proposed to be undertaken by TMR which are independent of the proposed action. These works are identified in this referral for clarity, as these works will occur in close proximity to the proposed action, however, they are not part of the proposed action. These additional works are limited, including grade separations (level crossing removals), and the new generation train signalling system), and are discussed further in **Attachment B** – Additional works, pages 1 and 2. In addition, these additional works do not impact on MNES, as detailed in **Attachment B** - Additional works, pages 1 and 2.

1.2.2 Is the project action part of a staged development or related to other actions or proposals in the region?

Yes

1.2.3 Is the proposed action the first stage of a staged development (or a larger project)?

No

1.2.4 Related referral(s)

EPBC Number	Project Title
2022/09348	Loganlea Station Relocation and Park 'n' Ride Expansion

1.2.5 Provide information about the staged development (or relevant larger project).

The proposed action is not the first stage of a staged development or larger project.

Loganlea Station Relocation (LSR) sits within the physical rail corridor of Logan and Gold Coast (LGC) Faster Rail project. As per the EPBC Act staged development-split referrals policy LSR is a stand-alone project, which has its own business case, funding and community consultation and can operate independently of LGC. LSR received a 'not a controlled action' determination on 14th November 2022 (EPBC 2022/09348).

1.2.6 What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant? *

A summary of Commonwealth or state legislation, planning frameworks or policy documents relevant to the proposed action and how they are relevant is presented in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 3.0, pages 13-15.

Commonwealth

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act identifies 'nationally significant' animals, plants, habitats and places as MNES to be protected. The Project Area intersects locations with potential to support habitat for MNES. To assess potential impacts of land use changes and new developments, a significant impact assessment informed by desktop and field investigations was undertaken against the EPBC Act significant impact guidelines, which indicates the proposed action is likely to have a significant impact on MNES.

The EPBC Act recognises Weeds of National Significance (WONS), which threaten natural landscapes, waterways and coastal areas by displacing native species, contributing to land degradation and reducing farm and forestry productivity. Threat abatement plans are considered to identify research, management, and other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities to assist the long-term survival of affected native species or ecological communities in the wild.

State

Aboriginal Cultural Heritage Act 2003

The Project Area is located across land belonging to numerous Traditional Owner Groups. These include the Jagera People and Turrbal Association in the north, the Danggan Balun (Fiver Rivers) through the central extent to Logan River and the Gold Coast Native Title Group in the southern extent.

Consultation with the relevant Traditional Owner groups will manage residual risk to heritage values. Requirements of resultant Cultural Heritage Management Agreements will be carried forward into the construction phase and incorporated into the Construction Contractors Environmental Management Plan – Construction (EMP(C)).

Queensland Heritage Act 1992

There are several listed heritage items in or within proximity to the Project Area under the Queensland Heritage Register / Queensland National Trust Heritage Register, Logan City Council Heritage Register, and Brisbane City Council Heritage Register.

Consultation with relevant stakeholders responsible for managing identified historical heritage places will manage the residual risk to heritage places. Management measures resulting from stakeholder engagement will be carried forward into the construction phase and incorporated into the Construction Contractors EMP(C).

Acquisition of Land Act 1967 (ALA)

The proposed action will require residential property acquisitions, by way of negotiation or resumption under the ALA within the Project Area. The Project Area for the proposed action has been developed based on the reference design and includes allowance for future design progression as well as construction buffer and land use requirements (e.g. laydown areas). The design will be refined within the Project Area with consideration for potential impacts to environmental constraints including vegetation and habitat for threatened species and interaction with waterways. As the Project Area encroaches privately held residential allotments, the requirement for land acquisition within the Project Area is being progressed concurrently with this referral. TMR will continue to consult with property owners who may be

subject to a partial or full land resumption as the design progresses.

Biosecurity Act 2014 (Biosecurity Act)

The proposed action will meet the General Biosecurity Obligations (GBO) through development of the EMP(C) to manage biosecurity risk during the construction phase. Located in Fire Ant Biosecurity Zone 2, the proposed action will detail approved Fire Ant high risk material disposal sites. Where movement controls cannot be adhered to a Biosecurity Instrument Permit must also be obtained, the conditions within adhered to and all records and kept on site. Similarly, GBO for weed management will also be carried through into the Construction Contractor's EMP(C) and upheld throughout construction.

Environmental Protection Act 1994 (EP Act)

The proposed action will comply with the general environmental duty, particularly when undertaking activities with the potential to cause environmental harm.

Lots within the Project Area are located on the Environmental Management Register (EMR). Soils within these lots may be contaminated due to use of contaminated fill during previous construction activities and/or contamination due to historic and existing use as a rail corridor. Contractual requirements have been included to ensure detailed contaminated land investigations through subsequent design phases of the proposed action will inform ongoing management and permitting through to construction.

Vegetation Management Act 1999 (VM Act)

The proposed action is expected to impact mapped REs and other regulated vegetation. As State Government Supported Transport Infrastructure, the proposed action is exempt from requiring a development approval for clearing of regulated vegetation for the construction or maintenance of infrastructure as provided under Schedule 21 of the Planning Regulation 2017.

Nature Conservation Act 1992 (NC Act)

Nature Conservation (Plants) Regulation 2020 (NC Plants Reg)

Ecological investigations sought to identify NC Act-listed Critically Endangered, Endangered, Vulnerable or Near threatened (CREVNT) flora within the Project Area. The proposed action has potential to directly impact suitable habitat for threatened flora species identified by field investigations as having potential to occur within the disturbance area. Only vulnerable Macadamia nut (Macadamia integrifolia) was confirmed present but not considered to occur in the wild (i.e. planted), therefore clearing permit requirements do not apply. Exemptions apply for clearing outside of a high risk area on the flora survey trigger map; however, a flora survey and protected plant clearing permit is required for removing a protected pant or within 100 m of the plant. Under the Act an offset may be required as a condition of your permit approval to compensate for unavoidable impacts on a protected plant species in the wild. This will be informed by further survey during detailed design phases.

Nature Conservation (Animals) Regulation 2020 (NC Animals Reg)

The proposed action will utilise the existing State-wide TMR Low-Risk Species Management Program (SMP) to protect and manage any breeding places (e.g. nests) for least concern species that may be established and require relocation prior to construction.

A High-Risk SMP may be required if colonial breeders or animal breeding places for CREVNT species are found in the Project Area. This will be informed by further survey during detailed design phases.

Planning Act 2016 (Planning Act)

Coastal Protection and Management Act 1995 (Coastal Act)

The proposed action will intersect and traverse tidal watercourses and associated Coastal Management District (CMD). Consequently, the proposed action is also expected to impact areas of marine plants. Ecological investigations will support the quantification of expected impacts to areas of marine plants and guide environmental design responses for infrastructure within tidal areas to support procurement of development approvals and compliance with accepted and performance outcomes under State legislation.

Fisheries Act 1994

The proposed action will intersect and traverse mapped fish passage waterways. Proposed bridge and culvert works will include structures with potential to meet criteria for permanent waterway barriers within fisheries waterways. Ecological investigations will identify where existing infrastructure is deficient, where new infrastructure is required and guide environmental design responses for infrastructure within areas where fish passage is required to support procurement of development approvals and compliance with accepted and performance outcomes under State legislation.

Environmental Offsets Act 2014 (Offsets Act)

Provisions exist under the Offsets Act to avoid the duplication of offsets conditions between Commonwealth and Queensland requirements. Under these provisions:

• the Queensland Government cannot impose an offset condition for a prescribed environmental matter if the same and/or substantially the same impact and/or matter has been subject to assessment under the EPBC Act, regardless of whether an offset condition was imposed by the Commonwealth or not; and

• when considering whether to apply an offset condition, a Queensland Government agency must consider whether a relevant offset condition that has already been imposed is for a substantially the same impact and/or matter.

Acquired development approvals and associated conditions will be included in the construction contract documents and adopted by the Construction Contractor in their EMP(C).

1.2.7 Describe any public consultation that has been, is being or will be undertaken regarding the project area, including with Indigenous stakeholders. Attach any completed consultation documentations, if relevant. *

On 3 September 2021 an eight-week consultation period was undertaken to seek community and stakeholder feedback to refine the proposed action scope and reference design. Tailored information was also provided to property owners whose properties might be directly impacted by the proposed action.

Engagement was targeted at three broad groups who were identified as stakeholders who might be impacted should the proposed action proceed. This included:

- Directly impacted property owners who might be subject to a partial or full land resumption.

- The community surrounding the rail corridor and/or use the Beenleigh line.
- Stakeholders such as local community groups and special interest organisations who have a potential geographical or subject matter interest in the proposed action. This included elected representatives from Federal, State and Local Governments.

There were more than 2200 interactions over the eight-week consultation period between 3 September and 29 October 2021. This consisted of:

- More than 300 letters sent to directly impacted property owners.
- 25,000 newsletters distributed to households in Kuraby, Woodridge, Logan Central, Kingston, Meadowbrook, Loganlea, Bethania, Edens Landing, Holmview and Beenleigh.
- 70 posters installed at stations between Kuraby and Varsity Lakes.
- 15,041 page views and 9,085 unique visits to the Department of Transport and Main Roads (TMR) webpage.
- 7,631 page views and 3,799 unique visits to the TMR Have your say consultation webpage.
- 145,254 views of TMR's Facebook post, with a 4.72% click through rate to the website.
- 12 station pop-ups and market stalls, and seven community information sessions and staffed displays, attended by 579 community members.
- 172 meetings with property owners and stakeholders.
- 332 comments on the interactive map.
- 101 online surveys and 34 feedback forms completed.
- 293 phone calls received to the information line.
- 391 emails received and addressed through the inbox.
- 11 formal submissions.

The key themes captured throughout the consultation were, in order of priority:

- Upgrading stations between Kuraby and Beenleigh with modern facilities.
- Providing an active transport corridor that connects with existing pedestrian and local cycle links.
- Improving access and safety to stations, minimising traffic impacts from changes to local road networks and visual, safety, and noise considerations.
- Alternative design suggestions for the rail corridor.
- Upgrading or removing level crossings improve traffic congestion and safety.
- Environmental impacts.
- Minimising the number of properties impacted by the proposed action design, property acquisition, property values and uncertainty about future property decisions.
- Noise management and mitigation measures and operational impacts during construction.

Following consultation, an overview and key insights summary was distributed on 6 April 2022, to all those who participated and registered for updates. Hard copies were provided to electoral offices, and it was uploaded to the website (see - **Attachment D** - Logan Gold Coast Faster Rail Update (Feb 2022), pages 1 and 2).

Since that time the team has been working through feedback from the consultation to refine the design. Ongoing consultation has taken place with directly impacted property owners to provide information on property impacts. On 12 September 2022, an update was distributed electronically to all who registered for communications (see **Attachment E** – Logan Gold Coast Faster Rail Project Update, pages 1 and 2). It has also been uploaded to the website and hard copies provided to electoral offices. Responsive engagement will continue via the phone number (1800 957 066) and email address (LoganGoldCoastRail@tmr.qld.gov.au), and we will continue to meet with impacted property owners and other stakeholders.

A Stakeholder Engagement Plan is in the process of being completed for the proposed action. This will identify requirements for engaging with the Traditional Owners (TO). The TOs for the proposed action include Jagera People #2 and Turrbal Association Inc, located in the northern extent of the Project Area and Danggan Balun (Five Rivers) and Gold Coast Native Title Group, located in the central and southern extent of the Project Area. TMR are in the process of organising a program to have the TOs undertake walk-over surveys for high-risk (i.e. Category 4 and 5) areas within the proposed actions disturbance footprint. Pending the results of these surveys, TMR will discuss further recommendations with the TOs including a form of agreement or management plan to manage cultural heritage during the construction phase.

1.3.1 Identity: Referring party

Privacy Notice:

Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

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department will be unable to contact you to seek further information (if required) and subsequently may impact the consideration given to your submission.

Personal information may be disclosed to other Australian government agencies, persons or organisations where necessary for the above purposes, provided the disclosure is consistent with relevant laws, in particular the Privacy Act 1988 (Privacy Act). Your personal information will be used and stored in accordance with the Australian Privacy Principles.

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☑ **Confirm that you have read and understand this Privacy Notice ***

1.3.1.1 Is Referring party an organisation or business? *

Yes

Referring party organisation details

ABN/ACN	20093846925
Organisation name	AECOM AUSTRALIA PTY LTD
Organisation address	Level 8, 540 Wickham Street, Fortitude Valley QLD 4006, Australia

Referring party details

Name	Jared Brook
Job title	Principal Environmental Consultant
Phone	0431822333
Email	jared.brook@aecom.com
Address	Level 8, 540 Wickham Street, Fortitude Valley QLD 4006, Australia

1.3.2 Identity: Person proposing to take the action

1.3.2.1 Are the Person proposing to take the action details the same as the Referring party details? *

No

1.3.2.2 Is Person proposing to take the action an organisation or business? *

Yes

Person proposing to take the action organisation details

ABN/ACN	39407690291
Organisation name	Department of Transport and Main Roads
Organisation address	Floor 3, 61 Mary Street, Brisbane 4000, QLD

Person proposing to take the action details

Name	Lynnell Davis
Job title	Principal Environmental Officer
Phone	07 3066 3630
Email	lynnell.w.davis@tmr.qld.gov.au
Address	Floor 3, 61 Mary Street, Brisbane 4000, QLD

1.3.2.14 Are you proposing the action as part of a Joint Venture? *

No

1.3.2.15 Are you proposing the action as part of a Trust? *

No

1.3.2.17 Describe the Person proposing the action's history of responsible environmental management including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person proposing to take the action. *

Taking account of its extensive projects and operations across Queensland, TMR has a satisfactory record of environmental management. TMR has not been subject to proceedings under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

1.3.2.18 If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

TMR operates under the guiding principles of its Environmental Sustainability Policy (TMR, 2021) and environmental management process. The policy outlines how TMR will manage impacts on natural, human and cultural environments by:
1) meeting the statutory obligations of all relevant environmental and heritage legislation as a minimum standard
2) considering the effects on stakeholders and long-term relationships when carrying out statutory obligations, and seeking feedback on our performance
3) acting as a good government agency and adopting a proactive approach to environmental and heritage management
4) improving awareness of environmental and heritage management processes, standards and responsibilities among TMR's employees and contractors
5) ensuring the approach to the management of environmental and heritage impacts embrace the hierarchy of "avoid, minimise and mitigate" in a financially feasible manner.

TMR undertakes works in accordance with their comprehensive Environmental Processes Manual (TMR, 2023), which applies a risk-based approach to identify, assess and manage environmental risks. The Environmental Processes Manual is available to view on the TMR website (TMR, 2023).

Further information about the TMR's environmental management is available on the TMR Environmental management website (TMR, 2022).

1.3.3 Identity: Proposed designated proponent

1.3.3.1 Are the Proposed designated proponent details the same as the Person proposing to take the action? *

Yes

Proposed designated proponent organisation details	
ABN/ACN	39407690291
Organisation name	Department of Transport and Main Roads
Organisation address	Floor 3, 61 Mary Street, Brisbane 4000, QLD

Proposed designated proponent details	
Name	Lynnell Davis
Job title	Principal Environmental Officer
Phone	07 3066 3630
Email	lynnell.w.davis@tmr.qld.gov.au
Address	Floor 3, 61 Mary Street, Brisbane 4000, QLD

1.3.4 Identity: Summary of allocation

Confirmed Referring party's identity

The Referring party is the person preparing the information in this referral.

ABN/ACN	20093846925
Organisation name	AECOM AUSTRALIA PTY LTD
Organisation address	Level 8, 540 Wickham Street, Fortitude Valley QLD 4006, Australia
Representative's name	Jared Brook
Representative's job title	Principal Environmental Consultant
Phone	0431822333
Email	jared.brook@aecom.com
Address	Level 8, 540 Wickham Street, Fortitude Valley QLD 4006, Australia

Confirmed Person proposing to take the action's identity

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	39407690291
Organisation name	Department of Transport and Main Roads
Organisation address	Floor 3, 61 Mary Street, Brisbane 4000, QLD
Representative's name	Lynnell Davis
Representative's job title	Principal Environmental Officer
Phone	07 3066 3630
Email	lynnell.w.davis@tmr.qld.gov.au
Address	Floor 3, 61 Mary Street, Brisbane 4000, QLD

Confirmed Proposed designated proponent's identity

The Person proposing to take the action is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

1.4 Payment details: Payment exemption and fee waiver

1.4.1 Do you qualify for an exemption from fees under EPBC Regulation 5.23 (1) (a)? *

No

1.4.3 Have you applied for or been granted a waiver for full or partial fees under Regulation 5.21A? *

No

1.4.5 Are you going to apply for a waiver of full or partial fees under EPBC Regulation 5.21A?

No

1.4.7 Has the department issued you with a credit note? *

No

1.4.9 Would you like to add a purchase order number to your invoice? *

No

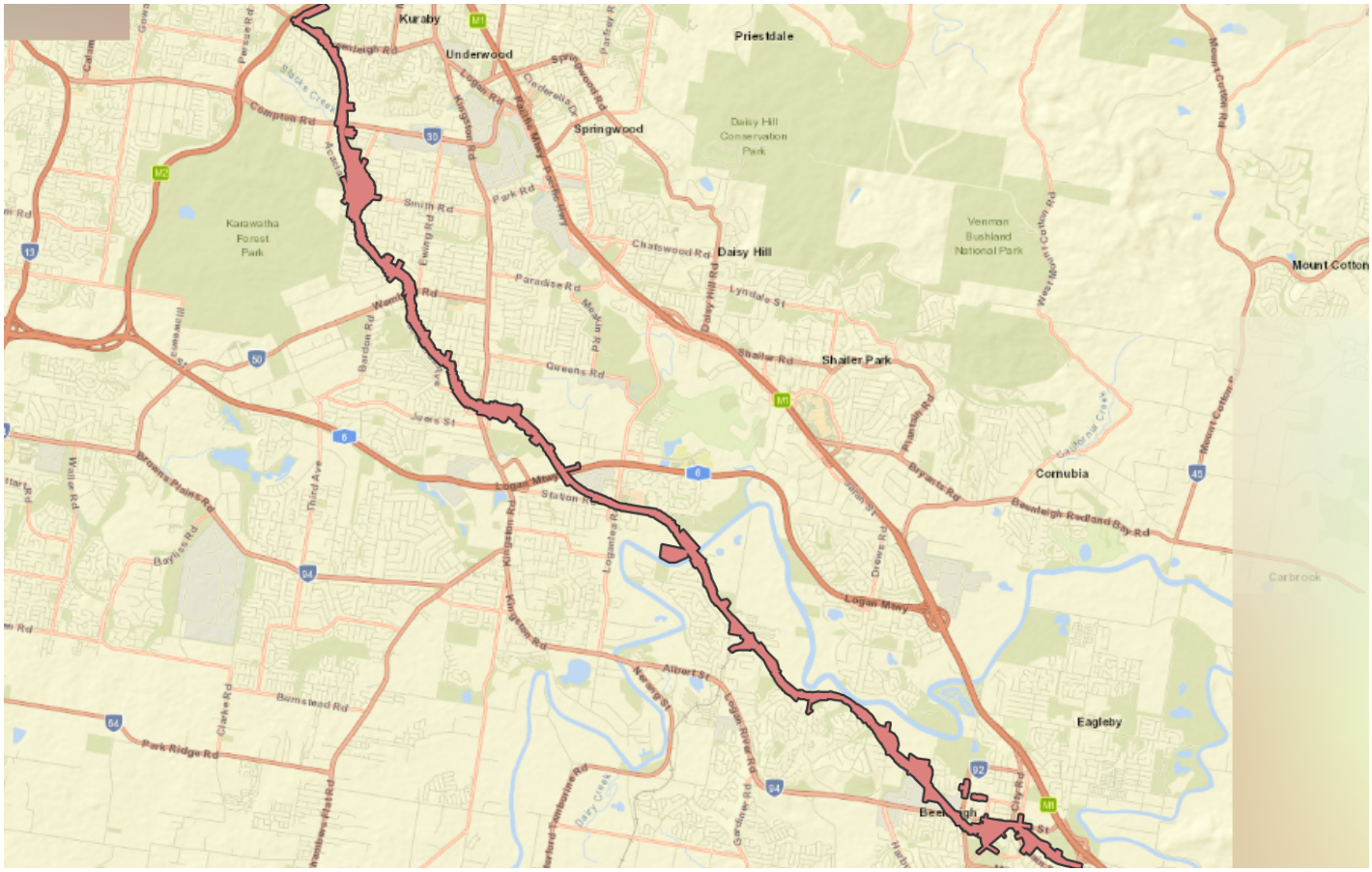
1.4 Payment details: Payment allocation

1.4.11 Who would you like to allocate as the entity responsible for payment? *

Person proposing to take the action

2. Location

2.1 Project footprint



2.2 Footprint details

2.2.1 What is the address of the proposed action? *

Approximately 1388A Beenleigh Rd, Kuraby QLD 4112 to 31 Wardell Cr, Beenleigh QLD 4207

2.2.2 Where is the primary jurisdiction of the proposed action? *

Queensland

2.2.3 Is there a secondary jurisdiction for this proposed action? *

No

2.2.5 What is the tenure of the action area relevant to the project area? *

The Project Area extends over Brisbane City Council and Logan City Council local government areas, predominantly within an existing railway corridor. The existing railway corridor is zoned SP3 Special purpose (transport infrastructure) under the Brisbane City Plan 2014 and zoned Community facilities under the Logan Planning Scheme 2015. The wider study corridor is predominantly zoned as:

- Low density and medium density residential
- Low impact and medium impact industry
- Neighbourhood centre
- Sport and recreation
- Rural
- Emerging community
- Centre
- Environmental management and conservation
- Recreation and open space
- Mixed use.

A range of Lands Lease, Easement, Freehold and Reserve tenure is present in the Project Area.

The Project Area for the proposed action has been developed based on the reference design and includes allowance for future design progression as well as construction buffer and land use requirements (e.g. laydown areas). The design will be refined within the Project Area with consideration for potential impacts to environmental constraints including vegetation and habitat for threatened species and interaction with waterways.

With this in mind, the proposed action will require residential property acquisitions, by way of negotiation or resumption under the *Acquisition of Land Act 1967* (ALA), within the Project Area as it encroaches privately held residential allotments. TMR will continue to consult with property owners who may be subject to a partial or full land resumption as the design progresses.

3. Existing environment

3.1 Physical description

3.1.1 Describe the current condition of the project area's environment.

The Project Area is predominantly characterised by the existing rail corridor within an urban setting. Much of the existing land uses include previously cleared areas of rail corridor and traverses adjacent to residential housing, commercial and industrial districts. The Project Area encroaches privately held residential allotments. TMR will continue to consult with property owners who may be subject to a partial or full land resumption as the design progresses. The environmental values of these lots are typical of residential backyards.

The rail alignment traverses a series of undulating hills and low-lying riverine environments. Coastal areas lower than 5 m Australian Height Datum (AHD) are likely to have acid sulfate soils (ASS) present. The ground is generally low lying along the alignment, with areas between Kuraby and Trinder Park presenting key risk for ASS and watercourse crossings.

Areas of bushland are intersected, especially adjacent to the existing alignment at Scrubby Creek and Edens Landing and at the proposed straightening of the alignment through Trinder Park. These are described further in Section 3.2.

The existing rail alignment is associated with several lots on the Environmental Management Register (EMR) maintained by Department of Environment and Science (DES) QLD, pursuant to the *Environmental Proection Act 1994 (EP Act)*. Soils within these lots may be contaminated due to use of contaminated fill during previous construction activities and/or contamination due to historic and existing use as a rail corridor. Common contaminants of potential concern typically associated with rail operations include asbestos, pesticides, heavy metals and hydrocarbons. There is potential for other EMR listed properties to be impacted where TMR acquires land for the proposed action. When the design is further developed, any acquisitions that require further contaminated land investigation will be assessed and managed accordingly.

Construction traffic will make use of existing roads to access site offices, car parks and work sites along the project corridor. The project will be required to develop a construction traffic management plan which will prioritise the use of the highest road classification in each area. The construction traffic management plan will also detail requirements to ensure pedestrian/cyclist safety, and maintain access to private property and schools and clear paths for emergency vehicles. Upon completion of the works, it is anticipated that there will be no significant increase in the traffic through the project area. Minor changes to traffic routes on local roads are anticipated to accommodate the proposed design changes to facilitate better access around the station and precinct areas.

3.1.2 Describe any existing or proposed uses for the project area.

The Project Area is dictated by the need to duplicate the existing rail corridor between Kurraby and Beenleigh. The proposed land uses of the proposed project site is a duplication of the existing rail corridor between Kuraby and Beenleigh Station from two to four tracks, including associated station and rail system upgrades. The area is in the urban footprint under the South East Queensland Regional Plan 2017 and within a priority living area under the *Regional Planning Interest Act 2014*. The proposed action strategically supports these broader urban functions.

The Project Area extends over Brisbane City Council and Logan City Council local government areas, predominantly within an existing railway corridor. The existing railway corridor is zoned SP3 Special purpose (transport infrastructure) under the Brisbane City Plan 2014 and zoned Community facilities under the Logan Planning Scheme 2015. The wider study corridor is predominantly zoned as:

- Low density and medium density residential
- Low impact and medium impact industry
- Neighbourhood centre
- Sport and recreation
- Rural
- Emerging community
- Centre
- Environmental management and conservation
- Recreation and open space
- Mixed use.

A range of Lands Lease, Easement, Freehold and Reserve tenure is present in the Project Area.

Between chainage 23,000 m and 25,000 m a straightening of the rail alignment is proposed to improve efficiency of train movements through this section. To achieve this, the alignment is rerouted through Acacia Forest Park on the north-eastern corner of Karawatha Forest Park. Karawatha Forest is a Brisbane City reserve and is listed in the Register of the National Estate.

3.1.3 Describe any outstanding natural features and/or any other important or unique values that applies to the project area.

Between chainage 23,000 m and 25,000 m the proposed alignment is routed through Acacia Forest Park on the north-eastern corner of Karawatha Forest Park. Within Karawatha Park are the Karawatha Wetlands which are listed as a Nationally Important Wetland on the Directory of Important Wetlands in Australia. The proposed action does not intersect with any of the mapped wetlands within Karawatha Forest, with direct impacts limited to the north-eastern corner of the Park which has primarily been cut off from Karawatha by the existing Acacia Road. Acacia Forest Park itself does not have any outstanding natural features or unique values.

Additionally, the Project Area traverses the Logan River, which is the main waterway of the Logan Catchment, draining to Moreton Bay.

There are otherwise no outstanding natural features within the Project Area.

3.1.4 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The terrain within the Project Area is generally flat with some gently undulating areas in the southern extent. The ground is low lying with elevations generally between 10 m AHD and 50 m AHD. There are several waterway crossings which are lower than 5 m AHD.

3.2 Flora and fauna

3.2.1 Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.

The Flora and Fauna setting of the Project Area is described in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 4.3, pages 17-21, and summarised as follows.

Most of the Project Area is dominated by the existing rail alignment and surrounding residential setting, with sparse foraging trees present in landscaped areas and residential backyards.

The Project Area traverses several key parks and areas of remnant vegetation including at Spring Creek and Slacks Creek (Chainage 22,000-23,500 m), Karawatha Forest (Chainage 24,000 m), Scrubby Creek (Chainage 29,500 m), Logan River (Chainage 33,000 m), Edens Landing (Chainage 35,500 to 37,000 m) and Hugh Muntz Park (Chainage 41,000 m). (**Attachment C** – Matters of National Environmental Significance Assessment Report, Figure 1-1, page 3)

Remnant, high value regrowth and regrowth vegetation communities have been identified in the Project Area through a combination of desktop and field assessment. They make up approximately 43 ha along the 20 km alignment and include Eucalyptus woodland to open forest, complex notophhyll to microphyll vine forest and melaleuca, casuarina and eucalyptus open forest. Additionally the alignment crosses Spring Creek, Slacks Creek, Scrubby Creek and Logan River as well as 14 other minor waterways. Associated with the low-lying areas are swamps and estuarine habitat and non-remnant areas on the banks of waterways.

Despite the increasing urbanisation and development occurring within the region, mature patches of eucalypt woodlands are present in and adjacent to the Project Area. These areas support remnant eucalypt woodlands that reflect vegetation communities that were once widespread within the South East Queensland region. Where the Project Area extends along small order streams and ephemeral waterbodies, the fringing vegetation transitions from dry eucalypt woodlands into wet Melaleuca forests that dominated the temporarily inundated ecosystems. This habitat type was particularly dominant along Spring Creek and Scrubby Creek, and contained occasional patches of sedge, reeds and rushes.

Patches of these vegetation communities have been identified along road edges and in narrow corridors between residential areas, with many showing signs of impact (degradation) from anthropogenic pressures. Regardless, these areas still have potential to provide linking habitat for native fauna and facilitate fauna movement throughout the Project Area. Queensland Globe interactive mapping tools identify proximate biodiversity corridors. Biodiversity corridors are located within and adjacent to the Project Area especially at Spring Creek and Karawatha Forest, Scrubby Creek and adjacent to the Logan River.

Fauna communities that could be supported by these habitats include birds, reptiles, amphibians and mammals.

3.2.2 Describe the vegetation (including the status of native vegetation and soil) within the project area.

Remnant, high value regrowth and regrowth vegetation communities have been identified in the Project Area through a combination of desktop and field assessment. They make up approximately 43 ha along the 20 km alignment and include Eucalyptus woodland to open forest, complex notophhyll to microphyll vine forest and melaleuca, casuarina and eucalyptus open forest. Additionally, the alignment crosses Spring Creek, Slacks Creek, Scrubby Creek and Logan River as well as 14 other minor waterways. Associated with the low-lying areas are swamps and estuarine habitat and non-remnant areas on the banks of waterways. The vegetation communities and corresponding RE descriptions are summarised in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 4.3, Table 8, pages 18-19.

Soil types within the Project Area include Chromosols, Demosols and Hydrosols. Much of the topsoil in the Project Area is would be previously disturbed by urbanisation, except soils associated with remnant vegetation.

3.3 Heritage

3.3.1 Describe any Commonwealth heritage places overseas or other places recognised as having heritage values that apply to the project area.

No Commonwealth heritage places are located in or adjacent to the Project Area.

Other places recognised as having heritage values are detailed below:

Queensland Heritage Register

One item listed on the Queensland Heritage Register (QHR) is located in the Project Area. Bethania Lutheran Church (QHR#600002) is located in the Project Area, 330 m south-east of Bethania Railway Station in lots 1 and 2 RP196081.

One item listed on the Queensland Heritage Register (QHR) is located 80 m north-west of the Project Area. Mayes Cottage (QHR#600662) is located 500 m north-west of Kingston Railway Station in lot 1253/SL8885 (**Attachment F** – Cultural Heritage Risk Assessment (CHRA), Part 2 of 2, Appendix 1, Figure 4d, Appendix 3).

Queensland National Trust Heritage Register

One item is listed on the Queensland National Trust Heritage Register in the Project Area. Bethania Lutheran Church (ID#LOG7/1), is located in the Project Area, 330 m south-east of Bethania Railway Station in lots 1 and 2 RP196081 (**Attachment F** – Cultural Heritage Risk Assessment (CHRA), Part 2 of 2, Appendix 3).

Local Heritage Register

The Project Area is located within the Logan City Council (LCC) and Brisbane City Council (BCC). There are 12 local heritage sites located in or directly adjacent the Project Area.

Seventeen items on the LCC local heritage register are located in and within 100 m of the Project Area (**Attachment F** – Cultural Heritage Risk Assessment (CHRA), Part 1 of 2, Appendix 1, Figure 4a-b; Part 2 of 2, Appendix 1, Figure 4c-e; Part 2 of 2, Appendix 3).

Three items on the BCC local heritage register are located in and within 100 m of the Project Area (**Attachment F** – Cultural Heritage Risk Assessment (CHRA), Part 1 of 2, pages 18-19).

Queensland Rail Register

Queensland Rail (QR) has identified one QR Registered historical place located in the Project Area. Bethania Passenger Station (QRHR#365) is located in the Project Area in lot 73/SP109403 in the south-central extent of the Project Area. The QR listing for this place is a good example of a second-class timber passenger station of the late 19th century (pre-WWII) and is significant as the original junction for the Beaudesert branch line. This QR heritage place is listed on the LHR register as Bethania Railway Station. (**Attachment F** – Cultural Heritage Risk Assessment (CHRA), Part 1 of 2, page 19).

Management Recommendations

Having regard to the above matters, and noting that there are no Commonwealth heritage places within, or adjacent to, the Project Area, the management recommendations for the above matters for the Project Area are provided for in **Attachment F** – Cultural Heritage Risk Assessment (CHRA), Part 1 of 2, Table 1, pages 5-15.

3.3.2 Describe any Indigenous heritage values that apply to the project area.

The Project Area is located on the land of the Jagera People #2 and Turrbal Association Inc, (in the northern extent of the Project Area) and Danggan Balun (Five Rivers) and Gold Coast Native Title Group, (in the central and southern extent of the Project Area).

A Cultural Heritage Risk Assessment has recently been completed (see **Attachment F** – Cultural Heritage Risk Assessment (CHRA), Parts 1 of 2 and 2 of 2).

Two DSDSATSIP sites are located in or within 100 m of the Project Area (**Attachment F** – Cultural Heritage Risk Assessment (CHRA), Part 1 of 2, Appendix 1, Figure 3c).

The proposed action is located in areas containing identified Indigenous cultural heritage sites, likely mature vegetation, high-risk landscape features, and causing additional ground disturbance. Consultation and survey prior to construction are required with the relevant Aboriginal Parties.

All management recommendations are provided in **Attachment F** – Cultural Heritage Risk Assessment (CHRA), Part 1 of 2, Table 1, pages 5-15.

3.4 Hydrology

3.4.1 Describe the hydrology characteristics that apply to the project area and attach any hydrological investigations or surveys if applicable. *

The hydrology characteristics that apply to the Project Area are described in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 4.5, pages 23-24.

The Project Area spans three catchment areas including Brisbane River, Logan River and Albert River. The majority of the Project Area lies within the Logan River Catchment within only northern and southern extremities within the Brisbane and Albert catchments respectively. Queensland Globe inland watercourse layer and watercourse identification map (WIM) identifies the known extent of watercourses and drainage features that are managed under the *Water Act 2000* (Water Act). The proposed action traverses numerous (17) water features including mapped watercourses, drainage lines and unmapped watercourses.

4. Impacts and mitigation

4.1 Impact details

Potential Matters of National Environmental Significance (MNES) relevant to your proposed action area.

EPBC Act section	Controlling provision	Impacted	Reviewed
S12	World Heritage	No	Yes
S15B	National Heritage	No	Yes
S16	Ramsar Wetland	Yes	Yes
S18	Threatened Species and Ecological Communities	Yes	Yes
S20	Migratory Species	Yes	Yes
S21	Nuclear	No	Yes
S23	Commonwealth Marine Area	No	Yes
S24B	Great Barrier Reef	No	Yes
S24D	Water resource in relation to large coal mining development or coal seam gas	No	Yes
S26	Commonwealth Land	No	Yes
S27B	Commonwealth heritage places overseas	No	Yes
S28	Commonwealth or Commonwealth Agency	No	Yes

4.1.1 World Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.1.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.1.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

No World Heritage properties were identified by the Protected Matters Search Tool (PMST) within 10 km of the Project Area.

4.1.2 National Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.2.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.2.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

No National Heritage Places were identified by the PMST within 10 km of the Project Area.

4.1.3 Ramsar Wetland

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Ramsar wetland
No	Yes	Moreton Bay

4.1.3.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.3.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

The Project Area is 10-20 km upstream from the Moreton Bay Ramsar site according to the PMST. The Project Area is not in the Moreton Bay Ramsar site and will not cause direct impacts to the wetland values. Given the distance of the Project Area from the Moreton Bay Ramsar site, potential pathways for indirect impacts to the Ramsar site are limited to possible changes to flow regimes from widening or duplicating assets in the Logan River and its tributaries and potential downstream water quality impact during construction, however these are not expected to be significant, as assessed in **Attachment C** – Matters of National Envirornmental Significance Report, Section 7.1.3, pages 40-41.

4.1.3.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.3.6 Describe why you do not consider this to be a Significant Impact. *

A significant impact assessment for Moreton Bay Ramsar site is presented in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 7.1.3, Table 11, pages 40-41.

The Project Area is 10-20 km upstream from the Moreton Bay Ramsar site according to the PMST. The Project Area is not in the Moreton Bay Ramsar site and will not cause direct impacts to the wetland values including destruction of substantial modification, establishment or spread of invasive species in the wetland.

It is considered unlikely any proposed action activities would result in indirect impacts that may significantly impact the values of the Moreton Bay Ramsar wetland. As part of the reference design refinement process, hydraulic modelling will be undertaken to inform design recommendations to ensure that this occurs. Management and mitigation for downstream water quality impacts are summarised below.

4.1.3.7 Do you think your proposed action is a controlled action? *

No

4.1.3.9 Please elaborate why you do not think your proposed action is a controlled action. *

The proposed action is not anticipated to have a significant impact on a Ramsar Wetland and as such this is not expected to be a controlling provision of the action.

4.1.3.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

It is anticipated that potential downstream water quality impacts can be managed and mitigated through further detailed investigations of hydrology, contaminated land and acid sulfate soils staged to be complete in subsequent design phases.

Widening or duplication of rail assets over waterways will potentially result in impacts to the affected waterways, including changes to the flow regime and the creation of flood afflux. As part of the reference design refinement process, hydraulic modelling is being undertaken to inform design recommendations around permanent water treatment devices and design infrastructure within various waterways.

Potential indirect impacts associated with these activities such as sedimentation or contaminant movement will be actively managed via the Environmental Management Plan – Construction (EMP(C)) (can be provided to the Department upon request) to ensure impacts to adjacent areas and waterways are minimal. This will include best practice erosion, stormwater and sediment control and designated bunded areas for construction materials and refuelling activities.

Detailed investigations will be undertaken within the Project Area which will identify potential contaminants within the surface soil. The potential environmental risks associated with contaminant release and mobilisation will be informed by detailed investigations to effectively manage potential contaminants during all phases of the proposed action.

ASS is considered a known risk within the Project Area. Sufficient mitigation and management measures relevant to ASS are available to ensure future risks can be managed.

Excavated contaminated materials will be disposed of appropriately at an authorised offsite location, and stockpiles will be managed in accordance with the EMP(C).

4.1.3.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

There are no proposed offsets relevant to this matter.

4.1.4 Threatened Species and Ecological Communities

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Threatened species

Direct impact	Indirect impact	Species
Yes	Yes	Anthochaera phrygia
No	No	Argynnis hyperbius inconstans
Yes	Yes	Arthraxon hispidus
No	No	Baloghia marmorata
Yes	Yes	Bosistoa transversa
Yes	Yes	Botaurus poiciloptilus
Yes	Yes	Calidris ferruginea

Direct impact	Indirect impact	Species
Yes	Yes	Calyptorhynchus lathami
No	No	Calyptorhynchus lathami lathami
No	No	Caretta caretta
No	No	Chalinolobus dwyeri
No	No	Charadrius leschenaultii
No	No	Chelonia mydas
No	No	Coeranoscincus reticulatus
Yes	Yes	Coleus habrophyllus
No	No	Corchorus cunninghamii
No	No	Cryptocarya foetida
No	No	Cryptostylis hunteriana
No	No	Cupaniopsis shirleyana
No	No	Cyclopsitta diophthalma coxeni
Yes	Yes	Dasyurus maculatus maculatus (SE mainland population)
No	No	Delma torquata
No	No	Dermochelys coriacea
No	No	Diomedea antipodensis
No	No	Diomedea antipodensis gibsoni
No	No	Diomedea exulans
No	No	Diploglottis campbellii
No	No	Endiandra floydii
No	No	Epinephelus daemelii
No	No	Eretmochelys imbricata
No	No	Erythrotriorchis radiatus
No	No	Falco hypoleucos
No	No	Fontainea venosa
No	No	Furina dunmalli
No	No	Geophaps scripta scripta
Yes	Yes	Gossia gonoclada
Yes	Yes	Grantiella picta
No	No	Hemiaspis damelii
Yes	Yes	Hirundapus caudacutus
Yes	Yes	Lathamus discolor
No	No	Lepidochelys olivacea
No	No	Limosa lapponica baueri

Direct impact	Indirect impact	Species
Yes	Yes	Macadamia integrifolia
No	No	Macadamia tetraphylla
No	No	Maccullochella mariensis
No	No	Macroderma gigas
No	No	Macronectes giganteus
No	No	Macronectes halli
No	No	Mixophyes fleayi
No	No	Natator depressus
No	No	Notelaea ipsviciensis
No	No	Numenius madagascariensis
No	No	Pachyptila turtur subantarctica
Yes	Yes	Persicaria elatior
No	No	Petauroides volans
Yes	Yes	Petauroides volans (southern and central)
Yes	Yes	Petaurus australis australis
No	No	Phaius australis
Yes	Yes	Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)
No	No	Planchonella eerwah
No	No	Plectranthus habrophyllus
Yes	Yes	Potorous tridactylus tridactylus
No	No	Pseudomys novaehollandiae
Yes	Yes	Pteropus poliocephalus
Yes	Yes	Rhodamnia rubescens
Yes	Yes	Rhodomyrtus psidioides
No	No	Rostratula australis
Yes	Yes	Rostratula benghalensis australis
No	No	Samadera bidwillii
No	No	Sphyrna lewini
No	No	Sternula nereis nereis
Yes	Yes	Tachyglossus aculeatus
No	No	Thalassarche cauta
No	No	Thalassarche impavida
No	No	Thalassarche melanophris
No	No	Thalassarche salvini
No	No	Thalassarche steadi

Direct impact	Indirect impact	Species
No	No	Thesium australe
No	No	Thunnus maccoyii
No	No	Turnix melanogaster
No	No	Vincetoxicum woollsii
No	No	Xeromys myoides

Ecological communities

Direct impact	Indirect impact	Ecological community
No	No	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community
No	No	Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland
No	No	Lowland Rainforest of Subtropical Australia
No	No	Poplar Box Grassy Woodland on Alluvial Plains
No	No	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

4.1.4.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.4.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

The potential direct and indirect impacts from the proposed action are described in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 5.0, pages 25-34, and summarised below.

Direct impacts from construction phase are likely to include:

- Vegetation clearing and habitat loss
- Loss or alteration of conservation significant fauna habitat
- Loss or alteration of conservation significant flora habitat
- Habitat fragmentation
- Injury and mortality of fauna

Indirect impacts from construction phase are likely to include:

- Impacts to waterways
- Weed species and plant diseases
- Pest fauna species
- Noise and vibration
- Light
- Dust

Potential impacts of the Project Area considered for ecological MNES either identified within the Project Area or assessed as potentially present. The PMST identified seven threatened ecological communities, 28 threatened flora species and 57 threatened fauna species as known, likely or having potential to occur within the Project Area. Of these, field verification and likelihood of occurrence assessment indicated two threatened ecological communities, eight plants, six mammals and eight birds as known or having potential to occur within the disturbance footprint.

Threatened Ecological Communities

Field verification confirmed no threatened ecological community is present within the Project Area, and no direct or indirect impacts are anticipated from the proposed action.

Threatened Flora

While potential suitable habitat for Scrub turpentine (*Rhodamnia rubescens*), Native guava (*Rhodomyrtus psidiodes*), Angle-stemmed myrtle (*Gossia gonoclada*), *Coleus habrophyllus*, Tall knotweed (*Persicaria elatior*), Hairy-joint grass (*Arthraxon hispidus*) and Three-leaved bosistoa (*Bosistoa traversa*) was identified in the Project Area, none of the species were recorded within the Project Area during the flora

surveys. Further targeted surveys are required to confirm their presence and whether direct or indirect impacts to these species will result from the proposed action.

The potential habitat areas within the Project Area for these species is not contiguous, occurring in patches along the 20 km alignment. The Project Area is predominantly adjacent to existing rail, road or urban features and the potential habitat identified is subject to existing threats associated with the urban environment and weed incursion. In addition, none of these species were recorded within the Project Area during the flora survey. On this basis, it is considered unlikely that specimens (if present) of listed threatened species will be identified in the full extent of potentially suitable habitat within the Project Area. MNES listed flora were assessed through the risk assessment and were identified as low risk and therefore a SIA has not been completed, however the requirement to complete an SIA for these species will be revisited once targeted survey is available.

Threatened Fauna

Of the six mammals and eight birds known, likely and potentially occurring within the Project Area, a two-step significant impact assessment process was applied. The screening assessment identified the Koala (*Phascolarctos cinereus*), Grey-headed flying fox (*Pteropus poliocephalus*) and Greater glider (*Petauroides volans sensu lato*) as requiring further assessment for potential risk of significant impacts. Other potentially occurring threatened and migratory species are considered to have a low risk of significant impact as defined under the EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (Department of the Environment, 2013a), due to the combination of factors:

- Project Area lacking habitat critical for the survival or important habitat for the species
- Inability of the Project Area to support an important population or ecologically significant proportion of a population.

Threatened species may use the Project Area for opportunistic seasonal foraging and dispersal; however, the available habitat in the urban context lacks condition and connectivity, and more suitable foraging and dispersal habitat is available in the region. Only the vulnerable Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*) is known to use the Project Area for breeding, foraging and as a dispersal pathway; however, preferred hollow tree species were not recorded during field surveys so the breeding habitat is not critical to survival of the species. The linear nature of the disturbance and of the existing urbanisation in the surrounding area suggest the proposed action will not result in habitat fragmentation in the context of threatened species such as Spotted-tail quoll (*Dasyurus maculatus maculatus*), Yellow-bellied glider (*Petaurus australis australis*), long-nosed potoroo (*Potorous tridactylus tridactylus*), Painted Honeyeater (*Grantiella picta*), White-throated needletail (*Hirundapus caudacutus*), Regent honeyeater (*Anthochaera phrygia*), Swift parrot (*Lathamus discolor*), Curlew sandpiper (*Calidris ferruginea*), Australasian bittern (*Botaurus poiciloptilus*), Australian Painted Snipe (*Rostratula australis*); however, it may result in loss of future hollow-bearing trees and food trees. During construction, threats other than vegetation clearing will be comparable to the existing urban environment and rail corridor, and managed through the EMP(C) developed as part of the proposed action.

4.1.4.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

Yes

4.1.4.5 Describe why you consider this to be a Significant Impact. *

The significant impact assessment is presented in **Attachment C** – Matters of National Environmental Significance Assessment Report, Appendix A, pages 22-41, and summarised in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 7.1.4, pages 41-44.

The koala, grey-headed flying fox and greater glider were identified as having a potential risk of significant impact under the detailed significant impact criteria outlined in the EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (Department of the Environment, 2013a). Key aspects of this assessment are captured as follows:

Koala – possible significant impact

Habitat within the Project Area has potential to meet essential life cycle requirements of the koala (foraging and dispersal) and is considered habitat critical to survival of the species as defined under the Conservation Advice (DAWE 2022). The Project Area has been refined, however, direct impacts include loss of foraging habitat (up to 40.9 ha) and low-quality dispersal and sheltering habitat (up to 161.3 ha). Given the urban context, koalas rely on small patches of vegetation and, as such, there is a possibility of significant impact due to loss of foraging habitat.

Grey-headed flying fox – possible significant impact

Vulnerable grey-headed flying fox may use the Project Area sporadically to forage when seasonal conditions are suitable. Habitat within the Project Area largely comprises remnant and non-remnant vegetation containing identified grey-headed flying fox forage species. The National Recovery Plan for the Grey Headed Flying Fox (Commonwealth of Australia 2021) defines habitat critical to the survival of the species. While it is recognised that the vegetation is low-quality, the vegetation meets the definition of habitat critical to the survival of the species since it contains important winter and spring flowering vegetation communities, and there are three nationally important camps as identified within 20 km of the Project Area (Commonwealth of Australia 2021). The total area of impact to habitat critical to the survival of the grey-headed flying-fox is calculated as 11.4 ha of suitable roosting and foraging habitat, and 196.6 ha of habitat suitable for foraging only. The proposed action will directly impact these areas as a result of vegetation clearing. As the proposed action is expected to impact on native foraging habitat critical to the survival of the grey-headed flying-fox, the proposed action could be considered to interfere with the recovery of the species.

Greater glider – possible significant impact

The endangered greater glider is known to occur within the Project Area based on recent records within 1 km of the Project Area; however, utilisation by this species is likely to be minimal and for short periods of rest, dispersal and foraging. Given its endangered status and limited dispersal capabilities, populations of the greater glider are considered important for the conservation of the species as per the Conservation Advice for Petauroides volans (greater glider (southern and central)) (Department of Climate Change Energy the Environment and Water 2022a); as such, any individuals present within the Project Area are considered an important population.

The highly urbanised nature of the environment lacks connectivity for dispersal, provides sparse potential foraging resources in eucalypt dominated forests and marginal breeding habitat based on the scarcity of mature trees suitable for denning. Forest areas currently unoccupied by the greater glider may still represent habitat critical to survival if the recruitment of hollow-bearing trees as the forest ages could allow the species to colonise these areas and ensure persistence of a subpopulation. As habitat trees present may facilitate activities such as foraging, breeding and denning, all potential habitat is considered habitat critical to the survival of the species as defined under the Conservation Advice (Department of Climate Change Energy the Environment and Water 2022a). Vegetation clearing will directly impact 41.8 ha of suitable habitat, including 36.3 ha of denning habitat, 4.6 ha of foraging habitat and 0.9 ha of dispersal habitat. Tree hollows are required for this species to breed, and potential breeding habitat will be directly impacted (a total area of 27.27 ha); the reduction in suitable hollow-bearing trees available for the species in the local area may result in the disruption of the breeding cycle of an important population.

4.1.4.7 Do you think your proposed action is a controlled action? *

Yes

4.1.4.8 Please elaborate why you think your proposed action is a controlled action. *

Given the potential for a significant impact to Koala, Grey-headed flying fox, and Greater glider, it is anticipated the proposed action would be a controlled action for potential impacts on listed threatened species.

The significant impact assessment is presented in **Attachment C** – Matters of National Environmental Significance Assessment Report, Appendix A, pages 22-41, and summarised in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 7.1.4, page 41-44.

4.1.4.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

A summary of measures proposed to avoid or mitigate potential impacts to threatened species is included in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 6.0, pages 36-41.

The proposed action is currently at reference design phase. The following actions have been undertaken to avoid, minimise, mitigate and offset impacts to MNES where possible:

- Targeted flora and fauna ecological investigations have been undertaken to ground-truth areas of mapped habitat and guide the design refinement process.
- Design optioneering has incorporated environmental assessment to inform selection of preferred options.

Specific design responses achieved through the processes outlined above has resulted in the following inclusions in the reference design for the subsequent design and construction phase of the proposed action:

- Fauna exclusion fencing has been proposed along the alignment of the proposed action in identified high value habitat areas to guide and funnel fauna to proposed fauna movement infrastructure
- Fauna exclusion fencing and fauna movement infrastructure will be designed to accommodate target fauna species based on ecological investigations within high value habitat areas adjacent to the alignment of the proposed action. Some design considerations include (but are not limited to):
    - Infrastructure vertical alignments and subsequent sizing of movement infrastructure.
    - The type of infrastructure that currently exists (eg. will the infrastructure upgrade require extension of culverts or duplication of a bridge).
    - Whether movement infrastructure is best placed over or under transport infrastructure.
    - The presence of biodiversity corridors and existing fragmentation in the landscape.
    - Whether the movement infrastructure is dedicated or serves a dual function for drainage.
- Park and ride facilities have been relocated east of the proposed rail alignment at Trinder Park to take advantage of areas which would otherwise be severed from Acacia Forest Park and ultimately serves to reduce fragmentation of mapped koala habitat caused by the proposed action.

- A retaining wall structure has been included adjacent to Edens Landing to minimise additional clearing of habitat, including marine plants, and subsequent impacts to water quality through decreased stability to riparian areas.

Design and construction mitigation responses to environmental risks will be developed further through detailed design and recorded in the Environmental Design Report (EDR) (can be provided to the Department upon request). The EDR will detail tangible design responses to the potential risks and mitigation strategies identified within the proposed action's environmental assessment(s) (Review of Environmental Factors) and ensure they are carried through to construction.

Any residual risks linked to the construction phase will be managed through the development of an EMP(C) (can be provided to the Department upon request) by the construction contractor. The EMP(C) must be submitted to and deemed suitable by TMR prior to the commencement of any ground disturbance works.

4.1.4.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

TMR is committed to reducing potential impacts on protected matters through avoidance and mitigation measures with offsets employed as a secondary measure to ameliorate residual impacts.

An Offset Strategy is being developed to address Commonwealth and State offset policies, guidance, recovery plans and conservation advice. The proposed action is seeking to secure and manage direct land-based offsets to compensate for significant residual impacts. The areas of offsetting will be determined using Commonwealth Offset Assessment Guide.

4.1.5 Migratory Species

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Species
Yes	Yes	Actitis hypoleucos
Yes	Yes	Apus pacificus
No	No	Ardenna grisea
Yes	No	Calidris acuminata
Yes	No	Calidris ferruginea
Yes	Yes	Calidris melanotos
No	No	Calonectris leucomelas
No	No	Caretta caretta
No	No	Charadrius leschenaultii
No	No	Chelonia mydas
Yes	Yes	Cuculus optatus
No	No	Dermochelys coriacea
No	No	Diomedea antipodensis
No	No	Diomedea exulans
No	No	Eretmochelys imbricata

Direct impact	Indirect impact	Species
Yes	Yes	Gallinago hardwickii
Yes	No	Hirundapus caudacutus
No	No	Lamna nasus
No	No	Lepidochelys olivacea
No	No	Limnodromus semipalmatus
No	No	Limosa lapponica
No	No	Macronectes giganteus
No	No	Macronectes halli
No	No	Mobula alfredi
No	No	Mobula birostris
Yes	Yes	Monarcha melanopsis
Yes	No	Monarcha trivirgatus
Yes	No	Myiagra cyanoleuca
No	No	Natator depressus
No	No	Numenius madagascariensis
Yes	Yes	Pandion haliaetus
No	No	Phaethon lepturus
Yes	Yes	Plegadis falcinellus
Yes	No	Rhipidura rufifrons
No	No	Symposiachrus trivirgatus
No	No	Thalassarche cauta
No	No	Thalassarche impavida
No	No	Thalassarche melanophris
No	No	Thalassarche salvini
No	No	Thalassarche steadi
Yes	Yes	Tringa nebularia
Yes	Yes	Tringa stagnatilis

4.1.5.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.5.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

The potential direct and indirect impact from the proposed action are described in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 5.0, pages 25-34, and summarised below.

Potential impacts of the Project Area considered for ecological MNES either identified within the Project Area or assessed as potentially present. Of the 21 listed migratory species identified in the PMST, 14 are known, likely or have potential to occur within the Project Area.

Of the listed migratory species known, likely or having potential to occur within the Project Area, the nature and extent of direct impacts to habitat include:

- 0.2 ha of foraging and dispersal habitat for Black-faced monarch (*Monarcha melanopsis*) and Spectacled monarch (*Monarcha trivirgatus syn. Symposiachrus trivirgatus*)
- 0.7 ha of foraging and dispersal habitat for Osprey (*Pandion haliaetus*)
- 13.2 ha of foraging and dispersal habitat for Sharp-tailed sandpiper (*Calidris acuminata*), Common sandpiper (*Actitis hypoleucos)* and Pectoral sandpiper (*Calidris melanotos*)
- 6.6 ha of foraging and dispersal habitat for Curlew sandpiper (*Calidris ferruginea*), Glossy ibis (*Plegadis falcinellus*), Common greenshank (*Tringa nebularia*), Marsh sandpiper (*Tringa stagnatilis*) and Latham's snipe (*Gallinago hardwickii*)
- 36.3 ha of foraging and dispersal habitat for Rufous fantail (*Rhipidura rufifrons*)
- 41.1 ha of foraging and dispersal habitat for Oriental cuckoo (*Cuculus optatus*) and Satin flycatcher (*Myiagra cyanoleuca*)
- 208.8 ha of foraging and dispersal habitat for Fork-tailed swift (*Apus pacificus*)
- 208.8 ha of foraging, dispersal and marginal roosting habitat for White-throated needletail (*Hirundapus caudacutus*).

During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C) to be developed as part of the proposed action.

These species are highly mobile and unlikely to be sensitive to potential indirect impacts associated with the proposed action.

4.1.5.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.5.6 Describe why you do not consider this to be a Significant Impact. *

Listed migratory species were screened for potential significant impacts **Attachment C –** Matters of National Environmental Significance Assessment Report, Appendix A, pages 16-21. As summarised in **Attachment C** – Matters of National Environmental Significance Assessment Report, Section 7.1.5, pages 44-45. Migratory species are considered to have a low risk of significant impact as defined under the EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (Department of the Environment, 2013a).

The Project Area offers potential suitable foraging and dispersal habitat within the migration range for a small number of individuals in the airspace above the wooded areas, and vegetation near wetlands and waterways. Migratory species will not breed in this habitat and the habitat does not provide unique features or areas important for the survival of the listed migratory species.

Direct impacts via vegetation clearing are unlikely to impact these species. The linear nature of the disturbance and the existing disturbances in the surrounding area suggest the proposed action will not result in habitat fragmentation for migratory species. The proposed action is unlikely to exacerbate threats to the species, as many threats already occur within the region. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the proposed action due to the existing presence of pests and weeds.

The extent of habitat present within the Project Area does not meet the thresholds suggested to lead to a significant impact to migratory species. Further, it is unlikely that this habitat supports an ecologically significant proportion of a migratory population.

4.1.5.7 Do you think your proposed action is a controlled action? *

No

4.1.5.9 Please elaborate why you do not think your proposed action is a controlled action. *

The proposed action is not anticipated to have a significant impact on Migratory Species and as such this is not expected to be a controlling provision of the action.

4.1.5.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

A summary of measures proposed to avoid or mitigate potential impacts to species is included in Attachment C – Matters of National Environmental Significance Assessment Report, Section 6.0, pages 36-41.

The proposed action is currently at reference design phase. The following actions have been undertaken to avoid, minimise, mitigate and offset impacts to MNES where possible:

- Targeted flora and fauna ecological investigations have been undertaken to ground-truth areas of mapped habitat and guide the design refinement process.
- Design optioneering has incorporated environmental assessment to inform selection of preferred options.

Design and construction mitigation responses to environmental risks will be developed further through detailed design and recorded in the Environmental Design Report (EDR) (can be provided to the Department upon request). The EDR will detail tangible design responses to the potential risks and mitigation strategies identified within the proposed action's environmental assessment(s) (Review of Environmental Factors) and ensure they are carried through to construction.

Any residual risks linked to the construction phase will be managed through the development of an EMP(C) (can be provided to the Department upon request) by the construction contractor. The EMP(C) must be submitted to and deemed suitable by TMR prior to the commencement of any ground disturbance works.

4.1.5.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

There are no proposed offsets relevant to this matter.

4.1.6 Nuclear

4.1.6.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.6.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

None of the activities associated with the proposed action could be considered a nuclear action as defined in Section 22 of the EPBC Act.

4.1.7 Commonwealth Marine Area

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.7.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.7.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The PMST did not identify any Commonwealth Marine Areas within 10 km of the Project Area.

4.1.8 Great Barrier Reef

4.1.8.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.8.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Great Barrier Reef Marine Park (GBRMP) covers an area of 348,000 km2 and is located off the coast of Queensland. The Project Area is roughly 16 km inland and 350 km from the southern extent of the GBRMP and therefore, it is unlikely to have any impacts on the GBRMP.

4.1.9 Water resource in relation to large coal mining development or coal seam gas

4.1.9.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.9.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

This action does not consist of coal seam gas development or large coal mining development.

4.1.10 Commonwealth Land

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.10.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.10.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The PMST identified four areas of Commonwealth Land within 10 km of the Project Area. They relate to Defence Training Areas and Depots, Annerley Training Depot [30237], Greenbank Training Area [31014], Moorooka Training Depot [31030], and Moorooka Training Depot [31029]. The Project Area does not intersect or impact these areas.

4.1.11 Commonwealth heritage places overseas

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.11.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.11.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Proposed Action is not located overseas.

4.1.12 Commonwealth or Commonwealth Agency

4.1.12.1 Is the proposed action to be taken by the Commonwealth or a Commonwealth Agency? *

No

4.2 Impact summary

Conclusion on the likelihood of significant impacts

You have indicated that the proposed action will likely have a significant impact on the following Matters of National Environmental Significance:

- Threatened Species and Ecological Communities (S18)

Conclusion on the likelihood of unlikely significant impacts

You have indicated that the proposed action will unlikely have a significant impact on the following Matters of National Environmental Significance:

- World Heritage (S12)
- National Heritage (S15B)
- Ramsar Wetland (S16)
- Migratory Species (S20)
- Nuclear (S21)
- Commonwealth Marine Area (S23)
- Great Barrier Reef (S24B)
- Water resource in relation to large coal mining development or coal seam gas (S24D)
- Commonwealth Land (S26)
- Commonwealth heritage places overseas (S27B)
- Commonwealth or Commonwealth Agency (S28)

4.3 Alternatives

4.3.1 Do you have any possible alternatives for your proposed action to be considered as part of your referral? *

No

4.3.8 Describe why alternatives for your proposed action were not possible. *

The proposed action relates to the duplication of approximately 20 km of rail corridor and upgrades to associated rail infrastructure between Kuraby and Beenleigh. The location of the proposed action is tied to the existing rail alignment for the majority of the Project Area. The exception to this is at Woodridge where track straightening is required to improve train speeds and connectivity to the rail network (see **Attachment G** – Alternatives Figures, Figures 1-3, pages 1-2). As part of this realignment, the Trinder Park station will be shifted from the existing station precinct to a site 1.2 km north. The new station will be more centrally located between the two nearest stations (Kuraby and Woodridge).

The bend near the Trinder Park station is one of the tightest curves on the SEQ rail network which significantly constrains train speeds and as a result, also generates significant noise for adjacent residents, due to wheel squeal as the trains travel around the sharp radius curve. An assessment of potential options for this location was completed as part of an earlier planning stage. This study took into account the environmental impacts of realigning the rail corridor, but concluded that realignment of the rail corridor at this location is necessary to

address the current constraints on rail-line speed, improve rail standards compliance and ultimately achieve the required outcomes for the transport network. By realigning the rail corridor here, there are also fewer impacts on residential properties (compared with widening the existing corridor) and the relocated station provides improved accessibility and connectivity to the surrounding precinct.

The relocation of Trinder Park Station will intersect Acacia Forest Park, which forms part of Karawatha Forest Park, an ecologically sensitive area. This is the only part of the rail alignment which is located within greenfield. During the design refinement stage, alternative options have been investigated for the park 'n' ride facility for this station to further minimise impacts on vegetation and koala habitat. Following design and stakeholder input, positioning the park 'n' ride on the eastern side was identified as the preferred option. It would result in less habitat fragmentation (compared to being located on the western side of the station); would be closer to residential areas, and would provide improved accessibility for private vehicles and improved serviceability for buses as the main residential catchment is located to the east of the rail corridor. The design footprint could also be reduced by a further ten percent at this location with negligible difference in terms of cost and construction. This would result in less vegetation impact.

For the 20 km duplication of the rail corridor, the design will continue to be refined within the Project Area with consideration for potential impacts to environmental constraints including vegetation and habitat for threatened species and interaction with waterways. As the Project Area encroaches on privately held residential allotments, the requirement for land acquisition within the Project Area is being progressed concurrently with this referral. TMR will continue to consult with property owners who may be subject to a partial or full land resumption as the design progresses.

5. Lodgement

5.1 Attachments

1.2.1 Overview of the proposed action

#1.	Attachment A - Proposed action additional information	Document	Additional information to describe the proposed action.
#2.	Attachment B Additional Works	Document	Additional information to describe additional works.

1.2.6 Commonwealth or state legislation, planning frameworks or policy documents that are relevant to the proposed action

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

1.2.7 Public consultation regarding the project area

#1.	Attachment D - Logan Gold Coast Faster Rail Update – Feb 2022	Document	Published project update
#2.	Attachment E – Logan Gold Coast Faster Rail Project Update – Sept 2022.	Document	Published project update
#3.	Have your say - Logan and Gold Coast Faster Rail	Link (Webpage)	https://www.yoursay-projects.tmr.qld.gov.au/logan-and-gold-coast-faster-rail
#4.	Logan and Gold Coast Faster Rail	Link (Webpage)	https://www.tmr.qld.gov.au/projects/logan-and-gold-coast-faster-rail

1.3.2.17 (Person proposing to take the action) Proposer's history of responsible environmental management

#1.	Environmental management	Link (Webpage)	http://www.tmr.qld.gov.au/Community-and-environment/Environmental-management
#2.	Environmental Processes Manual	Link (Webpage)	https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Environmental-processes-manual
#3.	Environmental Sustainability Policy	Link (Webpage)	https://www.tmr.qld.gov.au/-/media/communityandenvironment/Er Management/Environmental-sustainability-policy/Environmental-Sustainability-Policy.pdf?la=en

3.2.1 Flora and fauna within the affected area

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

3.2.2 Vegetation within the project area

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

3.3.1 Commonwealth heritage places overseas or other places that apply to the project area

#1.	Attachment F - Cultural Heritage Risk Assessment (CHRA)	Document	Cultural Heritage Risk Assessment for Project

3.3.2 Indigenous heritage values that apply to the project area

#1.	Attachment F - Cultural Heritage Risk Assessment (CHRA)	Document	Cultural Heritage Risk Assessment for Project

3.4.1 Hydrology characteristics that apply to the project area

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

4.1.3.2 (Ramsar Wetland) Why your action has a direct and/or indirect impact on the identified protected matters

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

4.1.3.6 (Ramsar Wetland) Why you do not consider the direct and/or indirect impact to be a Significant Impact

#1.

	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

4.1.4.2 (Threatened Species and Ecological Communities) Why your action has a direct and/or indirect impact on the identified protected matters

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

4.1.4.5 (Threatened Species and Ecological Communities) Why you consider the direct and/or indirect impact to be a Significant Impact

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.
#2.	Conservation Advice for Petauroides volans	Link (Webpage)	https://www.environment.gov.au/biodiversity/threatened/species/p conservation-advice-05072022.pdf
#3.	Conservation Advice for Phascolarctos cinereus (Koala)	Link (Webpage)	http://www.environment.gov.au/biodiversity/threatened/species/pu conservation-advice-12022022.pdf
#4.	National Recovery Plan for the Grey-headed Flying-fox	Link (Webpage)	https://www.dcceew.gov.au/sites/default/files/documents/recovery plan-grey-headed-flying-fox.pdf
#5.	Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999	Link (Webpage)	https://www.dcceew.gov.au/sites/default/files/documents/nes-guidelines_1.pdf

4.1.4.8 (Threatened Species and Ecological Communities) Why you think your proposed action is a controlled action

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

4.1.4.10 (Threatened Species and Ecological Communities) Avoidance or mitigation measures proposed for this action

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

4.1.5.2 (Migratory Species) Why your action has a direct and/or indirect impact on the identified protected matters

#1.	Attachment C –Matters of National Environmental	Document	Assessment of potential impact to MNES.

Significance Assessment Report		

4.1.5.6 (Migratory Species) Why you do not consider the direct and/or indirect impact to be a Significant Impact

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

4.1.5.10 (Migratory Species) Avoidance or mitigation measures proposed for this action

#1.	Attachment C –Matters of National Environmental Significance Assessment Report	Document	Assessment of potential impact to MNES.

4.3.8 Why alternatives for your proposed action were not possible

#1.	Attachment G – Alternatives figures	Document	Figures to support alternatives discussion

5.2 Declarations

Completed Referring party's declaration

The Referring party is the person preparing the information in this referral.

ABN/ACN	20093846925
Organisation name	AECOM AUSTRALIA PTY LTD
Organisation address	Level 8, 540 Wickham Street, Fortitude Valley QLD 4006, Australia
Representative's name	Jared Brook
Representative's job title	Principal Environmental Consultant
Phone	0431822333
Email	jared.brook@aecom.com
Address	Level 8, 540 Wickham Street, Fortitude Valley QLD 4006, Australia

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ By checking this box, I, **Jared Brook of AECOM AUSTRALIA PTY LTD**, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

Completed Person proposing to take the action's declaration

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	39407690291
Organisation name	Department of Transport and Main Roads
Organisation address	Floor 3, 61 Mary Street, Brisbane 4000, QLD
Representative's name	Lynnell Davis
Representative's job title	Principal Environmental Officer
Phone	07 3066 3630
Email	lynnell.w.davis@tmr.qld.gov.au
Address	Floor 3, 61 Mary Street, Brisbane 4000, QLD

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ I, **Lynnell Davis of Department of Transport and Main Roads**, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

✔ Completed Proposed designated proponent's declaration

The Proposed designated proponent is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ I, **Lynnell Davis of Department of Transport and Main Roads**, the Proposed designated proponent, consent to the designation of myself as the Proposed designated proponent for the purposes of the action described in this EPBC Act Referral. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

Attachment A: Proposed action additional information

Further information in relation to the Key features is provided below:

Proposed action key features	Further description of key features
Duplication of approximately 20km of rail corridor and upgrades to associated rail systems between Kuraby and Beenleigh Stations resulting in an increase from two tracks to four tracks.	Twenty kilometres (20km) of rail formation widening and duplication of existing two to four tracks. Requires rail corridor widening and track slews. Rail system upgrades include new overhead wire requirement, traction power upgrades.
Eight station upgrades including a station relocation (Trinder Park Station) to improve accessibility, safety and amenity, including platform straightening, and new pedestrian bridges.	Eight Station upgrades including new island platforms – *all Disability Discrimination Act 1992* compliant, new station buildings, new pedestrian overpasses with vertical transport. Updated station accessibility systems including hearing loops, CCTV and help points. Improved rail staff facilities and customer services. Improved primary path of access from the station platforms to the surrounding precinct.
Park 'n' Ride upgrades, including a new multi-story Park 'n' Ride at Beenleigh Station with an integrated bus interchange	The station upgrades include new park ‘n’ ride facilities including improved bus facilities for transit interchange, new kiss ‘n’ ride facilities, new *Disability Discrimination Act 1992* compliant parking, new station entrance with improved pedestrian and traffic access. Beenleigh station includes a multi-storey car park and bus station with improved transit interchange and accessibility to the station via a raised concourse.
Extension of the cattle siding at Holmview Station	Extension of the Holmview abattoir cattle siding to a full length (680m) so that trains can be accommodated without having to be broken in half at a nearby stabling yard improving operations.

Proposed action key features	Further description of key features
Potential duplication of the rail tunnel under Beenleigh Town Square	The corridor widening to accommodate two new tracks may require a new tunnel portal to be constructed adjacent to the existing rail tunnel underneath Beenleigh Town Square.
Dedicated active transport facilities and paths along the corridor	Active transport corridor, generally 6m wide, has been provided along the rail corridor. The active transport corridor (ATC) will alternate between one side of the corridor to the other at various locations via ATC bridges to maximize catchment and minimise land impacts.
Dedicated rail maintenance access road adjacent to project corridor	Dedicated rail maintenance access roads (RMAR) have been provided along the corridor for Queensland Rail to gain access to critical infrastructure. 50% of the route has a single RMAR and, land constraints permitting, the other 50% of the corridor has two RMARs either side of the corridor. RMAR have passing bays provided nominally every 200m with access points to the local road network along the corridor.
Adjacent local road network alterations associated with the railway duplication	Where the widened rail corridor is flanked by local roads, these have been realigned to accommodate the track duplication. Where corridor widening has impacted properties, road alterations have been required to maintain property access, cul-de-sac truncated roads and upgrade some local intersections.
Public Utility Plant (PUP) relocations	The Public Utility Plant (PUP) activities will include the relocation or protection of existing overhead and underground telecommunications, gas, electricity, water and sewerage assets including pipes, pits, conduits, cables/wires, poles and pump stations. PUP works include connections to stations and associated rail infrastructure. PUP assets are traditionally located within defined road corridors, easements or transverse crossings of the rail corridor.
Removal of a rail level crossing at Spanns Road, Holmview	Given Spann's Road has low traffic volumes and that there is an alternative access via Boundary Road to residential areas currently serviced by Spanns

Proposed action key features	Further description of key features
	Rd, it is proposed to close this level crossing and cul-de-sac Spann's Road, either side of the rail corridor. In order to maintain flood immunity of residential areas currently serviced by Spanns Road, some local road works will need to raise existing levels to provide flood immunity. This key feature has been included as part of the 'proposed action' as no grade separation works are proposed following the removal of the level crossing.
Removal of a rail level crossing at Trinder Park	Removal of the existing rail level crossing near Trinder Park within the rail corridor. A new grade-separated road connection will be provided closer to the relocated Trinder Park Station.
Removal of a rail level crossing at Holmview Road	Removal of the existing rail level crossing at Holmview Road within the rail corridor. The road either side of the level crossing will be permanently closed and formed as a 'cul-de-sac' with turning area provided for vehicles.

Attachment B: Additional works

The additional works, discussed below, do not form part of the proposed action or the proposed disturbance footprint, the subject of this referral under the EPBC Act. These additional works are independent of the activities to be undertaken as part of the proposed action as described below and are generally beneficial to the operation of the road and rail network regardless of whether the proposed action proceeds. These works are identified in this referral for clarity, as some of these works will occur proximate to the proposed action, however, are not part of the proposed action.

To ensure all potential environmental impacts are identified, evaluated and appropriately mitigated, TMR operates under the guiding principles of its Environmental Policy and Environmental Management System. The policy outlines how TMR manages impacts on natural, human and cultural environments. TMR undertakes works in accordance with their comprehensive Environmental Processes Manual (EPM), which applies a risk-based approach to identify, assess and manage environmental risks. These additional works will be assessed under the EPM to ensure environmental impacts are assessed and mitigation measures are implemented to avoid, minimise and mitigate impacts.

a. Grade separations

The Queensland Level Crossing Safety Strategy 2012-2021, refreshed with the 2019 Update: On Track to Zero Harm, sets out TMR's strategy to improve safety at level crossings in Queensland. As part of this strategy, TMR are undertaking a program of works to eliminate level crossings across the network. A level crossing is any crossing of a railway at grade, providing for both vehicular traffic and other road users, including pedestrians. There are more than 2,800 level crossings in Queensland. Level crossing collisions between trains and vehicles are a major safety risk.
These additional works are outside the scope of the referred action described in the referral and involve removal of three level crossings and construction of 'grade separations' (bridges) to reinstate cross-corridor access for vehicles at these locations.
The three locations where these works are proposed include:

- Location 1 – Beenleigh Road at Kuraby
- Location 2 – Upgrade of the existing Kingston Road at Kingston
- Location 3 – Station Road at Bethania

The grade separation works will bring current level crossings up to the required compliant design safety standards, which will be beneficial to the operation of the surrounding road network.
The grade separation works will include the construction of the grade separation with adjustments as required to the local road network to accommodate the new infrastructure. These works will consist of proposed level crossing removals and associated works where 'grade separation' bridges will be constructed.
All of the works are proposed to be undertaken within the existing road corridor and are expected to commence in 2024. Should the proposed action not proceed, the grade separations can operate at 100% of their design capacity with no additional works required.
TMR have undertaken an assessment of the proposed grade separation works at these locations and is satisfied that there is no impact on MNES. The environmental assessment of the grade separations works will also be documented in line with TMR's EPM.

b. European Train Control System (ETCS)

European Train Control System (ETCS) is a new generation train signalling system that provides automated train protection and communications-based signalling. TMR intends to roll out ETCS across

the Southeast Queensland rail network. In April 2019, the major contractor for the delivery of ETCS was announced and development of the delivery schedule is currently underway.

The ETCS – Inner City project, combined with the roll out of ETCS through the Cross River Rail tunnel to Salisbury, represents the first phase of the signalisation upgrade of the Gold Coast Line. The rollout will continue from north to south in steps, nominally Salisbury to Kuraby, Kuraby to Beenleigh and Beenleigh to Varsity Lakes. This will result in a complete signalling connection established from Brisbane to the Gold Coast.

ETCS will be completely independent of the proposed action and will still be rolled out regardless of whether the proposed action is constructed or not. As all the works are proposed within the rail corridor, there will be no impact on MNES. TMR have undertaken an assessment and is satisfied that there is no impact on MNES.

Prepared for
Department of Transport and Main Roads
ABN: 39 407 690 291

Matters of National Environmental Significance Assessment Report

Logan and Gold Coast Faster Rail

20-Dec-2022
Logan and Gold Coast Faster Rail

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Matters of National Environmental Significance Assessment Report

Logan and Gold Coast Faster Rail

Client: Department of Transport and Main Roads

ABN: 39 407 690 291

Prepared by

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Table of Contents

1.0 Introduction

This report has been prepared in support of a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) for the Logan and Gold Coast Faster Rail Project. The report provides an assessment of the project's potential impact on Matters of National Environmental Significance (MNES) to inform the determination as to whether it constitutes a controlled action. This report is intended to be read in conjunction with the EPBC Act referral.

To provide a comprehensive assessment of potential impacts on MNES, this report has been structured to provide additional information to supplement the information provided in the referral. A summary of the report structure and content is provided in **Table 1**.

Table 1 Report structure

Section	Description
Section 1.0	Details the proposed action, including the proposed scope of works, project background and proposed activities.
Section 2.0	Describes the methodology and approach taken to make an assessment of potential impacts to MNES.
Section 3.0	Summarises the legislative context, including Commonwealth and State matters considered in the assessment.
Section 4.0	Describes the existing environment of the Project Area, particularly as it relates to MNES considered in the assessment.
Section 5.0	Presents the assessment of direct and indirect impacts of the proposed action.
Section 6.0	Details the project-specific mitigation measures proposed to avoid and reduce potential impacts on MNES as a result of the proposed action.
Section 7.0	Provides a clear assessment of the potential impacts of the proposed action on each of the MNES.
Section 8.0	Summarises the outcomes of the assessment of the proposed action's potential impacts on MNES.
Section 9.0	Lists the references considered in the assessment.

1.1 Summary of the proposed action

1.1.1 Description of the proposed action

The State of Queensland, represented by the Department of Transport and Main Roads in Queensland (**TMR**) is proposing to duplicate the existing rail corridor between Kuraby and Beenleigh Station from two to four tracks, including associated station and rail system upgrades (the **proposed action**).

Key features of the **proposed action** include the construction of the following:

- Duplication of approximately 20 kilometres (km) of rail corridor and upgrades to associated rail systems between Kuraby and Beenleigh Stations resulting in an increase from two tracks to four tracks;
- Eight station upgrades including a station relocation (Trinder Park Station) to improve accessibility, safety and amenity, including platform straightening, and new pedestrian bridges;
- Park 'n' Ride upgrades, including a new multi-story Park 'n' Ride at Beenleigh Station with an integrated bus interchange;
- Extension of the cattle siding at Holmview Station;
- Potential duplication of the rail tunnel under Beenleigh Town Square;
- Dedicated active transport facilities and paths along the corridor;
- Dedicated rail maintenance access road adjacent to the rail corridor;

- Adjacent local road network alterations associated with the railway duplication; and
- Removal of rail crossings at Woodridge (Railway Parade), Holmview (Spanns Road) and Beenleigh (Holmview Road).

1.1.2 Purpose of proposed action

To support growing population and rail patronage demand between Brisbane, Logan and the Gold Coast, the number of Beenleigh and Gold Coast train services will need to double over the next 20 years. The rail line between Kuraby and Beenleigh is a key capacity bottleneck on the rail corridor. The Queensland Government, together with the Australian Government, has committed $2.6 billion towards increasing the number of tracks between Kuraby and Beenleigh from two to four tracks, with modernised rail systems, station upgrades and level crossing removals. Additional tracks will require a wider rail corridor and track straightening in some areas.

1.1.3 Proposed action activities

The proposed construction activities include:

- Site preparation works, including clearing and grubbing, earthworks, and establishment of temporary construction compounds and laydowns;
- Public Utility Plant (PUP) relocation works;
- Construction of new tracks, including bridges and associated drainage works;
- Roadworks (including minor road realignments resulting from track widening); and
- Station rebuilds (including upgrade and relocation of stations).

All construction activities are within the Project Area, including an allowance of approximately 20 ha for temporary construction compounds and laydown.

Figure 1 Overview of the proposed action

2.0 Methodology

2.1 Project Area

The **Project Area** for the proposed action is based on the reference design and includes allowance for future design progression as well as buffers to accommodate construction and land use requirements (e.g. laydown areas). The Project Area is approximately 295 hectares (ha) in size, extending approximately 20 km from Kuraby to Beenleigh.

The design of the proposed action will be refined within the Project Area with consideration for potential impacts to environmental constraints including vegetation and habitat for threatened species and interaction with waterways. Given the current level of design (reference design), it is conservatively assessed that the proposed action involves total clearing of the Project Area. It is expected that the extent of clearing will reduce as the design progresses and, therefore, this assessment presents a 'worst-case' scenario.

As the Project Area encroaches privately held residential allotments, the requirement for land acquisition within the Project Area is being progressed concurrently with this referral. TMR will continue to consult with property owners who may be subject to a partial or full land resumption as the design progresses.

The ecological values of the Project Area are provided in **Section 4.3**. For the habitat within the Project Area, further detail on habitat condition and utilisation for each matter of national environmental significance (MNES) is provided in **Appendix A**.

2.2 Desktop assessment

A desktop assessment was undertaken to characterise and identify ecological values that may be present in the Project Area. The desktop assessment included a review of the following publicly available datasets and online mapping:

- EPBC Act Protected Matters Search Tool (PMST) Interactive Map, to identify MNES that may occur within the Project Area (Department of Agriculture Water and the Environment, 2022a),
- WildNet Records: Species List report to identify flora and fauna species records within or surrounding the Project Area (Department of Environment and Science, 2022c),
- Atlas of Living Australia (ALA) database to identify locations of previously recorded flora and fauna within or surrounding the Project Area (Atlas of Living Australia, 2022),
- Queensland Department of Environment and Science (DES) Environmental reports: Matters of State Environmental Significance, including essential habitat, wetlands and waterways, and regulated vegetation (Department of Environment and Science, 2022a),
- The Queensland Herbarium Regional Ecosystem Description Database (REDD) for current Regional Ecosystem (RE) descriptions and geological and land zone descriptions (Queensland Herbarium, 2021a), and Department of Resources (DoR) Regional Ecosystem (RE), essential habitat, watercourse and wetland mapping (Department of Resources, 2022),
- DoR Regulated Vegetation Management Map to determine the extent of Category A, Category B, Category C and Category R vegetation within and surrounding the Project Area (Department of Resources, 2022a).
- DES map of Queensland wetland environmental values to identify high ecological significance wetlands and general ecological significance wetlands (Department of Environment and Science [DES], 2021b),
- DES Protected Plants Flora Survey Trigger Map to identify the high-risk areas for protected plants (Department of Environment and Science, 2022b)
- National Flying-Fox Monitoring Viewer (DAWE, 2022) to identify locations of mapped flying fox roosts
- Species distribution maps from various current field guides

- Historical aerial imagery (Q Imagery, 2021)
- Previous ecological assessments undertaken within the Project Area:
  - Logan and Gold Coast Faster Rail Loganlea Station Relocation and Park 'n' Ride Expansion Project Terrestrial Flora and Fauna Assessment (AECOM, 2022)
  - Logan and Gold Coast Faster Rail Project Supplementary Ecological Assessment (Ausecology, 2022) (**Appendix B**)
  - Logan and Gold Coast Faster Rail Review of Environmental Factors (GHD Aurecon, 2021)
  - Logan and Gold Coast Faster Rail Ecology Assessment Report (GHD, 2021) (**Appendix E**)

Information collected as part of the desktop assessment was reviewed and used in the preparation of the field survey, to identify flora and fauna species potentially found within and/or utilising the Project Area, and to determine appropriate survey techniques to employ.

Within a highly urban environment, a 5 km search radius was applied for the PMST and WildNet databases to capture the surrounding environment and ecological values with potential to be directly or indirectly impacted in the vicinity of the Project Area.

2.3 Field assessment

Field assessments conducted to ground truth vegetation communities, assess habitat values and identify threatened flora, fauna and ecological communities are identified in **Table 2**.

Table 2 Field survey effort – flora and fauna

Location	Scope	Lead	Timing
Within and adjacent to Project Area, including rail corridor and adjacent land parcels where access permitted.	• Ground-truthing regional ecosystems • Identifying threatened ecological communities • Habitat assessments • Opportunistic search for threatened fauna and flora • Opportunistic checks for koala scats and scratches • Targeted fauna surveys, including spotlighting • Opportunistic observations of culverts for fauna passage • Recording exotic fauna and flora species.	Ausecology	13 July - 8 August 2022
Within parkland areas in and adjacent to the Project Area (refer Figure 2 of Appendix C)	• Detection dog searches to detect koala individuals, scats and scratches	OWAD	4 June 2022 25-28 July 2022
Armstrong Road, Logan (Logan Station Relocation and Park 'n' Ride)	• Habitat assessments • Animal breeding places • Location and count of non-juvenile koala habitat trees	AECOM	1 June 2022 6 June 2022
Within and adjacent to Project Area, including rail corridor and adjacent land parcels where access permitted; 53 survey sites.	• Habitat assessment surveys • Targeted trace surveys • Spot assessments • Bird senses surveys • Active frog reptile surveys • Opportunistic checks for koala scats and scratches	GHD	3-5 June 2019 (WSP) 10-24 February 2021

2.3.1 Flora

A flora field assessment was undertaken to classify and map REs and to identify flora species, including threatened flora. The extent, classification and condition of ground-truthed vegetation communities within the Project Area was validated in accordance with the *Methodology for surveying and mapping regional ecosystem and vegetation communities in Queensland* (Neldner et al., 2022). This involved traversing vegetation on foot throughout the Project Area, and undertaking quaternary level assessments.

Quaternary-level sites were used to verify vegetation units and confirm dominant characteristic species. Structural analysis included recording the height class and life form of the dominant species within the mid and canopy strata as per Neldner et al. (2022). Evidence of previous disturbance, incidence of exotic species and general notes on soil type and ecological integrity were compiled for each quaternary survey site.

At each quaternary point, RE classification was confirmed using the definitions of remnant, regrowth, and non-remnant vegetation, as defined under the *Vegetation Management Act 1999* (Qld) (VM Act). The relevant BioCondition benchmark was used to assess height and coverage of the canopy and characteristic species, in conjunction with technical descriptions for the RE where available. Regrowth was confirmed in the field; where aerial imagery has shown areas have not previously been cleared for last 15 years, the regrowth was classified as High Value Regrowth (HVR) in the data.

The listing advice for each potentially occurring threatened ecological community (TEC) was examined and, during ground-truthing of REs, any REs likely to be associated with one (or more) TECs were further assessed against the descriptions, condition categories and thresholds as detailed in the respective approved conservation advice documents.

In addition to recording species at each sampling site, plant species were recorded opportunistically during the survey, including searching for threatened species.

2.3.1.1 Specimen identification and nomenclature

Specimens of any plant taxa that could not be identified in the field were collected, pressed and dried in accordance with the requirements of the Queensland Herbarium (Bean, 2016). Dried specimens were then identified through reference books and keys and through comparison with named species. Nomenclature used in this report follows that of the Queensland Herbarium census (Brown, G.K. & Bostock, 2020).

Taxonomic nomenclature used for the description of floral species is according to Census of the Queensland Flora 2018 (Bostock & Holland, 2018). Exotic flora species are signified in text by an asterisk (*) (Townsend, 2007).

2.3.2 Fauna

2.3.2.1 Habitat Assessments

Habitat assessments were undertaken to characterise the fauna habitat values within the Project Area. These assessments provide an indication of likely fauna utilisation, and suitability for fauna species, including threatened fauna. Habitat attributes recorded during the assessment include:

- Vegetation structure and dominant species, including a description of canopy, shrub and ground layer structure and composition.
- Presence and abundance of small, medium and large tree hollows and stags.
- Presence and abundance of woody debris such as habitat logs and ground timber.
- Rocky habitat such as surface rocks, boulders, crevices, overhangs and caves.
- Presence of watercourses, wetlands or artificial waterbodies (e.g., dams).
- Presence and abundance of important koala food and shelter trees.
- Availability and abundance of leaf litter cover, bare ground, grasses, and low forbs/shrubs.
- Presence and abundance of fruiting and nectar producing plant cover.

- Disturbance from invasive weeds/pests.
- Other threats or disturbances such as grazing pressure, clearing, thinning or fire.
- Any other significant habitat features or values present.

Included in the habitat assessments were searches for signs of animal activity, including tracks, scats, scratches, bones, fur, feathers, nests, foraging holes and diggings. At all fauna habitat assessment locations, incidental observations and visual and auditory survey of birds were conducted.

2.3.2.2 Animal breeding places

A non-invasive assessment of animal breeding places was conducted for animals listed as least concern, colonial breeders, special least concern, near threatened, vulnerable, endangered and critically endangered under the *Nature Conservation Act 1992* (Qld) (NC Act). This was completed by a suitably qualified ecologist and was conducted as per the guidelines (Department of Environment and Science, 2016). Primary targeted animal breeding places included bird nests and hollow-bearing trees. This survey was non-invasive and as such individual hollows or nests which were out of reach could not be checked to determine if they were actively being used by a protected animal to incubate or rear the animal's offspring.

2.3.2.3 Fauna Survey

Supplementary fauna surveys involved nocturnal spotlighting searches targeting *Phascolarctos cinereus* (koala), *Petauroides volans* (greater glider), *Ninox strenua* (powerful owl), *Pteropus poliocephalus* (grey-headed flying fox) and *Petaurus australis australis* (yellow-bellied glider (southern subspecies)). These surveys included random meander transects of approximately 30 person minutes per hectare, with two people walking 25 m apart where space permitted. The spotlighting also targeted particular trees identified as potential stags with habitat for Greater Glider.

Methods and data capture were undertaken in accordance with the Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Version 3.0 (Eyre et al., 2018). Spotlight events focused on seven 'high-risk' habitat areas for the target species, such as larger patches of forest and areas mapped as essential habitat and/or core koala habitat (**Appendix B**).

Field assessments also included:

- Opportunistic photos of any culverts encountered to inform fish passage requirements.
- Opportunistic records of exotic fauna and flora species encountered during surveys.
- Opportunistic searches for threatened plants.
- Opportunistically observed flora and fauna records.
- Opportunistically checking for koala animals, scats and scratches.

2.3.2.4 Koala Detection Survey

A non-invasive survey for the koala (*Phascolarctos cinereus*) was conducted at targeted areas (refer **Figure 2**, **Appendix C**) within the Project Area. The field survey was conducted over a total of four days which occurred on 4 June 2022 (half day), 25, 26 and 27 July 2022 (full days) and the remaining half day on 28 July 2022. A total of 51.5 km of detection dog searches were performed in this study. The survey was performed by OWAD Environment (OWAD), including two of OWAD's purpose-bred professional field detection canines certified for koala detection. Convenience sampling was selected as an appropriate design for this survey in order to enable maximum assessment of the sites within the four days of field survey. Convenience sampling is a form of non-probability sampling of readily accessible areas using on-leash and opportunistic searches.

2.4 Limitations

All flora and fauna species were recorded using the current nomenclature presented in the Census of Queensland Flora 2021 (Brown, 2021) and the QLD Wildlife Data API, 2021 (State of Queensland, 2021) respectively.

A flora field survey has inherent limitations associated with the variability of vegetation communities across a survey location, and changes to the detectability and presence of species over time. The seasonal condition during which the survey was undertaken was conducive to a relatively high degree of detectable floral diversity. However, it is recognised that a single field study cannot always account for 100% of potential floral diversity present across a survey location.

The detection of fauna species during habitat assessments is limited, given the cryptic and nocturnal nature of many fauna. The species directly observed during this survey are opportunistic sightings only and not considered exhaustive. However, habitat assessment has been undertaken to identify the potential species within the Project Area, specifically threatened and migratory species.

Field survey data collection to inform mapping was conducted using a hand-held iPad unit with aerial imagery. The accuracy of the iPad is generally +/-5 metres and is not intended to be relied upon for design purposes.

2.5 Assessment of Matters of National Environmental Significance

Detailed description of relevant MNES and assessment of potential for significant impacts is presented in **Section 7.0**. This section describes the assessment approach for threatened species and ecological communities, and migratory species.

2.5.1 Likelihood of Occurrence Assessment

The Commonwealth Protected Matters Search for the Project Area identified 28 flora species and 57 fauna species listed under the EPBC Act with the potential to occur within the 5 km search area.

The Review of Environmental Factors report by GHD (2021) produced a likelihood of occurrence table, used to inform the searches and results of the Ausecology report in 2022. The GHD Ecology report searched a 1 km search area around the Project Area, finding 20 flora and 53 fauna EPBC listed species from the PMST search, and an additional 5 fauna, and 4 flora state listed species from the WildNet search.

As part of this assessment, updates were made to the Likelihood of Occurrence assessment undertaken by GHD 2021 based on known habitat and ecological requirements of the species/TECs against the vegetation and habitat types identified in the field survey. Ausecology (2022) identified 97 species in the desktop assessment to be subject to the likelihood of occurrence assessment. It was determined that 4 species are ‘Confirmed present’, 4 species as ‘Known’, 18 species as ‘Likely to occur’, 17 species as ‘May occur’, and 54 species as ‘Unlikely to occur’.

2.5.2 Significant Impact Assessment

For MNES known, likely or having potential to occur within the Project Area, the assessment comprises a two-step process to assess the potential for significant impacts. The purpose of the two-step approach was to focus in on the key MNES (ecological) values with potential to be significantly impacted by the proposed action.

The first step was a risk assessment, which involved reviewing the nature and magnitude, as well as likely consequences of potential impacts resulting from the proposed action. The findings of the risk assessment determined the vulnerability of MNES to potential impacts, and whether further assessment via the significant impact assessment process was necessary to determine potential significant impacts.

2.5.2.1 Screening Assessment

A risk assessment is applied to identify MNES at risk of potential significant impacts from the proposed action. The potentially occurring direct and indirect impacts on MNES have been assessed based on a ‘worst-case’ scenario of impacts and consequences (see **Table 4**), and the understood likelihood of the anticipated impacts occurring (see **Table 3**). Given the current level of design (reference design), it is conservatively assessed that the proposed action involves total clearing of the Project Area. It is expected that the extent of clearing will reduce as the design progresses and, therefore, this assessment presents a ‘worst-case’ scenario. The outcome of these assessments was evaluated via a comprehensive risk matrix to determine the level of risk of significant residual impacts to relevant MNES (see **Table 5**).

To determine the anticipated consequence, the nature and magnitude of potential impacts were assessed against three consequence levels which contained multiple criteria. Consideration was given to the context of the ecology of the specific MNES, such as community or species' distribution, habitat preferences including breeding habitat and movement patterns. For MNES with referral guidance documents, any terminology, area thresholds and recommendations detailed within were considered foremost. Knowledge gaps and known threats were also reviewed.

Within the risk assessment framework, to assign a consequence level of one or two, all criteria associated with that level must be met, otherwise a level three is automatically assigned. Only one of the criteria in consequence level three needs to be met for that level to be assigned.

MNES that are evaluated via the risk matrix with a 'potential' risk rating triggered further assessment whilst MNES with a 'low' risk rating required no further assessment. The risk assessment framework, including likelihood and consequence criteria for specific MNES is outlined in **Table 3**, **Table 4** and **Table 5**.

Table 3 Risk assessment likelihood criteria

Likelihood level	Criteria
Highly unlikely	• May only occur in exceptional circumstances • No previous incidence of occurring
Unlikely	• Very low chance of occurring • One rare previous incidence of occurring
Possible	• Might occur in some circumstances • Few previous incidences of occurring

Table 4 Risk assessment consequence criteria

Consequence level	Criteria	
	Threatened species and communities	**Migratory species**
1	• No impacts to threatened species populations, ecological communities, habitat extent and habitat quality; **and** • No increase in threatening processes to threatened species and ecological communities; **and** • Threatened species and ecological communities recovery or persistence is unaffected.	• No impacts to migratory species habitat extent and habitat quality; **and** • No increase in threatening processes to migratory species; **and** • Area of habitat within the Project Area is not nationally or internationally significant **and** • Migratory species recovery or persistence is unaffected.
2	• Impacts to threatened species, ecological communities and associated habitats are of a low magnitude or are short-term; **and** • Increased threatening processes to threatened species and ecological communities can effectively be mitigated by well characterised management measures; **and** • In a regional context, reduction in available habitat is inconsequential; **and** • Species specific referral guidance (if available) indicates a low risk.	• Impact area is below species-specific clearing thresholds (if available); **and** • No impacts to areas supporting an ecologically significant proportion of a population; **and** • Impacts to migratory species important habitat are of a low magnitude or are short-term; **and** • Increased threatening processes to migratory species can effectively be mitigated by well characterised management measures; **and** • In a regional context, reduction in available habitat is inconsequential.
3	• Species has been confirmed within the Project Area or in adjacent properties; however uncertainty on population density, population	• Multiple individuals were recorded using habitat within the Project Area; • Close to or above species-specific clearing thresholds (if available); **or**

Consequence level	Criteria	
	Threatened species and communities	**Migratory species**
	dynamics and or habitat utilisation occurs; **or** • Population numbers and habitat utilisation within the Project Area may vary temporally and spatially due to dependence on climatic conditions i.e. rainfall events recharging wetlands. Therefore, full extent of potential impacts on threatened species is uncertain; **or** • Impacts to threatened species, ecological communities and associated habitats are of a moderate or high magnitude or are longer-term; **or** • Increased threatening processes to threatened species and ecological communities require more intensive, longer term management or intervening measures to mitigate impacts; **or** • Receiving environment is more sensitive to impacts or the consequence of the impact is uncertain; **or** • In a regional context, reduction in available habitat is notable; **or** • Species specific referral guidance (if available) indicates a moderate or high risk.	• Impacts to areas supporting or close to supporting an ecologically significant proportion of a population; **or** • Impacts to migratory species important habitat are of a moderate or high magnitude or are longer-term; **or** • Increased threatening processes to migratory species require more intensive, longer term management or intervening measures to mitigate impacts; **or** • Receiving environment is more sensitive to impacts or the consequence of the impact is uncertain; **or** • In a regional context, reduction in available habitat is notable.

Table 5 Risk assessment outcome matrix

Likelihood	Consequence		
	1	**2**	**3**
Highly unlikely	Low risk – no further assessment required	Low risk – no further assessment required	Low risk – no further assessment required
Unlikely	Low risk – no further assessment required	Low risk – no further assessment required	Low risk – no further assessment required
Possible	Low risk – no further assessment required	Low risk – no further assessment required	Potential risk – further assessment required

2.5.2.2 Significant Impact Assessment

The EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (DotE, 2013) provides the framework to assess the potential impacts on MNES, and determine significance and severity of impacts.

As per this guideline, this assessment has determined impacts on MNES by utilising the broadest scope of the proposed action, and considers both direct and indirect impacts, as well as the measures proposed to avoid and reduce impacts.

The significant impact criteria utilised in the assessment is outlined in **Table 6**, tailored to the conservation status or type of each MNES.

Table 6 Significant impact criteria and key definitions

Criteria	Key definitions
Critically endangered and endangered species and ecological communities	
An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will: • Lead to a long-term decrease in the size of a population • Reduce the area of occupancy of the species; • Fragment an existing population into two or more populations • Adversely affect **habitat critical to the survival of a species** • Disrupt the breeding cycle of a population; • Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; • Result in invasive species that are harmful to a Critically Endangered or Endangered species becoming established in the Endangered or Critically Endangered species' habitat; • Introduce disease that may cause the species to decline; or • Interfere with the recovery of the species.	'**Habitat critical to the survival of a species'** refers to areas that are necessary: • For activities such as foraging, breeding, roosting, or dispersal • For the long-term maintenance of the species (including the maintenance of species essential to the survival of the species, such as pollinators); • To maintain genetic diversity and long-term evolutionary development, or • For the reintroduction of populations or recovery of the species.
Vulnerable species and ecological communities	
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will: • Lead to a long-term decrease in the size of an important population of a species; • Reduce the area of occupancy of an important population; • Fragment an existing important population into two or more populations; • Adversely affect habitat critical to the survival of a species; • Disrupt the breeding cycle of an important population; • Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; • Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat; • Introduce disease that may cause the species to decline; or • Interfere substantially with the recovery of the species.	'Habitat critical to the survival of a species' as defined above. An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: Key source populations either for breeding or dispersal; Populations that are necessary for maintaining genetic diversity, and/or Populations that are near the limit of the species range.
Migratory species	
An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will: • Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species • Result in an invasive species that is harmful to the migratory species becoming established in	An area of **'important habitat'** for a migratory species is: • Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or • Habitat that is of critical importance to the species at particular life-cycle stages, and/or • Habitat utilised by a migratory species which is at the limit of the species range, and/or

Criteria	Key definitions
an area of important habitat for the migratory species, or • Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	• Habitat within an area where the species is declining. • Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

3.0 Legislative context

3.1 Legislation and policy requirements

3.1.1 Commonwealth

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act identifies 'nationally significant' animals, plants, habitats and places as MNES to be protected. The Project Area intersects locations with potential to support habitat for MNES. To assess potential impacts of land use changes and new developments, a significant impact assessment informed by desktop and field investigations was undertaken against the EPBC Act significant impact guidelines, which indicates the proposed action is likely to have a significant impact on MNES.

The EPBC Act recognises Weeds of National Significance (WONS), which threaten natural landscapes, waterways and coastal areas by displacing native species, contributing to land degradation and reducing farm and forestry productivity. Threat abatement plans are considered to identify research, management, and other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities to assist the long-term survival of affected native species or ecological communities in the wild.

3.1.2 State

Aboriginal Cultural Heritage Act 2003

The Project Area is located across land belonging to numerous Traditional Owner Groups. These include the Jagera People and Turrbal Association in the north, the Danggan Balun (Fiver Rivers) through the central extent to Logan River and the Gold Coast Native Title Group in the southern extent.

Consultation with the relevant Traditional Owner groups will manage residual risk to heritage values. Requirements of resultant Cultural Heritage Management Agreements will be carried forward into the construction phase and incorporated into the Construction Contractors Environmental Management Plan – Construction (EMP(C)).

Queensland Heritage Act 1992

There are several listed heritage items in or within proximity to the Project Area under the Queensland Heritage Register / Queensland National Trust Heritage Register, Logan City Council Heritage Register, and Brisbane City Council Heritage Register.

Consultation with relevant stakeholders responsible for managing identified historical heritage places will manage the residual risk to heritage places. Management measures resulting from stakeholder engagement will be carried forward into the construction phase and incorporated into the Construction Contractors EMP(C).

***Acquisition of Land Act 1967* (ALA)**

The proposed action will require residential property acquisitions, by way of negotiation or resumption under the ALA within the Project Area. The Project Area for the proposed action has been developed based on the reference design and includes allowance for future design progression as well as construction buffer and land use requirements (e.g. laydown areas). The design will be refined within the Project Area with consideration for potential impacts to environmental constraints including vegetation and habitat for threatened species and interaction with waterways. As the Project Area encroaches privately held residential allotments, the requirement for land acquisition within the Project Area is being progressed concurrently with this referral. TMR will continue to consult with property owners who may be subject to a partial or full land resumption as the design progresses.

***Biosecurity Act 2014* (Biosecurity Act)**

The proposed action will meet the General Biosecurity Obligations (GBO) through development of the EMP(C) to manage biosecurity risk during the construction phase. Located in Fire Ant Biosecurity Zone 2, the proposed action will detail approved Fire Ant high risk material disposal sites. Where movement controls cannot be adhered to a Biosecurity Instrument Permit must also be obtained, the conditions

within adhered to and all records and kept on site. Similarly, GBO for weed management will also be carried through into the Construction Contractor's EMP(C) and upheld throughout construction.

***Environmental Protection Act 1994* (EP Act)**

The proposed action will comply with the general environmental duty, particularly when undertaking activities with the potential to cause environmental harm.

Lots within the Project Area are located on the Environmental Management Register (EMR). Soils within these lots may be contaminated due to use of contaminated fill during previous construction activities and/or contamination due to historic and existing use as a rail corridor. Contractual requirements have been included to ensure detailed contaminated land investigations through subsequent design phases of the proposed action will inform ongoing management and permitting through to construction.

***Vegetation Management Act 1999* (VM Act)**

The proposed action is expected to impact mapped REs and other regulated vegetation. As State Government Supported Transport Infrastructure, the proposed action is exempt from requiring a development approval for clearing of regulated vegetation for the construction or maintenance of infrastructure as provided under Schedule 21 of the *Planning Regulation 2017*.

***Nature Conservation Act 1992* (NC Act)**

***Nature Conservation (Plants) Regulation 2020* (NC Plants Reg)**

Ecological investigations sought to identify NC Act-listed Critically Endangered, Endangered, Vulnerable or Near threatened (CREVNT) flora within the Project Area. The proposed action has potential to directly impact suitable habitat for threatened flora species identified by field investigations as having potential to occur within the disturbance area. Only vulnerable Macadamia nut (*Macadamia integrifolia*) was confirmed present but not considered to occur in the wild (i.e. planted), therefore clearing permit requirements do not apply. Exemptions apply for clearing outside of a high risk area on the flora survey trigger map; however, a flora survey and protected plant clearing permit is required for removing a protected pant or within 100 m of the plant. Under the Act an offset may be required as a condition of your permit approval to compensate for unavoidable impacts on a protected plant species in the wild. This will be informed by further survey during detailed design phases.

***Nature Conservation (Animals) Regulation 2020* (NC Animals Reg)**

The proposed action will utilise the existing State-wide TMR Low-Risk Species Management Program (SMP) to protect and manage any breeding places (e.g. nests) for least concern species that may be established and require relocation prior to construction.

A High-Risk SMP may be required if colonial breeders or animal breeding places for CREVNT species are found in the Project Area. This will be informed by further survey during detailed design phases.

***Planning Act 2016 (*Planning Act)**

Coastal Protection and Management Act 1995 (Coastal Act)

The proposed action will intersect and traverse tidal watercourses and associated Coastal Management District (CMD). Consequently, the proposed action is also expected to impact areas of marine plants. Ecological investigations will support the quantification of expected impacts to areas of marine plants and guide environmental design responses for infrastructure within tidal areas to support procurement of development approvals and compliance with accepted and performance outcomes under State legislation.

Fisheries Act 1994

The proposed action will intersect and traverse mapped fish passage waterways. Proposed bridge and culvert works will include structures with potential to meet criteria for permanent waterway barriers within fisheries waterways. Ecological investigations will identify where existing infrastructure is deficient, where new infrastructure is required and guide environmental design responses for infrastructure within areas where fish passage is required to support procurement of development approvals and compliance with accepted and performance outcomes under State legislation.

Environmental Offsets Act 2014 (Offsets Act)

Provisions exist under the Offsets Act to avoid the duplication of offsets conditions between Commonwealth and Queensland requirements. Under these provisions:

- the Queensland Government cannot impose an offset condition for a prescribed environmental matter if the same and/or substantially the same impact and/or matter has been subject to assessment under the EPBC Act, regardless of whether an offset condition was imposed by the Commonwealth or not; and
- when considering whether to apply an offset condition, a Queensland Government agency must consider whether a relevant offset condition that has already been imposed is for a substantially the same impact and/or matter.

Acquired development approvals and associated conditions will be included in the construction contract documents and adopted by the Construction Contractor in their EMP(C).

4.0 Description of the environment

4.1 Matters of National Environmental Significance

To identify whether MNES are present and could be affected by the proposed action, the PMST was used to define a polygon aligning with the Project Area and to identify MNES with the potential to occur on or within 5 km of the proposed action (see Appendix B of **Appendix B**). A summary of the results of the PMST is presented in **Table 7**.

Table 7 EPBC Act Protected Matters Search Tool results summary

MNES under the EPBC Act	Potential MNES within the search area
World Heritage properties	None
National Heritage properties	None
Wetlands of International Importance	Moreton Bay Ramsar site – 10 km buffer within Ramsar Site
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	None
Threatened ecological communities	7 threatened ecological communities
Threatened species	28 flora species and 57 fauna species
Migratory species	50 migratory species – 21 migratory only species

4.2 Physical description

4.2.1 Current condition

The Project Area is predominantly characterised by the existing rail corridor within an urban setting. Much of the existing land uses include previously cleared areas of rail corridor and traverses adjacent to residential housing, commercial and industrial districts. As the Project Area encroaches privately held residential allotments, the requirement for land acquisition within the Project Area is being progressed concurrently with this referral. TMR will continue to consult with property owners who may be subject to a partial or full land resumption as the design progresses. The environmental values of these lots are typical to residential backyards.

The rail alignment traverses a series of undulating hills and low-lying riverine environments. Coastal areas lower than 5 m Australian Height Datum (AHD) are likely to have acid sulfate soils (ASS) present. The ground is generally low lying along the alignment, with areas between Kuraby and Trinder Park presenting key risk for ASS and watercourse crossings.

Areas of bushland are intersected, especially adjacent to the existing alignment at Scrubby Creek and Edens Landing and at the proposed straightening of the alignment through Trinder Park. These are described further in Section 4.3.

The existing rail alignment is associated with several lots on the EMR maintained by DES, pursuant to the EP Act. Soils within these lots may be contaminated due to use of contaminated fill during previous construction activities and/or contamination due to historic and existing use as a rail corridor. Common contaminants of potential concern typically associated with rail operations include asbestos, pesticides, heavy metals and hydrocarbons. There is potential for other EMR listed properties to be impacted where TMR acquires land for the proposed action. When the design is further developed, any acquisitions that require further contaminated land investigation will be assessed and managed accordingly.

4.2.2 Existing tenure and land use

The Project Area is dictated by the need to duplicate the existing rail corridor between Kuraby and Beenleigh. The area is in an urban footprint under the *South East Queensland Regional Plan 2017* and within a priority living area under the *Regional Planning Interest Act 2014*. The proposed action strategically supports these broader urban functions.

The Project Area extends over Brisbane City Council and Logan City Council local government areas, predominantly within an existing railway corridor. The existing railway corridor is zoned SP3 Special purpose (transport infrastructure) under the *Brisbane City Plan 2014* and zoned Community facilities under the *Logan Planning Scheme 2015*. The wider study corridor is predominantly zoned as:

- Low density and medium density residential
- Low impact and medium impact industry
- Neighbourhood centre
- Sport and recreation
- Rural
- Emerging community
- Centre
- Environmental management and conservation
- Recreation and open space
- Mixed use.

A range of Lands Lease, Easement, Freehold and Reserve tenure is present in the Project Area.

A straightening of the rail alignment is proposed between chainage 23,000 m and 25,000 m to improve efficiency of train movements through this section (see **Figure 1**). To achieve this, the alignment is rerouted through Acacia Forest Park on the north-eastern corner of Karawatha Forest Park. Karawatha Forest is a Brisbane City reserve and is listed in the Register of the National Estate. Within Karawatha Park are the Karawatha Wetlands which are listed as a Nationally Important Wetland on the Directory of Important Wetlands in Australia. The proposed action does not intersect with any of the mapped wetlands within Karawatha Forest, with direct impacts limited to the north-eastern corner of the Forest which has primarily been cut off from Karawatha by the existing Acacia Road.

4.2.2.1 Address of the proposed action

A full list of properties in the Project Area are included in **Appendix D**.

As Project Area encroaches privately held residential allotments, the requirement for land acquisition within the Project Area is being progressed concurrently with this referral. TMR will continue to consult with property owners who may be subject to a partial or full land resumption as the design progresses.

4.2.3 Topography

The terrain within the Project Area is generally flat with some gently undulating areas in the southern extent. The ground is low lying with elevations generally between 10 m AHD and 50 m AHD. There are several waterway crossings which are lower than 5 m AHD.

4.3 Flora and fauna

Most of the Project Area is dominated by the existing rail alignment and surrounding residential setting, with sparse foraging trees present in landscaped areas and residential backyards.

The Project Area traverses several key parks and areas of remnant vegetation including at Spring Creek and Slacks Creek (Chainage 22,000-23,500 m), Karawatha Forest (Chainage 24,000 m), Scrubby Creek (Chainage 29,500 m), Logan River (Chainage 33,000 m), Edens Landing (Chainage 35,500 to 37,000 m) and Hugh Muntz Park (Chainage 41,000 m). This is illustrated in **Figure 1**.

Remnant, high value regrowth and regrowth vegetation communities have been identified in the Project Area through a combination of desktop and field assessment. They make up approximately 43 ha along the 20 km alignment and include Eucalyptus woodland to open forest, complex notophhyll to microphyll vine forest and melaleuca, casuarina and eucalyptus open forest. Additionally, the alignment crosses Spring Creek, Slacks Creek, Scrubby Creek and Logan River as well as 14 other minor waterways. Associated with the low-lying areas are swamps and estuarine habitat and non-remnant areas on the

banks of waterways. The vegetation communities and corresponding RE descriptions are summarised in **Table 8** and illustrated on **Figure 2**.

Table 8 Overview of vegetation communities and REs in the Project Area

Vegetation community type	RE	RE Description	Condition	Project Area (ha)
1. Eucalyptus woodland to open forest on metamorphics	12.11.23	*Eucalyptus pilularis* open forest on coastal metamorphics and interbedded volcanics	Remnant	1.49
	12.11.27	*Eucalyptus racemosa* subsp. *racemosa* and/or *E. seeana* and *Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics	Remnant	0.01
	12.11.3	*Eucalyptus siderophloia, E. propinqua +/- E. microcorys, Lophostemon confertus*, *Corymbia intermedia*, *E. acmenoides* open forest on metamorphics +/- interbedded volcanics	Remnant	1.39
	12.11.5	*Corymbia citriodora* subsp. *variegata* woodland to open forest +/- *Eucalyptus siderophloia/ E. crebra, E. carnea, E. acmenoides, E. propinqua* on metamorphics +/- interbedded volcanics	Remnant	0.66
			High Value Regrowth	0.61
	12.11.27/ 12.11.5	*Eucalyptus racemosa* subsp. *racemosa* and/or *E. seeana* and *Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics and *Corymbia citriodora* subsp. *variegata* woodland to open forest +/- *Eucalyptus siderophloia/ E. crebra, E. carnea, E. acmenoides, E. propinqua* on metamorphics +/- interbedded volcanics	Remnant	0.20
			High Value Regrowth	1.25
			Regrowth	1.10
2. Eucalyptus woodland to open forest on alluvial plains	12.3.11	*Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast	Remnant	6.59
			High Value Regrowth	0.93
			Regrowth	0.64
	12.3.3	*Eucalyptus tereticornis* woodland on Quaternary alluvium	Remnant	6.12
3. Eucalyptus woodland to open forest on Tertiary surfaces	12.5.2	*Corymbia intermedia, Eucalyptus tereticornis* open forest on remnant Tertiary surfaces, usually near coast and on deep red soils	Remnant	0.49
			Regrowth	1.26
	12.5.3	*Eucalyptus racemosa* subsp. *racemosa* woodland on remnant Tertiary surfaces	Remnant	0.64
			High Value Regrowth	0.52
	12.9-10.1		Remnant	3.55

Vegetation community type	RE	RE Description	Condition	Project Area (ha)
4. Eucalyptus woodland to open forest on sedimentary rocks		Mixed woodland usually containing *Corymbia intermedia*, *Angophora leiocarpa* and at least the presence of *Eucalyptus seeana* on sedimentary rocks	High Value Regrowth	0.04
			Regrowth	0.43
	12.9-10.17	*Eucalyptus acmenoides, E. major*, *E. siderophloia* +/- *Corymbia citriodora* subsp*. variegata* open forest on sedimentary rocks	Remnant	5.19
	12.9-10.4	*Eucalyptus racemosa* subsp. *racemosa* woodland on sedimentary rocks	Remnant	2.26
			High Value Regrowth	0.06
	12.9-10.7	*Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris, Angophora spp.* and *E. melanophloia* woodland on sedimentary rocks	Remnant	0.84
5. Complex notophyll to microphyll vine forest on alluvial plains	12.3.16	Complex notophyll to microphyll vine forest on alluvial plains	Remnant	0.17
			Regrowth	0.04
6. Melaleuca, casuarina and Eucalyptus open forest on alluvial plains	12.3.20	*Melaleuca quinquenervia, Casuarina glauca* +/- *Eucalyptus tereticornis, E. siderophloia, M. styphelioides* open forest on low coastal alluvial plains	Remnant	0.31
			High Value Regrowth	0.10
	12.3.7	*Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana* +/- *Melaleuca* spp. fringing woodland	Remnant	2.37
			High Value Regrowth	0.02
			Regrowth	1.19
	12.3.6	*Melaleuca quinquenervia* +/- *Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest on coastal alluvial plains	Remnant	0.00
			Regrowth	0.63
7. Swamps	12.3.8	Swamps with *Cyperus* spp.*, Schoenoplectus* spp. and *Eleocharis* spp.	Remnant	0.72
8. Estuary	N/A	N/A	N/A	0.73
9. Non-remnant - wetland	N/A	Non-remnant areas adjacent to wetlands and banks of waterways		5.89
10. Non-remnant - sparse foraging trees	N/A	Non-remnant areas with potential foraging habitat (low density residential areas)	N/A	160.36
Total Remnant / High Value Regrowth / Regrowth				**42.55**

Despite the increasing urbanisation and development occurring within the region, mature patches of eucalypt woodlands are present in and adjacent to the Project Area. These areas support remnant eucalypt woodlands that reflect vegetation communities that were once widespread within the South East Queensland region. Where the Project Area extends along small order streams and ephemeral waterbodies, the fringing vegetation transitions from dry eucalypt woodlands into wet Melaleuca forests that dominated the temporarily inundated ecosystems. This habitat type was particularly dominant along Spring Creek and Scrubby Creek, and contained occasional patches of sedge, reeds and rushes.

Patches of these vegetation communities have been identified along road edges and in narrow corridors between residential areas, with many showing signs of impact (degradation) from anthropogenic pressures. Regardless, these areas still have potential to provide linking habitat for native fauna and facilitate fauna movement throughout the Project Area. Queensland Globe interactive mapping tools identify proximate biodiversity corridors. Biodiversity corridors are located within and adjacent to the Project Area especially at Spring Creek and Karawatha Forest, Scrubby Creek and adjacent to the Logan River.

During the field survey undertaken by Ausecology (2022), habitat assessments were conducted at 20 locations across the Project Area. These assessments were used to inform the likelihood of occurrence assessment. Potential habitat features observed included:

- Presence of tree hollows between 2 - >20 cm in size, which can potentially support bird and arboreal mammal species
- Coarse woody debris, which supports potential foraging and/or breeding places for a range of fauna
- Nests, including small to medium stick nests in trees, pardalote nests in earth banks and mud nests under rail structures
- Ground and arboreal termite mounds, which may provide foraging opportunities to echidnas and nesting opportunities for kingfishers and kookaburras
- Anthropogenic structures (culverts, gravel pits, stockpiles, metal sheeting etc.), which may support foraging and breeding places for a range of fauna
- Patches of Eucalypt dominated forests, which provide foraging resources for greater glider (*Petauroides armillatus*) and nectar feeding birds such as the swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*)
- Areas of important koala food and shelter trees and their abundance
- Mistletoe trees, which provide nectar for a range of birds, but are a key food source for the regent honeyeater (*Anthochaera phrygia*)
- Patches of Casuarina/Allocasuarina spp. which are a key feed tree of the glossy black-cockatoo (*Calyptorhynchus lathami lathami*)
- Low shrub cover, which is an important habitat feature for some ground dwelling species such as the black-breasted button quail (*Turnix melanogaster*)
- Leaf litter, decorticating bark and fallen bark which are features that may provide shelter to small fauna, as well as foraging habitat to other fauna
- Natural waterbodies (rivers, creeks, streams, floodplains, wetlands and gilgais) and artificial waterbodies (farm dams and drainage channels)
- Soil type, elevation, landform, vegetation structure and dominant species indicative of habitat for different flora species

With regards to MNES threatened fauna species, a summary of potential habitat is included in **Section 5.1.2**.

Figure 2 Overview of vegetation communities

4.4 Heritage

Areas containing cultural heritage value were identified using relevant online databases and previous reporting, including:

- EPBC Act PMST
- Australian Heritage Database
- DSDSATSIP Aboriginal and Torres Strait Islander Cultural Heritage Database and Register
- Queensland Heritage Register (DES, 2017)
- Queensland National Trust Heritage Register
- *Logan Planning Scheme 2015* Interactive Mapping
- *Brisbane City Plan 2014* Interactive Mapping
- Review of the following reports:
    - Technical Note 03: Measurement of Ground Vibrations and Airblast (Department of Transport and Roads, 2013)
    - Logan and Gold Coast Faster Rail – Cultural Heritage Duty of Care Assessment (Redleaf Environmental, 2021)
    - Loganlea station Relocation and expanded P'n'R facility (TMR, 2020)
- Review and analysis of the available historical aerial imagery from 1967 and 1982.

4.4.1 Non-Indigenous heritage

No world or national heritage places are present within the Project Area.

Historical cultural heritage places were identified inside and within 100 m of the Project Area which included:

- Two (2) places listed on the Queensland Heritage Register (QHR)
- One (1) place listed on the Queensland National Trust Heritage Register
- Three (3) items listed on the Brisbane City Council heritage register
- 17 listed on the Logan City Council local heritage register.

These cultural heritage places are discussed below.

Queensland Heritage Register

Two items are listed on the QHR is located in the Project Area: Bethania Lutheran Church (QHR#600002) and Mayes Cottage (QHR#600662).

Bethania Lutheran Church (QHR#600002), located in the Project Area, 330 m south-east of Bethania Railway Station. Mayes Cottage (QHR#600662) is located 500 m north-west of Kingston Railway Station.

Queensland National Trust Heritage Register

One item is listed on the Queensland National Trust Heritage Register in the Project Area. Bethania Lutheran Church (ID#LOG7/1), is located in the Project Area, 330 m south-east of Bethania Railway Station.

Local Heritage Registers

The Project Area is located within the Logan City Council (LCC) and Brisbane City Council (BCC). Seventeen items on the LCC local heritage register are located in and within 100 m of the Project Area. Three items on the BCC local heritage register are located in and within 100 m of the Project Area.

In additional to local heritage places, Queensland Rail (QR) has identified one QR Registered historical place located in the Project Area. Bethania Passenger Station (QRHR#365) is located in the Project

Area in lot 73/SP109403 in the south-central extent of the Project Area. The QR listing for this place is a good example of a second-class timber passenger station of the late 19th century (pre-WWII) and is significant as the original junction for the Beaudesert branch line. This QR heritage place is listed on the LHR register as Bethania Railway Station.

Chance finds

Where items of potential Cultural Heritage significance (Indigenous or Non-Indigenous) are discovered (and when no Cultural Heritage Personnel are present for Indigenous heritage), the Contractor will follow the Find – Stop – Notify – Manage procedure:

a) FIND: An item of potential Cultural Heritage is found.

b) STOP: All work at the Find location shall cease. The item shall not be removed or disturbed.

c) NOTIFY: The Contractor shall immediately notify the Administrator. The Administrator will promptly notify the Principal's Cultural Heritage Officer, and

d) MANAGE: Principal's Cultural Heritage Officer will arrange for the potential Cultural Heritage to be inspected and assessed for significance. Principal's Cultural Heritage Officers will provide the temporary management recommendations. This may include securing the find by erecting an exclusion zone for a period of time and precluding access to that area. The Contractor will notify all Site personnel of the object and/or area and proposed treatment of the object and/or area as soon as possible, but prior to commencing work on the next working day.

4.4.2 Indigenous heritage

Four (4) Aboriginal Parties are located within the Project Area. To the north of the Project Area are the Jagera People #2 and the Turrbal People. To the south of the Project Area are the Danggan Balun (Five Rivers) people and the Gold Coast Native Title Group (Jabree).

A site survey completed in February 2021 identified one artefact scatter along Scrubby Creek which was then recorded on the DSDSATSIP register. A search of DSDSATSIP identified two (2) registered indigenous heritage sites:

- An artefact scatter (a smoky quartz flacked piece) in the railway corridor (identified in 2021) (Ch. 29,200) and
- An artefact scatter 30 m south-west of the Project Area comprised of four components (Ch. 29,500).

There is always potential that there may be additional artefacts located near these registered sites. Further ground truthing in consultation with the Traditional Owner (TO) group is recommended to understand the extent of the sites and the risk of impact.

4.5 Hydrology

The Project Area (**Figure 1**) spans three catchment areas including Brisbane River, Logan River and Albert River. The majority of the Project Area lies within the Logan River Catchment within only northern and southern extremities within the Brisbane and Albert catchments respectively.

The northern section of the proposed action falls within the Southern reaches of the lower Brisbane River Catchment (Chainage 21,300 m – 23,300 m). The Lower Brisbane Catchment covers approximately 1,195 km^2 with approximately 2,475 km of stream network. The Lower Brisbane River receives water from the Mid Brisbane River, its contributing catchments, and the Bremer River. However, the proposed action does not traverse any watercourses within this portion of the catchment.

The majority of the proposed action falls within this catchment (Chainage 23.300 m– 39,100 m). The catchment covers approximately 3,000 km^2 with approximately 5,500 km of stream network. The main waterway is the Logan River with numerous smaller waterways flowing into it. It is joined by the Albert River near Eagleby (11 km upstream of its mouth) and then flows to southern Moreton Bay, a Ramsar listed wetland area.

The southern portion of the proposed action sits within the Albert River catchment (Chainage 39,100 – 40,900). It is linked to the catchment via unnamed drainage lines which run through Hugh Muntz Park

and into the Albert River. The catchment covers approximately 790 km^2 and the Albert River joins the Logan River near Beenleigh.

Queensland Globe inland watercourse layer and watercourse identification map (WIM) identifies the known extent of watercourses and drainage features that are managed under the *Water Act 2000* (Water Act). The proposed action traverses numerous water features including mapped watercourses, drainage lines and unmapped watercourses. A summary of these is provided in **Table 9**.

Table 9 Summary of mapped watercourses under Water Act

Name	Status (*Water Act 2000*)	Chainage (m)
Spring Creek	Watercourse	Ch. 23,000
Slacks Creek	Drainage line	Ch. 23,200
Tributary of Slacks Creek	Drainage line	Ch. 24,020
Scrubby Creek	Watercourse	Ch. 29,300
Tributary of Scrubby Creek	Drainage line	Ch. 30,800
Tributary of Logan River	Drainage line	Ch. 32,400
Logan River	N/A (tidal)	Ch. 32,700
Tributary of Logan River	Drainage line	Ch. 33,700
Tributary of Logan River	Drainage line	Ch. 35,050
Tributary of Logan River	Drainage line	Ch. 35,600
Tributary of Logan River	Drainage line	Ch. 36,300
Tributary of Logan River	Drainage line	Ch. 36,920
Tributary of Logan River	N/A (tidal)	Ch. 37,600
Tributary of Logan River	Drainage line	Ch. 38,370
Tributary of Logan River	Drainage line	Ch. 39,300
Tributary of Albert River	Drainage line	Ch. 40,550
Tributary of Albert River	Drainage line	Ch. 40,800

Of the mapped watercourses, drainage lines and unmapped watercourses identified in **Table 9**, the major watercourses are identified as Slacks Creek, Scrubby Creek and Logan River. It is noted that Spring Creek is located immediately adjacent to the rail corridor, however, proposed laydown areas identified within the reference design will likely require access tracks to intersect the watercourse.

The majority of the identified water features along the alignment will be accommodated by extension of existing culverts or inclusion of new culverts (e.g. Trinder Park corridor realignment). The existing bridges over the Logan River and Slacks Creek will be duplicated to accommodate the additional rail.

Brisbane City Council and Logan City Council flood and overland flow mapping indicates flood hazard areas exist around each of the major watercourses intersecting the proposed action. These include areas around:

- Bulimba Creek tributary (not intersected by alignment but impacts Wally Tait Park);
- Spring Creek and Slacks Creek;
- Scrubby Creek;
- Logan River (Loganlea, Edens Landing, Beenleigh; and
- Albert River (Beenleigh).

5.0 Potential impacts

The proposed action may result in potential direct and indirect impacts to ecological values within and adjacent to the Project Area. With the sensitive siting and design of the proposed action, impacts have been substantially reduced. Suitable avoidance, mitigation and management techniques have been developed to remove or further reduce impacts, particularly indirect impacts to ecological values; however, the proposed action may impact up to approximately 208.8 ha of potential habitat for MNES.

5.1 Direct impacts from construction phase

5.1.1 Vegetation clearing

The Project Area is aligned to the existing operational rail corridor subject to previous vegetation removal and ground disturbance for rail infrastructure development. Most of the surrounding rail corridor is managed grassland areas surrounded by high safety/security fencing. Beyond the boundary of the rail corridor, the proposed action will impact native vegetation within backyards, road corridor and reserves.

The design of the proposed action has been developed and refined to maximise use of disturbed areas, and avoid and minimise further vegetation clearing wherever feasible, however due to the location of the existing rail line, disturbance of vegetation is not complete avoidable. The area of vegetation to be directly impacted (removed) by the proposed action is quantified in **Table 8** and the area of habitat available for potential foraging, dispersal and occasional breeding within the Project Area is detailed in **Table 10**.

Where removal of regulated vegetation cannot be avoided, TMR is exempt from requiring a development permit under the *Planning Act 2016* as the proposed action is considered Government Supported Transport Infrastructure.

5.1.2 Loss or alteration of conservation significant fauna habitat

The maximum required clearing will impact on approximately 208.8 ha of habitat for conservation significant species (excluding dispersal habitat for flyover species). How this loss of habitat impacts each individual species through the direct loss of habitat resources for potential foraging, dispersal and occasional breeding varies depending on the current utilisation of the area by the species and the species-specific habitat requirements. This is quantified for each known, likely or potentially occurring conservation significant species in **Table 10**. Mitigation measures are recommended to avoid impacts to these species, as outlined in **Section 6.1.1**.

5.1.3 Loss or alteration of conservation significant flora habitat

The proposed action has the potential to directly impact suitable habitat for threatened flora species identified by field investigations as having potential to occur within the Project Area. The direct impacts on the conservation significant flora is quantified and described in **Table 11.** While potential suitable habitat for Scrub turpentine, Native guava, Angle-stemmed myrtle, *Coleus habrophyllus,* Tall knotweed, Hairy-joint grass and Three-leaved bosistoa was identified in the Project Area, none of the species were recorded during the flora surveys. Only vulnerable Macadamia nut (*Macadamia integrifolia*) was confirmed present and within the Project Area, however, the individual was planted and not considered to occur in the wild. Further targeted surveys are required to confirm the presence of listed threatened flora and whether direct or indirect impacts to these species will result from the proposed action.

Mitigation measures are recommended to avoid impacts to these species, as outlined in **Section 6.1.1**.

Table 10 Maximum extent of direct impacts to conservation significant fauna habitat

Species	EPBC Act status	Likelihood of occurrence (Ausecology, 2022)	Habitat utilisation	Vegetation community	Direct impacts (ha)
Spotted-tailed quoll (south-eastern mainland population) (*Dasyurus maculatus maculatus*)	Endangered	May occur	Denning	Eucalypt woodland to open forest.	6.7
			Foraging and dispersal	Any vegetated habitat including non-remnant areas with sparse foraging trees.	194.8
Greater glider (southern & central) (*Petauroides volans sensu lato*)	Endangered	Known	Denning	Any Eucalypt habitat	36.3
			Foraging	Any Melaleuca habitat	4.6
			Dispersal	Non-remnant with trees including vine thicket, swamps.	0.9
Koala (combined populations of Qld, NSW and the ACT) (*Phascolarctos cinereus*)	Endangered	Known	Foraging	Eucalyptus or melaleuca vegetation communities.	40.9
			Dispersal	Vine forest and non-remnant habitat which could provide dispersal, including swamps and areas with sparse foraging trees.	160.4
Yellow-bellied glider (south-eastern) (*Petaurus australis australis*)	Vulnerable	Likely to occur	Denning	Any Eucalypt habitat.	36.3
			Foraging	Any Melaleuca habitat.	4.6
			Dispersal	Swamps and non-remnant with trees.	161.1
Long-nosed Potoroo (SE Mainland) (*Potorous tridactylus tridactylus*)	Vulnerable	May occur	Breeding, foraging and dispersal habitat	Remnant with trees on alluvial plains.	19.1
Grey-headed flying-fox (*Pteropus poliocephalus*)	Vulnerable	Confirmed present	Roosting and foraging	Melaleuca, mangroves, vine thickets, wetlands/ swamps (including non-remnant) and/or riparian vegetation.	11.4
			Foraging only	Habitat with nectar producing species (remnant and non-remnant).	196.6

Species	EPBC Act status	Likelihood of occurrence (Ausecology, 2022)	Habitat utilisation	Vegetation community	Direct impacts (ha)
Regent honeyeater (*Anthochaera phrygia*)	Critically Endangered	May occur	Breeding (marginal) and foraging	Eucalyptus woodland to open forest.	36.3
Swift parrot (*Lathamus discolor*)	Critically Endangered	Known	Foraging	Eucalyptus woodland to open forest.	36.3
Curlew sandpiper (*Calidris ferruginea*)	Critically Endangered / Migratory	May occur	Foraging and dispersal	Melaleuca open forest, swamps and non-remnant wetlands.	15.4
Australasian Bittern (*Botaurus poiciloptilus*)	Endangered	Likely to occur	Breeding (marginal) foraging and disperal	Melaleuca open forest, swamps and non-remnant wetlands.	15.4
Australian Painted Snipe (*Rostratula australis*)	Endangered	May occur	Breeding (marginal) foraging and disperal	Melaleuca open forest, swamps and non-remnant wetlands.	15.4
Glossy Black Cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*)	Vulnerable	Known	Breeding	RE 12.11.5, RE 12.9-10.7a.	1.5
			Foraging and dispersal	RE 12.9-10.12, RE 12.9-10.17d, RE 12.3.20, RE 12.11.27/ 12.11.5, RE 12.3.11, and RE 12.5.2a.	16.7
Painted Honeyeater (*Grantiella picta*)	Vulnerable	May occur	Breeding (marginal) and foraging	Eucalyptus woodland to open forest.	36.3
White-throated needletail (*Hirundapus caudacutus*)	Vulnerable / Migratory	Likely to occur	Roosting, foraging and dispersal	All vegetation.	208.8
Common Sandpiper (*Actitis hypoleucos*)	Migratory	May occur	Foraging and dispersal	Swamps, melaleuca open forest, and non-remnant wetlands.	13.2
Fork-tailed swift (*Apus pacificus*)	Migratory	Likely to occur	Foraging and dispersal	Eucalyptus woodland to open forest, melaleuca woodland, vine thickets, estuaries and non-remnant wetlands or	208.8

Species	EPBC Act status	Likelihood of occurrence (Ausecology, 2022)	Habitat utilisation	Vegetation community	Direct impacts (ha)
				non-remnant areas with sparse foraging trees.	
Sharp-tailed Sandpiper (*Calidris acuminata*)	Migratory	May occur	Foraging and dispersal	Estuary, swamps and non-remnant wetlands (marginal).	6.6
Pectoral Sandpiper (*Calidris melanotos*)	Migratory	May occur	Foraging and dispersal	Swamps, estuaries and non-remnant wetlands (marginal).	6.6
Oriental cuckoo (*Cuculus optatus*)	Migratory	May occur	Foraging and dispersal	Eucalyptus and melaleuca woodland to open forest, vine thickets.	41.1
Latham's Snipe (*Gallinago hardwickii*)	Migratory	Likely to occur	Foraging and dispersal	Open forest on alluvial plains, swamps, and non-remnant wetlands.	6.6
Black-faced monarch (*Monarcha melanopsis*)	Migratory	Likely to occur	Foraging and dispersal	Vine thickets.	0.2
Satin flycatcher (*Myiagra cyanoleuca*)	Migratory	Likely to occur	Foraging and dispersal	Eucalyptus and melaleuca woodland to open forest, vine thickets.	41.1
Osprey (*Pandion haliaetus*)	Migratory	May occur	Foraging and dispersal	Estuaries.	0.7
Glossy Ibis (*Plegadis falcinellus*)	Migratory	Likely to occur	Foraging and dispersal	Open forest on alluvial plains, swamps and non-remnant wetlands.	6.6
Rufous fantail (*Rhipidura rufifrons*)	Migratory	Likely to occur	Foraging and dispersal	Eucalyptus woodland to open forest.	36.3
Spectacled monarch (*Monarcha trivirgatus syn. Symposiachrus trivirgatus*)	Migratory	May occur	Foraging and dispersal	Vine thickets.	0.2
Common Greenshank (*Tringa nebularia*)	Migratory	Likely to occur	Foraging and dispersal	Open forest on alluvial plains, swamps and non-remnant wetland.	6.6
Marsh Sandpiper (*Tringa stagnatilis*)	Migratory	Likely to occur	Foraging and dispersal	Open forest on alluvial plains, swamps and non-remnant wetlands.	6.6
Scrub Turpentine (*Rhodamnia rubescens*)	Critically Endangered	Likely to occur	Potential habitat	Non-remnant wetlands.	16.0

Species	EPBC Act status	Likelihood of occurrence (Ausecology, 2022)	Habitat utilisation	Vegetation community	Direct impacts (ha)
Native Guava (*Rhodomyrtus psidiodes*)	Critically Endangered	May occur	Potential habitat	Non-remnant wetlands.	16.0
Angle-stemmed Myrtle (*Gossia gonoclada*)	Endangered	May occur	Potential habitat	Eucalyptus woodland to open forest, non-remnant wetlands.	25.0
Coleus habrophyllus	Endangered	Likely to occur	Potential habitat	Eucalyptus woodland to open forest.	11.9
Macadamia nut (*Macadamia integrifolia*)	Vulnerable	Confirmed present (not considered to occur in wild)	Potential habitat	Vine thickets.	0.2
Tall Knotweed (*Persicaria elatior*)	Vulnerable	Likely to occur	Potential habitat	Open forest on alluvial plains, swamps, non-remnant wetlands.	11.2
Hairy-joint Grass (*Arthraxon hispidus*)	Vulnerable	May occur	Potential habitat	Open forest on alluvial plains, swamps, vine thickets, non-remnant wetlands.	11.4
Three-leaved bosistoa (*Bosistoa traversa*)	Vulnerable	May occur	Potential habitat	Eucalyptus woodland to open forest, vine thickets.	36.5

Table 11 Extent of potential direct impacts to conservation significant flora

MNES	EPBC Act Status	Likelihood of Occurrence (Ausecology, 2022)	Nature and extent of direct impacts
Scrub turpentine (*Rhodamnia rubescens*)	Critically Endangered	Likely to occur	Suitable habitat for Scrub turpentine is present and there is a recent record approximately 2 km from the Project Area along Slacks Creek, a tributary of the Logan River with connectivity to Scrubby Creek. Potential habitat includes open forests and woodlands, often associated with watercourses, and within the Project Area is defined as REs 12.3.16, 12.9-10.17, 12.9-10.19a, 12.11.3, and 12.11.5, as well as along watercourses. This species was not recorded during the field surveys. Approximately 16 ha of potential habitat for the scrub turpentine has been identified in the Project Area, however species presence has not been confirmed. Further survey is required to confirm the presence of scrub turpentine and inform whether direct or indirect impacts to scrub turpentine will result from the proposed action.
Native guava (*Rhodomyrtus psidiodes*)	Critically Endangered	May occur	Native guava may occur within the Project Area as suitable habitat is present and there are several records of the species in the surrounding area, including one approximately 4 km to the north-east of the Project Area. Potential habitat includes sclerophyll vegetation associated with rainforest formations, near creeks and drainage lines, and within the Project Area may include REs 12.11.1, 12.11.3, 12.3.1a, 12.9-10.2, 12.9-10.17e and along creeks and drainage lines. This species was not recorded during the field surveys. Approximately 16 ha of potential habitat for the native guava has been identified in the Project Area, however species presence has not been confirmed. Further survey is required to confirm the presence of native guava and inform whether direct or indirect impacts to native guava will result from the proposed action.
Angle-stemmed myrtle (*Gossia gonoclada*)	Endangered	May occur	Angle-stemmed myrtle may occur within the Project Area as there is suitable habitat present and recent records within proximity of the Project Area. Approximately 25 ha of potential habitat has been identified within the Project Area, in the form of notophyll vine forest, however species presence has not been confirmed. Further survey is required to confirm the presence of angle-stemmed myrtle and inform whether direct or indirect impacts to angle-stemmed myrtle will result from the proposed action.
Coleus habrophyllus	Endangered	Likely to occur	*Coleus habrophyllus* is considered likely to occur within the Project Area as there is suitable habitat present (REs 12.9-10.17a, 12.9-10.19a, 12.9-10.2, 12.11.3a, 12.11.24, 12.11.5) and there are recent records within proximity of the Project Area. Approximately 11.9 ha of potential habitat has been identified within the Project Area, however species presence has not been confirmed. Further survey is required to confirm the presence of *Coleus*

MNES	EPBC Act Status	Likelihood of Occurrence (Ausecology, 2022)	Nature and extent of direct impacts
			habrophyllus and inform whether direct or indirect impacts will result from the proposed action.
Macadamia nut (*Macadamia integrifolia*)	Vulnerable	Confirmed present (not considered to occur 'in the wild')	Macadamia nut is confirmed present, as one planted (5 m tall) macadamia nut was recorded within the Project Area on a residential lot. It is not considered that this is a wild individual and it is thought that the individual was planted. Suitable habitat for this species to grow naturally is found within the Project Area. The total habitat area to be cleared as a result of the proposed action is 0.2 ha. Other than the loss of the one planted individual, no direct impacts to macadamia nut populations or wild individuals are expected as a result of the proposed action.
Tall knotweed (*Persicaria elatior*)	Vulnerable	Likely to occur	Tall knotweed is considered likely to occur within the Project Area due to the presence of suitable habitat and records within proximity of the Project Area. However, the species was not detected during field surveys. Approximately 11.2 ha of potential habitat is modelled within the Project Area, in the form of swampy areas and along watercourses. Although potential habitat is present within the Project Area, the presence of tall knotweed has not been confirmed. Further survey is required to confirm the presence of Tall knotweed and inform whether direct or indirect impacts to angle-stemmed myrtle will result from the proposed action.
Hairy-joint grass (*Arthraxon hispidus*)	Vulnerable	May occur	Hairy-joint grass may occur within the Project Area as potentially suitable habitat is present, however there are no records in the region. Potential habitat includes creeks, swamps and alluvial woodlands. As habitat critical to the survival of the species is not defined, all potential habitat is conservatively considered to be critical. Approximately 11.4 ha of potential habitat has been identified within the Project Area, however species presence has not been confirmed. Habitat is already degraded as a result of urbanisation and weed incursion, indicating that any population present is likely already impacted.
Three-leaved bosistoa (*Bosistoa traversa*)	Vulnerable	May occur	Three-leaved bosistoa may occur within the Project Area as potentially suitable habitat is present, however there are no records in the region. Potential habitat includes Eucalyptus woodland to open forest, and complex notophyll to microphyll vine forest. Approximately 36.5 ha of potential habitat has been identified within the Project Area, however species presence has not been confirmed. Habitat is already degraded as a result of urbanisation and weed incursion, indicating that any population present is likely already impacted.

5.1.4 Habitat fragmentation

Habitat surrounding the Project Area occurs in existing reserves and parklands, adjacent to road corridors and urban backyards, representing a highly fragmented environment where movement corridors are particularly important. Fragmentation of habitat can impact on species populations through mechanisms including increasing edge effects, reducing gene flow between small isolated populations, reducing the potential for species to adapt to environmental change and loss or severe modification of the interactions between species.

Vegetation removal for the proposed action is expected to be required in narrow corridors along the proposed alignment, with a broader corridor of clearing proposed in Acacia Forest Park. For the purposes of this assessment, it is conservatively assessed that all vegetation within the Project Area will be cleared. It is expected that clearing will take place at the habitat edge directly adjacent to the existing rail corridor, which already presents a significant barrier to movement for some species. This vegetation removal will not result in a change to the shape or scale of remaining habitat fragments of a quantum that it would reduce the carrying capacity or ecological function of the habitat for native species.

Security fencing installed along the length of the rail corridor is likely to impact on fauna movement; although the existing fencing has already established a barrier across much of the alignment. While small bodied species will be able to move through the fencing, the barrier may restrict east-west movement for large-bodied species in Acacia Forest Park and along waterway corridors adjacent to Logan River and Scrubby Creek. Where larger bodied fauna disperse north or south, the fence has deterred fauna entering the rail corridor, but may funnel individuals to areas where breaks in the fence exist e.g. crossing road.

Where fauna funnel to a potential crossing point, the risk of vehicle collision is high. Dispersing individuals may be able to access the road corridor, however, get stuck or temporarily disoriented increasing risk of vehicle collision. This presents an issue to the endangered koala (*Phascolarctos cinereus*) for which vehicle strike to dispersing individuals is a key threatening process.

Heightened activity during construction may also create a temporary barrier or deter some species from dispersing through movement corridors intersected by the proposed action. However, current road and rail traffic and associated noise is significant and may already act as a deterrent to noise, light and activity sensitive species.

Given that the proposed action will widen the current rail corridor which already presents a major barrier to movement and habitat areas are not being significantly reduced in shape or scale, the impacts of the proposed action on habitat fragmentation are considered minor.

5.1.5 Injury and mortality of fauna

Clearing of vegetation in Acacia Forest Park and along waterway corridors may result in injury or mortality of fauna, particularly ground dwelling fauna (e.g. reptiles), that may be crushed by machinery or struck by vehicles. Particularly in the larger clearing corridor in Acacia Forest Park, Arboreal mammals may be trapped in trees as they are felled. Additionally, nesting birds may be disturbed and displaced. While local impact on fauna may occur throughout the Project Area, the impact on fauna populations within the broader landscape is considered minimal.

Widening of the cleared area between vegetation east and west of the rail corridor, particularly as it passes adjacent to Wally Tate Park and adjacent to Logan River in Loganlea and Edens Landing, does present an elevated risk of predation to some dispersing species (i.e. woodland birds being preyed on by raptors). This may influence dispersal behaviours (i.e. avoidance given the increased distance to cross) and increase risk of mortality through vehicle strike.

The existing roads adjacent to the current rail corridor present a major threat of mortality from vehicle strike. This is particularly relevant to medium to large-bodied mammals such as the endangered koala (*Phascolarctos cinereus*) for which vehicle strike is a key threatening process (Department of Agriculture Water and the Environment 2022). This threat is expected to be exacerbated as traffic levels intensify and the distance travelled to cross the road is significantly increased. The potential for vehicle strike may also be exacerbated for species which cannot easily move under or over the fences and become stuck or temporarily impeded when crossing the road.

5.2 Indirect impacts from construction phase

5.2.1 Weed spread

No Weeds of National Significance (WONS) were identified in the EPBC Act PMST generated using a 10 km buffer around the Project Area. A total of 42 non-native flora species were identified during the field assessment, including 12 listed as Category 3 Restricted Matter under the *Biosecurity Act 2014* (Qld).

Activities with potential to increase the risk of establishing new infestations and exacerbating existing infestations include:

- Soil disturbance through vegetation clearance and construction activities.
- Areas of ground remaining bare for extended periods will establish weed species where there is little competition from other species.
- Increased vehicular traffic through the area.
- Importation of construction materials to the site which may harbour introduced species.

Weed proliferation can degrade vegetation communities by increasing fuel loads (with the potential to alter fire regimes), reducing floristic diversity, altering the vegetation structure, causing vegetation dieback and altering habitat for native flora and fauna species.

5.2.2 Spread of Invasive Fauna Species

Typical of the suburban location, typical pest fauna species identified during ecological surveys include cat (*Felis catus*), house mouse (*Mus musculus*) and domestic dog (*Canis lupus familiaris*). The Project Area and surrounds may support populations of a range of other species including European fox (*Vulpes vulpes*), feral pig (*Sus scrof*a), European rabbit (*Oryctolagus cuniculus*) and cane toad (*Rhinella marina*) among others.

Some potential impacts of these pest fauna to native species include that they may:

- Prey on native species and compete for food.
- Carry diseases that may affect native animals.
- Act as the primary prey for other exotic predators such as feral cats or foxes which then threaten native species.
- Be predated on by native predators leading to lethal ingestion of toxic species (i.e. cane toad).

Given the ability of most of the potentially present feral species to persist in highly diverse habitats, it is unlikely that the proposed action will result in the further proliferation of these species.

The Project Area is located within a mapped red imported fire ant biosecurity zone 2. Movement restrictions apply for high risk fire ant material (soil, mulch, turf, etc), and a Biosecurity Instrument Permit (BIP) may be required if movement restrictions cannot be adhered to. At all times, the general biosecurity obligations must be met.

5.2.3 Activity, Noise and vibration

Typically, fauna will move away from noise and light sources as these may be perceived as a threat. These disturbances occur as a result of traffic and often extend into the area surrounding a road creating a ‘road-effect zone’. This road effect zone is degraded or sometimes completely unsuitable for wildlife resulting in indirect habitat loss (Bhardwaj, Soanes, Lahoz-Monfort, Lumsden, & Van Der Ree, 2021). For example, studies on microchiropteran bats have found that the activity of many species significantly decreased with proximity to a freeway with the overall road-effect zone ranging from 123 m to 890 m. Acclimatisation by some species may occur over the medium to long term and many of the species identified in the Project Area are known to occur in areas subject to noise, light and general activity. However, activity levels of some taxa may be reduced in the road-effect zone and certain species may be excluded completely.

Current research indicates that there are no government policies or other widely-accepted guidelines in respect to the noise levels which may be acceptable to wildlife. The levels or character of noise that

may “startle” or otherwise affect the feeding or breeding pattern of birds or other wild animals are also not firmly established in the technical literature. Sudden loud, impulsive or impact noises are capable of causing birds and other fauna to become startled, which if occurring over the longer term, may affect feeding and breeding behaviour in some species. These impacts are expected to occur to the fauna using the habitats both within and immediately adjacent to the Project Area.

During the construction phase, there will be an increase in noisy activity in the Project Area as machinery undertakes clearing and other activities. Impacts of construction noise will be temporary and will not affect the entire Project Area simultaneously. However, when activity and noise is occurring in areas adjoining retained habitat, potential impacts may include the following:

- Reduced foraging ability by auditory predators due to increased background noise.
- Increased risk of predation by visual predators due to increased background noise.
- Increased potential for collisions with vehicles.
- Human visitation causing disturbance to foraging or breeding behaviours.

5.2.4 Light

Artificial light used during project construction can affect both nocturnal and diurnal animals by disrupting patterns, with quality of light (e.g. wavelength, colour), intensity and duration potentially evoking different responses. Impacts from increased light levels include: disorientation from or attraction toward artificial sources of light; mortality from collisions with structures; and, effects on light-sensitive cycles of species (e.g. breeding and migration for fauna and flowering in plants). An increase in artificial lighting during construction of the proposed action may also increase the abundance and efficiency of predators. This could result in fauna avoiding some areas due to an increased perceived risk of predation and/or becoming more vulnerable to predation. The use of artificial lighting is expected to be limited to concentrated work areas over short durations during the construction of the proposed action.

5.2.5 Dust

Deposition of dust, sand and soil resulting from construction may have potential impacts on vegetation if excessive levels are sustained over extended periods. When dust settles on plant foliage it can reduce the amount of light penetration on the leaf surface, block and damage stomata, and slow rates of gas exchange and water loss (Farmer, 1993). Reduction in the ability to photosynthesise due to physical effects may result in reduced growth rates of vegetation and decreases in floral vigour and overall community health.

6.0 Project-specific mitigation measures

The proposed action is currently at reference design refinement phase. The following actions have been undertaken to avoid, minimise, mitigate and offset impacts to MNES where possible:

- Targeted flora and fauna ecological investigations have been undertaken to ground-truth areas of mapped habitat and guide the design refinement process.
- Design optioneering has incorporated environmental assessment to inform selection of preferred options.

Specific design responses achieved through the processes outlined above has resulted in the following inclusions in the reference design and/or contract requirements for the subsequent design and construction phase of the proposed action:

- Fauna exclusion fencing has been proposed along the alignment of the proposed action in identified high value habitat areas to guide and funnel fauna to proposed fauna movement infrastructure:
  - Spring Creek (eastern side of corridor Ch. 22,600 – 23,200)
  - Slacks Creek (both sides of corridor Ch. 23,300 – 24,000)
  - Trinder Park (both sides of corridor from Ch. 24,000 – 24,300)
  - Collin Park (eastern side of corridor from Ch. 28,000 – 28,100)
  - Scrubby Creek (eastern and western side of corridor from Ch. 29,100 – 29,500)
  - Loganlea (eastern side of corridor from Ch. 31,800 – 32,300)
  - Edens Landing to Holmview (eastern side of corridor from Ch. 35,500 – 37,000)
  - Edens Landing to Holmview (western side of corridor from Ch. 36,200 – 36,500 & 36,900 – 37,050)
  - Holmview (both sides of corridor from Ch. 37,400 – 37,800)
  - Beenleigh (eastern side of corridor from Ch. 40,400 – Rochester Drive)
  - Beenleigh (western side of corridor from Ch. 40,600 – Rochester Drive).
- Fauna exclusion fencing and fauna movement infrastructure will be designed to accommodate target fauna species based on ecological investigations within high value habitat areas adjacent to the alignment of the proposed action. Some design considerations include (but are not limited to):
  - Infrastructure vertical alignments and subsequent sizing of movement infrastructure.
  - The type of infrastructure that currently exists (eg. will the infrastructure upgrade require extension of culverts or duplication of a bridge).
  - Whether movement infrastructure is best placed over or under transport infrastructure.
  - The presence of biodiversity corridors and existing fragmentation in the landscape.
  - Whether the movement infrastructure is dedicated or serves a dual function for drainage.
- Park and ride facilities have been relocated east of the proposed rail alignment at Trinder Park to take advantage of areas which would otherwise be severed from Acacia Forest Park and ultimately serves to reduce fragmentation of mapped koala habitat caused by the proposed action.
- New culverts proposed through the Trinder Park area have been aligned with Department of Agriculture and Fisheries (QLD) waterways to comply with Accepted Development Requirements (ADR) (best practice), reduce culvert lengths and provide an alignment that is closer to existing flow regimes to avoid realignment of waterways.
- All existing culverts requiring extension to accommodate the proposed action will be assessed against the ADR to ensure compliance with best practices for maintaining and enhancing fish passage where applicable.

- A retaining wall structure has been included adjacent to Edens Landing to minimise additional clearing of habitat, including marine plants, and subsequent impacts to water quality through decreased stability to riparian areas.

Design and construction mitigation responses to environmental risks will be developed further through detailed design and recorded in the Environmental Design Report (EDR). The EDR will detail tangible design responses to the potential risks and mitigation strategies identified within the proposed action's environmental assessment(s) (Review of Environmental Factors) and ensure they are carried through to construction.

Any residual risks linked to the construction phase will be managed through the development of an EMP(C) by the construction contractor. The EMP(C) must be submitted to and deemed suitable by TMR prior to the commencement of any ground disturbance works.

6.1 Direct Impact mitigation

6.1.1 Vegetation Clearing

The entire Project Area is 295 ha and contains 42.55 ha of remnant, high value regrowth or regrowth vegetation. Despite the small proportion of remnant vegetation, measures will be considered by the Project team to minimise the level of impact from clearing vegetation, including:

- Development of the EDR will consider identified high value vegetated areas and ensure the development of the detailed design remains within the referred Project Area and aims to avoid and minimise impacts to those areas.
- The EMP(C) will include a section on vegetation management that is to provide clear guidance on areas to be cleared (to avoid any inadvertent clearing outside the Project Area), methods for clearing and other relevant environmental protection measures.
- Workers will be made aware of high value habitat areas and vegetation management requirements within the EMP(C) during induction training and through daily pre-start meetings while undertaking works in those area.

6.1.2 Loss of Fauna Habitat and Habitat Fragmentation

The clearance of native vegetation can adversely affect native fauna species, through the direct loss of habitat, habitat fragmentation and loss of food resources. Approximately 42.55 ha of remnant, high value regrowth or regrowth vegetation is mapped within the Project Area however, quantification of direct impacts to high value vegetation will be refined and determined during development of the detailed design While non-remnant vegetation is considered to contain less ecologically significant values, these areas may still provide habitat and make a significant portion of the Project Area.

There are a range of measures that will be considered by the Project team to minimise the level of impact even further. These include:

- Ensure the development of the detailed design within high value vegetation / habitat minimises clearing to the greatest extent possible and where required, landscape designs provides for the reinstatement vegetation species that align with pre-clearing regional ecosystems and habitat for local fauna species.
- Suitably qualified fauna spotter-catchers must be engaged to undertake pre-clearance habitat searches and be present during vegetation clearing activities to minimise fauna harm.
- As the Project Area is within Koala District A, vegetation clearing is required to be undertaken sequentially and in the presence of a suitably qualified koala spotter-catcher.
- The Project will also consider the use of the *Koala-sensitive Design Guideline* (Department of Environment and Science, 2019); a guide to koala-sensitive design measures for planning and development activities. This guideline provides appropriate measures to help avoid and minimise the impacts of development and land-use planning on koala movement and dispersal.

- An EMP(C) will be prepared to provide clear guidance on areas to be cleared and retained, methods for clearing, role of the spotter-catcher and other relevant environmental protection matters.
- The Project team will identify and map clear no-go zones to avoid unauthorised disturbance of areas of sensitive vegetation and habitat; such as vegetation outside the Project Area, identified nests and trees that are to be retained.
- Habitat features such as felled trees and logs will be salvaged and relocated to other areas where they can provide microhabitat for fauna.
- Consideration of connectivity and fauna passage will be undertaken at each design stage going forward.
- A High-Risk SMP will be obtained if Commonwealth listed, State listed or colonial breeding fauna breeding sites are to be impacted by the proposed action.

6.1.3 Disturbance, Injury or Mortality of Fauna

Clearing of vegetation can result in injury or mortality of fauna, particularly ground dwelling fauna (e.g. reptiles), that may be crushed by machinery or struck by vehicles. Arboreal mammals may be trapped in trees as they are felled. Whilst a local impact on fauna may occur, the impact on fauna populations within the broader landscape is considered minimal.

Mitigation measures to reduce the likelihood of injury or mortality to fauna include the following:

- Fauna-sensitive design principles will be considered during all design phases to reduce the instances of fauna mortality associated with the proposed All existing and new bridge structures and culverts traversing identified high value habitat areas or mapped fish passage will be assessed for their current suitability to facilitate fauna movement. Where current infrastructure can be enhanced to better facilitate fauna movement, detailed design will investigate designs to accommodate. This includes investigation of the inclusion dedicated fauna movement infrastructure as well as retrofitting of existing drainage infrastructure (e.g. inclusion of fauna ledges where culverts must perform dual function or vertical alignments do not allow for dry cells). Detailed design will also investigate inclusion of rope bridges for arboreal species over adjacent road infrastructure in high value habitat areas such as Acacia Forest Park ,
- Pre-clearance surveys to identify shelters and breeding places potentially utilised by least concern species, colonial breeders and threatened fauna will be undertaken.
- Fauna spotter-catchers will be used to capture and relocate fauna prior to clearing.
- Any injured, sick and dead vertebrate fauna will be recorded before (by fauna spotter-catchers), during and after construction and operation.

6.2 Indirect Impact Mitigation

6.2.1 Potential for Weed Spread

Weed proliferation can degrade vegetation communities by increasing fuel loads (with the potential to alter fire regimes), reducing floristic diversity, altering the vegetation structure, causing vegetation dieback and altering habitat for native fauna species. The EMP(C) will include biosecurity management including:

- Pre-construction assessment and treatment of weed infestations in and around proposed site office and laydown areas, access routes and areas to be cleared.
- Site personnel and sub-contractors will be informed of project biosecurity management practices and areas identified as high risk for spread of weeds contained in the EMP(C) through the site induction.
- Promote the awareness of weed management, by inclusion of weed issues, pictures and procedures around the Project’s common use areas.

- High-risk construction materials, machinery and equipment will be accompanied by a weed hygiene certification.
- Management methods to control spread of weeds considered to be Restricted Matters must be in keeping with regional management practice or DAF pest control prescriptions.
- The EMP(C) will include details of ongoing weed monitoring through the construction phase to readily identify and treat new incidences of weeds.

6.2.2 Potential for Spread of Invasive Fauna Species

As the Project Area is within restricted fire ant zone 2, activities must comply with movement restrictions that apply to movement of fire ant carriers in this zone as outlined by Biosecurity Queensland. Where movement controls cannot be adhered to a Biosecurity Instrument Permit (BIP) will need to be obtained via Biosecurity Queensland. Measures to reduce/avoid the spread of fire ants include:

- Clean down equipment before it is moved off-site, to prevent the spread of fire ants.
- Before cleaning, check all machinery, slashers and other equipment closely to ensure they are not infested.
- Report fire ants to Biosecurity Queensland on 13 25 23 and take all reasonable and practical steps to minimise the spread of fire ants.
- Some potential impacts of pest fauna to native species include that they may:
  - Prey on native species and compete for food
  - Carry diseases that may affect native animals
  - Act as the primary prey for other exotic predators such as feral cats or foxes which then threaten native species
  - Be predated on by native predators (i.e. northern quoll) leading to lethal ingestion of toxic species (i.e. cane toad).

Trenching or digging activities may enhance conditions which are favourable for the establishment and or proliferation of cane toad. Where trenches are inundated by rainfalls, this may increase artificial aquatic habitat, producing favourable conditions for cane toad breeding and proliferation.

6.2.3 Activity, Noise and Vibration

During the construction phase, there will be an increase in noise and activity in the Project Area as machinery undertakes clearing and other activities. When activity and noise is occurring in areas adjoining retained habitat, potential mitigation measures may include:

- Periods of respite sensitive to target fauna feeding and breeding habits.
- Provisions within the EMP(C) and site inductions around considerations and management of interactions with high risk fauna.
- The use of targeted lighting during night works to reduce ‘light spill’ into adjacent high value habitat.
- Project boundaries adjacent to high value habitat will consider local fauna and ensure for the safe provision of fauna movement around the Project area.

6.2.4 Species-specific mitigation measures

Mitigation measures specific to the potentially occurring conservation significant species and threatened ecological community are detailed in **Table 12**.

Table 12 Species-specific mitigation measures

Value	Mitigation measure
All threatened fauna species	Construction personnel, including subcontractors, will be made aware of the limit of works associated with the proposed action in which they will be working and where necessary, be advised of any specific limitations on or requirements for the

Value	Mitigation measure
	construction works being conducted in or within proximity to MNES and MSES species habitat or ecological communities. Any injured fauna species will be transported to a vet or recognised wildlife carer.
Koala	Clearing must be carried out in a way that ensures any koala present have time to move out of the clearing site without human intervention. Koalas will not be forcibly relocated at any time. Allow a clearing buffer surrounding the tree, equal to the height of the tree or deemed suitable by the fauna spotter catcher.
Greater glider	Prior to vegetation clearance commencing, the fauna spotter catcher will inspect trees to determine whether hollows are present. If hollows are present, the fauna spotter catcher will provide advice on the process for clearing in such a way as to allow fauna opportunities to vacate the area.
Grey-headed flying-fox	Prior to construction works commencing, the fauna spotter catcher will confirm the presence of any flying-foxes that may be disturbed by the activity. If a flying-fox camp is found within or in close proximity to the Project Area, advice will be sought from DES as to whether additional management and mitigation measures are required, prior to clearing commencing.
Threatened flora species	Identified locations of threatened flora to be retained within the Project Area will be clearly marked out and identified within the site induction. Further, the siting of infrastructure will avoid areas known to contain threatened flora species as a priority and where possible. Clearing works will maintain a sufficient buffer of at least 20 m, where possible, around identified locations of threatened flora to maintain suitable micro-climatic conditions. Maintain appropriate weed hygiene practices and management as per the EMP (C) that is anticipated to be prepared as part of the proposed action.
Migratory Species	Prior to vegetation clearance commencing, the fauna spotter catcher will inspect trees to determine whether migratory species breeding sites are present and works in areas that have potential to provide habitat for migratory species will be timed to avoid breeding seasons.

7.0 Assessment of matters of national environmental significance

7.1.1 World Heritage Properties

No World Heritage properties were identified by the Protected Matters Search Tool (PMST) within 10 km of the Project Area.

7.1.2 National Heritage Places (NHP)

No National Heritage Places were identified by the PMST within 10 km of the Project Area.

7.1.3 Wetlands of International Importance

The Project Area is 10-20 km upstream from the Moreton Bay Ramsar site according to the PMST. The Project Area is not in the Moreton Bay Ramsar site and will not cause direct impacts to the wetland values. Given the distance of the Project Area from the Moreton Bay Ramsar site, potential pathways for indirect impacts to the Ramsar site are limited to possible changes to flow regimes from widening or duplicating assets in the Logan River and its tributaries and potential downstream water quality impact during construction, however these are not expected to be significant as assessed in **Table 13**.

Table 13 Moreton Bay Ramsar site - Significant impact assessment

Criterion	Assessment
Possibility the action will result in areas of the wetland being destroyed or substantially modified.	**Unlikely** The Project Area is 10-20 km upstream from the Moreton Bay Ramsar site according to the PMST. The Project Area is not in the Moreton Bay Ramsar site and will not cause direct impacts to the wetland values including destruction of substantial modification. Widening or duplication of rail assets over waterways will potentially result in impacts to the affected waterways, including changes to the flow regime and the creation of flood afflux. As part of the reference design refinement process, hydraulic modelling is being undertaken to inform design recommendations around permanent water treatment devices and design infrastructure within various waterways identified as having value for fish passage. Therefore, it is considered unlikely any proposed action activities would result in a substantial and measurable change in the hydrological regime of the wetland.
Possibility the action will result in a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland.	
Possibility the action will result in the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected.	
Possibility the action will result in a substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health.	**Unlikely** Given the Project Area is 10-20 km upstream from the Moreton Bay Ramsar site, potential pathways for indirect impacts to the Ramsar site are limited to changes to flow regimes from widening or duplicating assets in the Logan River and its tributaries and potential downstream water quality impact during construction. The Project Area intersects 17 water features including mapped watercourses, drainage lines and unmapped watercourses. There are four major watercourses Spring Creek, Slacks Creek, Scrubby Creek and the Logan River. The remaining 13 are minor tributaries or drainage lines of the Logan River. All water courses are in the Logan River sub-basin which discharges to the Moreton Bay Ramsar site. Potential indirect impacts associated with these activities such as sedimentation or contaminant movement will be actively managed via the EMP(C) to ensure impacts to adjacent areas and waterways are minimal. This will include best practice erosion, stormwater and

Criterion	Assessment
	sediment control and designated bunded areas for construction materials and refuelling activities. Detailed investigations will be undertaken within the Project Area which will identify potential contaminants within the surface soil. The potential environmental risks associated with contaminant release and mobilisation will be informed by detailed investigations to effectively manage potential contaminants during the proposed action. ASS is considered a known risk within the Project Area. Sufficient mitigation and management measures relevant to ASS are available to ensure future risks can be managed. Excavated contaminated materials will be disposed of appropriately at an authorised offsite location, and stockpiles will be managed in accordance with the Remediation Plan and ASSMP included within the EMP(C). Therefore, it is considered unlikely any proposed action activities would result in indirect impacts that may significantly impact the values of the Moreton Bay Ramsar wetland.
Possibility the action will result in an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.	**Unlikely** The Project Area is 10-20 km upstream from the Moreton Bay Ramsar site according to the PMST. The Project Area is not in the Moreton Bay Ramsar site and will not cause direct impacts to the wetland values including establishment or spread of invasive species in the wetland.

7.1.4 Listed Threatened Species and Ecological Communities

Potential impacts of the proposed action are considered for ecological MNES either identified within the Project Area or assessed as potentially present in the Significant Impact Assessment in **Appendix A**. The PMST identified 7 threatened ecological communities, 28 threatened flora species and 57 threatened fauna species as known, likely or having potential to occur within the Project Area. Of these, field verification and likelihood of occurrence assessment by Ausecology (2022) indicated two threatened ecological communities, eight plants, six mammals and eight birds as known or having potential to occur within the Project Area, as assessed in the following sections.

Threatened ecological communities

Field verification confirmed no threatened ecological community is present within the Project Area, and no direct or indirect impacts are anticipated from the proposed action. Of the two threatened ecological communities having potential to occur:

- Field verification confirmed potential habitat for the endangered threatened ecological community Coastal Swamp Oak (*Casuarina glauca*) forest of New South Wales and South-East Queensland was not present within the Project Area (Ausecology, 2022).
- Field investigations identified vegetation with characteristics of the critically endangered Lowland Rainforest of Subtropical Australia; however, the vegetation community is less than 1 hectare in size and lacks the number of woody species to meet the key diagnostic characteristic and condition thresholds (Ausecology, 2022).

The extent of existing vegetation communities is confined by the existing railway corridor; vegetation removed from the edge of this patch for widening the rail corridor will not increase fragmentation, change species composition, assist invasive species or otherwise reduce quality or integrity of the existing vegetation community in a way considered to interfere with recovery of an ecological community.

Threatened flora species

The proposed action has potential to directly impact suitable habitat for eight threatened flora species identified by field investigations as having potential to occur within the Project Area. Only vulnerable Macadamia nut (*Macadamia integrifolia*) was confirmed present but not considered to occur in the wild; other than the loss of the one planted individual (0.2 ha of potential habitat), the proposed action will not directly impact macadamia nut populations or wild individuals.

Field investigations verified modelled potential habitat for threatened flora species within the Project Area was degraded by urbanisation and weed incursion indicating any potential population was already impacted. According to potential habitat for remaining potential threatened flora species, the proposed action will impact up to:

- 16 ha of potential habitat for critically endangered Scrub turpentine (*Rhodamnia rubescens*)
- 16 ha of potential habitat for critically endangered Native guava (*Rhodomyrtus psidiodes*)
- 25 ha of potential habitat for endangered Angle-stemmed myrtle (*Gossia gonoclada*)
- 11.9 ha of potential habitat for endangered *Coleus habrophyllus*
- 11.2 ha of potential habitat for vulnerable Tall knotweed (*Persicaria elatior*)
- 11.4 ha of potential habitat for vulnerable Hairy-joint grass (*Arthraxon hispidus*)
- 36.5 ha of potential habitat for vulnerable Three-leaved bosistoa (*Bosistoa traversa*).

While potential suitable habitat for these species was identified in the Project Area, none of the species were recorded during the flora surveys. Further targeted surveys are required to confirm their presence and whether direct or indirect impacts to these species will result from the proposed action.

The potential habitat areas within the Project Area for these species is not contiguous, occurring in patches along the 20 km alignment. The Project Area is predominantly adjacent to existing rail, road or urban features and the potential habitat identified is subject to existing threats associated with the urban environment and weed incursion. In addition, none of these species were recorded within the Project Area during the flora survey. On this basis, it is considered unlikely that specimens (if present) of listed threatened species will be identified in the full extent of potentially suitable habitat within the Project Area. MNES listed flora were assessed through the risk assessment and were identified as low risk and therefore a SIA has not been completed, however, the requirement to complete an SIA for these species will be revisited once targeted survey is available.

During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. The proposed action will manage potential indirect impacts such as weed incursion, edge effects, elevated dust hydrological changes and erosion leading to loss of individuals and reduced seeding through implementation of the EMP(C) to be developed as part of the proposed action.

Threatened fauna species

Of the six mammals and eight birds known, likely and potentially occurring within the Project Area, a two-step significant impact assessment process was applied (described in Section 2.5.2). The screening assessment identified the Koala, Grey-headed flying fox and Greater glider as requiring further assessment for potential risk of significant impacts. Other potentially occurring threatened and migratory species are considered to have a low risk of significant impact as defined under the EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (Department of the Environment, 2013a), due to the combination of factors:

- Project Area lacking habitat critical for the survival or important habitat for the species
- Inability of the Project Area to support an important population or ecologically significant proportion of a population.

Threatened species may use the Project Area for opportunistic seasonal foraging and dispersal; however, the available habitat in the urban context lacks condition and connectivity, and more suitable foraging and dispersal habitat is available in the region. Only the vulnerable Glossy Black Cockatoo is known to use the Project Area for breeding, foraging and as a dispersal pathway; however, preferred

hollow tree species were not recorded during field surveys so the breeding habitat is not critical to survival of the species. The linear nature of the disturbance and of the existing urbanisation in the surrounding area suggest the proposed action will not result in habitat fragmentation in the context of threatened species such as Spotted-tail quoll, Yellow-bellied glider, long-nosed potoroo, Painted Honeyeater, White-throated needletail, Regent honeyeater, Swift parrot, Curlew sandpiper, Australasian bittern, Australian Painted Snipe; however, it may result in loss of future hollow-bearing trees and food trees. During construction, threats other than vegetation clearing will be comparable to the existing urban environment and rail corridor, and managed through the EMP(C) developed as part of the proposed action.

The koala, grey-headed flying fox and greater glider were identified as having a potential risk of significant impact requiring further assessment under the detailed significant impact criteria outlined in the EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (Department of the Environment, 2013a).

- Koala – possible significant impact

  The Project Area contains koala food trees in remnant, high value regrowth and non-remnant condition and numerous records in the vicinity indicate the endangered koala may occur; however, no individuals or signs of utilisation were detected by surveys in the Project Area (see **Appendix C**). Utilisation by the koala is likely to be minimal and for short periods of rest, dispersal and foraging. The Project Area does not support habitat that would play a role in maintaining individuals or a population (the area contains poor foraging and sheltering habitat and does not provide a good stepping-stone to areas of surrounding habitat). The proposed action will not create a new barrier to movement for the koala and any koalas moving into the Project Area will maintain the ability to disperse back out again. Furthermore, key threats to the koala including fatalities from vehicle strike and dog attack are already prevalent within the Project Area. In consideration of the Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (the Conservation Advice) (Department of Agriculture Water and the Environment 2022), the proposed action is unlikely to substantially interfere with the recovery of the koala.

  However, as the habitat within the Project Area has potential to meet essential life cycle requirements of the koala (foraging and dispersal), it is considered habitat critical to survival of the species as defined under the Conservation Advice (Department of Agriculture Water and the Environment 2022). The Project Area has been refined, however, direct impacts include loss of foraging habitat (up to 40.9 ha) and low-quality dispersal and sheltering habitat (up to 161.3 ha). Given the urban context, koalas rely on small patches of vegetation and, as such, there is a possibility of significant impact due to loss of foraging habitat.

- Grey-headed flying fox – possible significant impact

  Vulnerable grey-headed flying fox may use the Project Area sporadically to forage when seasonal conditions are suitable. Habitat within the Project Area largely comprises remnant and non-remnant vegetation containing identified grey-headed flying fox forage species. The *National Recovery Plan for the Grey Headed Flying Fox* (Commonwealth of Australia 2021) defines habitat critical to the survival of the species. While it is recognised that the vegetation is low-quality, the vegetation meets the definition of habitat critical to the survival of the species since it contains important winter and spring flowering vegetation communities, and there are three nationally important camps as identified within 20 km of the Project Area (Commonwealth of Australia 2021). The total area of impact to habitat critical to the survival of the grey-headed flying-fox is calculated as 11.4 ha of suitable roosting and foraging habitat, and 196.6 ha of habitat suitable for foraging only. The proposed action will directly impact these areas as a result of vegetation clearing. As the proposed action is expected to impact on native foraging habitat critical to the survival of the grey-headed flying-fox, the proposed action could be considered to interfere with the recovery of the species.

  The *Referral guideline for management actions in grey-headed and spectacled flying-fox camps* (Department of the Environment 2015c) outlines actions to grey-headed flying-fox camps that are likely to require a referral to DCCEEW. Three flying fox roosts containing grey-headed flying-fox were identified within or within 1km of the Project Area and there are three known nationally

important camps of grey-headed flying-fox within 1km of the Project Area. Since the proposed action will not be clearing vegetation or introducing disturbances (during construction) to nationally important flying-fox camps, it is not considered that the proposed action is likely to have a significant impact to a grey-headed flying-fox camp. Considering the proximity of the proposed action to three nationally important flying-fox camps, however, it is recommended that the proposed action follow the mitigation standards listed in the referral guidelines, to avoid having a significant impact on the flying-fox camps.

The proposed action is unlikely to result in further habitat fragmentation or restrict the availability of roosting opportunities within the landscape in a way that would reduce the viability of the population. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor and appropriately managed through the EMP(C) to be developed as part of the proposed action.

- Greater glider – possible significant impact

  The endangered greater glider is known to occur within the Project Area based on recent records within 1 km of the Project Area; however, utilisation by this species is likely to be minimal and for short periods of rest, dispersal and foraging. Given its endangered status and limited dispersal capabilities, populations of the greater glider are considered important for the conservation of the species as per the Conservation Advice for *Petauroides volans* (greater glider (southern and central)) (Department of Climate Change Energy the Environment and Water 2022a); as such, any individuals present within the Project Area are considered an important population.

  The highly urbanised nature of the environment lacks connectivity for dispersal, provides sparse potential foraging resources in eucalypt dominated forests and marginal breeding habitat based on the scarcity of mature trees suitable for denning. Forest areas currently unoccupied by the greater glider may still represent habitat critical to survival if the recruitment of hollow-bearing trees as the forest ages could allow the species to colonise these areas and ensure persistence of a subpopulation. As habitat trees present may facilitate activities such as foraging, breeding and denning, all potential habitat is considered habitat critical to the survival of the species as defined under the Conservation Advice (Department of Climate Change Energy the Environment and Water 2022a). Vegetation clearing will directly impact 41.8 ha of suitable habitat, including 36.3 ha of denning habitat, 4.6 ha of foraging habitat and 0.9 ha of dispersal habitat. Tree hollows are required for this species to breed, and potential breeding habitat will be directly impacted (a total area of 27.27 ha); the reduction in suitable hollow-bearing trees available for the species in the local area may result in the disruption of the breeding cycle of an important population.

  The Conservation Advice (Department of Climate Change Energy the Environment and Water 2022a) identifies threats to the species as habitat clearing and fragmentation, introduced species, over-abundant native species and inappropriate fire regimes. As the proposed action is unlikely to exacerbate current threats to the species, or introduce these threats in the local area, it is unlikely the proposed action will interfere with the recovery of the species.

7.1.5 Listed Migratory Species

Of the 21 listed migratory species identified in the PMST, 14 are known, likely or have potential to occur within the Project Area. The Project Area offers potential suitable foraging and dispersal habitat within the migration range for a small number of individuals in the airspace above the wooded areas, and vegetation near wetlands and waterways. Migratory species will not breed in this habitat and the habitat does not provide unique features or areas important for the survival of the listed migratory species.

Direct impacts via vegetation clearing are unlikely to impact these species. The linear nature of the disturbance and the existing disturbances in the surrounding area suggest the proposed action will not result in habitat fragmentation for migratory species. The proposed action is unlikely to exacerbate threats to the species, as many threats already occur within the region. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the proposed action due to the existing presence of pests and weeds.

The extent of habitat present within the Project Area does not meet the thresholds suggested to lead to a significant impact to migratory species. Further, it is unlikely that this habitat supports an ecologically

significant proportion of a migratory population. Of the listed migratory species known, likely or having potential to occur within the Project Area, the nature and extent of direct impacts to habitat include:

- 0.2 ha of foraging and dispersal habitat for Black-faced monarch and Spectacled monarch
- 0.7 ha of foraging and dispersal habitat for Osprey
- 13.2 ha of foraging and dispersal habitat for Sharp-tailed sandpiper, Common sandpiper and Pectoral sandpiper
- 6.6 ha of foraging and dispersal habitat for Curlew sandpiper, Glossy ibis, Common greenshank, Marsh sandpiper and Latham's snipe
- 36.3 ha of foraging and dispersal habitat for Rufous fantail
- 41.1 ha of foraging and dispersal habitat for Oriental cuckoo and Satin flycatcher
- 208.8 ha of foraging and dispersal habitat for Fork-tailed swift
- 208.8 ha of foraging, dispersal and marginal roosting habitat for White-throated needletail.

During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C) to be developed as part of the proposed action.

7.1.6 Nuclear Action

None of the activities associated with the proposed action could be considered a nuclear action as defined in Section 22 of the EPBC Act.

7.1.7 Commonwealth Marine Areas

The PMST did not identify any Commonwealth Marine Areas within 10 km of the Project Area.

7.1.8 The Great Barrier Reef Marine Park (GBRMP)

The Great Barrier Reef Marine Park (GBRMP) covers an area of 348,000 km^2 and is located off the coast of Queensland. The Project Area is roughly 16 km inland and 350 km from the southern extent of the GBRMP and therefore, it is unlikely to have any impacts on the GBRMP.

7.1.9 Protection of Water Resources from Coal Seam Gas Development and Large Coal Mining Development

This action does not consist of coal seam gas development or large coal mining development.

7.1.10 Commonwealth Land

The PMST identified four areas of Commonwealth Land within 10 km of the Project Area. They relate to Defence Training Areas and Depots, Annerley Training Depot [30237], Greenbank Training Area [31014], Moorooka Training Depot [31030], and Moorooka Training Depot [31029]. The Project Area does not intersect or impact these areas.

8.0 Environmental offsets

TMR is committed to reducing potential impacts on protected matters through avoidance and mitigation measures with offsets employed as a secondary measure to ameliorate significant residual impacts. Using current ecological data to inform the ongoing design refinement process, potential impacts will be avoided and mitigated through siting and design solutions. For significant residual impacts, TMR will evaluate a number of offset options which may include a combination of land-based offsets, financial payments and/or indirect offsets.

For likely significant impacts to MNES, offsets are proposed to be provided primarily through direct land-based offsets (actions that provide a measurable conservation gain for an impacted protected matter) with contribution of other compensatory measures that do not directly offset the impacts on the protected matter but are anticipated to lead to benefits for the impacted matter such as funding for research (DSEWPaC, 2012).

The offset obligations for the proposed action have not yet been determined; however, TMR will continue to progress habitat quality analysis throughout the design refinement process to confirm offset requirements with consideration of conservation outcomes. For land-based offsets, the suitability of the offset site relative to the impact site and the prescribed environmental matters is measured through undertaking a habitat quality analysis. Minimum potential offset area required under the EPBC Act Environmental Offsets Policy will be estimated with the use of the EPBC Act Offsets Assessment Guide (calculator) (DSEWPaC, 2012). The terrestrial habitat quality scoring methodology will calculate the Commonwealth habitat quality inputs for the Offsets Assessments Guide (OAG) (DSEWPaC, 2012).

9.0 Conclusion

The report documents the assessment of the proposed action's potential impact on Matters of National Environmental Significance (MNES) to inform the determination as to whether it constitutes a controlled action. The impacts to MNES have been assessed based on a worst-case scenario, which involves total clearing of the Project Area. However, the Project Area contains both permanent and temporary impact areas in order to reduce the overall impact of the proposed action.

Key findings of the MNES assessment include:

- The proposed action is located in a highly disturbed landscape where the original vegetation and habitat has been removed for urban infrastructure and residential living.
- The proposed action is located within an area of 295 ha (the Project Area), made up of:
  - Approximately 42.55 ha of remnant, high value regrowth and regrowth vegetation made up of Eucalyptus woodland to open forest, complex notophhyll to microphyll vine forest and melaleuca, casuarina and eucalyptus open forest.
  - Approximately 166.3 ha of non-remnant vegetation, consisting of:
    - Areas adjacent to wetlands and banks of waterways (approximately 5.9 ha)
    - Areas of sparse foraging habitat, including scattered trees present in landscaped areas and residential backyards (approximately 160.4 ha)
  - Non-remnant vegetation with no fauna habitat value made up of existing rail corridor, train station and cleared parcels of land (approximately 86.1 ha).
- Habitat for eight threatened flora species identified by field investigations as having potential to occur within the Project Area, including:
  - Macadamia nut (*Macadamia integrifolia*): Vulnerable under the EPBC Act. One planted individual was recorded on a residential property. This individual is not considered to be 'in the wild'.
  - Potential habitat for Scrub turpentine (*Rhodamnia rubescens*), Native guava (*Rhodomyrtus psidiodes*), Angle-stemmed myrtle (*Gossia gonoclada*), *Coleus habrophyllus,* Tall knotweed (*Persicaria elatior*), Hairy-joint grass (*Arthraxon hispidus*) and Three-leaved bosistoa (*Bosistoa traversa*). These species were not identified during survey, however, targeted flora survey is required to confirm presence.
- Fourteen threatened fauna species and 14 migratory species known, likely and potentially occurring within the Project Area based on recent, nearby records and/or the presence of suitable habitat.
- Of the known, likely and potentially occurring fauna species, three are identified as having a potential risk of significant impact as a result of the proposed action, including:
  - Koala – possible significant impact
  - Grey-headed flying fox – possible significant impact
  - Greater glider – possible significant impact
- A number of potential impacts to listed threatened species may occur as a result of the proposed action. Mitigation and management measures are recommended to ensure the potential impact on ecological values are minimised or avoided.
- The proposed action is unlikely to have a significant impact on World Heritage Properties, National Heritage Places, Wetlands of International Important, Commonwealth Marine Areas, or the Great Barrier Reef Marine Park. The proposed action is not a Nuclear Action, a Coal Seam Gas Development or Large Coal Mining Development, and is not proposed to be undertaken on Commonwealth Land.

The significant impact assessment determined that the proposed action is likely to result in a significant impact on listed threatened species and communities. Therefore, it is considered that the proposed action is a controlled action.

A number of mitigation measures, including project-specific and species-specific measures, are proposed to avoid and reduce the potential impact of the proposed action. Where required, offsets are proposed to be provided primarily through direct land-based offsets to address significant residual impacts resulting from the proposed action. TMR are continuing to undertake further assessment through the design refinements process to quantify offset obligations for the proposed action.

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Appendix A

Significant Impact Assessment

Prepared for
Department of Transport and Main Roads
ABN: 39 407 690 291

Significant Impact Assessment

20-Dec-2022
Logan and Gold Coast Faster Rail

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Delivering a better world

Significant Impact Assessment

Client: Department of Transport and Main Roads

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Document Significant Impact Assessment

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1.0 Assessment methodology

For Matters of National Environmental Significance (MNES) known, likely or having potential to occur within the Project Area, the assessment comprises a two-step process to assess the potential for significant impacts. The purpose of the two-step approach was to focus in on the key MNES (ecological) values with potential to be significantly impacted by the proposed action.

The first step was a risk assessment, which involved reviewing the nature and magnitude, as well as likely consequences of potential impacts resulting from the proposed action. The findings of the risk assessment determined the vulnerability of MNES to potential impacts, and whether further assessment via the significant impact assessment process was necessary to determine potential significant impacts.

1.1 Screening Assessment

A risk assessment is applied to identify MNES at risk of potential significant impacts from the proposed action. The potentially occurring direct and indirect impacts on MNES have been assessed based on a 'worst-case' scenario of impacts and consequences (see **Table 2**), and the understood likelihood of the anticipated impacts occurring (see **Table 1**). Given the current level of design (reference design), it is conservatively assessed that the proposed action involves total clearing of the Project Area. It is expected that the extent of clearing will reduce as the design progresses and, therefore, this assessment presents a 'worst-case' scenario.

The outcome of these assessments was evaluated via a comprehensive risk matrix to determine the level of risk of significant residual impacts to relevant MNES (see **Table 3**). To determine the anticipated consequence, the nature and magnitude of potential impacts were assessed against three consequence levels which contained multiple criteria. Consideration was given to the context of the ecology of the specific MNES, such as community or species' distribution, habitat preferences including breeding habitat and movement patterns. For MNES with referral guidance documents, any terminology, area thresholds and recommendations detailed within were considered foremost. Knowledge gaps and known threats were also reviewed.

Within the risk assessment framework, to assign a consequence level of one or two, all criteria associated with that level must be met, otherwise a level three is automatically assigned. Only one of the criteria in consequence level three needs to be met for that level to be assigned.

MNES that are evaluated via the risk matrix with a 'potential' risk rating triggered further assessment whilst MNES with a 'low' risk rating required no further assessment. The risk assessment framework, including likelihood and consequence criteria for specific MNES is outlined in **Table 1**, **Table 2** and **Table 3**.

Table 1 Risk assessment likelihood criteria

Likelihood level	Criteria
Highly unlikely	• May only occur in exceptional circumstances • No previous incidence of occurring
Unlikely	• Very low chance of occurring • One rare previous incidence of occurring
Possible	• Might occur in some circumstances • Few previous incidences of occurring

Table 2 Risk assessment consequence criteria

Consequence level	Criteria	
	Threatened species and communities	**Migratory species**
1	• No impacts to threatened species populations, ecological communities, habitat extent and habitat quality; **and** • No increase in threatening processes to threatened species and ecological	• No impacts to migratory species habitat extent and habitat quality; **and** • No increase in threatening processes to migratory species; **and** • Area of habitat within the Project Area is

Consequence level	Criteria	
	Threatened species and communities	**Migratory species**
	communities; **and** • Threatened species and ecological communities recovery or persistence is unaffected.	not nationally or internationally significant **and** • Migratory species recovery or persistence is unaffected.
2	• Impacts to threatened species, ecological communities and associated habitats are of a low magnitude or are short-term; **and** • Increased threatening processes to threatened species and ecological communities can effectively be mitigated by well characterised management measures; **and** • In a regional context, reduction in available habitat is inconsequential; **and** • Species specific referral guidance (if available) indicates a low risk.	• Impact area is below species-specific clearing thresholds (if available); **and** • No impacts to areas supporting an ecologically significant proportion of a population; **and** • Impacts to migratory species important habitat are of a low magnitude or are short-term; **and** • Increased threatening processes to migratory species can effectively be mitigated by well characterised management measures; **and** • In a regional context, reduction in available habitat is inconsequential.
3	• Species has been confirmed within the Project Area or in adjacent properties; however uncertainty on population density, population dynamics and or habitat utilisation occurs; **or** • Population numbers and habitat utilisation within the Project Area may vary temporally and spatially due to dependence on climatic conditions i.e. rainfall events recharging wetlands. Therefore, full extent of potential impacts on threatened species is uncertain; **or** • Impacts to threatened species, ecological communities and associated habitats are of a moderate or high magnitude or are longer-term; **or** • Increased threatening processes to threatened species and ecological communities require more intensive, longer term management or intervening measures to mitigate impacts; **or** • Receiving environment is more sensitive to impacts or the consequence of the impact is uncertain; **or** • In a regional context, reduction in available habitat is notable; **or** • Species specific referral guidance (if available) indicates a moderate or high risk.	• Multiple individuals were recorded using habitat within the Project Area; • Close to or above species-specific clearing thresholds (if available); **or** • Impacts to areas supporting or close to supporting an ecologically significant proportion of a population; **or** • Impacts to migratory species important habitat are of a moderate or high magnitude or are longer-term; **or** • Increased threatening processes to migratory species require more intensive, longer term management or intervening measures to mitigate impacts; **or** • Receiving environment is more sensitive to impacts or the consequence of the impact is uncertain; **or** • In a regional context, reduction in available habitat is notable.

Table 3 Risk assessment outcome matrix

Likelihood	Consequence		
	1	2	3
Highly unlikely	Low risk – no further assessment required	Low risk – no further assessment required	Low risk – no further assessment required
Unlikely	Low risk – no further assessment required	Low risk – no further assessment required	Low risk – no further assessment required
Possible	Low risk – no further assessment required	Low risk – no further assessment required	Potential risk – further assessment required

1.2 Significant Impact Assessment

The EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (DotE, 2013) provides the framework to assess the potential impacts on MNES, and determine significance and severity of impacts.

As per this guideline, this assessment has determined impacts on MNES by utilising the broadest scope of the proposed action, and considers both direct and indirect impacts, as well as the measures proposed to avoid and reduce impacts.

The significant impact criteria utilised in the assessment is outlined in **Table 4**, tailored to the conservation status or type of each MNES.

Table 4 Significant impact criteria and key definitions

Criteria	Key definitions
Critically endangered and endangered species and ecological communities	
An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will: • Lead to a long-term decrease in the size of a population • Reduce the area of occupancy of the species; • Fragment an existing population into two or more populations • Adversely affect **habitat critical to the survival of a species** • Disrupt the breeding cycle of a population; • Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; • Result in invasive species that are harmful to a Critically Endangered or Endangered species becoming established in the Endangered or Critically Endangered species' habitat; • Introduce disease that may cause the species to decline; or • Interfere with the recovery of the species.	'**Habitat critical to the survival of a species'** refers to areas that are necessary: • For activities such as foraging, breeding, roosting, or dispersal • For the long-term maintenance of the species (including the maintenance of species essential to the survival of the species, such as pollinators); • To maintain genetic diversity and long-term evolutionary development, or • For the reintroduction of populations or recovery of the species.
Vulnerable species and ecological communities	
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will: • Lead to a long-term decrease in the size of an important population of a species; • Reduce the area of occupancy of an important population; • Fragment an existing important population into two or more populations; • Adversely affect habitat critical to the survival of a species;	'Habitat critical to the survival of a species' as defined above. An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: Key source populations either for breeding or dispersal; Populations that are necessary for maintaining genetic diversity, and/or Populations that are near the limit of the species

Criteria	Key definitions
• Disrupt the breeding cycle of an important population; • Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; • Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat; • Introduce disease that may cause the species to decline; or • Interfere substantially with the recovery of the species.	range.
Migratory species	
An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will: • Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species • Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or • Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	An area of **'important habitat'** for a migratory species is: • Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or • Habitat that is of critical importance to the species at particular life-cycle stages, and/or • Habitat utilised by a migratory species which is at the limit of the species range, and/or • Habitat within an area where the species is declining. • Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

2.0 Screening Assessment

Potential impacts of the proposed action have been considered for ecological MNES that have either been identified within the Project Area or assessed as potentially present. The ecological MNES that are not considered likely to occur at the site are identified in the Likelihood of Occurrence assessment undertaken by Ausecology (2022). The ecological MNES that are known to occur, are likely to occur or possibly occur at the site and which are subject to further impact assessment are summarised in **Table 5** below.

Table 5 Ecological MNES subject to impact considerations

MNES	Likelihood of Occurrence (Ausecology, 2022)	EPBC Act Status
Mammals		
Spotted-tailed quoll (south-eastern mainland population) (*Dasyurus maculatus maculatus*)	May occur	Endangered
Greater glider (southern & central) (*Petauroides volans sensu lato*)	Known	Endangered
Koala (*Phascolarctos cinereus*)	Known	Endangered
Yellow-bellied glider (south-eastern) (*Petaurus australis australis*)	Likely to occur	Vulnerable
Long-nosed potoroo (SE Mainland) (*Potorous tridactylus tridactylus*)	May occur	Vulnerable
Grey-headed flying-fox (*Pteropus poliocephalus*)	Confirmed present	Vulnerable
Birds		
Regent honeyeater (*Anthochaera phrygia*)	May occur	Critically Endangered
Swift parrot (*Lathamus discolor*)	Known	Critically Endangered
Curlew sandpiper (*Calidris ferruginea*)	May occur	Critically Endangered / Migratory
Australasian bittern (*Botaurus poiciloptilus*)	Likely to occur	Endangered
Australian painted snipe (*Rostratula australis*)	May occur	Endangered
Glossy black-cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*)	Known	Vulnerable
Painted honeyeater (*Grantiella picta*)	May occur	Vulnerable
White-throated needletail (*Hirundapus caudacutus*)	Likely to occur	Vulnerable / Migratory
Migratory Birds		
Common sandpiper (*Actitis hypoleucos*)	May occur	Migratory
Fork-tailed swift (*Apus pacificus*)	Likely to occur	Migratory
Sharp-tailed sandpiper (*Calidris acuminata*)	May occur	Migratory
Pectoral sandpiper (*Calidris melanotos*)	May occur	Migratory
Oriental cuckoo (*Cuculus optatus*)	May occur	Migratory
Latham's snipe (*Gallinago hardwickii*)	Likely to occur	Migratory
Black-faced monarch (*Monarcha melanopsis*)	Likely to occur	Migratory
Satin flycatcher (*Myiagra cyanoleuca*)	Likely to occur	Migratory
Osprey (*Pandion haliaetus*)	May occur	Migratory

MNES	Likelihood of Occurrence (Ausecology, 2022)	EPBC Act Status
Glossy ibis (*Plegadis falcinellus*)	Likely to occur	Migratory
Rufous fantail (*Rhipidura rufifrons*)	Likely to occur	Migratory
Spectacled monarch (*Monarcha trivirgatus* syn. *Symposiachrus trivirgatus*)	May occur	Migratory
Common greenshank (*Tringa nebularia*)	Likely to occur	Migratory
Marsh sandpiper (*Tringa stagnatilis*)	May occur	Migratory
Plants		
Scrub turpentine (*Rhodamnia rubescens*)	Likely to occur	Critically Endangered
Native guava (*Rhodomyrtus psidiodes*)	May occur	Critically Endangered
Angle-stemmed myrtle (*Gossia gonoclada*)	May occur	Endangered
Coleus habrophyllus	Likely to occur	Endangered
Macadamia nut (*Macadamia integrifolia*)	Confirmed present (not considered to occur in the wild)	Vulnerable
Tall knotweed (*Persicaria elatior*)	Likely to occur	Vulnerable
Hairy-joint grass (*Arthraxon hispidus*)	May occur	Vulnerable
Three-leaved bosistoa (*Bosistoa traversa*)	May occur	Vulnerable
Threatened ecological communities		
Lowland Rainforest of Subtropical Australia	May occur	Critically Endangered
Coastal Swamp Oak (*Casuarina glauca*) forest of New South Wales and South-East Queensland	May occur	Endangered

Ecological MNES values within the Project Area, or adjacent to the Project Area, may be directly or indirectly impacted by the development of the proposed action. The risk that the impacts will be considered significant (i.e. an impact which is *"important, notable, or of consequence, having regard to its context or intensity"*), however, will differ between species based on a combination of factors including the community or species' ecological characteristics and the likely consequence of such impacts.

As such, screening assessment was undertaken in accordance with the developed risk framework and the approach detailed in provided in **Section 1.0**, to identify MNES that are at 'low risk' of potential impacts, and MNES that are at potential risk and require further assessment. This screening assessment is provided in **Table 6** below.

Findings of the risk assessment determined that three MNES requires further assessment against the significant impact assessment criteria: greater glider, koala and grey-headed flying fox (**Table 6**).

While potential suitable habitat for Scrub turpentine, Native guava, Angle-stemmed myrtle, *Coleus habrophyllus,* Tall knotweed, Hairy-joint grass and Three-leaved bosistoa was identified in the Project Area, none of the species were recorded during the flora surveys. Further targeted surveys are required to confirm their presence and whether direct or indirect impacts to these species will result from the proposed action.

The potential habitat areas within the Project Area for these species is not contiguous, occurring in patches along the 20 km alignment. The Project Area is predominantly adjacent to existing rail, road or urban features and the potential habitat identified is subject to existing threats associated with the urban environment and weed incursion. In addition, none of these species were recorded within the Project

Area during the flora survey. On this basis, it is considered unlikely that specimens (if present) of listed threatened species will be identified in the full extent of potentially suitable habitat within the Project Area. MNES listed flora were assessed through the risk assessment and were identified as low risk and therefore a SIA has not been completed, however, the requirement to complete an SIA for these species will be revisited once targeted survey is available.

Table 6 MNES significance screening assessment

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
Critically Endangered and Endangered Species					
Mammals					
Spotted-tailed quoll (south-eastern mainland population) (*Dasyurus maculatus maculatus*)	The Spotted-tailed quoll occurs in south-east Queensland: coastally from Bundaberg to the border and inland to Monto and Stanthorpe. Occurrences are known from five broad geographic areas: four from coastal ranges and the Great Dividing Range from the NSW border to Gladstone, the fifth is centred on the eastern Darling Downs-Inglewood Sandstone provinces of the Brigalow Belt South Bioregion. Unconfirmed reports suggest the subspecies may occur in the Clarke and Conway Range areas, eastern Queensland (Department of Climate Change Energy the Environment and Water 2022c). Once distributed throughout much of eastern Australia, the species has experienced significant range reductions in recent decades. They are known to inhabit a range of forest environments, from rainforest to open woodland. They require forests with suitable den sites such as rock crevices, caves, hollow logs, burrows and tree hollows. Habitat that is critical to the survival of the Spotted-tailed quoll includes large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey. However, the threshold densities of these critical components required to support quoll populations are unknown. Consequently, it is currently not possible to define (or map) habitat critical to the survival of the Spotted-tailed quoll (Department of Climate Change Energy the Environment and Water 2022c). Key threats for the species include habitat loss and degradation through the clearing of native vegetation, predation, fire, road mortality and poisoning by Cane toads.	This species may potentially utilise the Project Area for opportunistic foraging and dispersal to larger, more suitable areas of habitat. It may also find suitable denning habitat within the Project Area in small metamorphic areas. Records occur approximately 12 km to the west of the proposed action near the Greenbank military base. Habitat critical to the survival of the species is considered unlikely to occur within the Project Area due to the urban fragmentation and small areas of potential denning habitat. Despite the presence of potential denning and foraging habitat, this species may only sporadically use the Project Area to forage when seasonal conditions are suitable, based on the urbanised nature of the area. Records of this species are rare in southern Queensland, and this species will not be reliant on the vegetation within the Project Area. Direct impacts will occur to 201.5 ha of habitat via vegetation clearing. This habitat consists of 6.7 ha of potential denning habitat and 194.8 ha of foraging and dispersal habitat, via vegetation clearing. The linear nature of the disturbance and the existing disturbances in the surrounding area suggest the proposed action will not result in habitat fragmentation in the context of this species. Management measures for the species include pest management for cane toads. All other key threats to this species are unlikely to be increased beyond current levels as a result of the proposed action.	2	Unlikely	**Low risk**
Greater glider (southern & central) (*Petauroides volans sensu lato*)	The greater glider occurs in eucalypt forests and woodlands within eastern Australia from the Windsor Tableland in north Queensland through to central Victoria. The species' distribution is discontinuous, with the area from south of Cooktown to Townsville in north Queensland disconnected from the remaining extent (Department of Climate Change Energy the Environment and Water 2022c). The species is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. During the day it shelters in tree hollows, with a particular preference for large hollows in large, old trees. Habitat critical to the survival of the species is defined as large contiguous areas of eucalypt forest that contain mature hollow-bearing trees, smaller or fragmented habitat patches connected to larger patches that can facilitate dispersal, cool microclimate forest or woodland areas such as gullies and coastal lowlands, areas defined as refuges under future climate change scenarios, and short-term or long-term post-fire refuges. All populations are considered important populations across the species' range (Department of Climate Change Energy the Environment and Water 2022c). In Queensland especially, the abundance of greater gliders is continuing to decline largely due to the removal of hollow-bearing trees during logging and repeated prescribed burning. Other key threats to the species include habitat fragmentation due to the species low dispersal ability, climate change and hyper predation by owls (Threatened Species Scientific Committee 2016).	The greater glider is known to occur within the Project Area based on recent records within 1 km of the Project Area. The Project Area contains large stags identified as potential habitat (although these are considered marginal breeding habitat), and eucalypt dominated forests which provide potential foraging resources for the species. The species' utilisation of the Project Area would likely be minimal and mainly for short periods of rest / dispersal / foraging. Habitat within the Project Area is not considered to meet the definition of habitat critical to the survival of the species due to the urbanised nature of the area and a lack of connectivity for dispersal. Furthermore, breeding habitat is considered to be marginal due to the scarcity of mature tree species suitable for denning. Regardless of this, given its status as an endangered species and considering its limited dispersal capabilities, all populations of the greater glider are considered to be important for the conservation of the species. Based on this definition, any individuals present within the Project Area are considered an important population. Direct impacts will occur to 41.8 ha of habitat via vegetation clearance. This consists of 36.3 ha of denning habitat, 4.6 ha of foraging habitat and 0.9 ha of dispersal habitat. Given there is a risk of habitat loss occurring, a significant impact assessment is recommended.	3	Possible	**Potential risk - significant impact assessment recommended**
Koala (combined populations of Qld, NSW and the ACT)	The koala has a large distribution across eastern Australia and occurs within a variety of vegetation types, particularly those that contain koala food trees. To	This species may potentially occur within the Project Area as it contains koala food trees in remnant, high value regrowth (HVR) and non-remnant condition.	3	Possible	**Potential risk - significant impact**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
(*Phascolarctos cinereus*)	ensure potential significant impacts on the koala are appropriately assessed, the *EPBC Act referral guidelines for the vulnerable koala* were developed (Department of the Environment 2014). These guidelines encourage the assessment of significant impacts on the koala to be completed primarily through the assessment of habitat critical to the survival of the koala and the actions that interfere substantially with the recovery of the koala. It is noted, however, that the koala listing was upgraded to Endangered in February 2022 and Conservation Advice has been released to support this upgrade. Habitat critical to the survival of the species is defined within this advice, as habitat that supports the species as forage, breeding or dispersal habitat. Key habitat types identified as important to species recovery are large contiguous tracts of vegetation that buffer and provide connectivity to riparian corridors – all dominated by koala food trees. Known threats to this species include habitat loss, fragmentation, collision with vehicles and predation by dogs.	These vegetation communities provide suitable habitat for the species totalling 202.2 ha, consisting of 40.9 ha of foraging habitat and 161.3 ha of dispersal habitat, with some areas that may act as a refuge for dispersing individuals. Direct impacts will occur to this habitat via vegetation clearance. While it is expected that koala use would be minimal and for short periods of rest/dispersal/foraging, it is recognised that this species has recently been up-listed to Endangered and the south-east Queensland population is considered an important population which is in rapid decline. Given the urban context of the Project Area, where it is noted that koalas rely on small patches of vegetation, there is a risk of notable habitat loss occurring. On a conservate basis, a significant impact assessment is recommended.			**assessment recommended**
Birds					
Regent honeyeater (*Anthochaera phrygia*)	The regent honeyeater is endemic to mainland south-eastern Australia. It has a patchy distribution which extends from south-east Queensland, through New South Wales and the Australian Capital Territory, to central Victoria. There are four known key breeding areas: three in New South Wales and one in Victoria. This species mostly inhabits areas of low to moderate relief with moist, fertile soils. It is most commonly associated with box-ironbark eucalypt woodland and dry sclerophyll forest, but also inhabits riparian vegetation such as sheoak (*Casuarina* spp.) where it feeds on needle-leaved mistletoe. Regent honeyeaters sometimes utilise lowland coastal forest, which may act as a refuge when its usual habitat is affected by drought. It also uses a range of other habitats including remnant patches in farmland and urban areas, roadside reserves and travelling stock routes. This species' movement patterns are thought to be governed by the flowering of select eucalypt species. It is nomadic and partly migratory, with some predictable seasonal movements observed. The species is highly mobile and capable of travelling large distances; however, the regularity and extent of long-distance movements are unknown. Habitat critical to the survival of the regent honeyeater includes any breeding or foraging areas where the species is likely to occur, and any newly discovered breeding or foraging locations. The decline of the regent honeyeater is thought to be mainly due to the clearing, fragmentation and degradation of its habitat. The species relies on a range of different food resources, and is particularly vulnerable to the removal of large mature trees which are important feeding and breeding habitat.	Foraging resources for the regent honeyeater are present within the Project Area, including eucalypt dominated forests and mistletoe and there is the potential that the species may utilise the Project Area for opportunistic foraging and dispersal to larger, more suitable areas of habitat. As the regent honeyeater may potentially occur within the area and the area could provide foraging opportunities, habitat critical to the survival of the species is considered present within the Project Area. It is considered unlikely, however, that the regent honeyeater would breed within the Project Area. Despite the presence of foraging habitat, this species may only sporadically use the Project Area to forage when seasonal conditions are suitable. Rare occurrences of this species are seen in southern Queensland, and this species will not be reliant on the vegetation within the Project Area. Direct impacts through vegetation clearing will be limited to 36.3 ha of foraging habitat and potential breeding habitat. Further, the linear nature of the disturbance and with consideration of the existing disturbances in the surrounding area, the proposed action will not result in habitat fragmentation in the context of this species. All other key threats to this species are unlikely to be increased beyond current levels as a result of the proposed action. Indirect impacts such as increased erosion, sedimentation and contamination will be managed through the Environmental Management Plan – Construction (EMP(C)) to be created for the proposed action. Other indirect impacts such increased dust, light and noise will be temporary and localised.	2	Highly unlikely	**Low risk**
Swift parrot (*Lathamus discolor*)	The swift parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia for the winter. They occupy habitats across all tenures, with the majority of habitats occurring outside formal conservation reserves. Whilst on the mainland the swift parrot disperses widely to forage on flowers and psyllid lerps in *Eucalyptus* species, with the majority being found in Victoria and New South Wales. Small numbers of swift parrots are observed in the Australian Capital Territory and in south-eastern Queensland on a regular basis. Their distribution fluctuates with food availability as they feed on psyllid lerps, seeds and fruit (Kennedy and Tzaros 2005). Non-breeding birds preferentially feed in inland box-ironbark and grassy woodlands, and coastal swamp mahogany (*Eucalyptus robusta*) and spotted gum (*Corymbia maculata*)	This species may potentially utilise the Project Area for opportunistic foraging and dispersal to larger, more suitable areas of habitat. Recent records occur at Gould Adams Park (2014), which is adjacent to the Project Area (ALA, 2022). Non-breeding birds preferentially feed in inland box-ironbark and grassy woodlands, and coastal swamp mahogany (*Eucalyptus robusta*) and spotted gum (*Corymbia maculata*) woodland when in flower. These preferential foraging tree species are not present within the Project Area, therefore it is considered that habitat critical to the survival of the species is not considered present within the Project Area. Despite the presence of suitable habitat, this species may only sporadically use the Project Area to forage when seasonal conditions are suitable. The species has only rarely been seen in southern Queensland (e.g. the most recent record is	2	Highly unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
	woodland when in flower. There are no species-specific guidelines for determining habitat critical to the survival of the swift parrot. Therefore, the generic definition should be applied. Known threats to the swift parrot include predation by sugar gliders, habitat loss and alteration, wildfire, collision with wire netting and mesh fences, competition for resources and Psittacine Beak and Feather Disease.	from 8 years ago), and this species will not be reliant on the vegetation within the Project Area. Direct impacts through vegetation removal will be limited to 36.3 ha of foraging habitat. Considering the linear nature of the disturbance and the existing disturbances in the surrounding area, it is not anticipated that the proposed action will result in habitat fragmentation in the context of this species. All other key threats to this species are unlikely to be increased beyond current levels as a result of the proposed action. Indirect impacts such as increased erosion, sedimentation and contamination will be managed through the EMP(C) to be created for the proposed action. Other indirect impacts such increased dust, light and noise will be temporary and localised.			
Curlew sandpiper *(Calidris ferruginea)*	The Curlew sandpiper requires aquatic habitats, generally preferring wetlands with varying levels of salinity. Foraging typically occurs in the shallow water edges of the wetland or in the adjacent mudflats. Curlew Sandpipers generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns. There are sparsely scattered records inland. In NSW, they are widespread east of the Great Divide, especially in coastal regions. Key threats to the species include loss of feeding and roosting habitat, fragmentation or isolation of sites within feeding areas resulting in decreasing abundance, human disturbance at roost and feeding sites, disturbance by dogs at roost and feeding sites and pollution.	This species may occur in the Project Area due to the presence of suitable foraging and dispersal habitat, and ALA records to the east of the Project Area along the Logan River (1988-2001). The potential habitat that is present, however, is marginal as it is limited to watercourses which are not considered the preferred foraging habitat for the species. Only small numbers of this species occur inland. Furthermore, areas of higher quality potential habitat occur in the wider area to the east, closer to the coastline. Based on this and the low quality of potential habitat, only vagrant individuals are expected to utilise potential habitat on a transitory basis. It is not considered that habitat that is critical to the survival of the species is present in the Project Area as the habitat that is present is degraded nature and non-preferred habitat type. A maximum of 15.4 ha of potential habitat will be directly impacted via vegetation clearing. The proposed action will not create a barrier that may hinder access potential habitat. Indirect impacts such as increased erosion, sedimentation and contamination will be managed through the EMP(C) to be created for the proposed action. Other indirect impacts such increased dust, light and noise will be temporary and localised.	1	Highly unlikely	**Low risk**
Australasian bittern (*Botaurus poiciloptilus*)	The Australasian bittern favours freshwater wetlands and rarely, estuarine or tidal wetlands. Its preferred microhabitats are shallow water with tall vegetation such as rushes, reeds and sedges or trampled vegetation adjacent to deep-water pools (Department of Agriculture Water and the Environment, 2021). The species typically occurs in and about water in reedbeds, sedges and rushes. Occasionally seen in tussock paddocks, saltmarshes and brackish wetlands. The species occurs within eastern and south-eastern Australia although it is considered uncommon throughout much of its range (Pizzey and Knight, 1999). In southeast Queensland there is habitat remaining on Fraser Island, the Fraser Coast, North Stradbroke Island, Redlands and out into the Lockyer Valley (DCCEEW 2019). Key areas in Queensland where the species has been reliably seen in the past include the flood plains south of Byfield State Forest, Garnett's Lagoon and Lake Clarendon. Key threats to the species include impacts through the loss of wetland habitat, habitat degradation, impacts from grazing animals and reduced water flows due to changing climate and predation by introduced species.	The species is considered likely to occur within the Project Area due to the presence of marginally suitable habitat such as vegetated wetlands and waterway banks, as well as REs 12.3.25, 12.3.11 and 12.3.6 in the Project Area. Nearby records occur along the Logan River from 1986-1996 (or records with no date), suggesting the species is an infrequent visitor to the area adjacent to the Project Area. Habitat within the Project Area generally consists of non-remnant wetlands, and more suitable habitat for the species occurs elsewhere at a regional scale. A total of 15.4 ha of suitable habitat occurs within the Project Area, which will be directly impacted via vegetation clearing. The proposed action is considered unlikely to impact habitat critical to the species' survival and given the rare occurrence of the species within the region it is unlikely that an important population will be impacted. The proposed action will not create a barrier that may hinder access potential habitat. Indirect impacts such as increased erosion, sedimentation and contamination will be managed through the EMP(C) to be developed as part of the proposed action. Other indirect impacts such increased dust, light and noise will be temporary and localised.	1	Unlikely	**Low risk**
Australian Painted Snipe (*Rostratula australis*)	The Australian painted snipe is a wading bird found in shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans generally across eastern Australia. Important areas for this species in the past have included the Murray-Darling Basin (particularly the Riverina of Victoria and New South Wales), Queensland	This species may occur within the Project Area due to the presence of suitable foraging and dispersal habitat. Recent species records include from 2013-2017 at Logan River to the east of the Project Area, and scattered records elsewhere in the region. Habitat within the Project Area generally consists of non-remnant wetlands or watercourses, and more suitable habitat for the species occurs	1	Unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
	Channel Country, Fitzroy Basin of Central Queensland, south-eastern South Australia and adjacent parts of Victoria. Within Queensland, records are most common in coastal areas however also occur at scattered locations inland. This species requires suitable wetland areas, even in drought conditions, and will move to suitable habitat if necessary. Nest records are nearly all from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover (Department of Climate Change Energy the Environment and Water 2022c). The main identified threat to the Australian painted snipe is the loss and degradation of wetlands, through drainage and the diversion of water for agriculture and reservoirs. Grazing and associated trampling of wetland vegetation by cattle and/or sheep is a threat to the species, particularly in arid regions where grazing tends to become concentrated around wetlands in the dry season.	elsewhere at a regional scale. It is likely that only a small number of dispersing individuals would utilise potential habitat on a transitory basis. Furthermore, areas of higher quality potential habitat occur in the wider area to the east, which are more likely to be utilised. The areas of potential habitat within the Project Area are not considered to comprise habitat critical to the survival of the species, which is defined as wetlands providing potential breeding or foraging and roosting habitat. A maximum of 15.4 ha of potential habitat will be directly impacted via vegetation clearing. The proposed action will not create a barrier that may hinder access to potential habitat. As construction will occur in phases along the linear Project Area, it is unlikely that all the areas of potential habitat will be disturbed at one time, thus allowing for individuals to move to avoid disturbed areas. The proposed action will not create a barrier that may hinder access potential habitat. Indirect impacts such as increased erosion, sedimentation and contamination will be managed through the EMP(C) to be created for the proposed action. Other indirect impacts such increased dust, light and noise will be temporary and localised.			
Flora					
Scrub Turpentine (*Rhodamnia rubescens*)	Scrub turpentine is a shrub or small tree to 25 m high. It is found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest, usually on volcanic and sedimentary soils. It occurs in coastal regions and occasionally inland onto escarpments up to 600 m ASL in areas with rainfall of 1,000-1,600 mm. It is found along the coast from Bundaberg, QLD, down south to Bateman's Bay, NSW (NSW OEH, 2021). Exotic rust fungi (Myrtle Rust) is listed as a key threatening process for the species.	This species is considered likely to occur within the Project Area as suitable habitat is present and there is a recent record approximately 2 km from the Project Area along Slacks Creek, a tributary of the Logan River with connectivity to Scrubby Creek. Potential habitat includes open forests and woodlands, often associated with watercourses, as well as along watercourses. This species was not recorded during the field surveys. Approximately 16 ha of potential habitat for the scrub turpentine has been identified in the Project Area, however species presence has not been confirmed. Further survey is required to confirm the presence of scrub turpentine and inform whether direct or indirect impacts to scrub turpentine will result from the proposed action. Potential incursion of new weeds, or exacerbation of current weeds, will be managed in accordance with EMP(C) to be developed as part of the proposed action. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C). The screening assessment identified this species as low risk and therefore a SIA has not been completed, however this assessment will be revisited once targeted survey results are available.	2	Unlikely	**Low risk**
Native Guava (*Rhodomyrtus psidiodes*)	The native guava is a shrub or small tree to 12 m that is found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest, often near creeks and drainage lines. It occurs from Maryborough, QLD, south to Broken Bay, NSW, throughout coastal and sub-coastal areas at low elevations (NSW OEH, 2021). Occurrence records are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120km inland in the Hunter and Clarence River catchments and along the Border Ranges. Exotic rust fungi (Myrtle Rust) is listed as a key threatening process for the species.	This species may occur within the Project Area as suitable habitat is present and there are several records of the species in the surrounding area, including one approximately 4 km to the north-east of the Project Area. Potential habitat includes sclerophyll vegetation associated with rainforest formations, near creeks and drainage lines. This species was not recorded during the field surveys. Approximately 16 ha of potential habitat for the native guava has been identified in the Project Area, however species presence has not been confirmed. Further survey is required to confirm the presence of native guava and inform whether direct or indirect impacts to native guava will result from the proposed action. Potential incursion of new weeds, or exacerbation of current weeds, will be managed as per the EMP(C) to be developed as part of the proposed action. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats	2	Unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
		from construction activities will be appropriately managed through the EMP(C). The screening assessment identified this species as low risk and therefore a SIA has not been completed, however this assessment will be revisited once targeted survey results are available.			
Angle-stemmed Myrtle (*Gossia gonoclada*)	The angle-stemmed myrtle is a tree 3-12 m high with a dense canopy of glossy, deep green foliage. It is found in lowland riparian rainforest and notophyll vine forest, along permanent watercourses subject to tidal influence. It usually grows below the peak flood level, on steep slopes and at low elevations of 5-50 m. It occurs on moderately well drained clay soils, sandy loams and alluvial soils It is currently known from sites along the lower reaches of the Brisbane and Logan Rivers and their tributaries. It reproduces both vegetatively and from seed with flowering occurring in late spring (October to November) with fruits ripening from January to February (DES, 2021). Exotic rust fungi (Myrtle Rust) is listed as a key threatening process for the species alongside habitat degradation from land use activities and weeds.	This species may occur within the Project Area as there is suitable habitat present and recent records within proximity of the Project Area. Approximately 25 ha of potential habitat has been identified within the Project Area, in the form of notophyll vine forest, however species presence has not been confirmed. Further survey is required to confirm the presence of angle-stemmed myrtle and inform whether direct or indirect impacts to angle-stemmed myrtle will result from the proposed action. Potential incursion of new weeds will be managed as per the EMP(C) to be developed for the proposed action. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C). The screening assessment identified this species as low risk and therefore a SIA has not been completed, however this assessment will be revisited once targeted survey results are available.	2	Unlikely	**Low risk**
Coleus habrophyllus	*Coleus habrophyllus* is a woody, square-stemmed herb, recorded growing on chert or sandstone outcrops, in open woodlands often in shaded situations near vine forest. (DAWE, 2021). Seven populations are known south of Brisbane in the following locations: Oxley Creek, Greenbank, Opposum Creek, Springfield, Woogaroo Creek, Goodna, three populations within White Rock Conservation Park, incorporating Six Mile Creek Conservation Park, near Ormeau (south of Beenleigh). The main threat to the species is habitat loss from introduced weeds such as Lantana.	This species is considered likely to occur within the Project Area as there is suitable habitat present (REs 12.9-10.17a, 12.9-10.19a, 12.9-10.2, 12.11.3a, 12.11.24, 12.11.5) and there are recent records within proximity of the Project Area. Approximately 11.9 ha of potential habitat has been identified within the Project Area, however species presence has not been confirmed. Further survey is required to confirm the presence of *Coleus habrophyllus*. Potential incursion of new weeds, or exacerbation of current weeds, will be managed in accordance with the EMP(C) to be developed for the proposed action. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C). The screening assessment identified this species as low risk and therefore a SIA has not been completed, however this assessment will be revisited once targeted survey results are available.	2	Unlikely	**Low risk**
Vulnerable Species					
Mammals					
Yellow-bellied glider (*Petaurus australis australis*)	The yellow-bellied glider (south-eastern) occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests. Abundance is highly dependent on habitat suitability, which is in turn determined by forest age and floristics. The subspecies shows a preference for large patches of mature old growth forest that provide suitable trees for foraging and shelter. There is also a clear preference for forests with a high proportion of winter-flowering and smooth-barked. Smooth-barked eucalypts are important due to the range of foraging substrates (and therefore food resources) they provide, as loose bark hanging in strips from these trees provides shelter for insect prey. The yellow-bellied glider (south-eastern) is found at altitudes ranging from sea level to 1400m above sea level and has a widespread but patchy distribution from south-eastern Queensland to far south-eastern SA, near the SA-Vic	This species may occur within the Project Area based on potential habitat identified in the Project Area and records in the region approximately 10 km to the east and west of the Project Area. The suitable habitat within the Project Area includes eucalypt dominated woodlands and open forest, however no large patches of mature old growth forest are present within the Project Area which are preferred by the species. Smooth-barked eucalypts occur within the Project Area including *Eucalyptus propinqua, Eucalyptus racemosa, Eucalyptus seeana and Eucalyptus tereticornis,* and *Corymbia citriodora*. The species may utilise the Project Area, particularly the patch of vegetation associated with Karawatha forest (approximately 10 ha within the Project Area). It is therefore considered that the Project Area contains habitat critical to the survival of the species.	3	Unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
	border. Most of the Qld distribution is coastal, extending southward along the eastern seaboard from north of Mackay and continuing through the NSW-Qld border. However, isolated subpopulations are found inland in the Blackdown and Carnarvon Ranges of central Qld. Key threats to the species include loss and fragmentation of habitat, loss of hollow-bearing trees and loss of feed trees.	Direct impacts via vegetation clearing will occur to 201.3 ha of potential habitat, consisting of 36.3 ha of breeding habitat, 4.6 ha of foraging habitat and 160.4 ha of dispersal habitat. The linear nature of the disturbance and the existing disturbances in the surrounding area suggest the proposed action will not result in habitat fragmentation in the context of this species, however it may result in a loss of hollow-bearing trees and feed trees. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C) to be developed as part of the proposed action.			
Long-nosed Potoroo (SE Mainland) (*Potorous tridactylus tridactylus*)	The long-nosed potoroo has a broad and fragmented distribution. It occurs between sea level and generally up to 800 m above sea level and is restricted to habitats receiving an annual rainfall greater than 760 mm. The northern long-nosed potoroo has a broad, though highly fragmented distribution across two major bioregions (Southeast Queensland and New South Wales north coast) and occurs between Many Peaks Range (near Gladstone) in the north to the northern boundaries of the Sydney Basin in the south. Important populations in Queensland include: Many Peaks Range, Fraser Island, Wide Bay Military Training Area, Tin Can Bay, Sunshine coast hinterlands and D'Aguilar Ranges - Lamington Plateau and Springbrook Plateau. They inhabit coastal heaths and dry and wet sclerophyll forests with a dense understorey of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature (NSW OEH, 2020). Habitat critical to the survival includes occupied forested habitats larger than 0.1 km^2. Unoccupied forested areas (larger than 0.1 km^2), which are either adjacent or proximal to extant subpopulations, may also be considered critical if they have the potential to provide future habitat for the northern long-nosed potoroo as either a natural range expansion or as a translocation site for at-risk populations. Key threats to the species include invasive species, loss of food sources, inappropriate fire regimes, and habitat degradation.	This species may occur within the Project Area based on the presence of potential habitat in the area, however no records occur in the region. The habitat within the Project Area is likely to be only marginally suitable and lacks the structural complexity and understorey microhabitat requirements for the species. Despite the presence of suitable habitat, there is no evidence that the species will utilise the Project Area, and therefore it is unlikely that the habitat within the Project Area contains habitat critical to the survival of the species. The Project Area is not located close to an important population, and it is also unlikely that the species will be reliant on the vegetation within the Project Area. Direct impacts via vegetation clearing will be limited to 19.1 ha of potential breeding, foraging and dispersal habitat. The linear nature of the disturbance and the existing disturbances in the surrounding area suggest the proposed action will not result in habitat fragmentation in the context of this species. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C) to be developed for the proposed action.	1	Highly unlikely	**Low risk**
Grey-headed flying-fox (*Pteropus poliocephalus*)	Grey-headed flying-foxes occupy the coastal lowlands and slopes of eastern Australia, from Rockhampton in central Queensland to Melbourne in Victoria. Areas of repeated occupation extend inland to the tablelands and western slopes in northern New South Wales and the tablelands in southern Queensland. The areas of Brisbane, Newcastle, Sydney and Melbourne are occupied continuously. Important populations have not been defined for this species and as such the generic definition should be applied. Grey-headed flying-foxes require continuous areas that provide productive foraging habitats, migration corridors or stopover habitats that link productive areas, and suitable roosting habitat within nightly commuting distance of foraging areas. The *National Recovery Plan for the Grey Headed Flying Fox* (Commonwealth of Australia 2021) defines habitat critical to the survival of the species as field verified communities dominated by important winter and spring flowering vegetation. Habitat critical to the survival of the species may also be vegetation communities not containing winter and spring flowering tree species but which: • Contain native species that are known to be productive as foraging habitat during the final weeks of gestation and during the weeks of birth, lactation and conception (August to May) • Contain native species used for foraging and occur within 20 km of a	Roosting and foraging habitat is present within the Project Area, associated with rainforest patches, stands of Melaleuca, mangroves, wetlands/swamps and/or riparian vegetation as they may contain both foraging and roosting. Foraging habitat also occurs for the species, associated with multiple vegetation communities. However, suitable foraging habitat may occur in any remnant habitat with nectar producing species as well as in non-remnant / urban areas where there are native and exotic feed trees A total of 11.4 ha of suitable roosting and foraging habitat occurs within the Project Area, as well as 196.6 ha of habitat suitable for foraging only. This habitat meets the definition of habitat critical to the survival of the species as there are known camps within 20 km, including one to the east at Lincoln Street, Beenleigh, and to the south at Yvonne Crescent, Mount Warren Park (Department of Climate Change Energy the Environment and Water 2020). Important populations of grey-headed flying-foxes have not been identified. Therefore, any population potentially occurring within the Project Area has been assessed against the generic definition in the *EPBC Act Significant Impact Guidelines 1.1*. There are no separate or distinct populations of this species due to the constant genetic exchange and movement between camps throughout their entire geographic range. Although the species is highly mobile and move throughout their range, any population potentially present within the Project Area	3	Potential	**Potential risk - significant impact assessment recommended**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
	nationally important camp, as identified on the Department's interactive flying-fox viewer, **OR** • Contain native and/or exotic species used for roosting at the site of a nationally important grey-headed flying-fox camp. Key threats to the species include habitat destruction; culling; entanglement in netting and barbed wire fencing; camp disturbance by humans; electrocution on powerlines; bushfires and pathogens such as Australian bat Lyssavirus, Bat Paramyxovirus and Menangle Pig virus.	is considered an 'important population'. On this basis, a significant impact assessment is recommended. Despite the above, the species may only sporadically use the Project Area to forage when seasonal conditions are suitable. The proposed action is unlikely to restrict the availability of roosting opportunities within the landscape in a way that would reduce the viability of the population. The linear nature of the disturbance and the existing disturbances in the surrounding area suggest the proposed action will not result in habitat fragmentation in the context of this species. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C) to be developed as part of the proposed action.			
Birds					
Glossy Black Cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*)	South-eastern Glossy Black-Cockatoos are uncommon but widespread. They can be found from Mitchell, Queensland, through eastern New South Wales to Mallacoota, Victoria. This species prefers woodland areas dominated by *Allocasuarina*, or open sclerophyll forests and woodlands with a stratum of *Allocasuarina* beneath Eucalyptus, Corymbia or Angophora. In south-east Queensland, preferred foraging trees include *Allocasuarina littoralis* and *Allocasuarina torulosa*. This species roosts in tree hollows and can fly more than 10 km from roosting or nesting sites to feeding areas. Habitat critical to the survival is split between foraging and breeding habitat. Foraging habitat includes nine species of She-oaks, while breeding habitat includes nesting hollows within narrow leaved ironbark, blue leaved ironbark and Blakeley's red gum with nest hollows having the following traits: 8 m above ground; located in branches >30 cm in diameter, branch or stem no more than 45 degrees from vertical; and a minimum entrance diameter of >15 cm. Key threats to the species include habitat loss, changing fire regimes, and predation from feral cats and possums.	The south-eastern glossy-black cockatoo is considered known to occur within the Project Area, based on field surveys by GHD (2021). It is considered that the species may utilise the Project Area for breeding, foraging and as a dispersal pathway. Suitable foraging habitat is present including *Allocasuarina* spp. and *Casuarina* spp. However, the preferred hollow tree species were not recorded during field surveys. The Project Area may contain foraging habitat critical to the survival of the species, but does not contain breeding habitat critical to the survival. This species is highly mobile and larger, more suitable habitat occurs in the region. Foraging and breeding habitat identified within the Project Area. Direct impacts via vegetation clearance include removal of 1.5 ha of breeding habitat and 18.3 ha of foraging and dispersal habitat. The linear nature of the disturbance and the existing disturbances in the surrounding area suggest that the proposed action will not result in habitat fragmentation in the context of this species. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C) to be developed as part of the proposed action.	2	Possible	**Low risk**
Painted Honeyeater (*Grantiella picta*)	The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The greatest concentrations of records come from the inland slopes of the Great Dividing Range between the Grampians, Victoria and Roma, Queensland (DAWE, 2021). The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, Acacia- dominated woodlands, paperbarks, casuarinas, *Callitris*, and trees on farmland or gardens (DAWE, 2021). Habitat loss is a key threat for the species, specifically through clearing for grazing and loss of mistletoe, alongside threats through competition and predation.	This species may occur within the Project Area, with potential foraging habitat available for the species (flowering *Eucalyptus* spp. and mistletoe species), however it is unlikely that preferred breeding habitat occurs. A single record from 1992 occurs 8 km east of the Project Area, with no other recent records in the region. Direct impacts via vegetation clearance include 36.3 ha of foraging habitat. The linear nature of the disturbance and existing disturbances in the surrounding area indicate the proposed action will not result in habitat fragmentation in the context of this species. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C) to be developed as part of the proposed action.	2	Highly unlikely	**Low risk**
White-throated needletail (*Hirundapus caudacutus*)	The white-throated needletail breeds in the northern hemisphere and migrates in the austral summer months to Australia. While in Australia, this species is widespread and predominately aerial. There is no current accurate population estimate, however the global population is estimated at greater than 10,000 birds (Higgins 1999). Important populations are not defined, however important habitat includes large tracts of native vegetation, particularly forest. The species usually roosts in tall trees on cliffs or steep slopes that have vantage	This species may potentially occur in the airspace above the Project Area, however, the species is unlikely to depend on the vegetation to forage or roost. This habitat is not considered to be habitat critical to the survival of the species as the species will not breed within this habitat (non-breeding migrant), and it does not provide any unique features or areas which are important for the survival of the species. As its range throughout Australia is continuous, the population within Australia	2	Highly unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
	points, amongst dense foliage in the canopy or in hollows. In Australia, white-throated needletails almost always forage aerially, at heights up to 'cloud level', though usually much lower. They often forage in areas of updraughts, such as ridges, cliffs or sand-dunes, or in the smoke of bushfires or occasionally in whirlwinds. Identified threats to this species whilst in Australia include habitat loss and fragmentation, mortality due to collision with wind turbines and overhead wires, poisoning and pesticides. However, it is stated that as this affects only a few individuals, it is not a threat to the species overall.	can be considered as one large population. On this basis, any individuals occurring within the Project Area would be considered an important population. Direct impacts as a result of the proposed action will include clearing of 208.8 ha of foraging, dispersal and marginal roosting habitat. Given this species is predominately aerial, is widespread within Australia and has broad habitat requirements, impacts are unlikely to affect the persistence of the species. The linear nature of the disturbance and the existing disturbances in the surrounding area suggest the proposed action will not result in habitat fragmentation in the context of this species. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C) to be developed as part of the proposed action.			
Plants					
Macadamia nut (*Macadamia integrifolia*)	In Queensland, the macadamia nut is known from Mt Bauple, north of Gympie, to Currumbin Valley in the Gold Coast hinterland. It occurs as a scattered rare to occasional tree, and population sizes are difficult to estimate. Populations in the south-east Queensland Regional Forest Agreement region (area of 10,000 km²) are estimated at 2,500 mature individuals in 20 populations. These populations were formerly declining but are presently stable. The macadamia nut grows in remnant rainforest, preferring partially open areas such as rainforest edges. However, this habitat is not continuously fit for the species. Vegetation communities in which the macadamia nut is found range from complex notophyll mixed forest, extremely tall, closed forest, simple notophyll mixed very tall closed forest to simple microphyll-notophyll mixed mid-high closed forest with *Araucaria* and *Argyrodendron* emergents. Important populations have not been defined for this species, nor has critical habitat, and as such the generic definitions should be applied. This species is threatened by urban clearing, agricultural clearing, weed invasion and inappropriate fire regimes.	This species is confirmed present, as one planted (5 m tall) macadamia nut was recorded within the Project Area on a residential lot. It is not considered that this is a wild individual and it is thought that the individual was planted. Suitable habitat for this species to grow naturally is found within the Project Area. The total habitat area to be cleared as a result of the proposed action is 0.2 ha. Other than the loss of the one planted individual, no direct impacts to macadamia nut populations or wild individuals are expected as a result of the proposed action. Potential indirect impacts from the proposed action may include weed incursion, creation of edge effects, elevated dust and erosion leading to loss of individuals and reduced seeding. These potential impacts will be managed through implementation of the EMP(C) to be developed as part of the proposed action. The screening assessment identified this species as low risk and therefore a SIA has not been completed, however this assessment will be revisited once targeted survey results are available.	1	Highly unlikely	**Low risk**
Tall Knotweed (*Persicaria elatior*)	The species is known to occur from the North Central and South Coast botanical subdivisions of NSW and the Moreton Pastoral District in south-east Queensland This species is an erect herb growing to 90 cm tall, found in damp places, including coastal with swampy areas, along watercourses, streams and lakes, swamp forest and disturbed areas (DAWE, 2021). Knotweed grows on sandy, alluvial soil in swampy areas and riparian herblands along watercourses and lake edges. Associated plant species include *Melaleuca linearifolia*, *M. quinquenervia*, *Pseudognaphalium luteoalbum*, *Persicaria hydropiper*, *Floydia praealta* and *Cyperus semifertilis.* The main identified threats to Knotweed are damage to populations from road and track maintenance activities, clearing and hydrological changes to wetlands.	This species is considered likely to occur within the Project Area due to the presence of suitable habitat and records within proximity of the Project Area. However, the species was not detected during field surveys. Approximately 11.2 ha of potential habitat is modelled within the Project Area, in the form of swampy areas and along watercourses. Although potential habitat is present within the Project Area, the presence of tall knotweed has not been confirmed. Further survey is required to confirm the presence of tall knotweed. Potential incursion of new weeds and hydrological changes will be managed through implementation of the EMP(C) to be developed as part of the proposed action. Key threats to this species are unlikely to be increased beyond current levels with the implementation of the EMP(C) to be developed as part of the proposed action. The screening assessment identified this species as low risk and therefore a SIA has not been completed, however this assessment will be revisited once targeted survey results are available.	2	Highly unlikely	**Low risk**
Hairy-joint Grass (*Arthraxon hispidus*)	The species has been recorded from scattered locations throughout Queensland and on the northern tablelands and north coast of NSW. The species is a slender, tufted, creeping perennial grass. In south-east Queensland, Hairy-joint Grass typically grows around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests and also with bog mosses in	This species may occur within the Project Area as potentially suitable habitat is present, however there are no records in the region. Potential habitat includes creeks, swamps and alluvial woodlands. As habitat critical to the survival of the species is not defined, all potential habitat is conservatively considered to be critical. Approximately 11.4 ha of potential habitat has been identified within the Project	2	Highly unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
	mound springs. The species flowers during summer to autumn (DES, 2021c). The key threats to the species are trampling by stock, clearing for agriculture and development; inappropriate fire regimes; over-grazing and competition from introduced species.	Area, however species presence has not been confirmed. Habitat is already degraded as a result of urbanisation and weed incursion, indicating that any population present is likely already impacted. Potential indirect impacts from the proposed action include weed incursion, creation of edge effects, elevated dust and erosion leading to loss of individuals and reduced seeding. These potential impacts will be managed through implementation of the EMP(C) to be developed as part of the proposed action. The screening assessment identified this species as low risk and therefore a SIA has not been completed, however this assessment will be revisited once targeted survey results are available.			
Three-leaved bosistoa (*Bosistoa traversa*)	Occurs from the Richmond River, NSW, to Mt Larcom near Gladstone, QLD. Flowering between December and July. Fruiting has been recorded most of the year (DES, 2021). The species is a small tree found in wet sclerophyll forest, dry sclerophyll forest and rainforest up to 300 m above sea level. Associated vegetation includes *Argyrodendron trifoliolatum, Syzygium hodgkinsoniae, Endiandra pubens, Dendrocnide photinophylla, Acmena ingens, Diploglottis australis* and *Diospyros mabacea*. The main identified threats to the species are habitat loss and degradation through clearing, fragmentation and disturbance; weed invasion; grazing by domestic stock; inappropriate fire; and timber harvesting	This species may occur within the Project Area as potentially suitable habitat is present, however there are no records in the region. Potential habitat includes Eucalyptus woodland to open forest, and complex notophyll to microphyll vine forest. Approximately 36.5 ha of potential habitat has been identified within the Project Area, however species presence has not been confirmed. Habitat is already degraded as a result of urbanisation and weed incursion, indicating that any population present is likely already impacted. Potential indirect impacts from the proposed action include weed incursion, creation of edge effects, elevated dust and erosion leading to loss of individuals and reduced seeding. These potential impacts will be managed through implementation of the EMP(C) to be developed as part of the proposed action. The screening assessment identified this species as low risk and therefore a SIA has not been completed, however this assessment will be revisited once targeted survey results are available.	2	Highly unlikely	**Low risk**
Migratory Species					
Fork-tailed swift (*Apus pacificus*)	The fork-tailed swift is almost exclusively aerial, recorded generally east of the Great Dividing Range from Cooktown to the New South Wales border, but extends further west in southern Queensland (Department of Climate Change Energy the Environment and Water 2022c). This species mostly occurs over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. The fork-tailed swift does not breed in Australia. The Referral guideline for 14 birds listed as migratory species under the EPBC Act, defines important habitat for the species as “non-breeding habitat only: found across a range of habitats, from inland open plains to wooded areas, where it is exclusively aerial” (Department of the Environment 2015b). An ecologically significant proportion of the population is 100 individuals (0.1% threshold). No area thresholds for important habitat likely to result in a significant impact have been delineated for this species. There are no identified significant threats to the species while in Australia. Potential threats include habitat destruction and predation by feral animals.	Based on this species general habitat requirements, the potential habitat in the Project Area meets the definition of important habitat, and therefore this species may potentially occur in the airspace above the Project Area. All potential habitat is suitable for foraging and dispersal only as this species does not breed in Australia. Due to the broad habitat requirements, suitable habitat is highly likely to be common within the local area surrounding the Project Area. Direct impacts via vegetation clearing will occur to approximately 208.8 ha of potential habitat. The species is exclusively aerial and will not depend on habitat within the Project Area to breed or roost but may forage or disperse in the airspace above. The proposed action will not result in habitat fragmentation or barriers to movement for this highly mobile species. The proposed action does not present other potential threats to the species.	1	Highly unlikely	**Low risk**
Oriental cuckoo (*Cuculus optatus*)	The oriental cuckoo is a non-breeding migrant that occurs in coastal regions across northern and eastern Australia from September to May. While in Australia, the species inhabits a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types (Department of the Environment 2015a). The Referral guideline for 14 birds listed as migratory species under the EPBC Act, defines important habitat for the species as “monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus	The oriental cuckoo may occur within the Project Area, due to the presence of marginally suitable habitat. Vegetation communities within the Project Area meet the definition to be considered important habitat, due to the presence of vine thicket and open woodland. However, this habitat is considered unlikely to support an ecologically significant proportion of the population. The species is likely to utilise the Project Area while on passage to more suitable areas, and habitat within the Project Area is considered marginal. All potential habitat is suitable for foraging and dispersal only as this species does not breed in Australia. Due to the broad habitat requirements, suitable habitat is highly likely to	2	Highly unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
	woodlands. Frequently at edges or ecotones between habitat types" (Department of the Environment 2015b). Based on estimates of population sizes within Europe, the global population may be greater than 20 million. An ecologically significant proportion of the population is 1,000 individuals (0.1% threshold). The lower area threshold for impacts on important habitat is 25,000 ha. There is no information regarding known threats to this species while in Australia.	be common within the region. Direct impacts via vegetation clearing will occur to approximately 41.1 ha of potential habitat. The proposed action will not result in habitat fragmentation or barriers to movement for this highly mobile species. The proposed action does not present other potential threats to the species.			
Latham's Snipe (*Gallinago hardwickii*)	Latham's snipe is a non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia. This species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia. In Queensland, the range extends inland over the eastern tablelands in south-eastern Queensland. In Australia, the Latham's snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies) (Department of Agriculture Water and the Environment, 2021). Key threats to the species include loss of habitat caused by the drainage and modification of wetlands, and excessive mortality due to hunting.	This species is likely to occur within the Project Area based on the presence of suitable habitat and ALA records in the region, such as along the Logan River. Potential habitat within the Project Area includes vegetated wetlands and waterway banks, as well as REs 12.3.25, 12.3.11 and 12.3.6. A total of 6.6 ha of habitat occurs within the Project Area, which may be considered marginal foraging habitat for the Latham's snipe. No breeding or nesting habitat occurs within the Project Area as Latham's snipe is a non-breeding migrant to Australia. Habitat within the Project Area generally consists of non-remnant wetlands or watercourses, and more suitable habitat for the species occurs elsewhere at a regional scale. It is likely that only a small number of dispersing individuals would utilise potential habitat on a transitory basis. Furthermore, areas of higher quality potential habitat occur in the wider area to the east, which are more likely to be utilised. The proposed action will not create a barrier that may hinder access to wetland habitat. Indirect impacts such as increased erosion, sedimentation and contamination will be managed through implementation of the EMP(C) to be developed as part of the proposed action. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through the EMP(C).	2	Unlikely	**Low risk**
Satin flycatcher (*Myiagra cyanoleuca*)	The satin flycatcher occurs from Cape York to eastern South Australia and migrates north-south during summer. It is a breeding summer migrant to the southeast of Australia and Tasmania. Within Queensland, this species has a scattered but widespread distribution occurring mostly in coastal regions but also on the Great Dividing Range types (Department of the Environment 2015a). The *Referral guideline for 14 birds listed as migratory species under the EPBC Act*, defines important habitat for the species as "eucalypt forest and woodlands, at high elevations when breeding. They are particularly common in tall wet sclerophyll forest, often in gullies or along water courses. In woodlands they prefer open, grassy woodland types. During migration, habitat preferences expand, with the species recorded in most wooded habitats except rainforests. Wintering birds in northern Qld will use rainforest - gallery forests interfaces, and birds have been recorded wintering in mangroves and paperbark swamps" (Department of the Environment 2015b). An ecologically significant proportion of the population is 1,700 individuals (0.1% threshold). The lower area threshold for impacts on important habitat is 440 ha. Known threats to this species include the clearing and logging of forests in south-eastern Australia, as well as black rats and invasive vines (e.g. rubber vine) in riparian habitats.	This species is considered likely to occur within the Project Area due to its relatively common presence in the Brisbane region and therefore is likely to utilise the Project Area from time to time. Suitable habitat occurs in the eucalypt woodland and forest vegetation communities, particularly along watercourses. The potential habitat in the Project Area meets the definition of important habitat as it is a wooded habitat within the migration route of the species. The species is likely to be a seasonal visitor to the Project Area when in transit between breeding grounds in south-eastern Australia and wintering areas in northern Australia. While it meets the definition of important habitat, it is considered of marginal quality for the species given its preference for tall wet sclerophyll forest, or open grassy woodland. The species utilizes this region on its' migration and does not reside or breed in the area. As such habitat within the Project Area has been identified as foraging and dispersal only. Due to the broad habitat requirements, suitable habitat is highly likely to be common within the local area surrounding the Project Area. Direct impacts via vegetation clearing will occur to approximately 41.1 ha of potential habitat. The extent of habitat present within the Project Area does not meet the thresholds suggested to lead to a significant impact to the species. Further, it is unlikely that this habitat supports an ecologically significant proportion of the population. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the proposed action due to the likely existing presence of rubber vine and black rats.	2	Unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
Osprey (*Pandion haliaetus*)	The species occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DAWE, 2021). They are mostly found in coastal areas but occasionally travel inland along major rivers (DAWE, 2021). They require extensive areas of open fresh, brackish or saline water for foraging (DAWE, 2021). The current main threat to the Eastern Osprey in Australia is loss, degradation or alteration of habitat for urban or tourism development. Other current but presently less pervasive threats include ingestion of prey items containing pollutants such as pesticides, heavy metals or fishing tackle; competition for food with commercial and recreational fisheries; reduced water quality at foraging grounds caused by discharge of effluent or runoff; disturbance or persecution by humans; and accidental mortality arising from collisions with powerlines (DAWE, 2021).	The species is likely to occasionally use major rivers, such as the Logan River adjacent to the site, to forage or may occur over the Project Area when travelling to and from foraging sites. The species shows preference for coastal habitat along large water bodies and the Project Area does not meet the definition of important habitat for the species. Regardless, marginally suitable foraging and dispersal habitat occurs within the Project Area. Direct impacts via vegetation clearing are unlikely to impact this species, with 0.7 ha of foraging and dispersal habitat present within the Project Area. The proposed action is unlikely to exacerbate threats to the species, as many threats already occur within the region. During construction, threats other than vegetation clearing are anticipated to be comparable to the existing urban environment and rail corridor. Potential threats from construction activities will be appropriately managed through implementation of the EMP(C) to be developed as part of the proposed action.	1	Highly unlikely	**Low risk**
Glossy Ibis (*Plegadis falcinellus*)	Within Australia, this species is widely distributed generally occurring east of the Kimberley in Western Australia and Eyra Peninsula in South Australia. It moves in response to good rainfalls, expanding its range, however the core breeding areas used are within the Murray-Darling Basin region of New South Wales and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. The glossy Ibis often move north in autumn, then return south to the main breeding areas in spring and summer (Department of Climate Change Energy the Environment and Water 2022c). Regular migration to locations outside of Australia is also suspected but has not been confirmed. Preferred habitat for foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is also occasionally found in coastal locations. Wetland destruction or degradation is the major threat to the species. Clearing, grazing, burning, increased salinity, groundwater extraction and invasion by exotic plants and fish species are also threats to the species through habitat modification (Department of Climate Change Energy the Environment and Water 2022c).	This species is considered likely to occur within the Project Area, due to marginally suitable habitat present in the form of non-remnant wetlands and waterways. Some records occur within the region including along the Logan River to the east of the Project Area. Based on the species large distribution and migration patterns, only a small number of individuals are expected to utilise potential habitat of the Project Area at any time. Furthermore, areas of higher quality potential habitat occur in the wider area to the east, which are more likely to be utilised. A total of 6.6 ha of marginal foraging and dispersal habitat may be directly impacted via vegetation clearing. The proposed action will not create a barrier that may hinder access to suitable habitat. Indirect impacts such as increased erosion, sedimentation and contamination will be managed through implementation of the EMP(C) to be developed as part of the proposed action. Other indirect impacts such increased dust, light and noise will be temporary and localised.	1	Unlikely	**Low risk**
Rufous fantail (*Rhipidura rufifrons*)	The rufous fantail occurs in coastal and near coastal districts of northern and eastern Australia. One of the two subspecies (*Rhipidura rufifrons intermedia*) has breeding populations occurring on and east of the Great Divide, from about the NSW-Queensland border, north to the Cairns-Atherton region, Queensland. This species mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts usually with a dense shrubby understorey including ferns. The *Referral guideline for 14 birds listed as migratory species under the EPBC Act*, defines important habitat for the species as “moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey. When on passage a wider range of habitats are used including dry eucalypt forests and woodlands and Brigalow shrublands” (Department of the Environment 2015b). Movement patterns are not fully understood, but some populations of the species in east Australia are migratory. An ecologically significant proportion of the population is 4,800 individuals (0.1% threshold). The lower area threshold for impacts on important habitat is 750 ha. Known threats to this species include habitat fragmentation and loss of moist forest breeding habitat, the black rat, and invasive vines (e.g. rubber vine) in riparian habitat. However, in Australia this species is considered common and	Vegetation communities within the Project Area do not meet the definition to be considered important habitat. However, suitable habitat may occur in the eucalypt woodland to open forest vegetation communities, while moving to areas with more suitable habitat. All potential habitat is suitable for foraging and dispersal only as this species prefers to breed in dense, moist vegetation. Due to the broad habitat requirements, suitable habitat is highly likely to be common within the local area surrounding the Project Area. Direct impacts via vegetation clearing will occur to approximately 36.3 ha of potential habitat. The extent of habitat present within the Project Area does not meet the thresholds suggested to lead to a significant impact to the species. Further, it is unlikely that this habitat supports an ecologically significant proportion of the population. This species is considered common and secure in Australia. It is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the proposed action due to the likely existing presence of invasive vines and rats.	2	Highly unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
	secure as there has been no evidence of population decline.				
Spectacled monarch (*Monarcha trivirgatus*)	In Queensland, the spectacled monarch occurs on islands in Torres Strait, where it is migratory, and on Cape York Peninsula, where it is considered resident or partly migratory. The species is widespread along the east coast including offshore islands and on the east slopes of the Great Dividing Range from Cooktown to the New South Wales border. This species occupies dense vegetation, mainly in rainforest but also in moist or wet sclerophyll forest and occasionally in other densely vegetated habitats such as mangroves, drier forest, woodlands, parks and gardens (Department of Climate Change Energy the Environment and Water 2022c). The Referral guideline for 14 birds listed as migratory species under the EPBC Act, defines important habitat for the species as “dense vegetation, mainly in rainforest but also in moist forest or wet sclerophyll and occasionally in other dense vegetation such as mangroves, drier forest and woodlands” (Department of the Environment 2015b). This document also states that the spectacled monarch is likely to be most susceptible to significant impacts due to the population size and limited distribution. An ecologically significant proportion of the population is 650 individuals (0.1% threshold) or 330 for the wet tropics spectacled monarch. The lower area threshold for impacts on important habitat is 210 ha or 110 ha for the wet tropics spectacled monarch. Known threats to this species include black rats and invasive vines (e.g. rubber vine) in riparian habitats.	Vegetation communities within the Project Area do not meet the definition to be considered important habitat. However, suitable habitat may occur in the eucalypt woodland to open forest vegetation communities, while the species is moving to more suitable areas. All potential habitat is suitable for foraging and dispersal only as this species prefers to breed in dense, moist vegetation. Due to the broad habitat requirements, suitable habitat is highly likely to be common within the local area surrounding the Project Area. Direct impacts via vegetation clearing will occur to approximately 0.2 ha of potential habitat. The extent of habitat present within the Project Area does not meet the thresholds suggested to lead to a significant impact to the species. Further, it is unlikely that this habitat supports an ecologically significant proportion of the population. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the proposed action due to the likely existing presence of invasive vines and rats.	2	Highly unlikely	**Low risk**
Black-faced monarch (*Monarcha melanopsis*)	The black-faced monarch breeds in eastern coastal Australia during summer and migrates to spend the non-breeding winter period in Papua New Guinea or northern Australia. This species mainly inhabits rainforests and riparian vegetation. In wet sclerophyll forest, the species mostly frequents sheltered gullies and slopes with a dense understorey of ferns and / or shrubs. The *Referral guideline for 14 birds listed as migratory species under the EPBC Act*, defines important habitat for the species as “wet forest specialist, found mainly in rainforest and wet sclerophyll forest, especially in sheltered gullies and slopes with a dense understorey of ferns and/or shrubs” (Department of the Environment 2015b). An ecologically significant proportion of the population is 460 individuals (0.1% threshold). The lower area threshold for impacts on important habitat is 260 ha. Known threats to this species include black rats and invasive vines (e.g. rubber vine) in riparian habitats.	This species is considered a likely occurrence due to records in areas adjacent to the Project Area such as Karawatha Forest, and the presence of suitable habitat such as eucalypt woodland vegetation community. A total of 0.2 ha of this habitat will be directly impacted by clearing activities. This habitat does not constitute important habitat and is not sufficient to support an ecologically significant proportion of the population. Immature rubber vine was present in low density within the Project Area, and black rat is likely to occur given the availability of records in the area and the species broad habitat tolerances. Pest and weed management measures will be implemented to manage risks of proliferation of these species.	2	Possible	**Low risk**
Common Sandpiper (*Actitis hypholeucos*)	The common sandpiper is a non-breeding migrant to Australia, occurring in all states and territories. Migrating individuals arrive in Australia from August onwards in New South Wales and Queensland. The non-breeding movements of the species within Australia are poorly known. The species utilises a wide range of coastal wetlands and some inland wetlands. It has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. Generally, the species forages in shallow water and on bare soft mud at the edges of wetlands. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves (Department of Climate Change Energy the Environment and Water 2022c). Known threats to the species include habitat loss, reduction of quality and quantity of water, global warming and disturbance from human activities.	The common sandpiper, sharp-tailed sandpiper, pectoral sandpiper, common greenshank and marsh sandpiper are considered to possibly occur or likely to occur within the Project Area due to the presence of marginally suitable habitat and records in the wider area. Watercourses and wetlands are conservatively assumed to provide potential habitat. Habitat is considered marginal due to the non-remnant condition of watercourses and the lack of preferred coastal habitat features. Potential habitat is considered suitable for foraging and dispersal only. Based on each species large distribution and migration patterns, only a small number of dispersing vagrant individuals are expected to utilise potential habitat of the Project Area at any time. A total of 13.2 ha of potential habitat occurs within the Project Area for the Common sandpiper and 6.6 ha for the Sharp-tailed sandpiper, Pectoral sandpiper, Common greenshank and Marsh sandpiper. The proposed action will not create a barrier that may hinder access to suitable habitat. Indirect impacts such as increased erosion, sedimentation and contamination will be managed through implementation of the EMP(C) to be developed as part of the proposed	1	Unlikely	**Low risk**
Sharp-tailed Sandpiper	The sharp-tailed sandpiper is a non-breeding migrant to Australia, occurring in		1	Unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
(*Calidris acuminata*)	all states and territories. In Queensland, they are recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland, particularly in central and south-western regions. Movements occur during the non-breeding period where birds appear to be dispersive, moving to temporary or flooded wetlands and leaving them when they dry. The species prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. Roosting occurs at the edges of wetlands, on wet open mud or sand, in shallow water, or in short sparse vegetation, such as grass or saltmarsh (Department of Climate Change Energy the Environment and Water 2022c). In Australia, known threats to the species include the loss of important habitat, habitat degradation and direct mortality as a result of human activities.	action. Other indirect impacts such increased dust, light and noise will be temporary and localised.			
Pectoral Sandpiper (*Calidris melanotos*)	In Queensland, most records for the Pectoral Sandpiper occur around Cairns. There are scattered records elsewhere, mainly from east of the Great Divide between Townsville and Yeppoon. This species prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitats but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation (Higgins and Davies, 1996). Key threats for the species include habitat loss and degradation, disturbance and direct mortality		1	Unlikely	**Low risk**
Common Greenshank (*Tringa nebularia*)	The common greenshank occurs in all types of wetlands and has the widest distribution of any shorebird in Australia. In QLD it occurs in the Gulf country and eastern gulf of Carpentaria. Several records occur inland south from near Dalby to Mt Guide. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and salt-flats. It also occurs in artificial wetlands, including sewage ponds (Department of Climate Change Energy the Environment and Water 2022c). The key threats to migratory shorebirds like the common greenshank is indirect and direct habitat loss. Staging areas used during migration through eastern Asia are being lost and degraded by activities which are reclaiming the mudflats for development. Other threats to the species includes degradation of habitat by increased silt in the water, pollution and weed or pest invasion, and disturbance by people reducing energy reserves required for migration.		2	Unlikely	**Low risk**
Marsh Sandpiper (*Tringa stagnatilis*)	The marsh sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore- drain swamps and flooded inland lakes. The key threats to migratory shorebirds like the marsh sandpiper is indirect and direct habitat loss. Staging areas used during migration through eastern Asia are being lost and degraded by activities which are reclaiming the mudflats for development. Other threats to the species includes degradation of habitat by increased silt in the water, pollution and weed or pest invasion, and disturbance by people reducing energy reserves required for migration.		2	Unlikely	**Low risk**

MNES	Habitat, Threats and Regional Context	Nature and Extent of Potential Impacts	Consequence	Likelihood	Outcome
Threatened ecological communities					
Lowland Rainforest of Subtropical Australia	The Lowland Rainforest of Subtropical Australia threatened ecological community primarily occurs from Maryborough in Queensland, to the Clarence River in New South Wales. The ecological community occurs on basalt and alluvial soils, mostly in areas <300m above sea level with high-annual rainfall (>1300mm). The ecological community is generally a moderately tall (≥20 m) to tall (≥30 m) closed forest (canopy cover ≥70%). Typically, there is a relatively low abundance of species from the genera Eucalyptus, Melaleuca and Casuarina. Buttresses are common as is an abundance and diversity of vines. The species composition of the canopy varies between local stands and between regions (Keith, 2004). The canopy comprises a range of tree species but in some areas a particular species may dominate (e.g.: palm forest, usually dominated by *Archontophoenix cunninghamiana* (bangalow palm) or *Livistona australis* (cabbage palm); and riparian areas dominated by *Syzygium floribundum* (weeping satinash/weeping lilly pilly). Below the canopy is an understorey of sparse shrubs and seedlings. The upper, discontinuous layer includes canopy emergents that may be 40–50 m tall and have large spreading crowns. This layer is composed of species such as *Araucaria cunninghamii* (hoop pine), *Ficus* spp. (figs), *Lophostemon confertus* (brushbox), and in some sites, *Eucalyptus* spp.. Most of the remaining patches of this ecological community are small and scattered. The main ongoing threats to the ecological community include: vegetation clearance, impacts associated with fragmentation of remnants and weeds.	The Ausecology field survey (July-August 2022) identified a patch of vegetation with characteristics of the Lowland Rainforest of Subtropical Australia TEC. A detailed vegetation biocondition assessment was completed for the area and the data was compared against the key diagnostic characteristics and condition thresholds for the TEC. The comparison determined that the patch is in the correct geographic area, on the soils typically associated with the community, at an altitude associated with the community, in an area with a rainfall typical of the community. The structure of the community aligns with the TEC consisting of a tall closed forest with multiple canopy layers. On assessment of species richness, however, it was determined that the patch of the community lacked the requisite number of woody species to meet the key diagnostic characteristic threshold. In addition, the patch contains some residual tree species with natural regeneration, however it is less than 1 hectare in size and therefore does not meet condition thresholds. On this basis, it is not anticipated that the TEC is present within the Project Area and there is not anticipated to be an impact on the TEC as a result of the proposed action.	2	Unlikely	**Low risk**
Coastal Swamp Oak (*Casuarina glauca*) forest of New South Wales and South-East Queensland	The ecological community occurs in sub-tropical, sub-humid and temperate climatic zones from Curtis Island, north of Gladstone, in Queensland to Bermagui in southern New South Wales. The ecological community occurs in coastal catchments, mostly at elevations of less than 20 m above sea-level that are typically found within 30 km of the coast. The ecological community is typically found where groundwater is saline or brackish, but can occur in areas where groundwater is relatively fresh. It is typically found on coastal flats, floodplains, drainage lines, lake margins, wetlands and estuarine fringes where soils are at least occasionally saturated, water-logged or inundated. Coastal Swamp Oak Forest is often found in association with other vegetation types such as coastal saltmarsh, mangroves, freshwater wetlands, littoral rainforests or swamp sclerophyll forests in a ‘mosaic’ of coastal floodplain communities. The canopy layer is dominated by *Casuarina glauca* (swamp oak, swamp she-oak). This often occurs as a relatively uniform upper layer of swamp oak, with height and density dependent on the local environmental conditions. In more freshwater patches of the ecological community, Melaleuca species, including *Melaleuca ericifolia* (swamp paperbark), *M. linariifolia* (narrow-leaved paperbark), *M. quinquenervia* (broad-leaved paperbark), and/or *M. styphelioides* (prickly-leaved paperbark), may occur in the canopy, sub-canopy or as emergents.	The Casuarina swamp forest TEC was identified in the GHD Ecological Assessment Report (GHD, 2021) as potentially occurring within the Project Area. This TEC was not identified during the ecological surveys undertaken by Ausecology in July – August 2022. As the TEC is not present within the Project Area, there is not anticipated to be an impact on the TEC as a result of the proposed action.	2	Unlikely	**Low risk**

3.0 Significant Impact Assessment

Three MNES values were identified as being at potential risk of significant impact as a result of the proposed action. Based on the screening assessment in **Section 2.0**, it was determined that further assessment under the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment 2013) was required for these species. This guideline provides the framework for the assessment of potential impacts upon MNES as well as a process for determining the level of significance of impacts.

The species recommended for a significant impact assessment are:

- Koala
- Grey-headed flying-fox, and
- Greater glider.

Commonwealth guidelines used to support the assessment of significant impacts include:

- Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (Department of Agriculture Water and the Environment 2022).
- A review of koala habitat assessment criteria and methods (Youngentob et al. 2021).
- Commonwealth Listing Advice on *Pteropus poliocephalus* (Grey-headed Flying-fox). (Threatened Species Scientific Committee, 2001).
- Referral guideline for management actions in Grey-headed and Spectacled flying-fox camps (Department of the Environment, 2015).
- Conservation Advice for *Petauroides volans* (greater glider (southern and central)). (Department of Climate Change, Energy, the Environment and Water, 2022).
- Guide to greater glider habitat in Queensland (Department of Environment and Science, 2022).

3.1 Koala (*Phascolarctos cinereus*)

3.1.1 Description and status under the EPBC Act

The koala is listed as Endangered under the EPBC Act. It is recognised that this listing was upgraded from Vulnerable in February 2022.

The koala is a tree-dwelling, medium-sized marsupial with a stocky body, large, rounded ears, sharp claws and variable but predominantly grey-coloured fur. It is one of Australia's most distinctive and iconic wildlife species (Department of Agriculture Water and the Environment 2022).

3.1.2 Distribution

The range of the koala, in relation to the combined populations of Queensland, New South Wales and the Australian Capital Territory, extends from approximately the latitude of Cairns to the New South Wales-Victoria border. Although the species is often more abundant in coastal areas, inland populations do occur. The species' distribution is not continuous within its range with a number of populations isolated by cleared land or unsuitable habitat (Department of Agriculture Water and the Environment 2022).

3.1.3 Habitat requirements

The koala inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by species from the genus *Eucalyptus* (Martin and Handasyde 1999). The distribution of koalas is also affected by altitude (limited to <800 m ASL), temperature and, at the western and northern ends of the range, leaf moisture (Munks, Corkrey, and Foley 1996).

The koala is a leaf-eating specialist that feeds primarily during dawn, dusk or night. Its diet is restricted mainly to foliage of *Eucalyptus* spp; however, it may also consume foliage of related genera, including

Corymbia spp., *Angophora* spp. and *Lophostemon* spp, and may, at times, supplement its diet with other species, including *Leptospermum* spp. and *Melaleuca* spp.

Based on the geographical location of the Project Area and the annual rainfall in the region, koala habitat is defined as:

- Large, connected areas of native vegetation, including forests and woodlands where logging has altered tree species composition; these areas may be remnant, regrowth or plantation vegetation.
- Small, isolated patches of native vegetation in rural, urban or peri-urban areas.
- Windbreaks and narrow areas of native vegetation along riparian areas or linear infrastructure.
- Isolated food and/or shelter trees (i.e. on farm lands, in suburban streetscapes, parks and yards).

Based on the above definition, all koala food trees (those within the *Eucalyptus, Corymbia, Angophora, Lophostemon, Leptospermum* and *Melaleuca* genera) are considered to provide koala habitat.

Within the South East Queensland bioregion, locally important koala food trees include *Eucalyptus tereticornis, Eucalyptus seeana, Eucalyptus crebra* and *Eucalyptus propinqua* (Youngentob et al. 2021), all of which were identified within the Project Area.

3.1.4 Threats

The main identified threats to the species are (Department of Climate Change Energy the Environment and Water 2022c):

- Climate change driven processes and drivers:
  - Loss of climatically suitable habitat;
  - Increased intensity/frequency of drought, heatwave, bushfire;
  - Declining nutritional value of foliage.
- Human related activities:
  - Clearing and degradation of koala habitat;
  - Mortality from vehicle strike;
  - Mortality from dog attack.
- Disease and health:
  - Koala retrovirus (KoRV);
  - Chlamydia (*Chlamydia percorum*).

3.1.5 Survey effort, timing and coverage

Four nights of nocturnal spotlighting events searches were conducted in July and August 2022 (Ausecology 2022). These surveys included random meander transects of approximately 30 person mins per hectare, with two people walking 25 m apart where space permitted. Fauna surveys involved nocturnal spotlighting searches targeting *Phascolarctos cinereus* (koala), *Petauroides volans* (greater glider), *Ninox strenua* (powerful owl), *Pteropus poliocephalus* (grey-headed flying fox) and *Petaurus australis australis* (yellow-bellied glider (southern subspecies)). Methods and data capture were undertaken in accordance with the Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Version 3.0 (Eyre et al. 2018). Spotlight events focused on seven ‘high-risk’ habitat areas for the target species, such as larger patches of forest. Across the seven areas, a total of 27 person hours of spotlighting was undertaken (Ausecology 2022).

Additionally, a non-invasive survey for the koala (*Phascolarctos cinereus*) was conducted at targeted areas within the Project Area. The field survey was conducted over a total of four days which occurred on 4 June 2022 (half day), 25, 26 and 27 July 2022 (full days) and the remaining half day on 28 July 2022. A total of 51.5 km of detection dog searches were performed in this study. The survey was performed by OWAD Environment (OWAD), including two of OWAD’s purpose-bred professional field detection canines certified for koala detection. Convenience sampling was selected as an appropriate design for this survey in order to enable maximum assessment of the sites within the four days of field

survey. Convenience sampling is a form of non-probability sampling of readily accessible areas using on-leash and opportunistic searches.

No recommended survey effort is specified for this species and species-specific survey guidelines do not exist. Nonetheless, due to the linear nature of the Project Area, the expended survey effort is considered sufficient.

3.1.6 Occurrence and potential habitat

No koalas or signs of their presence (i.e. characteristic scats and scratches) were detected during the field assessment.

Koala habitat trees were recorded within the Project Area, including notably large individuals in Nealdon Park. Koala habitat tree species identified within the Project Area are shown in Table 7.

Table 7 Koala habitat tree species within the Project Area

Eucalyptus species	Other tree species
• *Eucalyptus acmenoides* • *Eucalyptus carnea* • *Eucalyptus curtisii* • *Eucalyptus fibrosa* • *Eucalyptus microcorys* • *Eucalyptus moluccana* • *Eucalyptus pilularis* • *Eucalyptus propinqua* • *Eucalyptus racemosa* • *Eucalyptus resinifera* • *Eucalyptus seeana* • *Eucalyptus siderophloia* • *Eucalyptus tereticornis* • *Eucalyptus tindalii*	• *Angophora leiocarpa* • *Angophora woodsiana* • *Corymbia citriodora* subsp. *variegata* • *Corymbia henryi* • *Corymbia intermedia* • *Corymbia tessellaris* • *Corymbia trachyphloia* • *Lophostemon confertus* • *Lophostemon suaveolens* • *Melaleuca bracteata* • *Melaleuca leucadendron* • *Melaleuca linariifolia* • *Melaleuca nodosa* • *Melaleuca quinquenervia* • *Melaleuca salicinia* • *Melaleuca salignus* • *Melaleuca viminalis*

The review of koala habitat assessment criteria and methods (Youngentob et al. 2021) lists *Eucalyptus acmenoides, Eucalyptus crebra, Eucalyptus fibrosa, Eucalyptus propinqua, Eucalyptus resinifera, Eucalyptus tereticornis* and *Eucalyptus tindaliae* as 'locally important koala trees' in the south-east Queensland bioregion.

Koalas may occasionally utilise patches of habitat within the Project Area, particularly Nealdon Park (Kingston), Acacia Forest Park (Karawatha) and Hugh Muntz Gardens (Beenleigh). It is expected that koala use would be minimal and for short periods of rest/dispersal/foraging. Koalas may also shelter in areas with adequate canopy cover in these areas.

Key threats to the koala that are present that may reduce their utilisation include the high-density urban developing surrounding the area, traffic along major roads in the area, regular public access, heavy noise pollution, domestic dogs, the existing rail corridor and climate change. Fences along parts of the rail corridor may impede koala movement to a degree.

There are numerous koala records surrounding the Project Area supporting the assessment that they are likely to occur within the Project Area.

3.1.7 Impacts and mitigation measures

Potential impacts of the proposed action on this species includes direct impacts to foraging habitat (40.9 ha) and low-quality dispersal and sheltering habitat (161.3 ha) as a result of clearing activities and direct mortality during construction. The proposed action will not act as a new barrier to koala movement, however, as the majority of the Project Area follows the existing rail corridor and is surrounded by urban development.

There is a potential for koalas using the Project Area to experience direct mortality during clearing activities. This will be mitigated through pre-clearance surveys by fauna spotter-catchers and the presence of spotter-catchers on site during all clearing activities. Other recommended mitigation measures for this species include:

- Ensure clearing activities are restricted to daylight hours, wherever possible, to reduce impacts from construction light and noise on koala (i.e. interrupting calling male koalas during the breeding season).
- A procedure must be in place to humanely and safely capture and transport to veterinary care koala individuals if, during pre-clearance or construction activities, any koala is found to be affected by disease (i.e. *Chlamydia* or koala retrovirus).
- Enforce biosecurity procedures for all persons and vehicles that may carry vegetation pathogens known to affect koala food trees.
- Clearing must be carried out in a way that ensures any koalas present have time to move out of the clearing site without human intervention.
- If a koala is located during pre-clearance surveys or during clearing activities:
    - The individual must not be forcibly relocated.
    - Any tree which houses a koala as well as any tree with a crown that overlaps that tree will not be cleared until the koala vacates the tree on its own volition.
    - Allow a clearing buffer surrounding any tree where a koala is present, equal to the height of the tree or a buffer deemed suitable by the fauna spotter catcher.
    - Any injured koala (and fauna in general) should be transported to a vet or recognised wildlife carer.

3.1.8 Habitat critical to the survival of the species

Potential significant impacts to koala habitat may occur if habitat that is considered to be *critical to the survival of the koala* is disturbed. The new *Conservation Advice for Koala* (Department of Agriculture Water and the Environment 2022) lists the following factors that should be considered when identifying habitat that is critical to the survival of a species:

- whether the habitat is used during periods of stress (examples: flood, drought or fire);
- whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes);
- the extent to which the habitat is used by important populations;
- whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development;
- whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements;
- whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation;
- any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.

As the Project Area provides habitat that is used to meet essential life cycle requirements (foraging, roosting, dispersal), the **Project Area is considered habitat critical to the survival** of the koala.

3.1.9 Significant Impact Assessment

The *EPBC Act Referral Guidelines for the Vulnerable Koala*[1] (Department of the Environment 2014) identifies five impacts which are likely to substantially interfere with the recovery of the koala. These have been outlined in **Table 8** with a discussion on whether these impacts are likely to occur as a result of the proposed action. The result of this assessment is that the proposed action is unlikely to substantially interfere with the recovery of the koala.

Table 8 Impacts which are likely to substantially interfere with the recovery of the koala

Impacts which are likely to substantially interfere with the recovery of the koala:	Potential for impact to occur as a result of the proposed action
'Increasing koala fatalities in habitat critical to the survival of the koala due to dog attacks to a level that is likely to result in multiple, ongoing mortalities.'	**No.** Domestic dogs are likely to occur in the urban and residential areas surrounding the Project Area. No mechanisms which would facilitate the exacerbation of this species are expected as a result of the proposed action. The Project Area does not contain habitat critical to the survival of the species. The proposed action is unlikely to result in multiple, ongoing mortalities.
'Increasing koala fatalities in habitat critical to the survival of the koala due to vehicle- strikes to a level that is likely to result in multiple, ongoing mortalities.'	**No.** The current urbanised road network already presents a major threat of mortality from vehicle strike. This threat is not expected to be exacerbated as traffic levels will not change as a result of the proposed action. The Project Area does not contain habitat critical to the survival of the species. The proposed action is unlikely to result in multiple, ongoing mortalities.
'Facilitating the introduction or spread of disease or pathogens for example *Chlamydia* or *Phytophthora cinnamomi*, to habitat critical to the survival of the koala, that are likely to significantly reduce the reproductive output of koalas or reduce the carrying capacity of the habitat.'	**No.** The proposed action is not expected to introduce or exacerbate the spread of disease or pathogens (i.e. *Chlamydia*, koala retrovirus or *Phytophthora cinnamomi*) that may reduce the reproductive output of koalas or reduce the carrying capacity of the habitat. With the species-specific mitigation measures in place, proposed action activities are not expected to exacerbate these diseases on a population scale. Further, the proposed action is unlikely to lead to new pathways to dispersal into the Project Area for any individuals which may carry the disease. Implementation of weed and pest controls measures for the proposed action will ensure best practice site hygiene.
'Creating a barrier to movement to, between or within habitat critical to the survival of the koala that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the koala.'	**No.** Existing barriers to movement are present within the Project Area, consisting of the existing rail corridor as well as major arterial roads, such as the Logan Motorway, along with residential housing and fenced areas. The Project Area does not contain habitat critical to the survival of the species. The proposed action will not create a barrier to movement, beyond the current conditions.
'Changing hydrology which degrades habitat critical to the survival of the koala to the extent that the carrying capacity of the habitat is reduced in the long-term.'	**No.** Changes to hydrology can potentially impact the extent of local catchments, run-off characteristics and intensity of flood flows, which can impact on the condition and stability of riparian habitats. No changes to hydrology are expected as a result of the proposed action.

[1] The koala listing was upgraded to Endangered in February 2022. The Conservation Advice identifies the action to update the EPBC Act referral guidelines for koala. However, the current Conservation Advice still references the 2014 referral guidelines as the source on how to 'navigate the complexity of koala habitat to identify significant impacts' and standards for mitigating impacts.

Habitat critical to the survival of the species is found within the Project Area, however, the proposed action is not likely to substantially interfere with the recovery of the species.

These outcomes are considered in the full assessment under the *Significant Impact Guidelines Policy Statement 1.1* (Department of the Environment 2013) for endangered species which is presented in **Table 9**. The outcome of this assessment is that the proposed action is considered **possible to result in a significant impact to koala** through removal of trees that provide forage for the species. This determination is based on the following key points:

- Key threats to the species of dog attack and vehicle strike are already prevalent within the Project Area.
- The Project Area does not support habitat that would play a role in maintaining individuals or a population (the area contains poor foraging and sheltering habitat and does not provide a good stepping-stone to areas of surrounding habitat).
- The proposed action itself will not create a new barrier to movement for the koala and any koalas moving into the Project Area will maintain the ability to disperse back out again.

Table 9 Significant impact assessment – koala

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
Lead to a long-term decrease in the size of a population?	**No.** Low quality vegetation contain koala food trees will be directly impacted as a result of the proposed action. This habitat is not considered highly unique and habitat with similar characteristics, quality and condition occurs within the region. The species will continue to persist within its current distribution, regardless of the presence of habitat within the Project Area. Therefore, it is considered unlikely that the proposed action will lead to a long-term decrease in the size of a population of the koala.
Reduce the area of occupancy of the species?	**No.** The species occupies large areas of habitat within its range, with the area of occupancy estimated at 19,428 km^2 (Department of Agriculture Water and the Environment 2022). Koalas may occasionally occur within the area as they move to better quality habitat in the surrounding area, although there are existing barriers to movement of dispersing individuals which are likely to reduce the frequency of this type of use. The extent of clearing will not reduce the area of occupancy for koala as the amount of habitat that will remain following the proposed action will still be ample to support the species, if present in the area.
Fragment an existing population into two or more populations?	**No.** As identified in **Table 8,** existing barriers to movement are present within and surrounding the Project Area, consisting of the existing rail corridor as well as major arterial roads, such as the Logan Motorway, along with residential housing and fenced areas. The proposed action will not fragment an existing population as it will not create new barriers to movement beyond current conditions.
Adversely affect habitat critical to the survival of a species?	**Yes.** The Project Area contains habitat critical to the survival of the species. The proposed action will directly impact on this habitat through removal of tree species that provide forage opportunities for the koala.

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
Disrupt the breeding cycle of a population?	**No.** Koalas do not have specific breeding habitat requirements and hence potential habitat within the Project Area may be used for breeding purposes. Male koalas are most active during the breeding season and can cover areas of several kilometres with limited vegetation while searching for a mate. Therefore, there is a chance that dispersing males may move into the Project Area during this time. However, the Project Area already contains barriers to dispersal and the proposed action will not create new barriers to movement beyond current conditions, thus, any dispersing individuals will still be able to move out of the Project Area. Other impacts to the breeding cycle such as masking of auditory cues (i.e. calling males) from construction noise will be managed through implementation of the proposed mitigation measures – specifically, ensuring clearing activities are restricted to daylight hours during the koala breeding season. The koala breeding season in South-east Queensland extends from around August through to January with most young born over the summer months (Wildcare Australia 2018).
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**No.** Low quality vegetation containing koala food trees will be directly impacted as a result of the proposed action. It is expected that koala use of the Project Area would be minimal and for short periods of rest/dispersal/foraging. The removal of the habitat within the Project Area is not of the scale that would impact the carrying capacity of the species or any local population in the long-term.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat?	**No.** Domestic dogs are the primary invasive species which poses a threat to koala. As identified in **Table 8**, domestic dogs are likely to occur surrounding the Project Area. No mechanisms which would facilitate the exacerbation of this species are expected as a result of the proposed action.
Introduce disease that may cause the species to decline?	**No.** As identified in **Table 8**, the proposed action is not expected to introduce or exacerbate the spread of disease or pathogens (i.e. *Chlamydia*, koala retrovirus or *Phytophthora cinnamomi*) that may reduce the reproductive output of koalas or reduce the carrying capacity of the habitat. With the species-specific mitigation measures in place, proposed action activities are not expected to exacerbate these diseases on a population scale. Further, the proposed action is unlikely to lead to new pathways to dispersal into the Project Area for any individuals which may carry the disease. Implementation of weed and pest controls measures for the proposed action will ensure best practice site hygiene.
Interfere with the recovery of the species?	**No.** As identified in **Table 8**, no impacts which have the potential to interfere with the recovery of the species have been identified.

3.2 Grey-headed flying-fox (*Pteropus poliocephalus*)

3.2.1 Description and status under the EPBC Act

The grey-headed flying-fox is listed as Vulnerable under the EPBC Act.

The grey-headed flying-fox is one of the largest bats in the world with a weight of 600–1000 g and a head-body length of 230–289 mm. It is the only Australian flying-fox that has a collar of orange/brown fully encircling its neck. Thick leg fur extends to the ankle, in contrast to other *Pteropus* species in which it only reaches the knee. As its name implies, the head is covered by light grey fur. The belly fur is grey, often with flecks of white and ginger (Department of Climate Change Energy the Environment and Water 2022b).

3.2.2 Distribution

The grey-headed flying-fox is Australia's only endemic flying-fox and occurs in the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria. However, only a small proportion of this range is used at any one time, as the species selectively forages where food is available. As a result, patterns of occurrence and relative abundance within its distribution vary widely between seasons and between years. At a local scale, the species is generally present intermittently and irregularly. At a regional scale, broad trends in the distribution of plants with similar flowering and fruiting times support regular annual cycles of migration (Eby and Lunney 2002).

3.2.3 Habitat requirements

The grey-headed flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands. It also feeds on commercial fruit crops and on introduced tree species in urban areas. Major food plants include the fruit and blossom of rainforest species, especially *Ficus* spp., and blossoms of myrtaceous species such as *Eucalyptus*, *Corymbia* and *Angophora*, melaleucas, banksias and the fruit and flowers of *Syzygium* spp. (Commonwealth of Australia 2021). None of the vegetation communities used by the grey-headed flying-fox produce continuous foraging resources throughout the year. As a result, the species has adopted complex migration traits in response to ephemeral and patchy food resources (Eby 1991).

The foraging behaviour of the grey-headed flying-fox alters when native food sources are scarce. They have no biological adaptations to withstand food shortages (e.g. torpor) and migrate in response to changes in the quantity and location of food. The majority of eucalypts have regular seasonal flowering events, but do not flower every year and there are few areas within the species range where nectar is available continuously (Commonwealth of Australia 2021).

Grey-headed flying-foxes forage over extensive areas and have been known to fly as far as 40 km to feed, before returning to their roost the same night. Based on telemetry data, Westcott et al. (2015) reported the mean distance of a grey-headed flying-fox foraging site from the camp in which the animal had roosted and to which it returned was 10.9 km (quartile range from 6.2 - 27.9 km), with the maximum distance recorded during these observations being 148.3 km.

Grey-headed flying-foxes roost in large aggregations, known as camps, in the exposed branches of trees. Camps provide resting habitat, sites of social interactions and refuge for animals during significant phases of their annual cycle, such as birth, lactation and conception (Commonwealth of Australia 2021).

3.2.4 Threats

The main identified threats to the species are (Department of Climate Change Energy the Environment and Water 2022b):

- Habitat loss and fragmentation
- Exploitation: illegal shooting due to destroying commercial fruit crops
- Competition and hybridisation with black flying-foxes (*Pteropus alecto*)
- Pollutants, electrocution and pathogens: grey-headed flying-foxes accumulate lethal levels of lead from the environment and they are prone to electrocution on powerlines.

- Predation by European red foxes (*Vulpes vulpes*)

3.2.5 Survey effort, timing and coverage

Four nights of nocturnal spotlighting events searches were conducted in July and August 2022 (Ausecology 2022). These surveys included random meander transects of approximately 30 person mins per hectare, with two people walking 25 m apart where space permitted. Fauna surveys involved nocturnal spotlighting searches targeting *Phascolarctos cinereus* (koala), *Petauroides volans* (greater glider), *Ninox strenua* (powerful owl), *Pteropus poliocephalus* (grey-headed flying fox) and *Petaurus australis australis* (yellow-bellied glider (southern subspecies)). Methods and data capture were undertaken in accordance with the Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Version 3.0 (Eyre et al. 2018). Spotlight events focused on seven 'high-risk' habitat areas for the target species, such as larger patches of forest. Across the seven areas, a total of 27 person hours of spotlighting was undertaken (Ausecology 2022).

No recommended survey effort is specified for this species and species-specific survey guidelines do not exist. Nonetheless, due to the linear nature of the Project Area, the expended survey effort is considered sufficient.

3.2.6 Occurrence and potential habitat

Three flying fox roosts were identified over four nights of nocturnal spotlighting for the proposed action with two roosts occurring within 1km of the Project Area. It was noted that there were several hundred individuals in each of these roosts, which were predominantly *Pteropus alecto* (black flying fox), but approximately 20 grey-headed flying foxes were observed at the roost at Hugh Muntz Gardens. Vantage points to thoroughly observe the roosts were not adequate to accurately determine whether grey-headed flying foxes were present or absent, nor count the number of animals present.

These roosts may not be permanent roosts as they are not mapped on the National Flying-Fox Monitoring Viewer (Department of Climate Change Energy the Environment and Water 2020) and were not identified in earlier surveys. These roosts may need to be assessed again in different seasons to determine their importance, particularly during the breeding season.

The Australian government's 'national flying-fox monitoring viewer' identifies nationally-important flying-fox camps that are protected under the EPBC Act (Department of Climate Change Energy the Environment and Water 2020). These are camps that have contained ≥ 10,000 grey-headed flying-foxes in more than one year in the last 10 years, or have been occupied by more than 2,500 grey-headed flying-foxes permanently or seasonally every year for the last 10 years (Department of the Environment 2015c). A review of the National Flying-Fox Monitoring Viewer (DAWE, 2022a) showed that no flying fox camps are mapped in or adjacent to the Project Area. The nearest mapped camps (all of which have recorded grey-headed flying fox) are:

- Beenleigh, Lincoln St (Code 281) – approximately 600m from the Project Area.
- Loganholme, Alexander Clark Park (Code 138) – approximately 800m from the Project Area.
- Logan Central, Bardon and Wembley Rds (Code 596) – approximately 1.3km from the Project Area.

None of the camps identified during the field surveys are included as a nationally important camp by the Australian government.

Suitable roosting and foraging habitat was identified as rainforest patches, stands of *Melaleuca*, mangroves, wetlands/swamps and riparian vegetation. However, suitable foraging habitat may occur in any remnant habitat with nectar producing species as well as in non-remnant/urban areas where there are native and exotic feed trees. The total area of impact is calculated as 11.4 ha of roosting/foraging habitat and 196.6 ha of foraging only habitat.

3.2.7 Impacts and mitigation measures

Potential impacts of the proposed action on this species includes loss of foraging, dispersal and roosting habitat and direct mortality during construction. A total of 11.4 ha of suitable roosting and foraging habitat Area, as well as 196.6 ha of habitat suitable for foraging only, would be directly impacted by the proposed action. This habitat meets the definition of habitat critical to the survival of the species as there are known camps within 20 km, including one to the east at Lincoln Street, Beenleigh,

and to the south at Yvonne Crescent, Mount Warren Park (Department of Climate Change Energy the Environment and Water 2020).

These impacts will be mitigated through pre-clearance surveys and the presence of fauna spotter-catchers on site during all clearing activities. Other recommended mitigation measures for this species include:

- Ensure clearing activities are restricted to daylight hours wherever possible to reduce impacts from construction light and noise on foraging individuals.
- The Department of Environment and Science (DES) should be contacted with respect to any proposed activity relating to flying-foxes and flying-fox roosts.

3.2.8 Habitat critical to the survival of the species

The majority of myrtaceous plants in the diet of grey-headed flying-foxes flower within a defined season but are not annually reliable and the location of productive foraging habitat from these plants varies. In most months it is difficult to predict which locations will be productive as foraging habitat for the species.

Few forage plants flower in winter, and those that flower reliably in winter occur on coastal lowlands in northern New South Wales and southern Queensland. There is also evidence that spring forage is currently inadequate to provide reliable resources during critical periods in the reproductive cycle of grey-headed flying-foxes. Important winter and spring vegetation communities are those that contain *Eucalyptus tereticornis, Eucalyptus albens, Eucalyptus crebra, Eucalyptus fibrosa, Eucalyptus melliodora, Eucalyptus paniculata, Eucalyptus pilularis, Eucalyptus robusta, Eucalyptus seeana, Eucalyptus sideroxylon, Eucalyptus siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora, Corymbia eximia, Corymbia maculata, Grevillea robusta, Melaleuca quinquenervia* or *Syncarpia glomulifera* (Commonwealth of Australia 2021).

The *National Recovery Plan for the Grey Headed Flying Fox* (Commonwealth of Australia 2021) defines habitat critical to the survival of the species as field verified communities dominated by important winter and spring flowering vegetation. Habitat critical to the survival of the species may also be vegetation communities not containing winter and spring flowering tree species but which:

- contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)
- contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or
- contain native and or exotic species used for roosting at the site of a nationally important grey-headed flying-fox camp as identified on the Department's interactive flying-fox web viewer.

Back yard fruit trees, orchards or non-native trees that may be used for foraging are not considered to be habitat critical to the survival of the grey-headed flying-fox.

Habitat within the Project Area largely comprises remnant and non-remnant vegetation containing identified grey-headed flying fox forage species. While it is recognised that the vegetation is low-quality, the vegetation meets the definition of habitat critical to the survival of the species since it contains important winter and spring flowering vegetation communities, and there are three nationally important camps as identified on the Department's interactive flying-fox web viewer within 20 km of the Project Area.

The total area of impact to habitat critical to the survival of the grey-headed flying-fox is calculated as 11.4 ha of suitable roosting and foraging habitat occurs within the Project Area, as well as 196.6 ha of habitat suitable for foraging only.

3.2.9 Important population

Important populations of grey-headed flying-foxes have not been identified within the Project Area. Therefore, the population occurring within the Project Area has been assessed against the generic definition in the *EPBC Act Significant Impact Guidelines 1.1*. There are no separate or distinct populations of this species due to the constant genetic exchange and movement between camps throughout their entire geographic range. This species is highly mobile and move regularly throughout

their range. Any population potentially present within the Project Area is not considered an 'important population'.

3.2.10 EPBC Act referral guidelines for flying-fox camps

The *Referral guideline for management actions in grey-headed and spectacled flying-fox camps* (Department of the Environment 2015c) outlines actions to grey-headed flying-fox camps that are likely to require a referral to DCCEEW. Three flying fox roosts containing grey-headed flying-fox were identified within or within 1km of the Project Area and there are three known nationally important camps of grey-headed flying-fox within 1km of the Project Area.

Actions taken at grey-headed flying-fox camps that are likely to require referral under the EPBC Act because they are likely to have a significant impact include:

- clearing vegetation, dispersal of animals, *in situ* management or other impacts on nationally-important flying-fox camps that are not carried out in accordance with relevant mitigation standards
- dispersal actions at nationally-important flying-fox camps that are proposed during a period of significant population stress regardless of whether they adopt mitigation measures
- multiple camp dispersals or repeated *in situ* management actions that are likely to, over time or collectively, result in the total loss of roosting vegetation at a nationally important camp or result or in mortality levels that constitute significant population stress.
- If a proponent is proposing dispersal of multiple camps or repeated *in situ* management actions at one or more camps they should consider their action more strategically as a single, larger action and undertake appropriate strategic planning which conforms with the mitigation and outcomes outlined in the referral guidelines.

Actions taken at camps of grey-headed flying-fox that are unlikely to require referral under the EBPC Act because they unlikely to have a significant impact include:

- minor, routine camp management at any camp
- clearing some vegetation or other indirect impacts on nationally important flying-fox camps that are carried out in accordance with the mitigation standards
- dispersal of nationally-important flying-fox camps, that are carried out in accordance with the mitigation standards and are done so when the national population is not subject to significant stress
- clearing vegetation, dispersal of animals, *in situ* flying-fox management or other impacts on flying-fox camps that are not nationally important flying-fox camps that is carried out in accordance with state or territory regulatory requirements.
- *In situ* management includes actions that are not minor or routine, but aim to retain the camp whilst reducing human-flying-fox conflict. This may be achieved by carrying out works that increase or improve the buffer between the camp boundary and sensitive land-uses. *In situ* management may be referred to as 'camp boundary management' or 'nudging' by some agencies.

Since the proposed action will not be clearing vegetation or introducing disturbances (during construction) to nationally important flying-fox camps, it is not considered that the proposed action is likely to have a significant impact to a grey-headed flying-fox camp. Considering the proximity of the proposed action to three nationally important flying-fox camps, however, it is recommended that the proposed action follow the mitigation standards listed in the referral guidelines, to avoid having a significant impact on the flying-fox camps.

The mitigation standards are (Department of the Environment 2015c):

- The action must not occur if the camp contains females that are in the late stages of pregnancy or have dependant young that cannot fly on their own.
- The action must not occur during or immediately after climatic extremes (heat stress event, cyclone event), or during a period of significant food stress.

- Disturbance must be carried out using non-lethal means, such as acoustic, visual and/or physical disturbance or use of smoke.
- Disturbance activities must be limited to a maximum of 2.5 hours in any 12-hour period, preferably at or before sunrise or at sunset.
- Trees are not felled, lopped or have large branches removed when flying-foxes are in or near to a tree and likely to be harmed.
- The action must be supervised by a person with knowledge and experience relevant to the management of flying-foxes and their habitat, who can identify dependent young and is aware of climatic extremes and food stress events. This person must make an assessment of the relevant conditions and advise the proponent whether the activity can go ahead consistent with these standards.
- The action must not involve the clearing of all vegetation supporting a nationally-important flying-fox camp. Sufficient vegetation must be retained to support the maximum number of flying-foxes ever recorded in the camp of interest.

The mitigation standards have been developed to avoid significant impacts and are recommended to avoid referral or the likelihood of a significant impact on nationally important grey-headed flying fox camps, as defined under the EPBC Act.

3.2.11 Significant Impact Assessment

The above mitigation measures are recommended to avoid a significant impact on a nationally flying-fox camp. Actions which may also impact on foraging habitat are required to be assessed under the *Significant Impact Guidelines Policy Statement 1.1* (Department of the Environment 2013) for a vulnerable species. This assessment is presented in Table 10.

The outcome of this assessment is that the proposed action **may result in a significant impact to grey-headed flying-fox**, due to the removal of habitat that is critical to the survival of the species and by interfering with the recovery of the species.

Table 10 Significant impact assessment - grey-headed flying-fox

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
Lead to a long-term decrease in the size of an important population of a species?	**No.** A total of 11.4 ha of suitable roosting and foraging habitat, as well as 196.6 ha of habitat suitable for foraging only will be directly impacted by the proposed action. This habitat is not considered highly unique and habitat with similar characteristics, quality and condition occurs widely within the region. The species will continue to persist within its current distribution, regardless of the presence of habitat within the Project Area. As grey-headed flying-foxes are not restricted in their dispersal ability and they regularly move between foraging areas, impacts to any population as a result of the proposed action would be negligible. Therefore, it is considered unlikely that the proposed action will lead to a long-term decrease in the size of a population of the grey-headed flying-fox.
Reduce the area of occupancy of an important population?	**No.** A total of 11.4 ha of suitable roosting and foraging habitat, as well as 196.6 ha of habitat suitable for foraging only, will be directly impacted by the proposed action; however, the extent of clearing will not reduce the area of occupancy for grey-headed flying-fox as the amount of habitat that will remain following the proposed action will still be ample to support the species.
Fragment an existing important population into two or more populations?	**No.** The proposed action will not create a barrier to movement, beyond the current conditions.

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
Adversely affect habitat critical to the survival of a species?	**Yes.** The Project Area contains 208 ha of habitat that is considered 'habitat critical to the survival of the species' as defined in the *National Recovery Plan for the Grey Headed Flying Fox* (Commonwealth of Australia 2021).
Disrupt the breeding cycle of an important population?	**No.** Mating occurs in early autumn, after which time the larger camps begin to break up, reforming in late spring/early summer, as food resources become more abundant. Males and females segregate in October when females usually give birth. Fauna spotter catchers during clearing activities, particularly during these seasons, will ensure disruptions to this species are reduced.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**No.** Low quality vegetation containing foraging trees will be directly impacted as a result of the proposed action (208 ha of habitat). Given that this species forage over extensive areas and have been known to fly as far as 40 km to feed, before returning to their roost the same night, it is unlikely the proposed action will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	**No.** No invasive species are known to be harmful to the grey-headed flying-fox. A detailed Weed and Pest Management Plan will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through proposed action activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline?	**No.** Disease has not been identified as a threat to the grey-headed flying-fox.

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
Interfere with the recovery of the species?	**Yes.** As detailed in the *National Recovery Plan for the Grey-headed Flying-fox* (Commonwealth of Australia 2021), recovery objectives include: • Identify, protect and increase native foraging habitat that is critical to the survival of the grey-headed flying-fox. • Identify, protect and increase roosting habitat of grey-headed flying-fox camps. • Determine trends in the grey-headed flying-fox population so as to monitor the species' national distribution, habitat use and conservation status. • Build community capacity to coexist with flying-foxes and minimise the impacts on urban settlements from new and existing camps while avoiding interventions to move on or relocate entire camps. • Increase public awareness and understanding of grey-headed flying-foxes and the recovery program, and involve the community in the recovery program where appropriate. • Improve the management of grey-headed flying-fox camps in areas where interaction with humans is likely. • Significantly reduce levels of licenced harm to grey-headed flying-foxes associated with commercial horticulture. • Support research activities that will improve the conservation status and management of grey-headed flying-foxes. • Reduce the impact on grey-headed flying-foxes of electrocution on power lines, and entanglement in netting and on barbed-wire. Based on the above, the proposed action is expected to impact on native foraging habitat that is critical to the survival of the grey-headed flying-fox. This action could be considered to interfere with the recovery of the species.

3.3 Greater glider (*Petauroides volans*)

3.3.1 Description and status under the EPBC Act

The greater glider is listed as Endangered under the EPBC Act.

The greater glider is the largest gliding possum in Australia, with a head and body length of 35−46 cm and a long furry tail measuring 45−60 cm. Its tail is not prehensile. This species has thick fur that increases its apparent size. The fur is white or cream in colour below and varies from dark grey, dusky brown through to light mottled grey and cream above. It has large furry ears and a short snout.

3.3.2 Distribution

The greater glider (southern and central) occurs in eastern Australia, where it has a broad distribution from around Proserpine in Qld, south through NSW and the ACT, to Wombat State Forest in central Vic. It occurs across an elevational range of 0−1200 m above sea level (Department of Climate Change Energy the Environment and Water 2022a).

3.3.3 Habitat requirements

The greater glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. During the day, this species spends most of its time denning in hollowed trees, with each animal inhabiting up to twenty different dens within its home range. It is primarily folivorous, with a diet mostly comprising the leaves and flowers of Myrtaceae (e.g. eucalypt) trees. Home ranges of this species are typically relatively small (1 - 4 ha) but are larger in lower productivity forests and more open woodlands (up to 16 ha). They are larger for males than for females, with male home ranges being largely non-overlapping. A study on the greater glider population in the Seven Mile Beach National Park area found that while the species can cover distances up to 100 m, they usually glide less than 30 m and have a steeper trajectory than other species of glider (NSW Scientific Committee 2016).

Hollows develop extraordinarily slowly in Australian eucalypts, with figures most often quoted as minimum lag times of 150 - 360 years from germination to the beginning of hollow development (Gibbons and Lindenmayer 2002). A fall in the number of hollows below a minimum critical threshold for greater gliders could cause a decline in any local population and compromise population viability in the longer term if there is not a new cohort of hollow trees available to replace trees lost (Lindenmayer, Cunningham, and Donnelly 1997).

3.3.4 Threats

Key threats to the greater glider (southern and central) are frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting. There are synergies between these threats, and their combined impact needs to be considered in the recovery of the species. Loss and fragmentation of habitat has already occurred in many areas of the species' range, and the unprecedented 2019-20 bushfires have increased pressure on its remaining habitat. It has been identified that the species requires a Recovery Plan, however one has not yet been developed.

As per the species Conservation Advice (Department of Climate Change Energy the Environment and Water 2022a), all known threats include:

- Inappropriate fire regimes
- Habitat clearing and fragmentation
- Timber harvesting
- Barbed wire fencing entanglement
- Climate change
    - Increased temperatures and changes to rainfall patterns
- Over-abundant native species
    - Hyper-predation by owls
    - Competition from *Cacatua galerita* (Sulphur-crested Cockatoos)
- Introduced species

- Predation by feral cats (*Felis catus*)
- Predation by European red foxes (*Vulpes vulpes*)

3.3.5 Survey effort, timing and coverage

Four nights of nocturnal spotlighting events searches were conducted in July and August 2022 (Ausecology 2022). These surveys included random meander transects of approximately 30 person mins per hectare, with two people walking 25 m apart where space permitted. The spotlighting also targeted particular trees that were identified as potential stags with habitat for Greater Glider. Methods and data capture were undertaken in accordance with the Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Version 3.0 (Eyre et al. 2018). Spotlight events focused on seven 'high-risk' habitat areas for the target species, such as larger patches of forest. Across the seven areas, a total of 27 person hours of spotlighting was undertaken (Ausecology 2022).

No recommended survey effort is specified for this species and species-specific survey guidelines do not exist. Nonetheless, due to the linear nature of the Project Area, the expended survey effort is considered sufficient.

Subsequent to the completion of the field survey, the Guide to greater glider habitat in Queensland (DES, 2022) was released by the Queensland Department of Environment and Science. This document includes focus on Regional Ecosystems and density of large trees to map habitat for the species. The criteria presented below in '**Habitat critical to the survival of the species'** are generally consistent with the Guide to greater glider habitat in Queensland (DES, 2022) including consideration of suitable Regional Ecosystems and remnant status.

3.3.6 Occurrence and potential habitat

No *Petauroides volans* were detected during the surveys, however habitat was confirmed present for this species, including patches of eucalypt dominated forests providing denning and foraging resources. Sufficient habitat connectivity was also present.

Potential denning habitat was identified as any remnant eucalypt dominated RE within the Project Area of which 36.3 ha will be directly impacted. Potential foraging habitat was identified as *Melaleuca* open forest of which 4.6 ha will be directly impacted. Potential dispersal habitat was identified as any connected non-remnant area with trees of which 0.9 ha will be directly impacted. A total of 41.8 ha of potential denning, foraging and dispersal habitat will be directly impacted by the proposed action.

3.3.7 Habitat critical to the survival of the species

As per the species Conservation Advice (Department of Climate Change Energy the Environment and Water 2022a), habitat critical to survival for the greater glider (southern and central) may be broadly defined as (noting that geographic areas containing habitat critical to survival needs to be defined by forest type on a regional basis):

- large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region; and
- smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization; and
- cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes); and
- areas identified as refuges under future climate changes scenarios; and
- short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas.

Habitat meeting any one of the criteria above is considered habitat critical to the survival of greater glider (southern and central), irrespective of the current abundance or density of greater gliders or the perceived quality of the site. Forest areas currently unoccupied by the greater glider (southern and central) may still represent habitat critical to survival, if the recruitment of hollow-bearing trees as the forest ages could allow the species to colonise these areas and ensure persistence of a subpopulation (Department of Climate Change Energy the Environment and Water 2022a).

Based on this, all potential habitat is considered habitat critical to the survival of the species, as habitat trees present may be necessary for activities such as foraging, breeding and denning.

3.3.8 Important population

As per the species Conservation Advice (Department of Climate Change Energy the Environment and Water 2022a), all populations of the greater glider (southern and central) are important for the conservation of the species across its range. Due to the species' low fecundity and limited dispersal capabilities, areas where the species has become locally extinct are not readily recolonised (Department of Climate Change Energy the Environment and Water 2022a)**.**

3.3.9 Impacts and mitigation measures

A total of 41.8 ha of suitable habitat (36.3 ha of potential habitat, 4.6 ha of potential foraging only habitat and 0.9 ha of dispersal habitat) will be directly impacted by the proposed action. Other potential indirect impacts relevant to the greater glider includes:

- Habitat fragmentation
- Pest incursion
- Fauna mortality via felling of hollow-bearing trees.

In addition to the general mitigation and management measures, the following species-specific mitigation measures will be implemented:

- All hollow-bearing trees will be inspected by a fauna spotter-catcher prior to clearing to identify any denning or nesting individuals.

3.3.10 Significant impact assessment

An assessment of the significance of impacts to this species under the Significant Impact Guidelines Policy Statement 1.1 (Department of the Environment 2013) is provided is provided in **Table 11**. The outcome of this assessment is that the proposed action **may result in a significant impact** on the species.

Table 11 Significant impact assessment – greater glider

EPBC Act Criteria – is there a real possibility that the proposed action will:	Assessment of Significance
Lead to a long-term decrease in the size of a population	**No.** No individuals of this species were recorded during the field survey program. It is noted, however, that habitat was confirmed present for this species, including patches of eucalypt dominated forests providing denning and foraging resources. Sufficient habitat connectivity was also present. The proposed action will result in direct impacts, via vegetation clearing, to a total of 41.8 ha of suitable habitat, including 36.3 ha of potential breeding and foraging habitat and 5.5 ha potential foraging and dispersal habitat. As the Project Area has been predominantly located with an existing cleared linear area, it is not anticipated that additional habitat fragmentation or new barriers to species movement will occur as a result of the proposed action. Intact patches of potential habitat will remain in the surrounding area following the construction of the proposed action. Indirect impacts include increased activity, light and noise. However, these will be temporary and localised as the proposed action will be constructed in phases. Indirect impacts will be actively managed during all phases as per the EMP(C) to be developed for the proposed action. As such, it is considered unlikely the proposed action will lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of the species	**No.** The area of occupancy for this species has previously been estimated at

EPBC Act Criteria – is there a real possibility that the proposed action will:	Assessment of Significance
	16,164 km^2 and the extent of occurrence at 1,586,879 km^2. However, the species is currently undergoing taxonomic revision and the northern extent of the species distribution is disconnected. Vegetation clearing required for the proposed action will occur along portions of an existing linear rail reserve that is already disturbed and exists within an urbanised context. Efforts have been made by the proposed action to reduce the footprint and vegetation clearance requirements for the proposed action. On this basis, it is considered unlikely that the proposed action will reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations.	**No.** All populations of the greater glider are considered an to be important and the species is considered to be sensitive to fragmentation due to low dispersal ability and relatively small home ranges (Eyre 2006). Vegetation clearing required for the proposed action will occur along portions of an existing linear rail reserve that is already disturbed and exists within an urbanised context, and efforts have been made by the proposed action to reduce the footprint and vegetation clearance requirements as much as possible. The vegetation clearance will not introduce new barriers to movement and is unlikely to fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species.	**Possibly.** Tyndale-Biscoe and Smith, (1969) reported that greater gliders exhibit high site tenacity and typically die *in situ* when forests within their home ranges are cleared. Additionally, Kavanagh and Wheeler, (2004) reported that greater gliders restricted their home-ranges to the unlogged part of their range after intensive logging. Due to this high site fidelity, all suitable habitat within the Project Area is considered habitat critical to the survival of the species, as habitat trees present may be necessary for activities such as foraging, breeding and denning. Direct impacts are anticipated to occur to 41.8ha of both potential breeding and foraging habitat and potential foraging and dispersal habitat. Based on this, it is considered possible that the proposed action will adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an population.	**Possibly.** Breeding is restricted to a very brief period in February to May, and females give birth to a single young from March to June. Vegetation clearing and construction will be unable to avoid working during this period, however disturbance will be localised to a smaller area and phased. Tree hollows are required for this species to breed, and potential breeding habitat will be directly impacted (a total area of 27.27 ha). The use of fauna spotter catchers, particularly during the breeding period, will ensure that any displaced individuals possibly bearing young are captured and relocated. However, the reduction in suitable hollow-bearing trees available for the species in the local area may result in the disruption of the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**No.** Direct impacts via vegetation clearing will occur to 41.8 ha of suitable habitat, including 36.3 ha of potential breeding and foraging habitat and 5.5 ha potential foraging and dispersal habitat. As the Project Area has been predominantly co-located with an existing cleared linear area, habitat to be impacted by the proposed action is unlikely to be the best quality in the local area due to the existing edge effects impacts. Intact patches of potential habitat will remain in the wider area following the construction of the proposed action. Indirect impacts include increased activity, light and noise. However, these will occur

EPBC Act Criteria – is there a real possibility that the proposed action will:	Assessment of Significance
	during the day only, and will be temporary and localised as the proposed action will be constructed in phases. Indirect impacts will be actively managed during all phases as per the EMP(C) to be developed for the proposed action. Current recognised threats to the species are unlikely to be exacerbated by the proposed action. As such, it is considered unlikely the proposed action will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**No.** Invasive flora and fauna species have not been identified as a key threat to the species and it is unlikely that the proposed action will exacerbate invasive species beyond current levels. The EMP(C) to be developed for the proposed action will include mitigation and management measures to control the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through proposed action activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline.	**No.** A threat to this species includes the root fungus *Phytophthora* which is known to impact on the health of eucalypts. This threat is considered 'minor'. It is unlikely that the proposed action will introduce a disease to the extent that this species would decline. The EMP(C) for the proposed action will detail the biosecurity measures to prevent the introduction and spread of disease.
Interfere with the recovery of the species.	**No.** The SPRAT profile identifies that a Recovery Plan for the greater glider is required; however, no such plan exists at the time of this report. In Queensland, there are no species-specific management actions currently in place for the greater glider. As the proposed action is unlikely to exacerbate current recognised threats to the species, or introduce these threats in the local area, it is unlikely the proposed action will interfere with the recovery of the species.

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Appendix B

Supplementary Ecology Assessment (2022)

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Logan and Gold Coast Faster Rail (LGC) Project
Supplementary Ecological Assessment

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Glossary of Terms

Acronym	Description
BCC	Brisbane City Council
cm	Centimetres
Cth	Commonwealth
DAWE	Department of Agriculture Water and the Environment (Department of Climate Change, Energy, the Environment and Water)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DES	Department of Environment and Science (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
km	Kilometres
K2B	Kuraby to Beenleigh project
LCC	Logan City Council
LGC	Logan and Gold Coast Faster Rail
LSR	Loganlea Station Relocation
m	Metres
MNES	Matter of National Environmental Significance
MSES	Matter of State Environmental Significance
NC Act	*Nature Conservation Act 1992* (Qld)
NJKHT	Non-juvenile Koala Habitat Tree
PMST	Protected Matters Search Tool (Commonwealth)
PPFST	Protected Plant Flora Survey Trigger
RE	Regional Ecosystem
SLC	Special Least Concern
SPRAT	Species Profile and Threats Database (Commonwealth)
TEC	Threatened Ecological Community
VM Act	*Vegetation Management Act 1999* (Qld)

1 Introduction

1.1 Project background

The Queensland Government, together with the Australian Government, is planning to upgrade the north–south rail corridor linking the Sunshine Coast and Gold Coast, through Brisbane. This includes the Logan and Gold Coast Faster Rail (LGC) and Loganlea Station Relocation (LSR) projects. LGC (the Project) will increase the number of tracks with modernised rail systems. This requires a wider corridor to accommodate new and supporting infrastructure such as overhead lines, as well as upgraded train stations and road network improvements.

The Project Area lies on the Beenleigh and Gold Coast lines constituting approximately 20km of double track railway between Beenleigh Station in the south and Kuraby Station in the north (see Figure 1-1). The Project may impact on Matters of National Environmental Significance (MNES) as defined under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and on Matters of State Environmental Significance (MSES) under the Queensland State Planning Policy. Matters of Local Environmental Significance (MLES) as defined under local planning schemes may also be impacted by the Project. The Project is in the planning phase and is subject to further approvals by the Australian Government and Queensland Government.

Ausecology was engaged by AECOM to undertake a high-level terrestrial ecology assessment within the Project Area to investigate the presence of, and potential impacts on, relevant MNES/MSES/MLES. This technical investigation report will help identify the requirement for project approvals and additional surveys, as well as to inform design of the Project and mitigation measures (i.e., fauna crossings).

The ecological assessment aimed to:

- Conduct preliminary desktop assessments to guide and predict the presence and location of potential threatened species.
- Ground-truth mapped regional ecosystems (REs) within the Project Area.
- Conduct habitat assessments to quantify habitat quality within the Project Area.
- Undertake fauna surveys, primarily nocturnal spotlighting, targeting *Phascolarctos cinereus* (koala), *Petauroides volans* (greater glider), *Ninox strenua* (powerful owl), *Pteropus poliocephalus* (grey-headed flying-fox) and *Petaurus australis australis* (yellow-bellied glider (southern subspecies)).
- Identify any other MNES, MSES and MLES encountered.

The findings of this report will build on previous environmental studies for the Project and will be used to inform the significant impact assessment for the Project.

Figure 1-1 Map of Project Area

2 Desktop assessment methodology

Prior to field investigations, desktop searches of existing information for the Project Area were undertaken to identify the presence of threatened species and vegetation communities prescribed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Nature Conservation Act 1992* (NC Act). The desktop assessment involved a review of environmental databases, maps, and literature, summarised in Table 2-1. Matters of Local Environmental Significance (MLES) were also determined by searching Brisbane and Logan City Council Plan Overlays.

Previous reports reviewed for information included:

- Logan and Gold Coast Faster Rail, Review of Environmental Factors (GHD Aurecon, 2021); and
- Logan and Gold Coast Faster Rail, Ecology Assessment Report, (GHD, 2021).

Table 2-1 provides a full list of searches undertaken as part of the desktop assessment.

Table 2-1 Summary of database searches and previous assessments/reports that were reviewed

Search	Database source	Search criteria	Results
EPBC Act Protected Matters Search Tool (PMST)	Department of Climate Change, Energy, the Environment and Water (DCCEEW) (Cth)	Interactive tool at Project scale with 5 km buffer	Identified flora and fauna species and Threatened Ecological Communities (TEC's) prescribed under the EPBC Act (Cth) that are predicted to occur in proximity to Project Area.
WildNet species lists, from BioMaps	Department of Environment and Science (Qld)	Interactive tool at Project scale with 5 km buffer; Endangered, Vulnerable or Near Threatened (EVNT) flora and fauna species only.	Retrieved records of threatened flora and fauna species previously recorded in the vicinity of the Project Area.
Spatial analysis	Atlas of Living Australia (ALA)	Interactive tool with Project Area as base point.	Retrieved nearest records of threatened flora and fauna to Project Area.
Assessment of Queensland Globe mapping	Queensland Globe (Queensland Government, 2022)	Entire Project Area	▪ Essential Habitat Mapping ▪ Protected Plants Flora Survey Trigger (PPFST) Mapping ▪ Koala Habitat Area mapping ▪ Regional Ecosystem Mapping ▪ Regulated Vegetation Management Map ▪ Wetlands of High Ecological Significance

Search	Database source	Search criteria	Results
			▪ Protected Areas (under NC Act)
Flying fox roost search	National Flying-Fox Monitoring Viewer (DAWE, 2022a)	Interactive tool at Project scale and 5 km buffer	▪ Mapped flying fox roost locations
Matters of Local Environmental Significance	Brisbane City Council and Logan City Council Planning Schemes	Entire Project Area	▪ LCC Biodiversity, Waterway Corridor, and Wetland Trigger Areas ▪ BCC Biodiversity areas o High ecological significance o High ecological significance strategic o General ecological significance o General ecological significance strategic ▪ City Plan 2014 — Wetlands overlay

3 Desktop assessment results

A detailed desktop assessment was conducted in order to identify MNES, MSES, and MLES matters that may exist within the Project Area.

3.1 Matters of National Environmental Significance (MNES)

3.1.1 Threatened Ecological Communities

Threatened Ecological Communities (TECs), which may occur in the 5km search area as identified by the PMST:

- Poplar Box Grassy Woodland on Alluvial Plains – Endangered (community may occur within area).
- Coastal Swamp Sclerophyll Forest of New South Wales and South-East Queensland – Endangered (community known to occur within area).
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered (community may occur within area).
- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South-East Queensland ecological community – Endangered (community likely to occur within area).
- Lowland Rainforest of Subtropical Australia – Critically Endangered (community likely to occur within area).
- Subtropical and Temperate Coastal Saltmarsh – Vulnerable (community likely to occur within area).
- Swamp Tea-tree (*Melaleuca irbyana*) Forest of South-East Queensland – Critically Endangered (community may occur within area).

3.1.2 Threatened fauna and flora

A search of DCCEEW's PMST tool resulted in 28 flora species and 57 fauna species listed under the EPBC Act, which have the potential to occur within the 5km search area. See Appendix -1 for a full list of species.

The *Review of Environmental Factors* report by GHD (2021) produced a likelihood of occurrence table, which has been used to inform the searches and results of this report. The GHD Ecology report searched a 1km search area around the Project Area, finding 20 flora and 53 fauna EPBC listed species from the PMST search, and an additional 5 fauna, and 4 flora state listed species from the WildNet search.

A review of the National Flying-Fox Monitoring Viewer (DAWE, 2022a) showed that no flying fox camps are mapped in or adjacent to the Project Area. The nearest mapped camps (all of which have recorded grey-headed flying fox) are:

- Beenleigh, Lincoln St (Code 281) – approximately 600m from the Project Area.
- Loganholme, Alexander Clark Park (Code 138) – approximately 800m from the Project Area.
- Logan Central, Bardon and Wembley Rds (Code 596) – approximately 1.3km from the Project Area.

3.1.3 Migratory species

A total of 21 migratory terrestrial and wetland species identified under the provisions of the EPBC Act are predicted to occur within the Project Area based on the PMST results. See Appendix B-1 for a full list of species.

3.2 Matters of State Environmental Significance (MSES)

3.2.1 Regulated vegetation

A total of 11 'Endangered', 11 'Of Concern', and 3 'No Concern at present' regional ecosystems (REs) identified under the provisions of the VM Act are mapped to occur within the Project Area based on the results of the desktop assessment (Table 3-1). See Appendix A-1 for Regulated vegetation mapping.

In addition, multiple REs intersect with watercourses identified on the vegetation management watercourse and drainage feature map and wetlands identified on the vegetation management wetlands map within the Project Area.

Table 3-1 Regulated vegetation identified from the desktop assessment.

Regional Ecosystem	Regional ecosystem description (DES)	VM Act Status
12.1.1	*Corymbia citriodora* subsp. *variegata* woodland to open forest +/- *Eucalyptus siderophloia/E. crebra, E. carnea, E. acmenoides, E. propinqua* on metamorphics +/- interbedded volcanics	OC
12.3.3d	*Eucalyptus moluccana* woodland. Occurs on margins of Quaternary alluvial plains often adjacent sedimentary geologies.	E
12.3.6	*Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest on coastal alluvial plains	NC
12.3.8	Swamps with *Cyperus* spp., *Schoenoplectus* spp. and *Eleocharis* spp.	OC
12.3.11	*Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast	OC
12.3.11a	Open forest of *Eucalyptus tereticornis* and/or *E. siderophloia, Lophostemon confertus* with vine forest understorey. Occurs on sub-coastal Quaternary alluvial plains. Rainfall usually exceeds 1000mm/y.	OC
12.3.11b	*Eucalyptus tereticornis* and/or *E. racemosa subsp. racemosa +/- E. siderophloia, Lophostemon suaveolens, E. seeana, E. fibrosa subsp. fibrosa, E. propinqua* and *Angophora leiocarpa* open forest usually with a dense shrub layer dominated by *Melaleuca nodosa* and/or *Leptospermum polygalifolium*. Occurs on Quaternary alluvium usually higher Pleistocene plains and terraces. Rainfall usually exceeds 1000mm/y.	OC
12.3.16	Complex notophyll to microphyll vine forest on alluvial plains	E
12.3.19	*Eucalyptus moluccana* and/or *Eucalyptus tereticornis* and *E. crebra* open forest to woodland, with a sparse to mid-dense understorey of *Melaleuca irbyana* on alluvial plains	E
12.3.20	*Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, E. siderophloia, M. styphelioides* open forest on low coastal alluvial plains	E

Regional Ecosystem	Regional ecosystem description (DES)	VM Act Status
12.5.2a	*Corymbia intermedia, Eucalyptus tereticornis* woodland. Occurs on complex of remnant Tertiary surfaces +/- Cainozoic and Mesozoic sediments usually in coastal areas with deep red soils.	E
12.5.3a	Mixed woodland to open forest usually containing *Corymbia intermedia, Eucalyptus racemosa* subsp. *racemosa* and at least a presence of *Eucalyptus seeana*. Occurs on complex of remnant Tertiary surfaces +/- Cainozoic and Mesozoic sediments.	E
12.9-10.3	*Eucalyptus moluccana* open forest on sedimentary rocks	OC
12.9-10.4	*Eucalyptus racemosa* subsp. *racemosa* woodland on sedimentary rocks	NC
12.9-10.10	*Melaleuca nodosa* low open forest on sedimentary rocks	OC
12.9-10.12	Mixed woodland usually containing *Corymbia intermedia, Angophora leiocarpa* and at least the presence of *Eucalyptus seeana* on sedimentary rocks	E
12.9-10.17c	Open forest of *Eucalyptus carnea* and/or *E. tindaliae* and/or *E. helidonica* +/- *Corymbia citriodora* subsp. *variegata, Eucalyptus crebra, Eucalyptus major, Corymbia henryi, Angophora woodsiana, C. trachyphloia, E. siderophloia, E. microcorys, E. resinifera* and *E. propinqua*. Occurs on Cainozoic and Mesozoic sediments.	NC
12.9-10.26	*Eucalyptus baileyana* and/or *E. planchoniana* and/or *E. psammitica* woodland to open forest on quartzose sandstone	OC
12.9-10.27	*Corymbia citriodora* subsp. *variegata* and/or *E. moluccana, E. tereticornis, E. crebra* open forest with *Melaleuca irbyana* understorey on sedimentary rocks	E
12.11.5	*Corymbia citriodora* subsp. *variegata* woodland to open forest +/- *Eucalyptus siderophloia/E. crebra, E. carnea, E. acmenoides, E. propinqua* on metamorphics +/- interbedded volcanics	E
12.11.14	*Eucalyptus crebra, E. tereticornis, Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics	OC
12.11.23	*Eucalyptus pilularis* open forest on coastal metamorphics and interbedded volcanics	E
12.11.25	*Corymbia henryi* and/or *Eucalyptus fibrosa* subsp. *fibrosa* +/- *E. crebra, E. carnea, E. tindaliae* woodland on metamorphics +/- interbedded volcanics	OC
12.11.26	*Eucalyptus baileyana* and/or *E. planchoniana* woodland to open forest on metamorphics +/- interbedded volcanics	OC

Regional Ecosystem	Regional ecosystem description (DES)	VM Act Status
12.11.27	*Eucalyptus racemosa* subsp. *racemosa* and/or *E. seeana* and *Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics	E

VM Act Status: E – Endangered, OC – Of Concern, NC – No concern at present

3.2.2 Threatened fauna and flora

A search of the WildNet database showed 41 threatened fauna and 58 threatened flora species listed by the NC Act, that have the potential to occur within the 5km search area. See Appendix B-2 for a full list of species.

The *Review of Environmental Factors* report by GHD (2021) produced a likelihood of occurrence table, which has been used to inform the searches and results of this report. The GHD Ecology report searched a 1km search area around the Project Area, finding an additional 5 fauna, and 4 flora state listed species from the WildNet search, on top of the 53 fauna and 20 flora EPBC listed species from the PMST search.

3.2.2.1 *SEQ koala habitat*

There is mapped core koala habitat area within and surrounding the Project Area, as well as koala priority area mapped around Karawatha Forest Park. Clearing of core and locally refined koala habitat areas within koala priority areas is prohibited, subject to certain exemptions. See Appendix A for the location of mapped koala habitat in or within proximity to the Project Area.

3.2.3 Special least concern (SLC) species

Forty-five (45) SLC flora and 23 SLC fauna species identified under the provisions of the NC Act are predicted or known to occur within the Project Area. See Appendix B-2 for a full list of species.

3.2.4 Essential habitat

The essential habitat mapped within the Project Area was reviewed and combined with the desktop assessment results to create a shortlist of REs that likely provide habitat for MNES and MSES matters. See Appendix A for the location of essential habitat in or within proximity to the Project Area.

3.2.5 Protected areas

No protected areas, as defined under the NC Act, occur within the Project Area.

3.2.6 Legally secured offset areas

No legally secured offset areas, as defined under the *Environmental Offset Act 2014*, are located within the Project Area.

3.2.7 State significant wetlands

The Project Area intersects with 1.83 ha of High Ecological Significance wetlands as defined under the *Environmental Protection Act 1994*. The Project Area also intersects with 2.62 ha of regulated vegetation Wetlands as defined under the VM Act. See Appendix A-3 for mapping of intersecting wetlands.

3.3 Matters of Local Environmental Significance (MLES)

3.3.1 Brisbane City Council

The Brisbane City Council City Plan 2014 v24 overlays were viewed and extracts of the Biodiversity and Wetlands matters with in the Project Area were compiled. The search identified the following MLES mapped on the Plan overlays in the Project Area:

- BCC Biodiversity areas:
  - High ecological significance.
  - High ecological significance strategic.
  - General ecological significance.
  - General ecological significance strategic.
- City Plan 2014 — Wetlands overlay.
- Waterway corridors:
  - Citywide waterway corridor.
  - Local waterway corridor.

A Natural Areas Local Assets Law search was not conducted. Additional protected matters may be present. Relevant MLES mapping is provided in Appendix A-9.

3.3.2 Logan City Council

The Logan Planning Scheme Layers 2015 V8.1 overlays were viewed and extracts of the data relevant to ecological matters within the Project Area were compiled. The search identified the following MLES mapped on the Plan overlays in the Project Area:

- OM-02.00 Biodiversity areas trigger.
- OM-02.01 Vegetation management areas.
- OM-02.02 Biodiversity corridors:
  - Biodiversity corridor.
  - Environmental management and conservation area.
- OM-02.03 Locally significant vegetation types:
  - Locally significant *Gossia gonoclada* area.
  - Locally significant remnant vegetation area.
- OM-14.00 Waterway corridors and wetlands trigger:
  - Waterway corridor trigger.
  - Wetland area trigger.
  - Wetland buffer trigger.
- OM-14.01 Waterways.
- OM-14.02 Wetlands:
  - Wetlands.
  - Wetland buffer.

4 Field survey methodology

The field assessment methodology was determined based on the results from the desktop assessment described in Section 3. Ausecology conducted field surveys between 13th July and 8th August 2022, traversing the Project Areas on foot. These field surveys acted to verify and add to the information obtained via desktop assessments and the previous Ecological Assessment Report (GHD, 2021). A summary of survey efforts is detailed below.

4.1 Ground-truthing regional ecosystems

The quaternary assessment methodology was used to collect data on vegetation characteristics (floristic structure and composition), broad ecological condition and the extent and classification of vegetation communities across the Project Area. These assessments were conducted as per the *Methodology for Surveying and Mapping Regional Ecosystems and Vegetation Communities in Queensland, Version 6.0* (Neldner et al., 2022).

At each quaternary point, RE classification was confirmed using the definitions of remnant, regrowth, and non-remnant vegetation, as defined under the VM Act. The relevant BioCondition benchmark was used to assess height and coverage of the canopy and characteristic species, in conjunction with technical descriptions for the RE where available. Regrowth was confirmed in the field; where aerial imagery has shown areas have not previously been cleared for last 15 years, the regrowth was classified as High Value Regrowth (HVR) in the data. The locations of the quaternary assessments are shown in Appendix A-4.

4.2 Identifying Threatened Ecological Communities

The listing advice for each potentially occurring TEC was examined and, during ground-truthing of REs, any REs likely to be associated with one (or more) TECs were further assessed against the descriptions, condition categories and thresholds as detailed in the respective approved conservation advice documents.

4.3 Habitat assessments

Habitat assessments were undertaken at 20 locations across the Project Area (Appendix A-6). Habitat assessments were undertaken within as many REs as practical including areas that contained remnant, regrowth and non-remnant vegetation. The habitat assessments consist of a series of questions designed to help quantify habitat quality and the likelihood of target species presence. This visual assessment provides a measure of habitat attributes within a 50m x 50m quadrat located central to the site, with a particular emphasis on habitat for terrestrial MNES/MSES matters. For example, features included (but were not limited) to the following:

- Presence and abundance of small, medium and large hollow-bearing trees and stags,
- Presence and abundance of rocks, fallen logs, hollow logs and woody debris,
- Presence, abundance and depth of cracking clay soil,
- Presence of watercourses, wetlands or artificial waterbodies (e.g., dams),
- Presence and abundance of important koala food and shelter trees,
- Availability and abundance of leaf litter cover, bare ground, grasses, and low forbs/shrubs in which fauna can seek cover and protection,
- Presence and abundance of fruiting and nectar producing plant cover, and
- Presence and abundance of mistletoe and other flowering and fruiting resources.

Significant non-native species encountered throughout the surveys and their potential impacts were also noted.

4.4 Fauna Surveys

Four nights of nocturnal spotlighting events searches were conducted targeting *Phascolarctos cinereus* (koala), *Petauroides volans* (greater glider), *Ninox strenua* (powerful owl), *Pteropus poliocephalus* (grey-headed flying-fox) and *Petaurus australis australis* (yellow-bellied glider (southern subspecies)). These surveys included random meander transects of approximately 30 person mins per hectare, with two people walking 25 m apart where space permitted. The spotlighting also targeted particular trees that were identified as potential stags with habitat for Greater Glider. Methods and data capture were undertaken in accordance with the *Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Version 3.0* (Eyre et al., 2018). Spotlight events focused on seven 'high-risk' habitat areas for the target species, such as larger patches of forest and areas mapped as essential habitat and/or core koala habitat (Appendix A-2). Table 4-1 presents the results of the spotlighting survey effort in total person minutes per site.

Table 4-1 Spotlighting survey effort

Site	Sum of Effort - time in person minutes
Hugh Muntz Park, Beenleigh	85
Edens Parkland, Edens Landing	170
Scrubby Creek, Kingston	420
Collin Park, Kingston	90
Voyager Drive, Kuraby	288
Compton Park, Karawatha	104
Acacia Rd, Karawatha	460
Grand Total	**1617**

4.4.1 Other assessments

Field assessments also included:

- Opportunistic photos of any culverts encountered to inform fish passage requirements.
- Opportunistic records of exotic fauna and flora species encountered during surveys.
- Opportunistic searches for threatened plants.
- Opportunistically observed flora and fauna records.
- Opportunistically checking for *Phascolarctos cinereus* (koala) animals, scats and scratches.

4.5 Limitations

The timing of surveys is generally acceptable for most species, though some species will require targeted surveys during the breeding season, i.e., in summer for *Crinia tinnula* (wallum froglet). Although nocturnal surveys were

conducted over several hours after dusk, some nocturnal species may be most active in the later hours of the night and therefore not captured in the spotlighting surveys.

A suitably qualified person was present during threatened flora searches, however targeted flora survey methodology was not undertaken during this survey.

4.6 Nomenclature

All flora and fauna species were recorded using the current nomenclature presented in the *Census of Queensland Flora 2021* (Brown, 2021) and the *QLD Wildlife Data API, 2021* (State of Queensland, 2021) respectively.

5 Field survey results

5.1 Ground-truthed regional ecosystems

Fifty (50) quaternary assessments were undertaken to assist in verifying and delineating ground-truthed regional ecosystems across the Project Area. Detailed ground-truthed RE mapping is provided in Appendix A-4. The condition of the vegetation was classified into three categories as defined in Neldner et al. (2022):

- High value regrowth: native vegetation regrowth greater than 15 years old
- Remnant: 'vegetation, part of which forms the predominant canopy of the vegetation—
    - (a) covering more than 50% of the undisturbed predominant canopy; and
    - (b) averaging more than 70% of the vegetation's undisturbed height; and
    - (c) composed of species characteristic of the vegetation's undisturbed predominant canopy.'
- Regrowth: non-remnant vegetation that has a significant woody component but fails to meet the structural and/or floristic characteristics of remnant vegetation

An additional fourth condition category, 'Revegetation' was used for areas where vegetation has been actively replanted (i.e. planting, direct seeding, brush matting and transplanting) on previously cleared land (Figure 5-1). This category would be classified as 'non-remnant' but has been separated as it has been created by community or council and may represent intrinsic value.

A summary of the ground-truthed REs, their associated condition and total areas within the Project Area are provided in Table 5-1. Overall, four 'Least Concern', four 'Of Concern' and ten 'Endangered' remnant REs were confirmed to occur in the Project Area.

Table 5-1 Ground-truthed REs and their total area within the Project Area

Status - RE Code	Regulated RE Categories	RE	Area (ha)
High Value Regrowth	**Category C or R area containing endangered regional ecosystems**	12.11.27/12.11.5	1.25
		12.3.20	0.10
		12.5.3a	0.52
		12.9-10.12	0.04
	Category C or R area containing of concern regional ecosystems	12.3.11	0.93
	Category C or R area that is a least concern regional ecosystem	12.11.5	0.61
		12.3.7	0.02
		12.9-10.4	0.06
	Total		**3.54**
Remnant	**Category A or B area containing endangered regional ecosystems**	12.11.23	**1.49**
		12.11.27	**0.01**
		12.11.27/12.11.5	**0.2**
		12.3.16	**0.17**
		12.3.20	**0.31**
		12.3.3	**5.53**
		12.3.3d	**0.59**
		12.5.2a	**0.49**
		12.5.3a	**0.64**

Status - RE Code	Regulated RE Categories	RE	Area (ha)
		12.9-10.12	**3.55**
	Category A or B area containing of concern regional ecosystem	12.3.11	**5.86**
		12.3.8	**0.72**
		12.9-10.7a	**0.84**
	Category A or B area that is a least concern regional ecosystem	12.11.3	0.39
		12.11.5	0.66
		12.3.7	2.37
		12.9-10.17	1.4
		12.9-10.17c	0.58
		12.9-10.17d	3.21
		12.9-10.4	2.26
	Total		**32.25**
Non-Remnant	**Category X area**	12.11.27	0.01
		12.11.27/12.11.23	16.38
		12.11.27/12.11.5	78.85
		12.11.3	0.11
		12.11.5	6.86
		12.3.11	53.66
		12.3.11/12.3.3d	1.58
		12.3.11/12.3.6	2.74
		12.3.16	0.97
		12.3.20	0.28
		12.3.3d	1.91
		12.3.6	0.81
		12.3.7	1.52
		12.3.8	0.99
		12.5.2a	12.01
		12.5.3a	11.79
		12.9-10.12	16.07
		12.9-10.17b	1.18
		12.9-10.17c	0.11
		12.9-10.17d	1.36
		12.9-10.19a	23.89
		12.9-10.4	17.10
		12.9-10.7a	0.79
	Total		**5.29**
Regrowth	**Category X area**	12.11.27/12.11.5	1.10
		12.3.11	0.64
		12.3.16	0.04
		12.3.6	0.63
		12.3.7	1.19
		12.5.2a	1.26

Status - RE Code	Regulated RE Categories	RE	Area (ha)
		12.9-10.12	0.43
	Total		
Revegetation	**Category X area**	12.3.11	1.24
		12.5.2a	0.06
		12.9-10.12	0.67
	Total		**1.98**

Figure 5-1 A recent planting (left) and a more established planting (right) within the Project Area

5.2 Identified local government offsets within the Project Area

Although not mapped on the offset register or planning scheme, as plantings were identified during the field survey, a search for the listing of these as offsets was conducted. Two areas that are within the Project Area were found listed on the Brisbane City Council (BCC) and Logan City Council (LCC) websites respectively. On the BCC 'Environmental offsets and restoration program' website, listed under 'Environmental offset and restoration sites locations', the 'Kuraby' site is listed (BCC, 2022). The Kuraby site is recorded as 8.1 ha, located at Voyager Drive Park - 531 Millers Road, established in October 2022. On the LCC 'Environmental offsets in Logan' website, the 'Battle Park' offset is listed in the suburb of Loganlea as 1.2 ha.

5.3 REs intersecting watercourses

A total of 18 remnant and/or high value regrowth REs intersect with 48 mapped watercourses identified on the vegetation management watercourse and drainage feature map within the Project Area, comprising approximately 10.97 ha, 3.7% of the total 294.8 ha Project Area.

5.4 Threatened Ecological Communities

No EPBC Act listed TECs were confirmed in the Project Area.

One TEC, Casuarina swamp forest, was identified in the GHD Ecological Assessment Report (GHD, 2021) as potentially occurring within the Project Area. This TEC was not identified during the ecological surveys undertaken by Ausecology in July – August 2022.

The field surveys did identify a patch of potential TEC Lowland Rainforest of Subtropical Australia. A patch of remnant RE 12.3.16, described in the REDD short description as "Complex notophyll to microphyll vine forest on alluvial plains" was ground truthed in the Project Area near Edens Landing. Field results are presented for the

RE 12.3.16 patch as quaternary assessment site data Q 40 in Appendix A-4 (Map 8 of 10) and Appendix D-2. A complete traverse of the patch was not possible due to the steep river bank, however the quaternary data, when compared against the key diagnostic characteristics and condition thresholds for the TEC, is presented below in Table 5-2, and found the patch does not meet the criteria for the TEC (TSSC, 2011a).

Table 5-2 Assessment of remnant RE 12.3.16 patch at Q 40 Edens Landing against the Key Diagnostic Characteristics and Condition Thresholds for Lowland Rainforest of Subtropical Australia EPBC TEC

Key Diagnostic Characteristics			**Assessment of patch at Q 40**
Distribution of the ecological community is primarily in the NSW North Coast and South Eastern Queensland bioregions, according to Interim Biogeographic Regionalisation for Australia (IBRA) version 6.1 (2004).			Yes
The ecological community occurs on: soils derived from basalt or alluvium; or enriched rhyolitic soils; or basaltically enriched metasediments.			Yes
The ecological community generally occurs at an altitude less than 300 m above sea level.			Yes
The ecological community typically occurs in areas with high annual rainfall (>1300mm).			Yes
The ecological community is typically more than 2 km inland from the coast.			Yes
The structure of the ecological community is typically a tall (20 m–30 m) closed forest, often with multiple canopy layers.			Yes
Patches of the ecological community typically have high species richness (at least 30 woody species from Appendix A (TSSC, 2011b)).			Possibly
Condition Thresholds			
Patch Type (evidence of remnant vegetation & regeneration status)	**A** Natural remnant evident by the persistence of mature residual trees from Appendix B (TSSC, 2011b). **AND**	**B** Some residual trees from Appendix B (TSSC, 2011b) are present plus evidence of either; natural regeneration*[1] **AND/OR** regeneration with active management*[2] ***3 tree species recorded = Glochidion ferdinandi, Lophostemon confertus, Flindersia australis*** **AND**	**C** A non-remnant patch that has recovered through a) natural regeneration*[1] **AND/OR** b) supplementary planting that has stature and quality that is reflective of the "Description" *[3] **AND**

Condition Thresholds			
Patch Size (excludes buffer zone)	≥ 0.1 ha **AND**	≥ 1 ha ***No = 0.20 Ha*** **AND**	≥ 2 ha **AND**
Canopy Cover (over entire patch)*4	Emergent/canopy/subcanopy*4 cover is ≥ 70% ***Yes = 90%*** **AND**		
Species Richness (over entire patch)	contains ≥ 40 native woody species*5 from Appendix A (TSSC, 2011b) **AND**	contains ≥ 30 native woody species*5 from Appendix A (TSSC, 2011b) ***Maybe = 5 species recorded (potentially 30 if searched comprehensively)*** **AND**	
Percent of total vegetation cover that is native *6 (use sample plot)	≥70% of vegetation *6 is native	≥50% of vegetation *6 is native	

Notes:
*1 Evidence of natural regeneration is shown by the presence of seedlings of a range of native species that did not originate through deliberate plantings.
*2 A patch that is actively managed has regular (e.g. every 1–2 years) on the ground human regenerative activity such as weed control or supplementary plantings.
*3 Closed canopy, 20–30 m tall, of representative species (e.g. white booyong, hoop pine, figs, brush box, yellow carabeen, red cedar, rosewood, white beech)
*4 Canopy cover (projective foliage cover) is estimated over the entire patch. When assessing the ecological community, the canopy includes the emergents and subcanopy (everything above 10 m tall). Canopy/sub-canopy includes all trees and vines (native and non-native).
*5 Woody species are trees, shrubs or vines that contain wood or wood fibres that consist mainly of hard lignified tissues. Excluded from woody species are graminoids, other herbs and non-woody vines.
*6 Total vegetation cover includes emergents/canopy/subcanopy and understorey and ground layers.

The condition thresholds outlined above are the minimum level at which patches are to be considered under the EPBC Act for actions that may require referral to the Australian Government. Although a comprehensive species inventory of the patch may detect the minimum 30 species from Appendix A (TSSC, 2011b), the thresholds for patch size are far too small for this patch to meet the 1 ha size threshold.

No evidence indicating the presence of other potential or likely EPBC Act TECs, including those liked in the desktop results (Section 3.2), was observed in the Project area.

5.5 Threatened flora field assessment results

No targeted searches were undertaken, however opportunistic observations of threatened flora were recorded. Two threatened flora species were detected during the surveys: *Macadamia integrifolia* and *Eucalyptus curtisii*. Both species were found to be growing in planted situations and are therefore not considered to be 'in the wild'.

5.5.1 Marine flora

Two areas of protected marine plants within the Project Area were detected and mapped on the Logan River (Figure 5-2, Appendix A-7). A location in the Project Area at Edens Landing is mapped within the Queensland waterways for waterway barrier works spatial data layer as tidal and appears to support marine plant life on the aerial photos. The areas were not able to be field verified due to access restricted by dense vegetation and steep riverbanks. It is assumed the area may contain marine protected plants, and is therefore included in the results calculations.

Figure 5-2 Marine plants on Logan River tidal zones

5.6 Threatened fauna field assessment results

Four nights of nocturnal spotlighting searches were conducted, and one threatened fauna matters listed under the EPBC Act / NC Act was recorded in the Project Area- *Pteropus poliocephalus* (grey-headed flying-fox). An additional special least concern species, *Tachyglossus aculeatus* (short-beaked echidna), was also recorded. See Appendix A-6 for the location of each record.

Three flying fox roosts were identified during the surveys (see map Appendix A-6). Roost 1 was within 10m of the Project Area at Kuraby State School, Roost 2 was located within the Project Area near East St, Kingston; and Roost 3, which contained GHFF, was located within Hugh Muntz Park. The extent of the roost at Hugh Muntz Park couldn't be confirmed, as the area was inaccessible due to inundation, but is likely this roost is within or directly adjacent to the Project Area. Vantage points to thoroughly observe the roosts were not adequate to accurately determine the absence of grey-headed flying foxes, nor count the number of animals present, but

approximately 20 grey-headed flying foxes were observed at the roost at Hugh Muntz Park. Additionally, a roost at Battle Park Railway St was anecdotally reported by OWAD (*Pers. comms*) within 100m of the Project Area, but this was not confirmed by Ausecology Ecologists, and the exact location is not known.

These roosts may not be permanent roosts as they were not mapped on the National Flying-Fox Monitoring Viewer (DAWE, 2022a) and were not identified in earlier surveys. These roosts may need to be assessed again in different seasons to determine their importance, particularly during the breeding season.

Spotlighting searches for koala were undertaken during the surveys, as well as opportunistic observations. Presence and signs of koala activity were opportunistically noted if encountered. No koalas were observed, but potential signs including scratches were noted in some areas. No potential scats were detected.

5.7 Habitat assessments

Habitat assessments were undertaken at 20 locations across the Project Area (Appendix A-5). General habitat features were noted but were not individually recorded. Instead, the information collected from the habitat assessments informed the Likelihood of occurrence assessments and were then used to refine habitat mapping for individual species. Potential breeding places like nests and hollows were observed during the surveys, but these were not assessed for activity at this early stage in the project.

Habitat features detected during the assessments included (but were not limited to):

- Live and dead trees with hollows ranging from small (2 cm) to large (>20 cm) sizes, which may support numerous bird and arboreal mammal species.
- Small to large sized coarse woody debris (fallen logs) both with and without hollows, which support potential foraging and/or breeding places for a range of fauna.
- Various nests, including small to medium stick nests in trees, pardalote nests in earth banks and mud nests under rail structures.
- Ground and arboreal termite mounds, which may provide foraging opportunities to echidnas on the ground, and nesting opportunities for kingfishers and kookaburras.
- Anthropogenic structures (culverts, gravel pits, stockpiles, metal sheeting etc.), which may support foraging and breeding places for a range of fauna, particularly culverts which are commonly used by bat species as roosts.
- Patches of Eucalypt dominated forests, which provide foraging resources for greater glider (*Petauroides armillatus*) and nectar feeding birds such as the swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*).
- Areas of important koala food and shelter trees and their abundance.
- Mistletoes, which provide nectar for a range of birds, but are a key food source for the regent honeyeater (*Anthochaera phrygia*).
- Patches of *Casuarina*/*Allocasuarina* spp. which are an key feed tree of the glossy black-cockatoo (*Calyptorhynchus lathami lathami*).
- Low shrub cover, which is an important habitat feature for some ground dwelling species such as Black-breasted button Quail (*Turnix melanogaster*).
- Leaf litter, decorticating bark and fallen bark which are features that may provide shelter to small fauna, as well as foraging habitat to other fauna.

- Natural waterbodies (rivers, creeks, streams, floodplains, wetlands and gilgais) and artificial waterbodies (farm dams and drainage channels).
- Soil type, elevation, landform, vegetation structure and dominant species indicative of habitat for different flora species.

These features may provide habitat for a diversity of native fauna species, including frogs, terrestrial and arboreal mammals, birds, reptiles, and invertebrates.

The relative abundance of resources available to fauna varies from site to site. Availability and condition of nesting, shelter, and foraging opportunities for fauna was assessed in the context of the microhabitat requirements of each EVNT fauna species.

It was also noted that despite the availability of habitat for some species, the amount of fragmentation causing small sized patches, and the lack of connectivity due to large roads and urban areas, limits the likelihood of certain species utilising the area.

5.8 Threatened fauna habitat

Potential habitat was defined as all areas identified during the desktop assessment phase as areas that could potentially support matters based on previous records, literature reviews, and the *Review of Environmental Factors* report by GHD (2021). Potential habitat was further refined into final habitat for each matter based on additional data collected during the Ausecology assessments. The results of ground surveys, fauna surveys, and habitat and vegetation assessments were used to define the final habitat areas. The results of the Likelihood of Occurrence (LoO) assessment is presented in Appendix E and provides a summary of all fauna matters assessed for their likelihood to occur within the Project Area.

At this stage of the project, separating out breeding from foraging habitat for some species like the glossy black-cockatoo (*Calyptorhynchus lathami lathami*) and greater glider (*Petauroides armillatus*), is not possible, as it would require intensive field surveys. Also, it would not provide additional value, as in most cases it overlaps, and it is likely that any suitable habitat for threatened species will be considered protected.

5.9 Threatened flora habitat

Habitat mapping for flora matters was not conducted at this level of survey. Much of the Project Area is mapped on the protected plants flora survey trigger map, which identifies high-risk areas where endangered, vulnerable or near threatened native plants are present or are likely to be present. These areas will require a suitably qualified person to undertake a flora survey.

Threatened flora species that were determined to be Confirmed or Likely to occur were included in the habitat assessment, the *Review of Environmental Factors* report by GHD (2021) was consulted to determine the species, and additional data collected during the Ausecology assessments was used to update the likelihood. Potential habitat was assessed during the desktop assessment phase and refined during survey work. Data on potential habitat for flora is not readily available in literature, and refining the habitat for some flora matters can be difficult. Therefore, refined mapping has not been created for flora, but the results of the Likelihood of Occurrence (LoO) assessment is presented in Appendix E and provides a summary of all flora matters assessed for their likelihood to occur within the Project Area.

5.10 Non-native flora species

A total of 42 non-native flora species were identified during the field surveys. Of these, 12 are listed as 'Restricted' matter under the *Biosecurity Act 2014* (Qld). For a full list of non-native flora recorded during the surveys, refer to Appendix D-2.

4 Conclusion

The survey found that the Project Area supports regulated vegetation, threatened flora and fauna species habitat, populations of threatened animals, and potentially one EPBC Act threatened ecological community. In its current layout, the development footprint may impact on these matters, triggering potential requirements for EPBC referrals, and local and state government approvals. If the impacts cannot be avoided, offsets, permits, low- and high-risk species management plans, and impact management plans may be required for approvals to impact the protected matters. Pre-lodgement advice from the appropriate government bodies is advisable.

Key findings and recommended actions are outlined below:

- The area is mapped under protected plant flora survey trigger mapping, therefore a protected plant survey will be required once the design footprint is finalised, and within 12 months of anticipated clearing.
- Fifty quaternary vegetation assessment sites were utilised to refine the regional ecosystem mapping which showed the Project Area to contain:
    - twenty regional ecosystems in remnant condition covering a total 32.25 ha,
    - eight REs in High Value Regrowth condition covering 3.54 ha,
    - eight REs in a non-statutory 'regrowth' condition covering 5.29 ha,
    - estuary covering 0.66 ha,
    - native revegetation areas covering 1.98 ha, and
    - 250.98 ha of non-remnant areas.
- No EPBC Act protected threatened ecological communities were confirmed during the surveys.
- Threatened fauna species detected during surveys included *Pteropus poliocephalus* (grey-headed flying fox) listed as Vulnerable under the EPBC Act.
- No *Phascolarctos cinereus* (koala) or *Petauroides volans* (greater glider) were detected during the surveys, however habitat was confirmed present for these species.
- Three flying fox roosts were identified within proximity to the Project Area during the surveys, and further assessments of these roosts (i.e., in breeding season) will be required to determine the status of these under legislation. One of these roosts contained grey-headed flying fox. Advice may need to be sought from the appropriate government bodies regarding the treatment of these roosts.
- Further targeted surveys will likely be required to determine the presence of MSES Vulnerable listed *Adelotus brevis* (tusked frog) and *Wallum froglet (Crinia tinnula*), however suitable habitat was confirmed present in the Project Area for both species.
- Koala habitat is present including all remnant areas as well as scattered or isolated koala food trees in cleared and non-remnant areas.
- Updates were made to the Likelihood of Occurrence assessment undertaken by GHD 2021. Ausecology identified 97 species in the desktop assessment to be subject to the LoO assessment. It was determined that 4 species are 'Confirmed present', 4 species as 'Known', 18 species as 'Likely to occur', 17 species as 'May occur', and 54 species as 'Unlikely to occur'.

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Appendix A – Mapping

Appendix B - Desktop search results

Appendix B-1 Protected Matter Search Tool (PMST) results

Appendix B-2 Wildnet search results

Appendix C – Fauna Survey Results

Species Group	Scientific Name	Common Name	Native/ Introduced	NCA	EPBC	Survey type
Amphibia	*Frog sp.*	frog sp.	Native	-	-	Diurnal incidental
Amphibia	*Limnodynastes peronii*	striped marsh frog	Native	LC	-	Nocturnal / Spotlighting
Aves	*Parvipsitta pusilla*	little lorikeet	Native	LC	-	Diurnal incidental
Aves	*Accipiter cirrocephalus*	collared sparrowhawk	Native	LC	-	Diurnal incidental
Aves	*Accipiter fasciatus*	brown goshawk	Native	LC	-	Diurnal incidental
Aves	*Alectura lathami*	Australian brush turkey	Native	LC	-	Diurnal incidental
Aves	*Alisterus scapularis*	Australian king-parrot	Native	LC	-	Diurnal incidental
Aves	*Alisterus scapularis*	Australian king-parrot	Native	LC	-	Diurnal incidental
Aves	*Anas superciliosa*	Pacific black duck	Native	LC	-	Diurnal incidental
Aves	*Ardea alba modesta*	Eastern great egret	Native	LC	-	Diurnal incidental
Aves	*Ardea intermedia*	intermediate egret	Native	LC	-	Diurnal incidental
Aves	*Bubulcus ibis*	cattle egret	Native	LC	-	Diurnal incidental
Aves	*Butorides striata*	striated heron	Native	LC	-	Diurnal incidental
Aves	*Cacatua galerita*	sulphur-crested cockatoo	Native	LC	-	Diurnal incidental
Aves	*Cacomantis flabelliformis*	fan-tailed cuckoo	Native	LC	-	Diurnal incidental
Aves	*Ceyx azureus*	azure kingfisher	Native	LC	-	Diurnal incidental
Aves	*Chenonetta jubata*	Australian wood duck	Native	LC	-	Diurnal incidental
Aves	*Colluricincla harmonica*	grey shrike-thrush	Native	LC	-	Diurnal incidental
Aves	*Coracina novaehollandiae*	black-faced cuckoo-shrike	Native	LC	-	Diurnal incidental
Aves	*Corvus orru*	Torresian crow	Native	LC	-	Diurnal incidental
Aves	*Cracticus nigrogularis*	pied butcherbird	Native	LC	-	Diurnal incidental
Aves	*Cracticus tibicen*	Australian magpie	Native	LC	-	Diurnal incidental
Aves	*Cracticus torquatus*	grey butcherbird	Native	LC	-	Diurnal incidental
Aves	*Dacelo novaeguineae*	laughing kookaburra	Native	LC	-	Diurnal incidental
Aves	*Dicaeum hirundinaceum*	mistletoebird	Native	LC	-	Diurnal incidental
Aves	*Dicrurus bracteatus*	spangled drongo	Native	LC	-	Diurnal incidental
Aves	*Egretta novaehollandiae*	white-faced heron	Native	LC	-	Diurnal incidental
Aves	*Entomyzon cyanotis*	blue-faced honeyeater	Native	LC	-	Diurnal incidental
Aves	*Eolophus roseicapilla*	galah	Native	LC	-	Diurnal incidental
Aves	*Gallinula tenebrosa*	dusky moorhen	Native	LC	-	Diurnal incidental
Aves	*Geopelia humeralis*	bar-shouldered dove	Native	LC	-	Diurnal incidental

Species Group	Scientific Name	Common Name	Native/ Introduced	NCA	EPBC	Survey type
Aves	*Grallina cyanoleuca*	magpie-lark	Native	LC	-	Diurnal incidental
Aves	*Hirundo neoxena*	welcome swallow	Native	LC	-	Diurnal incidental
Aves	*Lichmera indistincta*	brown honeyeater	Native	LC	-	Diurnal incidental
Aves	*Malurus cyaneus*	superb fairy-wren	Native	LC	-	Diurnal incidental
Aves	*Malurus melanocephalus*	red-backed fairy-wren	Native	LC	-	Diurnal incidental
Aves	*Manorina melanocephala*	noisy miner	Native	LC	-	Diurnal incidental
Aves	*Meliphaga lewinii*	Lewin's honeyeater	Native	LC	-	Diurnal incidental
Aves	*Merops ornatus*	rainbow bee-eater	Native	LC	-	Diurnal incidental
Aves	*Microcarbo melanoleucos*	little pied cormorant	Native	LC	-	Diurnal incidental
Aves	*Myzomela sanguinolenta*	scarlet honeyeater	Native	LC	-	Diurnal incidental
Aves	*Ninox novaeseelandiae*	Southern boobook	Native	LC	-	Nocturnal / Spotlighting
Aves	*Ocyphaps lophotes*	crested pigeon	Native	LC	-	Diurnal incidental
Aves	*Pachycephala pectoralis*	golden whistler	Native	LC	-	Diurnal incidental
Aves	*Pachycephala rufiventris*	rufous whistler	Native	LC	-	Diurnal incidental
Aves	*Pardalotus punctatus*	spotted pardalote	Native	LC	-	Diurnal incidental
Aves	*Pardalotus striatus*	striated pardalote	Native	LC	-	Diurnal incidental
Aves	*Pelecanus conspicillatus*	Australian pelican	Native	LC	-	Diurnal incidental
Aves	*Petrochelidon nigricans*	tree martin	Native	LC	-	Diurnal incidental
Aves	*Phalacrocorax sulcirostris*	little black cormorant	Native	LC	-	Diurnal incidental
Aves	*Philemon citreogularis*	little friarbird	Native	LC	-	Diurnal incidental
Aves	*Philemon corniculatus*	noisy friarbird	Native	LC	-	Diurnal incidental
Aves	*Plectorhyncha lanceolata*	striped honeyeater	Native	LC	-	Diurnal incidental
Aves	*Podargus strigoides*	tawny frogmouth	Native	LC	-	Nocturnal / Spotlighting
Aves	*Porphyrio melanotus*	purple swamphen	Native	LC	-	Diurnal incidental
Aves	*Porphyrio porphyrio*	purple swamphen	Native	LC	-	Diurnal incidental
Aves	*Porzana tabuensis*	spotless crake	Native	LC	-	Diurnal incidental
Aves	*Psophodes olivaceus*	Eastern whipbird	Native	LC	-	Diurnal incidental
Aves	*Rhipidura albiscapa*	grey fantail	Native	LC	-	Diurnal incidental
Aves	*Rhipidura leucophrys*	willie wagtail	Native	LC	-	Diurnal incidental

Species Group	Scientific Name	Common Name	Native/ Introduced	NCA	EPBC	Survey type
Aves	*Sericornis frontalis*	white-browed scrubwren	Native	LC	-	Diurnal incidental
Aves	*Strepera graculina*	pied currawong	Native	LC	-	Diurnal incidental
Aves	*Taeniopygia bichenovii*	double-barred finch	Native	LC	-	Diurnal incidental
Aves	*Threskiornis molucca*	Australian white ibis	Native	LC	-	Diurnal incidental
Aves	*Threskiornis spinicollis*	straw-necked ibis	Native	LC	-	Diurnal incidental
Aves	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet	Native	LC	-	Diurnal incidental
Aves	*Trichoglossus haematodus*	rainbow lorikeet	Native	LC	-	Diurnal incidental
Aves	*Vanellus miles*	masked lapwing	Native	LC	-	Diurnal incidental
Aves	*Zosterops lateralis*	silvereye	Native	LC	-	Diurnal incidental
Mammalia	*Antechinus sp.*	antechinus sp.	Native	-	-	Nocturnal / Spotlighting
Mammalia	*Felis catus*	cat	Introduced	-	-	Nocturnal / Spotlighting
Mammalia	*Macropus rufogriseus*	red-necked wallaby	Native	LC	-	Diurnal incidental
Mammalia	*Microbat sp.*	microbat sp.	Native	-	-	Nocturnal / Spotlighting
Mammalia	*Petaurus norfolcensis*	squirrel glider	Native	LC	-	Nocturnal / Spotlighting
Mammalia	*Pseudocheirus peregrinus*	common ringtail possum	Native	LC	-	Nocturnal / Spotlighting
Mammalia	*Pteropus alecto*	black flying fox	Native	LC	-	Diurnal incidental
Mammalia	*Pteropus poliocephalus*	grey-headed flying fox	Native	LC	V	Diurnal incidental
Mammalia	*Trichosurus vulpecula*	common brushtail possum	Native	LC	-	Nocturnal / Spotlighting
Mammalia	*Wallabia bicolor*	swamp wallaby	Native	LC	-	Diurnal incidental
Monotremes	*Tachyglossus aculeatus*	short-beaked echidna	Native	SLC	-	Diurnal incidental
Reptilia	*Cryptoblepharus sp.*	*Cryptoblepharus* sp.	Native	-	-	Diurnal incidental
Reptilia	*Intellagama lesueurii*	Eastern water dragon	Native	LC	-	Diurnal incidental
Reptilia	*Lampropholis delicata*	grass skink	Native	LC	-	Diurnal incidental

Appendix D – Flora Survey Results

Appendix D-1 Quaternary Assessment Site Results

Site	Condition	Canopy Cover	Canopy Height	Canopy Species
Q 1	Remnant	70	18	*Melaleuca quinquenervia, Eucalyptus microcorys, Glochidion ferdinandi*
Q 2	Remnant	50	31	*Eucalyptus microcorys, Eucalyptus resinifera, Angophora leiocarpa*
Q 3	Remnant	45	19	*Melaleuca quinquenervia, Glochidion ferdinandi*
Q 4	Non remnant	50	10	*Ficus benjamina planted (dominant), Acacia leiocalyx, Melaleuca quinquenervia, Corymbia intermedia.*
Q 5	Regrowth and revegetation, parts remnant	45	22	*Eucalyptus tereticornis, Eucalyptus racemosa, Corymbia intermedia, Eucalyptus siderophloia*
Q 6	Small remnant	60	23	*Eucalyptus tereticornis, Eucalyptus siderophloia*
Q 7	Remnant	29	19	*Eucalyptus tereticornis, Eucalyptus siderophloia*
Q 8	Remnant	80	22	*Eucalyptus racemosa, Eucalyptus seeana, Corymbia intermedia*
Q 9	Regrowth	60	16.5	*Melaleuca quinquenervia, Eucalyptus tereticornis, Pinus sp.*
Q 10	Remnant	70	23	*Eucalyptus racemosa, E. tereticornis, E. siderophloia. E. seeana, E. carnea*
Q 11	Non remnant	0	Na	*Nil*
Q 12	Remnant	70	35	*Eucalyptus propinqua, Eucalyptus siderophloia, Corymbia intermedia, Eucalyptus acmenoides, E. tereticornis*
Q 13	Remnant	29	16.5	*Eucalyptus tereticornis, Melaleuca quinquenervia*
Q 14	Remnant	70	20	*Eucalyptus seeana, Eucalyptus tereticornis, Eucalyptus resinifera,*
Q 15	Remnant	70	28	*Eucalyptus propinqua, Eucalyptus seeana, Corymbia intermedia, Eucalyptus resinifera,*
Q 16	Remnant	40	22	*Eucalyptus resinifera, Angophora leiocarpa, Corymbia intermedia*
Q 17	Remnant	60	25	*Eucalyptus resinifera, Corymbia intermedia, Eucalyptus siderophloia*
Q 18	Remnant	80	17	*Melaleuca quinquenervia, Lophostemon suaveolens, Eucalyptus siderophloia*
Q 19	Remnant	45	20	*Eucalyptus racemosa, Eucalyptus resinifera, Corymbia intermedia*
Q 20	Remnant	80	32	*Eucalyptus microcorys, Eucalyptus propinqua, Eucalyptus tindalii*
Q 21	Remnant	80	27	*Eucalyptus tindalii, Corymbia trachyphloia, Eucalyptus resinifera*
Q 22	Remnant (small)	80	35	*Eucalyptus siderophloia, Eucalyptus propinqua, Corymbia citriodora subsp. variegata, Eucalyptus carnea, Eucalyptus tereticornis*
Q 23	Remnant small	80	17	*Eucalyptus seeana, Corymbia intermedia,*
Q 24	Cleared paddock	0	N/A	*Nil*
Q 25	Non remnant	10	30	*Eucalyptus tereticornis*
Q 26	Remnant	25	35	*Eucalyptus tereticornis*

Site	Condition	Canopy Cover	Canopy Height	Canopy Species
Q 27	Non remnant, cleared paddock	0	N/A	*Nil*
Q 28	Remnant	60	35	*Eucalyptus tereticornis, Casuarina cunninghamiana*
Q 29	Remnant narrow linear	85	33	*Eucalyptus tereticornis, Eucalyptus siderophloia*
Q 30	Remnant	65	37	*Eucalyptus tereticornis, Eucalyptus siderophloia, Lophostemon suaveolens, Corymbia citriodora subsp. variegata, Angophora leiocarpa*
Q 31	Remnant	65	37	*Eucalyptus tereticornis, Eucalyptus siderophloia, Lophostemon suaveolens, Corymbia citriodora subsp. variegata, Angophora leiocarpa*
Q 32	Remnant narrow linear	85	23	*Eucalyptus tereticornis, Eucalyptus siderophloia, Angophora leiocarpa*
Q 33	Remnant (disturbed)	35	17	*Eucalyptus tereticornis, Eucalyptus siderophloia. Pinus sp.*
Q 34	Mosaic small remnant patches and regrowth	36	19	*Eucalyptus tereticornis, Casuarina glauca, Corymbia tessellaris, Melaleuca bracteata*
Q 35	Regrowth	40	11	*Acacia disparrima, Corymbia tessellaris, Cupaniopsis anacardioides, Alphitonia excelsa*
Q 36	Remnant	40	17	*Eucalyptus tereticornis, Casuarina glauca, Acacia disparrima*
Q 37	Remnant	55	20	*Eucalyptus tereticornis, Eucalyptus siderophloia, Corymbia intermedia*
Q 38	Remnant	37	20	*Eucalyptus tereticornis, Corymbia intermedia*
Q 39	Remnant	70	23	*Eucalyptus tereticornis, Corymbia intermedia, Eucalyptus siderophloia*
Q 40	Remnant	70	24	*Eucalyptus tereticornis, Corymbia citriodora subsp. variegata, Casuarina cunninghamiana, Corymbia intermedia, Melaleuca bracteata*
Q 41	Remnant	0	N/A	*N/A*
Q 42	Non remnant	15	9	*Melaleuca bracteata, Casuarina glauca, Melaleuca quinquenervia*
Q 43	Remnant	50	23	*Eucalyptus propinqua, Eucalyptus tereticornis, Eucalyptus microcorys, Eucalyptus fibrosa, Eucalyptus siderophloia, Corymbia intermedia*
Q 44	Remnant	75	26	*Eucalyptus fibrosa, Eucalyptus propinqua, Corymbia henryi*
Q 45	Remnant	70	22	*Eucalyptus pilularis, Eucalyptus tereticornis, Eucalyptus siderophloia*
Q 46	Remnant	70	20	*Corymbia intermedia, Eucalyptus siderophloia, Eucalyptus pilularis, Corymbia citriodora subsp. variegata, Eucalyptus resinifera, Eucalyptus seeana*
Q 47	Narrow, small remnant	60	23	*Eucalyptus tereticornis, Eucalyptus siderophloia*
Q 48	Remnant	55	28	*Eucalyptus tereticornis, Eucalyptus siderophloia, Corymbia intermedia*
Q 49	Remnant	30	21	*Eucalyptus moluccana, Eucalyptus tereticornis*
Q 50	Mosaic of cleared, regrowth, small remnant patches.	25	23	*Eucalyptus tereticornis, Pinus sp.*

Site	Condition	Canopy Cover	Canopy Height	Canopy Species
Q 51	Water	20	25	*Eucalyptus tereticornis*
Q 52	Remnant	55	24	*Eucalyptus siderophloia, Eucalyptus propinqua, Corymbia intermedia, Eucalyptus tereticornis*
Q 53	Remnant	60	20	*Eucalyptus siderophloia, Eucalyptus seeana, Angophora leiocarpa, Corymbia citriodora subsp. variegata*
Q 54	Narrow remnant	55	20	*Eucalyptus siderophloia, Eucalyptus propinqua, Corymbia trachyphloia, Angophora woodsiana, Eucalyptus acmenoides*
Q 55	Remnant	70	25	*Corymbia citriodora subsp. variegata, Eucalyptus tereticornis, Eucalyptus siderophloia*
Q 56	Remnant small	80	20	*Melaleuca quinquenervia, Casuarina glauca*
Q 57	Remnant	70	27	*Eucalyptus tereticornis, Eucalyptus siderophloia, Corymbia intermedia*
Q 58	Remnant	0	N/A	*(blank)*
Q 59	HVR	60	22	*Eucalyptus tereticornis, Pinus sp.*
Q 60	Remnant	65	27	*Eucalyptus tereticornis*

Appendix D-2 Flora species recorded

Native Species	***Native Species***
Acacia disparrima	*Entolasia marginata*
Acacia fimbriata	*Eucalyptus acmenoides*
Acacia leiocalyx	*Eucalyptus carnea*
Acacia melanoxylon	*Eucalyptus curtisii*
Acmena smithii	*Eucalyptus fibrosa*
Allocasuarina littoralis	*Eucalyptus microcorys*
Alphitonia excelsa	*Eucalyptus moluccana*
Angophora leiocarpa	*Eucalyptus pilularis*
Angophora woodsiana	*Eucalyptus propinqua*
Bothriochloa bladhii	*Eucalyptus racemosa*
Breynia oblongifolia	*Eucalyptus resinifera*
Brunoniella australis	*Eucalyptus seeana*
Calochlaena dubia	*Eucalyptus siderophloia*
Capillipedium spicigerum	*Eucalyptus tereticornis*
Carex adpressa	*Eucalyptus tindalii*
Carex fasciculosa	*Eustrephus latifolius*
Carex sp.	*Ficus coronata*
Castanospermum australe	*Ficus obliqua*
Casuarina cunninghamiana	*Flindersia australis*
Casuarina glauca	*Gahnia aspera*
Cissus hypoglauca	*Gahnia sieberiana*
Commersonia bartramia	*Glochidion ferdinandi*
Corymbia citriodora subsp. variegata	*Goodenia rotundifolia*
Corymbia henryi	*Grevillea banksii*
Corymbia intermedia	*Imperata cylindrica*
Corymbia tessellaris	*Jacksonia scoparia*
Corymbia trachyphloia	*Jagera pseudorhus*
Crinum pedunculatum	*Juncus spp.*
Cryptocarya triplinervis	*Leersia hexandra*
Cupaniopsis anacardioides	*Lepironia sp.*
Cupaniopsis parviflora	*Lepidosperma laterale*
Cyclospermum coprosmoides	*Leptospermum polygalifolia*
Cymbopogon refractus	*Lomandra confertifolia*
Cyperus exaltatus	*Lomandra longifolia*
Cyperus gracilis	*Lomandra multiflora*
Denhamia celastroides	*Lophostemon confertus*
Dianella revoluta	*Lophostemon suaveolens*
Dichondra repens	*Maclura cochinchinensis*
Digitaria parviflora	*Mallotus philippensis*
Dodonaea triquetra	*Melaleuca bracteata*
Eleocharis spp.	*Melaleuca decora*

Native Species

Melaleuca leucadendra
Melaleuca linariifolia
Melaleuca nodosa
Melaleuca quinquenervia
Melaleuca salicina
Melaleuca salignus
Melaleuca viminalis
Melastoma malabathricum
Microlaena stipoides
Oplismenus aemulus
Oplismenus imbecillis
Ottochloa gracillima
Parsonsia straminea
Paspalidium distans
Phragmites australis
Pittosporum revolutum
Planchonella pohlmaniana
Scleria ma
Smilax australis
Smilax glaucophylla
Themeda triandra
Trema tomentosa
Trophis scandens
Xanthorrhoea macronema

Non-native

Ageratum houstonianum
Anredera cordifolia
Asparagus africanus
Asparagus aethiopicus
Axonopus compressus
Baccharis halimifolia
Callisia fragrans
Celtis sinensis
Cenchrus ciliaris
Cestrum nocturnum
Chloris gayana
Cinnamomum camphora
Cynodon dactylon
Dyschoriste depressa
Dolichandra unguis cati
Erythrina crus-galii
Ficus benjamina

Non-native

Hyparrhenia hirta
*Hypoestes aristata**
Ipomoea carioca
Lantana camara
Lantana montevidensis
Megathyrsus maximus
Melinis repens
Murraya paniculata exotica
*Ochna serrulata**
Paspalum conjugatum
Paspalum dilatatum
Passiflora suberosa
*Pinus sp.**
Poa annua
Schinus terebinthifolius
Senna pendula
Setaria sphacelata
Solanum chrysotrichum
Sphagneticola trilobata
Sporobolus natalensis
*Syagrus romanoffensis**
Syzygium sp. cv.
Typha sp.
Urena lobata
Urochloa decumbens
Urochloa mutica

Appendix E – Likelihood of occurrence of flora and fauna matters

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
Birds					
Australasian bittern (*Botaurus poiciloptilus)*	E	E	"May occur"	**Likely to occur** Suitable habitat present in several vegetated wetlands and waterway banks, as well as REs 12.3.25, 12.3.11, 12.3.6 in the Project Area. Nearby WildNet records along the Logan River.	Yes
Australian fairy tern (*Sternula nereis)*	V	LC	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species is mostly associated with sheltered coastal habitats.	No
Australian painted snipe (*Rostratula australis*)	E	E	"May occur"	**May occur** Suitable habitat present in several vegetated wetlands and waterway banks, as well as REs 12.3.25, 12.3.11, 12.3.6 in the Project Area. Records in along the Logan River and other similar waterways in the eastern part of South-east Queensland.	Yes
Bar-tailed godwit (*Limosa lapponica baueri*)	V	V	"May occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Records are mainly restricted to directly along the coastline and coastal islands.	No
Black-breasted button Quail (*Turnix melanogaster)*	V	V	"Unlikely to occur"	**Unlikely to occur** Suitable habitat of rainforests, semi-evergreen vine thicket and vine forest was not observed within the Project Area. There are no records on WildNet from the surrounding region.	No
Black-browed albatross (*Thalassarche melanophris)*	V	LC	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Campbell albatross (*Thalassarche Impavida)*	V	LC	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Chatham albatross (*Thalassarche eremita)*	E	LC	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Curlew sandpiper (*Calidris ferruginea)*	CE	LC	"Unlikely to occur"	**May occur** Some suitable foraging habitat identified in Project Area.	Yes

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
				Records are mainly restricted to the coastline but are also around some wetlands in the region and along the Logan river.	
Far Eastern Curlew (*Numenius madagascariensis)*	CE	V	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Mostly associated with sheltered coastal habitats and intertidal mudflats and sandflats.	No
Fairy prion (southern) (*Pachyptila turtur subantarctica)*	V	LC	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Gibson's albatross (*Diomedea antipodensis gibsoni)*	V	V	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments. Records are mainly restricted to directly along the coastline and coastal islands.	No
Glossy black-cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*)	V	V	"Confirmed present"	**Known** Suitable foraging habitat of *Allocasuarina* spp. / *Casuarina* spp. present, and possible breeding habitat in areas with large hollow-bearing trees. Confirmed records within Project Area (GHD, 2021).	Yes
Greater sand plover (*Charadrius leschenaultia*)	V	V	"May occur"	**Unlikely to occur** They mainly utilise large intertidal mudflats or sandbanks, and occasionally brackish swamps. No suitable foraging habitat was identified in the Project Area. Records are mainly restricted to directly along the coastline and coastal islands.	No
Grey falcon (*Falco hypoleucos*)	V	V	"Unlikely to occur"	**Unlikely to occur** Species is a nomadic vagrant that is rarely observed in south east Queensland. It is mainly restricted to inland arid and semi-arid zones. There is one record in the vicinity on Wildnet that is undated and obscured due to geoprivacy records in the surrounding region.	No
Hooded plover (eastern) (*Thinornis cucullatus)*	V	LC	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species is mostly associated with sheltered coastal habitats.	No
Lesser sand plover (*Charadrius mongolus)*	E	E	"May occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Records are mainly restricted to directly along the coastline and coastal islands.	No
Northern giant petrel (*Macronectes halli)*	V	V	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Northern Siberian bartailed godwit (*Limosa*	CE	E	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Records are mainly restricted to directly	No

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
lapponica menzbieri)				along the coastline and coastal islands.	
Painted honeyeater (*Grantiella picta)*	V	V	"May occur"	**May occur** Foraging habitat of flowering *Eucalyptus* spp. and Mistletoe species present. Unlikely but possible breeding habitat in the same areas. Habitat present but the majority of records are found west of the Great Diving Range . Records rare in South East Queensland.	Yes
Powerful owl (*Ninox strenua)*		V	-Not assessed-	**Likely to occur** Suitable foraging habitat present throughout Project Area, and some areas with large hollow bearing trees potentially suitable for roosting/breeding. Nearby records on ALA that are obscured due to geoprivacy. Prey likely to be abundant due to urban possums and flying-fox roosts.	Yes
Red goshawk *(Erythrotriorchis radiatus)*	V	E	"Unlikely to occur"	**Unlikely to occur** Species is extremely rare in the region and requires extremely large intact vegetation patches. There are no Wildnet records in the surrounding region.	No
Red knot (Calidris canutus)	E	E	"Unlikely to occur"	**Unlikely to occur** The species mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts and occasionally terrestrial saline wetlands near the coast. They rarely use lakes or swamps. Suitable habitat not present for this species within the project area. Records are mainly restricted to directly along the coastline and coastal islands.	No
Regent honeyeater (*Anthochaera phrygia*)	CE	CR	"Unlikely to occur"	**May occur** Foraging habitat of flowering *Eucalyptus* spp. and Mistletoe species present. Unlikely but possible breeding habitat in the same areas. Confirmed record within 1km from Project Area, and numerous records throughout SEQ (ALA, 2022).	Yes
Salvin's albatross *(Thalassarche salvini)*	V	LC	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Shy Albatross (*Thalassarche cauta)*	E	LC	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Southern giant-petrel (*Macronectes Giganteus)*	E	E	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Squatter pigeon(southern) *(Geohaps scripta scripta)*	V	V	"Unlikely to occur"	**Unlikely to occur** The species extent has contracted northwards, and is not likely to occur in South East Queensland. The species habitat requires open-forest to sparse, open-woodland or scrub, with a ground cover vegetation of patchy perennial tussock grasses, which is not	No

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
				present in the Project Area. There are no WildNet records of the species in the region.	
Swift parrot *(Lathamus discolor)*	CE	E	"May occur"	**Known** Suitable foraging habitat of flowering Eucalyptus spp. present. Confirmed records 500m from Project Area (ALA, 2022).	Yes
Wandering albatross (*Diomedea exulans*)	V	V	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments. Records are mainly restricted to directly along the coastline and coastal islands.	No
White-capped albatross (*Thalassarche steadi)*	V	V	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
White-throated Needletail *(Hirundapus caudacutus)*	V	V	"May occur"	**Likely to occur** Suitable foraging habitat in Project Area. Nonbreeding but may roost in tall trees. Records very common in the vicinity, including in both Karawatha Forest and Daisy Hill.	Yes
Mammals					
Greater glider (southern & central) (*Petauroides volans sensu lato*)	E	E	"May occur"	**Known** Denning and foraging resources and habitat connectivity present. Confirmed records within 1km of Project Area and within, and numerous records throughout SEQ (ALA, 2022).	Yes
Grey-headed flying fox (*Pteropus poliocephalus*)	V	C	"Likely to occur"	**Confirmed Present** Suitable foraging habitat for the species was found in multiple REs. However, suitable foraging habitat may occur in any remnant habitat with nectar producing species as well as in non-remnant/urban areas where there are native and exotic feed trees. Additionally, presence of rainforest patches, stands of Melaleuca, mangroves, wetlands/swamps, and/or riparian vegetation were included as they may contain both foraging and roosting habitat. Species detected in a flying fox camp at Hugh Muntz Gardens. Another unconfirmed specimen was observed at Crompton Park.	Yes
Koala *(Phascolarctos cinereus)*	E	E	"Likely to occur"	**Known** Suitable areas of important koala food and shelter trees confirmed throughout Project Area. Additional areas that may not be suitable habitat have been included as they may be important connectivity between habitats. Habitat widespread in Project area. OWAD report to inform recent presence of animals. Records in proximity.	Yes
Large-eared pied bat (*Chalinolobus dwyeri*)	V	V	"Unlikely to occur"	**Unlikely to occur** No suitable roost habitat in the vicinity to the Project Area. Records are scarce in SEQ and are restricted to high elevation areas where there are suitable roosting	No

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
				escarpments.	
Long-nosed Potoroo (northern) (*Potorous tridactylus tridactylus*)	V	V	"May occur"	**May occur** Potential habitat identified in the Project area. There are no records of the species in the region.	Yes
Short-beaked echidna (*Tachyglossus aculeatus*)		SL	- Not assessed -	**Confirmed present** Suitable foraging habitat present, and possible breeding habitat in areas with larger termite mounds. Recorded during field surveys within Project Area.	Yes
Spotted-tail Quoll (southeastern mainland population) (*Dasyurus maculatus maculatus*)	E	V	"May occur"	**May occur** Potential denning and foraging resources and habitat connectivity present. No recent records in Brisbane, however the project area is connected to Greenbank military base through the Flinders-Karawatha corridor which contains the last records in the area. It therefore cannot be discounted.	Yes
Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*)	V	V	Not assessed	**Likely to occur** Denning and foraging resources and habitat connectivity present. The species is known to occur in Greenbank Military Reserve and east of Mount Cotton (around 10km either side of the project area). There are anecdotal records in Daisy Hill and suitable habitat in Karawatha forest. Given the species highly cryptic nature and difficulty in detection there is potential for the species to occur in the project area.	Yes
Reptiles and Amphibians					
Collared delma (*Delma torquata*)	V	V	"Unlikely to occur"	**Unlikely to occur** All records in SEQ restricted to the northern side of the Brisbane River.	No
Flatback turtle *(Natator depressus)*	V	V	"Unlikely to occur"	**Unlikely to occur** Species inhabits deep ocean and coastal environments.	No
Fleay's barred frog (*Mixophyes fleayi*)	E	E	"Unlikely to occur"	**Unlikely to occur** Outside of the species range.	No
Green turtle (*Chelonia mydas)*	V	V	"Unlikely to occur"	**Unlikely to occur** Species inhabits deep ocean and coastal environments.	No
Hawksbill turtle *(Eretmochelys Imbricata)*	V	E	"Unlikely to occur"	**Unlikely to occur** Species inhabits deep ocean and coastal environments.	No
Leatherback turtle *(Dermochelys coriacea)*	E	E	"Unlikely to occur"	**Unlikely to occur** Species inhabits deep ocean and coastal environments.	No
Loggerhead turtle (*Caretta caretta*)	E	E	"Unlikely to occur"	**Unlikely to occur** Species inhabits deep ocean and coastal environments.	No
Olive ridley turtle	E	E	"Unlikely to	**Unlikely to occur**	No

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
(Lepidochelys olivacea)			occur"	Species inhabits deep ocean and coastal environments.	
Three-toed snaketooth Skink (*Coeranoscincus reticulatus)*	V	LC	"Unlikely to occur"	**Unlikely to occur** Records restricted to higher elevation, wet environments such as Gold Coast hinterland.	No
Tusked frog (*Adelotus brevis*)		V	"May occur"	**Likely to occur** Habitat present. Nearest record within 500m of Project Area.	Yes
Wallum froglet *(Crinia tinnula)*		V	"Likely to occur"	**Likely to occur** Habitat present. Records in Karawatha Bushland, closest within 150 m of Project area.	Yes
Insects					
Australian fritillary *(Argynnis hyperbius inconstans)*	CE	E	"Unlikely to occur"	**Unlikely to occur** Species has not been recorded for 25 years.	No
Migratory species					
Black-faced monarch (*Monarcha melanopsis)*	Mig	SL	"Unlikely to occur"	**Likely to occur** There are multiple ALA records in Karawatha Forest	Yes
Common greenshank *(Tringa nebularia)*	Mig	SL	"May occur"	**Likely to occur** Suitable habitat present in several vegetated wetlands and waterway banks in the Project Area. Some WildNet records in the surrounding region and along the Logan river.	Yes
Common sandpiper *(Actitis hypoleucos)*	Mig	SL	"May occur"	**May occur** Some suitable foraging habitat identified in Project Area. Records are mainly restricted to the coastline but are also around some wetlands in the region and along the Logan river.	Yes
Fork-tailed swift (*Apus pacificus)*	Mig	SL	"Unlikely to occur"	**Likely to occur** Nonbreeding migrant to Australia. The species is widespread but scattered in coastal areas. The Fork-tailed Swift is almost exclusively aerial, flying to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They do occur over settled areas, including towns, urban areas and cities. There are numerous records on Wildnet in the surrounding region. Suitable foraging habitat in Project Area.	Yes
Glossy ibis *(Plegadis falcinellus)*	Mig	SL	"May occur"	**Likely to occur** Suitable habitat present in several vegetated wetlands and waterway banks in the Project Area. Some WildNet records in the surrounding region and along the Logan river.	Yes
Latham's snipe *(Gallinago*	Mig	SL	"May occur"	**Likely to occur**	Yes

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
hardwickii)				Suitable habitat present in several vegetated wetlands and waterway banks, as well as REs 12.3.25, 12.3.11, 12.3.6 in the Project Area. Numerous WildNet records in the surrounding region along waterways, in wetlands and along the Logan river.	
Little curlew *(Numenius minutus)*	Mig	SL	"May occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	**No**
Marsh sandpiper (*Tringa stagnatilis)*	Mig	SL	"May occur"	**Likely to occur** Suitable habitat present in several vegetated wetlands and waterway banks in the Project Area. Some WildNet records in the surrounding region and along the Logan river.	Yes
Oriental cuckoo (*Cuculus optatus*)	Mig	SL	"May occur"	**May occur** Uses a wide variety of habitats, some of which occur in the project area, particularly woody vegetation on the edge of forests.	Yes
Osprey *(Pandion haliaetus)*	Mig	SL	"May occur"	**May occur** Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands. Some suitable foraging habitat was identified in Project Area. Records are mainly restricted to the coastline but are also along rivers and wetlands in the region.	Yes
Pectoral sandpiper *(Calidris melanotos)*	Mig	SL	"May occur"	**May occur** Some suitable foraging habitat identified in Project Area. Records are mainly restricted to the coastline but are also around some wetlands in the region.	Yes
Rufous fantail *(Rhipidura rufifrons)*	Mig	SL	"May occur"	**Likely to occur** Common in woodland and eucalypt forest areas of SEQ and is likely to use the project area from time to time	Yes
Satin flycatcher (*Myiagra cyanoleuca)*	Mig	SL	"May occur"	**Likely to occur** Relatively common across all of Brisbane and likely to use the project area from time to time	Yes
Sharp-tailed sandpiper *(Calidris acuminata)*	Mig	SL	"May occur"	**May occur** Some suitable foraging habitat identified in Project Area. Records are mainly restricted to the coastline but are also around some wetlands in the region and along the Logan river.	Yes
Sooty shearwater (*Ardenna grisea)*	Mig	SL	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
Spectacled monarch *(Monarcha trivirgatus)*	Mig	SL	"Unlikely to occur"	**May occur** There are two eBird records in Karawatha Forest. Confirmed records in Toohey forest 6 km to the north-west in the same Regional Ecosystems	Yes
Streaked shearwater (*Calonectris Leucomelas)*	Mig	SL	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Whimbrel *(Numenius phaeopus)*	Mig	SL	"Unlikely to occur"	**Unlikely to occur** No suitable foraging habitat in Project Area. Species inhabits deep ocean and coastal environments.	No
Flora					
Arthraxon hispidus (Hairy-joint grass)	V	V	"May occur"	**May occur** Found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps as well as woodland. In SEQ, Hairy-joint Grass has also been recorded growing in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests. There are no WildNet records in the region. Potential habitat was found during the surveys.	Yes
Baloghia marmorata (Marbled baloghia)	V	V	"Unlikely to occur"	**Unlikely to occur** Marbled Balogia has a geographically disjunct distribution confined to the Lismore district, in north-east NSW, and the Tamborine Mountains and Springbrook, in south-east Queensland (SPRAT, 2022c). The Project area is outside the species known distribution.	No
Bosistoa transversa (Three-leaved bosistoa)	V		"May occur"	**May occur** Species can be found in wet sclerophyll forest, dry sclerophyll forest and rainforest up to 300 m above sea level. The species appears to occur only in areas that have experienced minimal disturbance (Queensland Herbarium 2008b). There are no WildNet records in the region. Some potential habitat was found during the surveys.	Yes
Coleus habrophyllus	E	E	"Likely to occur"	**Likely to occur** Habitat present. Records in proximity to Project area. Occurs in two populations in Ipswich/Greenbank and Ormeau. Potentially suitable REs include 12.9-10.17a, 12.9-10.19a, 12.9-10.2, 12.11.3a, 12.11.24, 12.11.5 with rocky outcrops of sandstone and chert of on western facing aspect.	Yes
Corchorus cunninghamii	E	E	"Unlikely to	**Unlikely to occur**	No

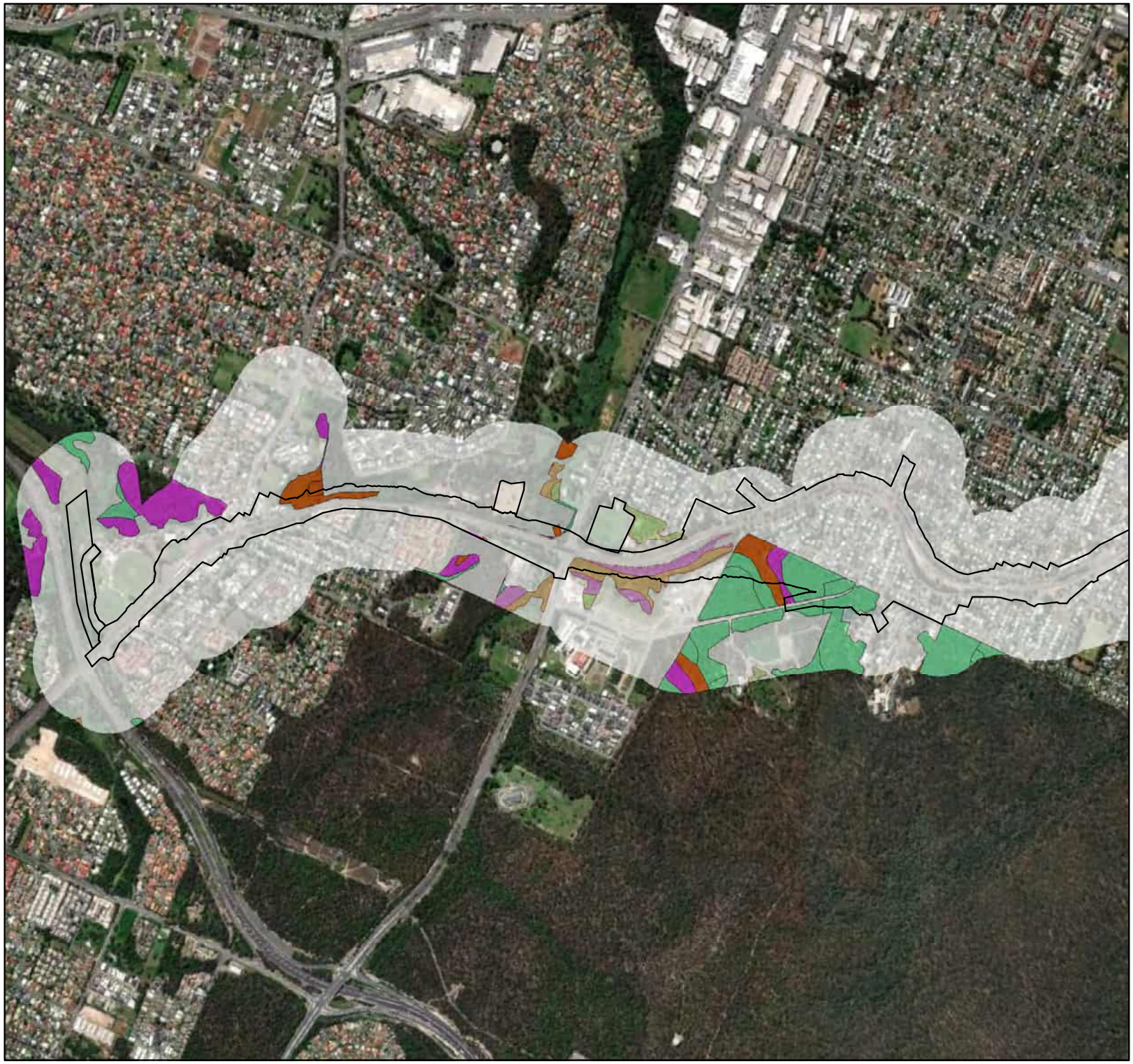
Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
(Native jute)			occur"	Elevation is generally too low for the species to occur. There are no WildNet records in the vicinity, but some records at Ormeau hills and Mount Cotton.	
Cryptocarya foetida (Stinking cryptocarya)	V	V	"Unlikely to occur"	**Unlikely to occur** The species is restricted to coastal sands, or if not, then close to the coast, occurring in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt to an altitude of 150 m. Associated species include *Syzygium hemilampra, Acronychia imperforata, Cryptocarya triplinervis, Cupaniopsis anacardioides, Flindersia bennettiana, Lophostemon confertus* and *Syzygium luehmannii.* There are no WildNet records in the region. Only marginal habitat was observed in the Project Area.	No
Cryptostylis hunteriana (Leafless tongue orchid)	V		"Unlikely to occur"	**Unlikely to occur** The Leafless Tongue-orchid has been reported to occur in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, *Xanthorrhoea* spp. plains, dry sclerophyll forests, forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests. There are no WildNet records in the region. Only marginal habitat was observed in the Project Area.	No
Cupaniopsis shirleyana (*Wedge-leaf tuckeroo*)	V	V	"Unlikely to occur"	**Unlikely to occur** The Wedge-leaf Tuckeroo occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along riverbanks. This species is also likely to occur on the margins of native vegetation in scrubby urbanised areas. The species occurs as a number of small populations which are mainly restricted to specific habitats throughout its range. There are no WildNet records in the vicinity, but some records at Whites Hill Reserve to the north.	No
Dichanthium setosum (Bluegrass)	V		"May occur"	**Unlikely to occur** The species is typically in heavy soils (predominantly cracking clays or alluvium, often in gilgai) in woodland or open woodland usually dominated by *Acacia* (brigalow) and/or *Eucalyptus* species. There are no WildNet records in the region. Only marginal habitat was observed in the Project Area.	No
Diploglottis campbellii	E	E	"Unlikely to occur"	**Unlikely to occur**	No

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
				In Queensland most of the wild populations occur in degraded lowland tropical rainforest, with deep brown loamy soils (pH 5-6) on level to slightly inclined alluvial terraces and levees at altitudes of 5-60 m. There are no WildNet records in the vicinity. Only marginal habitat was observed in the Project Area.	
Endiandra floydii	E	E	"Unlikely to occur"	**Unlikely to occur** There are no WildNet records in the vicinity. Only marginal habitat was observed in the Project Area.	No
Eucalyptus curtisii (Plunkett mallee)		NT	"May occur"	**Confirmed present** 40 individuals recorded in a narrow strip of roadside vegetation in the Project Footprint. These individuals may be planted, however this was unable to be determined. *Eucalyptus curtisii* has two growth forms that occur in different habitats. The shorter mallee form is more likely to occur as the only eucalypt species on poorly drained lowland sites in shrubland dominated by banksia, with an understorey of heath plants, and sometimes *E. conglomerata* may also be present. The larger growth form occurs as scattered individuals on better drained soils in the more open areas of mixed eucalypt forests. Commonly associated species include *Corymbia citriodora* subsp. *variegata*, *C. trachyphloia* and *Callitris endlicheri*, less commonly associated with *E. fibrosa, E. planchoniana* and *E. acmenoides*. The species occurs on sandy podsoils with impeded drainage, shallow stony soils, clay loams and stony clays with a surface layer of loose stones (DES Profile, 2022). In SEQ it may occur in REs 12.9-10.12. 12.9-10.2, 12.9-10.3, 12.9-10.19, 12.9-10.7, 12.9-10.17, 12.11.24, 12.11.3 and 12.11.5.	Yes
Fontainea venosa	V	V	"Unlikely to occur"	**Unlikely to occur** Outside of the three known species population areas. There are no WildNet records in the vicinity, but one isolated population is mapped 3.5km south west of the Project Area. No suitable habitat was present in the Project Area.	No
Gossia gonoclada	E	CR	"Likely to occur"	**May occur** *Gossia gonoclada* is found in lowland riparian rainforest and notophyll vine forest, along permanent watercourses subject to tidal influence. It usually grows below the peak flood level, on steep slopes and at low elevations of 5-50m (DES Profile, 2022). Suitable habitat present near Logan River floodplains and tributaries. Records in proximity to Project area. It may occur in REs 12.1.1, 12.1.3, 12.3.1, 12.3.7, 12.3.7a, 12.3.11, 12.3.11a, 12.5.13a,	Yes

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
				12.11.10, 12.11.3 and 12.11.3a as well as within tidal waterways up to the high water mark and flat alluvial terraces.	
Leichhardtia coronata (slender milkvine)		V	"Likely to occur"	**Likely to occur** Most commonly found in open eucalypt forest and woodland communities on hillslopes and ridge tops at altitudes of 40–780 m above sea level. The species prefers open areas under trees with limited grass cover or small rock outcrops with chert. Can be found climbing up small shrubs but this not as common. Habitat present. Wildnet records in proximity to Project area. May occur in REs 12.9-10.17, 12.9-10.19a, 12.9-10.4, 12.9-10.26, 12.9-10.2, 12.9-10.7, 12.8.24, 12.8.9, 12.8.19, 12.11.3, 12.11.11, 12.11.24	Yes
Lepidium peregrinum (Wandering pepper cress)	E		"May occur"	**Unlikely to occur** This species was most abundant in the tussock grassland fringe of the riparian open forest. It can also occur in an open riparian forest on the banks on sandy alluvium (NSW OEH, 2021). There are no WildNet records in the vicinity. Only marginal habitat was observed in the Project Area.	No
Macadamia integrifolia (macadamia nut)	V	V	"Confirmed present"	**Confirmed present** Species was recorded by GHD as planted specimens and not considered "in the wild". Potential habitat may occur in 12.3.16.	Yes
Macadamia tetraphylla (Rough-shelled bush nut)	V	V	"Unlikely to occur"	**Unlikely to occur** The species generally occurs in subtropical rainforest and complex notophyll vine forest, at the margins of these forests and in mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well-drained sites. There are no recent WildNet records in the vicinity. Only marginal habitat was observed in the Project Area.	No
Melaleuca irbyana (swamp tea-tree)		E	"Likely to occur"	**May occur** Habitat present. Historical records in proximity. Absence of recent records and high level of detectability indicate no longer present. Species model available https://www.data.qld.gov.au/dataset/habitat-suitability-models-series	Yes
Persicaria elatior (tall knotweed)	V	V	"May occur"	**Likely to occur** Habitat present. Records in proximity to Project footprint. Generally found in damp places, including coastal swampy areas, along watercourses,	Yes

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
				streams and lakes, swamp forest and disturbed areas (DAWE, 2021).	
Phaius australis (Lesser swamp orchid)	E	E	"Unlikely to occur"	**Unlikely to occur** *Phaius australis* grows in areas where soils are almost always damp, but not flooded for lengthy periods. Sands are generally the underlying soil type. The species are usually found in coastal habitats between swamps and forests or in suitable areas further inland. This includes swampy sclerophyll forest dominated by melaleucas, swampy forest that often have sclerophyll emergents, or fringing open forest and melaleuca swamp forest associated with rainforest species. It has also been recorded in wallum, sedgeland, rainforest and closed forest (DES Profile, 2022). There are no WildNet records in the region. Some potential habitat was observed in the Project Area.	No
*Rhodamnia rubescens (*Scrub turpentine)	CE	CE	"May occur"	**Likely to occur** Typically occurs in lowland rainforest or on rainforest margins, but can also be found in open forests and woodlands. Often associated with permanent and temporary watercourses. The species occurs on a range of soil types. Species range of habitat is broader than traditionally thought and can be found in margins of dry sclerophyll and wet sclerophyll (SPRAT, 2022). There is a recent record of the species approximately 2km from the Project Area along Slacks creek, a tributary of the Logan River with connectivity to Scrubby Creek. Potential REs 12.3.16, 12.9-10.17, 12.9-10.19a, 12.11.3 and 12.11.5 as well as along permanent and temporary watercourses.	Yes
Rhodomyrtus psidioides (Native guava)	CE	CE	"May occur"	**May occur** Found in subtropical rainforests, warm temperate rainforests, littoral rainforest, and wet sclerophyll forests. The species may be found in the adjoining margins of sclerophyll vegetation associated with any of these rainforest formations, and is often found near creeks and drainage lines (SPRAT, 2022). There are several records of the species in the surrounding area, and one recent record is approximately 4km to the north east, near a waterway with potential connectivity to Scrubby Creek Potential REs 12.11.1, 12.11.3, 12.3.1a, 12.9-10.2, 12.9-10.17e and along creek and drainage lines.	Yes
Samadera bidwillii (Quassia)	V		"May occur"	**Unlikely to occur** Outside known distribution. Nearest record of questionable reliability.	No

Threatened Species	EPBC	NCA	GHD report LoO result	Ausecology assessed LoO	Habitat area in Project footprint
				Occurs in lowland rainforest or on rainforest margins. Also found in open forests and woodlands. Typically associated with permanent and temporary watercourses. Potential habitat within REs 12.3.7 and 12.3.7b	
Thesium australe (Austral toadflax*)*	V	V	"May occur"	**Unlikely to occur** It occurs in shrubland, grassland or woodland, often on damp sites. Vegetation types include Kangaroo Grass grassland surrounded by Eucalyptus woodland; and grassland dominated by Barbed-wire Grass (*Cymbopogon refractus*) (SPRAT, 2022). There are no WildNet records of the species in the surrounding region.	No
Vincetoxicum woollsii	E	E	"Unlikely to occur"	**Unlikely to occur** The species has been recorded from wet sclerophyll/rainforest margins, Eucalypt dominated open forests and disturbed road verges (SPRAT, 2022). The only known Queensland population was recorded from Girraween NP in 1995. There are no WildNet records of the species in the surrounding region.	No
Zieria furfuracea		CE	"Unlikely to occur"	**Unlikely to occur** This species occurs on gently inclined hillslopes at elevations between 360 and 500 m asl. It grows in semi-evergreen vine thicket or eucalypt open forest or woodland communities with a shrubby vine thicket understorey (SPRAT, 2022). There are some historic and undated records in a patch approximately 10km north of the Project Area, but none in the vicinity. Elevation is generally too low for the species to occur.	No



Ausecology

Appendix A- 1

Regulated Vegetation V12
Location: Kuraby - Woodridge

N

0 300 600

Metres

Scale: 1:20,000

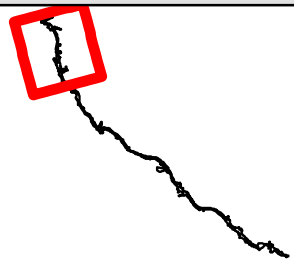
Coordinate System: GDA2020
Datum: GDA2020

Legend

Project Footprint

Regulated Regional Ecosystem v12 (VM Status)

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Water
- non-remnant
- Free Representation



Data sources:
Department of Environment and Science
Vegetation management regional ecosystem map - version 12.0

Document History:

Rev	Reason for Issue	Author	Approver	Date
0	Issued for Information	JS	LG	29/11/2022

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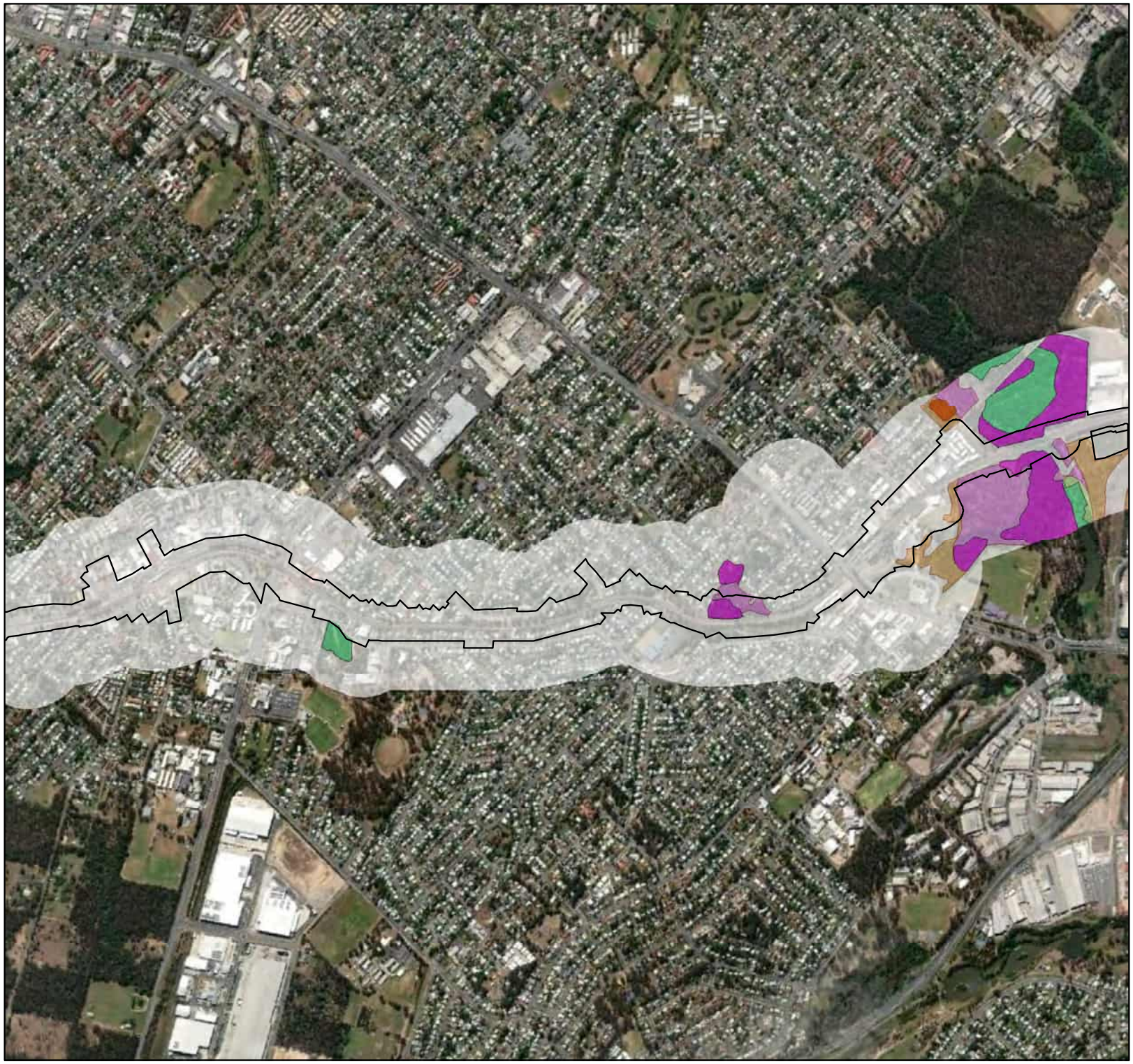


Ausecology

Appendix A- 1

Regulated Vegetation V12
Location: Logan Central - Kingston

0 300 600
Metres

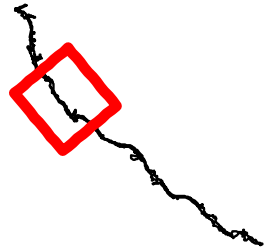
Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

Project Footprint

Regulated Regional Ecosystem v12 (VM Status)

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Water
- non-remnant
- Free Representation



Data sources:
Department of Environment and Science
Vegetation management regional ecosystem map - version 12.0

Document History:

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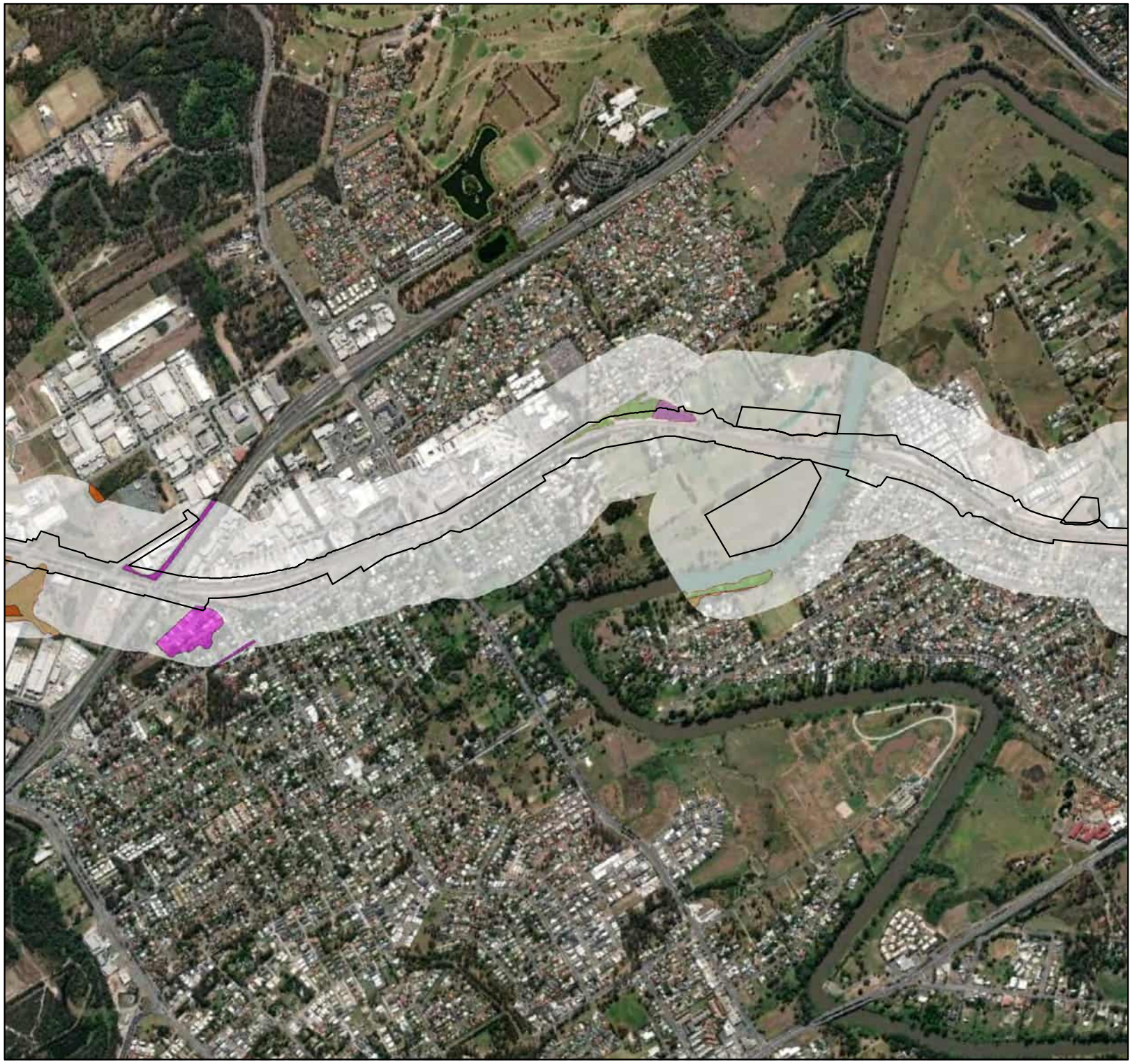


Ausecology

Appendix A- 1

Regulated Vegetation V12
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

Scale: 1:20,000

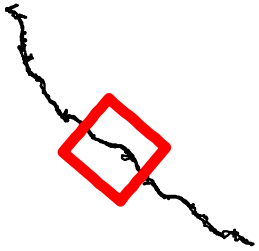
Coordinate System: GDA2020
Datum: GDA2020

Legend

Project Footprint

Regulated Regional Ecosystem v12 (VM Status)

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Water
- non-remnant
- Free Representation



Data sources:
Department of Environment and Science
Vegetation management regional ecosystem map - version 12.0

Document History:

Rev	Reason for Issue	Author	Approver	Date
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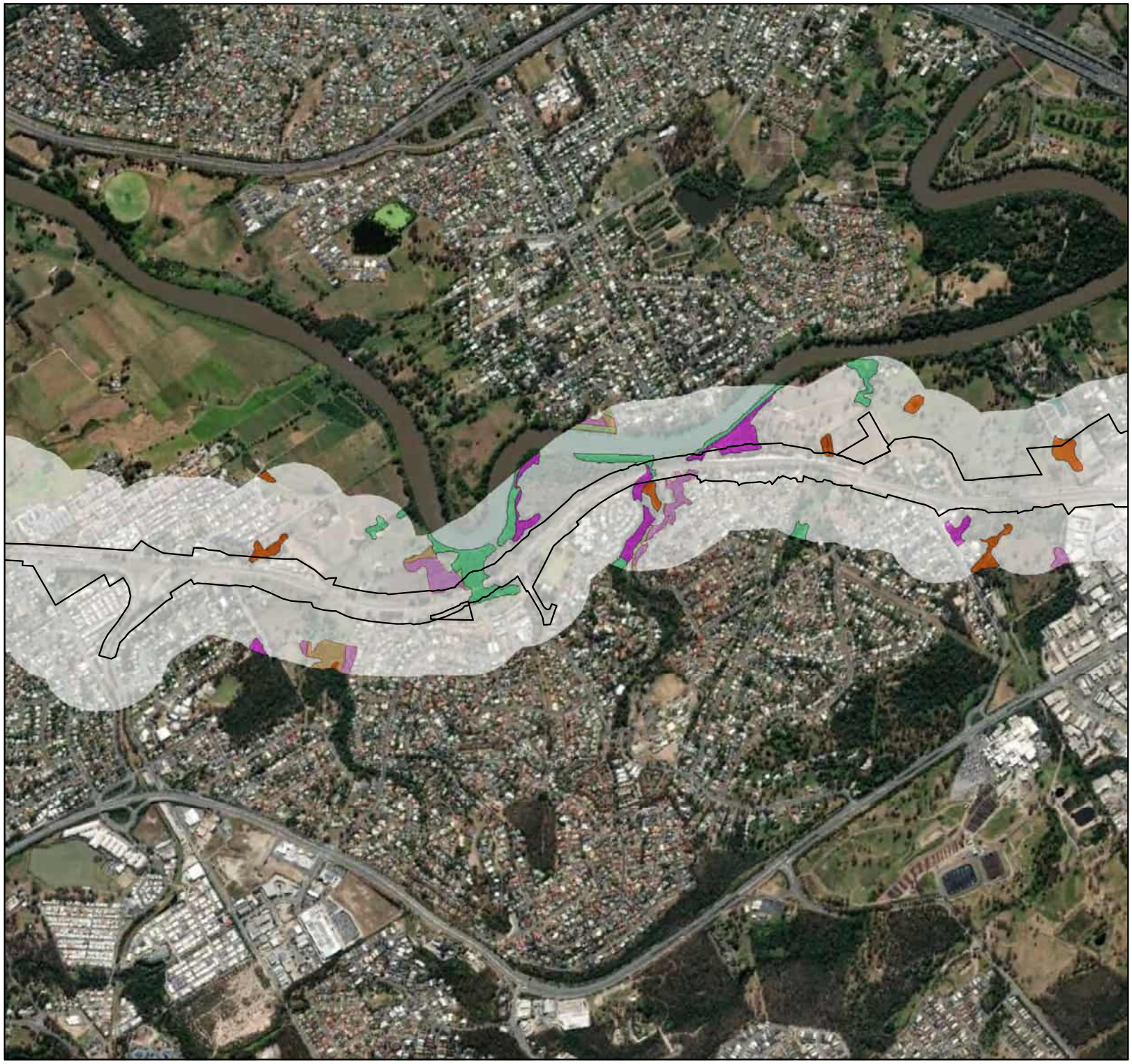


Ausecology

Appendix A- 1

Regulated Vegetation V12
Location: Bethania - Beenleigh

N

0 300 600

Metres

Scale: 1:20,000

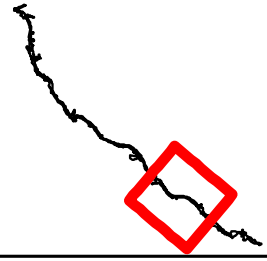
Coordinate System: GDA2020
Datum: GDA2020

Legend

Project Footprint

Regulated Regional Ecosystem v12 (VM Status)

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Water
- non-remnant
- Free Representation



Data sources:
Department of Environment and Science
Vegetation management regional ecosystem map - version 12.0

Document History:

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Ausecology

Appendix A- 1

Regulated Vegetation V12
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

Scale: 1:20,000

Coordinate System: GDA2020

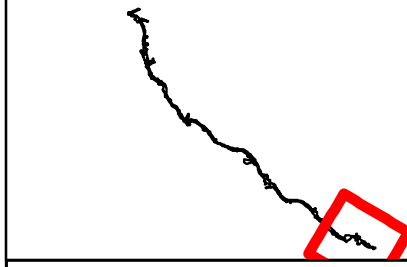
Datum: GDA2020

Legend

Project Footprint

Regulated Regional Ecosystem v12 (VM Status)

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Water
- non-remnant
- Free Representation



Data sources:
Department of Environment and Science
Vegetation management regional ecosystem map - version 12.0

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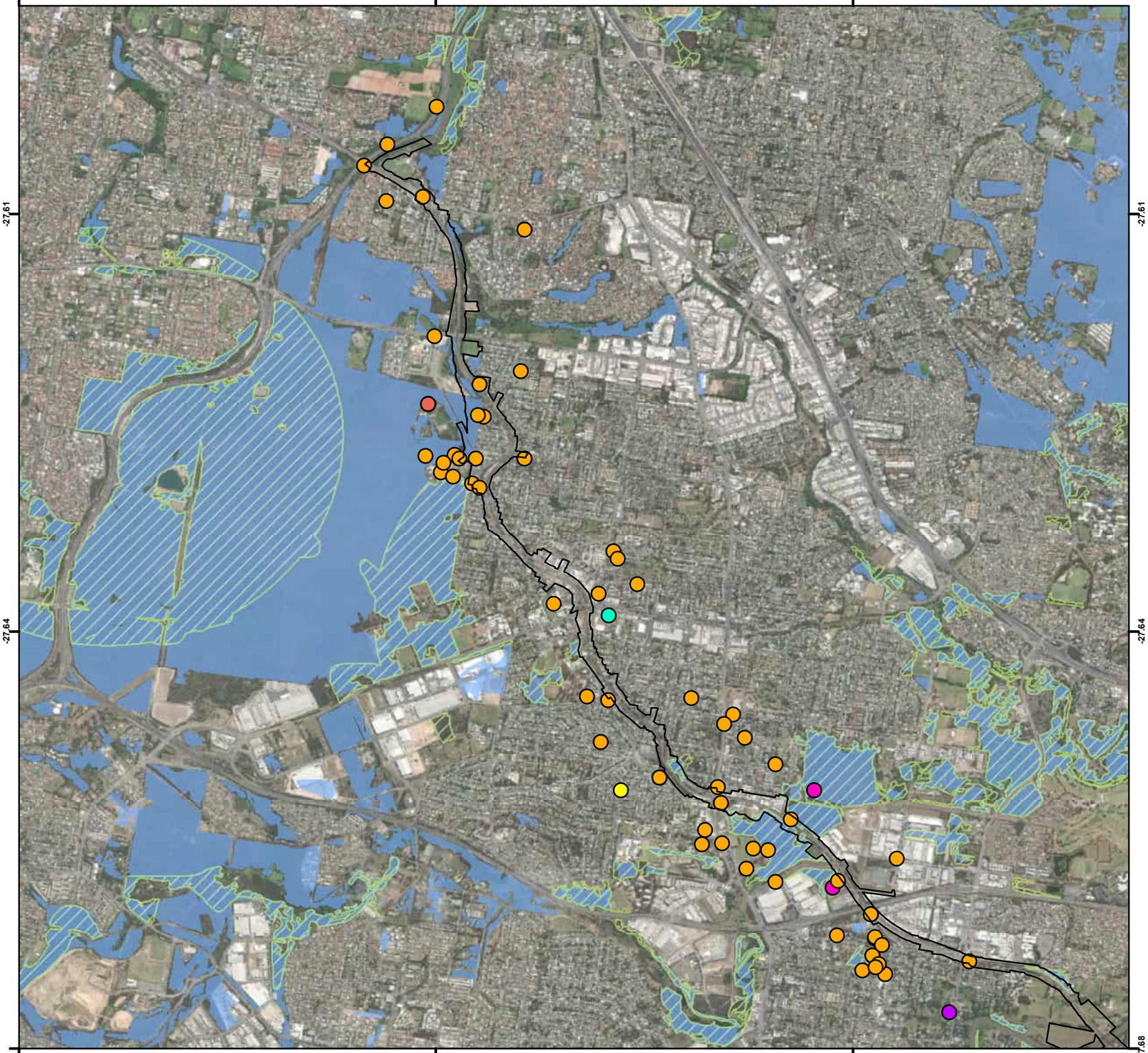


Ausecology

Appendix A-2:

MSES
Location: North

N

0 0.5 1 2

Kilometers

Scale: 1:50,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

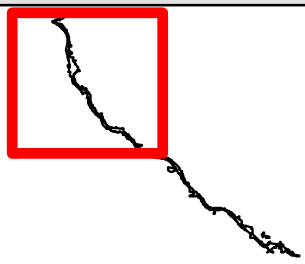
- Project Footprint
- Flora Survey Trigger Mapping
- Essential Habitat

NCA Listed

- *Calyptorhynchus lathami lathami*
- *Crinia tinnula*
- *Leichhardtia coronata*
- *Melaleuca irbyana*
- *Monarcha melanopsis*
- *Tachyglossus aculeatus*

EPBC Listed

- *Phascolarctos cinereus*



Data sources:
National Flying-Fox Monitoring Program (NFFMP) Flying Fox Census

Document History:

Rev	Reason for Issue	Author	Approver	Date
0	Issued for Information	NC	BJ	29/11/2022

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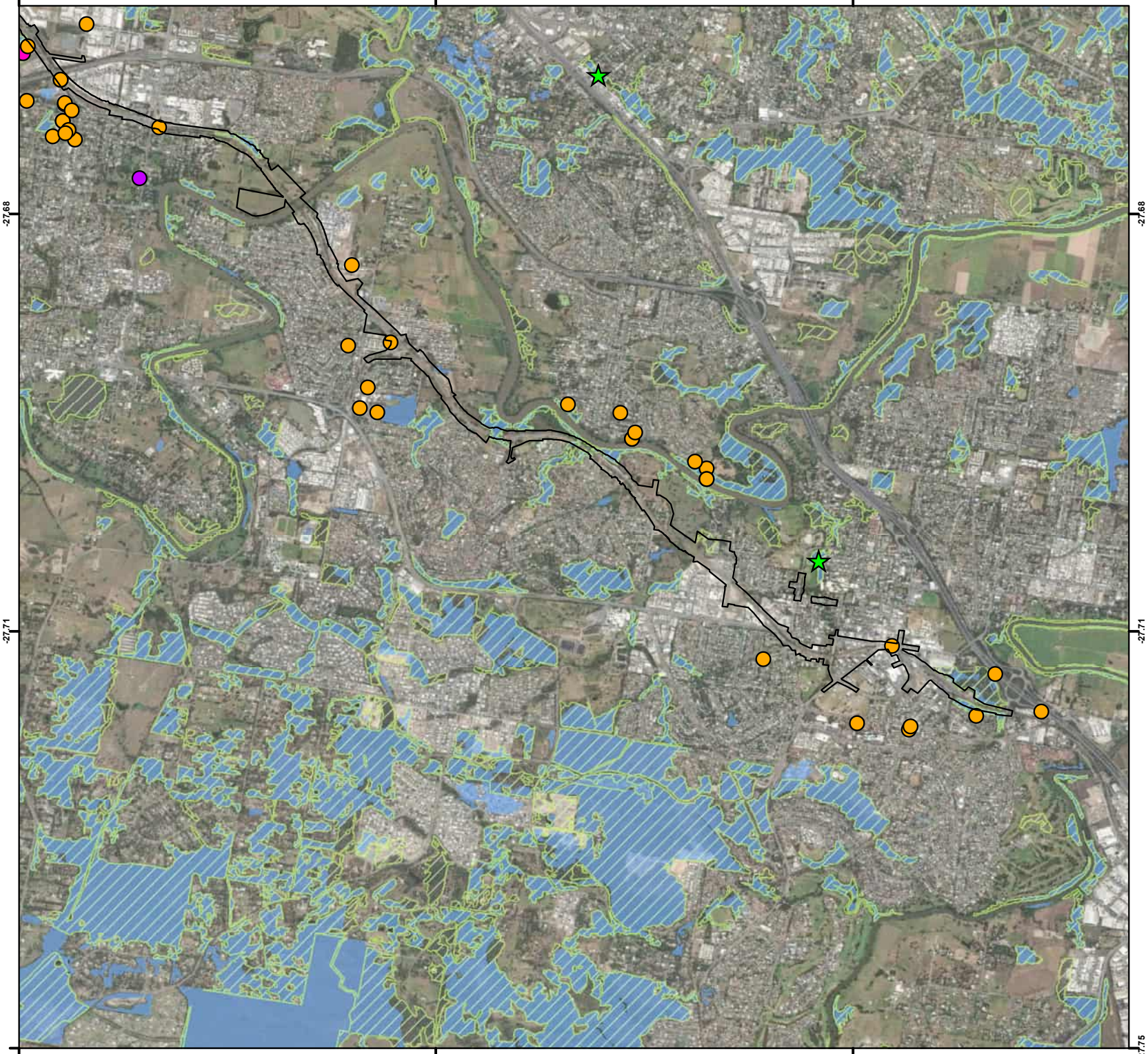


Ausecology

Appendix A-2:

MSES
Location: South

N

0 0.5 1 2

Kilometers

Scale: 1:50,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

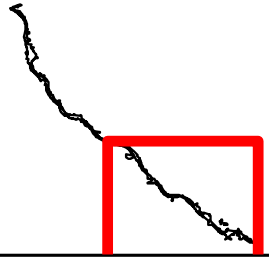
- Project Footprint
- Grey Headed Flying Fox Roosting Camps
- Flora Survey Trigger Mapping
- Essential Habitat

NCA Listed

- *Melaleuca irbyana*
- *Tachyglossus aculeatus*

EPBC Listed

- *Phascolarctos cinereus*



Data sources:
National Flying-Fox Monitoring Program (NFFMP) Flying Fox Census

Document History:

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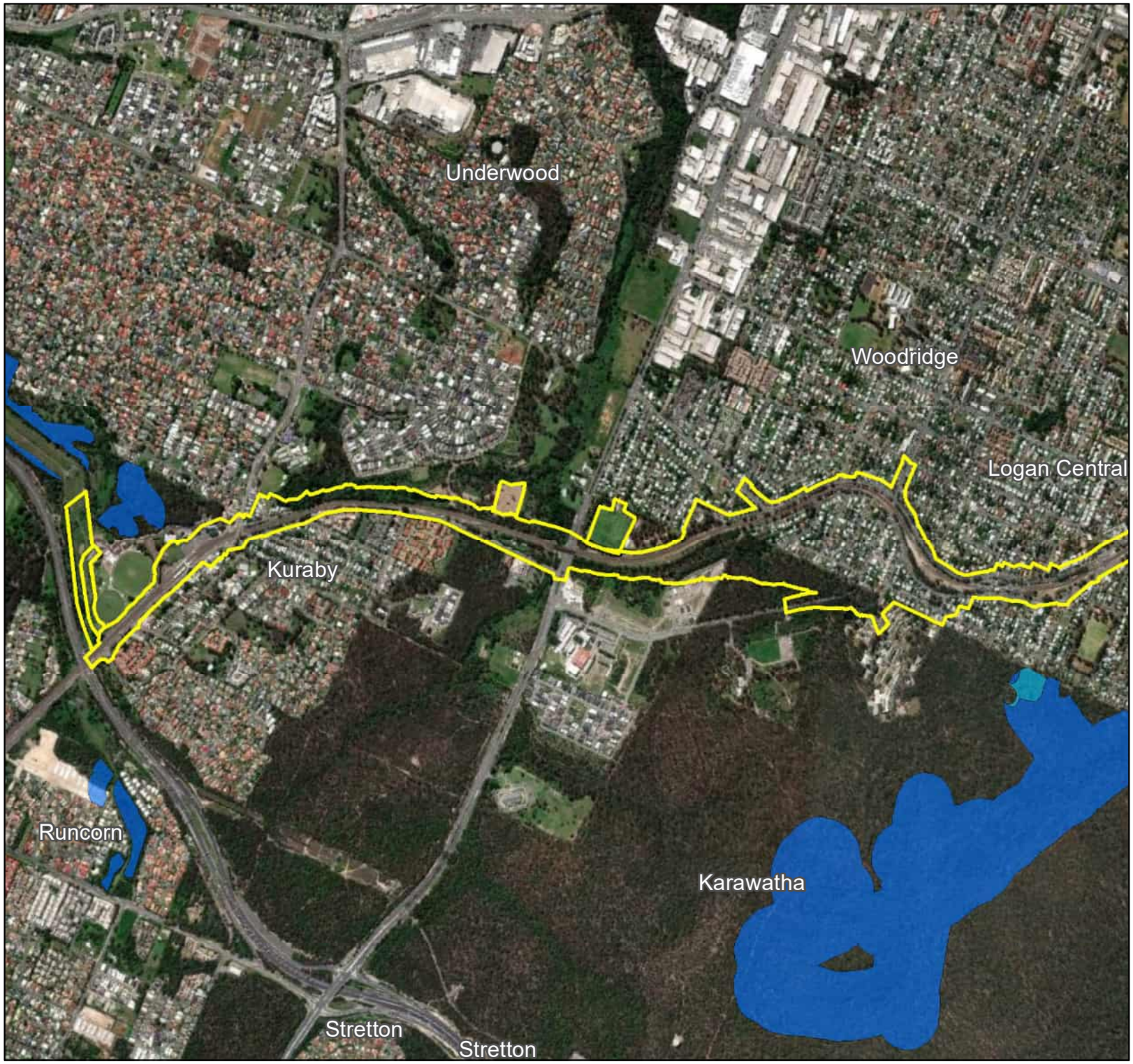


Ausecology

Appendix A-3:

Ground Truthed Regional Ecosystem
Location: Kuraby - Woodridge

N

0 300 600

Metres

Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

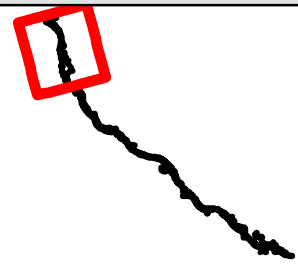
Legend

Project Area

MSES Regulated Vegetation 100m from wetland

Category B Area

Category C Area



Disclaimers:
Wetland layers extend beyond the Project Area to provide context. Wetland area calculations provided are based on Project Area extent only.

Document History:

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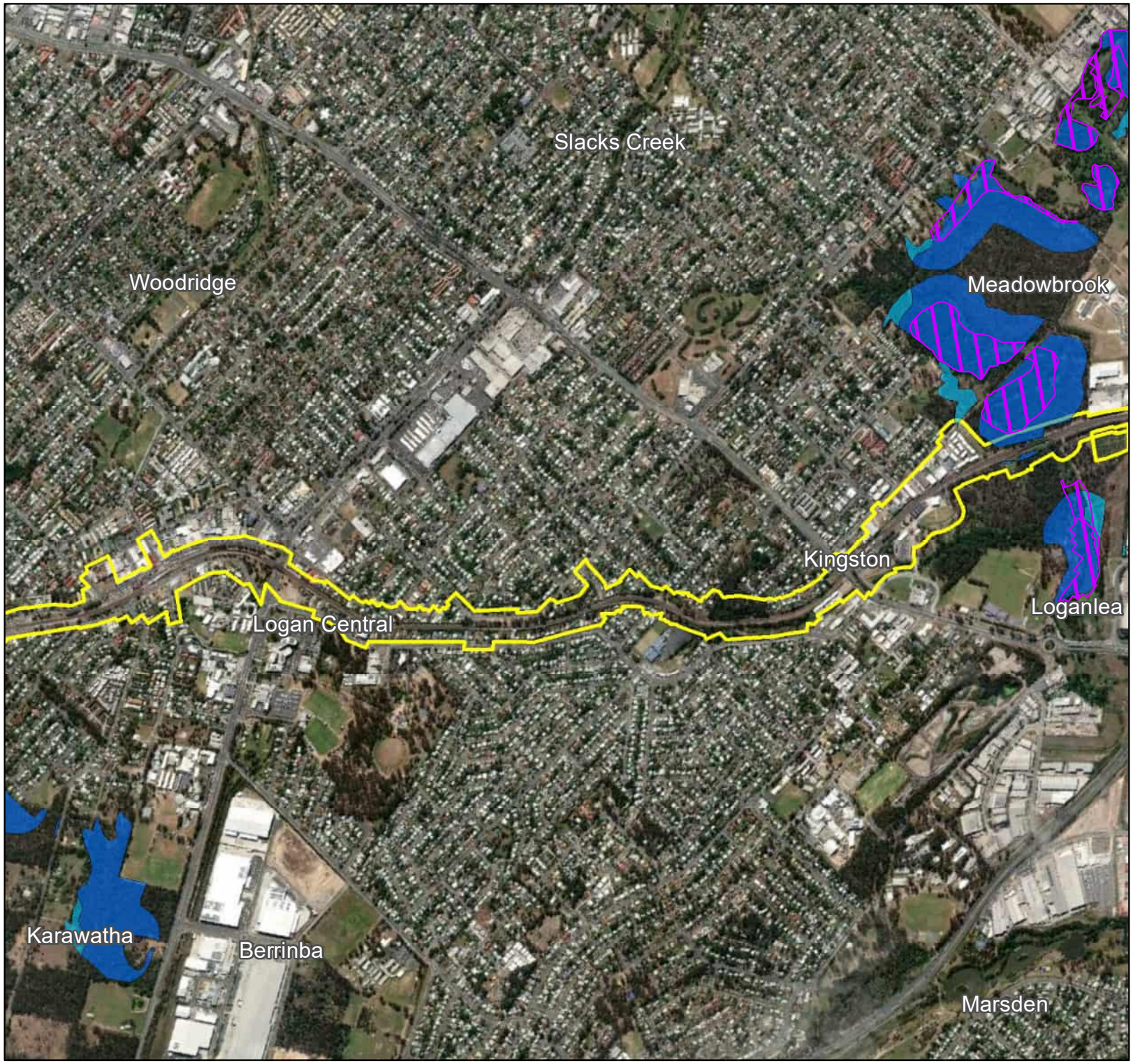


Ausecology

Appendix A-3:

Ground Truthed Regional Ecosystem
Location: Logan Central - Kingston

N

0 300 600

Metres

Scale: 1:20,000

Coordinate System: GDA2020

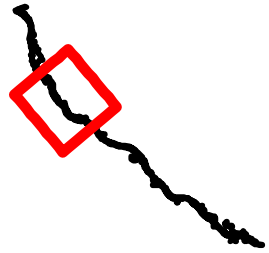
Datum: GDA2020

Legend

- Project Area
- MSES High ecological significance wetland

MSES Regulated Vegetation 100m from wetland

- Category B Area
- Category C Area



Disclaimers:
Wetland layers extend beyond the Project Area to provide context. Wetland area calculations provided are based on Project Area extent only.

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Ausecology

Appendix A-3:

Ground Truthed Regional Ecosystem
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

Scale: 1:20,000

Coordinate System: GDA2020

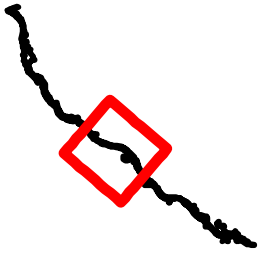
Datum: GDA2020

Legend

- Project Area
- MSES High ecological significance wetland

MSES Regulated Vegetation 100m from wetland

- Category B Area
- Category C Area



Disclaimers:
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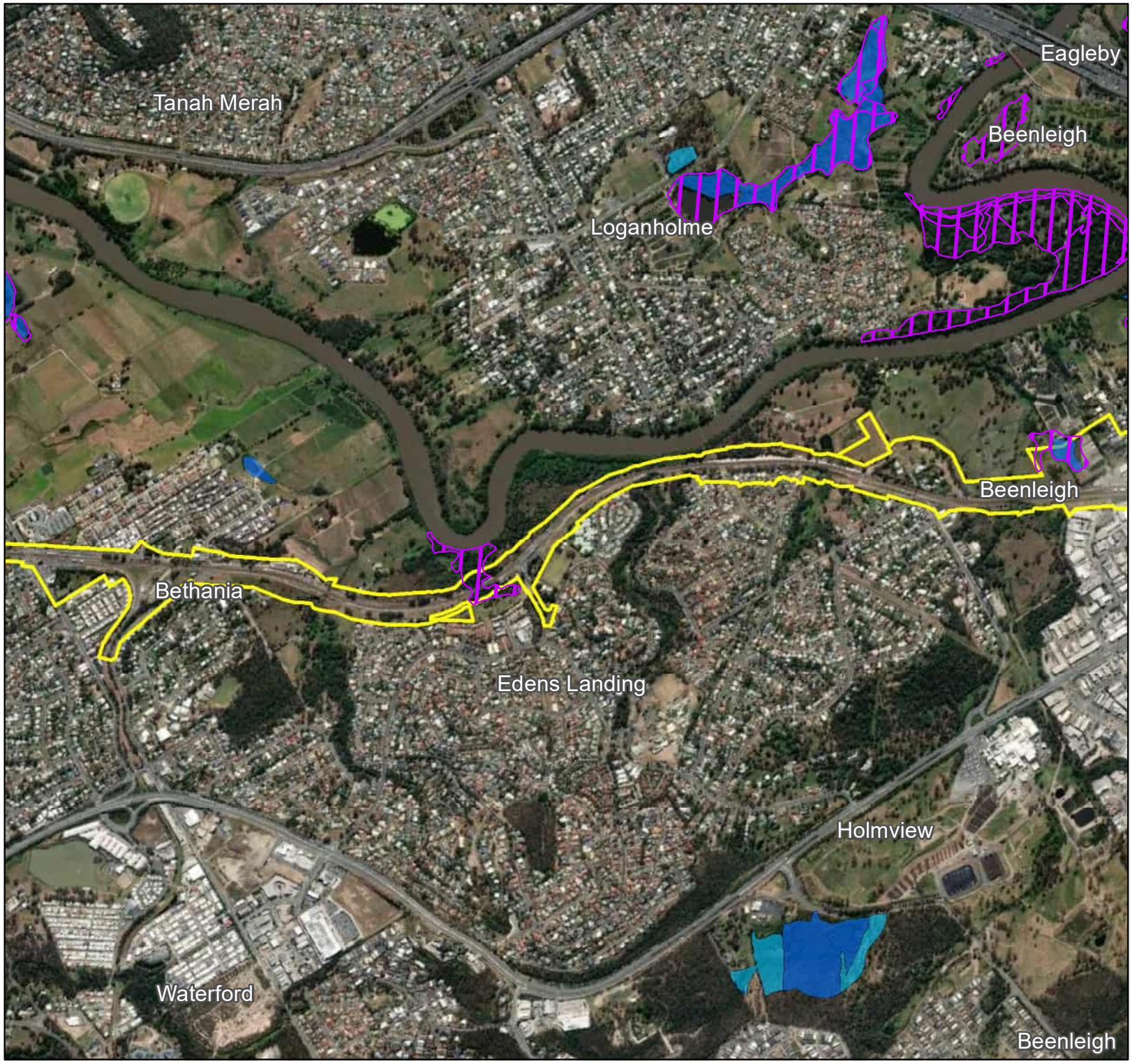


Ausecology

Appendix A-3:

Ground Truthed Regional Ecosystem
Location: Bethania - Beenleigh

N

0 300 600

Metres

Scale: 1:20,000

Coordinate System: GDA2020

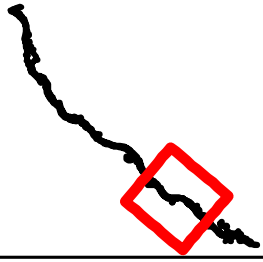
Datum: GDA2020

Legend

- Project Area
- MSES High ecological significance wetland

MSES Regulated Vegetation 100m from wetland

- Category B Area
- Category C Area



Disclaimers:
Wetland layers extend beyond the Project Area to provide context. Wetland area calculations provided are based on Project Area extent only.

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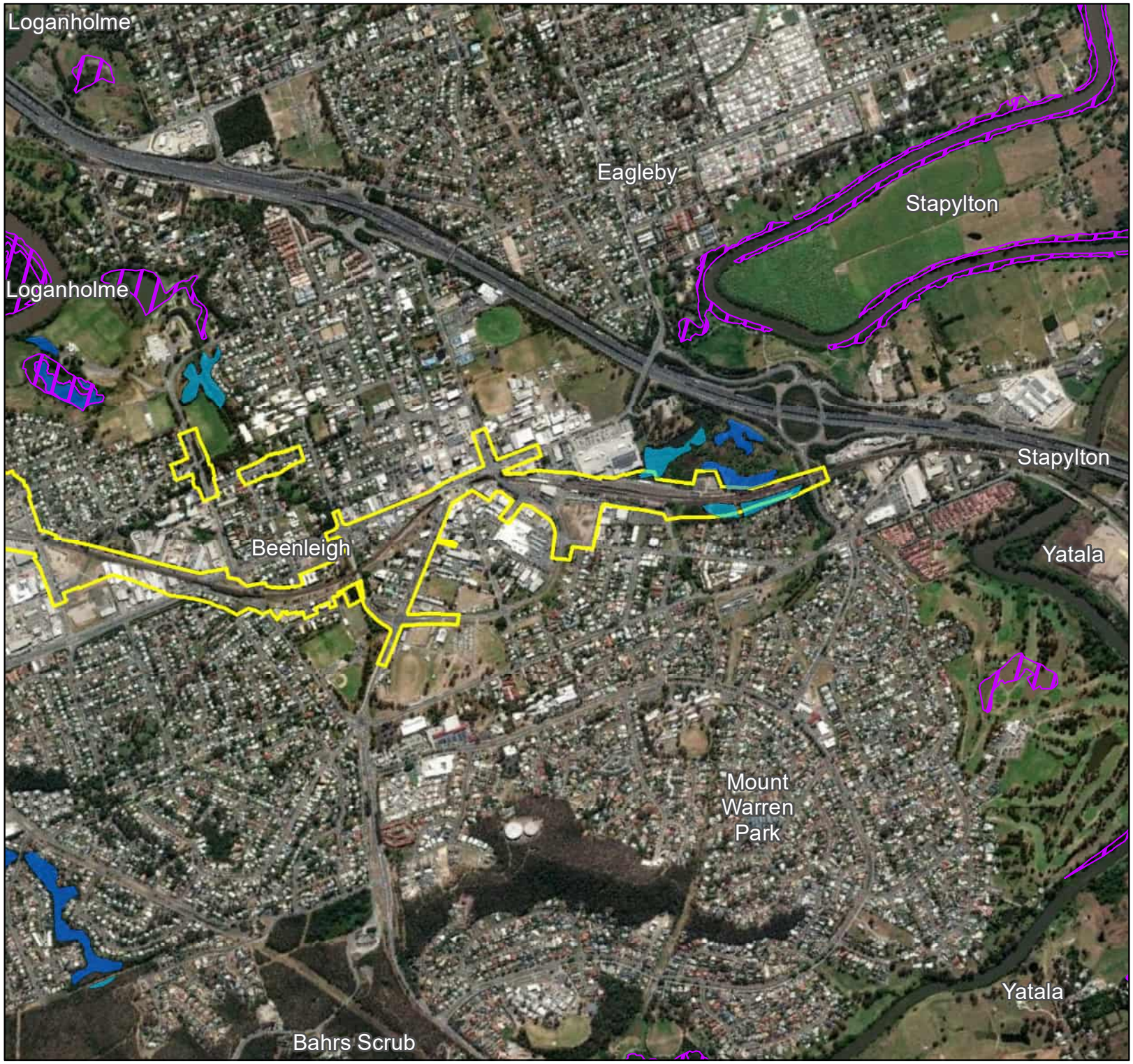


Ausecology

Appendix A-3:

Ground Truthed Regional Ecosystem
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

Scale: 1:20,000

Coordinate System: GDA2020

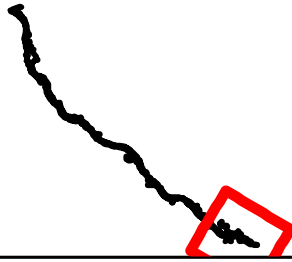
Datum: GDA2020

Legend

- Project Area
- MSES High ecological significance wetland

MSES Regulated Vegetation 100m from wetland

- Category B Area
- Category C Area



Disclaimers:
Wetland layers extend beyond the Project Area to provide context. Wetland area calculations provided are based on Project Area extent only.

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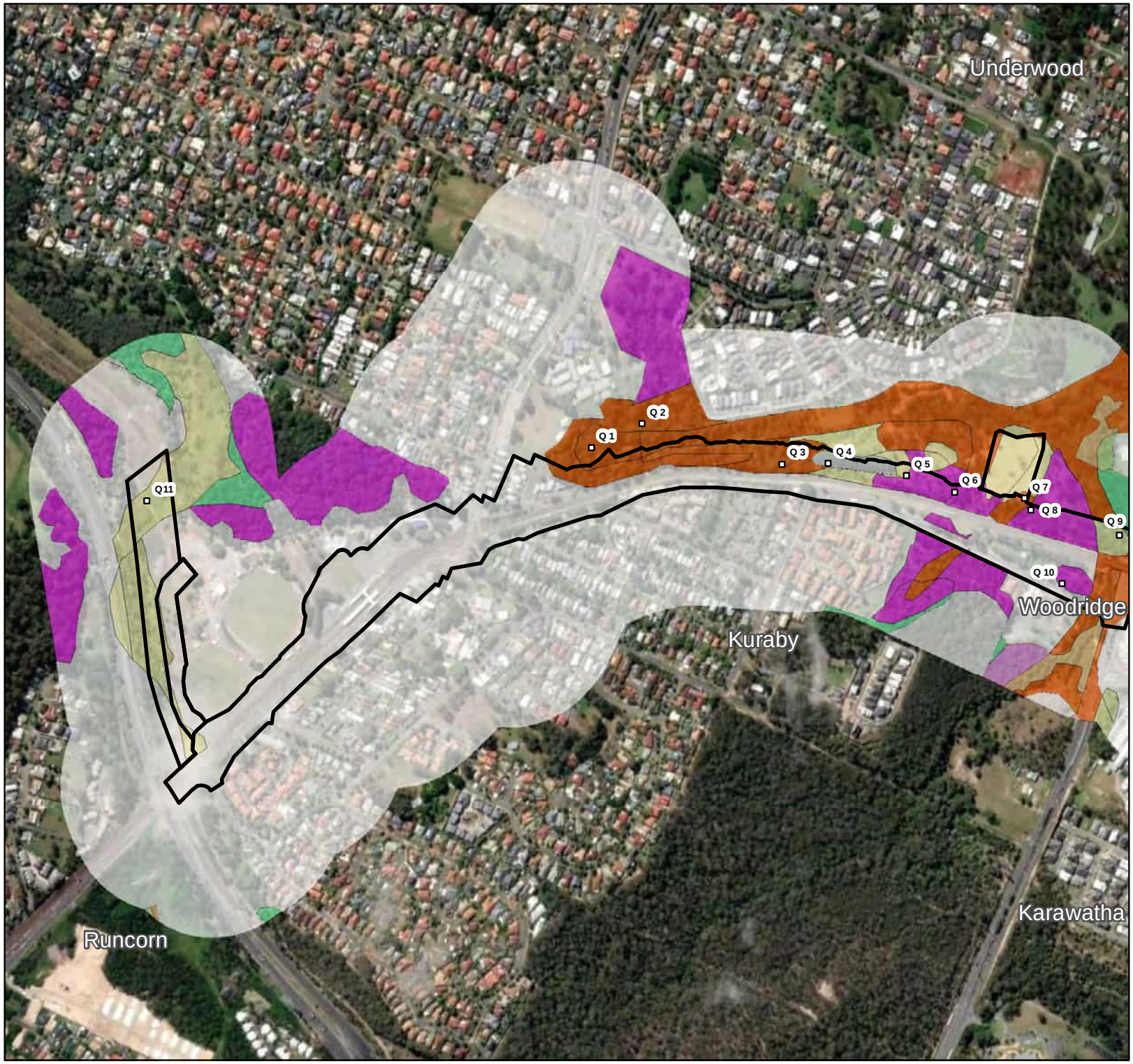


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Kuraby - Woodridge

N

0 200 400

Metres

Scale: 1:10,000

Coordinate System: GDA2020

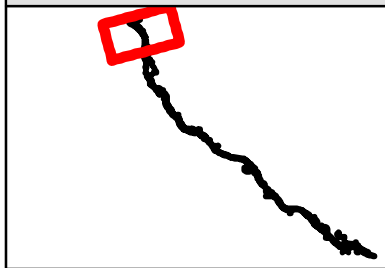
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



Disclaimers:
GTRE extends beyond the Project Area to provide context.
GTRE area calculations provided are based on Project Area extent only.

Document History:

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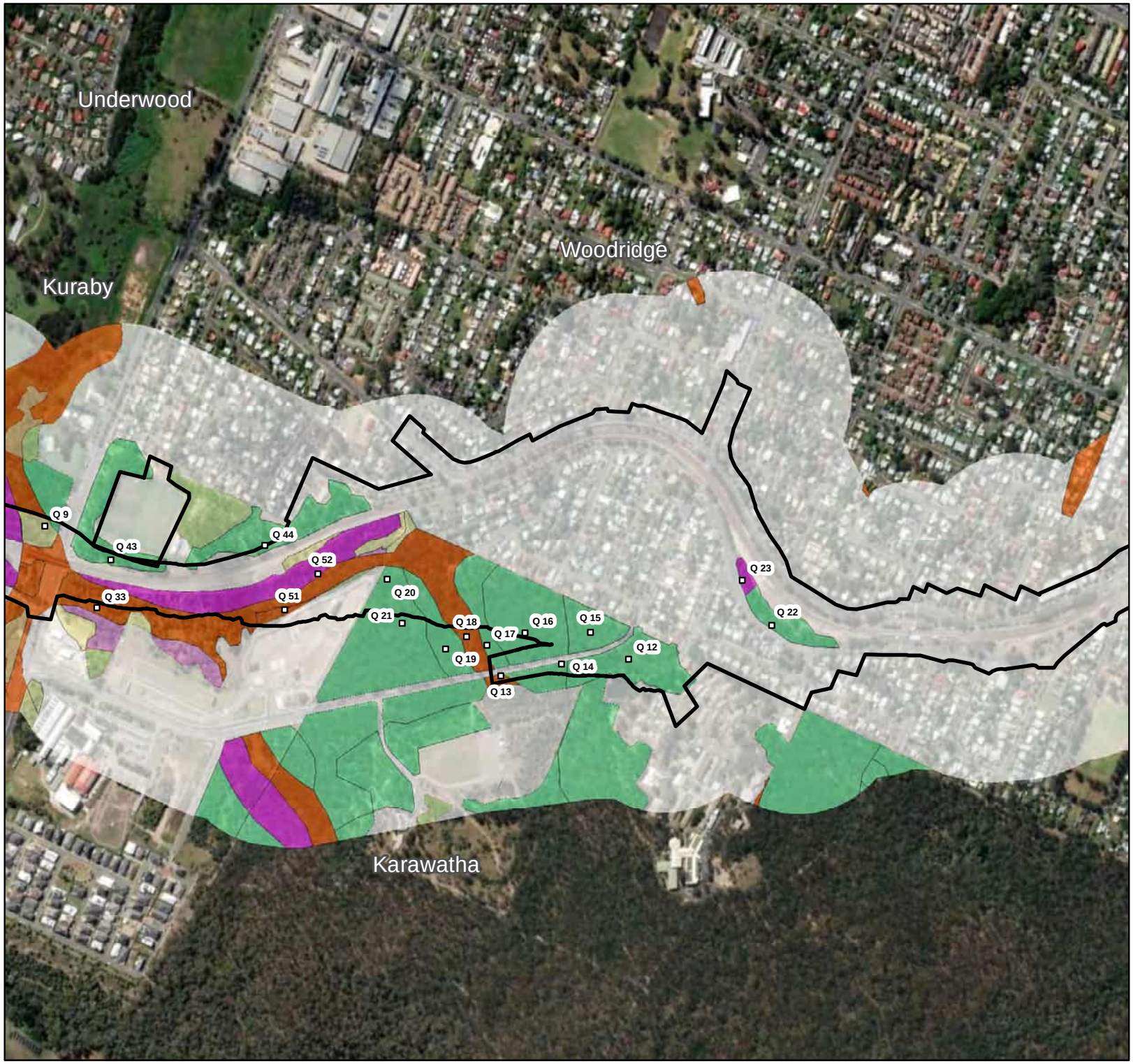


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Kuraby - Woodridge

N

0 200 400

Metres

Scale: 1:10,000

Coordinate System: GDA2020

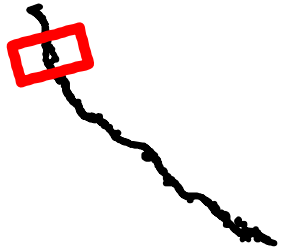
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



Disclaimers:
GTRE extends beyond the Project Area to provide context.
GTRE area calculations provided are based on Project Area extent only.

Document History:

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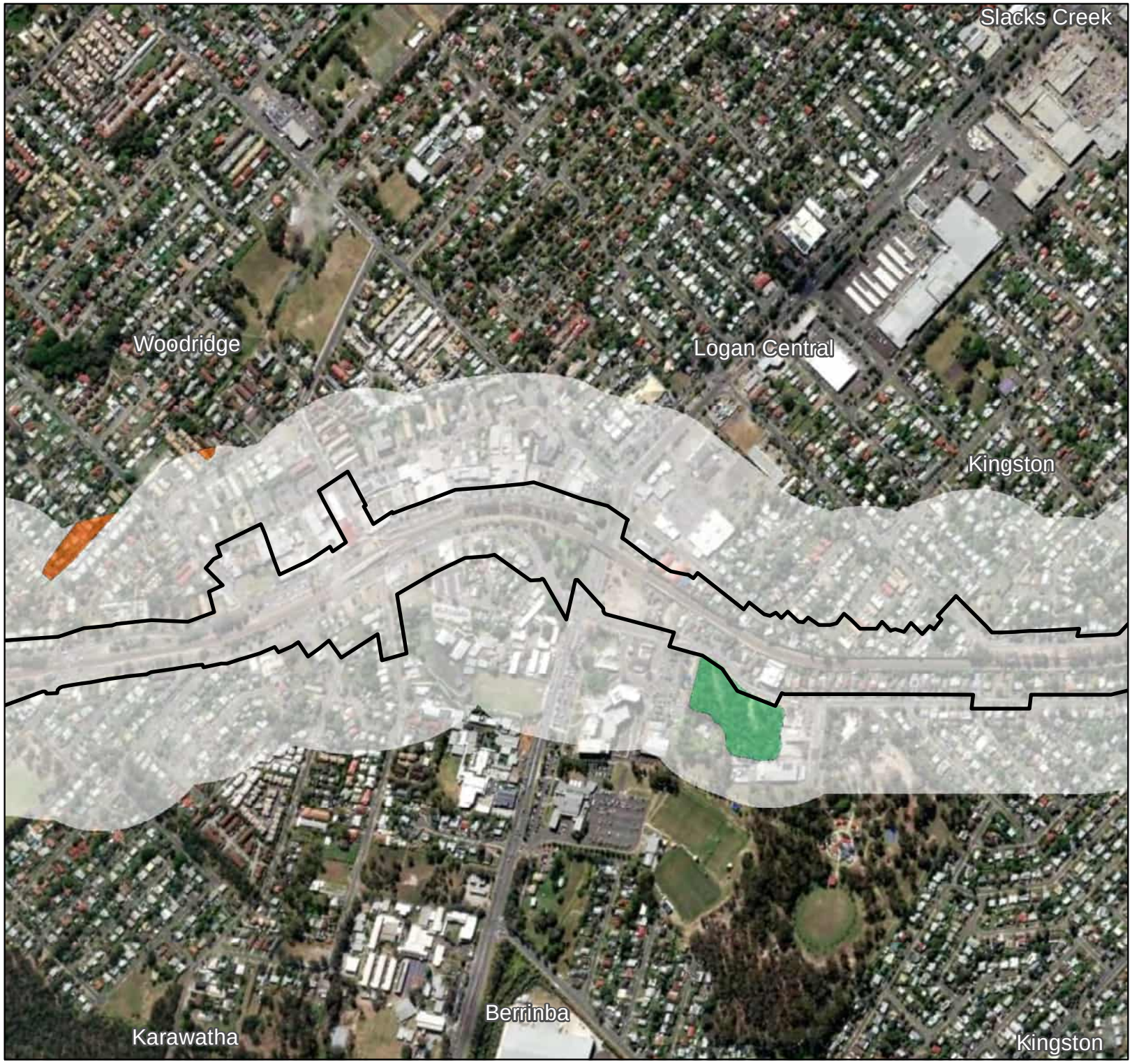


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Logan Central - Kingston

0 200 400
Metres

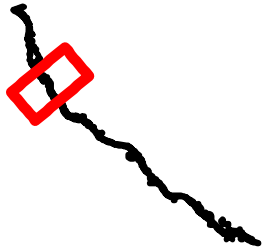
Scale: 1:10,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing of concern
- Category A or B that is of least concern
- Non Remnant



Disclaimers:
GTRE extends beyond the Project Area to provide context.
GTRE area calculations provided are based on Project Area extent only.

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Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Logan Central - Kingston

0 200 400
Metres

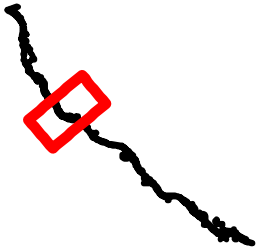
Scale: 1:10,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant



Disclaimers:
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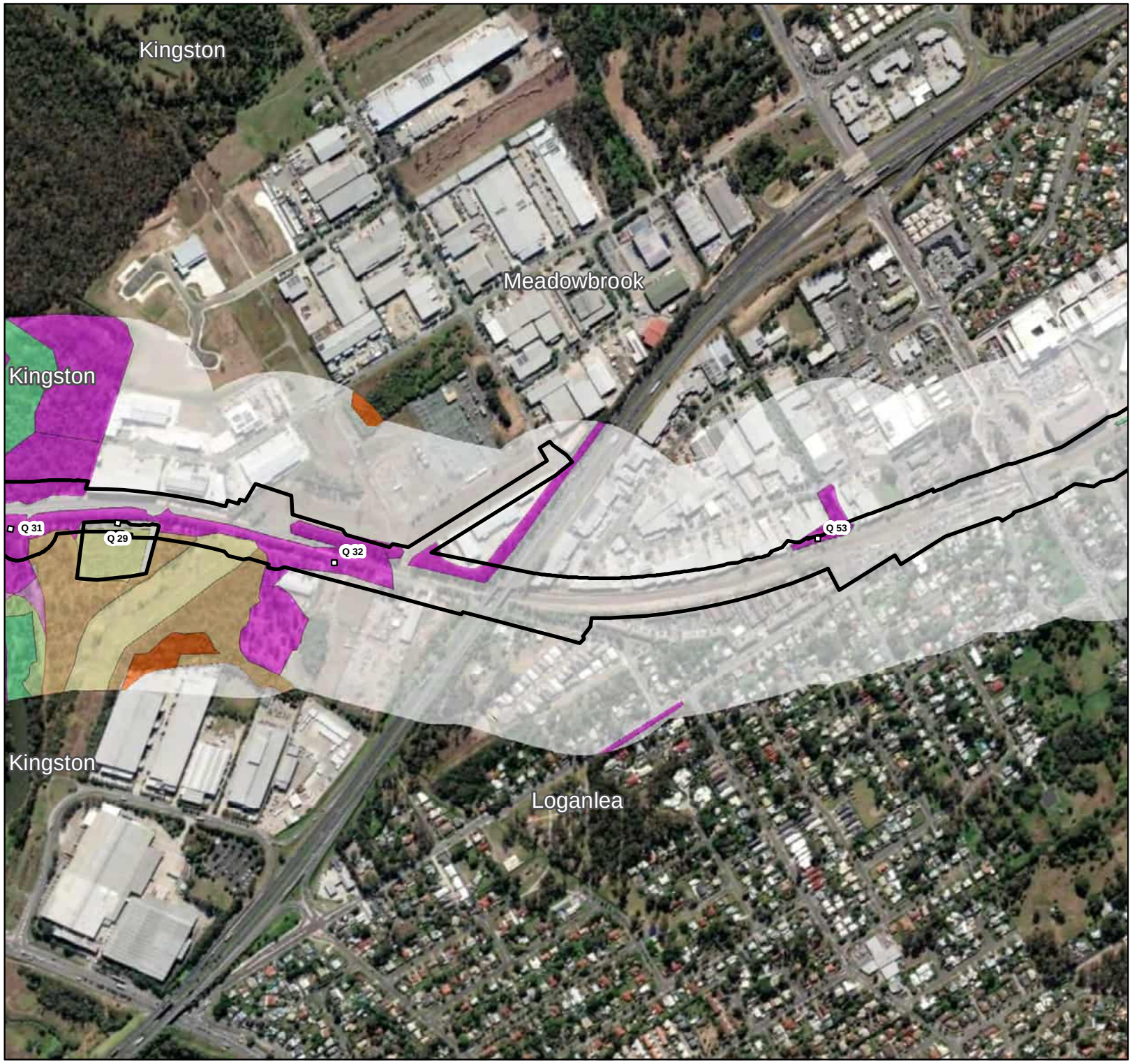


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Meadowbrook - Loganlea

N

0 200 400

Metres

Scale: 1:10,000

Coordinate System: GDA2020

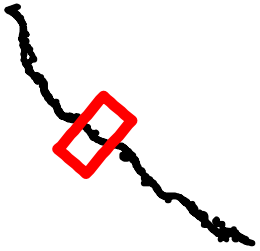
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



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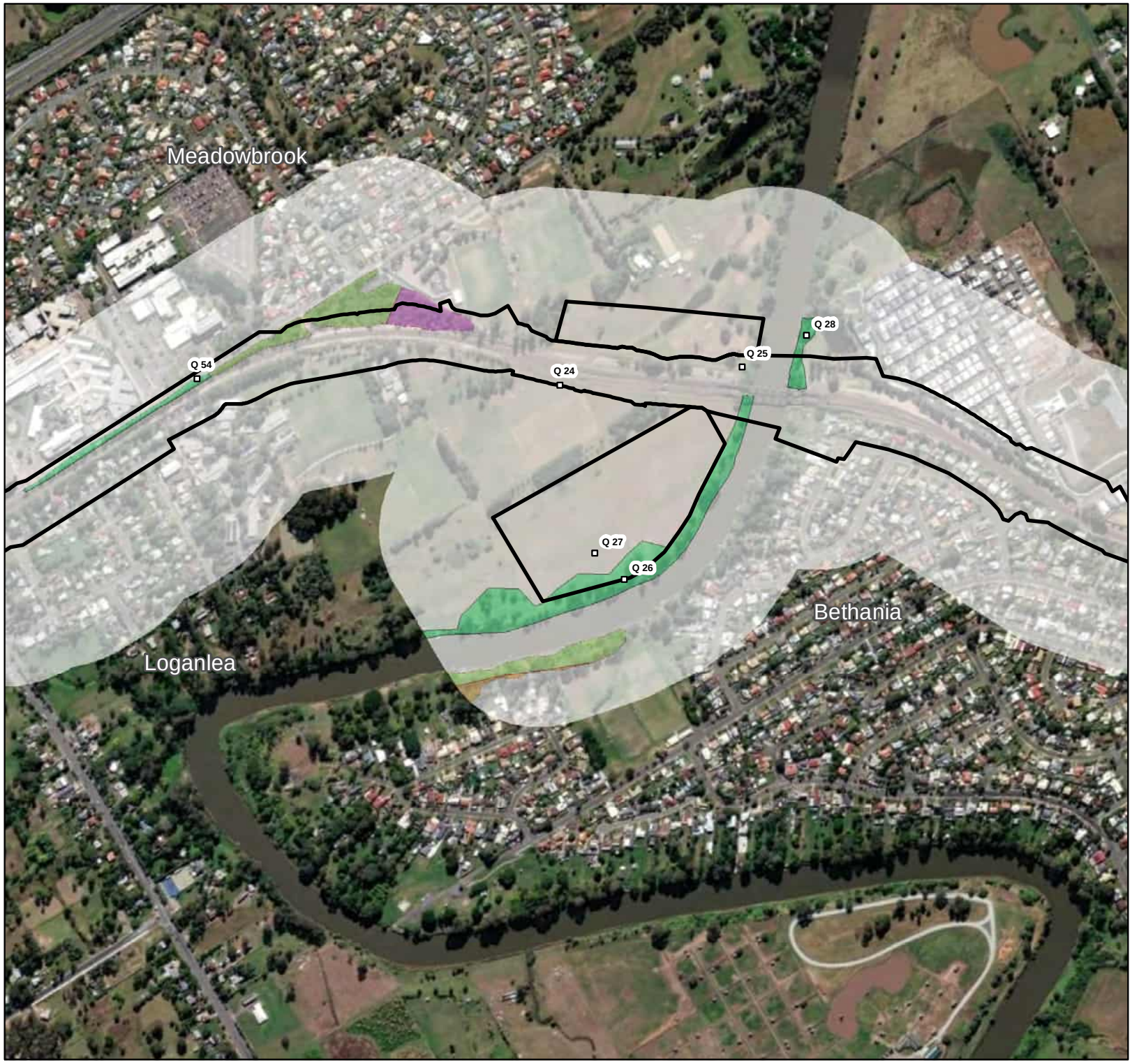


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Meadowbrook - Loganlea

N

0 200 400

Metres

Scale: 1:10,000

Coordinate System: GDA2020

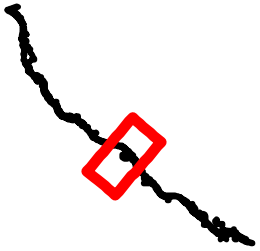
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant



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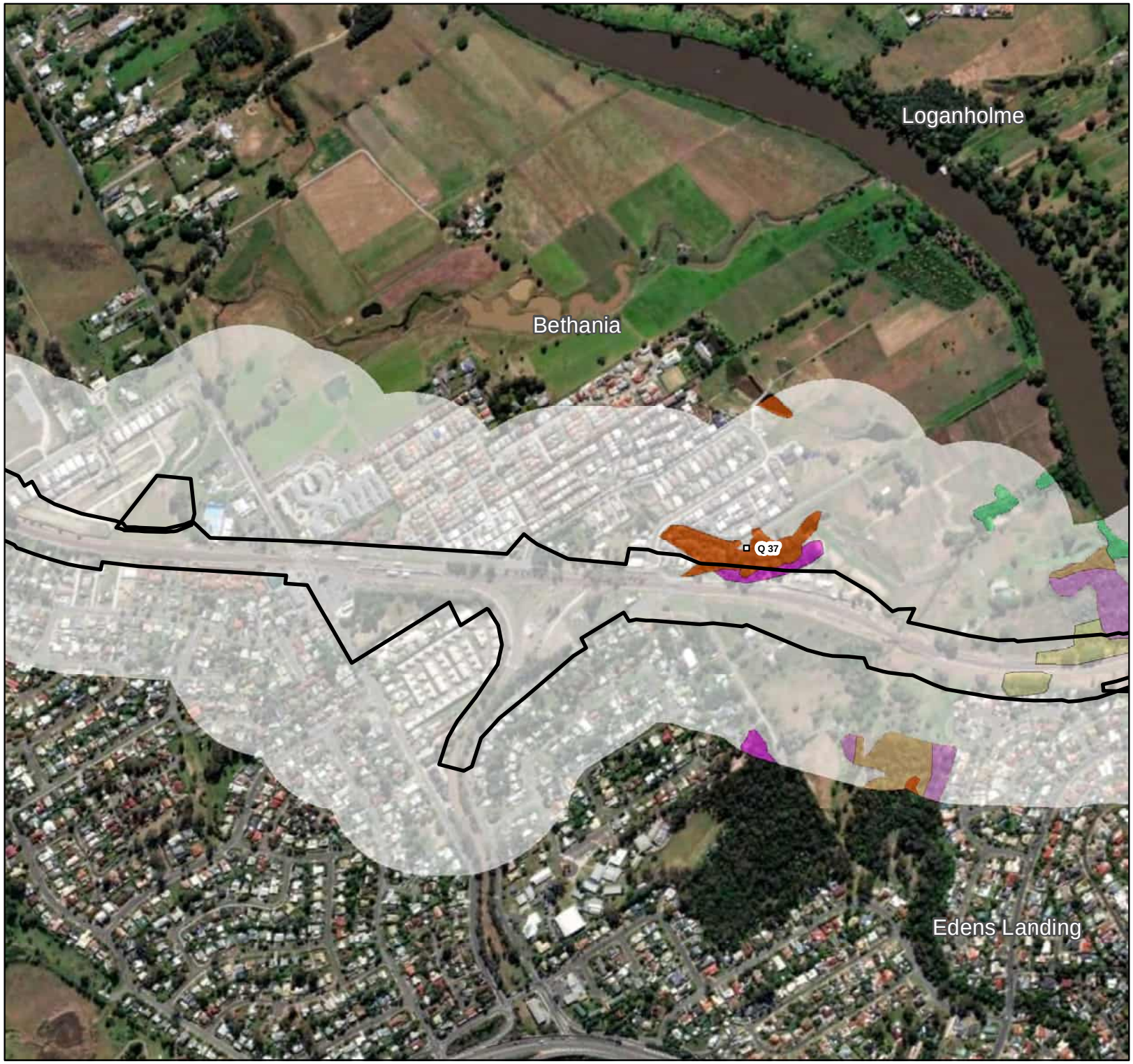


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Bethania - Beenleigh

N

0 200 400

Metres

Scale: 1:10,000

Coordinate System: GDA2020

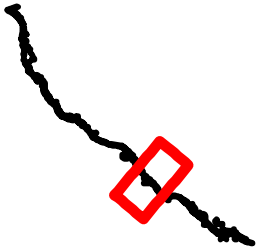
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



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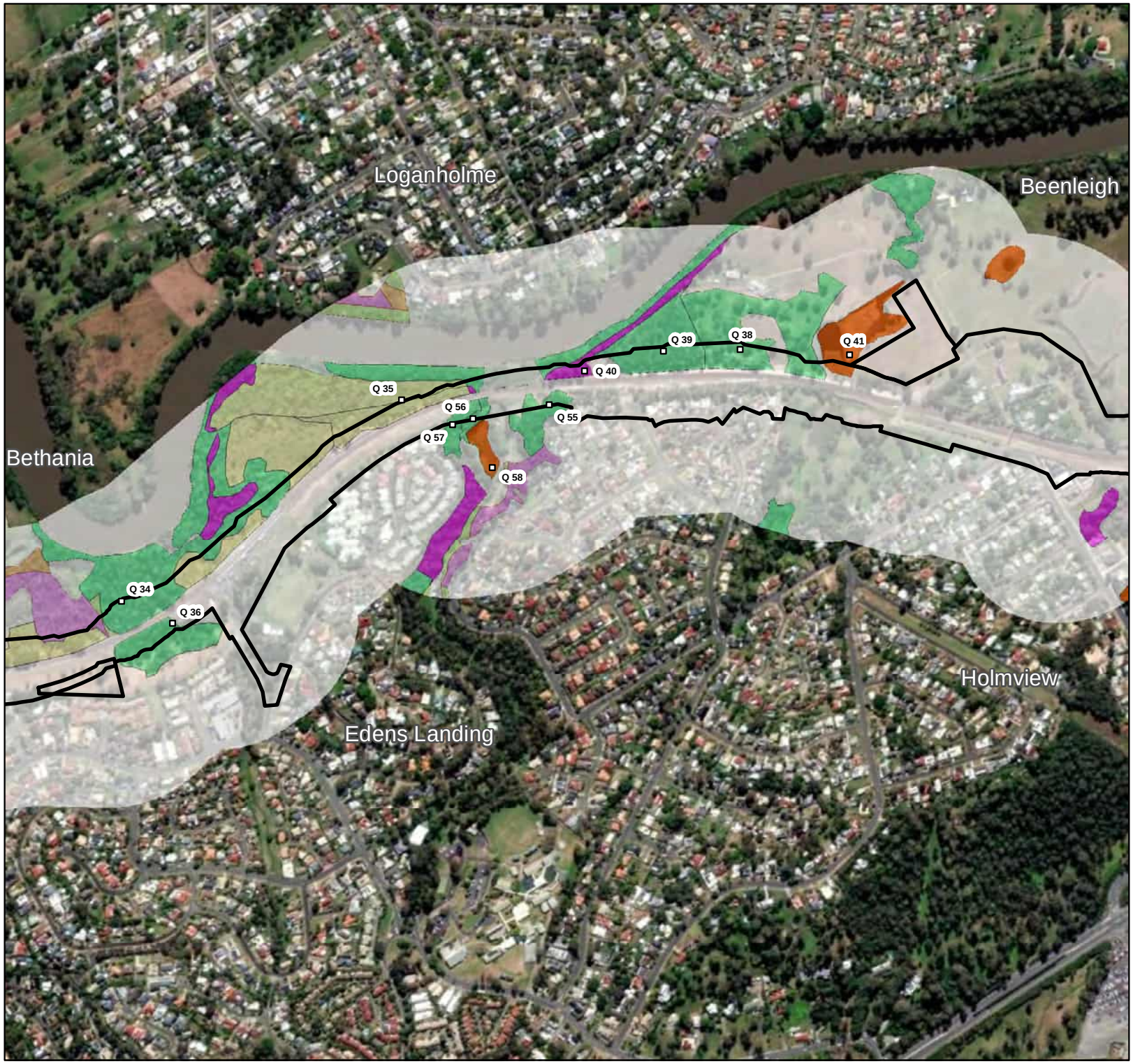


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Bethania - Beenleigh

N

0 200 400

Metres

Scale: 1:10,000

Coordinate System: GDA2020

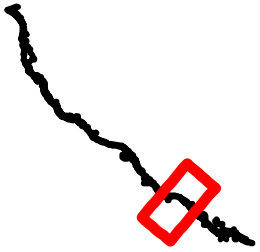
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



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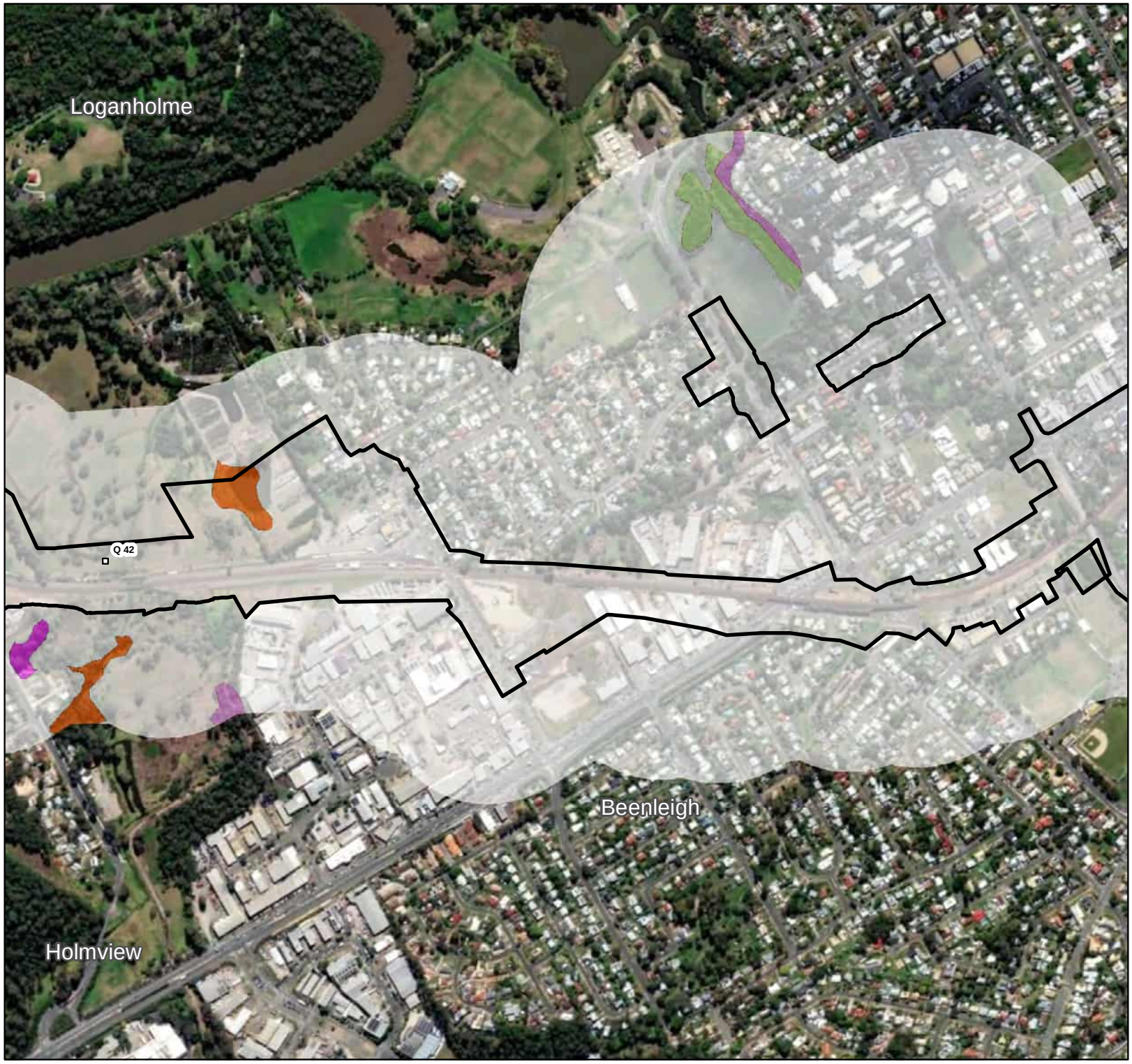


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Beenleigh - Mount Warren Park

N

0 200 400

Metres

Scale: 1:10,000

Coordinate System: GDA2020

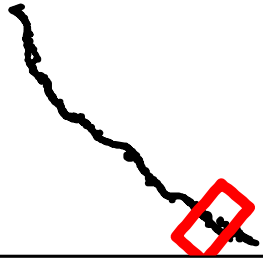
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category C or R containing endangered
- Category C or R that is of least concern
- Non Remnant



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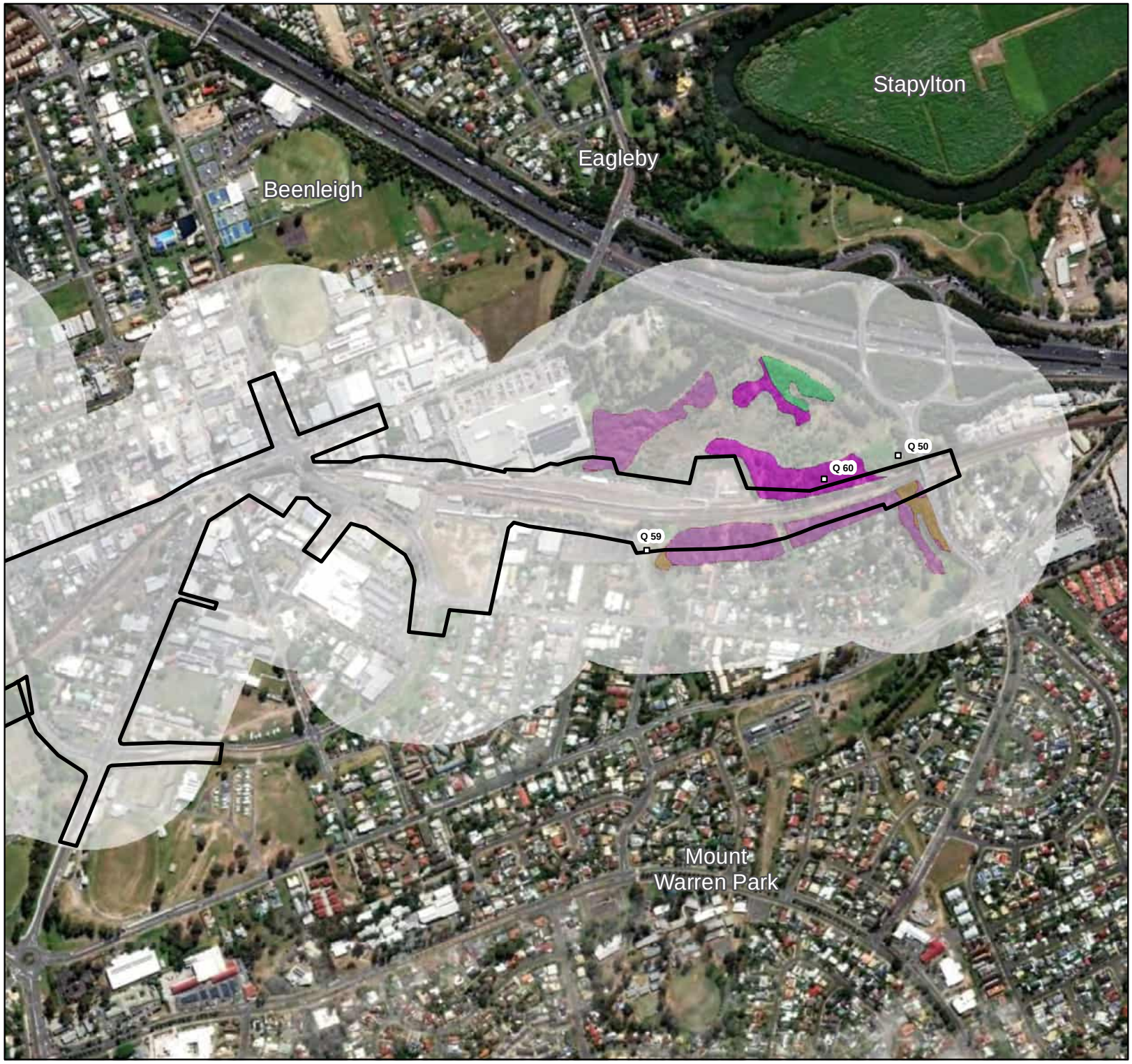


Ausecology

Appendix A-4:

Ground Truthed Regional Ecosystem
Location: Beenleigh - Mount Warren Park

0 200 400
Metres

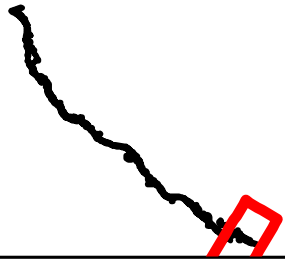
Scale: 1:10,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Quaternary Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Non Remnant



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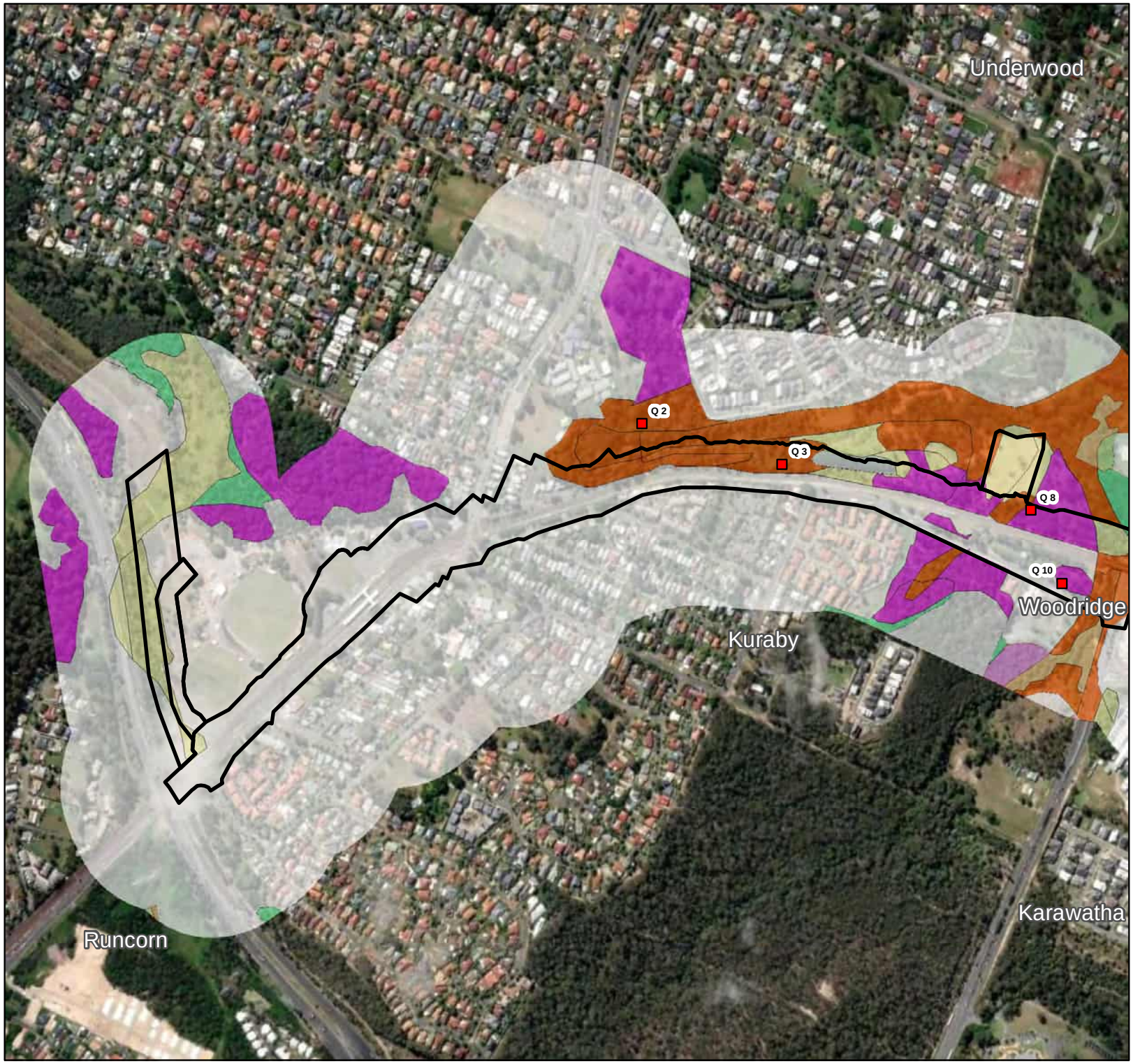


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Kuraby - Woodridge

N

0 150 300

Metres

Scale: 1:10,000

Coordinate System: GDA2020

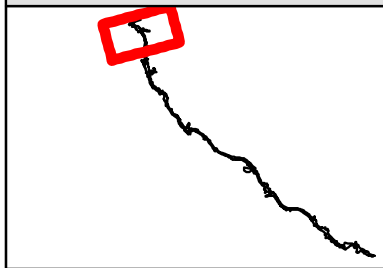
Datum: GDA2020

Legend

- Habitat Assessment Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



Disclaimers:
Habitat assessments were co-located with 20 quaternary assessments.

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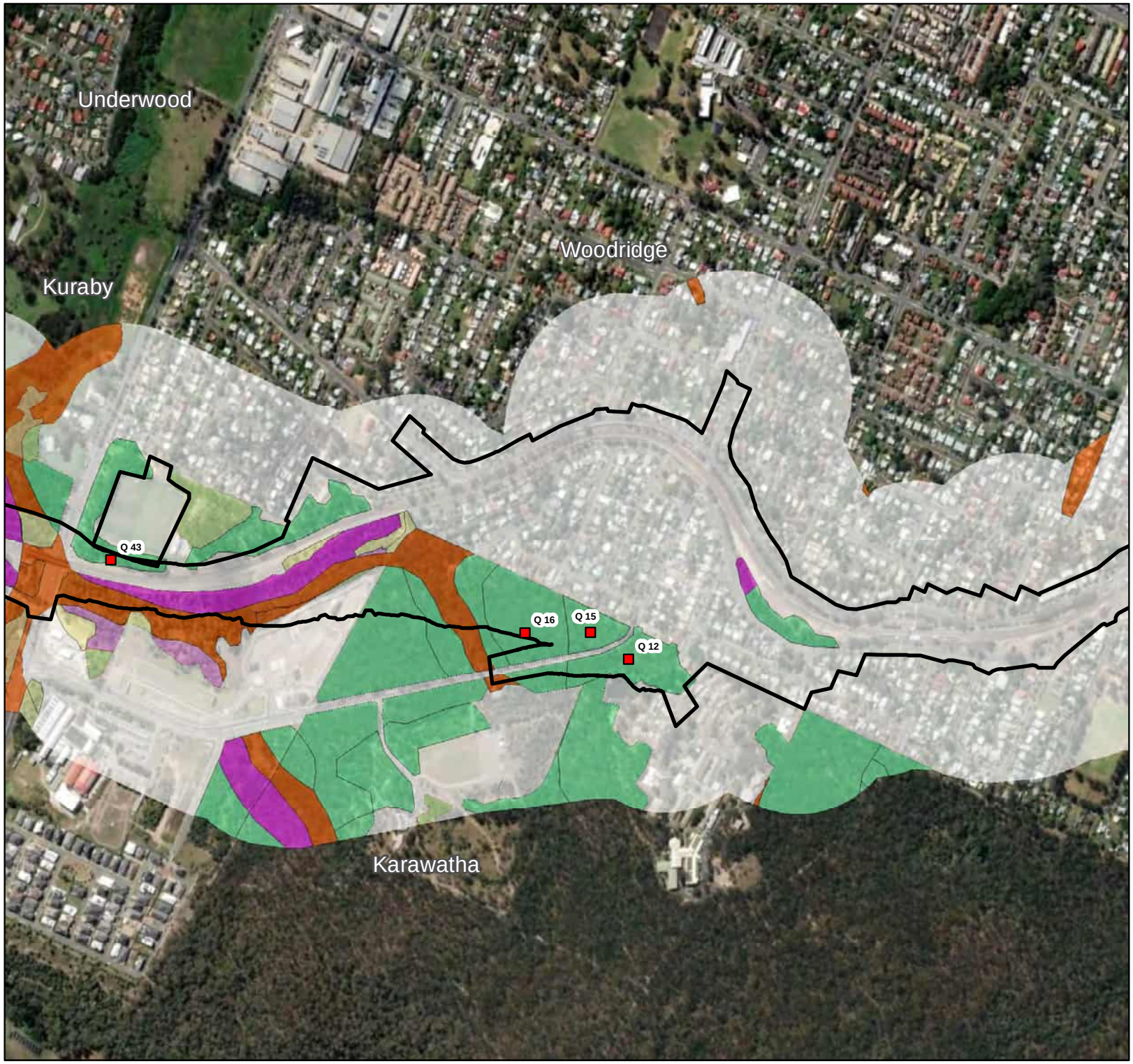


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Kuraby - Woodridge

N

0 150 300

Metres

Scale: 1:10,000

Coordinate System: GDA2020

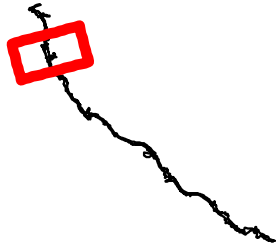
Datum: GDA2020

Legend

- Habitat Assessment Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



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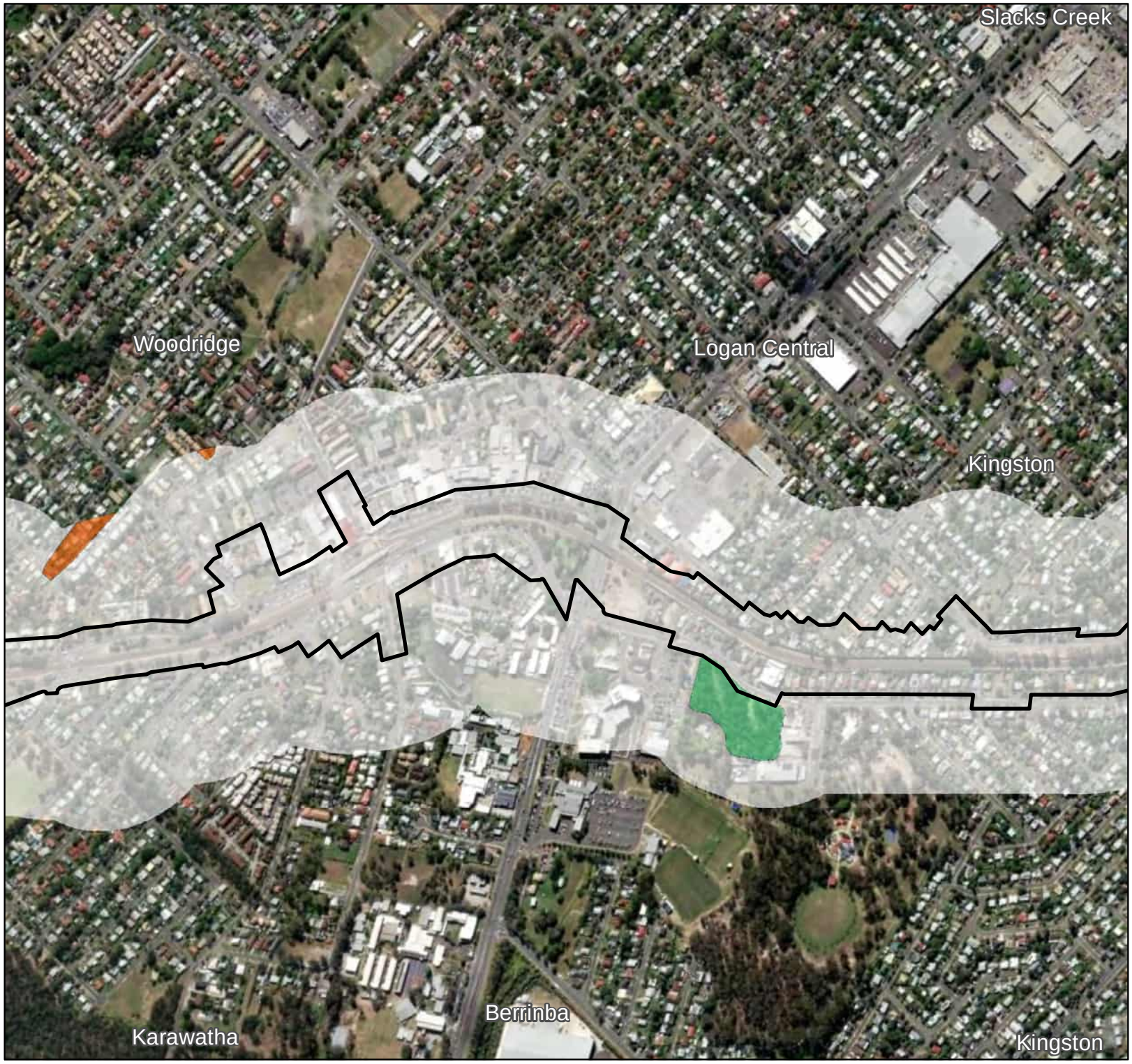


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Logan Central - Kingston

0 150 300
Metres

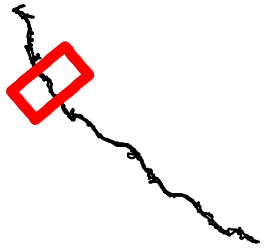
Scale: 1:10,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing of concern
- Category A or B that is of least concern
- Non Remnant



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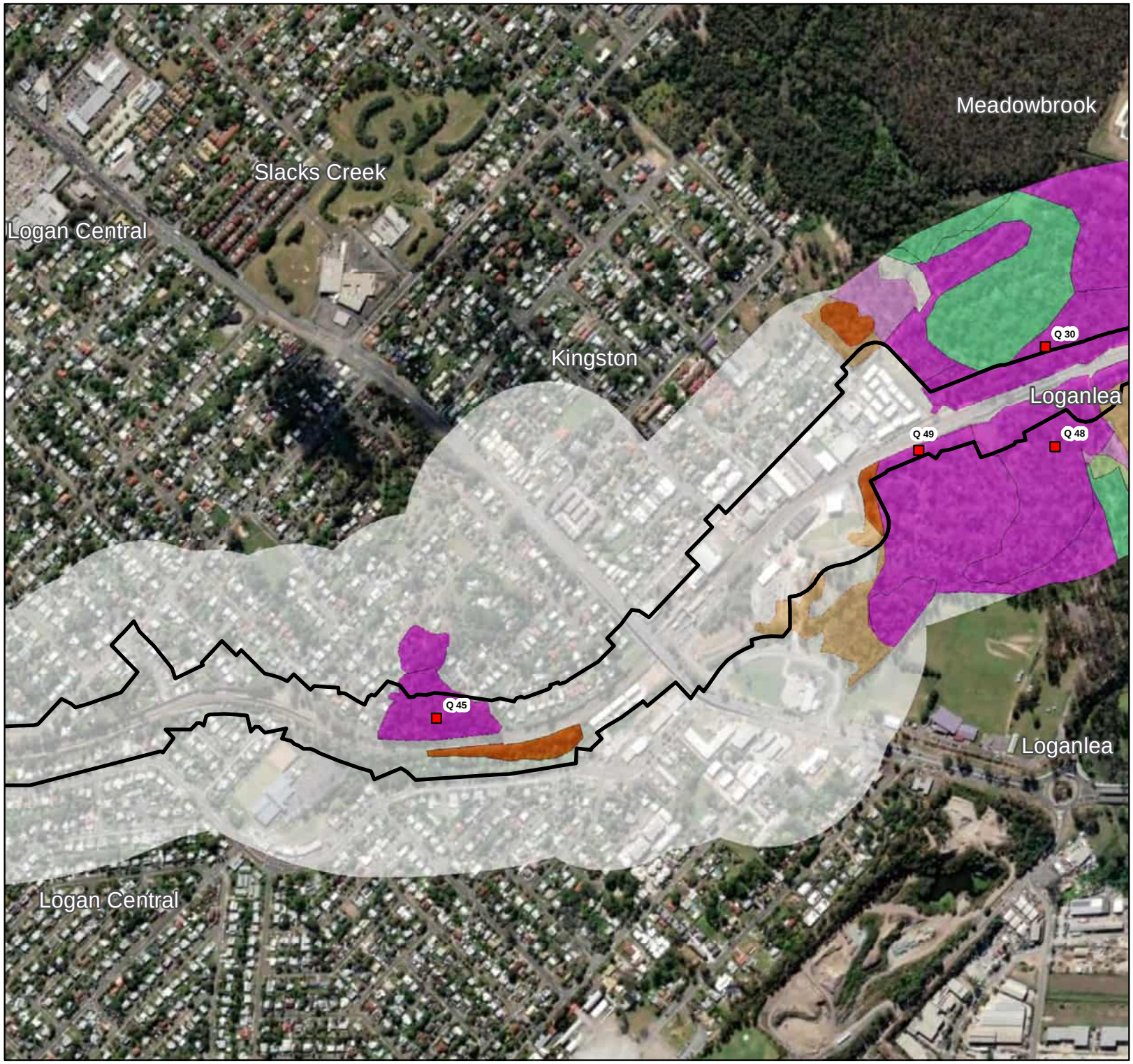


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Logan Central - Kingston

N

0 150 300
Metres

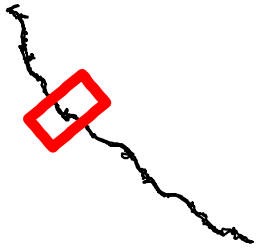
Scale: 1:10,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Habitat Assessment Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant



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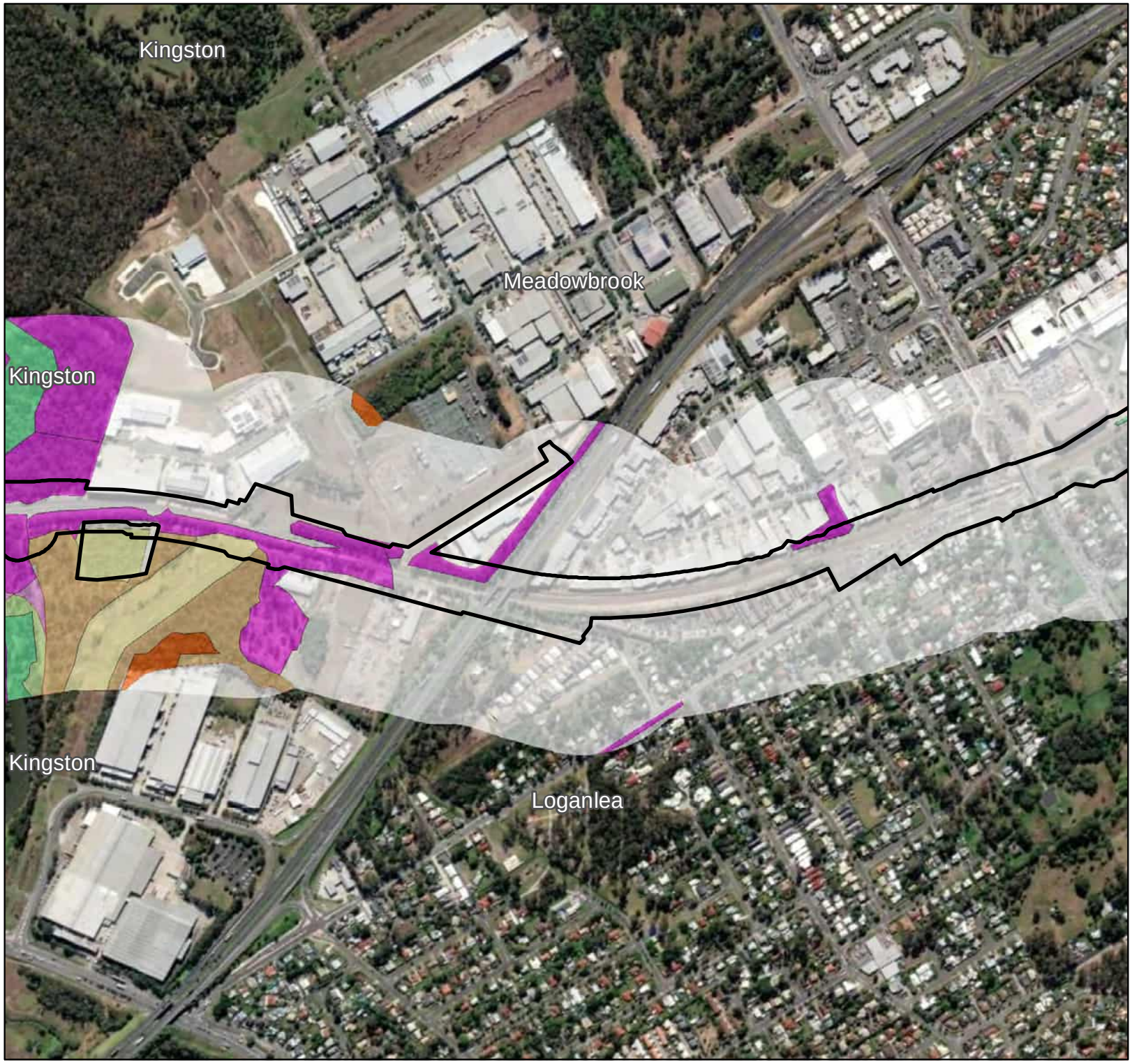


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Meadowbrook - Loganlea

N

0 150 300

Metres

Scale: 1:10,000

Coordinate System: GDA2020

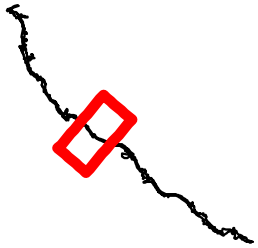
Datum: GDA2020

Legend

Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



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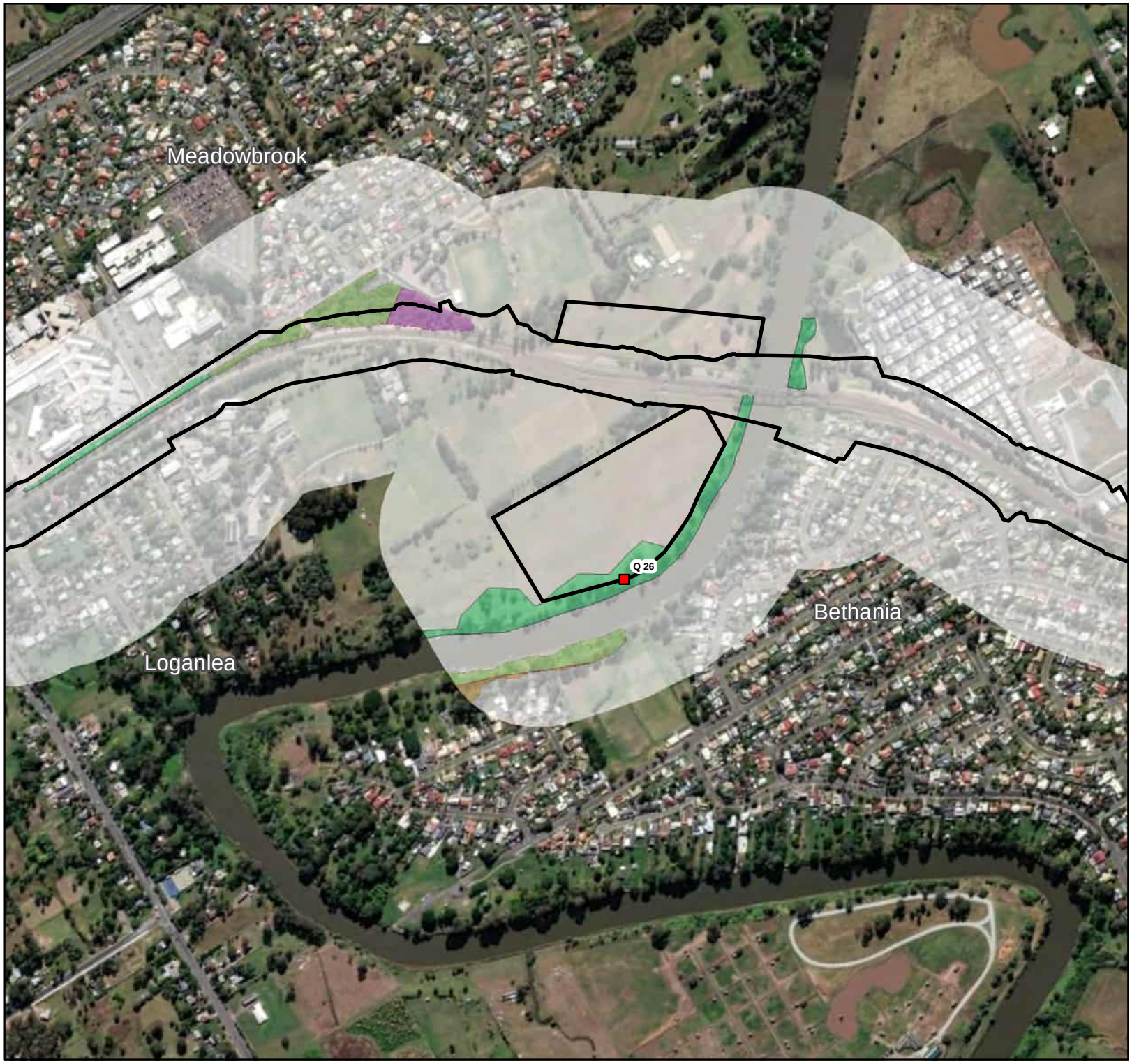


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Meadowbrook - Loganlea

N

0 150 300

Metres

Scale: 1:10,000

Coordinate System: GDA2020

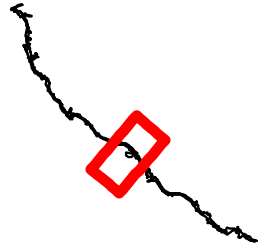
Datum: GDA2020

Legend

- Habitat Assessment Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant



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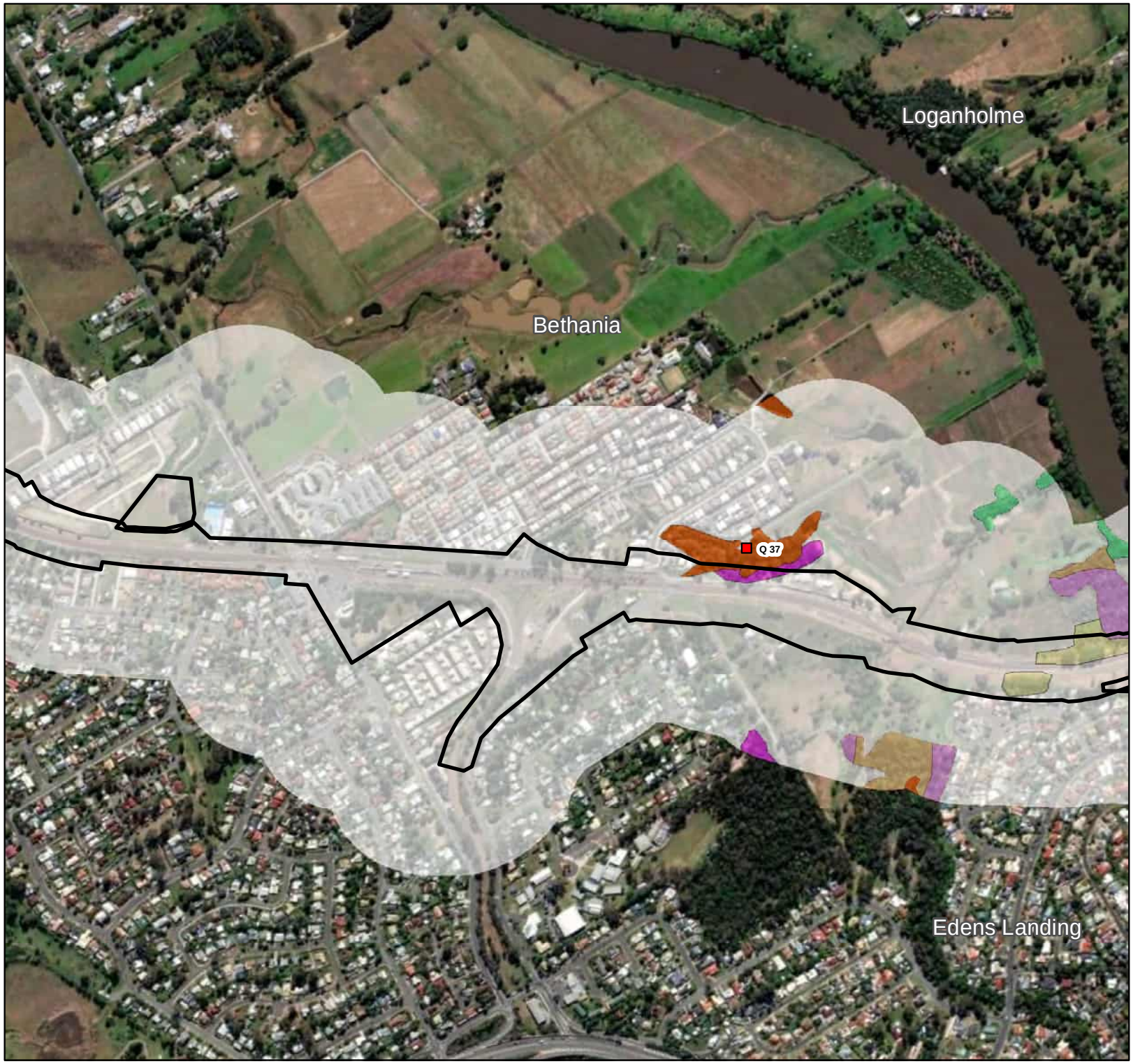


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Bethania - Beenleigh

N

0 150 300

Metres

Scale: 1:10,000

Coordinate System: GDA2020

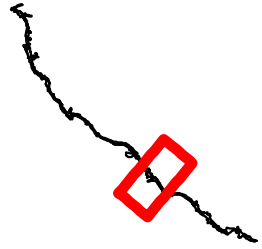
Datum: GDA2020

Legend

- Habitat Assessment Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



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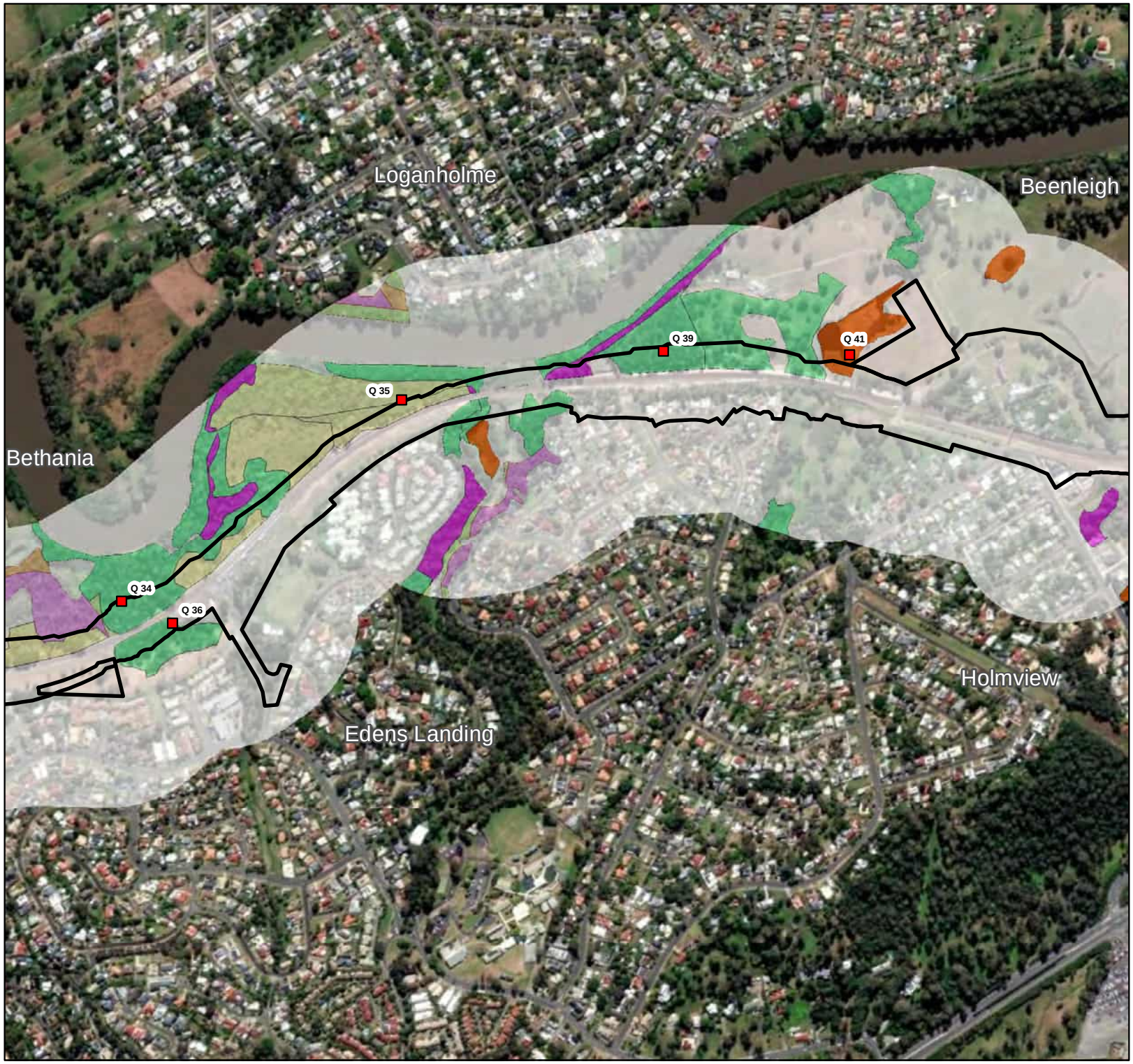


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Bethania - Beenleigh

N

0 150 300

Metres

Scale: 1:10,000

Coordinate System: GDA2020

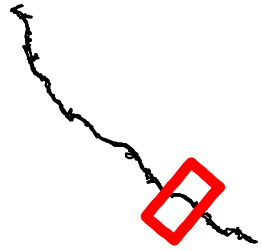
Datum: GDA2020

Legend

- Habitat Assessment Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Non Remnant
- Revegetation and Regrowth



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Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Beenleigh - Mount Warren Park

N

0 150 300

Metres

Scale: 1:10,000

Coordinate System: GDA2020

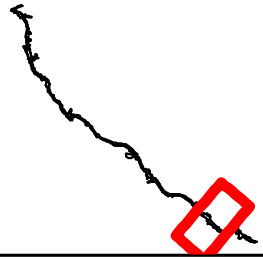
Datum: GDA2020

Legend

- Habitat Assessment Points
- Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B containing of concern
- Category C or R containing endangered
- Category C or R that is of least concern
- Non Remnant



Disclaimers:
Habitat assessments were co-located with 20 quaternary assessments.

Document History:

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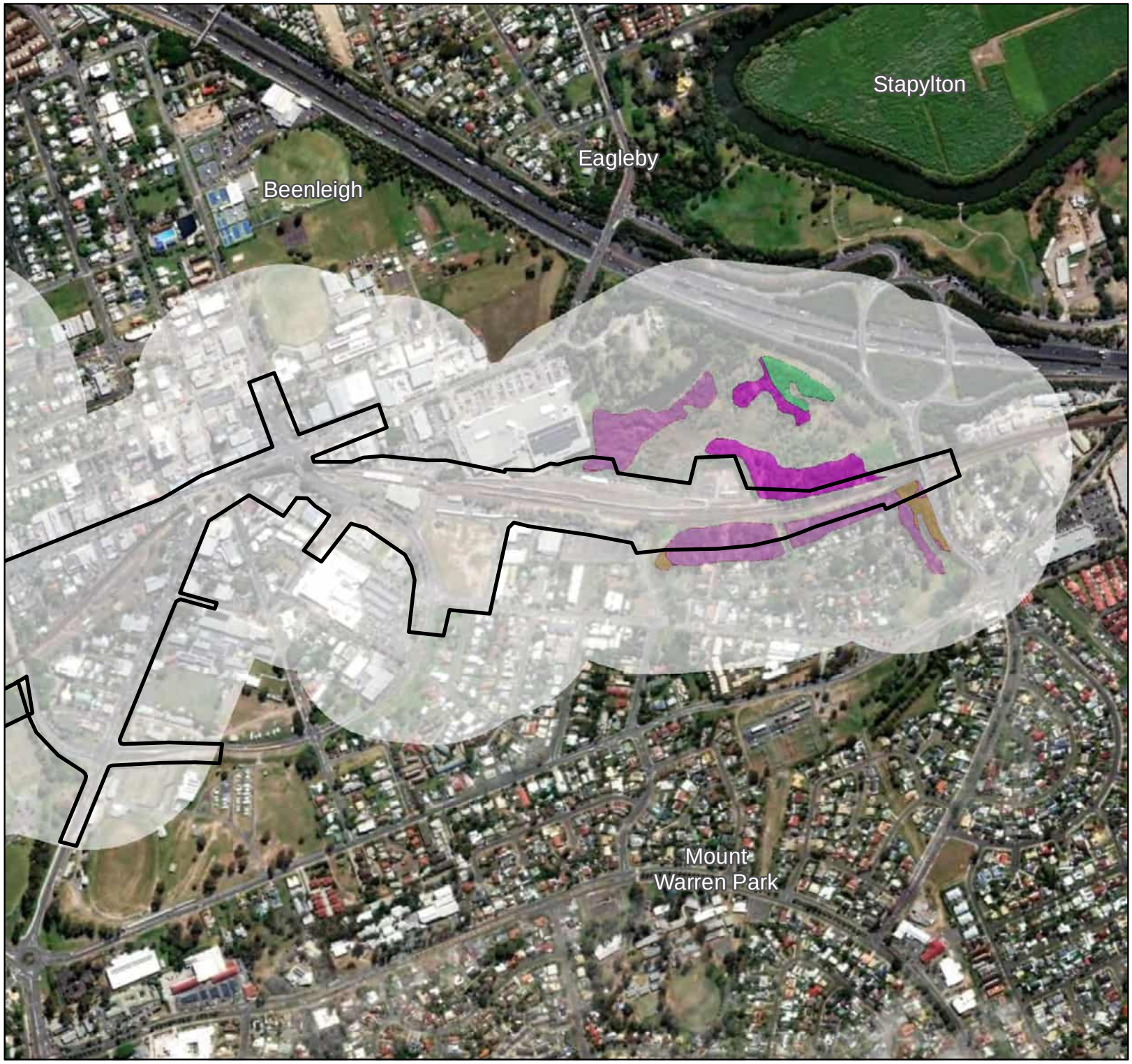


Ausecology

Appendix A-5:

Ground Truthed Regional Ecosystem and Habitat Assessment Locations
Location: Beenleigh - Mount Warren Park

0 150 300
Metres

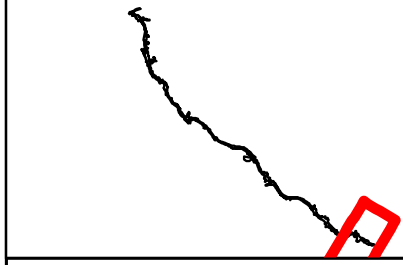
Scale: 1:10,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

Project Area

Ground Truthed Regional Ecosystem Mapping

- Category A or B containing endangered
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Non Remnant



Disclaimers:
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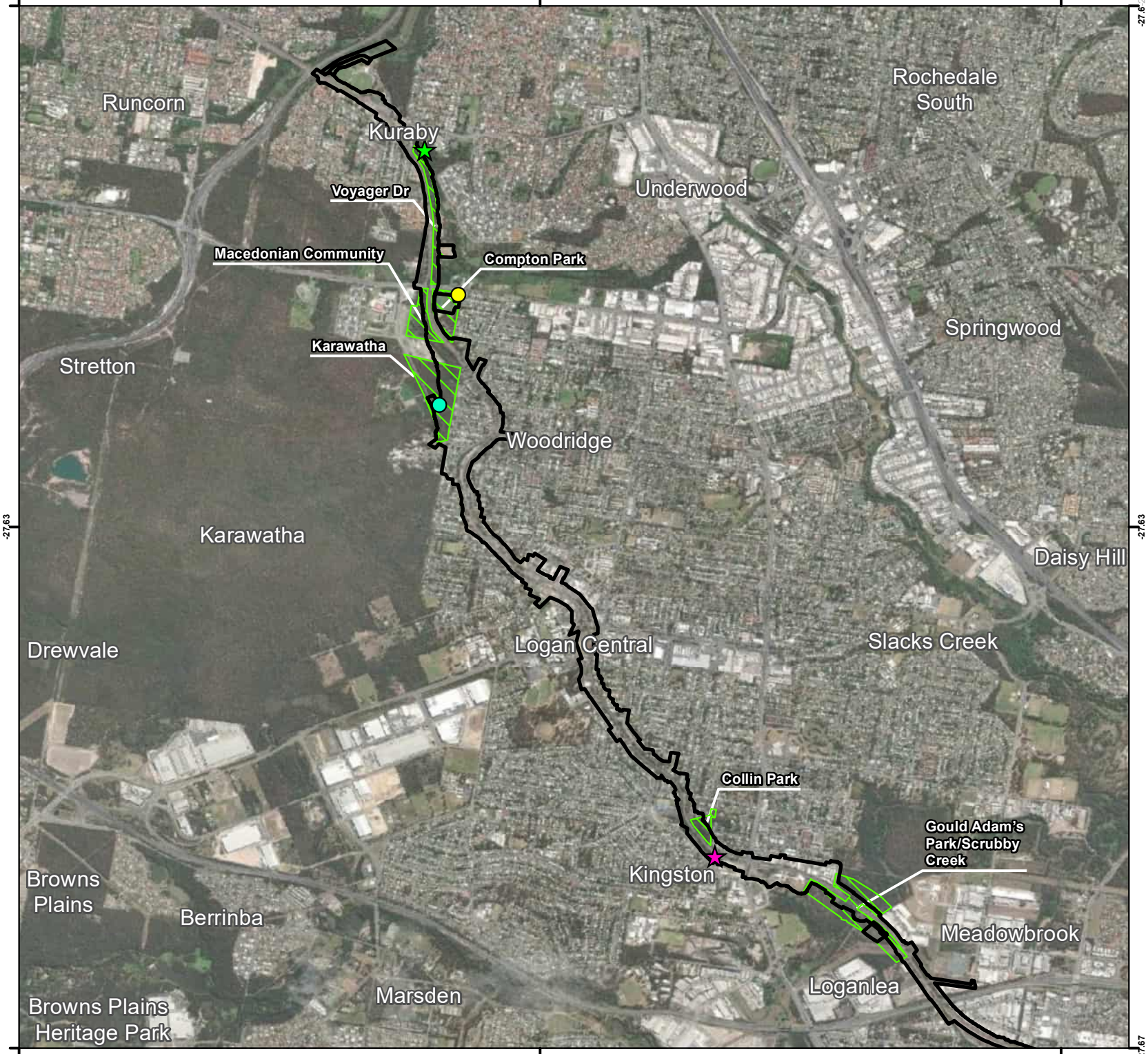


Ausecology

Appendix A-6:

Fauna Survey Areas and Records
Location: North

N

0 500 1,000 1,500

Metres

Scale: 1:40,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

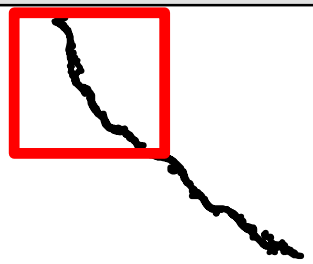
- Spotlight Survey Areas
- Project Area

Ausecology Fauna Records

- *Pteropus poliocephalus* (EPBC)
- *Tachyglossus aculeatus* (NCA)

Flying Fox Roosts Found During Surveys

- Roost 1
- Roost 2



Data sources:
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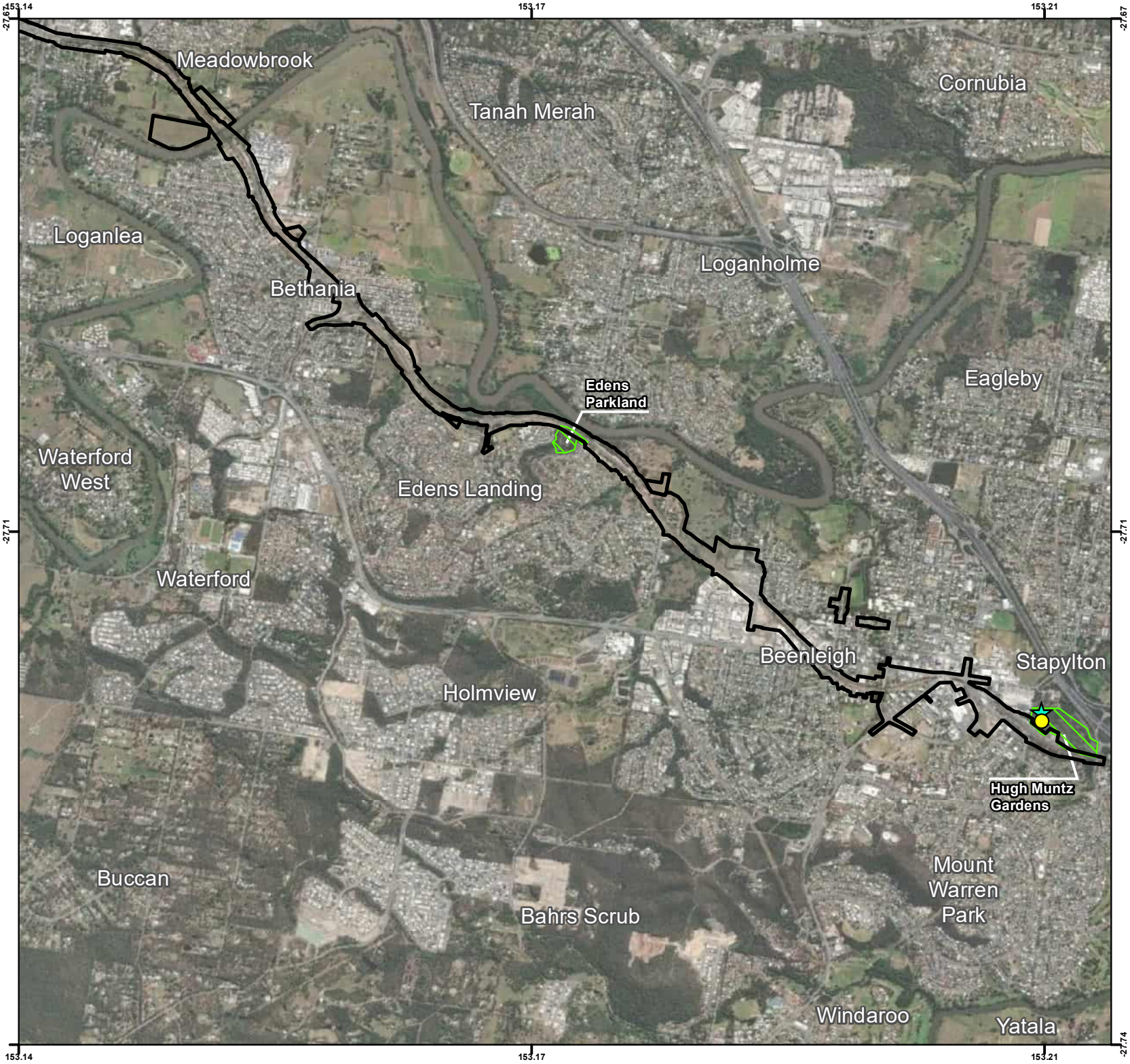


Ausecology

Appendix A-6:

Fauna Survey Areas and Records
Location: South

N

0 500 1,000 1,500

Metres

Scale: 1:40,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

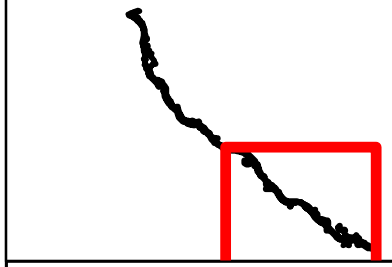
- Spotlight Survey Areas
- Project Area

Ausecology Fauna Records

- *Pteropus poliocephalus* (EPBC)

Flying Fox Roosts Found During Surveys

- Roost 3



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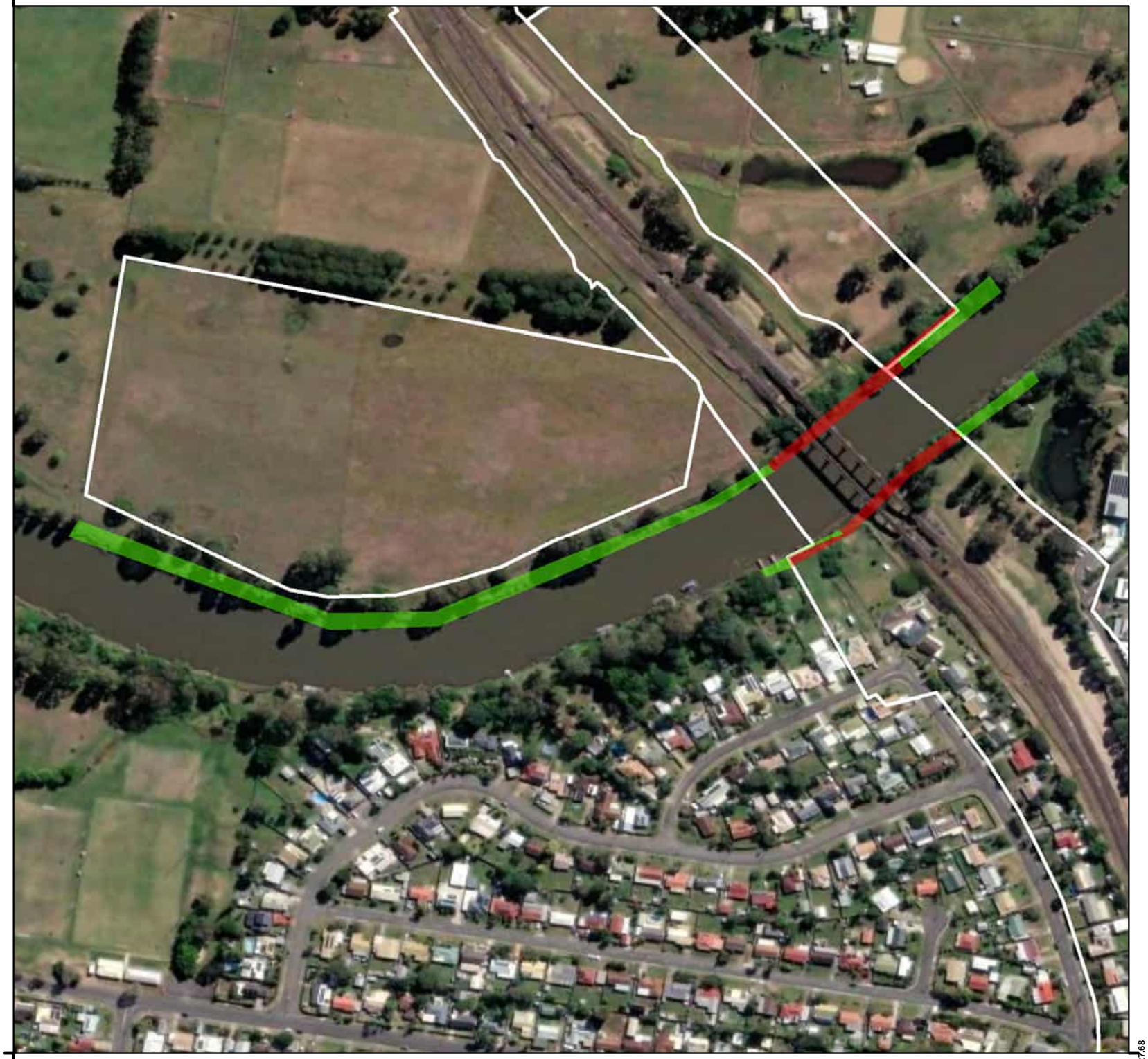


153.15

-27.68

Ausecology

Appendix A-7:

Marine Vegetation Mapping
Location: Logan

N

0 46.66666666666733333333340

Metres

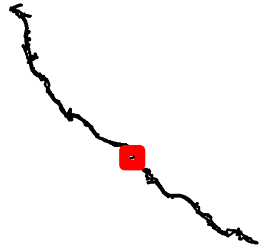
Scale: 1:4,000

Coordinate System: GDA2020
Datum: GDA2020

Legend

Marine Vegetation Areas

- Marine vegetation inside footprint (0.24 ha)
- Marine vegetation outside footprint
- Project Footprint



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Ausecology

Appendix A-8:

Glossy Black Cockatoo Habitat
Location: Kuraby - Woodridge

N

0 300 600

Metres

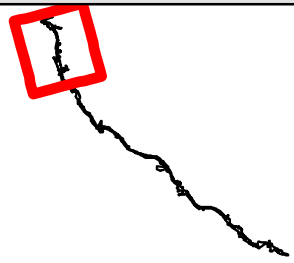
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Glossy Black Cockatoo Habitat



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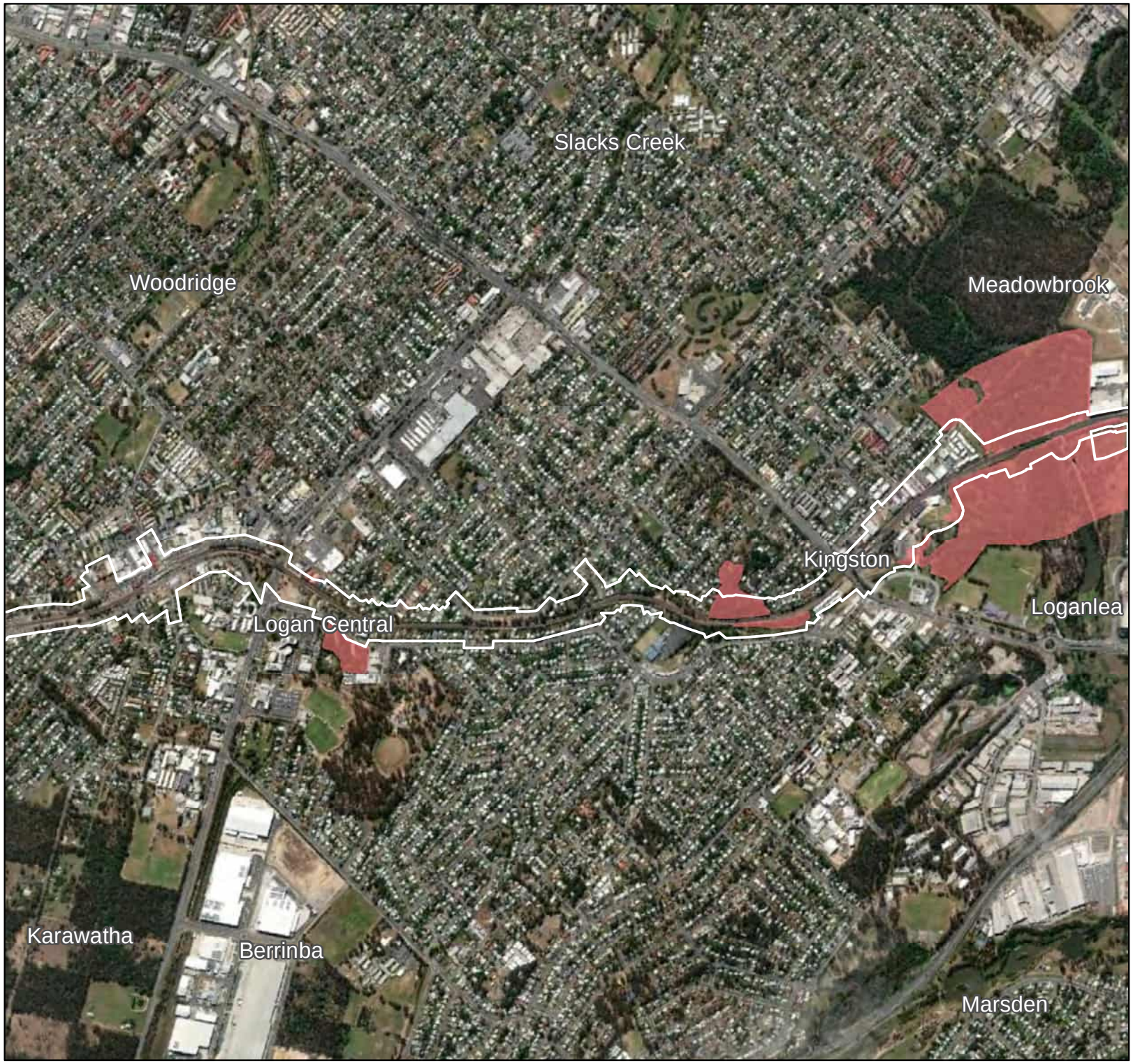


Ausecology

Appendix A-8:

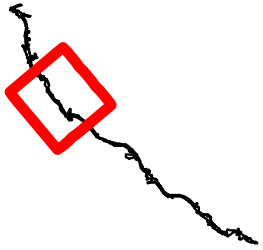
Glossy Black Cockatoo Habitat
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Glossy Black Cockatoo Habitat



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Ausecology

Appendix A-8:

Glossy Black Cockatoo Habitat
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

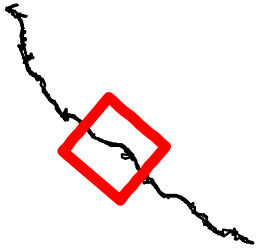
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Glossy Black Cockatoo Habitat



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Appendix A-8:

Glossy Black Cockatoo Habitat
Location: Bethania - Beenleigh

N

0 300 600

Metres

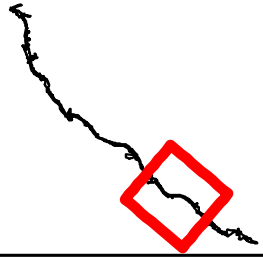
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Glossy Black Cockatoo Habitat



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Appendix A-8:

Glossy Black Cockatoo Habitat
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

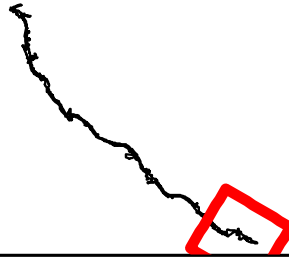
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Glossy Black Cockatoo Habitat



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Ausecology

Appendix A-8:

Greater Glider Habitat
Location: Kuraby - Woodridge

N

0 300 600

Metres

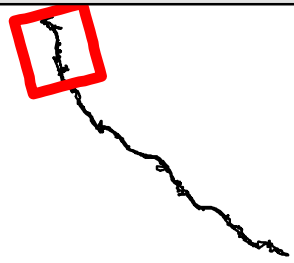
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Greater Glider Habitat



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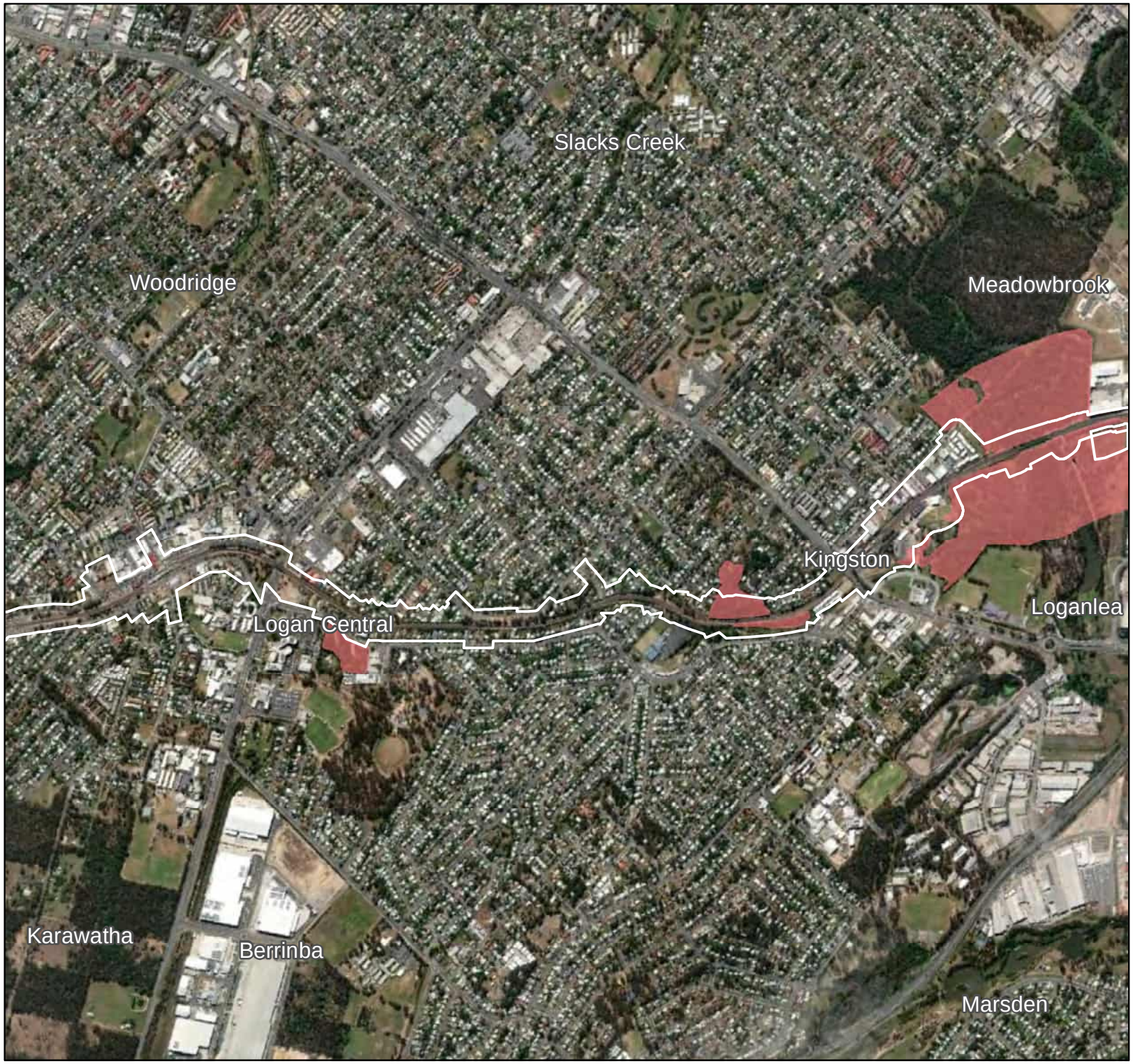


Ausecology

Appendix A-8:

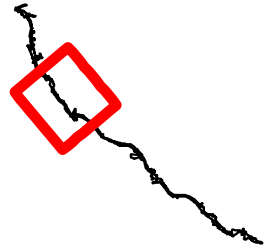
Greater Glider Habitat
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Greater Glider Habitat



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Ausecology

Appendix A-8:

Greater Glider Habitat
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

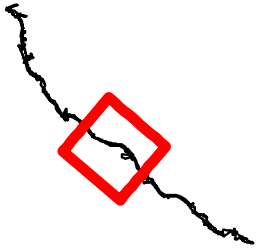
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Greater Glider Habitat



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Appendix A-8:

Greater Glider Habitat
Location: Bethania - Beenleigh

N

0 300 600

Metres

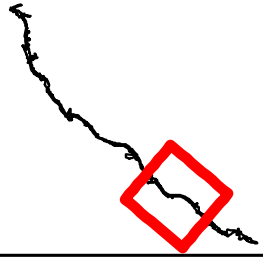
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Greater Glider Habitat



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Ausecology

Appendix A-8:

Greater Glider Habitat
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

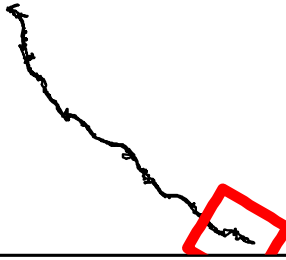
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Greater Glider Habitat



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Ausecology

Appendix A-8:

Grey Headed Flying Fox Habitat
Location: Kuraby - Woodridge

N

0 300 600

Metres

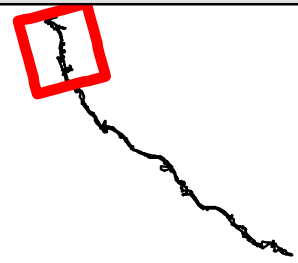
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Grey Headed Flying Fox Habitat



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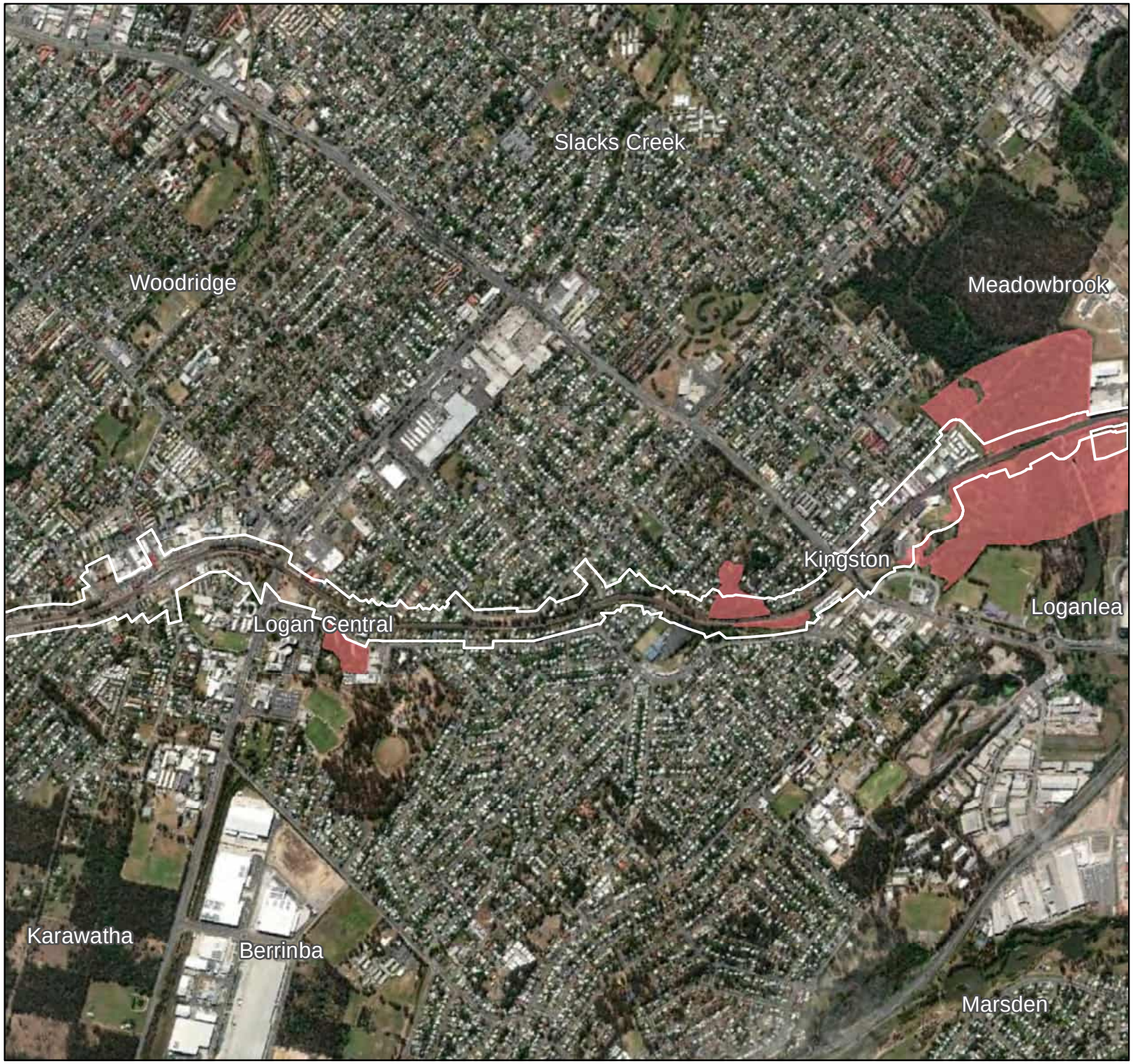


Ausecology

Appendix A-8:

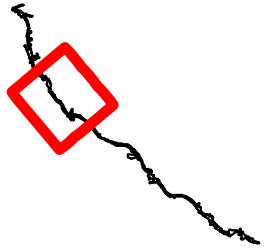
Grey Headed Flying Fox Habitat
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Grey Headed Flying Fox Habitat



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Ausecology

Appendix A-8:

Grey Headed Flying Fox Habitat
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

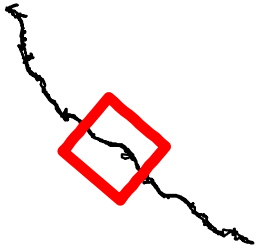
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Grey Headed Flying Fox Habitat



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Ausecology

Appendix A-8:

Grey Headed Flying Fox Habitat
Location: Bethania - Beenleigh

N

0 300 600

Metres

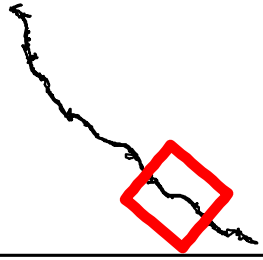
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Grey Headed Flying Fox Habitat



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Ausecology

Appendix A-8:

Grey Headed Flying Fox Habitat
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

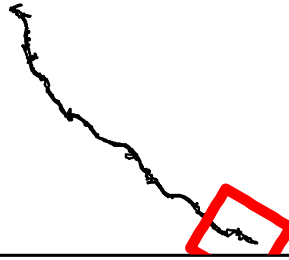
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Grey Headed Flying Fox Habitat



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Ausecology

Appendix A-8:

Koala Habitat
Location: Kuraby - Woodridge

N

0 300 600

Metres

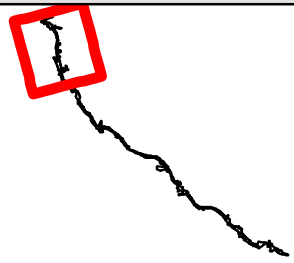
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Koala Habitat



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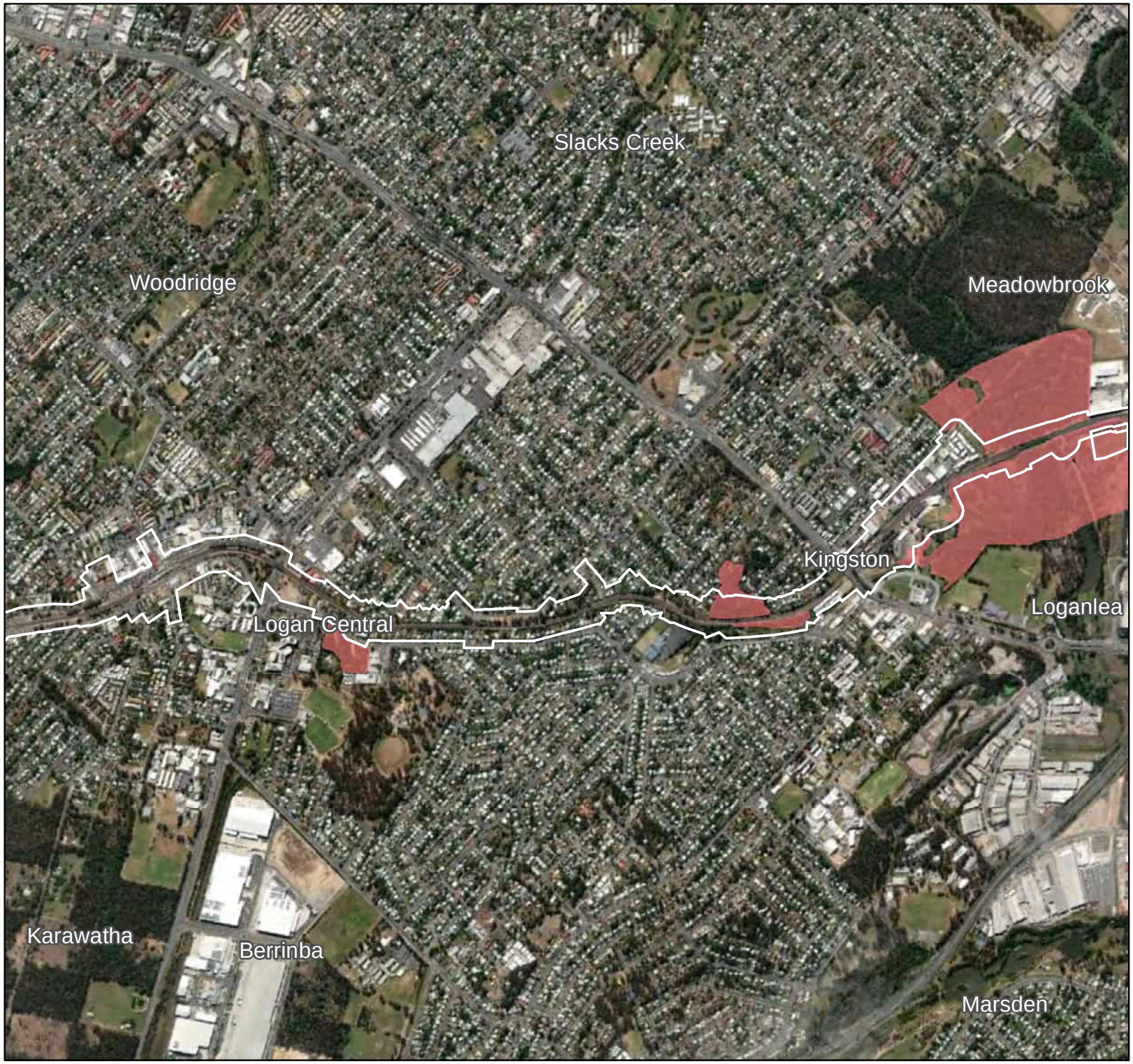


Ausecology

Appendix A-8:

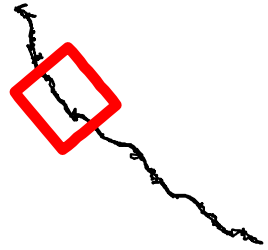
Koala Habitat
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Koala Habitat



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Appendix A-8:

Koala Habitat
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

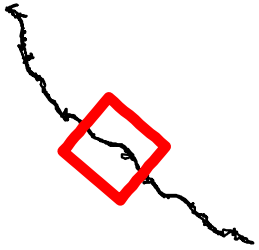
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Koala Habitat



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Ausecology

Appendix A-8:

Koala Habitat
Location: Bethania - Beenleigh

N

0 300 600

Metres

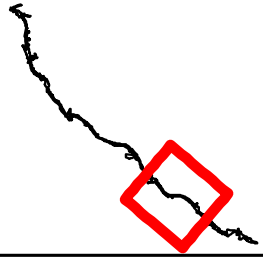
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Koala Habitat



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Appendix A-8:

Koala Habitat
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

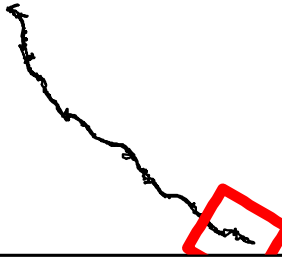
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Koala Habitat



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Ausecology

Appendix A-8:

Powerful Owl Habitat
Location: Kuraby - Woodridge

N

0 300 600

Metres

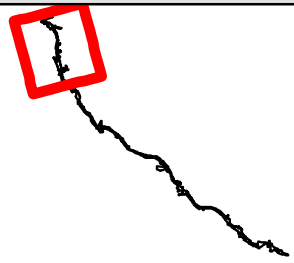
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Powerful Owl Habitat



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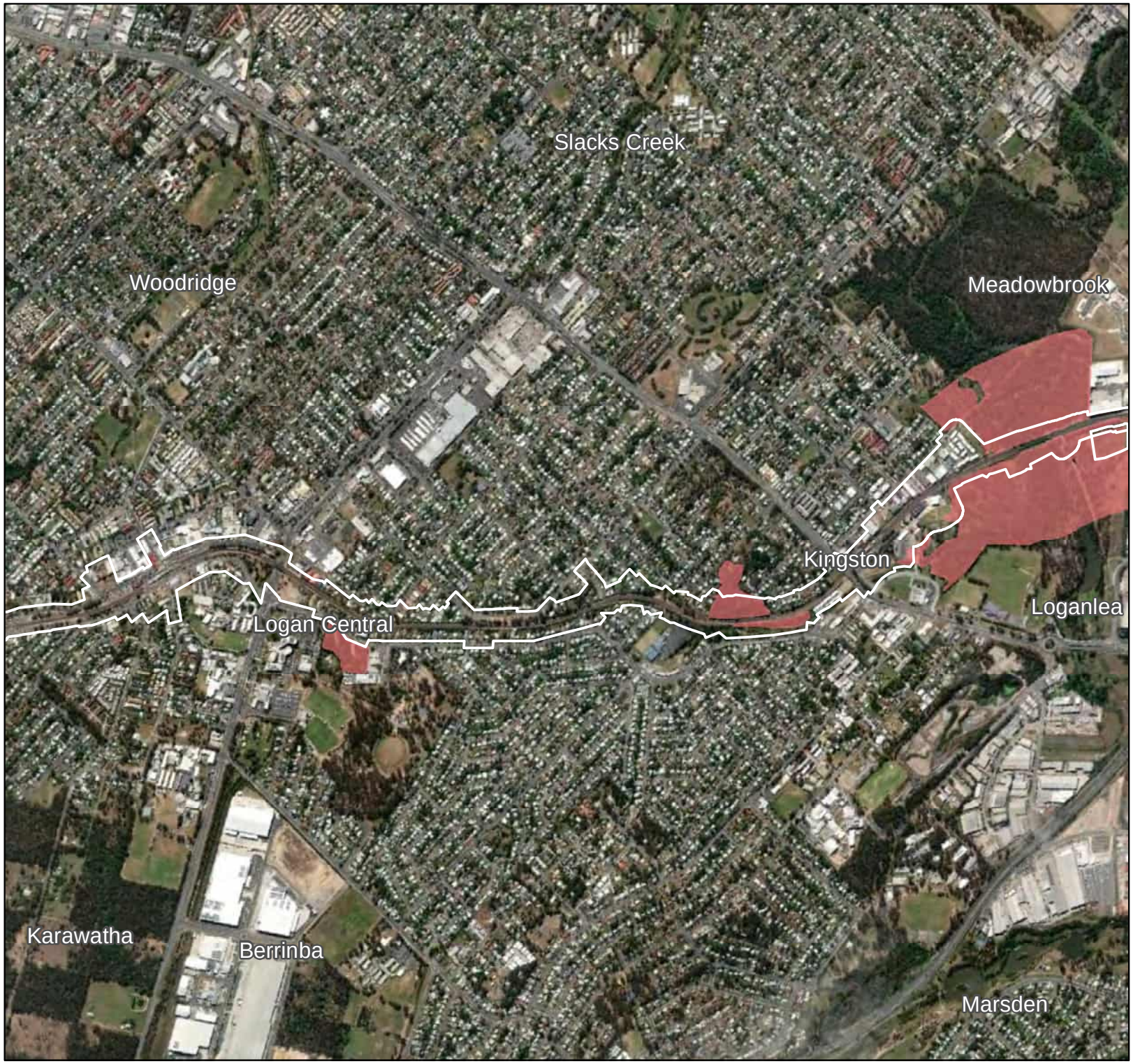


Ausecology

Appendix A-8:

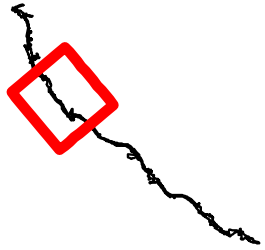
Powerful Owl Habitat
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Powerful Owl Habitat



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Ausecology

Appendix A-8:

Powerful Owl Habitat
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

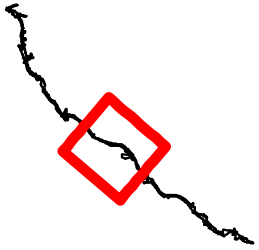
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Powerful Owl Habitat



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Ausecology

Appendix A-8:

Powerful Owl Habitat
Location: Bethania - Beenleigh

N

0 300 600

Metres

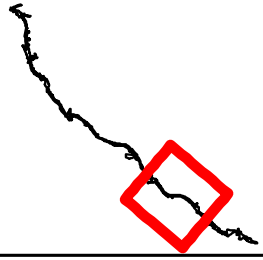
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Powerful Owl Habitat



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Ausecology

Appendix A-8:

Powerful Owl Habitat
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

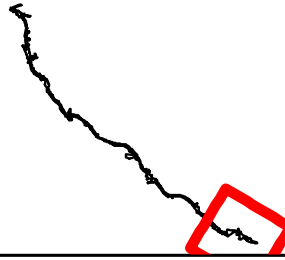
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Powerful Owl Habitat



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Ausecology

Appendix A-8:

Regent Honeyeater
Location: Kuraby - Woodridge

N

0 300 600

Metres

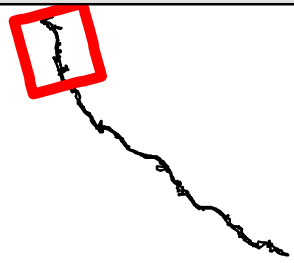
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Regent Honeyeater



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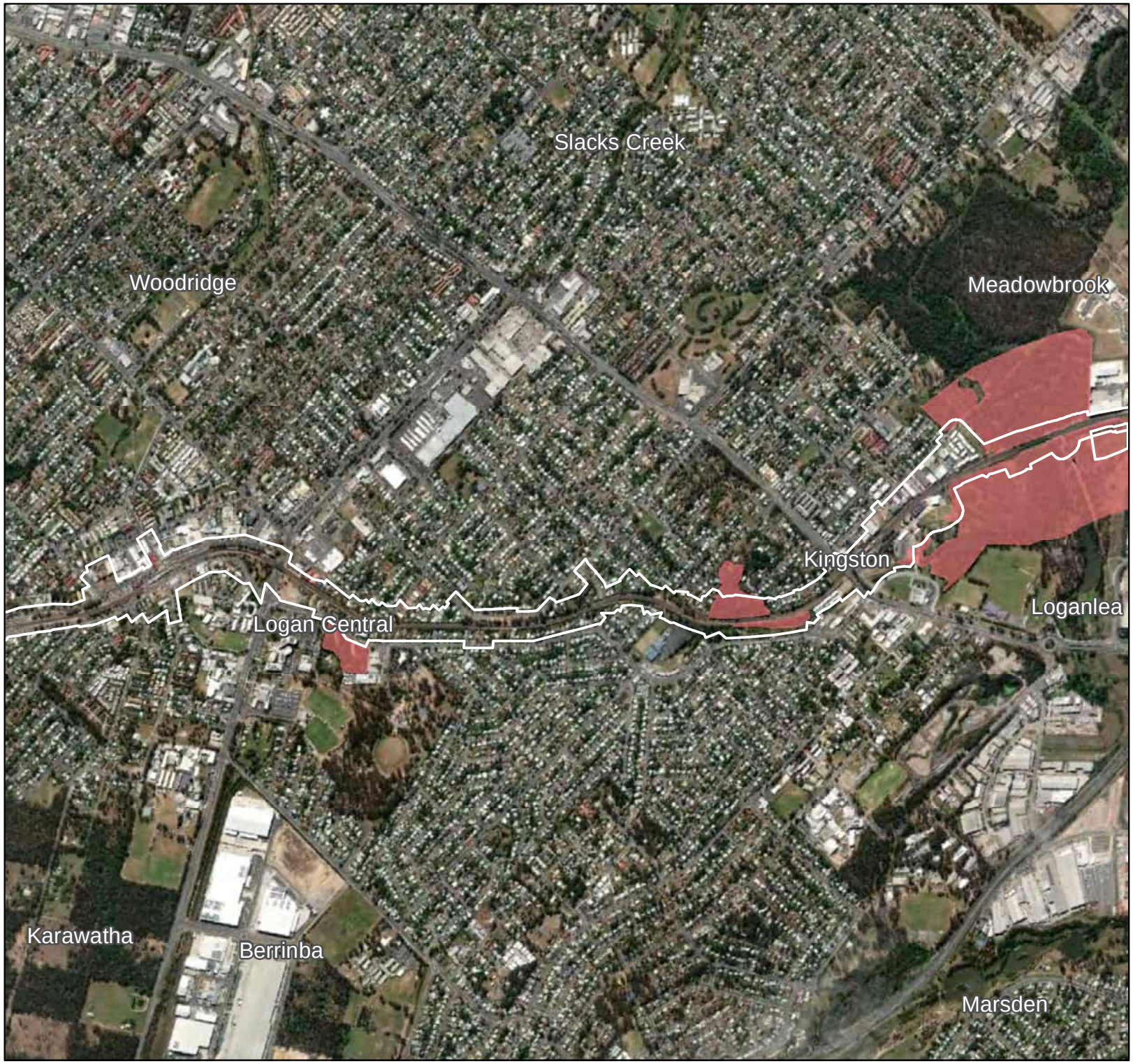


Ausecology

Appendix A-8:

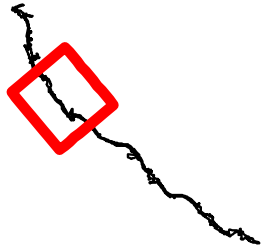
Regent Honeyeater
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Regent Honeyeater



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Ausecology

Appendix A-8:

Regent Honeyeater
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

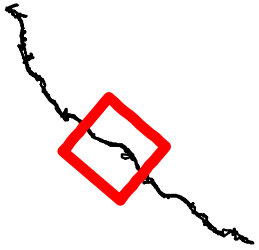
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Regent Honeyeater



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Ausecology

Appendix A-8:

Regent Honeyeater
Location: Bethania - Beenleigh

N

0 300 600

Metres

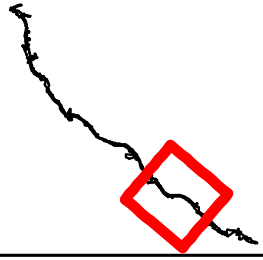
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Regent Honeyeater



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Appendix A-8:

Regent Honeyeater
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

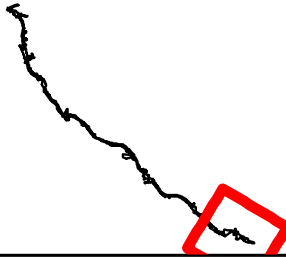
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Regent Honeyeater



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Ausecology

Appendix A-8:

Swift Parrot Habitat
Location: Kuraby - Woodridge

N

0 300 600

Metres

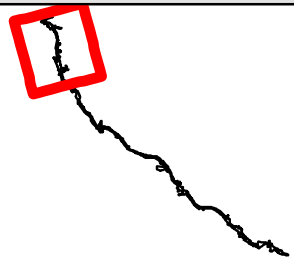
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Swift Parrot Habitat



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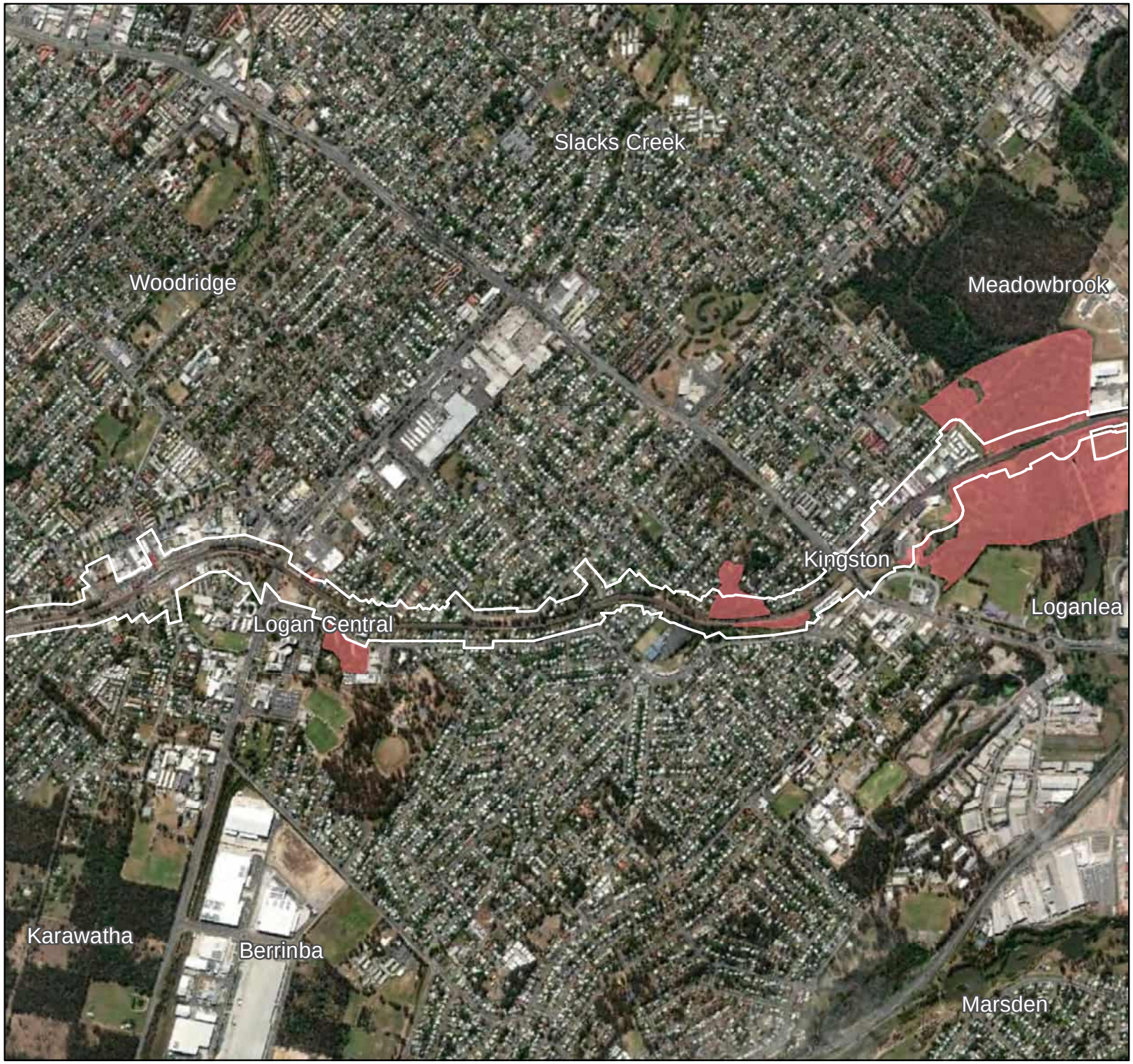


Ausecology

Appendix A-8:

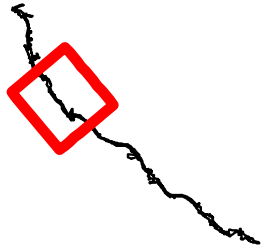
Swift Parrot Habitat
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Swift Parrot Habitat



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Appendix A-8:

Swift Parrot Habitat
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

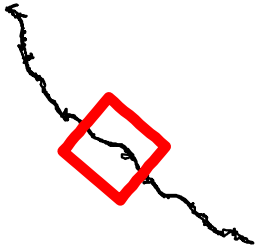
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Swift Parrot Habitat



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Ausecology

Appendix A-8:

Swift Parrot Habitat
Location: Bethania - Beenleigh

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0 300 600

Metres

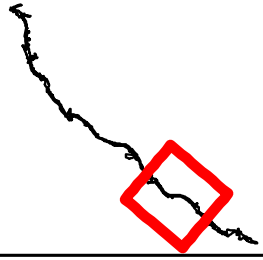
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Swift Parrot Habitat



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Appendix A-8:

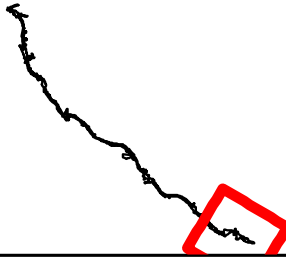
Swift Parrot Habitat
Location: Beenleigh - Mount Warren Park

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Swift Parrot Habitat



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Ausecology

Appendix A-8:

Tusked Frog Habitat
Location: Kuraby - Woodridge

N

0 300 600

Metres

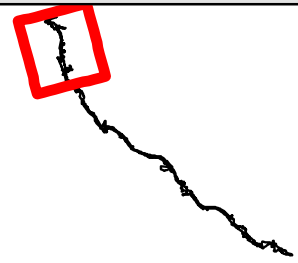
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Tusked Frog Habitat



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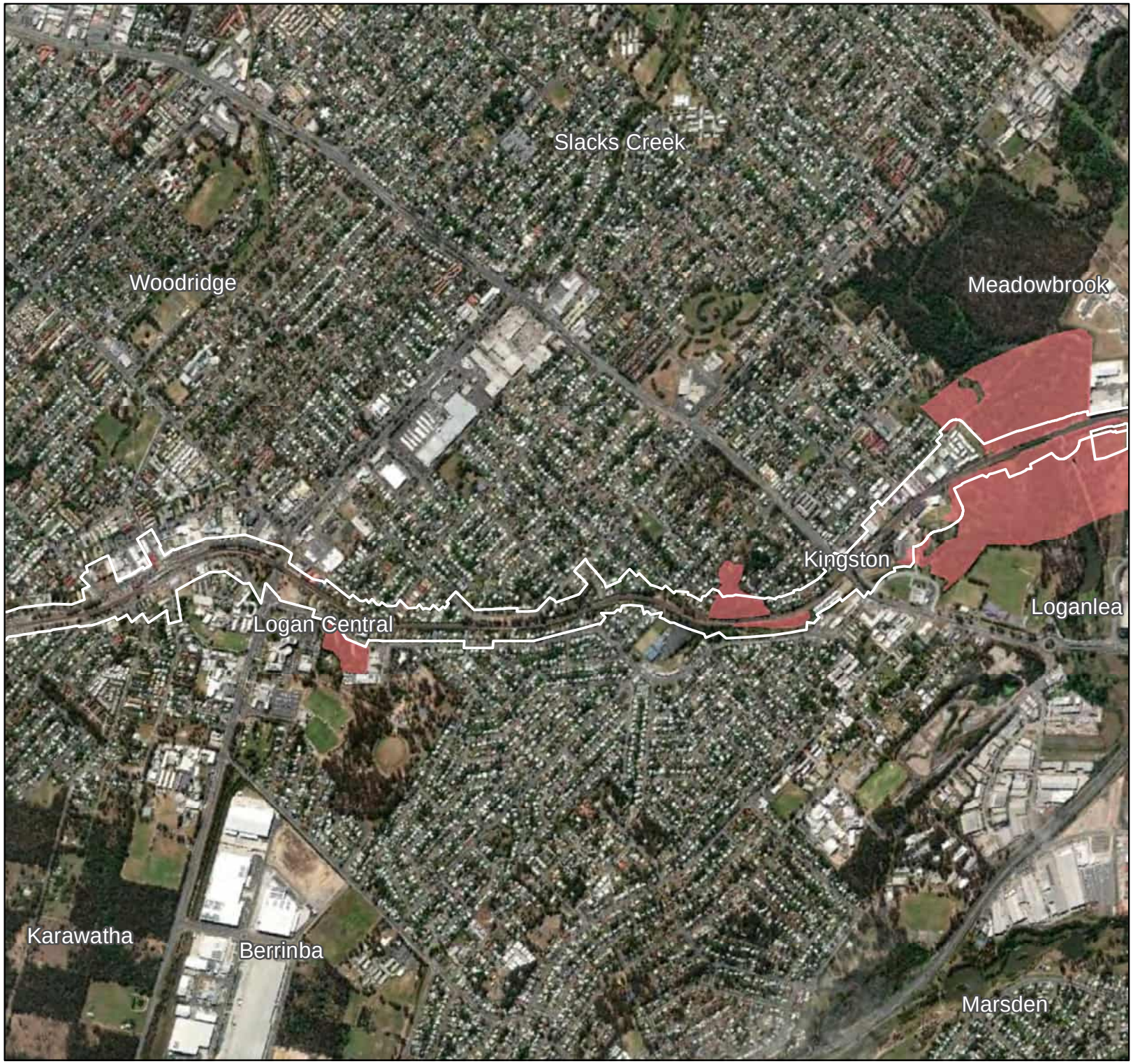

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Appendix A-8:

Tusked Frog Habitat
Location: Logan Central - Kingston

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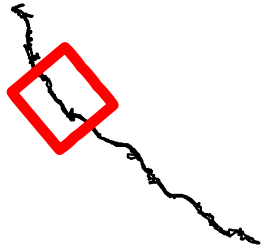
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Tusked Frog Habitat



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Appendix A-8:

Tusked Frog Habitat
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

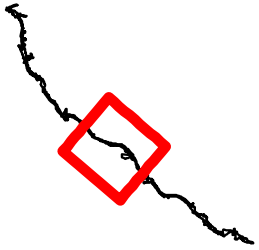
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Tusked Frog Habitat



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Appendix A-8:

Tusked Frog Habitat
Location: Bethania - Beenleigh

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Metres

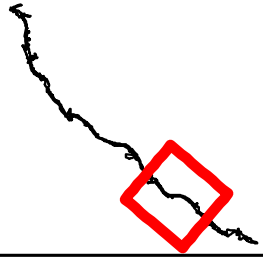
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Tusked Frog Habitat



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Appendix A-8:

Tusked Frog Habitat
Location: Beenleigh - Mount Warren Park

N

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Metres

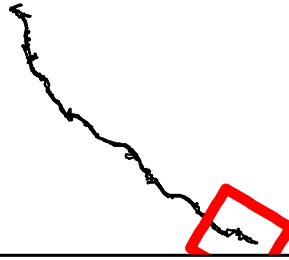
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Tusked Frog Habitat



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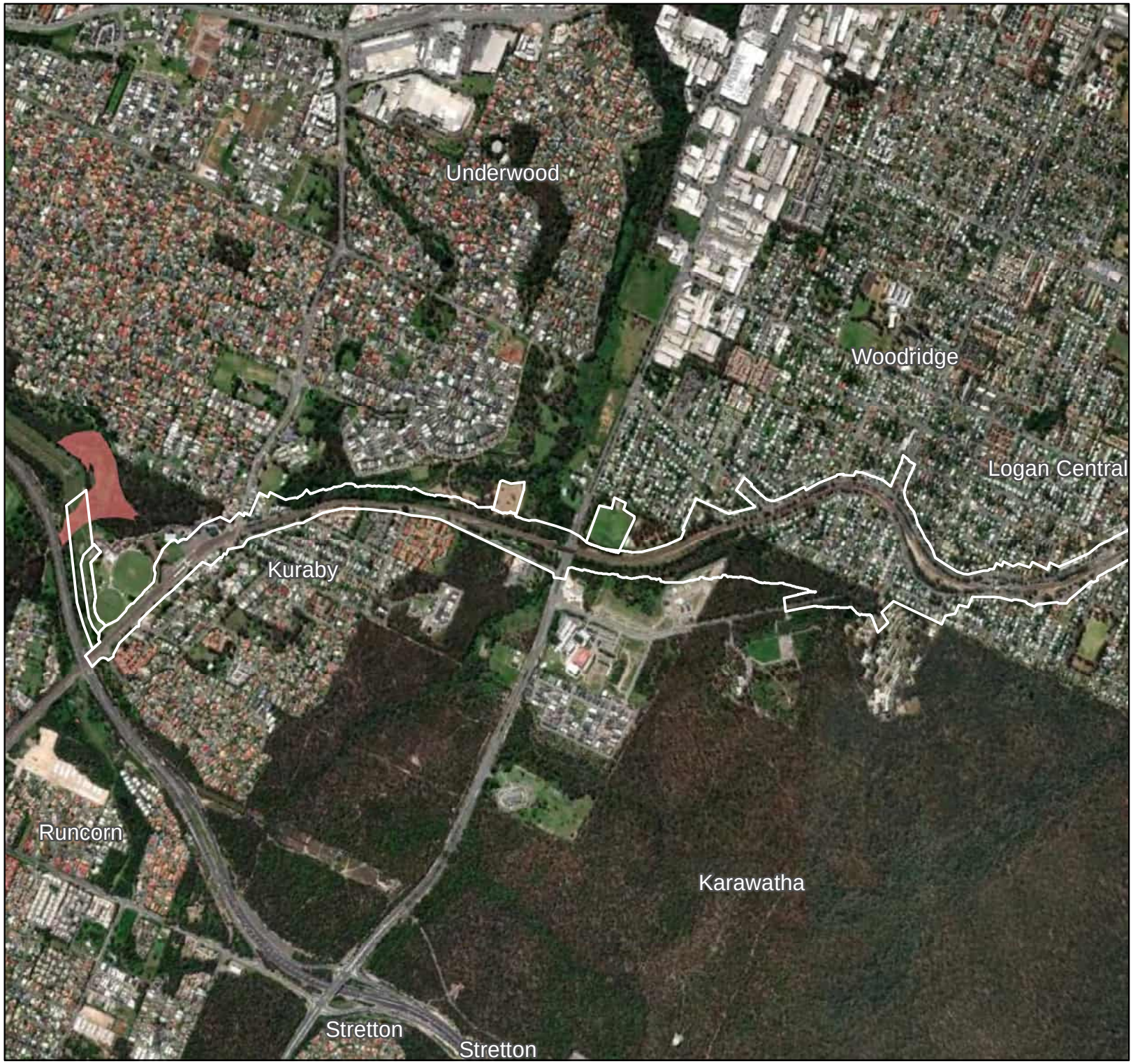


Ausecology

Appendix A-8:

Wallum Froglet Habitat
Location: Kuraby - Woodridge

N

0 300 600

Metres

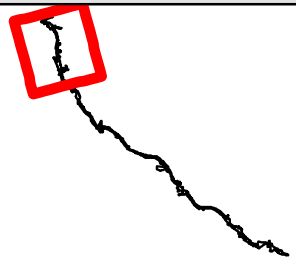
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Wallum Froglet Habitat



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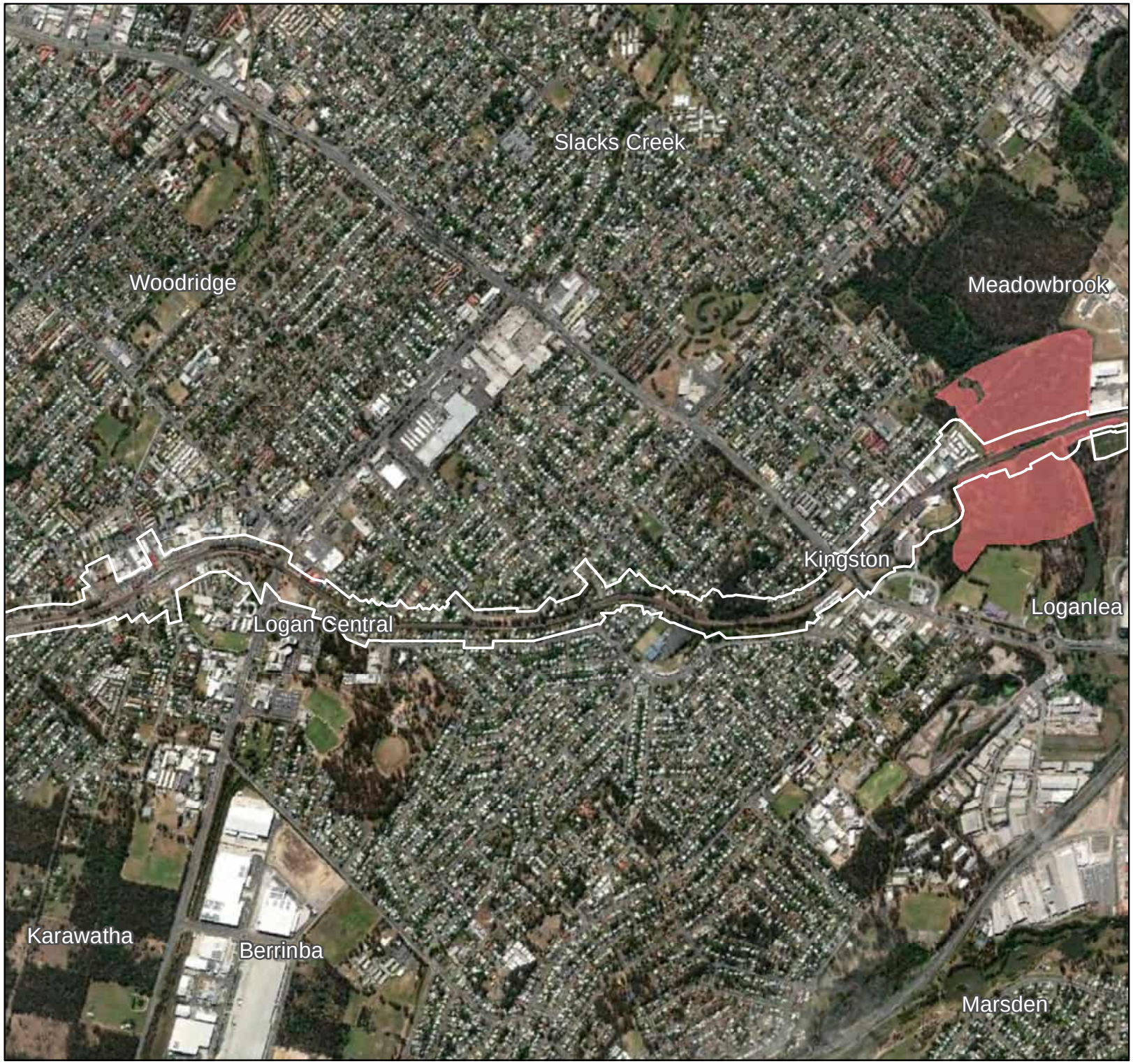


Ausecology

Appendix A-8:

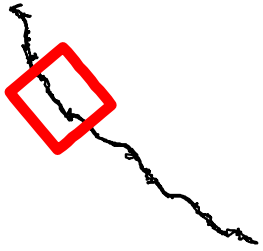
Wallum Froglet Habitat
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- Wallum Froglet Habitat



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Ausecology

Appendix A-8:

Wallum Froglet Habitat
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

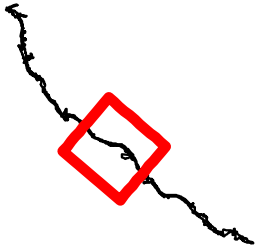
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Wallum Froglet Habitat



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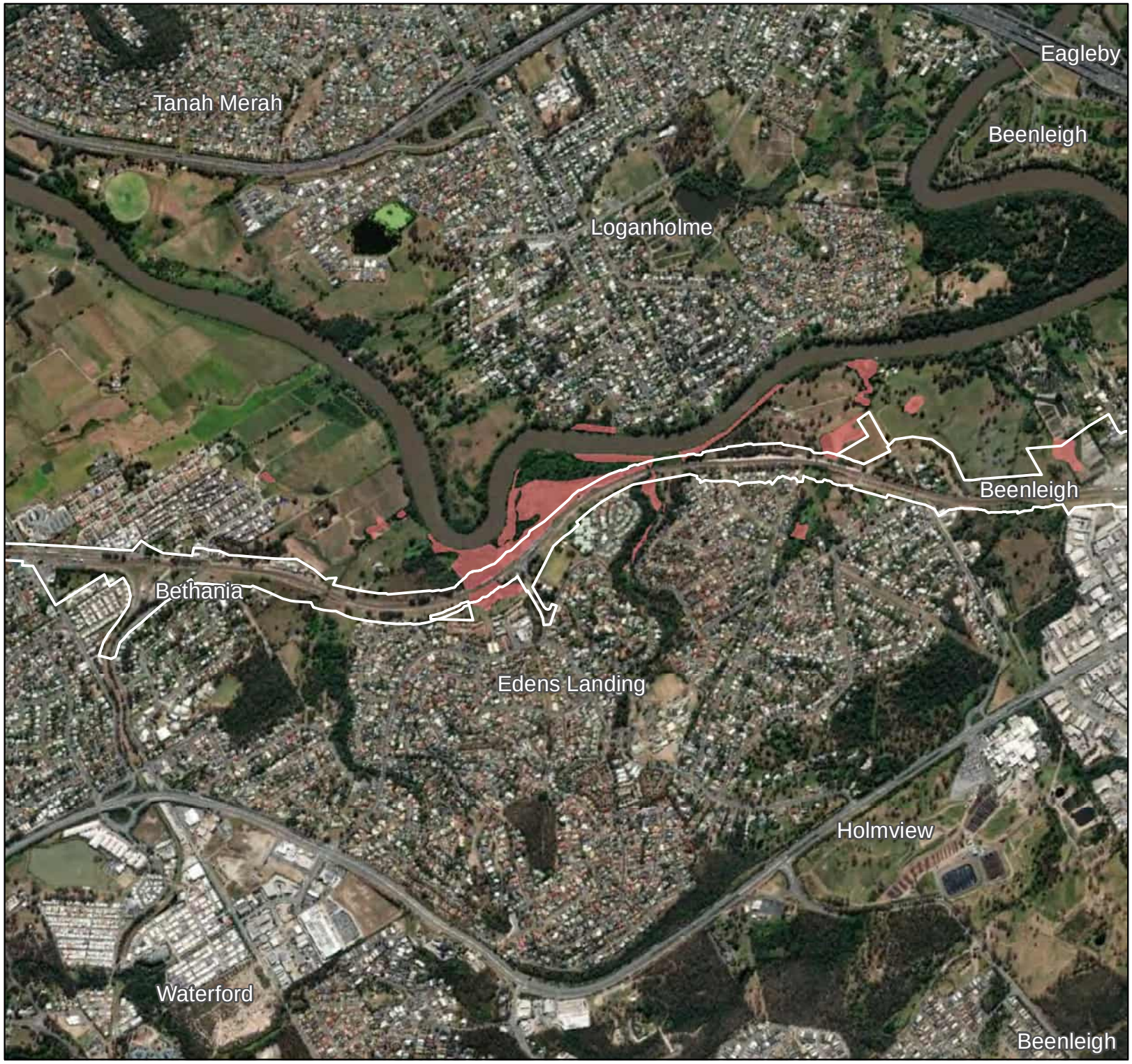


Ausecology

Appendix A-8:

Wallum Froglet Habitat
Location: Bethania - Beenleigh

N

0 300 600

Metres

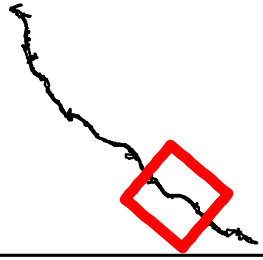
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Wallum Froglet Habitat



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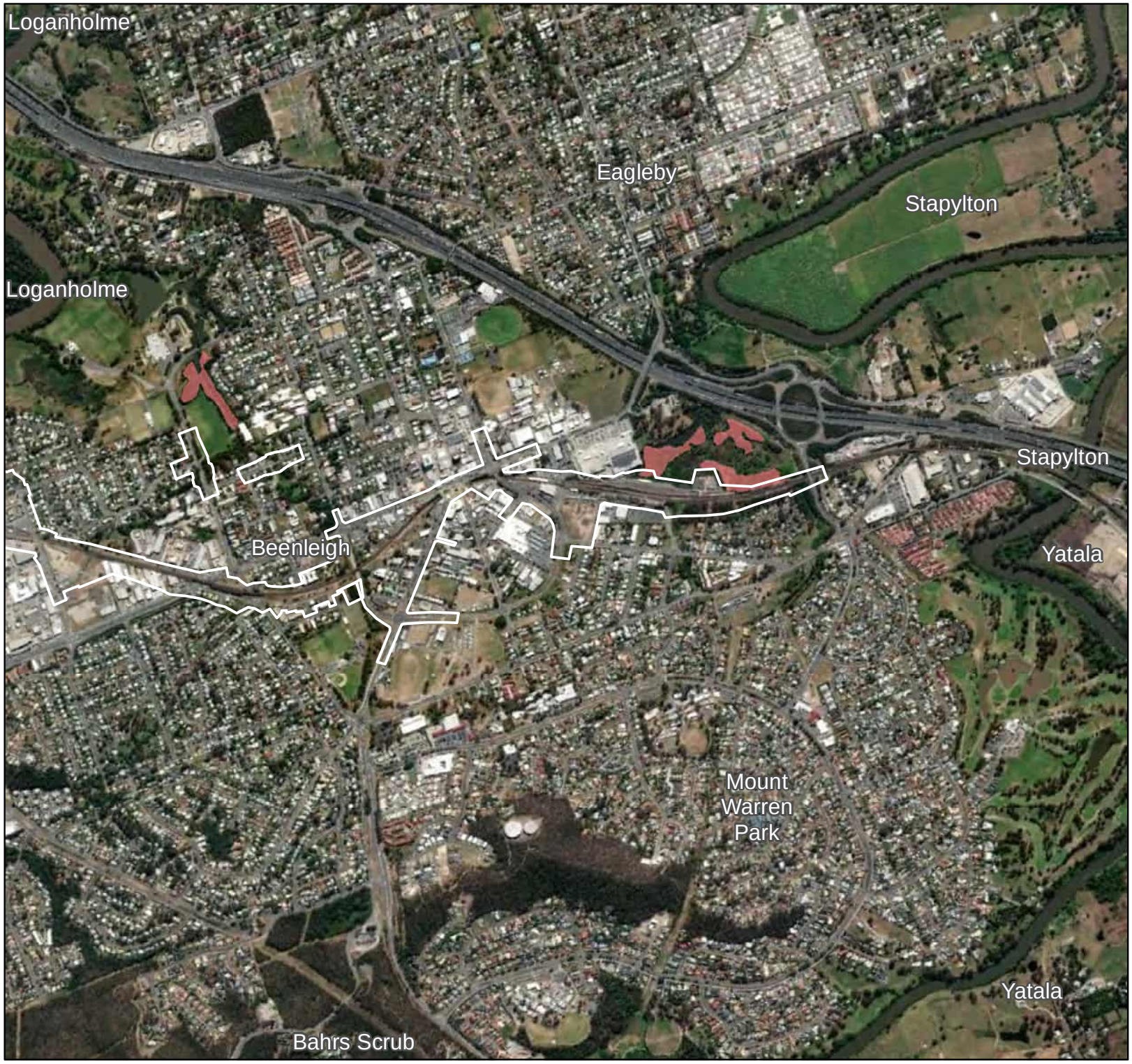


Ausecology

Appendix A-8:

Wallum Froglet Habitat
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

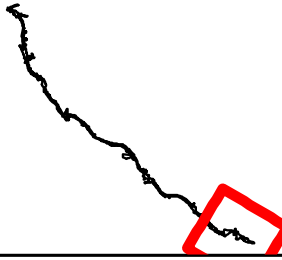
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- Wallum Froglet Habitat



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Ausecology

Appendix A-8:

White-throated Needletail
Location: Kuraby - Woodridge

N

0 300 600

Metres

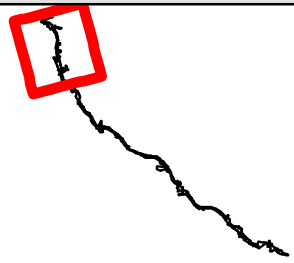
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- White-throated Needletail



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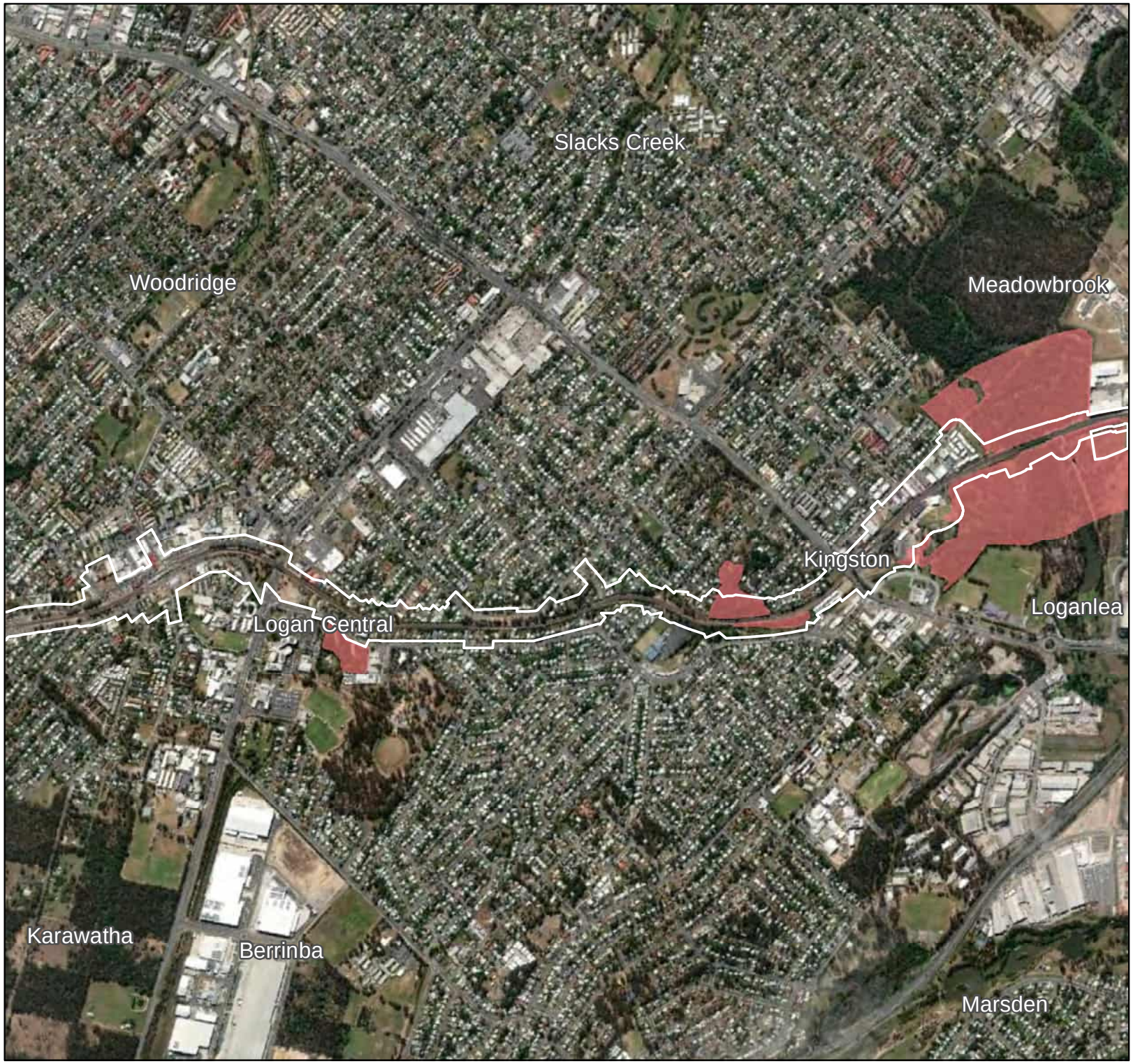


Ausecology

Appendix A-8:

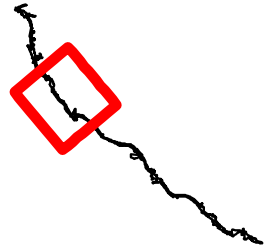
White-throated Needletail
Location: Logan Central - Kingston

0 300 600
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project Area
- White-throated Needletail



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Ausecology

Appendix A-8:

White-throated Needletail
Location: Meadowbrook - Loganlea

N

0 300 600

Metres

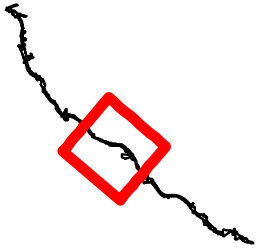
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- White-throated Needletail



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Ausecology

Appendix A-8:

White-throated Needletail
Location: Bethania - Beenleigh

N

0 300 600

Metres

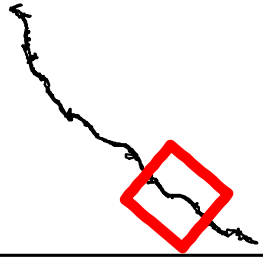
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- White-throated Needletail



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Ausecology

Appendix A-8:

White-throated Needletail
Location: Beenleigh - Mount Warren Park

N

0 300 600

Metres

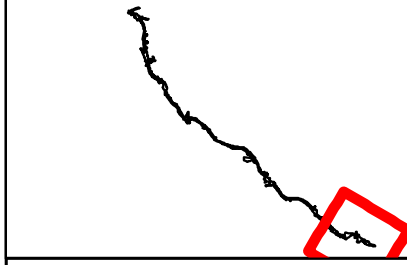
Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project Area
- White-throated Needletail



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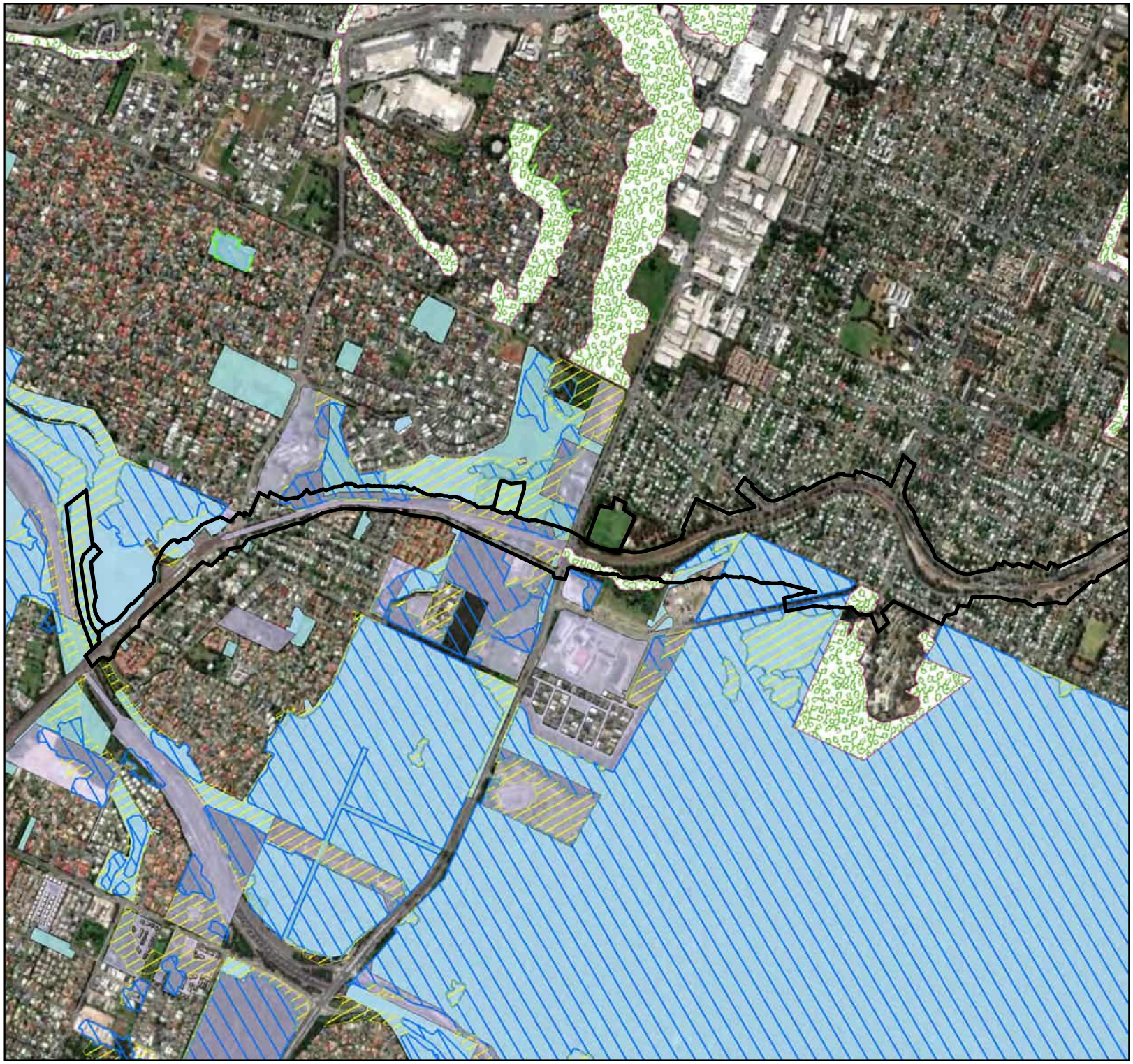


Ausecology

Appendix A-13:

MLES
Location: Kuraby - Woodridge

N

0 200 400 800

Metres

Scale: 1:20,000

Coordinate System: GDA2020

Datum: GDA2020

Legend

- Project
- Locally Significant Vine Forest Areas (Logan

Biodiversity Trigger (Logan Council)

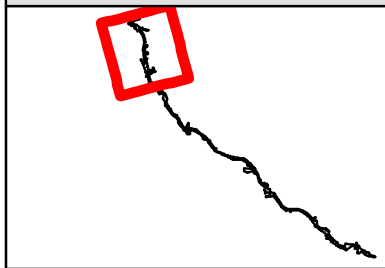
- Primary Vegetation Management
- Secondary Vegetation Management
- Corridors and Wetlands (Logan Council)

Biodiversity Areas (Brisbane City

- Biodiversity area (General ecological significance strategic)
- Biodiversity area (General ecological significance)
- Biodiversity area (High ecological significance strategic)
- Biodiversity area (High ecological significance)

Protected Vegetation - Natural Assets Local Law 2003 (Brisbane City Council)

- Waterway and Wetland Vegetation
- Significant Native Vegetation
- Council Vegetation



Data sources:
Brisbane City Council
City Plan 2014 — Biodiversity areas overlay — Biodiversity areas
Protected Vegetation (Natural Assets Local Law 2003) — Waterway and Wetland
Protected Vegetation (Natural Assets Local Law 2003) — Council Vegetation
Protected Vegetation (Natural Assets Local Law 2003) — Significant Native Vegetation
Logan City Council
OM-02.00 Biodiversity areas trigger
Corridors and Wetlands
Locally significant Vine Forest area
Locally significant Gossia gonoclada area

Document History:

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Ausecology

Appendix A-13:

MLES
Location: Logan Central - Kingston

0 200 400 800
Metres

Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project
- Locally Significant Vine Forest Areas (Logan

Biodiversity Trigger (Logan Council)

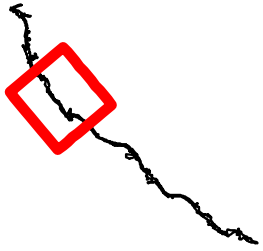
- Primary Vegetation Management
- Secondary Vegetation Management
- Corridors and Wetlands (Logan Council)

Biodiversity Areas (Brisbane City

- Biodiversity area (High ecological significance strategic)
- Biodiversity area (High ecological significance)

Protected Vegetation - Natural Assets Local Law 2003 (Brisbane City Council)

- Waterway and Wetland Vegetation
- Significant Native Vegetation
- Council Vegetation



Data sources:
Brisbane City Council
City Plan 2014 — Biodiversity areas overlay — Biodiversity areas
Protected Vegetation (Natural Assets Local Law 2003) — Waterway and Wetland
Protected Vegetation (Natural Assets Local Law 2003) — Council Vegetation
Protected Vegetation (Natural Assets Local Law 2003) — Significant Native Vegetation
Logan City Council
OM-02.00 Biodiversity areas trigger
Corridors and Wetlands
Locally significant Vine Forest area
Locally significant Gossia gonoclada area

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Ausecology

Appendix A-13:

MLES
Location: Meadowbrook - Loganlea

N

0 200 400 800

Metres

Scale: 1:20,000

Coordinate System: GDA2020

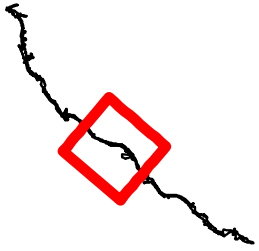
Datum: GDA2020

Legend

- Project
- Locally Significant Vine Forest Areas (Logan

Biodiversity Trigger (Logan Council)

- Primary Vegetation Management
- Secondary Vegetation Management
- Corridors and Wetlands (Logan Council)



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City Plan 2014 — Biodiversity areas overlay — Biodiversity areas
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Protected Vegetation (Natural Assets Local Law 2003) — Significant Native Vegetation
Logan City Council
OM-02.00 Biodiversity areas trigger
Corridors and Wetlands
Locally significant Vine Forest area
Locally significant Gossia gonoclada area

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Ausecology

Appendix A-13:

MLES
Location: Bethania - Beenleigh

N

0 200 400 800

Metres

Scale: 1:20,000

Coordinate System: GDA2020

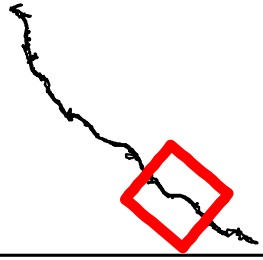
Datum: GDA2020

Legend

- Project
- Locally Significant Vine Forest Areas (Logan

Biodiversity Trigger (Logan Council)

- Primary Vegetation Management
- Secondary Vegetation Management
- Corridors and Wetlands (Logan Council)



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City Plan 2014 — Biodiversity areas overlay — Biodiversity areas
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Protected Vegetation (Natural Assets Local Law 2003) — Council Vegetation
Protected Vegetation (Natural Assets Local Law 2003) — Significant Native Vegetation
Logan City Council
OM-02.00 Biodiversity areas trigger
Corridors and Wetlands
Locally significant Vine Forest area
Locally significant Gossia gonoclada area

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Ausecology

Appendix A-13:

MLES
Location: Beenleigh - Mount Warren Park

N

0 200 400 800
Metres

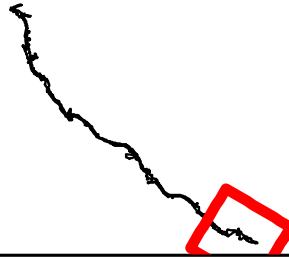
Scale: 1:20,000
Coordinate System: GDA2020
Datum: GDA2020

Legend

- Project
- Locally Significant Vine Forest Areas (Logan

Biodiversity Trigger (Logan Council)

- Primary Vegetation Management
- Secondary Vegetation Management
- Corridors and Wetlands (Logan Council)



Data sources:
Brisbane City Council
City Plan 2014 — Biodiversity areas overlay — Biodiversity areas
Protected Vegetation (Natural Assets Local Law 2003) — Waterway and Wetland
Protected Vegetation (Natural Assets Local Law 2003) — Council Vegetation
Protected Vegetation (Natural Assets Local Law 2003) — Significant Native Vegetation
Logan City Council
OM-02.00 Biodiversity areas trigger
Corridors and Wetlands
Locally significant Vine Forest area
Locally significant Gossia gonoclada area

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Appendix C

Koala Survey Report (2022)

Appendix C Koala Survey Report (2022)

Appendix D

Lot and Plans

Appendix D - Lot and Plans

LOT	PLAN	LOCALITY
2	RP127402	Woodridge
18	RP113277	Woodridge
1	GTP3	Woodridge
1	SP191815	Woodridge
0	SP263441	Woodridge
0	SP273386	Woodridge
2	RP150191	Meadowbrook
688	RP191785	Bethania
0	SP170338	Bethania
0	SP170338	Bethania
1	SP281233	Bethania
3	SP281233	Bethania
56	SP284811	Bethania
61	SP284811	Bethania
3	SP295236	Bethania
901	RP164264	Bethania
702	SP290407	Bethania
21	SP290407	Bethania
8	SP331056	Bethania
12	RP128727	Bethania
1	RP8048	Bethania
14	SP108695	Bethania
76	SP287603	Bethania
79	SP287603	Bethania
81	SP287603	Bethania
3	RP8040	Bethania
2	RP168714	Edens Landing
3	RP164489	Holmview
94	RP863699	Edens Landing
947	SP126303	Edens Landing
16	SP114587	Edens Landing
81	SP163692	Holmview
2	RP168717	Beenleigh
198	RP140873	Beenleigh
197	RP140873	Beenleigh
261	WD6515	Beenleigh
18	SP114582	Beenleigh
24	SP145848	Beenleigh
19	SP114586	Beenleigh
4	SP163688	Beenleigh
6	SP163688	Beenleigh
0	SP320086	Beenleigh
21	SP191056	Beenleigh
7	B13211	Beenleigh
1	RP142246	Beenleigh
20	RP8004	Beenleigh
12	RP8004	Beenleigh
264	CP890581	Beenleigh
33	BUP101672	Beenleigh
0	BUP8761	Beenleigh
1	SP210888	Beenleigh
0	SP250759	Beenleigh
0	SP250759	Beenleigh
1	RP213840	Beenleigh
4	RP213840	Beenleigh
11	RP852901	Beenleigh
175	RP892699	Beenleigh
42	RP137433	Beenleigh

43	RP137433	Beenleigh
37	RP140869	Beenleigh
20	RP217363	Beenleigh
45	RP868208	Beenleigh
1	SP275295	Beenleigh
11	RP8097	Beenleigh
6	RP8097	Beenleigh
161	RP893411	Beenleigh
2	SP153605	Beenleigh
1	RP93164	Beenleigh
15	RP8117	Beenleigh
19	RP234019	Beenleigh
16	SP240664	Beenleigh
12	SP240667	Beenleigh
291	SP127606	Beenleigh
3	RP136016	Woodridge
79	RP136016	Woodridge
63	RP136016	Woodridge
62	RP136016	Woodridge
74	RP136016	Woodridge
71	RP136016	Woodridge
53	RP136016	Woodridge
54	RP136016	Woodridge
43	RP136016	Woodridge
42	RP136016	Woodridge
52	RP136016	Woodridge
34	RP136016	Woodridge
20	RP136016	Woodridge
26	RP73277	Woodridge
13	RP73277	Woodridge
51	RP73277	Woodridge
49	RP73277	Woodridge
53	RP73277	Woodridge
60	RP73277	Woodridge
91	RP869376	Edens Landing
66	RP73277	Woodridge
91	RP136016	Woodridge
1	RP132771	Woodridge
5	RP105525	Woodridge
19	RP113277	Woodridge
42	RP45531	Logan Central
44	RP45531	Logan Central
1	RP110223	Kingston
18	RP103430	Logan Central
2	RP123956	Logan Central
14	RP115813	Logan Central
5	RP136693	Logan Central
6	RP136693	Logan Central
7	RP136693	Logan Central
11	RP136693	Logan Central
7	RP173915	Logan Central
50	SP150107	Logan Central
7	SP171102	Logan Central
855	RP108221	Logan Central
863	RP108229	Logan Central
864	RP108229	Logan Central
6	RP121509	Woodridge
5	RP121509	Woodridge
1	RP103240	Woodridge

10	RP103240	Woodridge
44	RP883965	Meadowbrook
50	RP908455	Meadowbrook
52	RP908455	Meadowbrook
7	SP209591	Meadowbrook
9	SP209591	Meadowbrook
0	SP180828	Loganlea
0	SP180828	Loganlea
24	SP180828	Loganlea
61	SP180828	Loganlea
22	SP236597	Loganlea
33	SL12627	Loganlea
15	RP222505	Kingston
1	RP208271	Kingston
0	SP214461	Kingston
49	SP214461	Kingston
7	SP214461	Kingston
20	SP214461	Kingston
39	SP214461	Kingston
36	RP25866	Loganlea
16	RP221549	Loganlea
33	SL12627	Loganlea
20	SP236596	Loganlea
35	RP202907	Edens Landing
40	RP37751	Logan Central
3	GTP2733	Logan Central
4	GTP2733	Logan Central
0	GTP2733	Logan Central
0	BUP102910	Logan Central
3	SP171103	Logan Central
2	SP171103	Logan Central
77	RP124577	Woodridge
1	RP160092	Woodridge
4	RP136404	Woodridge
911	SP168724	Woodridge
14	RP107881	Logan Central
23	RP107882	Logan Central
28	RP107882	Logan Central
871	RP108229	Logan Central
881	RP108229	Logan Central
0	SP222478	Logan Central
36	RP106550	Kingston
830	RP112418	Logan Central
846	RP108221	Logan Central
7	RP128988	Kingston
8	RP128988	Kingston
9	RP128988	Kingston
12	RP128988	Kingston
13	RP128988	Kingston
11	GTP100060	Kuraby
10	RP107143	Kingston
4	RP107143	Kingston
1	RP858827	Kingston
36	SP280048	Karawatha
40	SP280048	Karawatha
44	SP280048	Karawatha
48	SP280048	Karawatha
EE	SP280048	Karawatha
FF	SP280048	Karawatha

1002	SP266240	Kuraby
16	RP37393	Kuraby
17	RP37393	Kuraby
18	RP37393	Kuraby
111	SP223251	Runcorn
8	RP37751	Woodridge
43	RP113277	Woodridge
0	GTP3	Woodridge
3	SP273386	Woodridge
1	RP107993	Woodridge
1	RP150191	Meadowbrook
1	RP25858	Meadowbrook
137	CP827107	Loganlea
2	RP173106	Karawatha
2	RP178226	Bethania
607	RP191684	Bethania
603	RP191684	Bethania
598	RP191685	Bethania
692	RP191785	Bethania
689	RP191785	Bethania
0	SP271484	Bethania
52	SP284811	Bethania
62	SP284811	Bethania
5	SP321940	Bethania
40	SP290407	Bethania
1	RP8050	Bethania
37	SP144327	Bethania
0	SP287600	Bethania
70	SP287603	Bethania
74	SP287603	Bethania
78	SP287603	Bethania
7	RP839012	Bethania
2	RP164489	Holmview
1	RP164489	Holmview
96	RP863699	Edens Landing
97	RP863699	Edens Landing
72	SP109405	Edens Landing
1	RP153631	Beenleigh
1	RP203612	Beenleigh
199	RP140873	Beenleigh
3	SP121676	Beenleigh
1	SP307207	Beenleigh
12	SP307207	Beenleigh
0	SP320086	Beenleigh
6	RP148268	Beenleigh
0	BUP8731	Beenleigh
2	RP118901	Beenleigh
204	WD4350	Beenleigh
1	RP55307	Beenleigh
2	RP120157	Beenleigh
3	RP146807	Beenleigh
8	RP8004	Beenleigh
17	RP8004	Beenleigh
48	SP109408	Beenleigh
30	SP118729	Beenleigh
0	BUP101672	Beenleigh
2	BUP101672	Beenleigh
30	BUP101672	Beenleigh
0	SP204222	Beenleigh

0	SP263443	Beenleigh
2	SP255750	Beenleigh
0	SP287135	Beenleigh
3	RP82761	Beenleigh
1	RP78838	Beenleigh
2	RP229346	Beenleigh
5	SP107676	Beenleigh
48	RP137433	Beenleigh
24	RP140869	Beenleigh
40	RP140869	Beenleigh
34	RP140871	Beenleigh
4	RP137433	Beenleigh
14	SP142973	Beenleigh
93	SP109407	Beenleigh
2	SP275295	Beenleigh
5	RP84377	Beenleigh
1	RP200696	Beenleigh
4	RP136016	Woodridge
1	RP136016	Woodridge
70	RP136016	Woodridge
69	RP136016	Woodridge
81	RP136016	Woodridge
73	RP136016	Woodridge
39	RP136016	Woodridge
48	RP136016	Woodridge
32	RP136016	Woodridge
24	RP136016	Woodridge
21	RP136016	Woodridge
29	RP136016	Woodridge
2	RP73277	Woodridge
28	RP73277	Woodridge
50	RP73277	Woodridge
58	RP73277	Woodridge
59	RP73277	Woodridge
52	RP73277	Woodridge
32	RP73277	Woodridge
35	RP73277	Woodridge
33	RP73277	Woodridge
87	RP136016	Woodridge
86	RP136016	Woodridge
100	RP136016	Woodridge
8	RP105525	Woodridge
20	RP113277	Woodridge
27	RP102545	Logan Central
11	RP122847	Kingston
6	RP116657	Kingston
13	RP103430	Logan Central
17	RP103430	Logan Central
19	RP103430	Logan Central
4	RP119565	Logan Central
118	RP109759	Loganlea
119	RP109759	Loganlea
120	RP109759	Loganlea
1	RP109759	Loganlea
2	RP109759	Loganlea
867	RP108229	Logan Central
3	RP121509	Woodridge
43	RP883965	Meadowbrook
14	SP185266	Meadowbrook

0	SP210095	Meadowbrook
14	SP210095	Meadowbrook
0	SP180828	Loganlea
51	SP180828	Loganlea
53	SP180828	Loganlea
71	SP180828	Loganlea
74	SP180828	Loganlea
21	RP119435	Kingston
20	RP119435	Kingston
11	RP119435	Kingston
2	RP119435	Kingston
13	RP222505	Kingston
14	RP222505	Kingston
1	RP114753	Kingston
2	RP171477	Kingston
135	CP827105	Kingston
7	SP185919	Kingston
0	SP214461	Kingston
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45	SP214461	Kingston
16	SP214461	Kingston
21	SP214461	Kingston
35	SP214461	Kingston
44	SP214461	Kingston
13	RP209342	Kingston
26	RP37751	Logan Central
38	RP131782	Logan Central
41	RP45531	Logan Central
1	RP70518	Logan Central
2	RP70518	Logan Central
3	RP70518	Logan Central
33	RP45531	Logan Central
1	RP207340	Logan Central
3	GTP677	Logan Central
2	GTP2733	Logan Central
3	GTP2733	Logan Central
22	RP906578	Logan Central
1	SP153952	Logan Central
52	RP845820	Logan Central
3	BUP6861	Logan Central
15	RP107881	Logan Central
22	RP107882	Logan Central
37	RP107882	Logan Central
876	RP108229	Logan Central
880	RP108229	Logan Central
1	SP305134	Logan Central
0	SP263460	Kingston
1	SP263460	Kingston
8	SP277695	Kingston
12	SP277695	Kingston
24	SP277695	Kingston
833	RP112418	Logan Central
825	RP112418	Logan Central
17	RP107004	Kingston
18	RP107004	Kingston
21	RP107004	Kingston
12	RP139962	Kingston
1	RP112119	Kingston
10	RP128988	Kingston

46	GTP3989	Kuraby
15	GTP100060	Kuraby
18	GTP100405	Kuraby
21	GTP100405	Kuraby
23	GTP100405	Kuraby
24	GTP100405	Kuraby
2	RP107143	Kingston
26	SP103672	Kingston
1	RP91478	Kuraby
1004	SP248979	Kuraby
12	RP37393	Kuraby
10	RP37393	Kuraby
38	SP190117	Kuraby
103	SP241528	Kuraby
1	RP127402	Woodridge
0	SP263441	Woodridge
1	SP273385	Woodridge
2	SP323657	Woodridge
1	RP25857	Meadowbrook
604	RP191684	Bethania
602	RP191685	Bethania
1	SP159927	Bethania
2	SP159927	Bethania
0	SP271484	Bethania
584	RP191702	Bethania
1	RP212475	Bethania
3	RP183811	Bethania
0	GTP1044	Bethania
0	SP267645	Bethania
212	SP275555	Bethania
39	SP290407	Bethania
71	SP287603	Bethania
75	SP287603	Bethania
10	SP192504	Meadowbrook
1	RP168712	Bethania
3	RP168712	Bethania
1	RP8071	Holmview
950	RP849297	Edens Landing
949	RP849309	Edens Landing
133	RP868409	Edens Landing
503	RP863699	Edens Landing
2	SP121676	Beenleigh
3	SP145848	Beenleigh
42	SP163690	Beenleigh
81	SP163692	Beenleigh
13	SP307207	Beenleigh
15	RP148258	Beenleigh
7	RP148268	Beenleigh
1	RP7998	Beenleigh
2	RP8015	Beenleigh
27	SP118729	Beenleigh
25	BUP101672	Beenleigh
32	BUP101672	Beenleigh
36	BUP101672	Beenleigh
0	BUP8761	Beenleigh
0	SP250759	Beenleigh
1	SP250759	Beenleigh
4	SP250759	Beenleigh
0	SP287135	Beenleigh

2	RP111236	Beenleigh
33	RP8194	Beenleigh
18	RP801585	Beenleigh
1	SP107675	Beenleigh
223	RP838955	Beenleigh
3	RP137433	Beenleigh
81	SP214556	Beenleigh
9	RP8097	Beenleigh
2	RP124389	Beenleigh
1	RP124389	Beenleigh
162	RP893411	Beenleigh
9	RP84377	Beenleigh
1	RP76375	Beenleigh
8	RP234019	Beenleigh
14	RP234020	Beenleigh
33	SP118731	Beenleigh
2	RP136016	Woodridge
10	RP136016	Woodridge
11	RP136016	Woodridge
12	RP136016	Woodridge
15	RP136016	Woodridge
60	RP136016	Woodridge
49	RP136016	Woodridge
22	RP136016	Woodridge
19	RP136016	Woodridge
24	RP73277	Woodridge
48	RP73277	Woodridge
54	RP73277	Woodridge
37	RP73277	Woodridge
92	RP869375	Edens Landing
68	RP73277	Woodridge
88	RP136016	Woodridge
97	RP136016	Woodridge
1079	RP866216	Woodridge
130	CP827102	Woodridge
4	RP132771	Woodridge
10	RP118345	Woodridge
1	RP105525	Woodridge
13	RP105525	Woodridge
1	RP115603	Logan Central
8	RP116657	Kingston
5	SP171098	Kingston
12	RP115813	Logan Central
8	RP136693	Logan Central
5	RP119565	Logan Central
1066	SL9999	Logan Central
134	CP827104	Logan Central
1	RP857301	Loganlea
117	RP109759	Loganlea
853	RP108221	Logan Central
858	RP108221	Logan Central
860	RP108229	Logan Central
862	RP108229	Logan Central
866	RP108229	Logan Central
11	SP185266	Meadowbrook
8	SP209591	Meadowbrook
25	SP180828	Loganlea
63	SP180828	Loganlea
65	SP180828	Loganlea

201	SP236599	Loganlea
22	RP119435	Kingston
1	RP99172	Kingston
3	RP86231	Kingston
0	SP214461	Kingston
2	SP214461	Kingston
3	SP214461	Kingston
6	SP214461	Kingston
8	SP214461	Kingston
19	SP214461	Kingston
30	SP214461	Kingston
33	SP214461	Kingston
43	SP214461	Kingston
3	RP209342	Kingston
2	SP118372	Loganlea
33	SL12627	Loganlea
36	RP202907	Edens Landing
5	RP127712	Logan Central
37	RP37751	Logan Central
40	RP45531	Logan Central
1	RP98038	Logan Central
5	RP70518	Logan Central
1	RP103104	Logan Central
5	GTP2733	Logan Central
0	BUP6861	Logan Central
9	RP131206	Woodridge
3	RP136404	Woodridge
1	RP209064	Woodridge
2	RP176701	Woodridge
6	RP118345	Woodridge
17	RP107881	Logan Central
18	RP107881	Logan Central
30	RP107882	Logan Central
33	RP107882	Logan Central
35	RP107882	Logan Central
878	RP108229	Logan Central
879	RP108229	Logan Central
1	SP222478	Logan Central
1	SP222978	Logan Central
35	RP106550	Kingston
6	SP263460	Kingston
10	SP277695	Kingston
851	RP108221	Logan Central
834	RP112418	Logan Central
2	RP170871	Logan Central
19	RP107004	Kingston
11	RP128988	Kingston
14	GTP100060	Kuraby
19	GTP100405	Kuraby
11	RP107143	Kingston
9	RP107143	Kingston
802	SP280048	Karawatha
37	SP280048	Karawatha
42	SP280048	Karawatha
1	RP71285	Kuraby
21	SP122200	Kuraby
13	RP37393	Kuraby
11	RP37393	Kuraby
37	RP889945	Runcorn

2	SP130744	Kuraby
48	SP195496	Kuraby
13	SP241528	Runcorn
1	RP103532	Woodridge
5	GTP3	Woodridge
0	GTP3	Woodridge
0	SP131372	Woodridge
0	SP263441	Woodridge
4	SP273386	Woodridge
18	RP37882	Woodridge
3	RP203428	Karawatha
686	RP191785	Bethania
605	RP191684	Bethania
601	RP191685	Bethania
599	RP191685	Bethania
597	RP191685	Bethania
606	RP191684	Bethania
0	SP170338	Bethania
2	SP281233	Bethania
0	SP284810	Bethania
53	SP284811	Bethania
9	SP331056	Bethania
73	SP109403	Bethania
0	SP250754	Bethania
3	SP250754	Bethania
4	SP250754	Bethania
1	RP168716	Holmview
98	RP863699	Edens Landing
137	RP868409	Edens Landing
16	SP114587	Holmview
66	RP122726	Beenleigh
193	RP140873	Beenleigh
100	SP208844	Beenleigh
4	SP181194	Beenleigh
9	RP148268	Beenleigh
2	RP70577	Beenleigh
1	RP118901	Beenleigh
1	RP105132	Beenleigh
1	RP164491	Beenleigh
3	B13214	Beenleigh
5	B13211	Beenleigh
19	RP8004	Beenleigh
1	RP188573	Beenleigh
2	RP164491	Beenleigh
16	RP8004	Beenleigh
11	RP8004	Beenleigh
7	BUP101672	Beenleigh
24	BUP101672	Beenleigh
0	BUP8761	Beenleigh
0	SP204222	Beenleigh
0	SP221053	Beenleigh
3	SP250759	Beenleigh
0	SP204222	Beenleigh
0	SP287135	Beenleigh
1	RP170107	Beenleigh
3	RP78838	Beenleigh
1	RP70924	Beenleigh
156	RP140873	Beenleigh
44	RP137433	Beenleigh

46	RP137433	Beenleigh
21	RP140869	Beenleigh
38	RP140869	Beenleigh
36	RP140869	Beenleigh
2	RP74430	Beenleigh
12	RP8097	Beenleigh
10	RP8097	Beenleigh
7	RP8097	Beenleigh
4	RP84377	Beenleigh
10	RP234019	Beenleigh
32	SP118731	Beenleigh
66	RP136016	Woodridge
65	RP136016	Woodridge
76	RP136016	Woodridge
47	RP136016	Woodridge
55	RP136016	Woodridge
56	RP136016	Woodridge
57	RP136016	Woodridge
59	RP136016	Woodridge
51	RP136016	Woodridge
31	RP136016	Woodridge
21	RP73277	Woodridge
5	RP73277	Woodridge
3	RP73277	Woodridge
27	RP73277	Woodridge
17	RP73277	Woodridge
55	RP73277	Woodridge
56	RP73277	Woodridge
36	RP73277	Woodridge
76	RP869376	Edens Landing
34	RP73277	Woodridge
63	RP73277	Woodridge
93	RP136016	Woodridge
96	RP136016	Woodridge
6	RP105525	Woodridge
9	RP105525	Woodridge
43	RP45531	Logan Central
1	RP136367	Logan Central
12	RP826102	Logan Central
52	SP280833	Logan Central
43	RP103430	Logan Central
10	RP136693	Logan Central
2	RP119565	Logan Central
1	RP119565	Logan Central
3	RP858018	Logan Central
3	RP109759	Loganlea
856	RP108221	Logan Central
2	RP103240	Woodridge
7	RP103240	Woodridge
45	RP883965	Meadowbrook
33	SL12627	Loganlea
49	RP908455	Meadowbrook
66	RP908455	Meadowbrook
0	SP209591	Meadowbrook
36	SP180828	Loganlea
201	SP236599	Loganlea
19	RP119435	Kingston
18	RP119435	Kingston
13	RP119435	Kingston

12	RP222505	Kingston
1	SP214461	Kingston
24	SP214461	Kingston
26	SP214461	Kingston
41	SP214461	Kingston
1	RP174366	Loganlea
1	RP38139	Loganlea
1	SP291890	Loganlea
38	RP202907	Edens Landing
34	RP202911	Edens Landing
33	RP202911	Edens Landing
941	RP849310	Bethania
1	RP138234	Logan Central
39	RP45531	Logan Central
48	RP37751	Logan Central
20	RP178255	Logan Central
6	GTP2462	Logan Central
1	GTP2733	Logan Central
4	GTP2733	Logan Central
55	SL4819	Logan Central
7	SP171102	Logan Central
6	SP246588	Logan Central
5	RP136404	Woodridge
6	RP136404	Woodridge
979	SL8335	Kingston
0	SP263460	Kingston
2	SP263460	Kingston
4	RP904684	Kingston
1	RP102123	Kingston
5	RP112119	Kingston
4	RP112119	Kingston
8	RP139962	Kingston
14	RP171799	Kingston
23	GTP3797	Kuraby
27	GTP3797	Kuraby
9	GTP100060	Kuraby
16	GTP100060	Kuraby
6	RP107143	Kingston
5	RP107143	Kingston
4	RP37312	Kuraby
80	SP195496	Kuraby
5	SP111219	Kuraby
8	RP37393	Kuraby
15	RP37393	Kuraby
40	RP889945	Kuraby
36	SP190117	Kuraby
100	SP190117	Kuraby
112	SP223251	Runcorn
4	RP37751	Woodridge
9	RP809071	Woodridge
8	RP809071	Woodridge
2	GTP3	Woodridge
4	GTP3	Woodridge
1	SP131372	Woodridge
7	SP171102	Woodridge
0	SP273385	Woodridge
2	SP273385	Woodridge
3	SP273385	Woodridge
1	SP273386	Woodridge

8	RP116259	Loganlea
6	RP116259	Loganlea
600	RP191685	Bethania
691	RP191785	Bethania
0	SP170338	Bethania
0	SP271484	Bethania
588	RP191702	Bethania
41	SP290407	Bethania
11	GTP2394	Bethania
0	SP250754	Bethania
77	SP287603	Bethania
93	RP863699	Edens Landing
1	RP204404	Beenleigh
1	RP168717	Beenleigh
0	BUP8756	Beenleigh
2	BUP8756	Beenleigh
14	RP148258	Beenleigh
6	BUP8731	Beenleigh
1	RP116167	Beenleigh
1	RP120157	Beenleigh
2	RP211684	Beenleigh
1	RP154613	Beenleigh
3	RP229789	Beenleigh
2	RP8064	Beenleigh
31	SP118729	Beenleigh
26	SP118730	Beenleigh
3	BUP101672	Beenleigh
1	RP75070	Beenleigh
139	WD5784	Beenleigh
4	SP107676	Beenleigh
2	RP163651	Beenleigh
35	RP140869	Beenleigh
1	RP74430	Beenleigh
3	RP887675	Beenleigh
2	RP105897	Beenleigh
50	RP142299	Beenleigh
16	SP240664	Beenleigh
12	SP240667	Beenleigh
6	RP136016	Woodridge
7	RP136016	Woodridge
8	RP136016	Woodridge
16	RP136016	Woodridge
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78	RP136016	Woodridge
68	RP136016	Woodridge
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46	RP136016	Woodridge
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26	RP136016	Woodridge
18	RP136016	Woodridge
19	RP73277	Woodridge
10	RP73277	Woodridge
9	RP73277	Woodridge
7	RP73277	Woodridge
4	RP73277	Woodridge
18	RP73277	Woodridge
16	RP73277	Woodridge
12	RP73277	Woodridge

30	RP73277	Woodridge
74	RP869376	Edens Landing
61	RP73277	Woodridge
64	RP73277	Woodridge
85	RP136016	Woodridge
83	RP136016	Woodridge
6	RP132771	Woodridge
5	RP132771	Woodridge
3	RP132771	Woodridge
3	RP105525	Woodridge
5	RP106466	Woodridge
2	RP136367	Logan Central
12	RP122847	Kingston
1	RP116657	Kingston
3	RP116657	Kingston
15	RP103430	Logan Central
20	RP103430	Logan Central
13	RP115813	Logan Central
854	RP108221	Logan Central
861	RP108229	Logan Central
4	RP103240	Woodridge
5	RP103240	Woodridge
6	RP103240	Woodridge
22	RP884200	Meadowbrook
135	CP827105	Loganlea
0	SP210095	Meadowbrook
0	SP180828	Loganlea
19	SP180828	Loganlea
60	SP180828	Loganlea
67	SP180828	Loganlea
73	SP180828	Loganlea
8	RP91781	Kingston
2	RP114753	Kingston
4	RP99172	Kingston
200	SP157993	Kingston
0	SP214461	Kingston
52	SP214461	Kingston
51	SP214461	Kingston
5	SP214461	Kingston
9	SP214461	Kingston
15	SP214461	Kingston
23	SP214461	Kingston
25	SP214461	Kingston
29	SP214461	Kingston
40	SP214461	Kingston
42	SP214461	Kingston
39	RP25866	Loganlea
32	SL12626	Loganlea
22	SP118372	Loganlea
21	SP236607	Loganlea
39	RP202907	Edens Landing
38	RP45531	Logan Central
1	RP169267	Logan Central
23	SP121849	Logan Central
49	SP151712	Logan Central
0	BUP6861	Logan Central
1	BUP6861	Logan Central
1	SP171103	Logan Central
80	RP124577	Woodridge

81	RP124577	Woodridge
3	CP827108	Woodridge
5	RP118345	Woodridge
8	RP118345	Woodridge
31	RP107882	Logan Central
873	RP108229	Logan Central
877	RP108229	Logan Central
13	SP277695	Kingston
14	SP277695	Kingston
850	RP108221	Logan Central
1	RP170871	Logan Central
826	RP112418	Logan Central
845	RP108221	Logan Central
22	RP107004	Kingston
28	GTP3797	Kuraby
12	GTP100060	Kuraby
13	GTP100060	Kuraby
12	RP107143	Kingston
3	RP107143	Kingston
2	RP858827	Kingston
903	SP280048	Karawatha
2	RP91478	Kuraby
752	SP222159	Kuraby
1007	SP275706	Kuraby
2	RP37392	Kuraby
17	RP113277	Woodridge
16	RP113277	Woodridge
3	GTP3	Woodridge
6	GTP3	Woodridge
8	GTP3	Woodridge
13	SP131372	Woodridge
0	SP131372	Woodridge
0	SP191815	Woodridge
0	SP191815	Woodridge
2	SP191815	Woodridge
0	SP273385	Woodridge
2	SP273386	Woodridge
9	RP116259	Loganlea
4	RP116259	Loganlea
343	SP107481	Loganlea
687	RP191785	Bethania
80	SP109401	Bethania
81	SP109402	Bethania
21	SP170338	Bethania
4	SP281233	Bethania
0	SP271484	Bethania
58	SP284811	Bethania
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4	SP319655	Bethania
708	RP191785	Bethania
4	RP849216	Bethania
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5	GTP2394	Bethania
6	RP168712	Edens Landing
99	RP863699	Edens Landing

132	RP868409	Edens Landing
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5	RP148268	Beenleigh
263	CP890580	Beenleigh
29	SP118729	Beenleigh
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865	RP108229	Logan Central
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9	RP103240	Woodridge
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70	SP180828	Loganlea
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8	RP148268	Beenleigh
1	RP107134	Beenleigh
47	SP109408	Beenleigh
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2	RP211685	Beenleigh
1	RP8015	Beenleigh
2	RP188573	Beenleigh
1	RP70960	Beenleigh
10	RP8004	Beenleigh
1	RP837532	Beenleigh
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24	RP215741	Beenleigh
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30	RP136016	Woodridge
28	RP136016	Woodridge
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14	RP73277	Woodridge
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38	RP73277	Woodridge
501	RP869376	Edens Landing
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7	RP116657	Kingston
16	RP103430	Logan Central

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1	RP123956	Logan Central
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9	RP136693	Logan Central
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857	RP108221	Logan Central
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4	B13214	Beenleigh

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1	RP8011	Beenleigh
1	RP152495	Beenleigh
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4	RP858018	Logan Central
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868	RP108229	Logan Central
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3	RP808678	Meadowbrook
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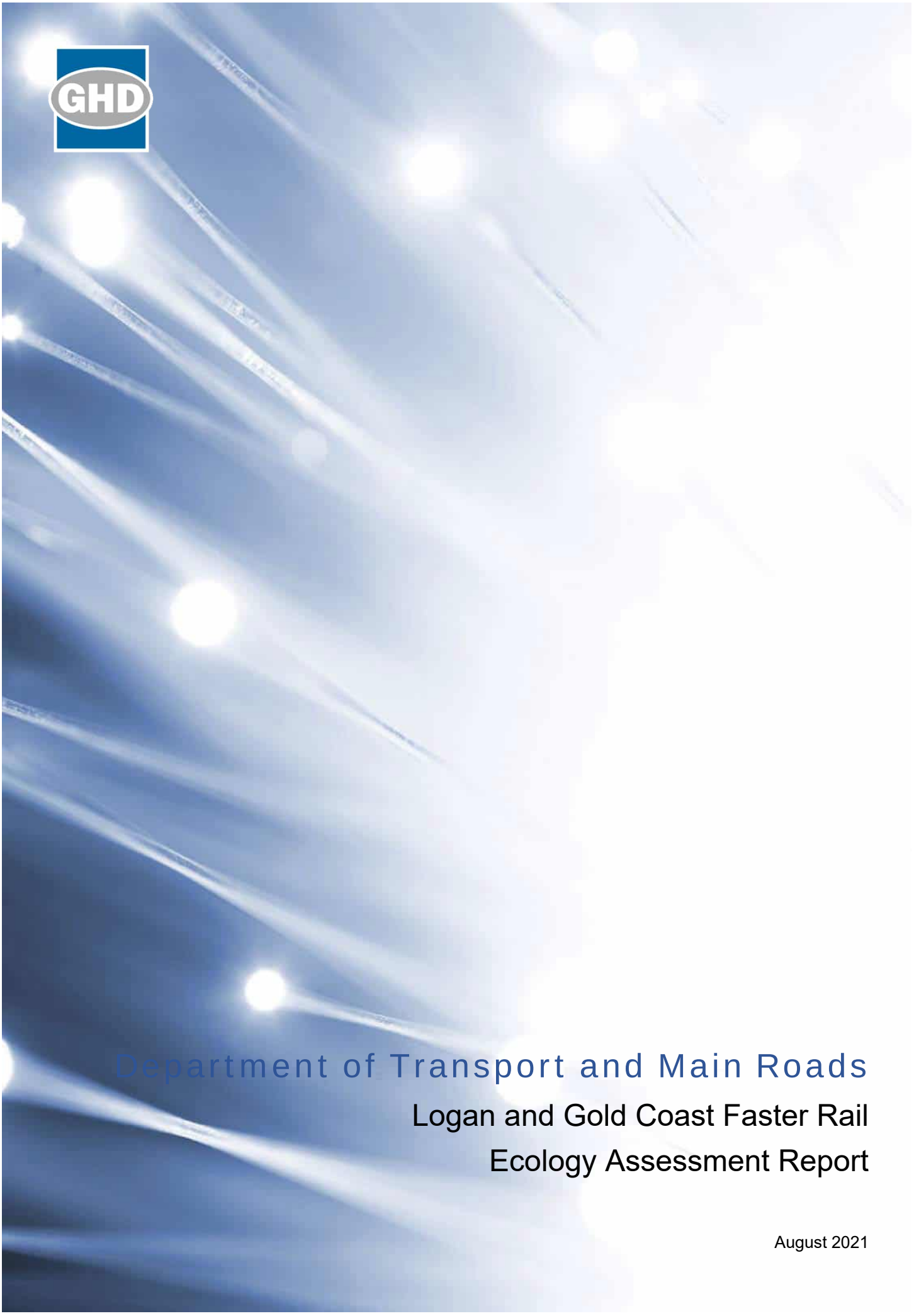
Appendix E

Ecology Assessment Report (2021)



Department of Transport and Main Roads

Logan and Gold Coast Faster Rail

Ecology Assessment Report

August 2021

Executive summary

This report builds on the baseline results of the desktop assessment and field survey previously undertaken by WSP (2019) to assess the ecological values of the proposed Study corridor for the Logan and Gold Coast Faster Rail improvements. Environmental investigations completed by WSP in 2019 as part of the Review of Environmental Factors (REF) (WSP, 2019a) and Ecological Values Report (WSP, 2019b) were limited by land access restrictions. In order to further understand the ecological values of the Study corridor, subsequent ecological investigations have been undertaken in 2021 by GHD. These ecological investigations have been undertaken across areas not previously assessed, termed the 'Subsequent study areas'. The Project is proposed over 300 properties from Kuraby to Beenleigh in the Brisbane City Council and Logan City Council local government areas (LGAs), approximately 16 to 33 km south-east of the Brisbane central business district (CBD). The 200 m wide corridor extends approximately 20 km in length between these localities, along the existing Beenleigh and Gold Coast rail lines (Chainage (Ch) 21,350 m to Ch 41,300 m).

In presenting the ecological assessment, data from previous studies have been reviewed and collated, primarily to assist with the assessment of the likelihood of occurrence of conservation significant species. Information on the distribution of habitat and vegetation communities has been based on current works, as this reflects current vegetation legislation and conditions on the ground.

The surveys primarily focussed on undertaking flora and fauna assessments in publicly owned land and within areas identified as having higher ecological value. Targeted surveys for flora and fauna including identification of habitat were undertaken and focused on conservation significant species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or Queensland *Nature Conservation Act 1992* (NC Act). Verification of Regional Ecosystem (RE) mapping was also undertaken and potential Threatened Ecological Communities (TEC) were assessed.

The surveys have shown that the Study corridor is located within a fragmented urban environment. The Study corridor intersects four major waterways, being the Logan River, ,Slacks Creek, Spring Creek, Scrubby Creek. Various minor tributaries of the major waterways are also located within the Study corridor and hold high ecological value. Section 5 discusses the impact of the project to water values in more detail.

Aside from the waterways and associated riparian vegetation intersected by the Study corridor, the most significant environmental feature is Acacia Forest Park associated with Karawatha Forest Park which adjoins Compton Road at Karawatha. Karawatha Forest Park is a Brisbane City Council managed reserve which includes 900 ha of remnant bushland. The Karawatha Forest Park contributes to the Flinders Karawatha Corridor which is a State Biodiversity Corridor extending from Karawatha Forest to Flinders Peak in Ipswich to Wyaralong Dam near Boonah.

During the field studies, verification of REs confirmed that tracts of remnant vegetation are present although a number of vegetation communities did not align with the mapped description. This did not impact the identification of habitat for conservation significant species as the vegetation communities held similar values. One TEC was considered to have high potential of occurring within the Study corridor, namely Coastal Swamp Oak (*Casuarina glauca*) Forest of South-east Queensland and New South Wales. However, an assessment of locations likely to contain TEC found that vegetation communities within the Subsequent study areas did not meet the key characteristics or condition threshold for this TEC.

Two conservation significant species considered to be 'in the wild' in accordance with the NC Act were confirmed present within the Subsequent study areas:

- *Macadamia integrifolia* (Macadamia), vulnerable under the EPBC Act and NC Act
- Glossy black-cockatoo (*Calyptorhynchus lathami*), vulnerable under the NC Act

One species listed as migratory under the EPBC Act, glossy ibis (*Plegadis falcinellus*) and special least concern under the NC Act was also confirmed present within the Study corridor during WSP (2019b) field survey.

Additionally, seven conservation significant species were considered likely to occur within the Subsequent study areas based on the vegetation communities, condition of habitats observed and the proximity of historical records:

- *Marsdenia coronata* (slender milk vine), vulnerable under the NC Act
- *Melaleuca irbyana* (swamp tea-tree), endangered under the NC Act
- *Gossia gonoclada* (angle stemmed myrtle), vulnerable under the NC Act
- *Coleus habrophyllus,* endangered under the EPBC Act and NC Act
- Koala (*Phascolarctos cinereus*), vulnerable under the EPBC Act and NC Act
- Grey-headed flying-fox (*Pteropus poliocephalus*), vulnerable under the EPBC Act
- Wallum froglet (*Crinia tinnula*), vulnerable under the NC Act

Numerous restricted invasive species listed under *Biosecurity Act 2014* were recorded across the Subsequent study areas.

An assessment of impacts found that works are likely to result in a significant impact to the koala due to the vegetation proposed to be cleared scoring a habitat value greater than eight (habitat critical to survival) and the extent of clearing for high value habitat will be greater than 10 ha. Additionally, there is potential for a significant impact on the grey headed flying fox and the glossy black-cockatoo. The grey headed flying fox may be impacted due to the clearing of potential winter flowering foraging resources, while the glossy black-cockatoo may be impacted through the clearing of tree species constituting the highly specialised diet for the species as well as ecological significant habitat. The significance of impacts should be confirmed at the detailed design stage when finer Project details have been confirmed.

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1. Introduction

1.1 Project background

The Logan and Gold Coast Faster Rail Project is vital to enhance the existing heavy rail connection between the Gold Coast, Logan and Brisbane central business district (CBD) through increased corridor capacity, improved travel times and reliability, enhanced passenger accessibility, and expanded connections to public and active transport modes.

With population growth in both Brisbane and the Gold Coast the network is currently experiencing the following capacity constraints:

- The existing rail line includes two tracks south of Kuraby station and three tracks to the north. This line is subject to a range of constraints, including tight curves that limit line speeds, and level crossings and lack of station infrastructure that limit additional tracks.
- Express services between the Gold Coast and Brisbane are currently required to share a single track with 'all stops trains' between Kuraby and Beenleigh. This limits the number of services that can be provided to support growth in travel demand between the cities of Brisbane, Logan and the Gold Coast. These infrastructure and operational constraints are resulting in overcrowding during peak periods.

Failure to address these capacity constraints could lead to potential rail users choosing to use the already congested M1 Motorway. This would result in additional travel times, with nationally significant impacts on productivity. Enhancing the corridor capacity between Kuraby and Beenleigh is therefore essential to achieving enhanced connectivity and accessibility across the region through the delivery of improved rail travel speeds, and service frequency. Moreover, K2B is key to fully realising the wider Cross River Rail (CRR) network benefits along the Beenleigh and Gold Coast rail corridor. It is therefore a critical Project for both the Department of Transport and Main Roads (TMR) and Cross River Rail Delivery Authority (CRRDA). The K2B capacity upgrade is also key to implementing future faster rail between the Brisbane CBD and the Gold Coast, helping to attract federal funding to the Project.

1.2 Project area

The Project area is proposed over 300 properties from Kuraby to Beenleigh in the Brisbane City Council and Logan City Council local government areas (LGAs), approximately 16 to 33 km south-east of the Brisbane CBD. The 200 m wide corridor extends approximately 20 km in length between these localities, along the existing Beenleigh and Gold Coast rail lines (Chainage (Ch) 21,350 m to Ch 41,300 m). A locality plan which shows the Project area and the Study corridor is presented as Figure 1-1.

Key planning, environmental and cultural heritage features of the Study corridor include:

- The suburbs affected by the Study corridor are (from north to south): Kuraby, Rochedale South, Woodridge, Logan Central, Kingston, Loganlea, Meadowbrook, Bethania, Edens Landing and Beenleigh. The most densely populated residential communities are located at Logan Central, Kingston, Loganlea and Beenleigh in the Logan City Council LGA.
- The existing railway corridor is zoned Special purpose (transport infrastructure) (SP3) under the Brisbane City Council planning scheme and is zoned for Community facilities under the Logan City Council planning scheme. Within the LGAs, the wider Study corridor (i.e. outside the current rail corridor) is predominantly zoned residential or open space, with a number of higher intensity zones (e.g. community facilities, industry, centre) prominent in key localities such as Logan Central, Loganlea and Beenleigh.

- The Study corridor intersects four major waterways, being the Logan River, Slacks Creek, Spring Creek and Scrubby Creek. River, Slacks Creek, Spring Creek, Scrubby Creek
- Aside from the waterways and associated riparian areas intersected by the Study corridor, the most significant environmental feature is Acacia Forest Park associated with Karawatha Forest Park which adjoins Compton Road at Karawatha. Karawatha Forest Park is a Brisbane City Council managed reserve which includes 900 ha of remnant bushland. The Karawatha Forest Park contributes to the Flinders Karawatha Corridor which is a State Biodiversity Corridor extending from Karawatha Forest to Flinders Peak in Ipswich to Wyaralong Dam near Boonah.

1.3 Definitions

The following terminology is used throughout this document to describe the Project:

- **Project area** – The Project area includes the future railway corridor required to accommodate assets comprising PE 1 (Preliminary evaluation: Option 1 as referred to in WSP 2019a), not including additional land needed to facilitate construction. This comprises a width of 20 m either side of the existing rail corridor centre line.
- **Study corridor** – The Study corridor is defined by the centre line of the existing rail corridor together with a 100 m buffer either side (200 m wide in total) between Ch 21,350 m and Ch 41,300 m together with an isolated 1,150 m^2 of land at Coopers Plains (Figure 2-1). The Study corridor referenced throughout this document aligns with the Study corridor defined during the PE phase within the Environmental Scoping Report (ESR) (WSP, 2019a). The environmental and cultural heritage values within the Study corridor have been identified and assessed to allow for the capture of both contributing and receiving environments which may be indirectly impacted by the Project. It is worth noting that the Study corridor is for environmental and cultural heritage assessment purposes only, and not all land parcels within the Study corridor will be directly impacted by the Project.
- **Subsequent study areas** – Environmental investigations completed by WSP in 2019 as part of the REF were limited by land access restrictions. In order to further understand the ecological values of the Study corridor, subsequent ecological investigations have been undertaken in 2021 by GHD. These ecological investigations have been undertaken across areas not previously assessed, termed the 'Subsequent study areas' for the purpose of this report and are shown in (Figure 2-1). The Subsequent study areas are located within the Study corridor.

1.4 Purpose of this report

This Ecological Assessment Report details the findings of the desktop assessment and field surveys undertaken within the Subsequent study areas. The purpose of the report is to detail the ecological values of the Study corridor. The report includes:

- An overview of the Project (Section 1).
- Description of assessment methodology (Section 2).
- Summary of existing ecological values including results of desktop assessment and field surveys and likelihood of occurrence for conservation significant species (Section 3).
- A Significant Impact Assessment for conservation significant fauna confirmed present or likely to occur within the Project area (Section 4)
- Conclusions and recommendations (Section 5)

1.5 Limitations

This report has been prepared by GHD for TMR and may only be used and relied on by TMR for the purpose agreed between GHD and TMR as set out in Section 1.4 of this report.

GHD otherwise disclaims responsibility to any person other than TMR arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

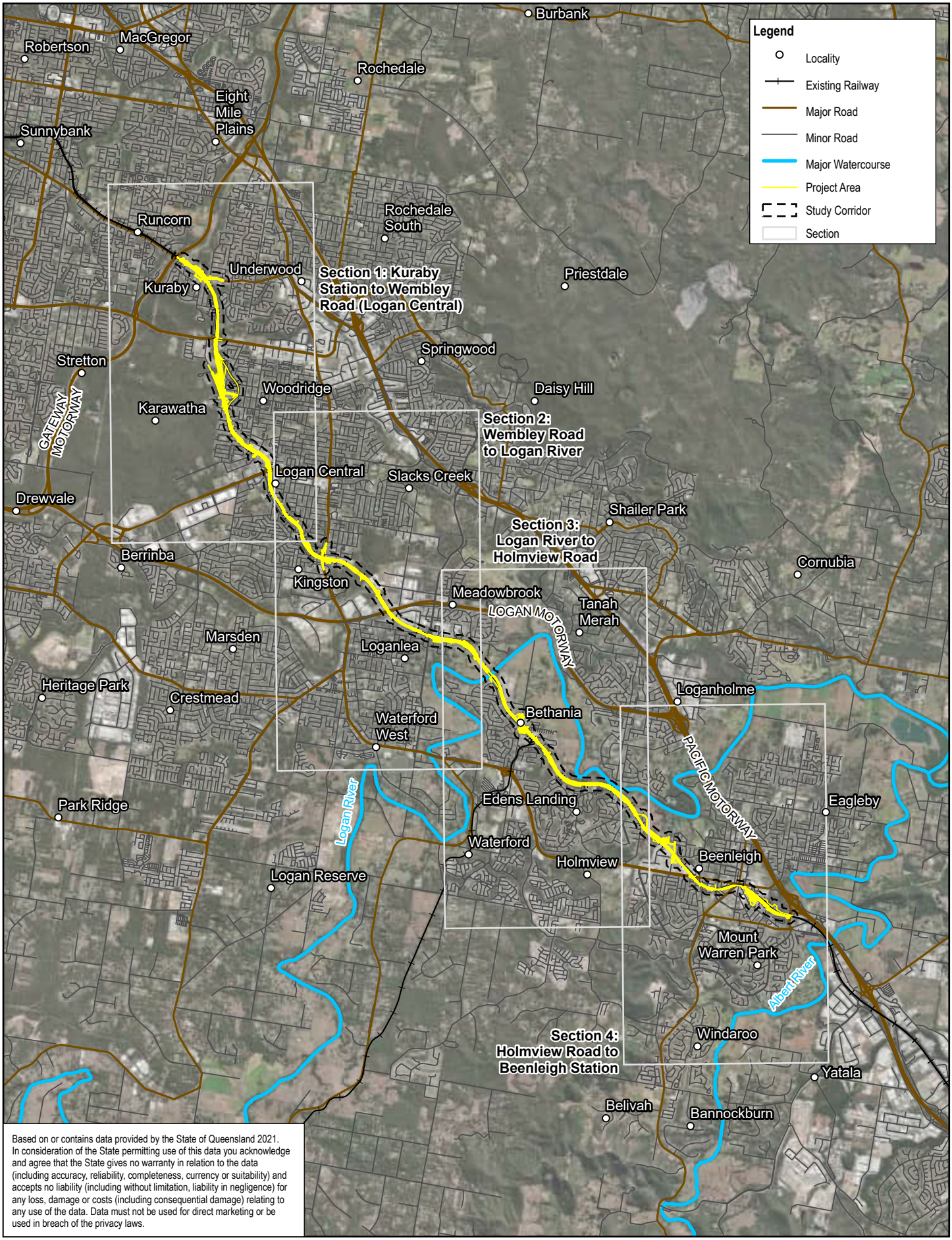
The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by TMR and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of threatened species) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.



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Logan and Gold Coast Faster Rail (Kuraby to Beenleigh) Project

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Project locality plan

FIGURE 1-1

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Print date: 09 Aug 2021 - 16:21

Data source: DoR: Watercourse, Road, Railway, Locality (2020); GHD: Proposed Alignment, Study Area, Section (2021); ESRI World Imagery: Earthstar Geographics.
Created by: xlee

2. Approach and methods

2.1 Approach

The ecological assessment for the Project included a desktop review of environmental databases, mapping layers and previous field survey reports, and a field assessment of the terrestrial flora and fauna ecological values within the Subsequent study areas. The desktop and field methods are detailed separately in Section 2.2.1 and 2.2.3 respectively.

2.2 Methods

2.2.1 Desktop review

A desktop review was undertaken to identify and collate existing information on the ecological values within the Study corridor. State and Commonwealth desktop information sources were reviewed so as to obtain all available information for the desktop search extent, including:

- ***Protected Matters Search Tool*** – The Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) was used to identify threatened ecological communities (TECs) and conservation significant flora and fauna species listed under the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) that have the potential to occur within the vicinity of the Project area. The search was undertaken with a 2 km radius of the Study corridor .
- ***State Planning Policy Mapping*** – State Planning Policy (SPP) mapping was reviewed to identify Matters of State Environmental Significance (MSES) that are mapped within or adjacent to the Study corridor.
- ***Wildlife Online database*** – The Department of Environment and Science (DES) Wildlife Online database was searched to retrieve historical records of flora and fauna species previously recorded within the Study corridor (DES, 2021a).
- ***Flora Survey Trigger Mapping*** – The DES Protected Plants Flora Survey Trigger Map was viewed to determine if the Study corridor is in proximity to a high-risk trigger area buffered around a previous record of a conservation significant flora species (DES, 2021b).
- ***Species Profile Search*** – The DES Species Profile Search was used to obtain spatial records and accompanying data for conservation significant species previously recorded in proximity to the Study corridor.
- ***Regulated Vegetation Mapping*** – The Department of Resources (DoR) Vegetation Management Regional Ecosystem and Remnant Map was viewed to determine the extent and type of Regional Ecosystems (REs) mapped within the Study corridor (DoR, 2021).
- ***Essential Habitat Mapping*** – The DoR Essential Habitat Map was viewed to determine if vegetation within the Study corridor has been identified as essential habitat for a conservation significant species of wildlife listed under provisions of the *Nature Conservation Act 1992* (NC Act).
- ***Queensland waterways for waterway barrier works*** – Queensland Waterways for Waterway Barrier Works GIS data layer to identify waterways with a risk of impact which intersect the Study corridor, which may require approvals under the *Fisheries Act 1994* where structures within the waterway are considered to restrict fish passage.

2.2.2 Previous documentation

The following documentation and previous works were reviewed and incorporated within this report, including:

- WSP (2019a) Kuraby to Beenleigh Capacity Improvement Project: Environmental Scoping Report. Report prepared for TMR.
- WSP (2019b) Kuraby to Beenleigh Capacity Improvement Project: Ecological Values Report. Report prepared for TMR.

2.2.3 Field assessment

Two rounds of field studies have been completed for the Project, namely, targeted surveys across the K2B Project area by WSP (2019) and targeted ecological survey by GHD (2021) of the Subsequent study areas.

WSP 2019 field surveys

WSP conducted ecological field surveys of the Project area over three days between 3 and 5 June 2019. Field surveys were conducted by a Principal Ecologist/Zoologist and Senior Ecologist/Botanist. The survey methods for fauna were based on visual observations and scat identification with no trapping used.

GHD 2021 field surveys

Field surveys were completed over 3 days (10 to 11 and 24 February 2021) to identify and describe the existing terrestrial ecology values of the Subsequent study areas. Field work was conducted by two ecologists, being one flora ecologist and one fauna ecologist.

Subsequent study area due to access restriction, targeted ecological surveys were limited to publicly-accessible locations only. Therefore, additional surveys for sections of the alignment that intersect private property will be required at a later stage of the Project.

Survey effort was targeted towards areas deemed to be of 'ecological significance', with little time dedicated to heavily urbanised and highly disturbed areas. Ecologically significant areas were determined during the desktop assessment using historical records and environmental mapping layers. The location of field survey sites is presented in Figure 2-1.

2.2.3.1 Flora survey methods

Terrestrial flora surveys involved a combination of timed random meanders, quaternary level assessments and/or rapid vegetation assessments, as described in Table 2-1 and shown on Figure 2-1.

Table 2-1 Flora field survey techniques

Survey type	Detailed survey methodology
Threatened Ecological Community assessments	In vegetation communities that were identified as potentially constituting a TEC, assessments were undertaken to determine if the condition thresholds of the relevant TEC were met. Potential TEC extents were mapped on ground and through aerial imagery. The TEC assessment sites are displayed in Figure 2-1.
Regional Ecosystem verification	Verification of mapped RE communities was undertaken using quaternary level assessments in accordance with the methods detailed in Neldner *et al.* (2020). Data collected included species, structural estimation of height and cover of the ecological dominant

Survey type	Detailed survey methodology
	layer. Information on geology and landscape attributes was also collected. Quaternary assessments were undertaken at 58 sites across the Subsequent study areas as shown in Figure 2-1.
Recording of invasive species	Prohibited or restricted invasive species as defined under the *Biosecurity Act 2014* were opportunistically recorded and notes taken on density and extent of each species.
Targeted and opportunistic flora surveys	Targeted flora surveys were undertaken for threatened and near threatened species within protected plant high risk trigger areas and where suitable habitats for target species identified in the desktop assessment were present. Surveys were undertaken using the timed meander search method (outlined in Section 6.2.2 of the Flora Survey Guidelines) (DES, 2021b). The majority of flora species encountered were identified in the field. Where this was not possible, specimen material was collected and later identified with the assistance of diagnostic keys and references. The timing of the survey was considered appropriate for the threatened flora identified as likely to occur within the Project area.

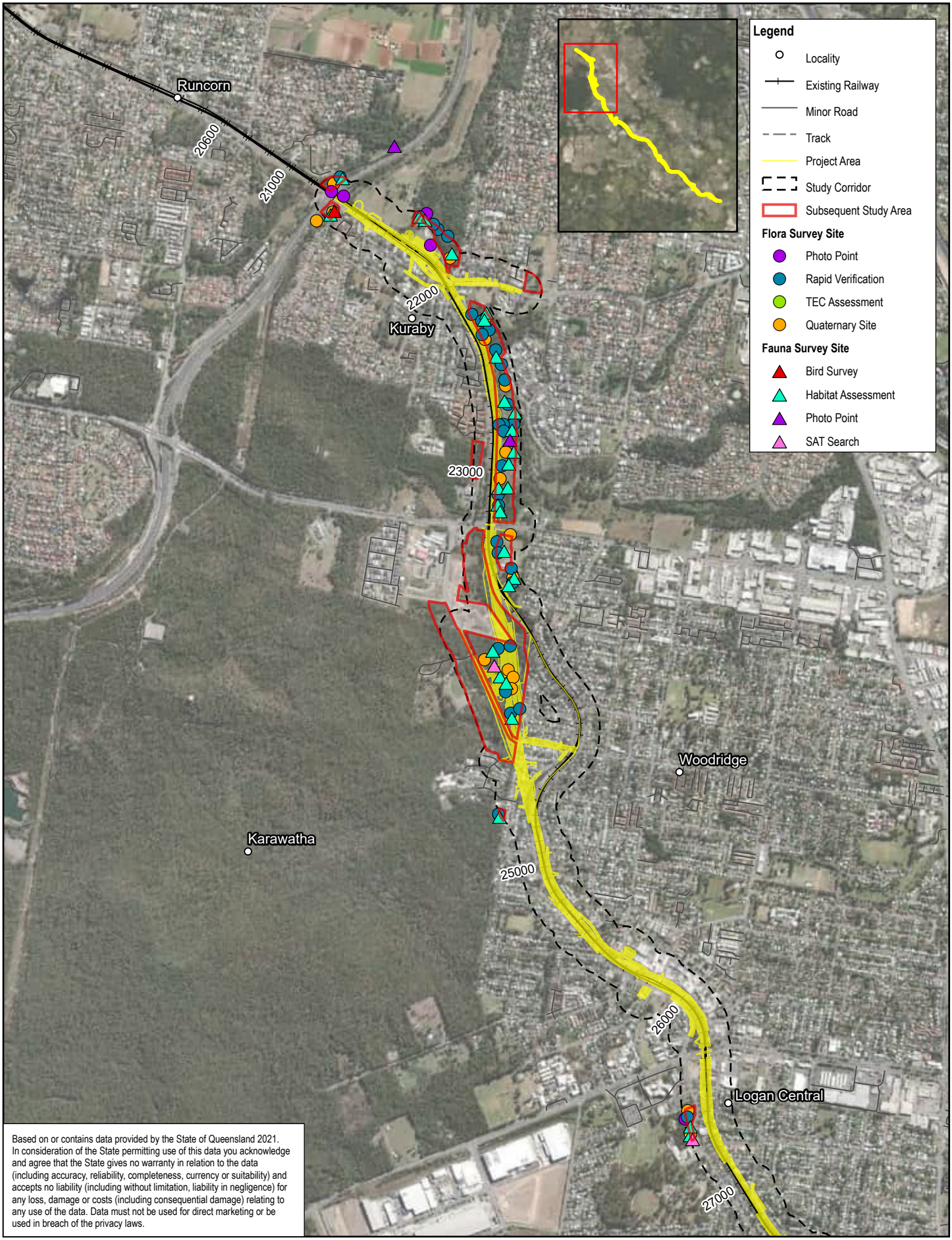
2.2.3.2 Fauna survey methods

The field surveys included predominantly rapid habitat assessments and active searches throughout areas within the Subsequent study areas. Field survey methods are detailed in Table 2-2, whilst the distribution of field survey sites is presented in Figure 2-1.

Table 2-2 Fauna field survey methods

Survey type	Detailed survey methodology
Habitat assessment surveys	Habitat assessments were undertaken at 53 survey sites. At each of the rapid survey sites, the value of habitats for terrestrial fauna was assessed based on the presence of key resources and microhabitats – as determined by the structural complexity of vegetation and the presence of features such as tree hollows, burrows, rocky outcrops, caves, leaf litter and woody debris. Key habitat features important for conservation
Targeted searches for traces of conservation significant species	Within suitable habitat, targeted searches were undertaken to detect characteristic traces of conservation significant wildlife. This included searching eucalypt woodland for evidence of koala (*Phascolarctos cinereus*) and greater glider (*Petauroides volans*) (i.e. faecal pellets and scratches) and searching beneath *Allocasuarina* trees for evidence of feeding by glossy black-cockatoos (*Calyptorhynchus lathami*).
Spot Assessment Technique	Searches for koala faecal pellets were undertaken at 6 sites using the Spot Assessment technique (SAT) (Phillips and Callaghan, 2011). Based on the results, assessments of habitat quality were undertaken using the koala habitat assessment toolkit detailed in the EPBC Act Referral guidelines for the vulnerable koala (DotE, 2014).

Survey type	Detailed survey methodology
Bird census surveys	To survey the existing passerine bird assemblage, fixed-point bird surveys were undertaken using the Birds Australia census technique (Loyn, 1986). This involved undertaking a 20 min survey of a 2 ha area recording all birds seen or heard calling. Bird census surveys were conducted at six sites, along with opportunistic aural surveys conducted during habitat assessments (n = 53).
Active searches for reptiles and frogs	Within suitable areas, a 20-minute active search was undertaken to detect reptile and amphibian species by actively searching beneath rocks, logs, bark, leaf litter and other microhabitats. Species targeted included the tusked frog (*Adelotus brevis*) and wallum froglet (*Crinia tinnula*).
Opportunist searches for wildlife and traces	All incidental records of fauna observed during surveys were recorded. Bones, feathers, skulls, sloughed skins, faecal pellets, tracks, burrows, scratches and other indirect wildlife traces were also recorded.



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Subsequent study area and distribution of field survey sites

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FIGURE 2-1a

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Print date: 09 Aug 2021 - 16:26

Data source: DoR: Watercourse, Road, Railway, Locality (2020); GHD: Proposed Alignment, Study Area, Field Survey Site (2021); ESRI World Imagery: Earthstar Geographics
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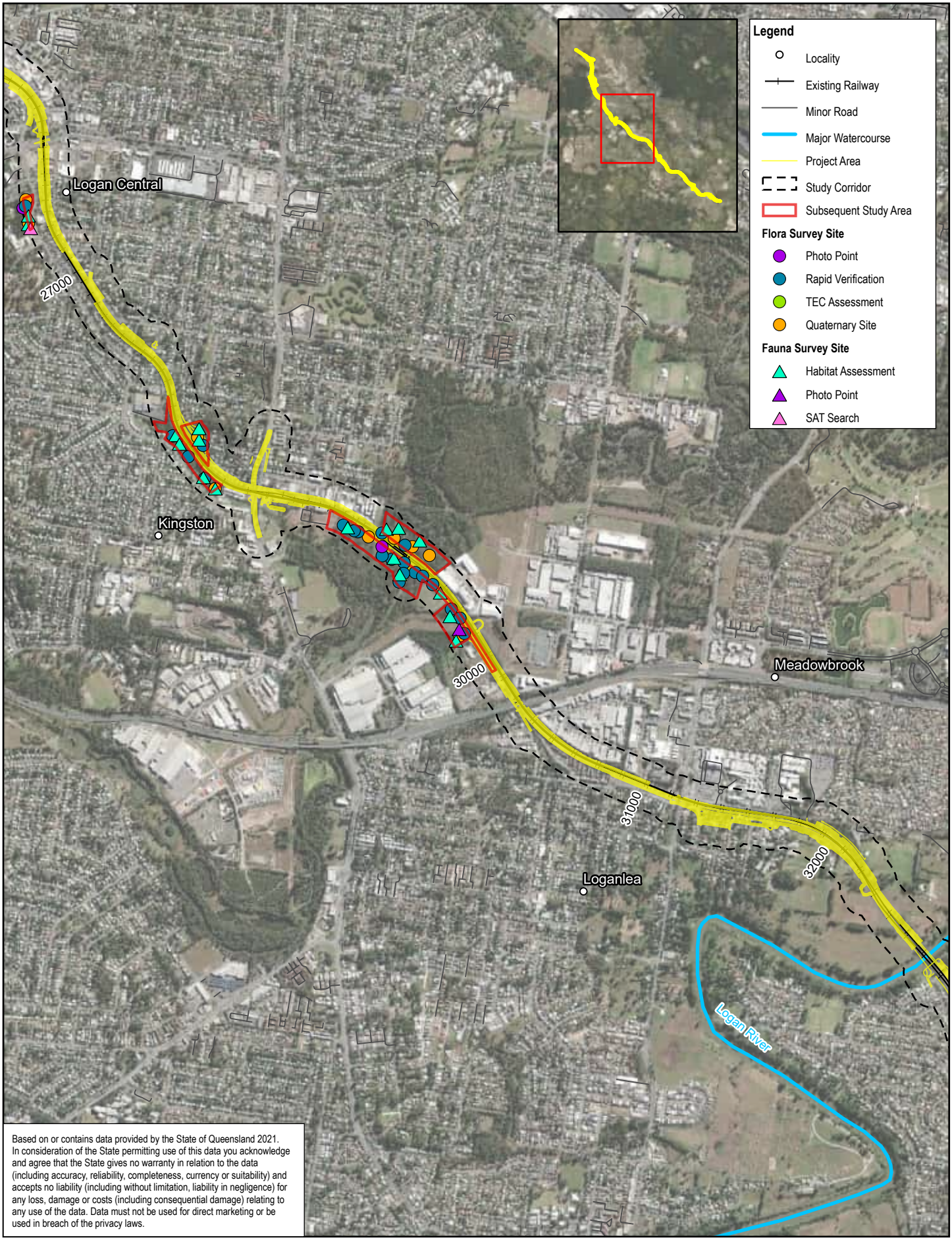

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FIGURE 2-1b

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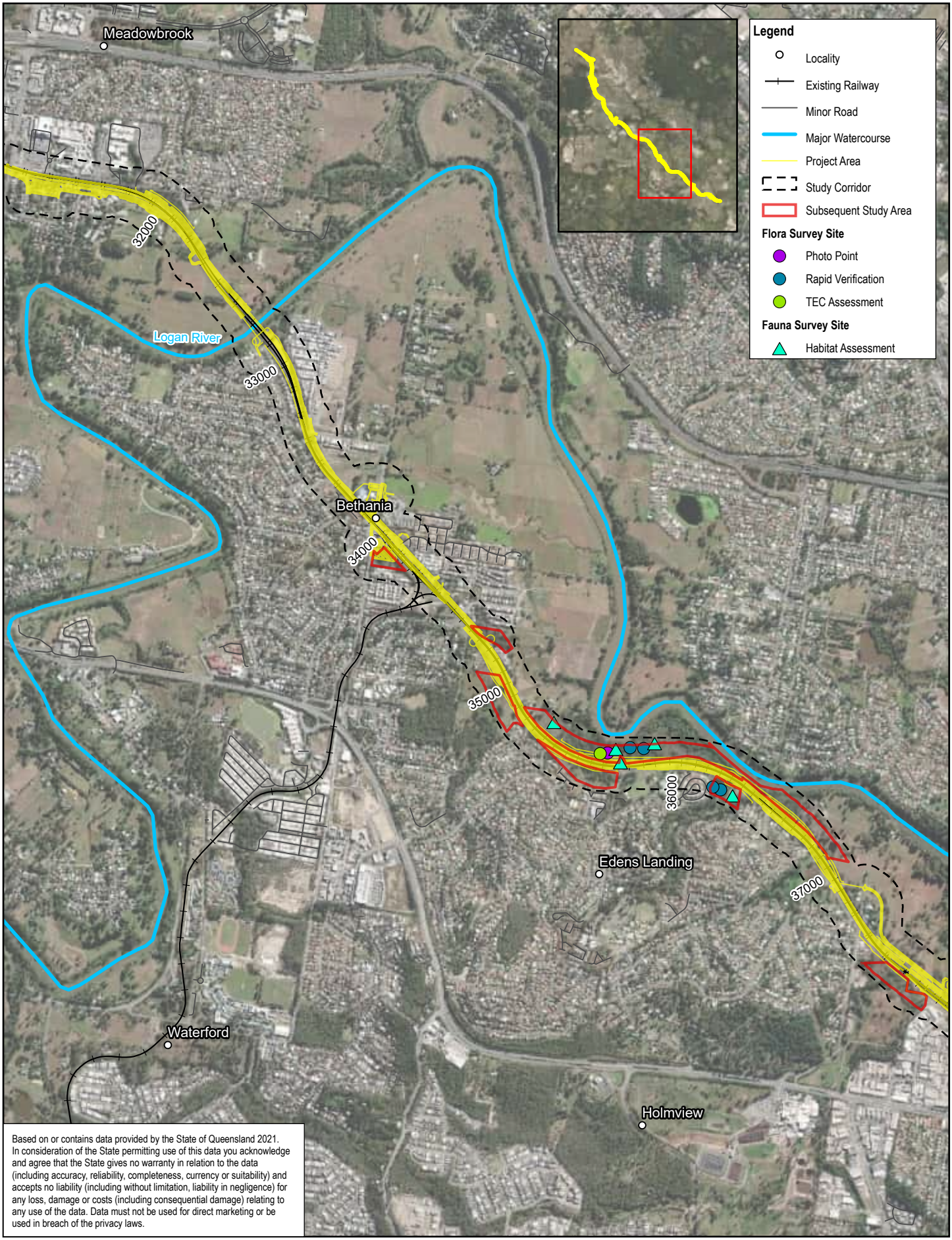

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FIGURE 2-1c

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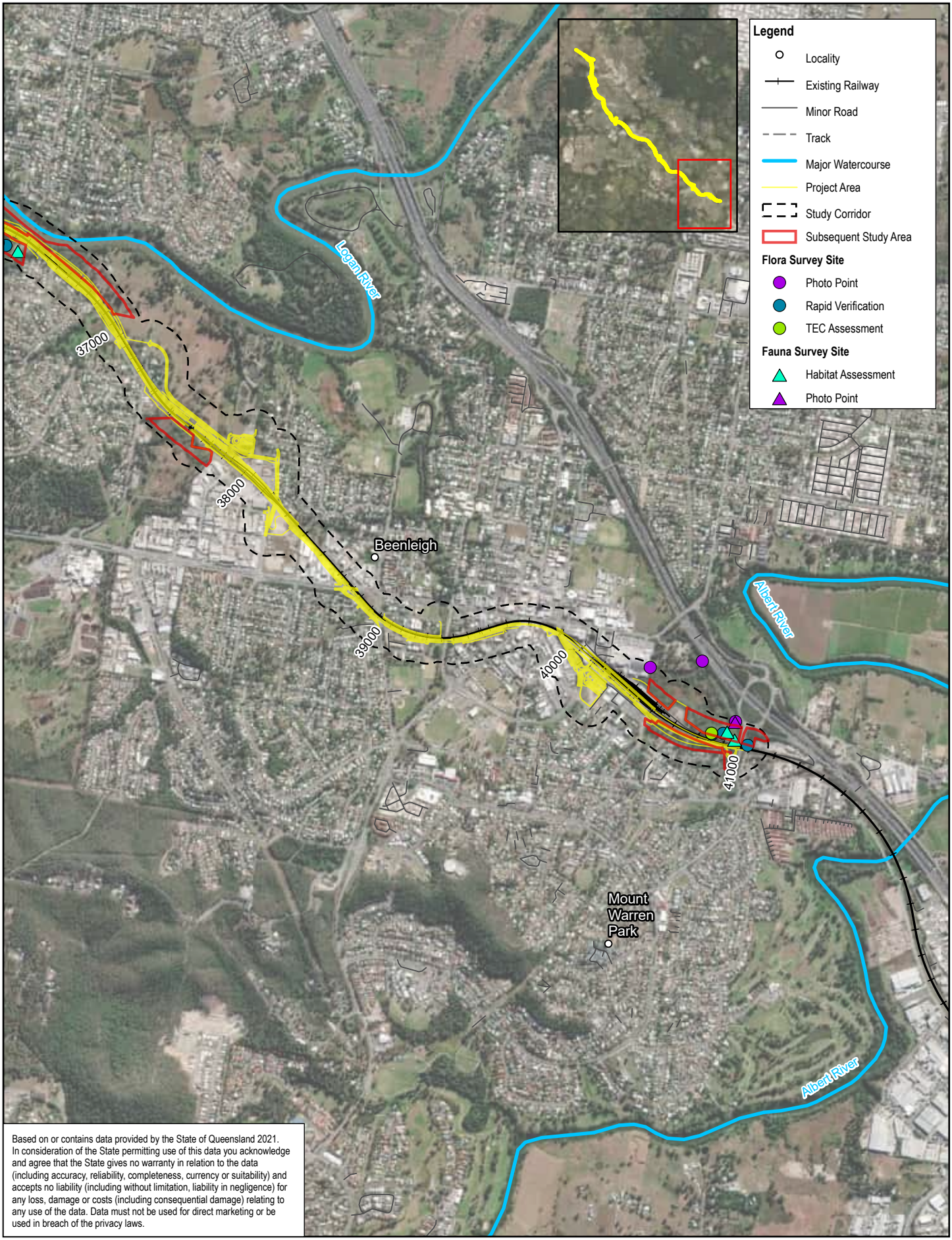

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FIGURE 2-1d

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Data source: DoR: Watercourse, Road, Railway, Locality (2020); GHD: Proposed Alignment, Study Area, Field Survey Site (2021); ESRI World Imagery: Earthstar Geographics
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2.2.4 Animal ethics and legislative permits

The ecological field surveys were conducted in accordance with the following permits and approvals:

- Department of Employment, Economic Development and Innovation Scientific Users Registration Certificate (Registration Number 132)
- Department of Environment and Heritage Protection Scientific Purposes Permit (permit number WISP15723315)
- Animal Reacher Authority issued by the accredited GHD Animal Ethics Committee.

2.3 Likelihood of occurrence assessment

An assessment was conducted to attribute a 'likelihood of occurrence' to conservation significant species (i.e. species listed under the EPBC Act and/or NC Act) that have been previously recorded or were predicted to occur in the desktop searches (Table 2-3). The likelihood of occurrence assessment was based on a review of species distributions and habitat requirements, historical records for the region, and the results of habitat assessments conducted during the field surveys.

Table 2-3 Likelihood of occurrence assessment criteria

Category	Criteria
Confirmed present	Species recorded during field surveys in the Study corridor.
Likely to occur	Species has been recorded within 1 km of the Project area and suitable habitat is present in the Study corridor. Species determined to be 'likely to occur' are otherwise known to occur within the surrounding landscape.
May occur	Species has not been recorded within 1 km of the Project area although species' distribution incorporates the Study corridor and potentially suitable habitat occurs in the Study corridor (but may not be particularly abundant or optimal habitat).
Unlikely to occur	Species has not been recorded within 1 km of the Project area and/or current known distribution does not encompass the Study corridor and/or suitable habitat is generally lacking from the Study corridor.

3. Results

3.1 Regional environment overview

3.1.1 Bioregion

The Project area is located within the Southeast Queensland bioregion. This bioregion encompasses 62,484.2 km^2 and approximately 3.6 percent of Queensland (DES, 2013a). The Southeast Queensland bioregion is located within the MacPherson-Macleay Overlap, where tropical and temperate zone converge. As such, the bioregion supports a high diversity of flora, fauna and ecological communities (SEQ Catchments, 2016).

3.1.2 Catchment and hydrology

The Project area intersects three riverine catchment areas, namely the Brisbane River, Logan River and Albert River Catchments.

The majority of the Project area is located within the Logan River Catchment, while Ch 21,250 to Ch 23,300 falls within the Lower Brisbane River Catchment and Ch 39,100 to Ch 41,350 falls within the Albert River Catchment.

The Logan River Catchment covers approximately 3,000 m^2. The main waterway within the catchment is the Logan River, with numerous smaller waterways flowing into it. The Logan River joins Albert River and flows to Moreton Bay which is a Ramsar wetland of International importance. The Lower Brisbane River Catchment covers approximately 1,195 m^2. The catchment receives water from the mid Brisbane River and its tributaries, as well as the Bremer River. The Lower Brisbane River Catchment also flows into Moreton Bay. The Albert River Catchment covers approximately 790 m^2. The catchment receives water from the Albert River and its tributaries (DES, 2013b).

3.1.3 Watercourse, waterways and drainage features

In total the Project area intersects 18 waterways including both minor and major waterways (Figure 3-1). Of these 18, four comprise major waterways to which the remaining 14 are minor tributaries of, these four major waterways include Spring Creek, Slacks Creek, Scrubby Creek and the Logan River. Each of the major waterways are further described below:

Spring Creek

The Project intersects Spring Creek at Ch 22,250 m, which is a tributary of Slacks Creek. Spring Creek converges with Slacks Creek at approximately Ch 23,100 m and is part of the Lower Logan River sub-catchment. The sub-catchment is located within urban residential developments and therefore receives runoff from a variety of sources including existing road and rail infrastructure, commercial and industrial sites, medium and high-density residential areas (DES, 2015a).

Slacks Creek

The Project intersects Slacks Creek at Ch 23,300 m (Plate 3-1). Slacks Creek is a major tributary of the Logan River. Slacks Creek joins with Logan River near Tanah Merah approximately 10 km downstream of the Project area. Slacks Creek is part of the Lower Logan River sub-catchment. Most of the sub-catchment is located within urban residential developments, and as with Spring Creek, receives runoff from a similar range of sources (DES, 2015a). Although Slacks Creek is located within a highly urbanised area of the sub-catchment,

the majority of housing and development has been set back from the waterway allowing some riparian connectivity to be maintained (Figure 3-1).

Scrubby Creek

The Project intersects Scrubby Creek at Ch 29, 300 m (Plate 3-1). Scrubby Creek is a major tributary of the Logan River. At the intersection location the waterway runs through two Council managed parklands including Nealdon Park and Battle Park. The waterway converges with the Logan River approximately 7 km downstream of the Project area just south of the Pacific Highway. As with Slacks Creek, majority of development has been set back from the high bank of the waterway allowing some riparian connectivity to occur.

Logan River

The Project intersects the lower reaches of Logan River at Ch 33, 000 m. Ultimately the Logan River flows into southern Moreton Bay which is listed as an Internationally important Ramsar wetland (Section 3.1.4). Moreton Bay is approximately 25 km downstream of the Project area. The Logan River is part of the Lower Logan River Sub catchment. The Project intersects the estuarine region of the lower Logan River, known as the Logan Estuary, which reaches from the river's convergence with the sea up to Stockleigh (DES, 2015a). Most of the catchment is urban residential developments, with activities such as grazing and horticulture occurring higher in the catchment (DES, 2015a).

Plate 3-1 Slacks Creek (left) and Scrubby Creek (right)

3.1.4 Ramsar wetlands

The EPBC PMST identified one Wetland of International Importance, the Moreton Bay Ramsar site, as occurring approximately 10 km downstream of the Project area (Figure 3-1). This wetland was confirmed to be approximately 25 km downstream of the Project. The Project area remains hydrological connected to the Ramsar wetland, with the Logan River catchment discharging directly into Moreton Bay.

No Ramsar wetlands are directly intersected by or in close proximity to the Project area. Given the separation distance and environmental management controls, no impacts to the Ramsar wetland values are anticipated to occur as a result of the proposed Project.

3.1.5 Wetlands of National significance

The Project area does not contain any wetlands of national significance listed under the Directory of Important Wetlands of Australia (DIWA). The nearest DIWA listed wetland is the Karawatha Forest Park wetland, located approximately 2.5 km southwest and upstream of the Project area (Figure 3-1).

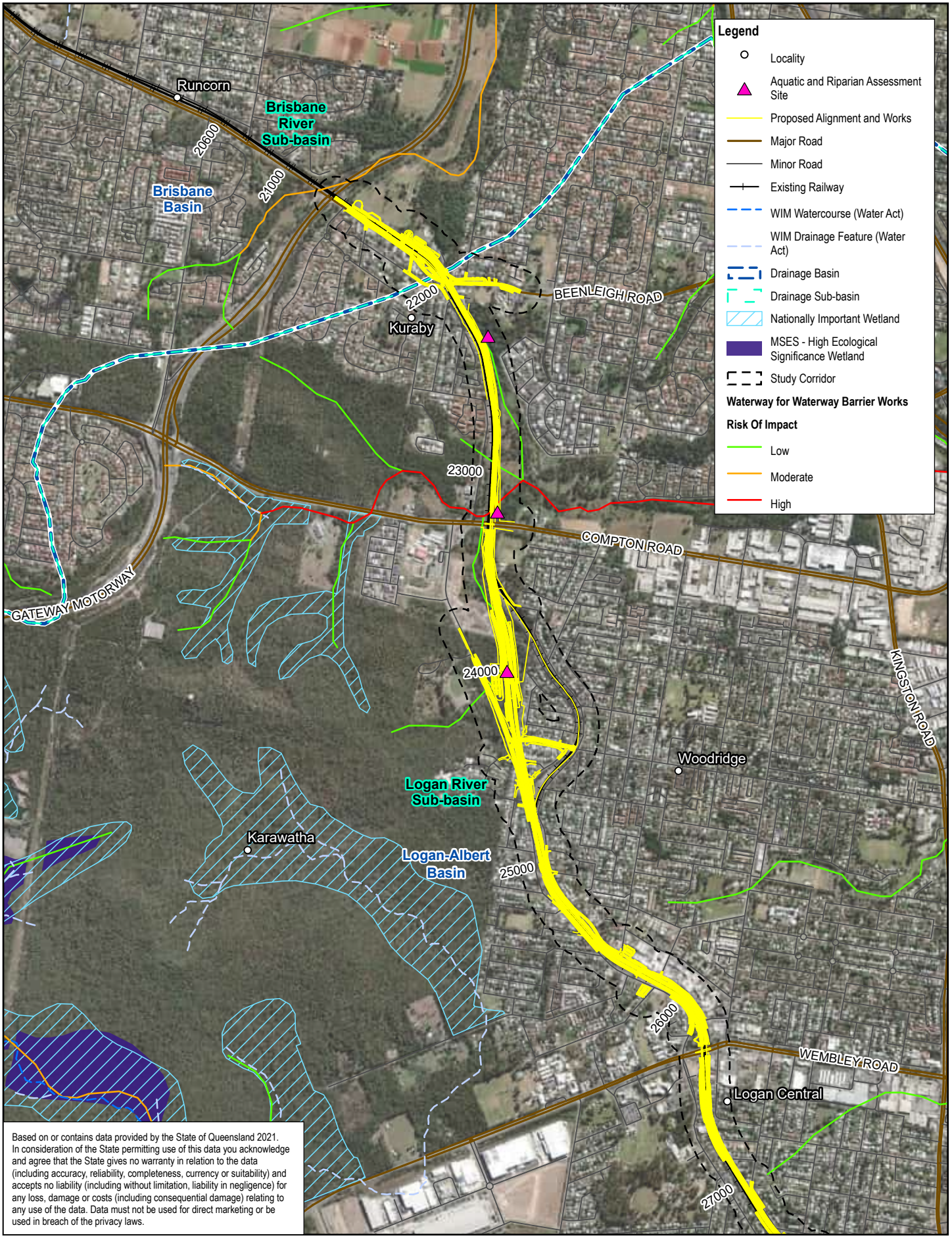
3.1.6 Wetlands of High Ecological Significance (HES)

The alignment intersects wetlands mapped under the Vegetation Management Act 1999 and Matters of State Environmental Significance. Table 3-1 lists where the protected waterbodies traverse the Project area.

Table 3-1 Protected waterbodies with HES wetlands

Protected waterbodies	Chainage
Wetland (HES) associated with Scrubby Creek	Ch 29,500 m
Wetland (HES) adjacent to Logan River	Ch 36,750 m
Wetland (HES) associated with unnamed watercourse or drainage feature	Ch 38,000 m

Key to table: HES = High Ecological Significance.



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Wetlands and waterways within the study corridor

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FIGURE 3-1a

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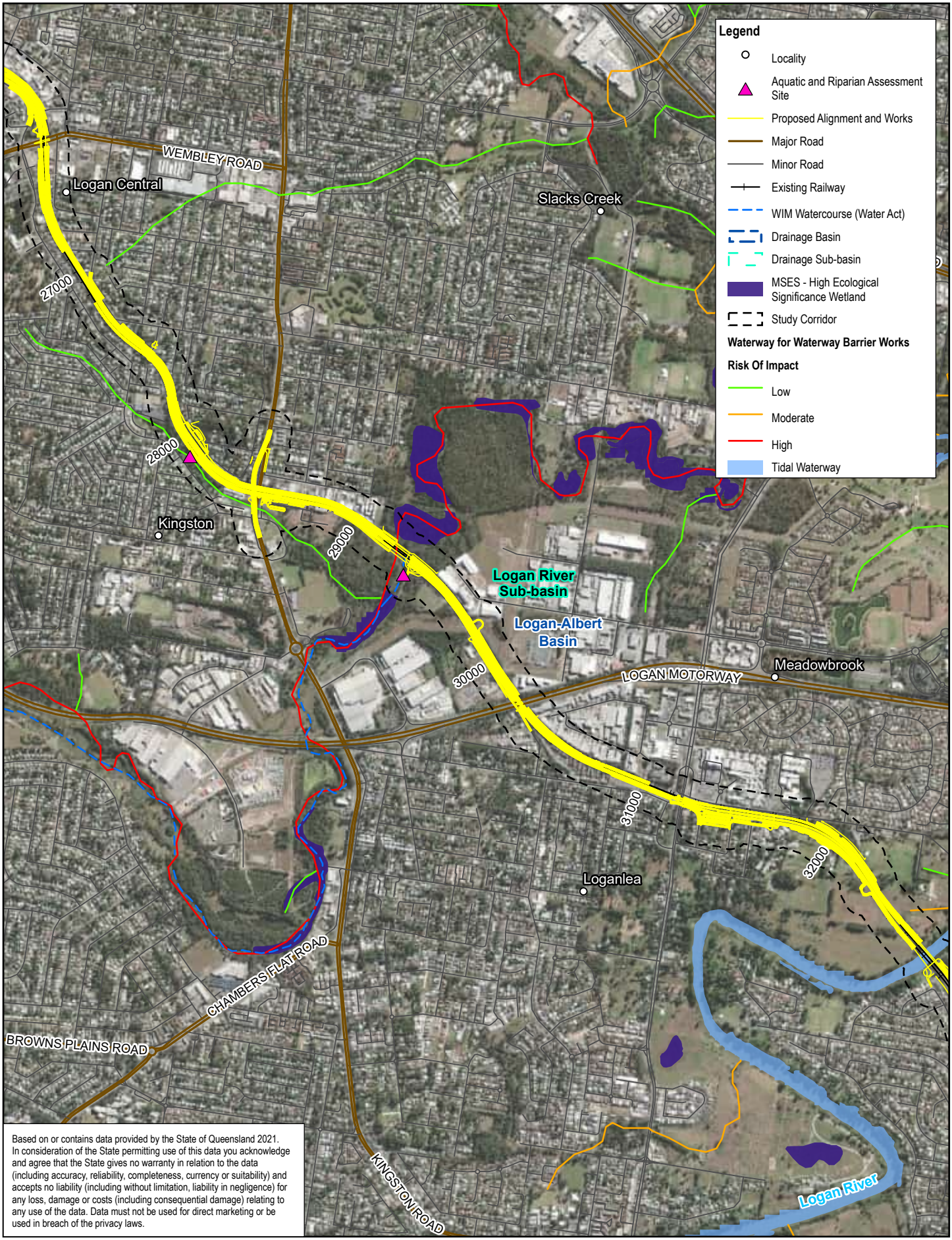
Data source: DoR: WIM Watercourse, WIM Drainage Feature, Locality, Roads, Railway, Drainage Basin and Sub-basin, HES Wetland, Watercourse labels (2020); DAF: Waterway Barrier Works (2016); DAWE: Nationally Important Wetland (2008); GHD: Proposed Alignment, Study Area (2021); ESRI World Imagery: Maxar. Created by: xlee



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Wetlands and waterways within the study corridor

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FIGURE 3-1b

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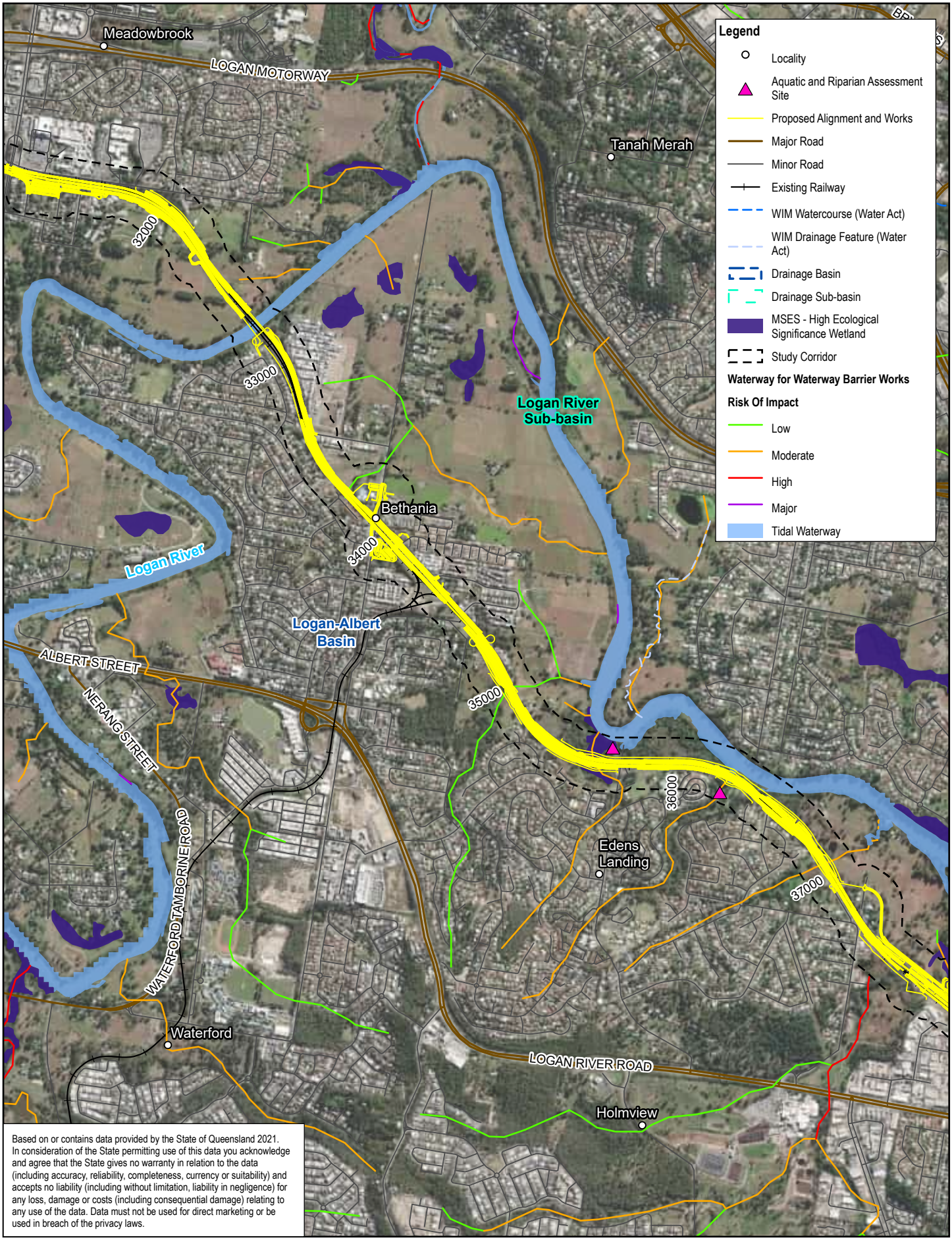

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Wetlands and waterways within the study corridor

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FIGURE 3-1c

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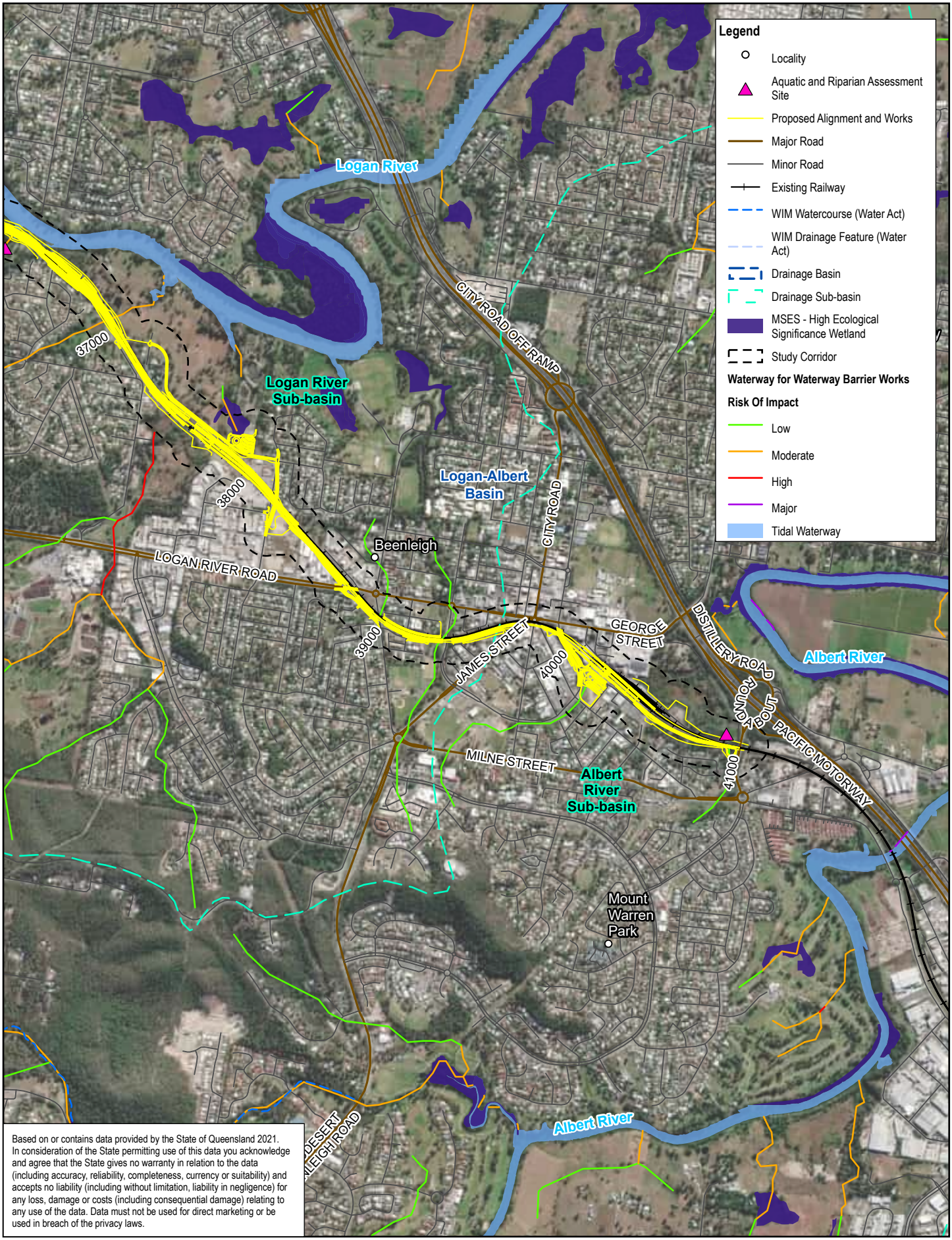
Print date: 09 Aug 2021 - 16:27

Data source: DoR: WIM Watercourse, WIM Drainage Feature, Locality, Roads, Railway, Drainage Basin and Sub-basin, HES Wetland, Watercourse labels (2020); DAF: Waterway Barrier Works (2016); DAWE: Nationally Important Wetland (2008); GHD: Proposed Alignment, Study Area (2021); ESRI World Imagery: Maxar. Created by: xlee



Paper Size ISO A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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GHD

Department of Transport and Main Roads
Logan and Gold Coast Faster Rail
(Kuraby to Beenleigh) Project

Wetlands and waterways within the study corridor

Project No. **12534697**
Revision No. **2**
Date **18/06/2021**

FIGURE 3-1d

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Print date: 09 Aug 2021 - 16:27

Data source: DoR: WIM Watercourse, WIM Drainage Feature, Locality, Roads, Railway, Drainage Basin and Sub-basin, HES Wetland, Watercourse labels (2020); DAF: Waterway Barrier Works (2016); DAWE: Nationally Important Wetland (2008); GHD: Proposed Alignment, Study Area (2021); ESRI World Imagery: Maxar. Created by: xlee

3.2 Threatened ecological communities

3.2.1 Desktop assessment

The EPBC Act PMST identified four TECs that have the potential to occur within 1 km of the Project area (Appendix A), namely:

- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community
- Lowland Rainforest of Subtropical Australia
- Poplar Box Grassy Woodland on Alluvial Plains
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Table 3-2 outlines the conservation status and the corresponding REs for each of the predicted TECs.

Of the REs identified as potentially corresponding with a TEC, only one was mapped by DoR within the Subsequent study areas. Specifically, RE 12.3.20 is mapped within the Study corridor at Ch 40,600 to 40,900 m and potentially constitutes the *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community*.

Table 3-2 Desktop TEC results with associated REs

TEC name	EPBC Act status	Associated REs
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community	E	12.1.1 and 12.3.20 (DEE, 2018)
Lowland Rainforest of Subtropical Australia	CE	12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.11.1, 12.11.10, 12.12.1 and 12.12.16 (DSEWPC, 2011)
Poplar Box Grassy Woodland on Alluvial Plains	E	11.3.2, 11.3.17, 11.4.7, 11.4.12 and 12.3.10 (TSSC, 2019)
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8, 13.12.8, 13.12.9, 11.3.23#, 12.8.16#, 13.3.4#^, 13.11.3#^ and 13.11.4#^ (TSSC, 2006)

Key to table: C.E = Critically Endangered, E = Endangered.

Can also be a smaller component these regional ecosystems:
^ Only at the far western edge of the bioregion

3.2.2 Field results

Assessment of vegetation communities that potentially constituted any of the EPBC Act listed TECs was undertaken throughout the Subsequent study areas. From these assessments only one TEC was considered to potentially occur, this being the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community.

Two vegetation communities were identified as potential locations for this TEC, one being Hugh Muntz park (Ch 40,600-40,900 m) at the southern extent of the Project area. However, these

vegetation communities were found to be highly modified and based on the canopy composition of the vegetation and the high percentage of introduced species, vegetation within the Subsequent study areas at this location was not considered to constitute the TEC at the time of the field survey as the condition thresholds for the TEC were not met.

The other area considered to be a potential TEC was located along the Logan River near Edens Landing Station (Ch 35,600 m). This location was recorded as meeting the key diagnostic characteristics of the TEC however, the condition thresholds were not met and therefore this vegetation did not constitute the TEC. Specifically, three disjunct patches were recorded as being too small (less than 0.5 ha) and containing vegetation cover that consisted of a high percentage of transformer species (non-native plant species with the potential to permanently change the character, condition, form or nature of patches of the ecological community) (DoEE, 2018). The two primary transformer species recorded within the communities included *Lantana camara** and *Asparagus plumosus**, both of which are listed as example transformer species within the conservation advice for this TEC (DoEE, 2018).

Plate 3-2 shows an area of vegetation at Edens Landing that is highly impacted by transformer species and therefore does not constitute the TEC.

Plate 3-2 Vegetation discounted as TEC due to extremely high impact from invasive species

3.3 Regional ecosystems

3.3.1 Desktop assessment

DoR's regulated vegetation management map shows that the Subsequent study areas comprised Category B (remnant) regulated vegetation and Category X (non-remnant) vegetation. A total of 14 different homogenous RE types are mapped within the Study corridor, as described in Table 3-3 and shown on Figure 3-2 (DoR, 2021). Due to the highly fragmented nature of the urban area, many of the mapped polygons are slithers or small remaining patches within a largely cleared landscape.

Table 3-3 Mapped regional ecosystem communities within the Study corridor

RE label	REDD short description	VMA status	Regulated Vegetation Category
12.3.3d	*Eucalyptus moluccana* woodland. Other frequently occurring species include *Eucalyptus tereticornis, E. crebra, E. siderophloia, Corymbia citriodora subsp. variegata, Angophora leiocarpa* and *C. intermedia*. Occurs on margins of Quaternary alluvial plains often adjacent sedimentary geologies.	E	B
12.3.6	*Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest on coastal alluvial plains.	LC	B
12.3.7	*Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca* spp. fringing woodland.	LC	B
12.3.8	Swamps with *Cyperus* spp., *Schoenoplectus* spp. and *Eleocharis* spp.	OC	B
12.3.11	*Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast.	OC	B
12.3.20	*Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, E. siderophloia* open forest on low coastal alluvial plains.	E	B
12.5.3a	*Eucalyptus racemosa subsp. racemosa* woodland on remnant Tertiary surfaces.	E	B
12.9-10.4	*Eucalyptus racemosa subsp. racemosa* woodland on sedimentary rocks.	LC	B
12.9-10.7a	*Eucalyptus siderophloia, Corymbia intermedia +/- E. tereticornis* and *Lophostemon confertus* open forest. Occurs on Cainozoic and Mesozoic sediments in near coastal areas.	OC	B
12.9-10.12	*Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa* woodland on sedimentary rocks	E	B
12.9-10.17c	Open forest of *Eucalyptus carnea* and/or *E. tindaliae* and/or *E. helidonica +/- Corymbia citriodora subsp. variegata, Eucalyptus crebra, Eucalyptus major, Corymbia henryi, Angophora woodsiana, C. trachyphloia, E. siderophloia, E. microcorys, E. resinifera and E. propinqua*. *Lophostemon confertus* often present as a sub-canopy or understorey tree. Occurs on Cainozoic and Mesozoic sediments.	LC	B

RE label	REDD short description	VMA status	Regulated Vegetation Category
12.9-10.17c	Open forest of *Eucalyptus carnea* and/or *E. tindaliae* and/or *E. helidonica +/- Corymbia citriodora subsp. variegata, Eucalyptus crebra, Eucalyptus major, Corymbia henryi, Angophora woodsiana, C. trachyphloia, E. siderophloia, E. microcorys, E. resinifera and E. propinqua. Lophostemon confertus* often present as a sub-canopy or understorey tree. Occurs on Cainozoic and Mesozoic sediments.	LC	B
12.9-10.19a	*Corymbia henryi* and/or *Eucalyptus fibrosa subsp. fibrosa* open forest. Other commonly associated species include, *Corymbia citriodora subsp. variegata, E. carnea, E. siderophloia, E. crebra* and *E. major*. Occurs in coastal areas on Cainozoic and Mesozoic sediments.	LC	B
12.11.27	*Eucalyptus racemosa subsp. racemosa* and/or *E. seeana* and *Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics.	E	B

Key to table: REDD = Regional Ecosystem Description Database, VMA = *Vegetation Management Act 1999;* E = Endangered, OC = Of Concern, LC = Least Concern.

3.3.2 Field results

The vegetation communities confirmed present within the Subsequent study areas are described in Table 3-4. A number vegetation communities were found to differ in species composition from that mapped by DoR (DoR, 2021).

Table 3-4 Observed vegetation communities within Subsequent study areas

Community	Description	Photograph	Chainage (m)
Mapped 12.3.3d Field Verified 12.3.3. (Eucalyptus tereticornis woodland on Quaternary alluvium) 12.3.11	**REDD:** *Eucalyptus moluccana* woodland. Other frequently occurring species include *Eucalyptus tereticornis, E. crebra, E. siderophloia, Corymbia citriodora* subsp. *variegata, Angophora leiocarpa* and *C. intermedia*. Occurs on margins of Quaternary alluvial plains often adjacent sedimentary geologies. **Field observation** Located on the alluvial plains of Scrubby creek. Canopy dominated by *Eucalyptus tereticornis* at 30 m with approximately 40 percent cover with district understorey of *Lophostemon suaveolens* at 15 m with approximately 60 percent cover. Sparse to absent shrub layer with young *Glochidion sumatranum* and *Parsonsia straminea*. Dense ground cover of *Paspalum conjugatum, Urochloa mutica* and *Sphagneticola trilobata** on alluvial soil. With a clear dominance of *Eucalyptus tereticornis* the RE is more likely 12.3.3 than 12.3.3d. Aligning with the change in geology the eastern section from approximately Ch 29,400 m the RE was recorded as aligning with 12.3.11. Dominated by a mix of species including *Eucalyptus siderophloia, Angophora leiocarpa, Eucalyptus tereticornis* and *Corymbia intermedia*. The understorey included *Melaleuca sieberi, Lophostemon suaveolens, Acacia disparrima* and *Alphitonia excelsa.* The ground layer included *Imperata cylindrica, Lomandra multiflora, Entolasia stricta* and *Lomandra confertifolia* on silty grey brown alluvial sols.	 	29,200; 29,400

Community	Description	Photograph	Chainage (m)
Mapped 12.3.6 Field Verified 12.3.6	**REDD:** *Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest on coastal alluvial plains. **Field observation** Confirmed present with *Melaleuca quinquenervia, Eucalyptus tereticornis, Lophostemon suaveolens* and *Corymbia intermedia* recorded in the canopy layer. The subcanopy was often dominated by *Melaleuca sieberi*. The ground layer was dominated by dense cover of *Paspalum conjugatum, Urochloa mutica* and *Sphagneticola trilobata** on alluvial soil.		29,300
Mapped 12.3.7 Field Verified 12.3.7 with areas of 12.3.20	**REDD:** *Eucalyptus tereticornis*, *Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca* spp. fringing woodland. **Field observation** Confirmed, although heavily impacted by introduced species. There was a clear presence of *Eucalyptus tereticornis* and some *Casuarina cunninghamiana*. Other species present included *Eucalyptus siderophloia, Angophora leiocarpa, Casuarina glauca, Corymbia tessellaris, Acacia disparrima* and *Corymbia torelliana*. The understorey was frequently dominated *Lantana camara** and *Asparagus plumosa**.		35,600; 35,800; 36,200

Community	Description	Photograph	Chainage (m)
Mapped 12.3.8 Field Verified 12.3.8 heavily impacted	**REDD:** Swamps with *Cyperus* spp., *Schoenoplectus* spp. and *Eleocharis* spp. **Field observation** Freshwater wetland dominated by *Typha orientalis* and *Phragmites australis*. Mature trees growing along fringe of wetland, including *Casuarina cunninghamiana* and *Melaleuca bracteata*. Ground layer contained *Eleocharis* spp. Local hydrology was recorded as being modified by culvert to the east. No tidal influence and heavily degraded by exotic species to the west of the Project area.		36,300
Mapped 12.3.11 Field Verified 12.3.11 heavily impacted	**REDD:** *Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast. **Field observation** Dominant species recorded as *Melaleuca quinquenervia* and with some emergent *Eucalyptus microcorys*. Associate species included *Glochidion sumatranum*, *Acacia disparrima* and *Lophostemon suaveolens*. Soils were alluvial with high percentage of introduced or invasive species including *Ipomoea indica, Megathyrsus maximus* and *Sphagneticola trilobata**		21,800; 23,201^; 23,220^; 23,225^; 24,060

Community	Description	Photograph	Chainage (m)
Mapped 12.3.20 Field Verified 12.3.7 Regrowth	**REDD:** *Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, E. siderophloia* open forest on low coastal alluvial plains **Field observation** Located at the southern end of Hugh Muntz Park the mapped RE was not able to be confirmed. The dominant species of this RE *Melaleuca quinquenervia* and *Casuarina glauca* were recorded from the wider area however the mapped portion of the RE accessed was dominated by regrowth *Eucalyptus tereticornis* with tall dense *Megathyrsus maximus* subsp. *maximus*. The entire area was heavily impacted by introduced or invasive species. Access was limited by the standing water and rail corridor.		40,900
Mapped 12.5.3a Field Verified 12.5.3a	**REDD:** *Corymbia intermedia, Eucalyptus seeana +/- E. racemosa subsp. racemosa, Angophora leiocarpa, E. siderophloia, E. microcorys, C. citriodora* subsp. *variegata, Lophostemon suaveolens* woodland. *Melaleuca quinquenervia* is often a prominent feature of lower slopes. Occurs on complex of remnant Tertiary surfaces +/- Cainozoic and Mesozoic sediments **Field observation** Dominated by *Eucalyptus microcorys* with some *Eucalyptus racemosa, Corymbia intermedia* and *Acacia disparrima* us subcanopy sparse. The section located within the Study corridor was maintained as a parkland and the understorey was mostly mown grasses, all shrubs were cleared. Recorded as sandy grey brown alluvial soils		21,800

Community	Description	Photograph	Chainage (m)
Mapped 12.9-10.4 Field Verified 12.9-10.4	**REDD:** *Eucalyptus racemosa* subsp. *racemosa* woodland on sedimentary rocks **Field observation** *Eucalyptus exserta* and *Eucalyptus racemosa* sparse canopy to 20 m over dense *Allocasuarina littoralis*. *Lepidosperma laterale* dominating the ground layer		23,250^; 24,000; 24,200
Mapped 12.9-10.7a Field Verified 12.3.5 with some 12.3.11, 12.9-10.7a may occur on upper slopes but too impacted to tell.	**REDD:** *Eucalyptus siderophloia, Corymbia intermedia +/- E. tereticornis* and *Lophostemon confertus* open forest. Occurs on Cainozoic and Mesozoic sediments in near coastal areas. **Field observation** *Melaleuca quinquenervia* to 15 m tall dominating the upper gully line and adjacent areas with approximately 80 percent cover. Associated species included *Glochidion sumatranum*, *Pinus elliottii* and *Syagrus romanzoffiana*. Lower in the gully a dense shrub layer was present including *Ochna serrulata* and *Pteridium esculentum* throughout *Ottochloa* spp. were present in the ground layer although some areas had dense introduced garden plants such as *Impatiens walleriana* dominating the ground layer. Sandy alluvial soils with heavy weed impacts through most areas.		22,200

Community	Description	Photograph	Chainage (m)
Mapped 12.9-10.12 Field Verified 12.9-10.7a	**REDD:** *Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa* woodland on sedimentary rocks **Field observation** *Eucalyptus siderophloia* and *Corymbia intermedia* dominated. *Eucalyptus racemosa* present uphill but not in this section. Small *Alphitonia excelsa* in the shrub layer and *Lepidosperma laterale* in the ground layer on sandy soils		23,100^; 23,200^; 24,001
Mapped 12.9-10.17c Field Verified 12.9-10.4	**REDD:** Open forest of *Eucalyptus carnea* and/or *E. tindaliae* and/or *E. helidonica +/- Corymbia citriodora* subsp. *variegata, Eucalyptus crebra, Eucalyptus major, Corymbia henryi, Angophora woodsiana, C. trachyphloia, E. siderophloia, E. microcorys, E. resinifera and E. propinqua. Lophostemon confertus* often present as a sub-canopy or understorey tree. Occurs on Cainozoic and Mesozoic sediments. **Field observation** *Eucalyptus racemosa* and *Corymbia intermedia* sparse to 24 m over dense *Allocasuarina littoralis*. *Eucalyptus robusta* also recorded in the lower tree layer. The ground layer species included *Lepidosperma laterale* dominating most dryer areas and included *Lomandra multiflora* and *Entolasia stricta*. Soils were recorded as sandy.		23,900

Community	Description	Photograph	Chainage (m)
Mapped 12.9-10.17d Field Verified 12.9-10.17d	**REDD:** Open forest generally containing *Eucalyptus siderophloia, E. propinqua* or *E major, Corymbia intermedia* on hills and ranges on Cainozoic and Mesozoic sediments. **Field observation** In the western block at Chainage 24,700 m had a mown ground layer for fire protection through most of the relevant area along the edge closer to the houses. The interior to the block conformed with the mapped RE being dominated *Eucalyptus propinqua Corymbia intermedia* and *Eucalyptus siderophloia*. A very sparse shrub layer present primarily *Acacia* spp. and the ground layer included *Lomandra multiflora, Lepidosperma laterale* and *Themeda triandra*.		24,300; 24,700
Mapped 12.9-10.19a Field Verified 12.9-10.17d	**REDD:** *Corymbia henryi* and/or *Eucalyptus fibrosa* subsp. *fibrosa* open forest. Other commonly associated species include, *Corymbia citriodora* subsp. *variegata, E. carnea, E. siderophloia, E. crebra* and *E. major*. Occurs in coastal areas on Cainozoic and Mesozoic sediments. **Field observation** The canopy consisted of *Eucalyptus propinqua* dominant with sub- dominant *Eucalyptus crebra* to 30 m tall and an approximate cover of 60 percent. Shrub and ground cover had Low native species diversity especially further from the road. Native species recorded included *Entolasia stricta, Themeda triandra, Lepidosperma laterale* and *Lomandra confertifolia*. Large amount of garden plants present, with areas dominated by *Bromeliad* sp., *Aloe* sp., *Bryophyllum* sp. and *Epidendrum* sp.		26,600

Community	Description	Photograph	Chainage (m)
Mapped 12.11.27 Field Verified 12.11.14	**REDD:** *Eucalyptus racemosa* subsp. *racemosa* and/or *E. seeana* and *Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics **Field observation** Highly disturbed woodland dominated by *Acacia leiocarpa, Eucalyptus siderophloia, Corymbia citriodora* and *Corymbia torelliana*. Shrub layer contained *Lantana camara**, *Asparagus plumosus*, Alphitonia excelsa* and *Acacia* spp. with associated *Casuarina cunninghamiana* and *Casuarina glauca*. Mixed ground layer often not present under dense *Lantana camara** cover and containing *Imperata cylindrica, Lomandra longifolia, Murdannia graminea* and various introduced grass species where dense shrub layer not present.		35,900; 36,250

^= indicates a slither polygon, *=restricted invasive species

3.4 Marine plants

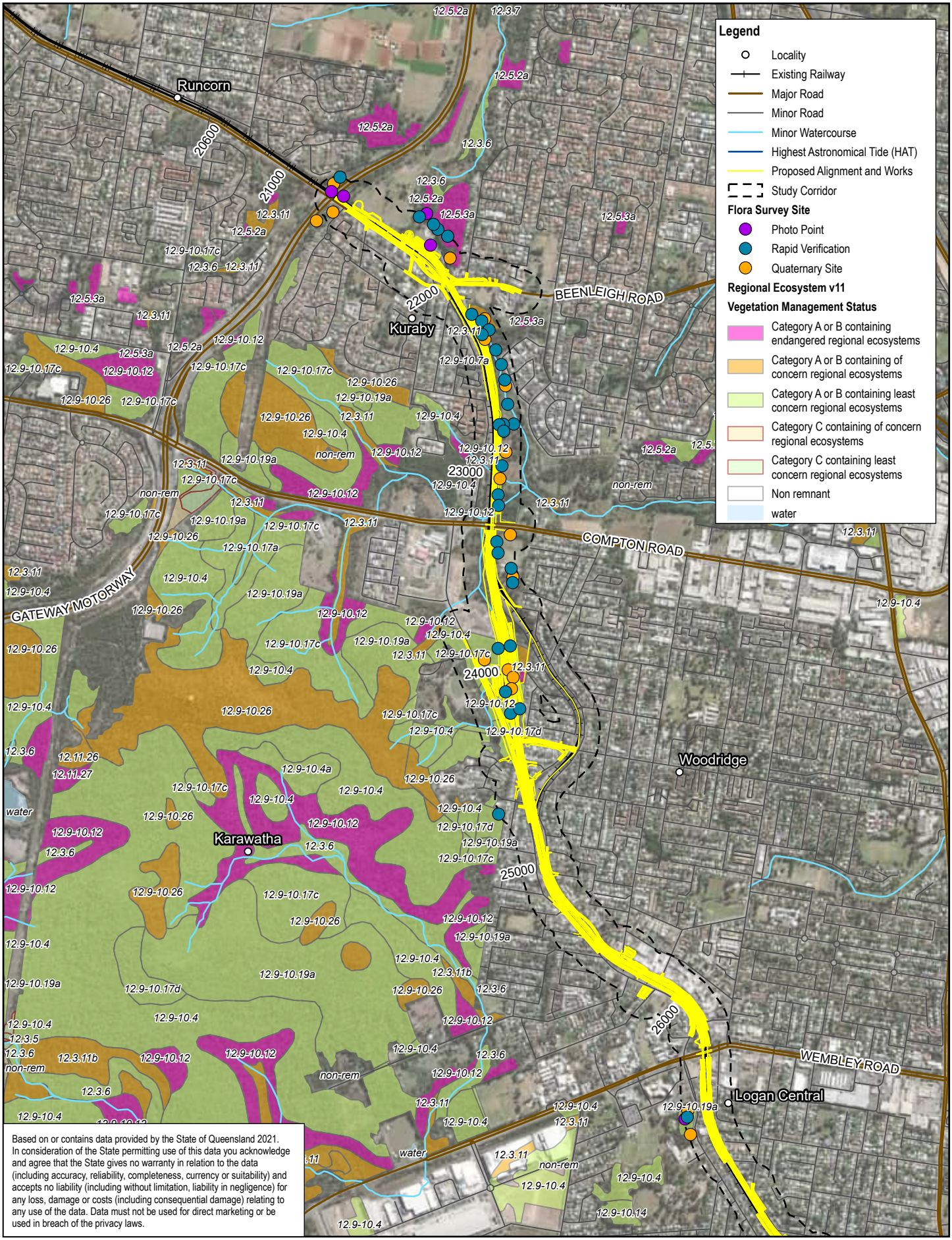
The Project area is partially located within the tidal flats of the Logan River and Albert River, with scattered areas adjacent to the Project mapped as below highest astronomical tide (HAT). The *Fisheries Act 1994* defines marine plants as plants which usually grow on or adjacent to tidal land.

The Fish Habitat Management Operational Policy FHMOP 001 (Fish Habitat Management Policy) stipulates that tidal 'is any land at or below the HAT mark' and therefore, all native vegetation growing below the theoretical level of HAT comprises marine plants. Mapped HAT is recorded at the following locations and shown in Figure 3-2.

- Ch 32, 700 – 32,800 m – the Logan River
- Ch 35,600 m – a minor tributary of the Logan River
- Ch 36,150 – 36,600 m – Logan River floodplain
- Ch 37,500 - 37,700 m – A tributary of the Logan River

Accordingly, vegetation within the Project area at these locations constitutes marine plants as per the *Fisheries Act 1994* definition.

This assessment confirmed that no areas of marine plants additional to the above are present within the Subsequent study areas.



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Grid: GDA 1994 MGA Zone 56

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Logan and Gold Coast Faster Rail
(Kuraby to Beenleigh) Project

Vegetation community values within the study corridor

Project No. **12534697**
Revision No. **2**
Date **18/06/2021**

FIGURE 3-2a

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Data source: DoR: Locality, Roads, Railway, Watercourses, RE v11 (2020), HAT (2013); GHD: Proposed Alignment, Flora Survey, Study Area (2021); World Imagery: Maxar. Created by: xlee

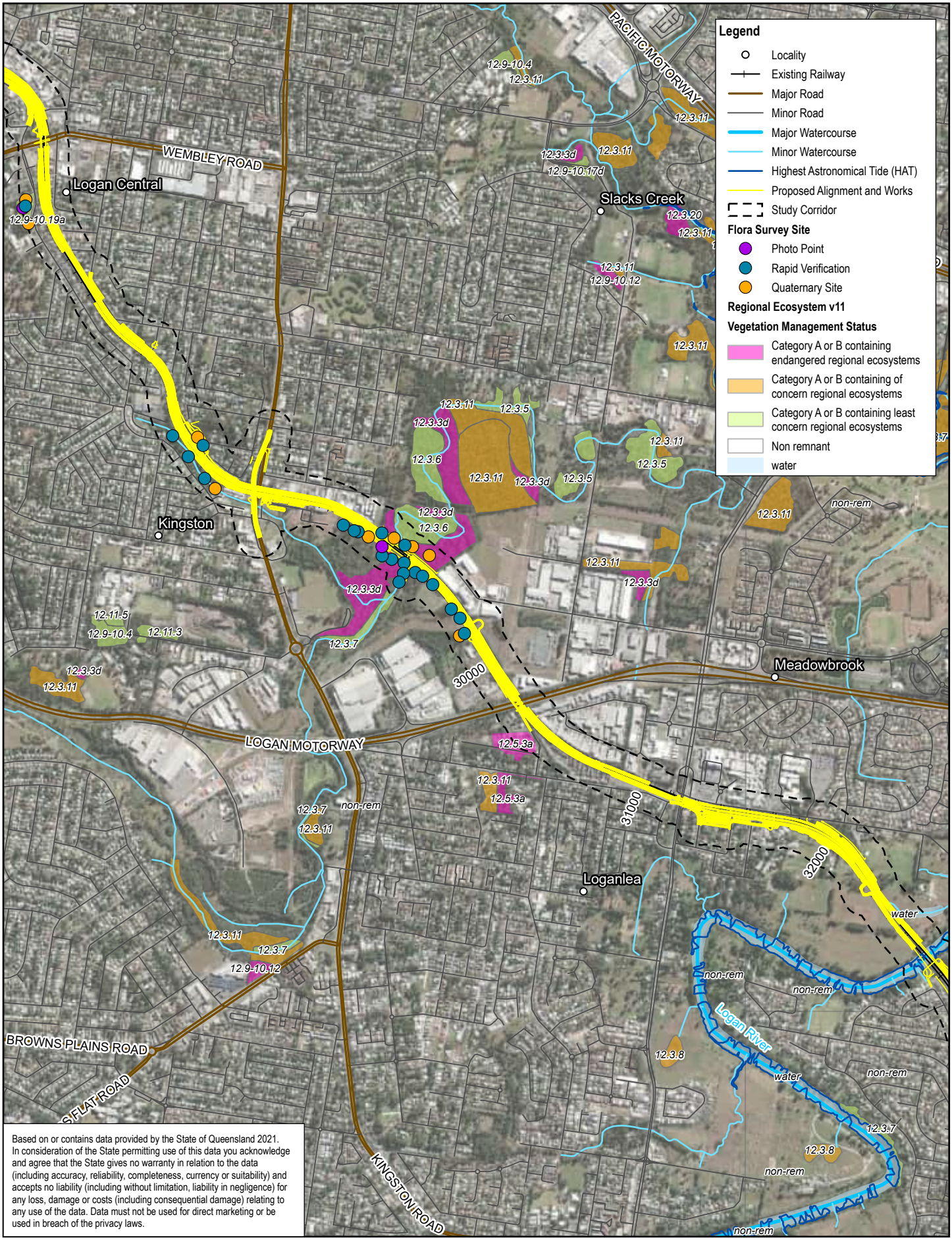

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FIGURE 3-2b

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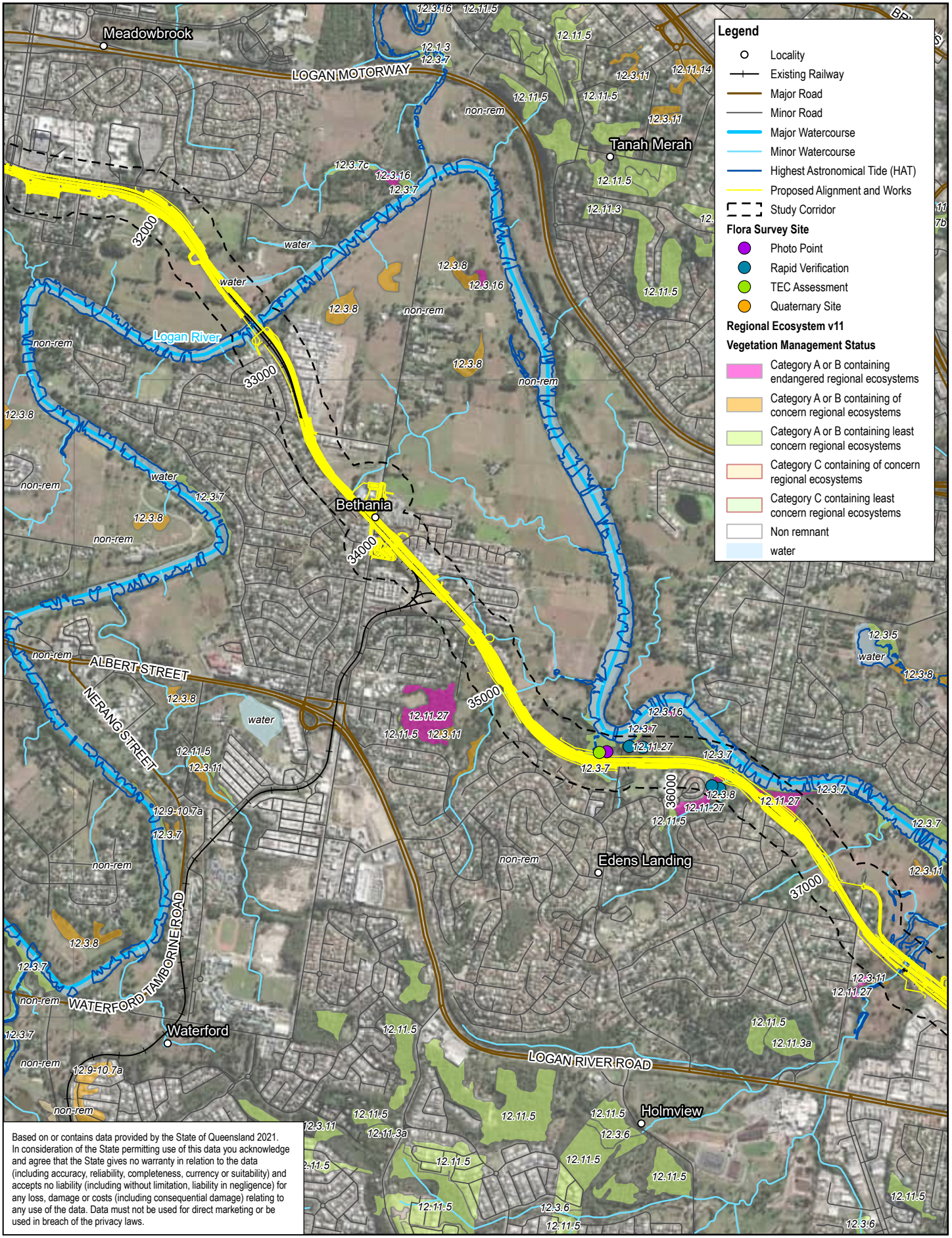
Data source: DoR: Locality, Roads, Railway, Watercourses, RE v11 (2020), HAT (2013); GHD: Proposed Alignment, Flora Survey, Study Area (2021); World Imagery: Maxar. Created by: xlee



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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FIGURE 3-2c

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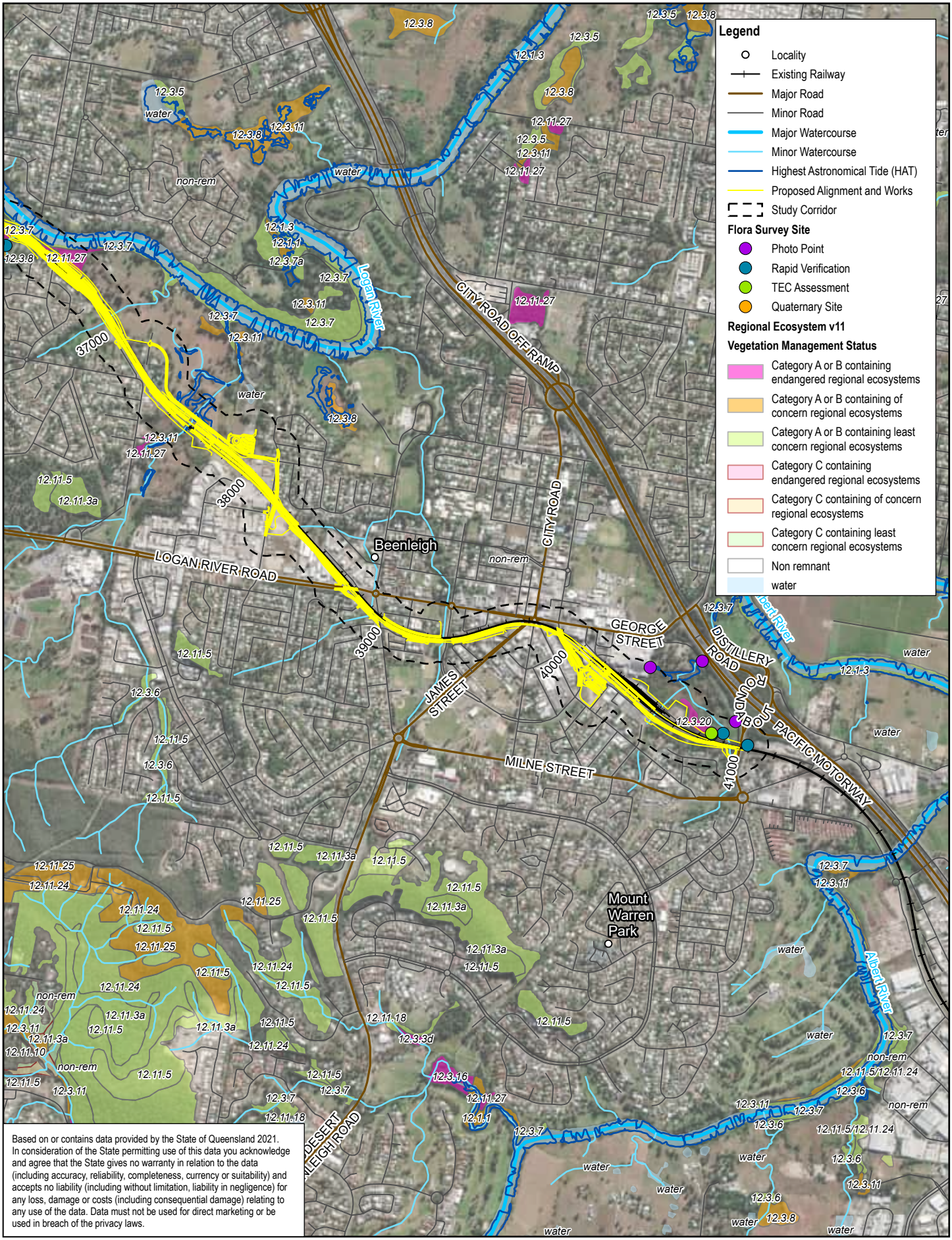
Data source: DoR: Locality, Roads, Railway, Watercourses, RE v11 (2020), HAT (2013); GHD: Proposed Alignment, Flora Survey, Study Area (2021); World Imagery: Maxar. Created by: xlee



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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FIGURE 3-2d

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Data source: DoR: Locality, Roads, Railway, Watercourses, RE v11 (2020), HAT (2013); GHD: Proposed Alignment, Flora Survey, Study Area (2021); World Imagery: Maxar. Created by: xlee

3.5 Conservation significant flora species

3.5.1 Desktop assessment

High-risk flora trigger areas are frequently present across large areas of the Subsequent study areas, particularly where the Project area intersects Scrubby Creek (Ch 29,100-29,500 m) and along the alluvial flats of the Logan River (Ch 35,600 to 36,700 m) (refer to Figure 3-3 and Appendix A).

A search of DAWE's PMST indicated that 20 threatened flora species listed under the EPBC Act are predicted to occur within 1 km of the Project area (refer to Appendix A). A search of DES's Wildlife Online database indicated that four NC Act listed conservation significant flora species have been historically recorded within 1 km of the Project area (refer to Appendix A), namely:

- *Coleus habrophyllus* – Endangered (EPBC Act and NC Act)
- *Gossia gonoclada* – Endangered (EPBC Act and NC Act)
- *Marsdenia coronata* – Vulnerable (NC Act)
- *Melaleuca irbyana* – Endangered (NC Act)

No conservation significant flora species were recorded within the Study corridor during the 2019 field surveys (WSP, 2019b). The likelihood of occurrence undertaken by WSP rated five species as moderately likely to occur. Two of these species were not recorded in the desktop extent for the current report, namely *Eucalyptus curtisii* (near threatened NC Act) and *Zieria furfuracea* (endangered NC Act). All species recorded within the desktop searches are presented in Table 3-5.

Essential habitat for two conservation significant flora species is mapped within the Study corridor, these being, *Gossia gonoclada* and *Coleus habrophyllus*. Essential habitat for *Gossia gonoclada* is mapped across five interconnected properties along the Logan River. These properties are situated along the eastern side of the Study corridor between Ch 36,400 – 37,600 m, with essential habitat immediately adjacent to the Project between Ch 36,400 – 36,700 m (refer to Table 3-6). Similarly, essential habitat for *Coleus habrophyllus* is mapped within the Study corridor, however outside the Project area. Essential habitat for this species occurs along an unnamed drainage line approximately 100 m southwest of the Project area at Ch 37,600 m. The essential habitat requirements for these species and the intersected property lots are summarised in Table 3-6 and displayed in Figure 3-4.

Table 3-5 Conservation significant flora species predicted occur within the Study corridor

Scientific name	Common name	Conservation status		Source
		EPBC Act	NC Act	
Arthraxon hispidus	Hairy-joint grass	V	V	PMST
Baloghia marmorata	Marbled balogia,	V	V	PMST
Bosistoa transversa	Three-leaved bosistoa	V	LC	PMST
Coleus habrophyllus	-	E	E	WO
Corchorus cunninghamii	Native jute	E	E	PMST
Cryptocarya foetida	Stinking cryptocarya	V	V	PMST
Cryptostylis hunteriana	Leafless tongue-orchid	V	LC	PMST

Scientific name	Common name	Conservation status		Source
		EPBC Act	NC Act	
Cupaniopsis shirleyana	Wedge-leaf tuckeroo	V	V	PMST
Diploglottis campbellii	Small-leaved tamarind	E	E	PMST
Endiandra floydii	Floyd's walnut	E	E	PMST
Eucalyptus curtisii^	Plunket mallee	NL	NT	WSP 2019
Fontainea venosa	-	V	V	PMST
Gossia gonoclada	Angel-stemmed myrtle	E	E	PMST, WO
Lepidium peregrinum	Wandering pepper-cress	E	LC	PMST
Macadamia integrifolia	Queensland nut tree	V	V	PMST
Macadamia tetraphylla	Rough-shelled bush nut	V	V	PMST
Marsdenia coronata	Slender milk vine	-	V	WO
Melaleuca irbyana	Weeping paperbark	NL	E	WO
Notelaea ipsviciensis	Cooneana olive	CE	CR	PMST
Persicaria elatior	Knotweed	V	V	PMST
Phaius australis	Lesser swamp-orchid	E	E	PMST
Samadera bidwillii	Quassia	V	V	PMST
Thesium australe	Austral toadflax	V	V	PMST
Vincetoxicum woollsii	-	E	E	PMST
Zieria furfuracea^	-	NL	E	WSP 2019

Key – CE /CR = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near threatened, NL = Not Listed, LC = Least Concern, WO = Wildlife Online.
^= identified as moderately likely to occur in WSP 2019 report.

3.5.2 Field results

Three conservation significant flora species were recorded during the 2021 field surveys; however two of these species were planted stock outside of suitable habitat within maintained areas, with only one of the species (*Macadamia integrifolia*) considered to be 'in the wild' based on the Operational policy '*When a protected plant in Queensland is taken to be 'in the wild*'' and presence of recruitment.

A precautionary approach was adopted and the likelihood of conservation significant flora was assessed based on habitat suitability (refer to Appendix B). This was undertaken for all conservation significant species identified during the desktop assessment. A summary of the likelihood of occurrence assessment is provided below.

- Four conservation significant flora species were considered likely to occur in the Study corridor
- Nine conservation significant flora species may occur within the Study corridor

- 12 of the 25 conservation significant flora species identified during the desktop assessment were considered ‘unlikely to occur’ due to a lack of suitable habitat and/or a lack of nearby records

The species recorded as confirmed or likely to occur are listed below with a description of habitat within the Subsequent study areas.

Macadamia integrifolia – Confirmed present

Macadamia integrifolia is listed as vulnerable under the EPBC Act and NC Act.

Six *Macadamia integrifolia* individuals were recorded across the Subsequent study area (outside the Project area), with most of them occurring within the parkland area as maintained amenity trees of Lot 2 on RP897149 (Ch 21,300 m) (refer to Figure 3-3). These individuals were recorded as being regularly mown around with herbicide treatment to the ground layer directly surrounding the base (refer to Plate 3-3). One juvenile individual was recorded as planted within the bushland area. This individual had a tree guard on and up until recently appears to have been maintained. These individuals were not considered to be ‘in the wild’ and therefore the provisions of the NC Act do not apply.

One recorded individual however was found to be a natural recruit of the larger planted trees. This naturally recruited individual was located with a stand of *Melaleuca* and *Eucalyptus* spp. with an understorey dominated by *Megathyrsus maximus*. This individual was considered to be ‘in the wild’.

This species is known to occur within a diverse range of landforms and several vegetation communities including complex notophyll mixed forest, extremely tall closed forest, simple notophyll mixed very tall closed forest to simple microphyll-notophyll mixed mid-high closed forest with *Araucaria* and *Argyrodendron* emergents (DAWE, 2021). The vegetation present within the Subsequent study areas does not meet the described habitats for this species with the community present described as open forest with some sections having a closed canopy. However, *Macadamia integrifolia* is also reported to occur on the margins of rainforests (DAWE, 2021) which would have a more open/low structural formation than the preferred habitat. Numerous introduced or invasive species were recorded from this part of the Subsequent study areas. Avoidance of impacts to this species should be achievable as it does not occur within area of predicted works. Indirect impacts will be addressed within an Impact Management Plan required with the submission of a clearing permit application.

Plate 3-3 *Macadamia integrifolia* recorded within the Project area

Marsdenia coronata – Likely to occur

Marsdenia coronata is listed as vulnerable under the NC Act.

A previous record from 2007 exists within a currently highly modified environment including carparks, buildings and roads approximately 200 m east of the Project area (refer to Figure 3-3). However, it was concluded that this record is inaccurately sited, with the location of the record described as '*Found 10 metres from centre of deep gully; metasediment geology, in Logan'* with the location accuracy specified as 2 km.

As this species can occur in a reduced state, with only the underground organ present, optimal survey conditions are required for the best chance of positive identification. The survey conditions during the current survey effort (2021) were optimal as the survey was undertaken during the species' known flowering period (November to March (DES, 2021c)). In addition, significant local rainfall events occurred between November 2020 to January 2021 coupled with hot days (BoM, 2021), which is likely to provide optimal growing conditions. As a result, it is expected that any individuals present would be able to be detected as they would be actively growing and have visible vegetative features. Supportive habitat requirements, in the form of eucalypt open forest, were recorded through various sections of the Subsequent study areas (DES, 2021c) and therefore the species was rated as likely to occur. Should this species be recorded within the project area at a later date, impacts will be managed under an Impact Management Plan required with the submission of a clearing permit application.

Melaleuca irbyana – Likely to occur

Melaleuca irbyana is listed as vulnerable under the NC Act.

Two *Melaleuca irbyana* individuals were recorded from Lot 2 on RP897149 and were also planted (refer to Figure 3-3 and Plate 3-4). Both individuals were planted in a small rise of the parkland with one recorded as having a tree guard present. Although this species is known from

the surrounding area, the location of these two individuals within the landscape does not met the described habitat for these species. The species profile description describes the habitat as flat areas that are periodically waterlogged, in eucalypt forest, mixed forest and *Melaleuca* woodland with a sparse and grassy understorey on poorly draining, heavy clay soils (DES, 2021c). The landform on site is highly modified and sloping towards the nearby residential street. It is very unlikely that this site would be periodically waterlogged. Based on this there is a low chance of the individuals onsite naturally germinating and forming a viable population.

The third point of the policy statement (Operational policy 'When a protected plant in Queensland is taken to be 'in the wild'') states:

Is the ecological situation in which the plant is found considered natural?

> *The plant should be found in a relatively natural ecological situation (e.g. in bushland) to be considered 'in the wild'. Generally speaking, planted vegetation is not considered 'in the wild' (see 1 for an exception), unless it has matured and is part of a relatively natural ecological community.*

Based on the lack of suitable habitat for this species and the low likelihood of becoming part of a self-sustaining *'relatively natural ecological community',* these individuals are not likely to be considered 'in the wild'.

Plate 3-4 *Melaleuca irbyana* individuals recorded within the Project area

Although the chosen site for these planted individuals does not meet the habitat requirements for this species, suitable habitat for this species was recorded further south in the Subsequent study areas and therefore this species was rated as likely to occur. The largest area of suitable habitat is located on the alluvial flats around Scrubby Creek, including Nealdon Park, Battle Park and adjacent areas (Ch 29,300 m) (Figure 3-3 and Plate 3-5). Historical records are located both north and south outside of the Study corridor at this location (Figure 3-3).

Plate 3-5 Suitable habitat for *Melaleuca irbyana* within the Project area

Rhodamnia rubescens – Confirmed not 'in the wild'

Rhodamnia rubescens is listed as critically endangered under the NC Act.

One *Rhodamnia rubescens* individual was also recorded from the same planted area of (Ch 21,300 m) Lot 2 on RP897149 (refer to Figure 3-3). Similar to *Melaleuca irbyana,* this species has been planted outside of its natural habitat. The likelihood of occurrence assessment considered this 'may occur' within the Study corridor due to the absence of nearby previous records and only marginally suitable habitat present around Scrubby Creek.

The individual recorded within the Subsequent study area was juvenile within a tree guard and in very poor health (refer to Plate 3-6). The species is very susceptible to *Austropuccinia psidii* (Myrtle rust) with the impact evident on this individual with only a few leaves remaining. Habitat for this species is recorded littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils (NSW OEH, 2021). Based on this, habitat within the Subsequent study areas is limited to riparian zones on alluvial soils. This species is unlikely to become part of a self-sustaining 'relatively natural ecological community' Although not evident at the time the younger planted species within the lot may still be under periodic maintenance (i.e. weed control) based on the type of reserve as a public amenity.

Plate 3-6 *Rhodamnia rubescens* individual recorded within the Project area

Gossia gonoclada – Likely to occur

Gossia gonoclada is listed as endangered under the EPBC Act and NC Act.

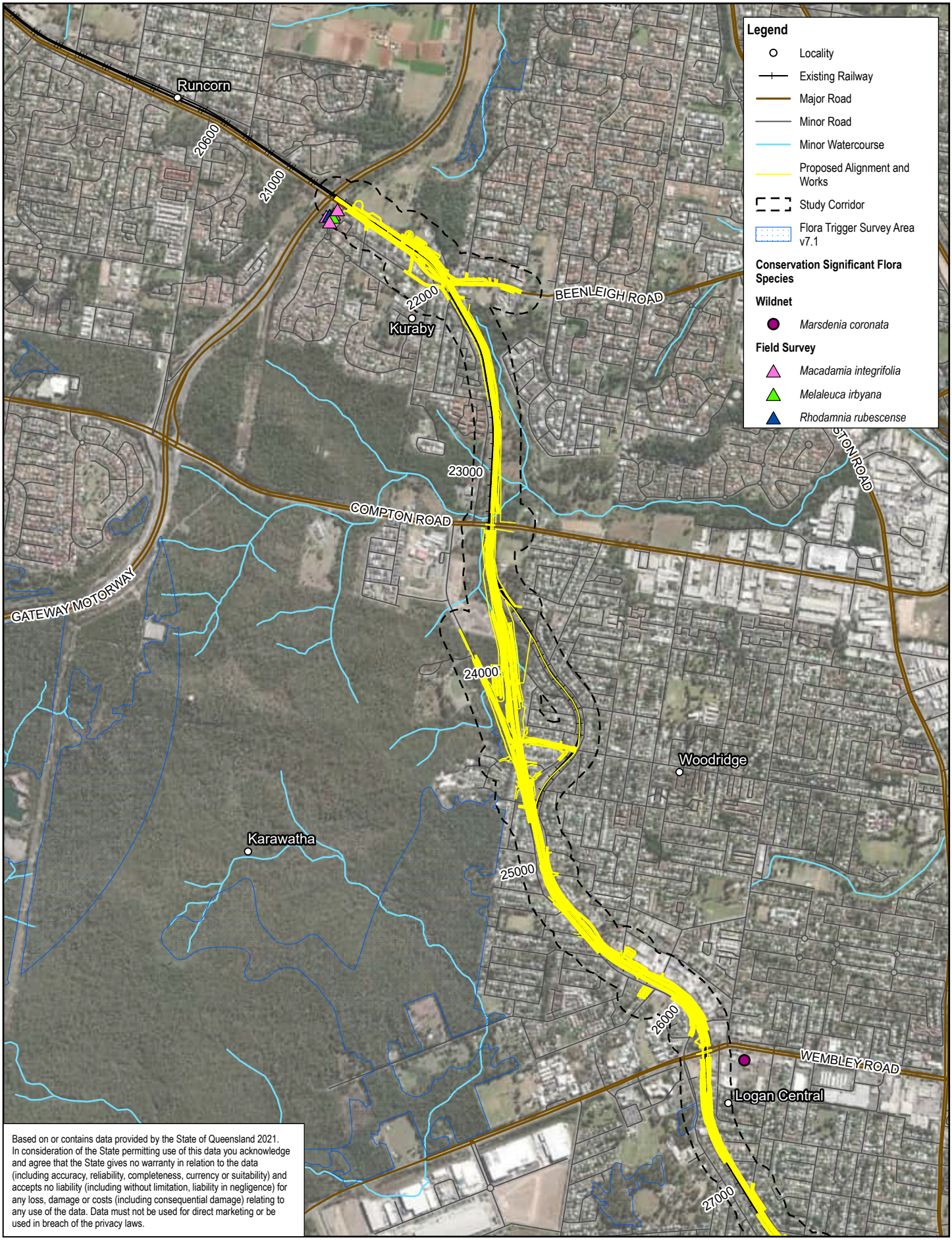
Gossia gonoclada was considered likely to occur within the Study corridor based on nearby historical records and the presence of suitable habitat. This species is recorded as occurring along permanent watercourses subject to tidal influence in lowland riparian rainforest and notophyll vine forest. Usually found between 5-50 m below the peak flood level, on steep slopes. It occurs on moderately well drained clay soils, sandy loams and alluvial soils (DES, 2021c). No *Gossia gonoclada* individuals were recorded from the Project area however marginally suitable habitat for this species was recorded present along waterways within the Project area. The nearest historical record of *Gossia gonoclada* is recorded from RE 12.3.7a located on the edge of the Logan river. One vegetation community within the Study corridor also along the Logan River is mapped as similar RE 12.3.7 and was assessed for suitability. The RE was, in part, confirmed as RE 12.3.7 however due to a very high presence of invasive species the habitat was considered to be very degraded and less likely to contain *Gossia gonoclada*. An additional area located along Scrubby Creek was considered to be marginally suitable habitat for this species, however evidence of a recent fire in part would exclude some of these areas.

Coleus habrophyllus – Likely to occur

Coleus habrophyllus is listed as endangered under the EPBC Act and NC Act.

Coleus habrophyllus was considered likely to occur within the Project area based on nearby historical records and the presence of suitable habitat. No *Coleus habrophyllus* individuals were recorded from the Study corridor however marginally suitable habitat for this species was recorded present from a restricted area of the Subsequent study area. This species is recorded as growing on chert or sandstone outcrops, in open woodlands often in shaded situations near vine forest, as stated in the Species Profile (DAWE, 2021). Although no associated vine forest was recorded, one area noted as potential habitat was recorded at Ch 23,450 (refer to Plate 3-7). The remainder of the Subsequent study areas were located on low lying areas with no rocky outcrops.

Plate 3-7 Potential habitat for *Coleus habrophyllus*



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Grid: GDA 1994 MGA Zone 56

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Conservation significant flora values within the study corridor

Project No. **12534697**
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FIGURE 3-3a

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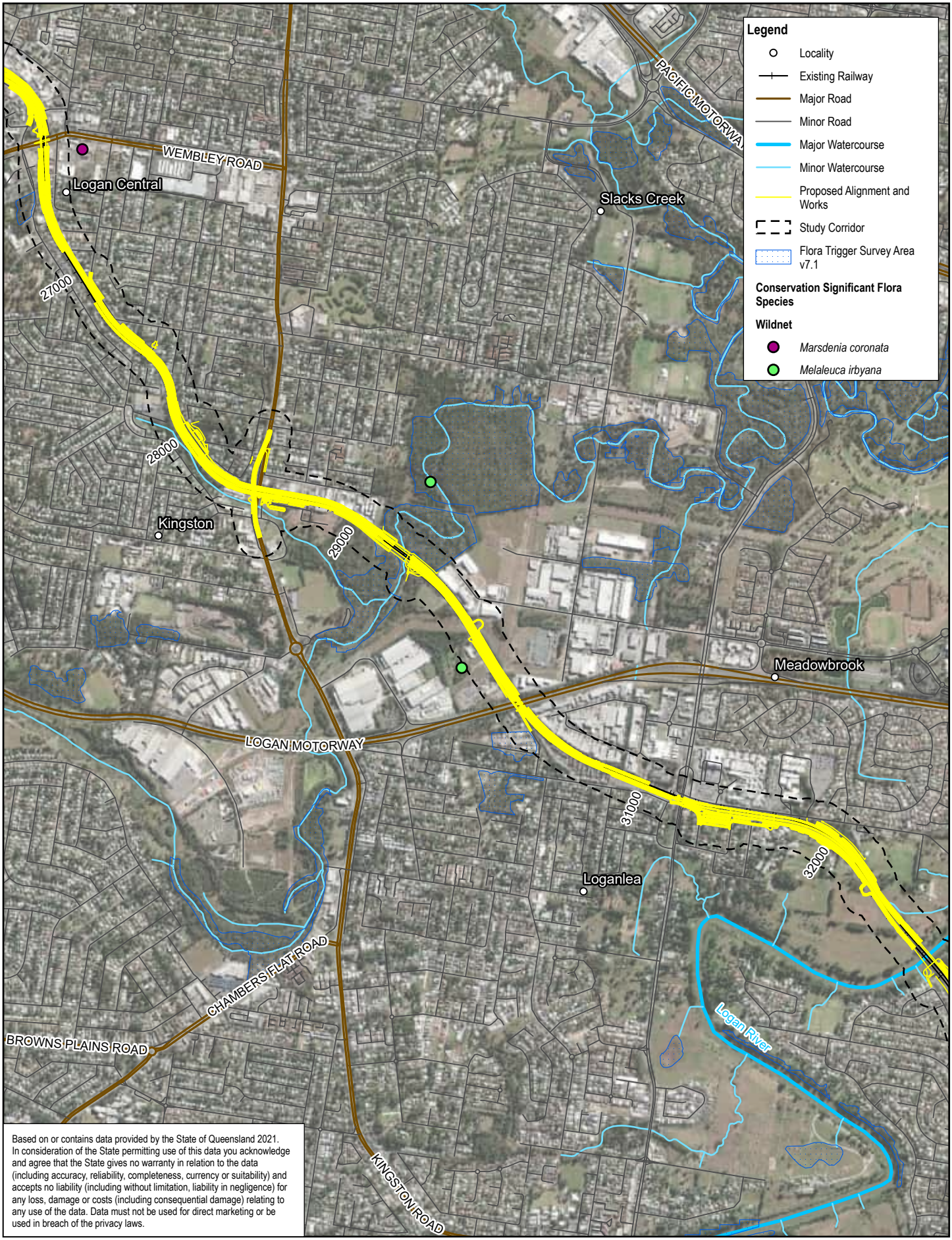

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FIGURE 3-3b

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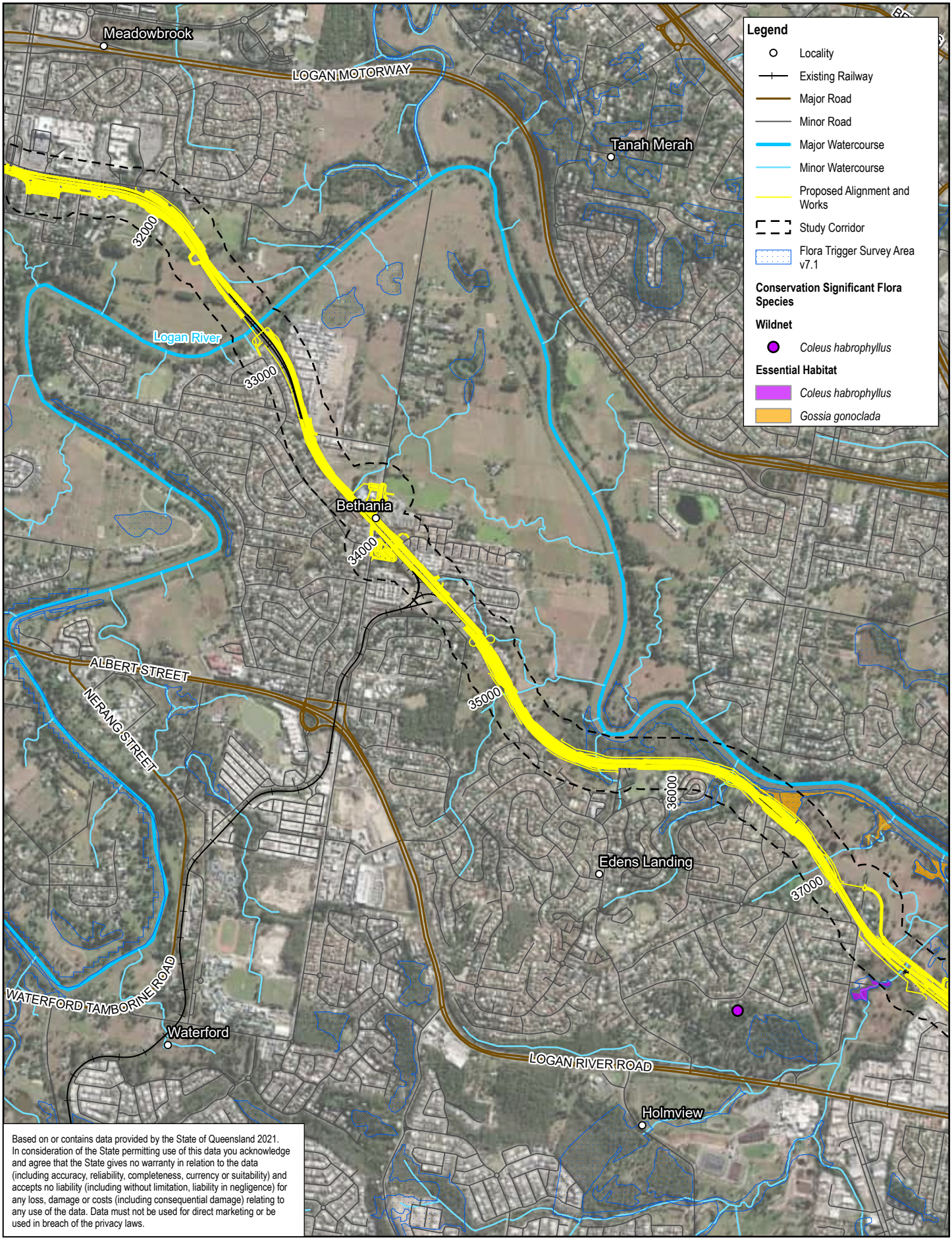

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FIGURE 3-3c

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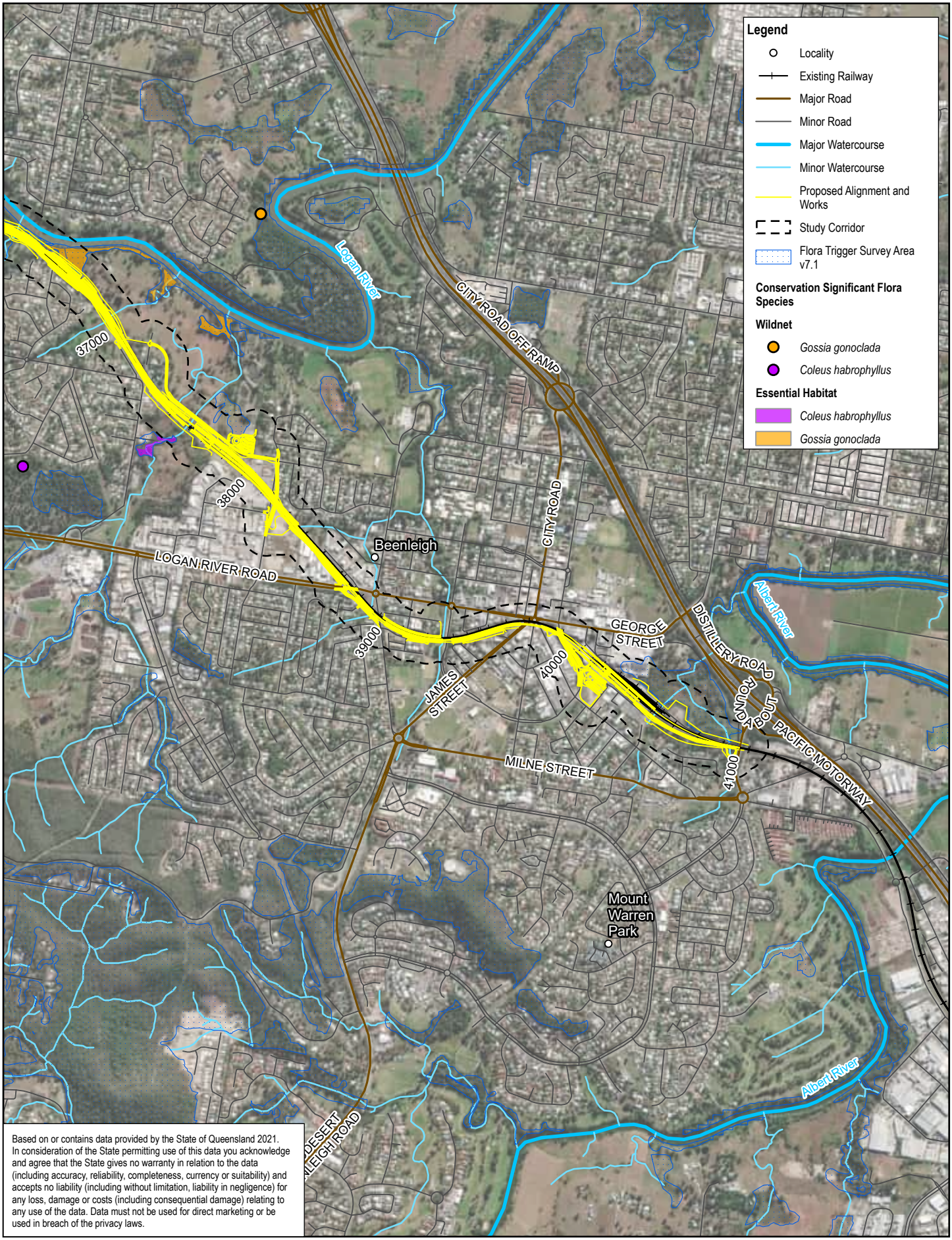

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FIGURE 3-3d

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3.6 Fauna and fauna habitats

3.6.1 Essential habitat

Seven conservation significant fauna species have essential habitat mapped within or adjacent to the Study corridor, as shown on DoR's regulated vegetation management mapping (Figure 3-4).

Essential habitat for the koala (*Phascolarctos cinereus*) widely occurs across the Subsequent study areas and is mapped on 46 properties (Table 3-6 and Figure 3-4). These areas exist as remnants patches of mixed eucalypt woodland and provide essential habitat for other arboreal mammal species such as the greater glider (*Petauroides volans*). Essential habitat for both species is contained within Karawatha Forest Park, Acacia Forest Park and along Scrubby Creek, which contained remnant woodlands of high ecological value. The woodlands along Scrubby Creek also contain essential habitat for the powerful owl (*Ninox strenua*) and the swift parrot (*Lathamus discolor*). Essential habitat for the glossy black-cockatoo (*Calyptorhynchus lathami*) was also mapped in eucalypt woodlands which supported a dense stratum of *Allocasuarina*, particularly within Karawatha Forest Park and Acacia Forest Park. Several waterways and drainage lines also occur within the Subsequent study areas that have the potential to support conservation significant amphibians, with essential habitat for the wallum froglet (*Crinia tinnula*) and tusked frog (*Adelotus brevis*) present within the Study corridor. Essential habitat for the tusked frog is mapped along the banks of the Logan River, near the existing Edens Landing station. Similarly, essential habitat for the wallum froglet is mapped with Karawatha Forest Park, Slacks Creek, Scrubby Creek, Wally Tate Park and Hugh Muntz Gardens in Beenleigh.

These species, their essential habitat requirements and the intersect property lots are summarised below in Table 3-6 and displayed in Figure 3-4.

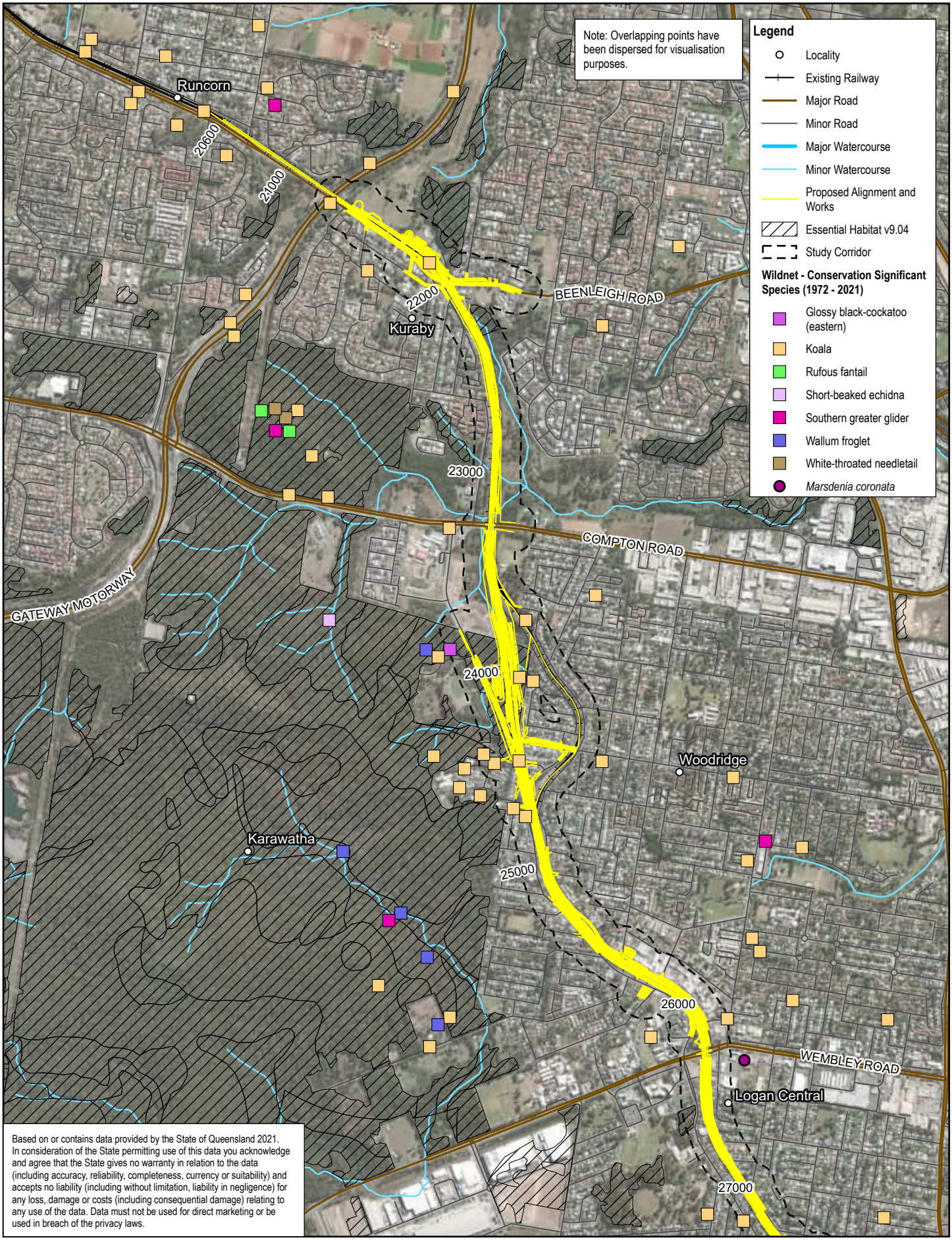
Table 3-6 Essential habitat within the Study corridor

Species	Conservation status		Essential habitat within the Project area	Habitat requirements
	EPBC Act	NC Act		
Fauna				
Glossy black-cockatoo *Calyptorhynchus lathami*	NL	V	2RP54123, 2RP173106, 3RP852745.	Lowland and highland eucalypt forest and woodland, including riparian, and brigalow scrub areas, with *Casuarina* (*C. glauca, C. cristata*)/*Allocasuarina* spp. (*A. torulosa, A. littoralis*). Nest in large vertical hollow up to 28 m above ground in tall slightly isolated tree usually near principal food source (*Allocasuarina/Casuarina*).
Greater glider *Petauroides volans*	V	V	2RP54123, 2RP173106, 2RP220135, 3RP852745, 72SP123137.	Tall mature open wet and dry eucalypt forest (*Eucalyptus* and/or *Corymbia* spp.) to low open eucalypt woodland; presence of hollow-bearing trees. Sea level to 1300 m. Usually on soils of relatively high fertility.

Species	Conservation status		Essential habitat within the Project area	Habitat requirements
	EPBC Act	NC Act		
Koala *Phascolarctos cinereus*	V	V	1RP8071, 1RP8072, 1RP80326, 1RP115298, 1RP157296, 1RP856096, 1SP307207, 2RP54123, 2RP168714, 2RP173106, 2RP220135, 2SP145849, 3RP203428, 3RP852745, 4RP203428, 7SP145849, 8RP219577, 8RP234019, 12SP106873, 13SP106873, 14RP209342, 14SP106873, 15SP114587, 16SP114587, 17SP100590, 21SP122200, 38SP190117, 42SP154633, 70SP109404, 72SP109405, 72SP123137, 135CP827105, 144RP37390, 145RP37390, 146RP37390, 147RP37390, 148RP37390, 149RP37390, 150RP37390, 151RP37390, 152RP99345, 154RP99345, 752SP222159, 941RP849310, 949RP849309, 950RP849297.	Open eucalypt forest and woodland that has: a) multiple strata layers containing *Eucalyptus, Corymbia, Angophora, Lophostemon* or *Melaleuca* trees that-at 1.3 metres above the ground-have a diameter both greater and less than 30 centimetres; and b) at least 1 of the following species: *Eucalyptus tereticornis, E. fibrosa, E. propinqua; E. umbra, E. grandis, E. microcorys, E. tindaliae, E. resinifera, E. populnea, E. robusta, E. nigra, E. racemosa, E. crebra, E. exserta, E. seeana, Lophostemon confertus, L. suaveolens, Melaleuca quinquenervia*
Powerful owl *Ninox strenua*	NL	V	2RP54123.	Occurs in gullies with wet and dry tall open eucalypt forest, including mountain forest gullies/gorges; forests aged 60+ years (large and old) on fertile soils with suitable hollows; roosting in dense foliage of closed forest (occasionally caves) and foraging in open forest and woodland including areas adjacent to urban/rural development. Nest in large hollows above ground, in large (>100 cm dbh) old eucalypts on the side or at the head of heavily wooded gully.

Species	Conservation status		Essential habitat within the Project area	Habitat requirements
	EPBC Act	NC Act		
Swift parrot *Lathamus discolor*	CE	E	1RP174366, 1RP856096, 2RP220135, 5SP291890, 6SP291890, 7SP291890, 14RP209342, 135CP827105.	Inhabits box-ironbark dry open eucalypt forest and woodland, including *Eucalyptus sideroxylon, E. microcarpa* and *E. albens, E. melliodora*, with profuse flowering; especially those on high fertility soils (generally large trees); in coastal areas visits *E. robusta, E. tereticornis* and *Corymbia citriodora/maculata*. Does not breed in Queensland.
Tusked frog *Adelotus brevis*	NL	V	1RP8071, 1RP8072, 1RP115298, 1RP157296, 7SP145849, 8RP219577, 15SP114587, 17SP100590.	Species occurs on cavities, under debris (logs, stones) in subtropical vine forest, tall open moist forest, heaths and *Melaleuca* swamp from sea level to 1000 m AHD.
Wallum froglet *Crinia tinnula*	NL	V	2RP54123, 2RP220135, 3RP852745, 8RP234019, 12SP106873, 13SP106873, 14SP106873, 38SP190117,	Vegetation community is a mandatory essential habitat factor for this species. Permanent to ephemeral acidic (pH 4.3 – 5.2), soft freshwater in *Melaleuca* (e.g. *M. quinquenervia*) swamps, sedgeland, wet and dry heathland and wallum (*Banksia aemula* shrubland/woodland) areas coastal lowlands on sand or sandstone, occasionally in adjacent open forest/woodland (e.g. *Eucalyptus racemosa, Corymbia citriodora*) with heathy understorey; known to persist in small remnants (<10 ha); may be found well away from water.

Key to table: CE = Critically Endangered, E = Endangered, V = Vulnerable, NL = Not Listed.



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Essential habitat and Wildnet records

FIGURE 3-4a

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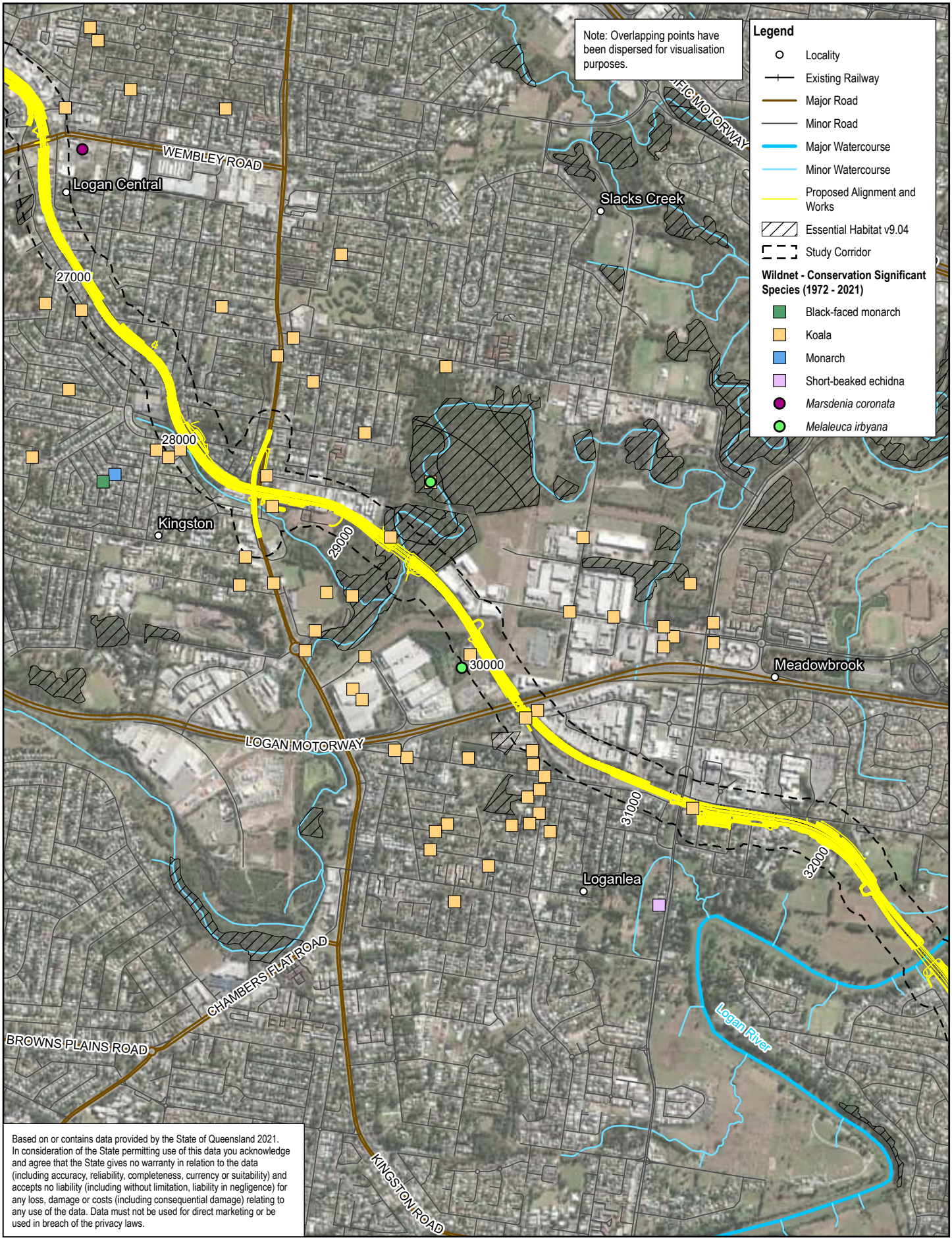

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Essential habitat and Wildnet records

FIGURE 3-4b

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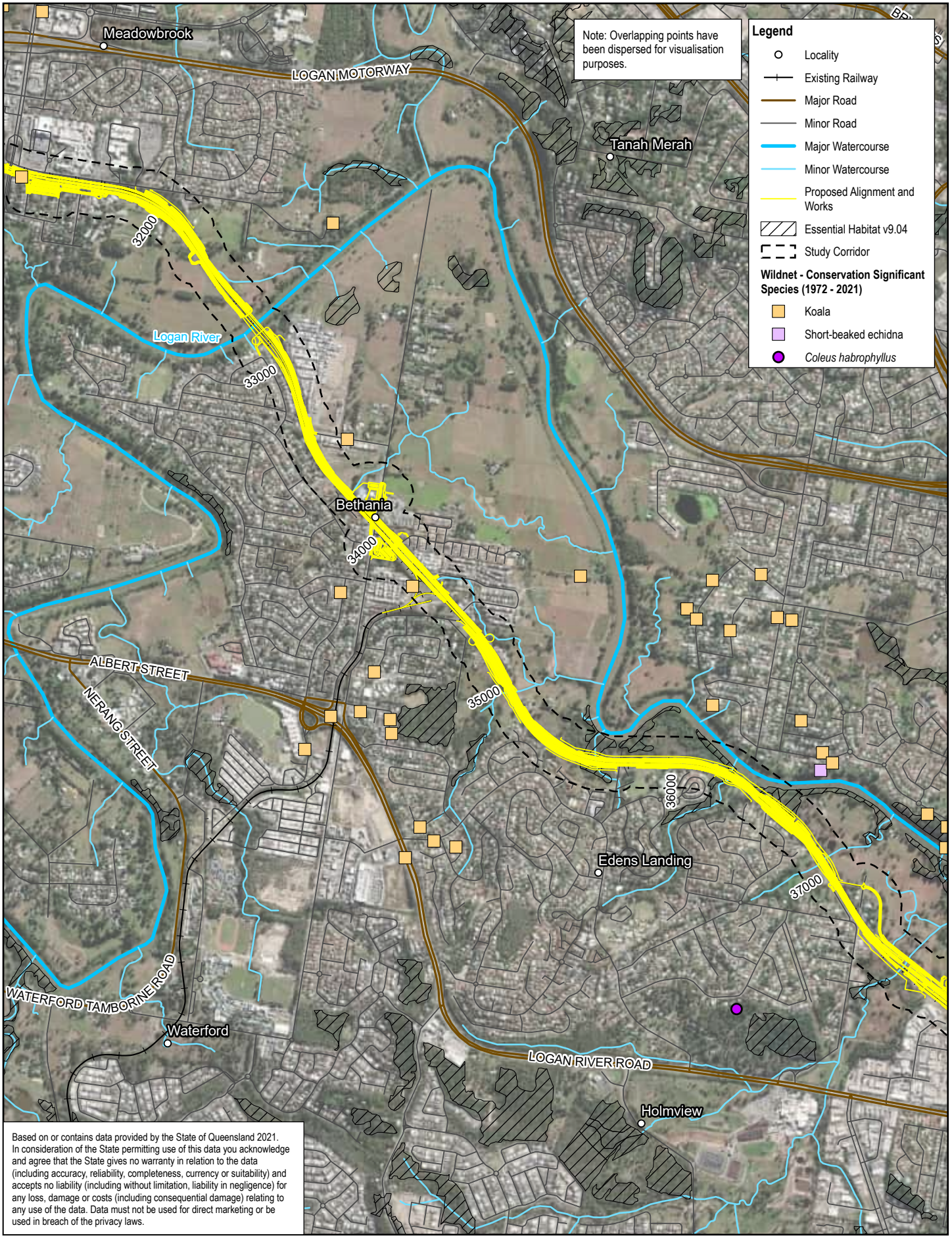

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Map Projection: Transverse Mercator
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Essential habitat and Wildnet records

FIGURE 3-4c

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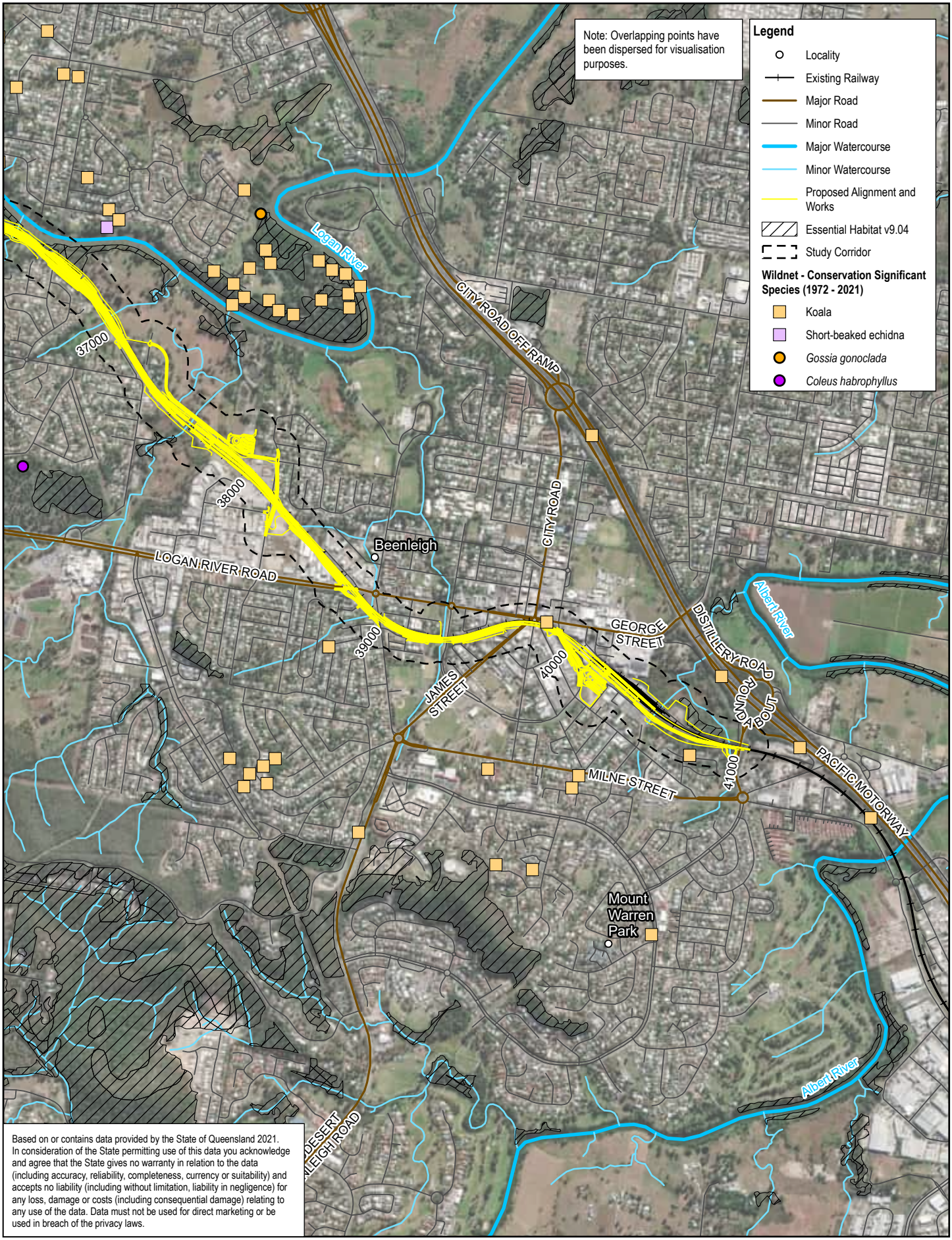
Print date: 09 Aug 2021 - 16:15

Data source: DoR: Locality, Roads, Railway, Essential Habitat v9.04, Watercourses (2020); DES: Wildnet Records (2021); GHD: Proposed Alignment, Study Area (2021); ESRI World Imagery: Maxar. Created by: xlee



Paper Size ISO A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Project No. **12534697**
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Date **18/06/2021**

Essential habitat and Wildnet records

FIGURE 3-4d

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Print date: 09 Aug 2021 - 16:15

Data source: DoR: Locality, Roads, Railway, Essential Habitat v9.04, Watercourses (2020); DES: Wildnet Records (2021); GHD: Proposed Alignment, Study Area (2021); ESRI World Imagery: Maxar. Created by: xlee

3.6.2 Fauna habitats

The Subsequent study areas support a diverse range of habitats, ranging from highly urbanised parklands to remnant eucalypt woodlands and wet *Melaleuca* forests (Table 3-7).

Despite the ever-increasing urbanisation and development occurring within the region, mature patches of eucalypt woodlands remained in several of the Subsequent study areas. These areas, particularly Acacia Forest Park, Nealdon Park and Wally Tate Park supported remnant eucalypt woodlands that reflect vegetation communities that were once widespread within the south east Queensland region. Where the Study corridor extends along small order streams and ephemeral waterbodies, the fringing vegetation transitions from dry eucalypt woodlands into wet *Melaleuca* forests that dominated the temporarily inundated ecosystems. This habitat type was particularly dominant along Spring Creek and Scrubby Creek, and contained occasional patches of sedge, reeds and rushes. In areas of lower moisture content, *Allocasuarina* occupied the lower canopy layer and occasionally formed dense monocultures of *Allocasuarina* woodlands. Whilst these vegetation communities were also identified along road edges and in narrow corridors between residential areas, such areas were often impacted by anthropogenic pressures and we highly degraded. Regardless, these areas still had the potential to provide linking habitat for native fauna and facilitate fauna movement throughout the Study corridor. In total, ten habitat types were observed within the Subsequent study areas, including:

- Permanent watercourses with fringing riparian vegetation
- Mixed eucalypt woodlands
- Eucalyptus woodland with dense *Allocasuarina* understorey
- Densely vegetated wetland
- Small order streams and ephemeral waterbodies
- Routinely managed parklands and open spaces
- Wet eucalypt woodland and *Melaleuca* woodland
- *Allocasuarina* woodland
- Degraded forest remnants
- Introduced grassland patches.

A summary and representative photograph of the fauna habitats recorded within the Subsequent study areas is presented in Table 3-7 and illustrated in Figure 3-5.

Table 3-7 Fauna habitat types observed within the Subsequent study areas

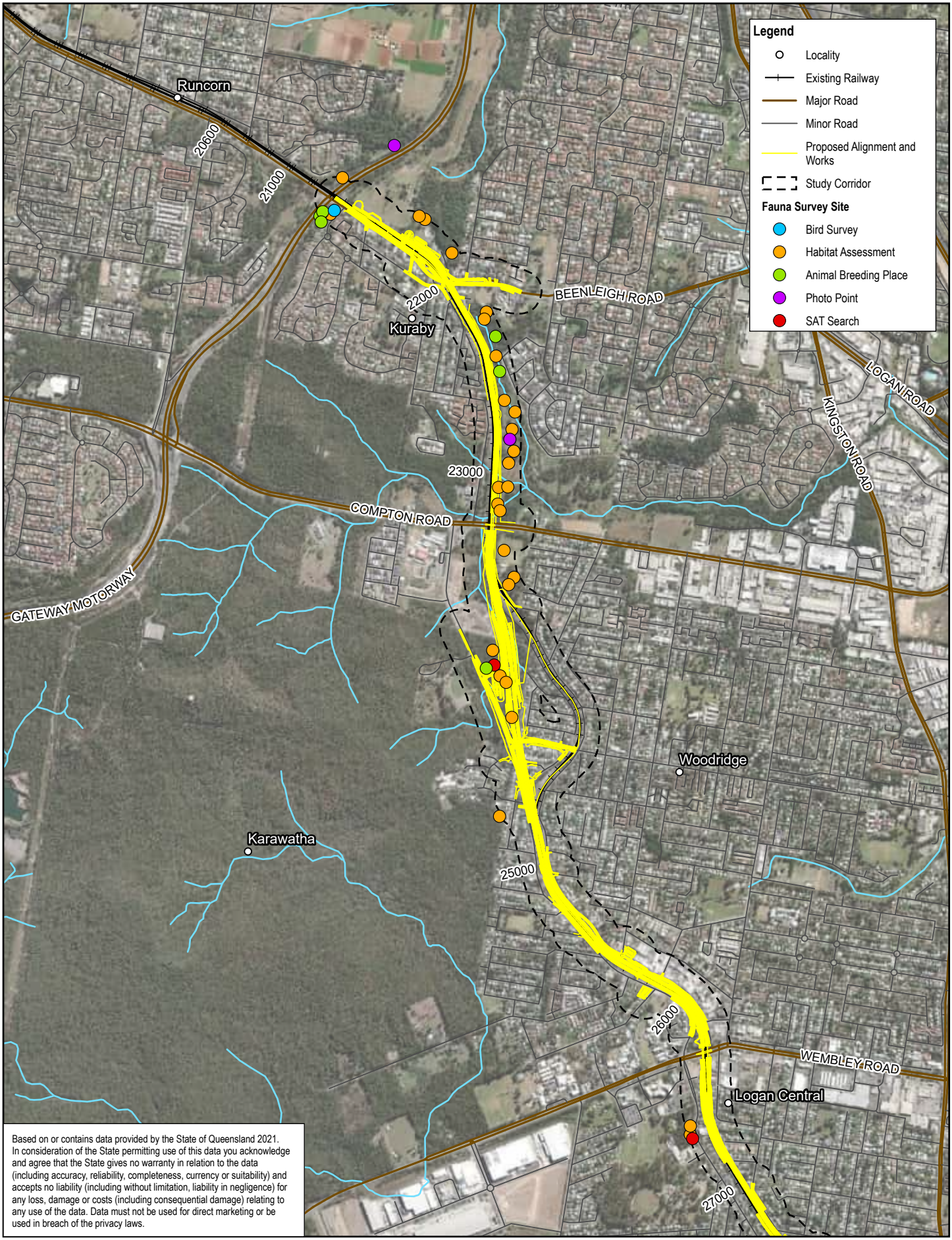
Habitat type	Habitat characteristics	Ecological value
Permanent watercourses with fringing riparian vegetation		
	• Riparian vegetation supported remnant woodlands. • Contained a variety of aquatic habitats (e.g. deeper pools, riffles). • Soft sandy substrate suitable for burrowing. • Supported dense clusters of aquatic surface plants. • Hollows occasionally present in fringing vegetation. • Important for urban storm / flood mitigation.	• Suitable foraging and breeding habitat for amphibians. • Drinking sites for birds and mammals. • Provided habitat for aquatic reptiles and frog-eating snakes. • Providing habitat continuity and continued fauna movement/dispersal pathways. • Foraging and roosting habitat and potential flyways for microbats. • Conservation significant species – wallum froglet and migratory bird species.
Mixed eucalypt woodlands		
	• Canopy layer mostly dominated by mixed eucalypt species. • Dense stratum of *Allocasuarina* beneath canopy. • Logs, woody debris and other complex ground-level microhabitats present in high densities. • Canopy layer representing the dominant vegetative strata.	• Provides important habitat connectivity for woodland species. • Suitable nesting habitat for a diversity of woodland birds. • Complex ground level microhabitats. • Nesting and foraging habitat for canopy-dwelling birds. • Refuges and basking areas for snakes, dragons, skinks and geckos. • Conservation significant species – koala and glossy black-cockatoo.

Habitat type	Habitat characteristics	Ecological value
Eucalyptus woodland with dense *Allocasuarina* understorey		
	• Canopy layer mostly dominated by mixed Eucalypt species. • Dense stratum of *Allocasuarina* beneath canopy. • Logs, woody debris and other complex ground-level microhabitats present in high densities. • Canopy layer representing the dominant vegetative strata. • Occasional hollows present.	• Provides important habitat connectivity for woodland species. • Suitable nesting habitat for a diversity of woodland birds and obligate-hollow nesters. • Complex ground level microhabitats. • Nesting and foraging habitat for canopy-dwelling birds. • Refuges and basking areas for snakes, dragons, skinks and geckos. • Conservation significant species – koala and glossy black-cockatoo.
Densely vegetated wetlands		
	• Contained dense populations of cumbungi (*Typha orientalis*) • Holds permanent still or slow-moving bodies of fresh or brackish water with impeded water flow. • Canopy layer absent. • Soft sandy and muddy substrate. • Often situated between eucalypt woodlands and residential developments.	• Suitable foraging and breeding habitat for amphibians. • Drinking sites for birds and mammals. • Suitable breeding and foraging habitat for wetland and aquatic bird species. • Suitable foraging habitat for frog-eating snakes. • Conservation significant species –migratory birds.

Habitat type	Habitat characteristics	Ecological value
Small order streams and ephemeral waterbodies		
	• Situated within low-land depressions and creek overflow areas. • Supports a dense ground and shrub layer. • Contains aquatic and semi-aquatic plants that are absent from the surrounding ecosystems. • Located at lowest point of the landscape and receives surface water runoff from adjacent urban areas. • Frequently encountered between the wetland system and eucalypt woodland patches.	• Drinking sites for birds and mammals. • Suitable foraging and breeding habitat for amphibians. • Suitable breeding and foraging habitat for wetland and aquatic bird species. • Suitable foraging habitat for frog-eating snakes. • Fringing vegetation provide habitat connectivity and dispersal pathways for fauna. • Conservation significant species – wallum froglet and migratory bird species.
Routinely managed parklands and open spaces		
	• Ground-level habitats cleared and lacking structural complexity. • Presence of occasional larger canopy trees. • Ground layer dominated by exotic pasture grasses. • Routinely mowed and/or slashed. • Hollows absent. • Vegetation consisted of common urban planting species (e.g. *Jacaranda* spp.). • Regularly utilised by residents for dog walking and recreational activities.	• Potential movement corridors for birds, reptiles and mammals within urban areas. • Foraging habitat for raptors and birds adapted to open landscapes. • Grasses provide food resources for granivorous birds and herbivorous mammals. • Ground-level habitats lacking structural complexity. • Conservation significant species – none.

Habitat type	Habitat characteristics	Ecological value
Wet eucalypt and *Melaleuca* woodland		
	• Contained a diverse range of rainforest flora species. • Situated along sandy semi-permanently inundated soils. • Occurred along drainage lines and watercourses. • Soft sandy and muddy substrate. • High rates of deposition from flaking melaleuca bark. • Contained a dense ground layer of ferns and bracken.	• Contained a dense, multi-layer canopy • Provided suitable nesting habitat for woodland birds. • Provide habitat connectivity and dispersal pathways for urban fauna. • Potential movement corridors for birds, reptiles and mammals within urban areas. • Potential drinking sites for fauna and place for drought refuge. • Conservation significant species – wallum froglet and koala.
***Allocasuarina* woodlands**		
	• Vegetation community dominated by *Allocasuarina littoralis* (black she-oak) or *A. glauca* (coastal she-oak). • Occasional eucalypt species present • Simple ground-level habitats due to high deposition of Allocasuarina spines. • Often contained a monoculture due to *Allocasuarina* spines suppressing recruitment from other species. • Hollows largely absent.	• Provides important habitat connectivity for woodland species. • Provided foraging resource for dietary specialists (e.g. the glossy black-cockatoo). • Suitable nesting habitat for a diversity of woodland birds. • Conservation significant species – glossy black-cockatoo.

Habitat type	Habitat characteristics	Ecological value
Degraded forest patches		
	• Often situated adjacent to linear infrastructure or within residential areas. • Exposed to increased noise levels • Heavy weed encroachment and degradation. • Increased predation pressure due to domestic dogs and cats. • Accumulation of fallen wooden debris where vegetation has been trimmed / fell. • Occasional patches of open grasslands amongst woodlands.	• Provide habitat connectivity and dispersal pathways for urban fauna. • Grasses provide food resources for granivorous birds and herbivorous mammals. • Sub-optimal nesting habitat for a diversity of woodland birds. • Complex ground-level habitats around fallen woody debris. • Potential refuge habitat for urban fauna. • Potential conservation significant species – none.
Introduced grassland patches		
	- Larger, open space mostly devoid of trees and shrubs. - Provide foraging habitat for birds and small herbivorous mammals. - Heavily degraded by exotic grasses and introduced flora. • Situated in isolated patches surrounded by eucalypt woodlands or degraded forest remnants. • Likely to have formed following clearing or previous earthworks / development.	• Foraging habitat for raptors and birds adapted to open landscapes. • Grasses provide food resources for granivorous birds and herbivorous mammals. • Potential conservation significant species – none.



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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(Kuraby to Beenleigh) Project

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Distribution of fauna habitats

FIGURE 3-5a

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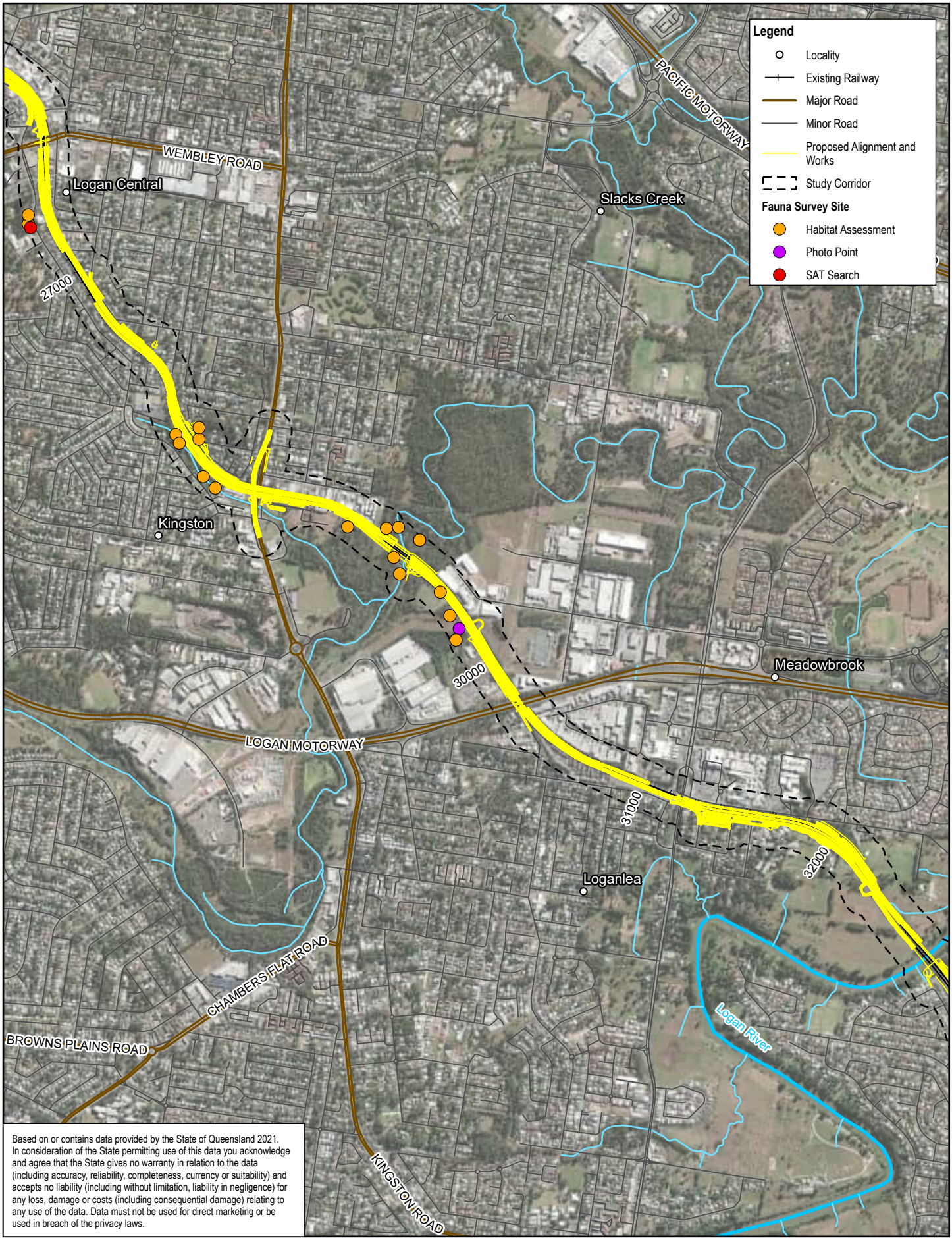
Print date: 09 Aug 2021 - 16:31

Data source: DoR: Locality, Roads, Railway, Watercourses (2020); GHD: Proposed Alignment, Study Area, Fauna Survey Site, Fauna Habitat (2021); ESRI World Imagery: Maxar. Created by: xlee



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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Revision No. **2**
Date **9/08/2021**

Distribution of fauna habitats

FIGURE 3-5b

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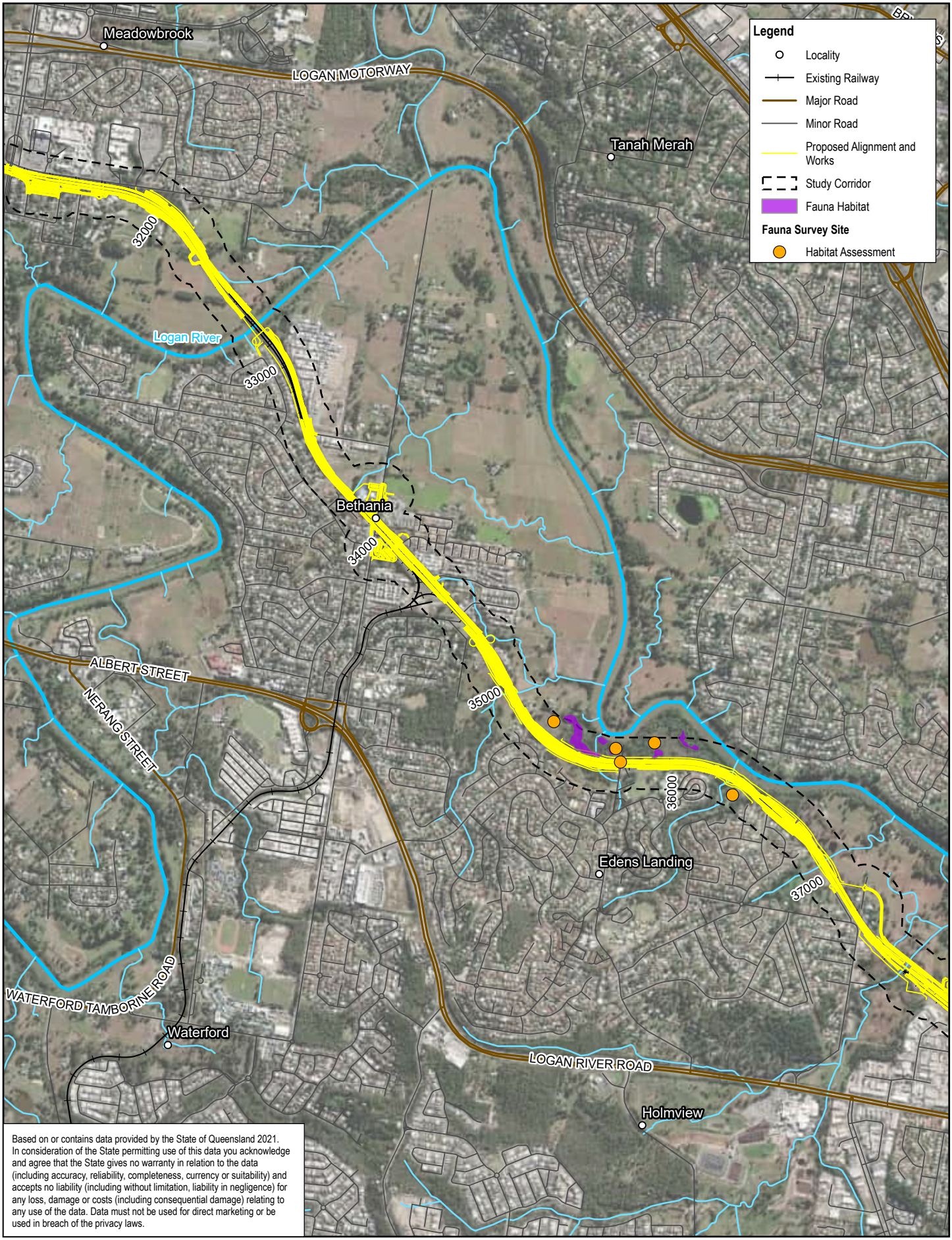

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Map Projection: Transverse Mercator
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Grid: GDA 1994 MGA Zone 56

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Distribution of fauna habitats

FIGURE 3-5c

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Print date: 09 Aug 2021 - 16:31

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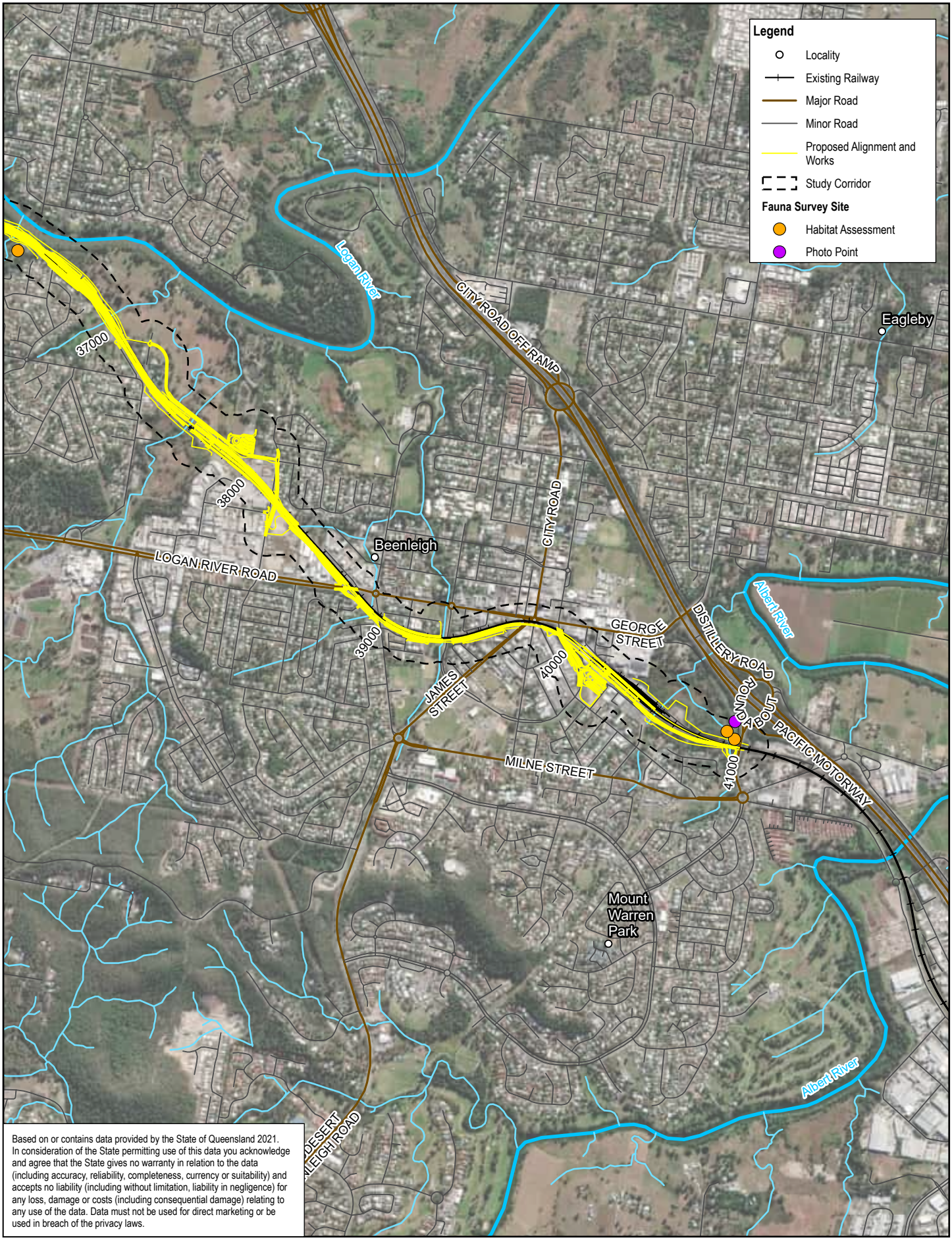

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Distribution of fauna habitats

FIGURE 3-5d

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Print date: 09 Aug 2021 - 16:31

Data source: DoR: Locality, Roads, Railway, Watercourses (2020); GHD: Proposed Alignment, Study Area, Fauna Survey Site, Fauna Habitat (2021); ESRI World Imagery: Maxar. Created by: xlee

3.6.3 Fauna communities

Birds

One conservation significant bird species was recorded during field surveys, this being, the glossy black-cockatoo (*Calyptorhynchus lathami*). The glossy black-cockatoo is listed as Vulnerable under the NC Act. No additional conservation significant bird species were assessed as likely to occur based on the presence of suitable habitats or historical records (Appendix C).

Remnant woodlands within the Subsequent study areas supported a diversity of woodland birds that inhabit multiple different vegetation strata. Frequently encountered species included the rainbow lorikeet (*Trichoglossus moluccanus*), sulphur crested cockatoos (*Cacatua galerita*), Lewin's honeyeater (*Meliphaga lewinii*), torresian crow (*Corvus orru*), spangled drongo (*Dicrurus bracteatus*) and black-faced cuckoo-shrike (*Coracina novaehollandiae*). Woodland patches with a complex shrub layer supported a high diversity of finches and wrens, particularly variegated fairy wrens (*Malurus lamberti*), red-backed fairy-wren (*Malurus melanocephalus*), superb fairy wren (*Malurus cyaneus*) and red-browed finches (*Neochmia temporalis*) (Plate 3-8). Watercourses, drainage lines and wetland areas provided both ephemeral and permanent sources of water, and therefore, supported a variety of aquatic and wetland avifauna, including cormorants (*Phalacrocorax* spp.), Australian wood ducks (*Chenonetta jubata*) (Plate 3-8), purple swamphens (*Porphyrio porphyrio*), collared kingfishers (*Todiramphus chloris*) and pied cormorants (*Phalacrocorax varius*). Overall, the most frequently encountered bird species were those considered highly adapted to the urban areas and characteristic species for the urban and bushland interphase.

Plate 3-8 Birds observed within the Subsequent study areas – clockwise from top left: Australian wood duck, red- browed finch **Lewin's honeyeater** and laughing kookaburra

Reptiles

No conservation significant reptiles were recorded during field surveys or assessed as likely to occur in the likelihood of occurrence assessment due to a lack of suitable habitat (Appendix C).

Five species of reptile were recorded during field surveys, with most species encountered within eucalypt woodlands and along riparian corridors. Within woodland habitats, complex groundcover provided refuge for a variety of small reptilian species, with the open-litter rainbow skink (*Morethia boulengeri*), elegant snake-eyed skink (*Cryptoblepharus pulche*r) and eastern brown snake (*Pseudonaja textilis*) being encountered during field surveys. Within the riparian corridors of Slacks Creek and Scrubby Creek, eastern water dragons (*Intellagama lesueurii*) were regularly witness foraging amongst the groundcover, whilst a Brisbane River turtle (*Emydura macquarii*) and observed basking at one location (Plate 3-9).

Plate 3-9 Elegant snake-eyed skink (left) and Brisbane River turtle observed within the Subsequent study areas

Amphibians

No conservation significant amphibians were recorded during field surveys, however one species, the wallum froglet (*Crinia tinnula*), was assessed as likely occur in the likelihood of occurrence assessment due to the presence of suitable habitat and mapped essential habitat (Appendix C).

Nocturnal surveys were not included in the current Project scope, and therefore, the detectability of amphibians was significantly reduced. However suitable habitat was identified within the Study corridor. Larger creek systems, e.g. Slack's Creek and Scrubby Creek, and their associated tributaries provide suitable habitat for amphibian species. Furthermore, these areas often supported fringing communities of wet eucalypt and *Melalueca* woodlands which contained ephemeral depressions of sedge, reeds and rushes. These areas also supported essential habitat for conservation significant amphibians (Section 3.6.1 and Figure 3-4).

Mammals

No conservation significant amphibians were recorded during field surveys, however two species, the koala (*Phascolarctos cinereus*) and grey-headed flying-fox (*Pteropus poliocephalus*) were assessed as likely to occur due to the presence of suitable habitat, essential habitat and historical records within the Subsequent study areas (Appendix C).

Only two mammal species were observed during field studies, these being the eastern grey kangaroo (*Macropus giganteus*) and the swamp wallaby (*Wallabia bicolor*). Mammalian activity within the Subsequent study areas was largely focussed around areas of remnant woodlands with a dense, grassy understorey. Mature vegetation within these areas provided suitable foraging habitat for arboreal mammals, including the koala (*Phascolarctos cinereus*), brush tail

possum (*Trichosurus vulpecula*) and ring-tailed possum (*Pseudocheirus peregrinus*), with potential scratches identified in multiple places within the Subsequent study area (Plate 3-10).

Plate 3-10 Macropod scat (left) and arboreal mammal scratches on mature eucalypt

3.7 Conservation significant fauna

3.7.1 Desktop assessment

The EPBC Act PMST identified 29 conservation significant fauna species that are predicted to occur within 1 km of the Study corridor (Appendix A). This included:

- 33 birds
- Nine mammals
- Nine reptiles
- Two fish
- One amphibian

Of these, four species have been historically recorded within 1 km of the Study corridor (DES, 2021a). The Wildlife Online database also reported the occurrence of five additional species listed at a State level only (Appendix A).

Table 3-8 contains a summary of the conservation significant fauna species predicted to occur within the Study corridor based on the results of the desktop assessment.

Table 3-8 Conservation significant fauna species predicted occur within the Study corridor

Scientific name	Common name	Conservation status		Source
		EPBC Act	NC Act	
Birds				
Anthochaera phrygia	Regents honeyeater	CE	CE	PMST
Botaurus poiciloptilus	Australian bittern	E	E	PMST
Calidris ferruginea	Curlew sandpiper	CE	CE	PMST
Calyptorhynchus lathami	Glossy black-cockatoo	NL	SL	WO
Diomedea antipodensis	Antipodean albatross	V	NL	PMST

Scientific name	Common name	Conservation status		Source
		EPBC Act	NC Act	
Diomedea antipodensis gibsoni	Gibson's albatross	V	V	PMST
Diomedea exulans	Wandering albatross	V	V	PMST
Erythrotriorchis radiatus	Red goshawk	V	E	PMST
Falco hypoleucos	Grey falcon	V	V	PMST
Geophaps scripta scripta	Squatter pigeon (southern)	V	V	PMST
Grantiella picta	Painted honeyeater	V	V	PMST
Hirundapus caudacutus	White-throated needletail	V	V	PMST, WO
Lathamus discolor	Swift parrot	CE	E	PMST
Limosa lapponica baueri	Bar-tailed godwit	V	V	PMST
Limosa lapponica menzbieri	Northern Siberian bar-tailed Godwit	CE	E	PMST
Macronectes giganteus	Southern giant-petrel	E	E	PMST
Macronectes halli	Northern giant petrel	V	V	PMST
Menura alberti	Albert's lyrebird	NL	NT	WO
Numenius madagascariensis	Eastern curlew	CE	CE	PMST
Pachyptila turtur subantarctica	Fairy prion (southern)	V	LC	PMST
Rostratula australis	Australian painted snipe	E	E	PMST
Sternula nereis nereis	Australian fairy tern	V	NL	PMST
Thalassarche cauta	Shy albatross	E	NL	PMST
Thalassarche eremita	Chatham albatross	E	NL	PMST
Thalassarche impavida	Campbell albatross	V	SL	PMST
Thalassarche melanophris	Black-browed albatross	V	NL	PMST
Thalassarche salvini	Salvin's albatross	V	SL	PMST
Thalassarche steadi	White-capped albatross	V	V	PMST
Thinornis cucullatus cucullatus	Hooded plover (eastern)	V	LC	PMST
Turnix melanogaster	Black-breasted button-quail	V	V	PMST
Fish				
Epinephelus daemelii	Black rockcod	V	NL	PMST
Maccullochella mariensis	Mary River cod	E	NL	PMST

Scientific name	Common name	Conservation status		Source
		EPBC Act	NC Act	
Amphibians				
Adelotus brevis	Tusked frog	NL	V	WO
Crinia tinnula	Wallum froglet	NL	V	WO
Mixophyes fleayi	Fleay's frog	E	E	PMST
Mammals				
Chalinolobus dwyeri	Large-eared pied bat	V	V	PMST
Dasyurus maculatus	Spotted-tail quoll	E	V	PMST
Petauroides volans	Greater glider	V	V	PMST, WO
Phascolarctos cinereus	Koala	V	V	PMST, WO
Potorous tridactylus tridactylus	Long-nosed potaroo	V	V	PMST
Pseudomys novaehollandiae	New Holland mouse	V	V	PMST
Pteropus poliocephalus	Grey-headed flying-fox	V	V	PMST, WO
Tachyglossus aculeatus	Short-beaked echidna	NL	SL	WO
Xeromys myoides	Water mouse	V	V	PMST
Reptiles				
Caretta caretta	Loggerhead turtle	E, Mar, Mig	E	PMST
Chelonia mydas	Green turtle	V, Mar, Mig	V	PMST
Coeranoscincus reticulatus	Three-toed snake-tooth skink	V	LC	PMST
Delma torquata	Collared delma	V	V	PMST
Dermochelys coriacea	Leatherback turtle	E, Mar, Mig	E	PMST
Eretmochelys imbricata	Hawksbill turtle	V, Mar, Mig	E	PMST
Furina dunmalli	Dunmall's snake	V	V	PMST
Lepidochelys olivacea	Olive Ridley turtle	E, Mar, Mig	E	PMST
Natator depressus	Flatback turtle	V, Mar, Mig	V	PMST

Key to table – CE = Critically endangered, E = Endangered, V = Vulnerable, Mig = Migratory, Mar = Marine, NT = Near threatened, NL = Not listed, LC = Least concern, WO = Wildlife Online .

Migratory species

The EPBC Act Protected Matters Search Tool reported 39 migratory species predicted to occur within 1 km of the Study corridor (Appendix A), comprising:

- Thirteen migratory marine bird species
- Ten migratory marine species
- Six migratory terrestrial species
- Six migratory wetland species

Of these, 14 species have been previously presented as conservation significant species and are not discussed further within this section. Similarly, as the Project is located outside the marine environment, migratory marine species were excluded from the assessment.

Of the 39 species predicted to occur, five species have been historically recorded within 1 km of the Study corridor (DES, 2021a). The Wildlife Online database (Appendix A) also reported to occurrence of three additional migratory wetland species not listed in the PMST report. These being,

- Glossy ibis (*Plegadis falcinellus*)
- Whimbrel (*Numenius phaeopus*)
- Marsh sandpiper (*Tringa stagnatilis*)

The glossy ibis was also confirmed present during previous ecological surveys of the Study corridor (WSP, 2019b).

Table 3-9 contains a summary of the conservation significant fauna species predicted to occur within the Study corridor based on the results of the desktop assessment.

Table 3-9 Migratory species predicted to occur within the Study corridor

Scientific name	Common name	Conservation status		Source
		EPBC Act	NC Act	
Migratory marine birds				
Apus pacificus	Fork-tailed swift	Mig, Mar	SL	PMST
Ardenna grisea	Sooty shearwater	Mig, Mar	SL	PMST
Calonectris leucomelas	Streaked shearwater	Mig, Mar	SL	PMST
Migratory terrestrial species				
Cuculus optatus	Oriental cuckoo	Mig	SL	PMST
Monarcha melanopsis	Black-faced monarch	Mig	SL	PMST, WO
Myiagra cyanoleuca	Satin flycatcher	Mig	SL	PMST
Rhipidura rufifrons	Rufous fantail	Mig	SL	PMST, WO
Symposiachrus trivirgatus	Spectacled monarch	Mig	SL	PMST
Migratory wetland species				
Actitis hypoleucos	Common sandpiper	Mig	SL	PMST

Scientific name	Common name	Conservation status		Source
		EPBC Act	NC Act	
Calidris acuminata	Sharp-tailed sandpiper	Mig	SL	PMST, WO
Calidris melanotos	Pectoral sandpiper	Mig	SL	PMST
Gallinago hardwickii	Latham's snipe	Mig	SL	PMST, WO
Numenius phaeopus	Whimbrel	Mig	SL	WO
Pandion haliaetus	Osprey	Mig	SL	PMST, WO
Plegadis falcinellus	Glossy ibis	Mig	SL	WO, WSP
Tringa nebularia	Common greenshank	Mig	SL	PMST
Tringa stagnatilis	Marsh sandpiper	Mig	SL	WO

Key to table – Mig – migratory, Mar – marine, SL = Special least concern, WO = Wildlife Online

3.7.2 Field assessment

One conservation significant fauna species was confirmed present during field surveys, this being the glossy black-cockatoo (*Calyptorhynchus lathami*). Three additional species, the koala (*Phascolarctos cinereus*), grey-headed flying-fox (*Pteropus poliocephalus*) and wallum froglet (*Crinia tinnula*) were assessed as likely to occur due to the presence of suitable habitat and historical records within the 1 km of the Subsequent study areas. Further discussion on the confirmed and likely to occur species is provided below.

Glossy black-cockatoo – confirmed present

The glossy black-cockatoo is listed as vulnerable under the NC Act.

The glossy black-cockatoo is distributed throughout eastern and southern Australia, from Mackay in the north, to Kangaroo Island in the south (Forshaw, 2006; Joseph, 1982; Pizzey and Knight, 1999). Within its range, the species predominantly occurs within coastal and subcoastal regions, though is also known to extend inland from southern central Queensland to north-eastern Victoria (Pizzey and Knight, 1999). As a dietary specialist, the glossy black-cockatoo feeds almost exclusively on the seed cones of *Allocasuarina* (Clout, 1989), and is heavily restricted by the availability of their required foraging resource. Therefore, preferred habitats for the species represent woodland areas dominated by she-oak (*Allocasuarina*), or open sclerophyll forests with a dominant stratum of *Allocasuarina* (Glossy Black Conservancy, 2010). Nine species of *Allocasuarina* are known to be utilised by the species, however only one or two are generally utilised within their range (Clout, 1989; Pepper et al., 2000; Chapman, 2007). Within southeast Queensland, preferred feed trees for the glossy black-cockatoo are *Allocasuarina torulosa* (forest she-oak) and *A. littoralis* (black she-oak) (Glossy Black Conservancy, 2010). As an obligate hollow-nesting species, the glossy black-cockatoo is further restricted in its distribution by requirement of old eucalypt forest as suitable nesting habitat (Cameron, 2006; Hourigan et al., 2012).

Within the Subsequent study area, characteristic orts (or chewings) were recorded within a patch of mixed eucalypt woodland at Kingston, within the centre of the Study corridor (Plate 3-11). This area supported a dominant stratum of *A. littoralis* and orts were found under three

threes within this location. Due to the species' sparse distribution and secretive nature, the presence of orts is a regularly utilised method for determining species occurrence for the glossy black-cockatoo (Cameron and Cunningham, 2006; Clout, 1989). Suitable foraging habitat for the species was also identified within Acacia Forest Park (Plate 3-11) and the species has been historically recorded within the neighbouring Karawatha Forest Park (DES, 2021a). No nesting habitat was identified within the Subsequent study areas due to the low abundance of hollows within woodland patches.

The location of field sightings and the distribution of suitable foraging habitat for the glossy black-cockatoo within the Subsequent study areas is displayed in Figure 3-6.

Plate 3-11 Suitable habitat and foraging evidence of the glossy black-cockatoo within the Subsequent study areas

Koala – likely to occur

The koala is listed as vulnerable under the EPBC Act and NC Act.

Koalas have a broad but patchy distribution, restricted to the eucalypt forests and woodlands of eastern Australia (Melzer et al., 2000). The species is a habitat specialist, feeding almost exclusively on the leaves of trees from the *Eucalyptus, Corymbia, Lophostemon, Angophora* and *Melaleuca* genus (Martin and Handasyde, 1999). The distribution and density of koalas is influenced by numerous factors, including habitat connectivity, habitat quality, population dynamics and the presence of threats (Rhodes et al., 2015). Key threats include habitat loss and fragmentation, dog attacks, vehicle strikes, disease and drought (DAWE, 2021).

The koala was not recorded during field surveys; however the species was assessed as likely to occur due to the presence of suitable habitat within the northern and central sections of the Study corridor. Furthermore, there are 189 historical records of the species within 2 km of the Study corridor (DES, 2021a). Suitable habitat was identified within Nealdon Park (Plate 3-12), along Scrubby Creek and within Karawatha State Forest, where the species has also been the focus of targeted studies (Lollback et al.,, 2017). These areas supported diverse eucalypt communities and maintained adequate connectivity for the species and potential koala scratches were recorded on the trunks of multiple trees (Plate 3-12). Whilst eucalypt communities were encountered at several additional locations within the Subsequent study areas, the presence of multiple threats (e.g. domestic dogs, busy roads), small patch sizes and low connectivity had reduced the quality of habitats available for the species.

The distribution of suitable habitat for the koala within the Subsequent study areas is displayed in Figure 3-6.

Plate 3-12 Suitable koala habitat and potential scratches observed within the Subsequent study areas

Grey headed flying fox – likely to occur

The grey-headed flying-fox is listed as vulnerable under the EPBC Act.

The species is Australia's only endemic flying-fox and is distributed along the east coast from Rockhampton, Queensland to Melbourne, Victoria (DAWE, 2021). The species is a canopy feeding frugivore that selectively forages in a wide range of vegetation communities including rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands (DAWE, 2021). Primarily, the species forages on blossoms from the Eucalypt genera, but it also known to infrequently utilize a wide range of rainforest fruits (Eby, 1998). However, as none of the vegetation communities utilized by the grey-headed flying fox produces foraging resources year-round, the species has adopted complex migration traits in response to seasonal resource availability (Spencer et al., 1991; Eby, 1998). At a regional level, the species movements are strongly linked to the flowering of *Eucalyptus, Melaleucas* and *Banksias*, with roosting sites often found near water bodies such as lakes, rivers or the coast (DAWE, 2021). Therefore, the species actually occupies relatively restricted and continuously changing habitats within their distribution (DAWE, 2021).

Suitable foraging habitat for the grey-headed flying fox was widely identified within the Subsequent study areas, particularly within Acacia Forest Park, Nealdon Park and along the Logan River. Additionally, two historical records of the species are located within 1 km of the Study corridor. Known mixed species flying fox colonies are also located in the southeast corner of Karawatha Forest Park (1.2 km west of Ch 24,900) and at Regents Park (7.5 km southwest of Ch 27,500). As the grey-headed flying fox is known to disperse up to 20 km an evening to forage (NSW OEH, 2021), the Subsequent study areas are considered to represent likely foraging habitat for the species.

The distribution of suitable foraging habitat for the grey-headed flying fox within the Subsequent study areas is displayed in Figure 3-6.

Wallum froglet – likely to occur

The wallum froglet is listed as vulnerable under the NC Act.

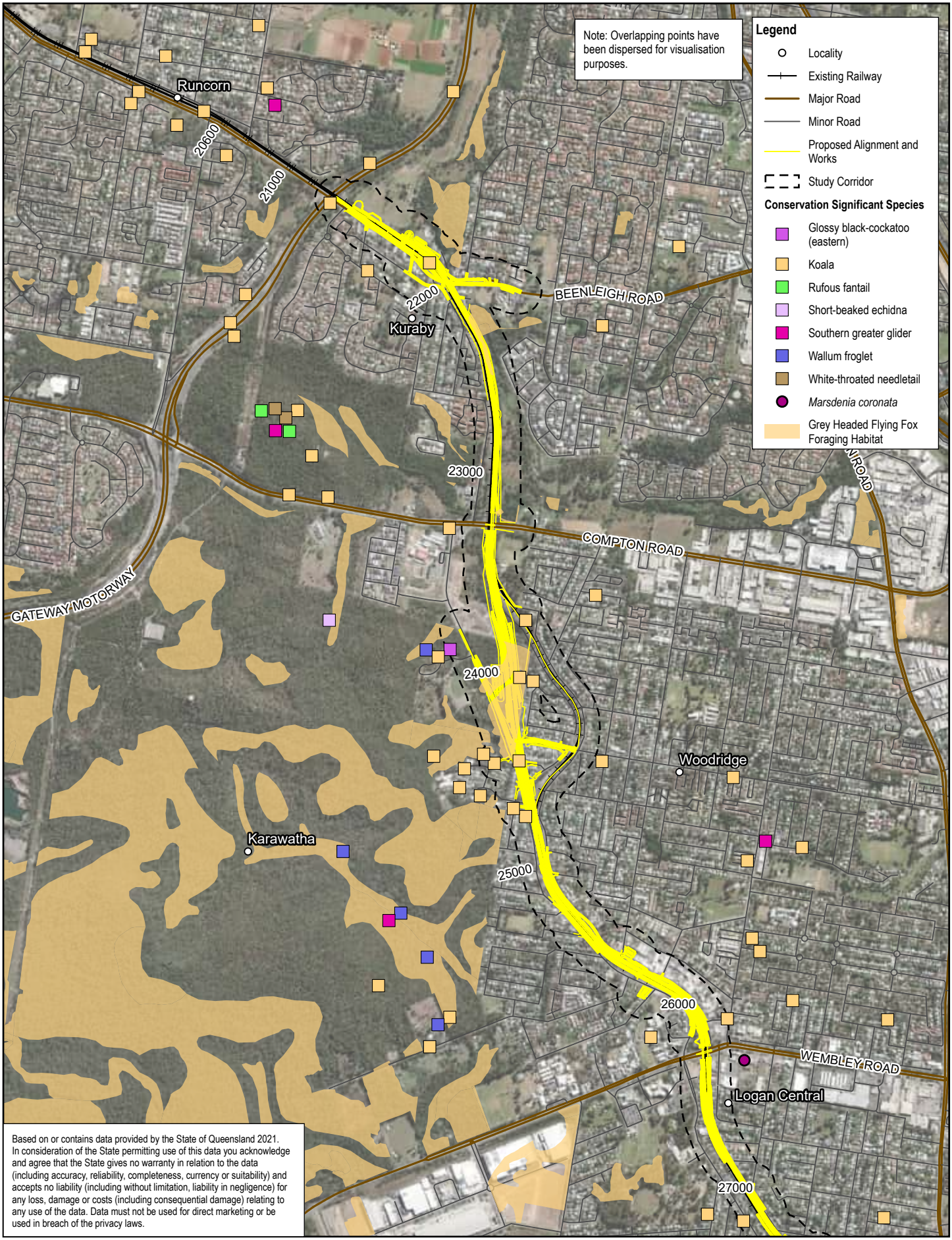
The wallum froglet is confined to the coastal lowlands and sand islands of south-east Queensland and New South Wales, particularly, Fraser, Bribie, Moreton and North Stradbroke Islands – as well as adjacent mainland areas (Meyer et al., 2004; Meyer et al., 2006).The preferred habitat of the wallum froglet is largely coastal environment (< 100 m ASL) associated with wet heath, sedgeland, woodland on nutrient-poor sandy soils and acid paperbark (melaleuca) swamps within a pH ranging between 4.3 - 5.2 (Meyer et al., 2004; Rowland et al., 2012). The swamps and lakes in which the wallum froglet breeds are typically oligotrophic (i.e.

nutrient poor), tannin-stained and acidic (pH < 6.0) and the species is thought to distributed into woodlands following breeding (Meyer et al., 2006). Due to their coastal distribution, niche habitat requirements and sensitivity to disturbances, it is important to minimise any disturbance to remaining populations. Since European settlement much of the remaining wallum has been cleared, modified, and substantially fragmented. As such, continued pressure for coastal development is the greatest threat to wallum frogs (Meyer et al., 2006).

Suitable habitat for the wallum froglet was identified in temporarily inundated patches of sedges, rushes and reeds adjacent to Scrubby Creek (Plate 3-13). This area was situated in a relatively undisturbed wet, eucalypt woodland which provided multiple micro-habitats for the species. This area also supports essential habitat for the species (Figure 3-4). Additionally, the species has the potential to occur within the wet eucalypt and *Melaleuca* communities along Slacks Creek. This area is located approximately 900 m northeast (downstream) of the Karawatha wetland, which contains six historical records for the species (DES, 2021a; Biomaps, 2021).

The distribution of suitable foraging habitat for the wallum froglet within the Subsequent study areas is displayed in Figure 3-6.

Plate 3-13 Suitable habitat for the wallum froglet within the Subsequent study areas



Paper Size ISO A4

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Location of field sightings and suitable habitat for conservation significant species within the study corridor

Project No. **12534697**
Revision No. **2**
Date **18/06/2021**

FIGURE 3-6a

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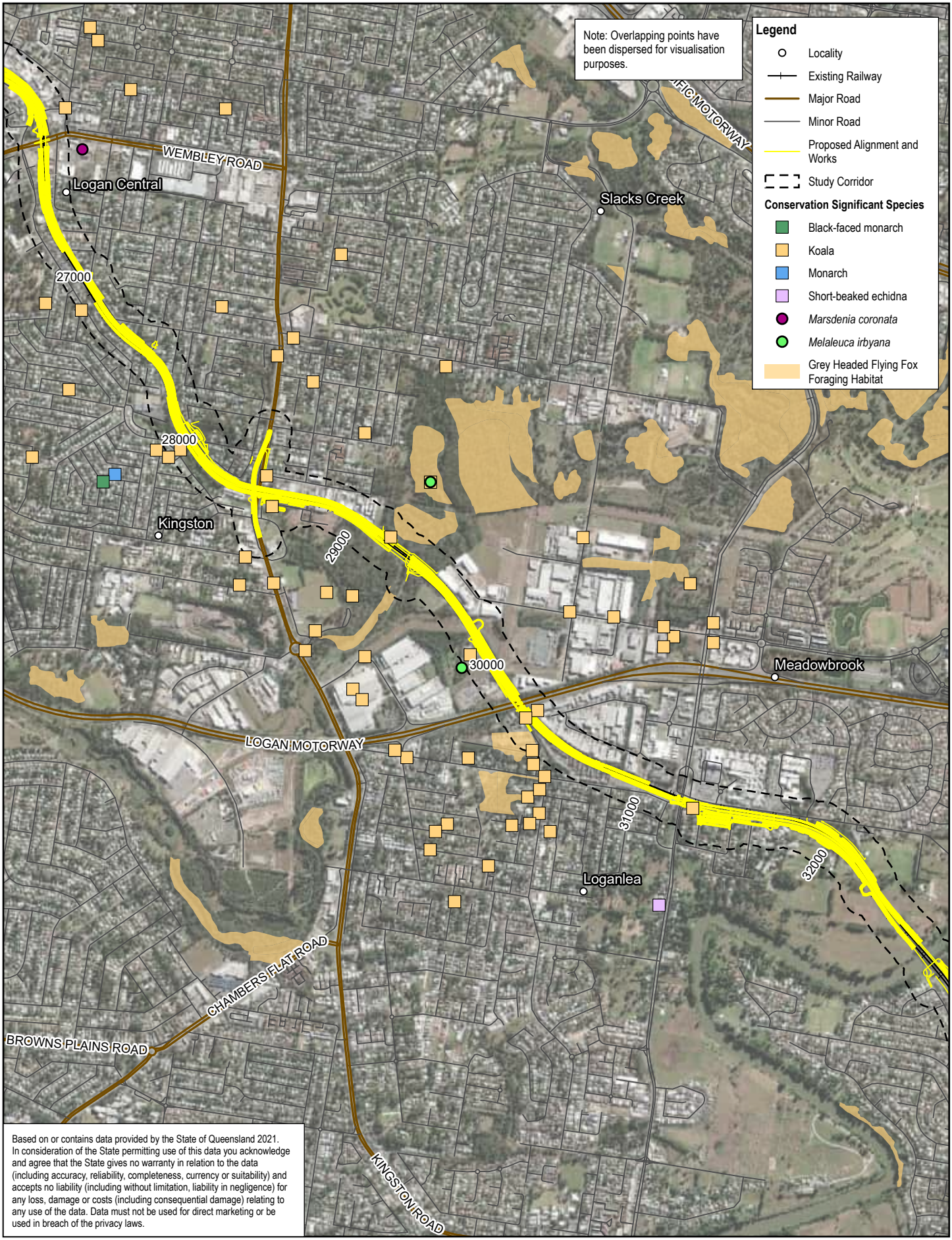

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Logan and Gold Coast Faster Rail
(Kuraby to Beenleigh) Project

Location of field sightings and suitable habitat for conservation significant species within the study corridor

Project No. 12534697
Revision No. 2
Date 18/06/2021

FIGURE 3-6b

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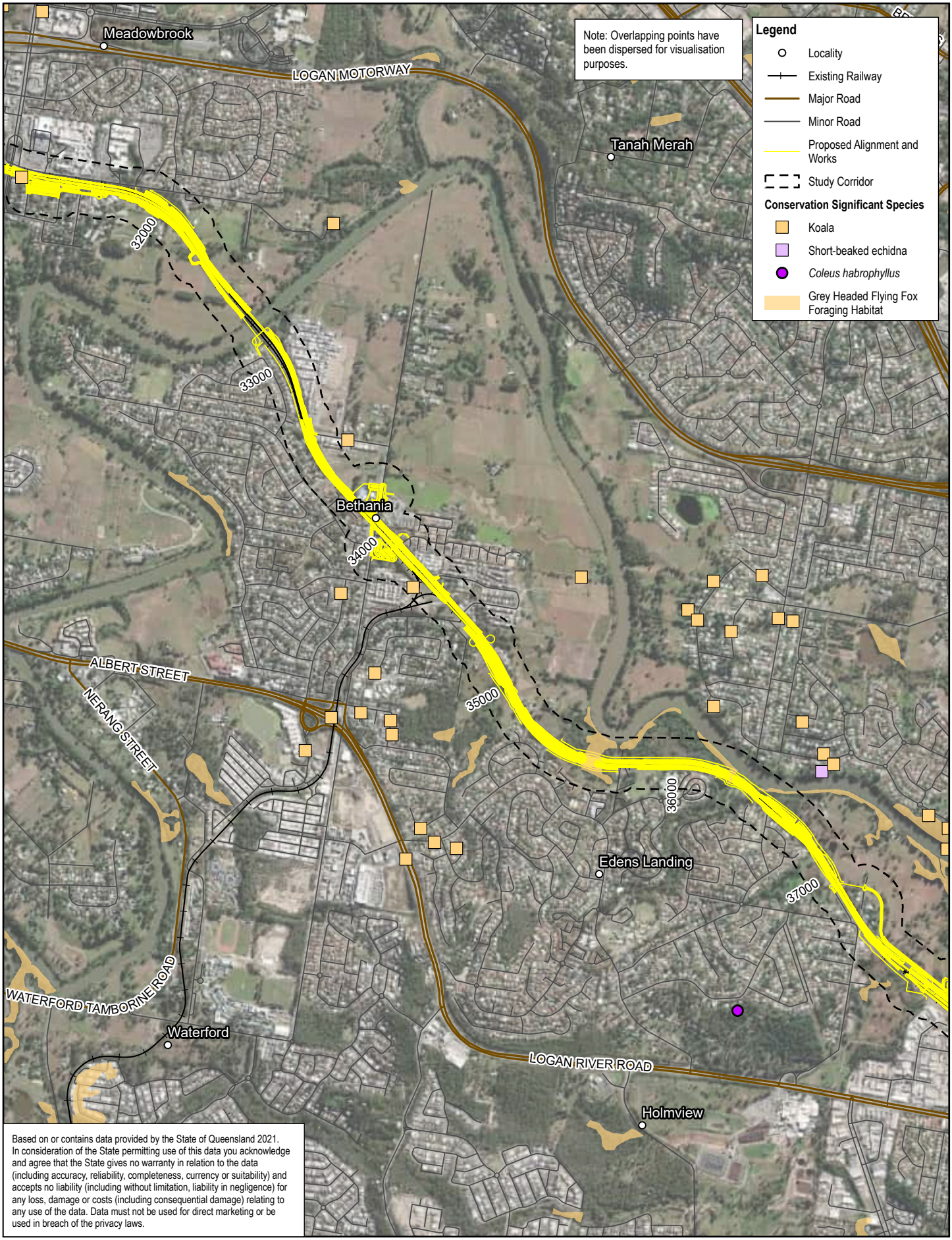

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Grid: GDA 1994 MGA Zone 56

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Department of Transport and Main Roads
Logan and Gold Coast Faster Rail (Kuraby to Beenleigh) Project

Location of field sightings and suitable habitat for conservation significant species within the study corridor

Project No. **12534697**
Revision No. **2**
Date **18/06/2021**

FIGURE 3-6c

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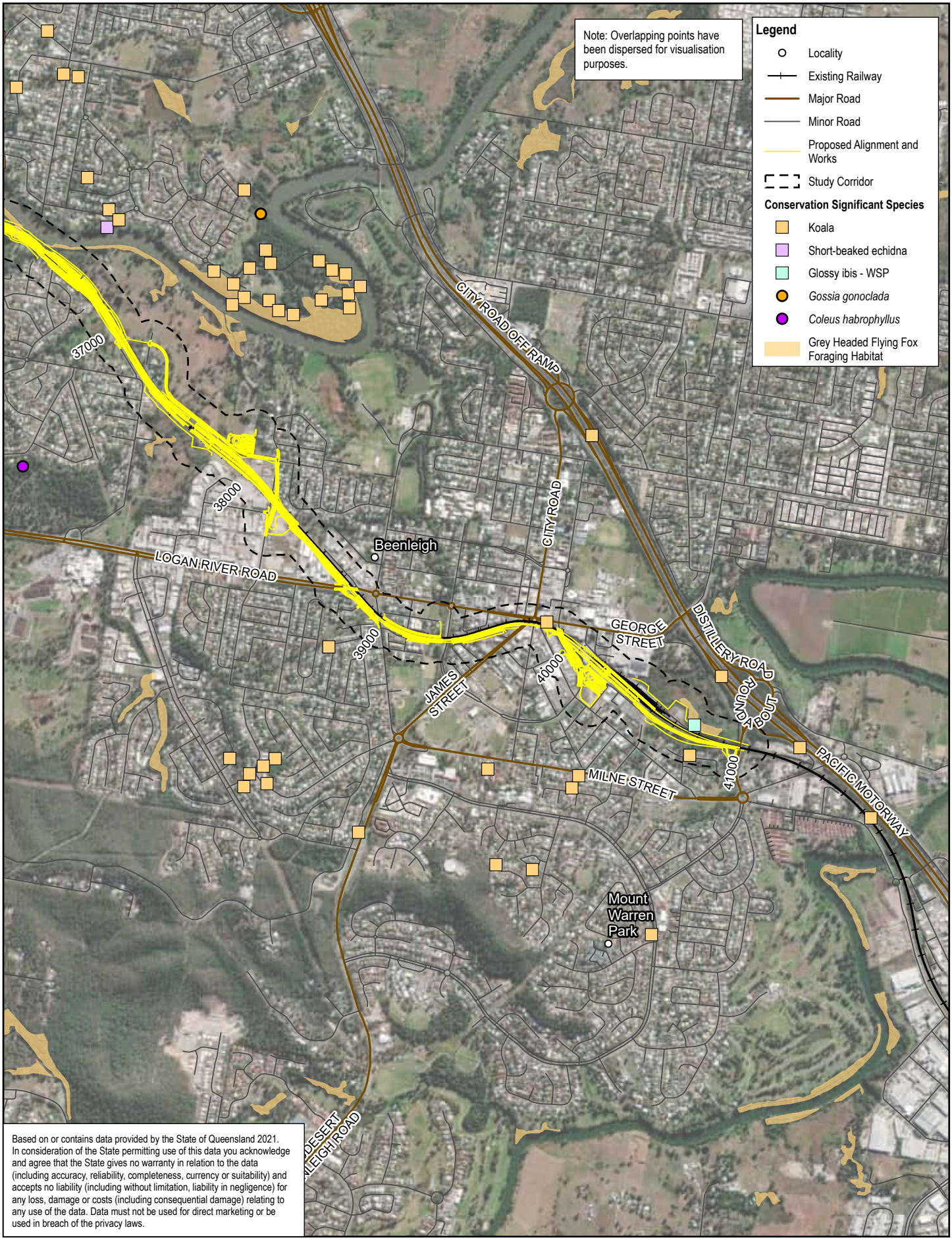

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Location of field sightings and suitable habitat for conservation significant species within the study corridor

Project No. **12534697**
Revision No. **2**
Date **18/06/2021**

FIGURE 3-6d

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3.8 Koala habitat

Under the *Nature Conservation (Koala) Conservation Plan* 2017, the Study corridor is located within koala district A within the south-east Queensland Koala Protection Area. Furthermore, the *South East Queensland Koala Conservation Strategy 2020-2025* (DES, 2020b) koala habitat mapping indicates the Subsequent study areas contain koala priority areas, core koala habitat areas, locally refine koala habitat areas and koala habitat restoration areas.

An area of remnant vegetation associated with the Karawatha State Forest is mapped as a Koala Priority Area (KPA) and adjacent to the Project at Ch 23,700 m (Figure 3-7). This KPA extends south and runs adjacent the western boundary of the Study corridor. This KPA also supports a mosaic of core koala habitat areas, locally refined koala habitat area and koala habitat restoration areas. Additional areas of core koala habitat are located within Nealdon Park (Ch 29,300 m), Hugh Muntz Gardens (Ch 40,800 m) and in scattered areas along the Logan River (Ch 35,600 m). Koala habitat restoration areas are widely mapped across much of the remaining Study corridor, particularly within Noffke Park (Ch 33,800 m), Gould Adams Park (Ch 29,200 m) and Battle Park (Ch 29,500 m).

Koala mapping layers were viewed on Queensland Globe.

The distribution of koala habitat mapping is displayed Figure 3-7 whilst a description of the koala habitat categories is presented in Table 3-10.

Table 3-10 Koala habitat mapping criteria

Mapping category	Description of mapping category
Koala priority areas	Large, connected areas that focus habitat protection, habitat restoration and threat mitigation to areas that have the highest likelihood of safeguarding koala populations in SEQ. Clearing of core and locally refined koala habitat areas within koala priority areas is prohibited, subject to certain exemptions.
Core koala habitat areas	The best quality koala habitat areas, based on modelling of biophysical measures including climate, suitable vegetation for both food and shelter, and koala sighting records.
Locally refined koala habitat area	Areas of mature vegetation that might not meet the Queensland Government's criteria for core koala habitat areas (see Spatial modelling for koalas in SEQ). However, these areas may contain locally important vegetation for koalas, including some areas previously protected under local government planning schemes.
Koala habitat restoration areas	land that could be restored and established as koala habitat areas. These areas feature low threats or constraints, and high conservation opportunities.

3.8.1 State Planning Policy Koala Habitat Mapping

TMR signed a memorandum of agreement (MOA) with the former Department of Environment and Resource Management (DERM, now DES) on 15 June 2010. The MOA serves as a formal mechanism responding to the *State Government Supported Infrastructure - Koala Conservation Policy* (DEHP, 2017) and outlines additional criteria to be used by TMR to guide road infrastructure Projects and determine if a particular Project proposed within the SEQ Koala

Protection Area must be assessed for compliance with the now superseded Koala Conservation State Planning Regulatory Provisions (SPRP). Under the MOA, TMR must assist in reducing adverse impacts to koalas and koala populations by complying with the SPRP where required (to the greatest extent practicable). TMR are required to self-assess Projects against the SPRP when:

- A Project intersects a koala habitat area mapped under the (now superseded) State Planning Policy (SPP)
- The Project does not meet the criteria for exemption from assessment against the SPRP

Furthermore, in accordance with Section 7.2 of the MOA, TMR are required to maintain records of government supported transport infrastructure Projects that intersect koala habitat areas. The register is required to identify:

- The name of the infrastructure Project
- Whether the transport Project was assessable against the Koala Conservation SPRP and if not, details of the exemption
- If the Project was assessable against the Koala Conservation SPRP a brief description of how the Koala Conservation SPRP was compiled with. The description could include any of the following:
  - Details of the koala sensitive design measures included in the design
  - Details of the amount of koala habitat impacted by the development (in the form of the number of individual trees or hectares impacted)
  - Details of any actions taken to mitigate these impacts, for example, revegetation, the provision of an environmental offset or financial contribution provided to DERM (now DES).

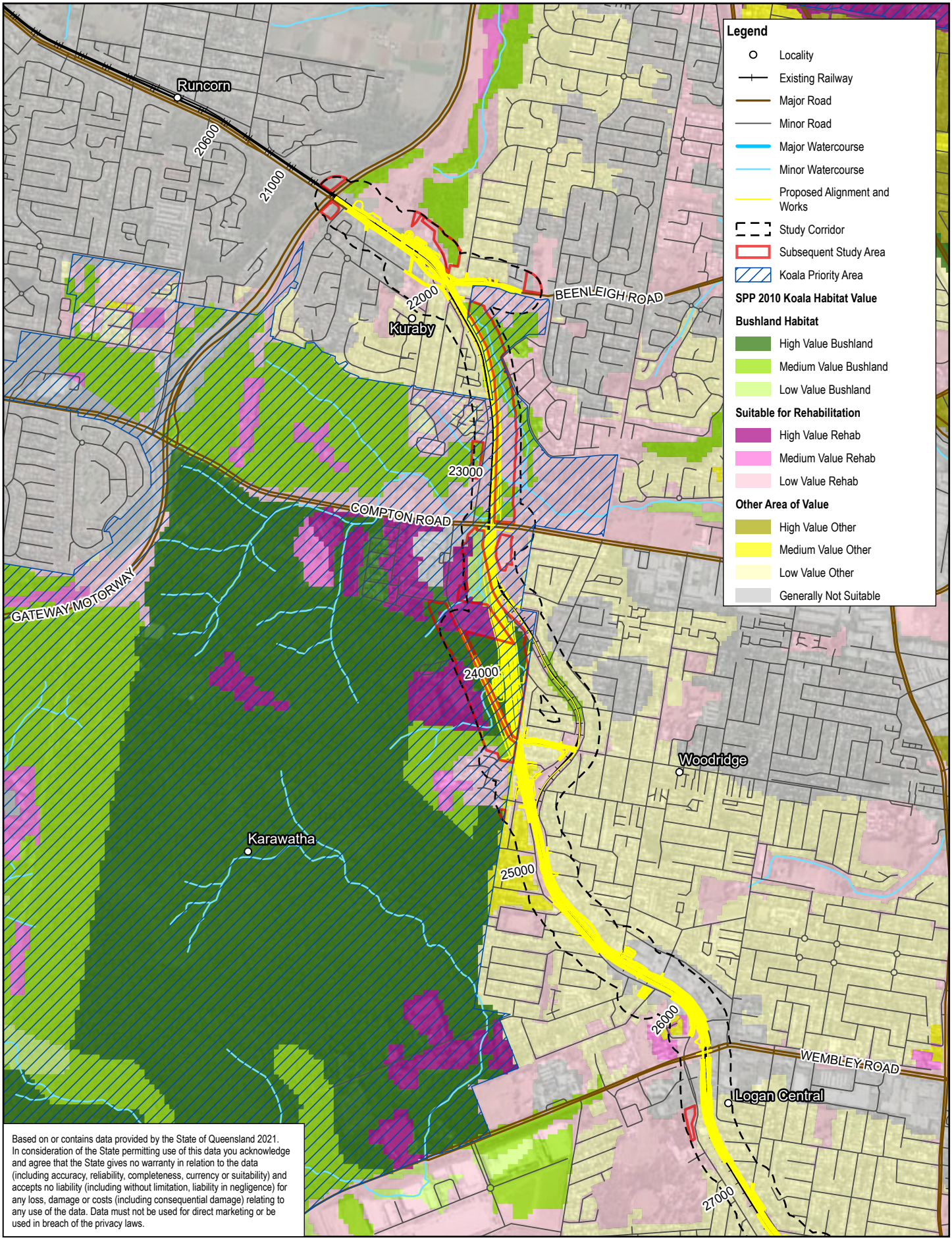
The signed MOA requires the use of the now superseded SPP koala habitat mapping to be utilised. The SPP koala habitat mapping has been superseded by the Koala Habitat Mapping 2020 (discussed in the following Section). The SPP mapping indicates that the Project area intersects the following mapped values as per the SPP koala habitat values:

- High value bushland
- Medium value bushland
- Low value bushland
- High value rehabilitation
- Medium value rehabilitation
- Low value bushland
- Medium value other
- Low value other
- Non-habitat

The total areas of SPP koala habitat mapped within the Project area is shown in Figure 3-7 and quantified in Table 3-11. Of note, the SPP koala habitat mapping is very coarse and currently includes habitat values mapped over existing infrastructure and hard stand areas such as the existing rail infrastructure. As a result, refinement of these areas was undertaken through GIS to remove hard stand areas or areas currently under active maintenance such as mowed batters. Further delineation of the impacted areas will be required during Detailed Design to inform TMR's offsetting obligations under their MOA.

Table 3-11 SPP koala habitat mapping

SSP Koala Habitat category	Extent within the Project area
High value bushland	7.10 ha
Medium value bushland	6.22 ha
Low value bushland	5.96 ha
High value rehabilitation	1.02 ha
Medium value rehabilitation	0.07 ha
Low value rehabilitation	43.28 ha
Medium value other	1.60 ha
Low value other	12.90 ha
Non-habitat	77.66 ha



Paper Size ISO A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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(Kuraby to Beenleigh) Project

Distribution of koala habitat mapping within the subsequent study areas

Project No. **12534697**
Revision No. **2**
Date **18/06/2021**

FIGURE 3-7a

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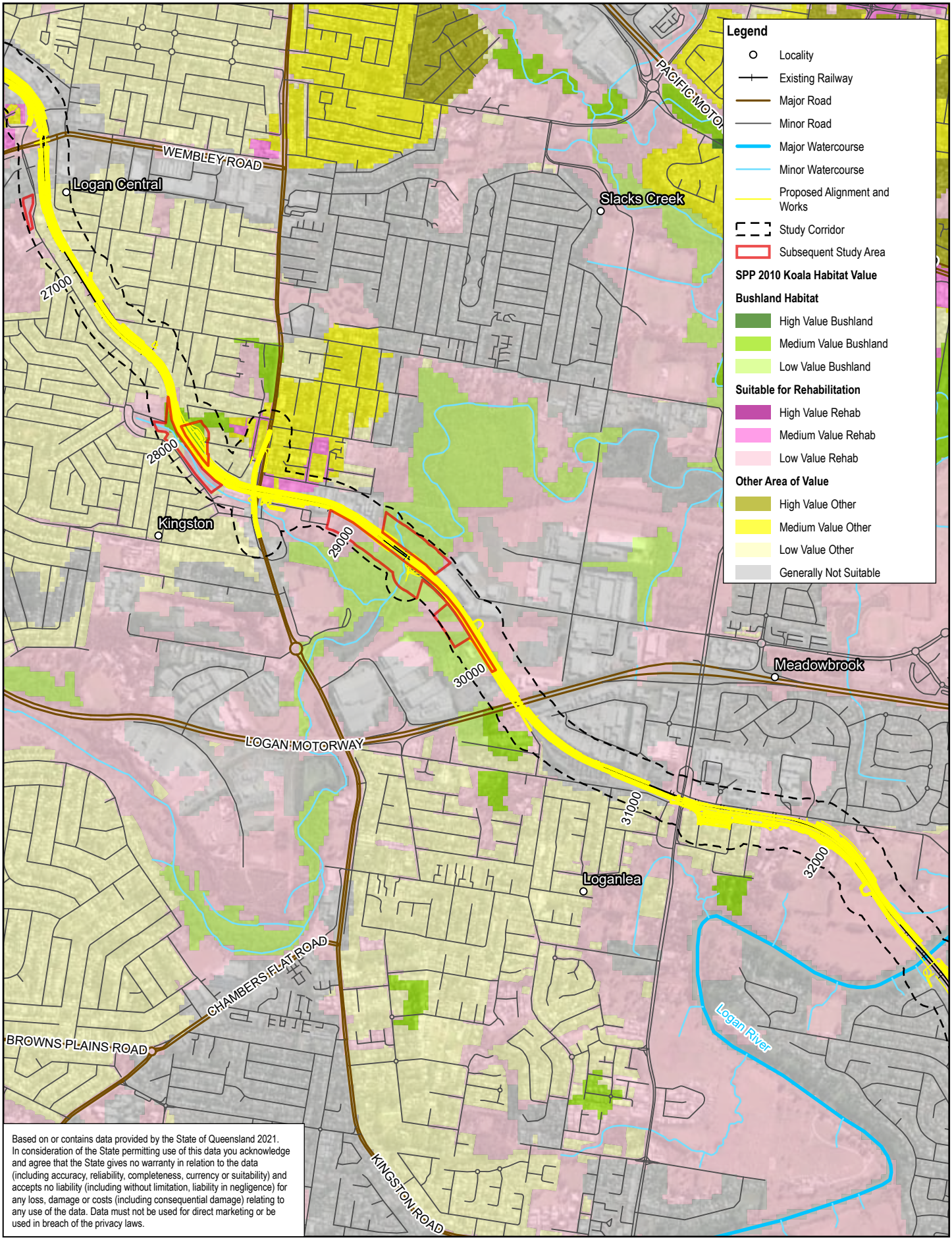

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Distribution of koala habitat mapping within the subsequent study areas

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FIGURE 3-7b

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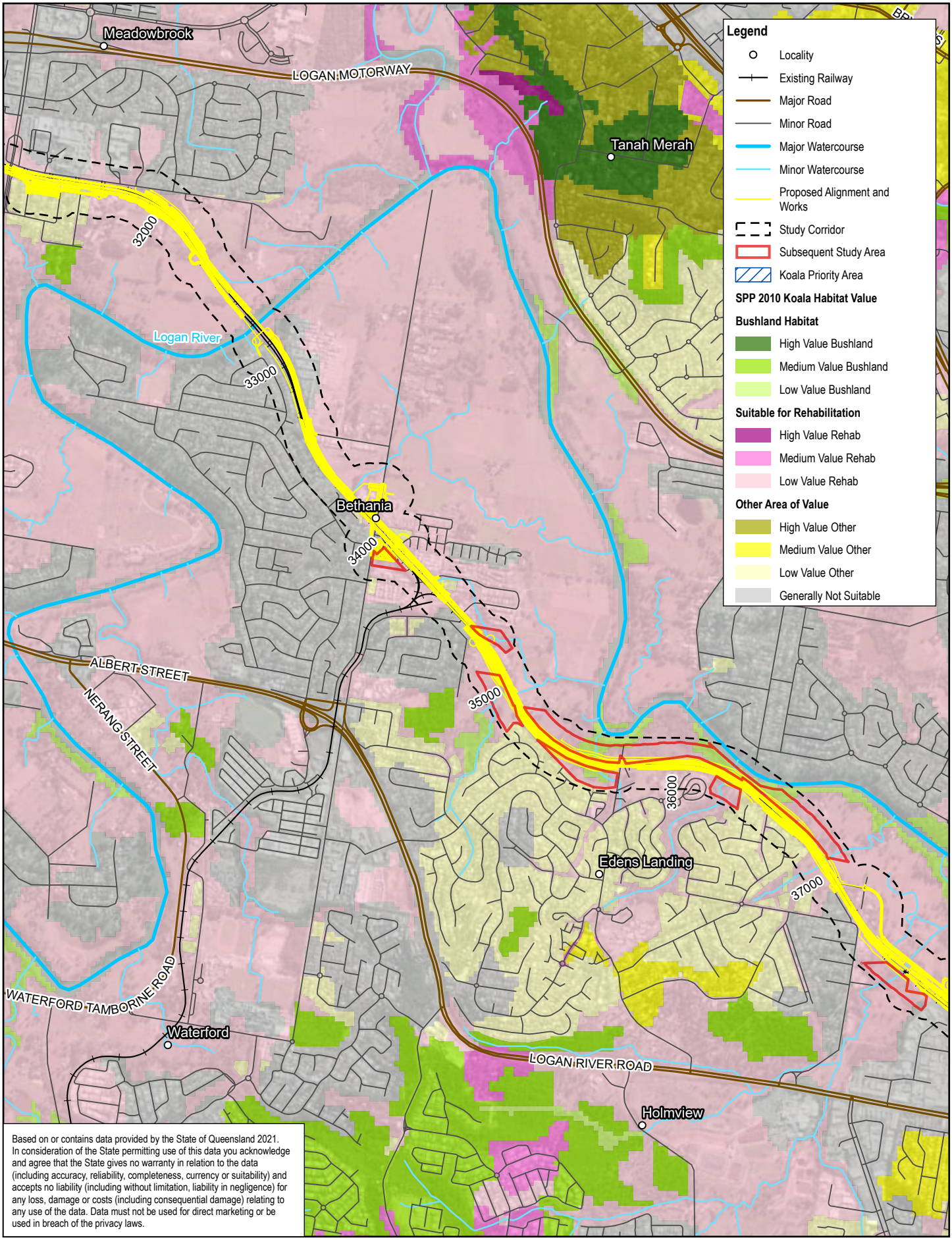

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(Kuraby to Beenleigh) Project

Distribution of koala habitat mapping within the subsequent study areas

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FIGURE 3-7c

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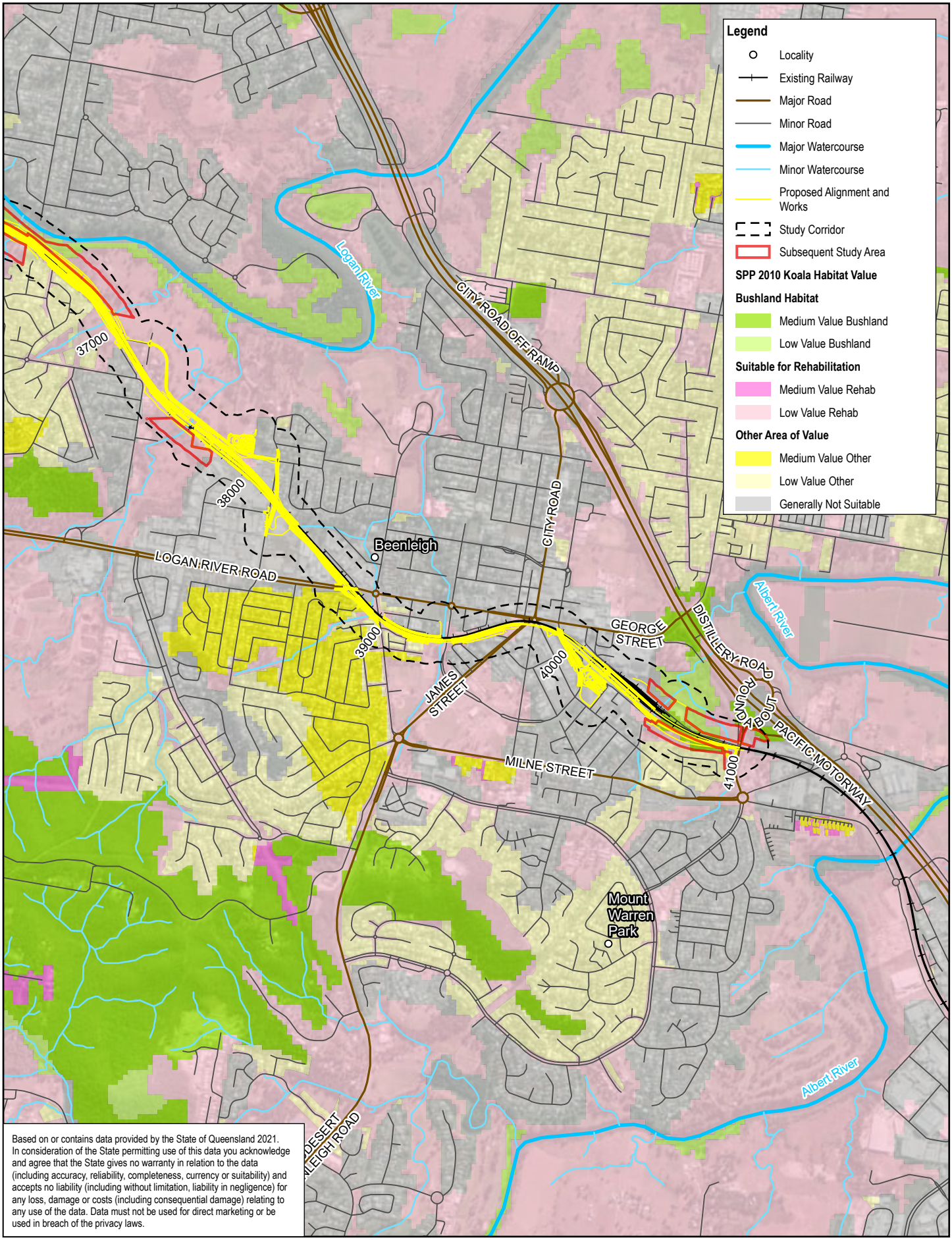

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Grid: GDA 1994 MGA Zone 56

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Department of Transport and Main Roads
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(Kuraby to Beenleigh) Project

Distribution of koala habitat mapping within the subsequent study areas

Project No. **12534697**
Revision No. **2**
Date **18/06/2021**

FIGURE 3-7d

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3.9 Animal breeding places

The Subsequent study areas contain a diverse range of fauna habitat features that supported a variety of terrestrial species commonly associated with urban and woodland habitats. Due to the mosaic of different habitats present within the Subsequent study areas (e.g. grasslands, woodland and wetlands), breeding places for a range of different fauna taxa were encountered during field surveys. More broadly, almost all native and introduced vegetation within the Subsequent study areas provides a range of microhabitat features (woody vegetation at different strata, ground cover, litter, soils) that contribute to the breeding, shelter and roosting habitat for terrestrial fauna. In general, key active, potential or significant habitat features encountered included:

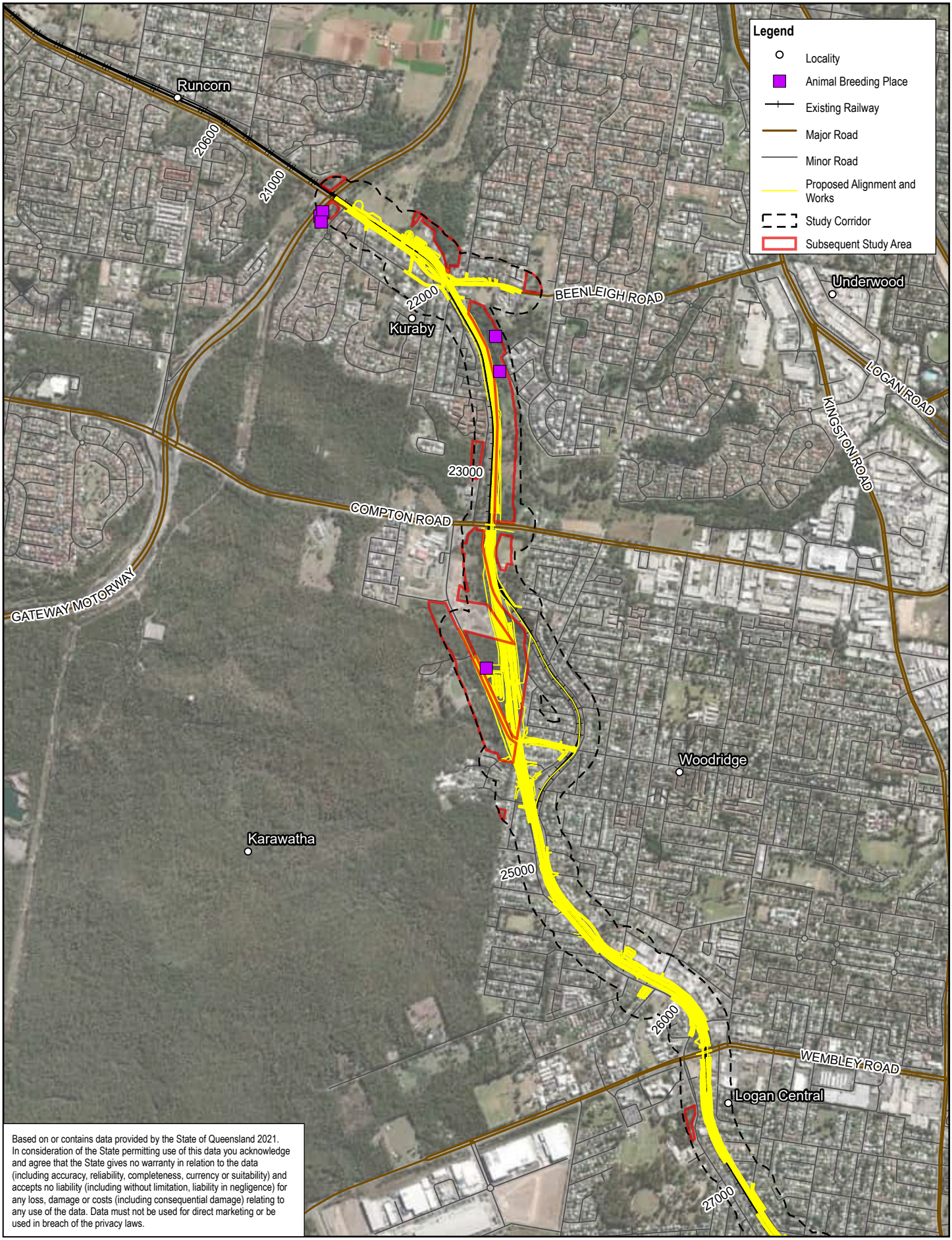
- Permanent and ephemeral waterbodies, wetlands and depressions that provide habitat for amphibians, aquatic reptiles and wetlands / migratory birds.
- Mature eucalypt forests which provide nesting habitat for large avifauna and denning habitat for arboreal mammals.
- Abandoned arboreal termite mounds that facilitate nesting woodland birds.

In total, six animal breeding places were recorded within the Subsequent study areas, which consisted of arboreal termite mounds, tree hollows and a nesting box (Appendix E). Arboreal termite mounds were the most frequently encountered animal breeding place (Plate 3-14) and are likely to provide nesting habitat for small avifauna (e.g. pardalotes and kingfishers) and/or denning and refuge habitat for arboreal mammals (e.g. gliders) and reptiles (e.g. *Varanus* spp.). Tree hollows were also encountered within the mature woodland habitats (Plate 3-15), though these were generally uncommon within the Subsequent study areas. These features have the potential to support small arboreal mammals (e.g. possums and gliders) and a range of hollow-dependent woodland birds (e.g. cockatoos, owls and lorikeets). Hollow-bearing trees are recognised as a limited resource within Australian ecosystems, with the loss of tree hollows considered to be a major threat to Australia's biodiversity (Gibbons and Lindenmayer, 2002). In the absence of hollows, nest boxes are recognised as an effective alternative to mitigate the loss of nesting features (Goldingay et al., 2020: 2015). Therefore, nest boxes could be considered to be of high ecological value. One nesting box was recorded within the Subsequent study areas (Plate 3-15), which was located within a remnant patch of eucalypt woodland at Wally Tate Park.

The distribution of animal breeding places within the Subsequent study areas is displayed in Figure 3-8 and presented in Appendix E.

Plate 3-14 Hollowed arboreal termite mounds within the Subsequent study areas

Plate 3-15 Tree hollow and constructed nestbox within the Subsequent study areas



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Distribution of animal breeding places within the subsequent study area

Project No. **12534697**
Revision No. **2**
Date **9/08/2021**

FIGURE 3-8a

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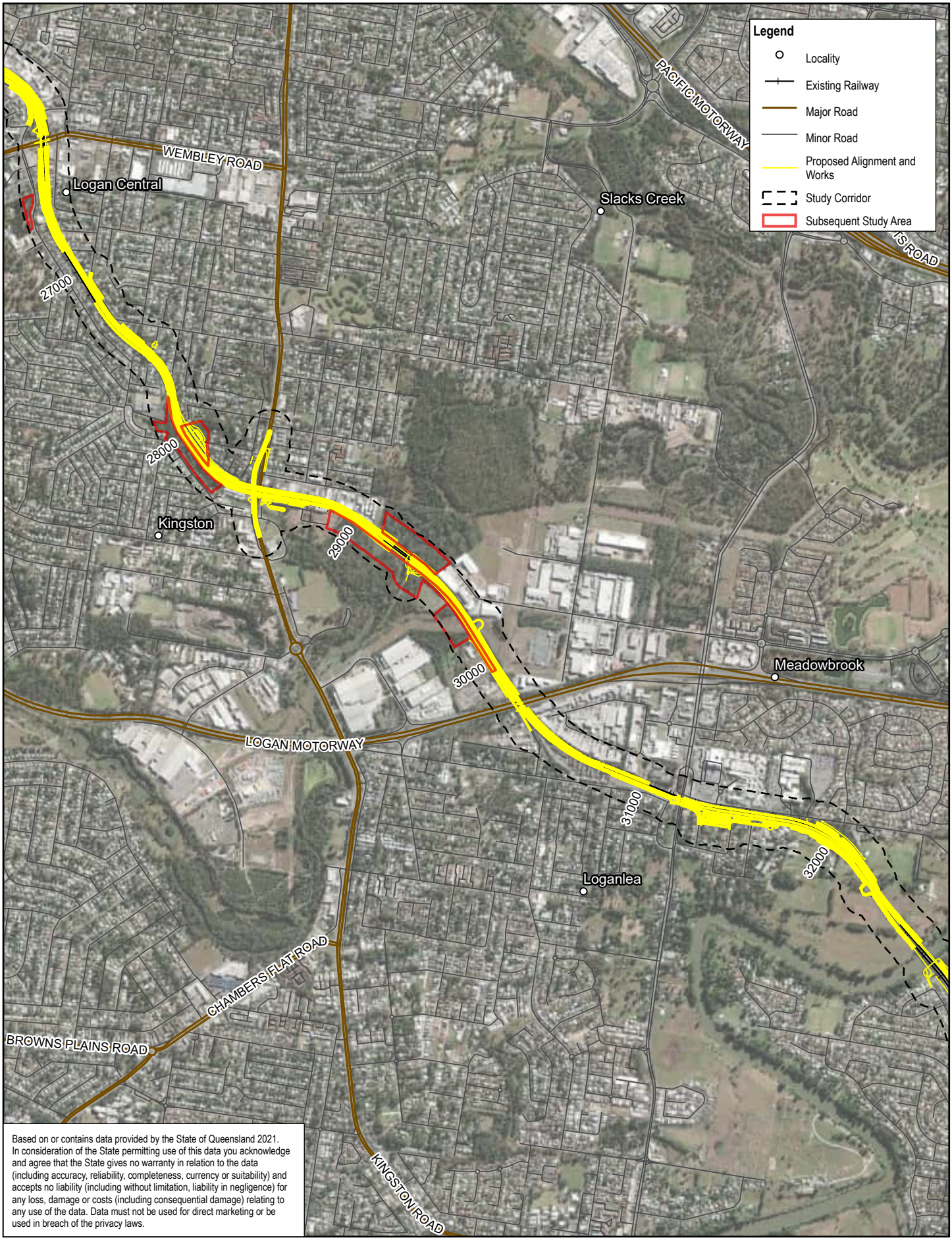

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Grid: GDA 1994 MGA Zone 56

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Date **9/08/2021**

Distribution of animal breeding places within the subsequent study area

FIGURE 3-8b

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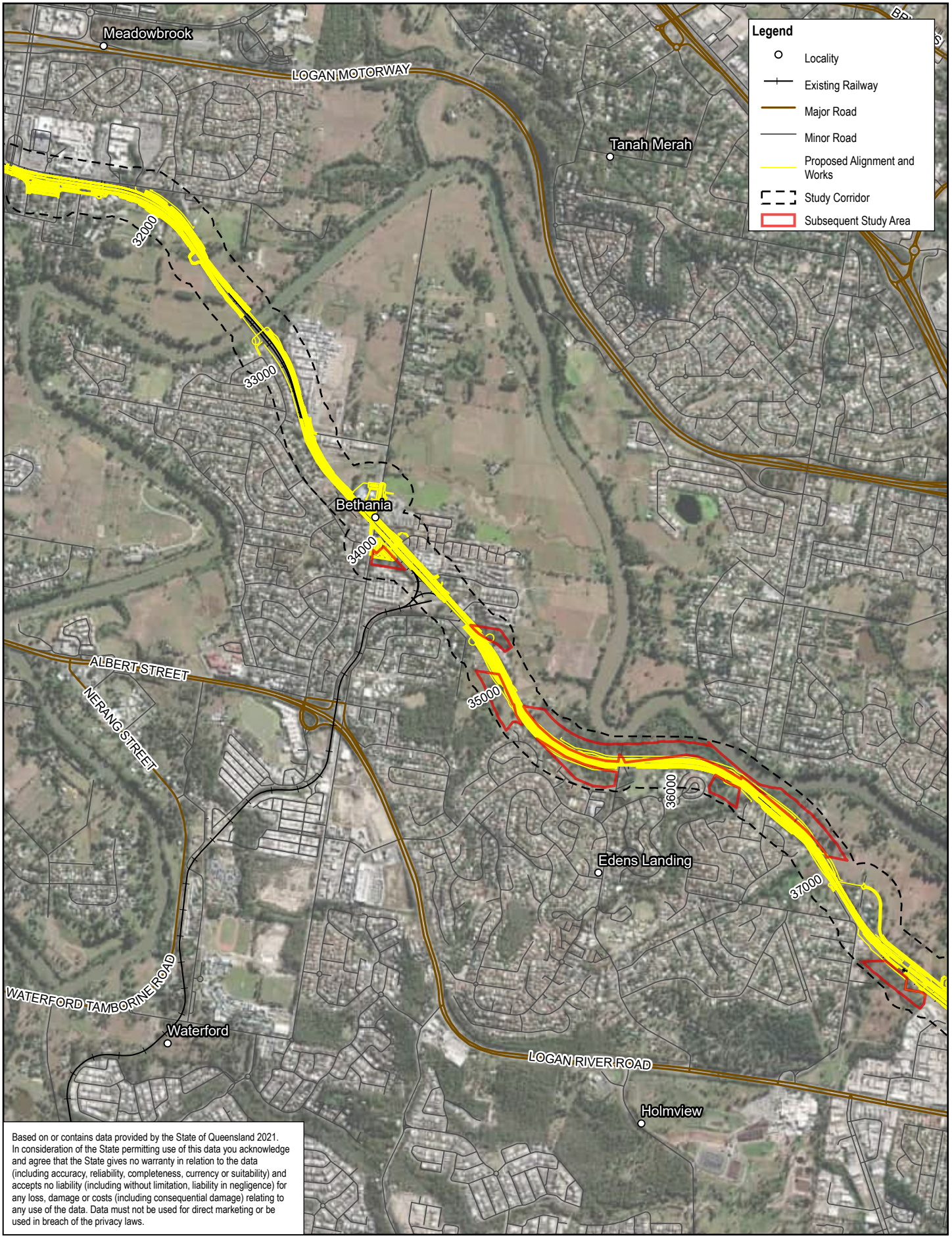

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Distribution of animal breeding places within the subsequent study area

Project No. **12534697**
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FIGURE 3-8c

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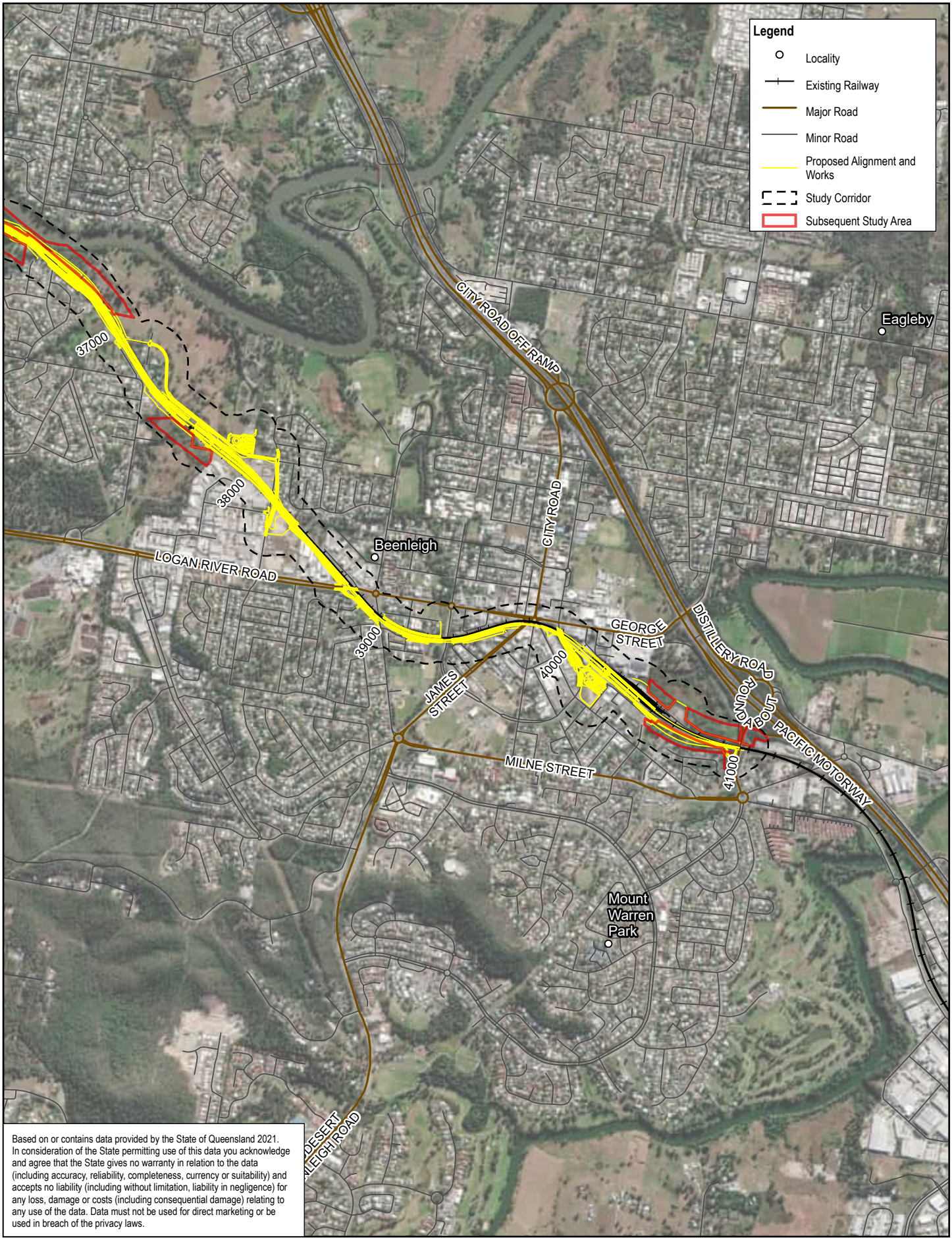
Print date: 09 Aug 2021 - 16:33

Data source: DoR: Road, Railway, Locality (2020); GHD: Proposed Alignment, Study Area, Animal Breeding Place (2021); ESRI World Imagery: Maxar. Created by: xlee



Paper Size ISO A4

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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(Kuraby to Beenleigh) Project

Distribution of animal breeding places within the subsequent study area

Project No. **12534697**
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Date **9/08/2021**

FIGURE 3-8d

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Print date: 09 Aug 2021 - 16:33

Data source: DoR: Road, Railway, Locality (2020); GHD: Proposed Alignment, Study Area, Animal Breeding Place (2021); ESRI World Imagery: Maxar. Created by: xlee

3.10 Fauna connectivity

3.10.1 Desktop assessment

Fauna connectivity is vital for maintaining ongoing ecosystem functioning and dispersal patterns of local and migratory fauna. Decreases in habitat connectivity can reduce species richness, abundance and activity for a wide range of terrestrial fauna species (Benítez-López et al., 2010; van der Ree et al., 2015), thereby making local populations more reliant on local resources and highly susceptible to disturbances (Fridley et al., 2007; Gilpin and Soule, 1986). Furthermore, loss of connectivity between smaller habitat patches can reduce genetic diversity and geneflow in isolated populations (Clark et al., 2010; Forman et al., 2003).

At the local scale, wildlife habitat within the Subsequent study areas is fragmented, largely due to linear infrastructure, open spaces and urban development. In some areas, isolated habitats may remain connected by a narrow line of either remnant, regenerating or planted vegetation. These narrow corridors are largely surrounded by a highly modified urban landscapes which are generally not conducive to fauna dispersal. The width of these corridors and presence of anthropogenic threats (e.g. vehicle strikes, increased stress, domestic dogs) limits the value of corridors for disturbance-sensitive species and those species that are generally unable to cross gaps in vegetation, such as small ground-dwelling mammals and forest interior birds.

Karawatha Forest Park and Acacia Forest Park occurs in the north of the Study corridor are a focal point for the convergence of regional wildlife habitat and a critical component of many fauna movement corridors. This area maintains important habitat connectivity and fauna movement throughout the surrounding landscape via Slacks Creek and Springvale Park to the east, the Compton Road overpass and Kuraby Nature Reserve to the north, west through Oxley Creek and the Greenbank Military Area and south via Berrinba Wetlands Nature Refuge. Karawatha Forest Park and the connecting habitats to the southwest support the Karawatha to Flinders corridor and represents the largest remaining continuous stretch of open eucalypt forest in southeast Queensland (DEHP, 2013). Fauna connectivity is also maintained within Nealdon Park, which is located within the centre of the Study corridor. Nealdon Park extends east along Scrubby Creek before connecting to the Slacks Creek Environmental Park, Leslie Parade Nature Reserve and the Daisy Hill Conservation Park.

The remainder of the Study corridor meanders through residential developments and alongside major road and rail networks. However, regardless of the surrounding land uses, the fragments of remnant vegetation within the Study corridor are likely act as ‘stepping-stone’ habitats for dispersal of highly mobile species. Vegetation within several small community parklands (e.g. Noffke Park, the Ridgewood Reserves, Eden Parklands and Rosewood Reserves) is of ecological value and likely to facilitate the local movements of terrestrial fauna, particularly woodland birds and arboreal mammals.

Biodiversity Planning Assessment – Terrestrial corridors

A number of biodiversity corridors have been identified within the Subsequent study areas and are recognised as having strategic value at state, regional and local levels. Biodiversity corridors can contribute to increased habitat connectivity at multiple spatial scales, with their efficacy dependent on the size, movement capabilities and habitat tolerances of the species that move through them (Rosenberg et al., 1997). The retention of wildlife corridors has been formalised as a conservation goal at all levels of government.

Three terrestrial biodiversity corridors are located within the Study corridor, including two state significant corridors and one regionally significant corridors (Figure 3-9). These being, the

- **The Mt Barney to Karawatha corridor**

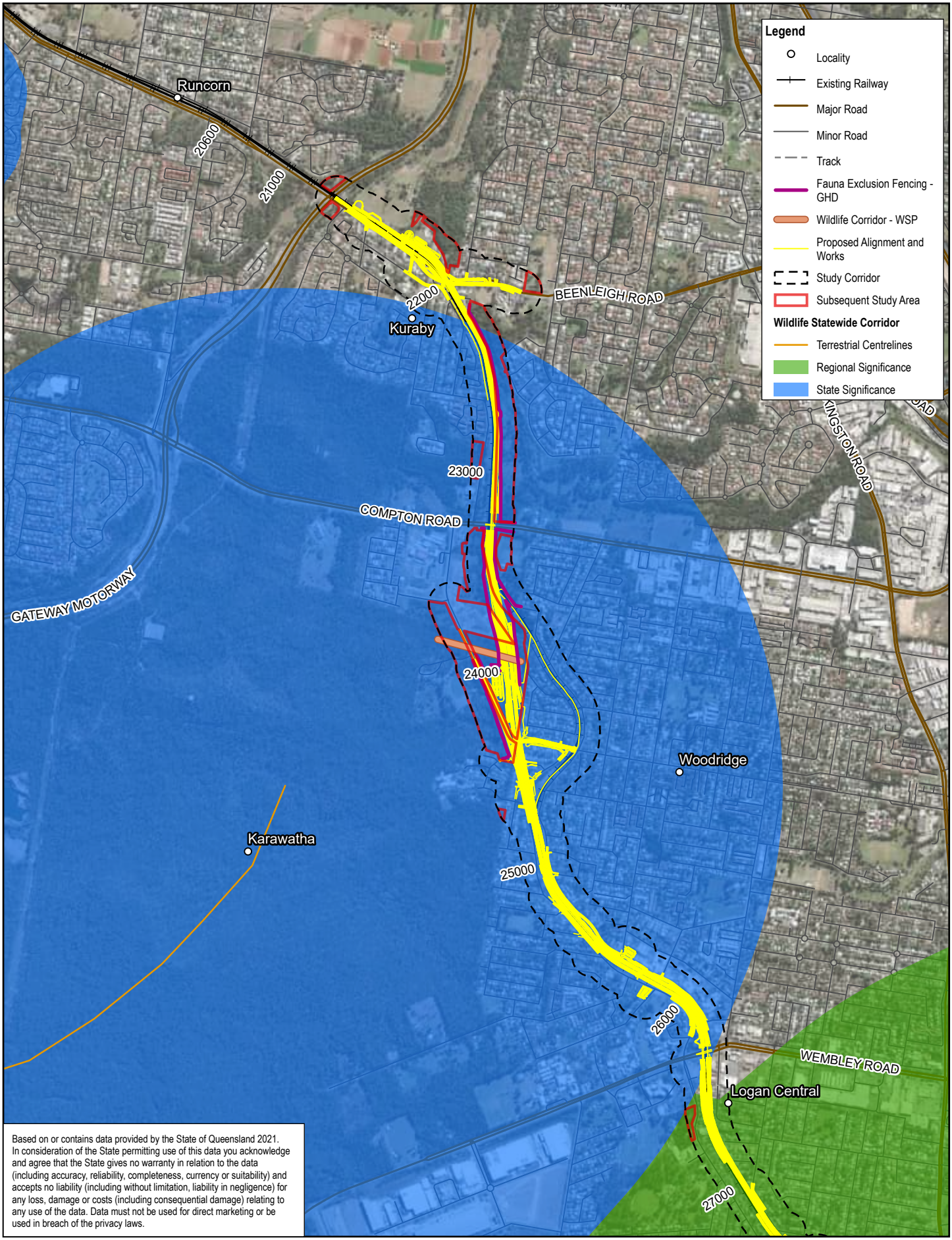
- **The Beenleigh to Springbrook corridor**
- The Karawatha to Stradbroke corridor

*Bold font identifies State listed corridors

The Mt Barney to Karawatha corridor extends from the New South Wales border, north along through Flinders Peak to Karawatha Forest Park and is adjacent to the northern extent of the Study corridor between Ch 22,600 – 25,000. This corridor is recognised as one of region's most important biodiversity corridor's and supports the largest stretch of intact open woodland in southeast Queensland (DEHP, 2013). Additionally, this corridor also contains Brisbane City Council's Flinders to Karawatha terrestrial corridor, which connects 56,350 hectares and 60 kilometres of native vegetation. In the southern extent of the Study corridor, the Beenleigh to Springbrook corridor extends along the western side of Study corridor. This corridor extends from the Logan River towards the suburb of Beenleigh, before crossing the Albert River and heading south towards Mt Tambourine. This corridor is not intersected by the alignment, however, is it located adjacent to the Study corridor between Ch 40,100 – 41,100. Lastly, the Karawatha to Stradbroke corridor originates within Karawatha Forest Park before heading east along Scrubby Creek towards Venman Bushland National Park. This regionally significant corridor intersects the Subsequent study areas between Ch 26,300 – 32,700.

Biodiversity Planning Assessment – Riparian corridors

Two riparian corridors are located within the Subsequent study areas, these being, the Logan River riparian corridor and the Albert River riparian corridor (Figure 3-9). The Logan River riparian corridor intersects the Study corridor at Ch 32,800 and runs adjacent between Ch 35,400 – 36,400 before heading northeast. The Albert River riparian corridor is not intersected by the Study corridor, however the southern extend of the Study corridor is within 900 m, approximately 9.5 km upstream of the confluence of the Albert and Logan Rivers.



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Map Projection: Transverse Mercator
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Grid: GDA 1994 MGA Zone 56

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Distribution of biodiversity corridors and proposed fauna movement pathways within the subsequent study area

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FIGURE 3-9a

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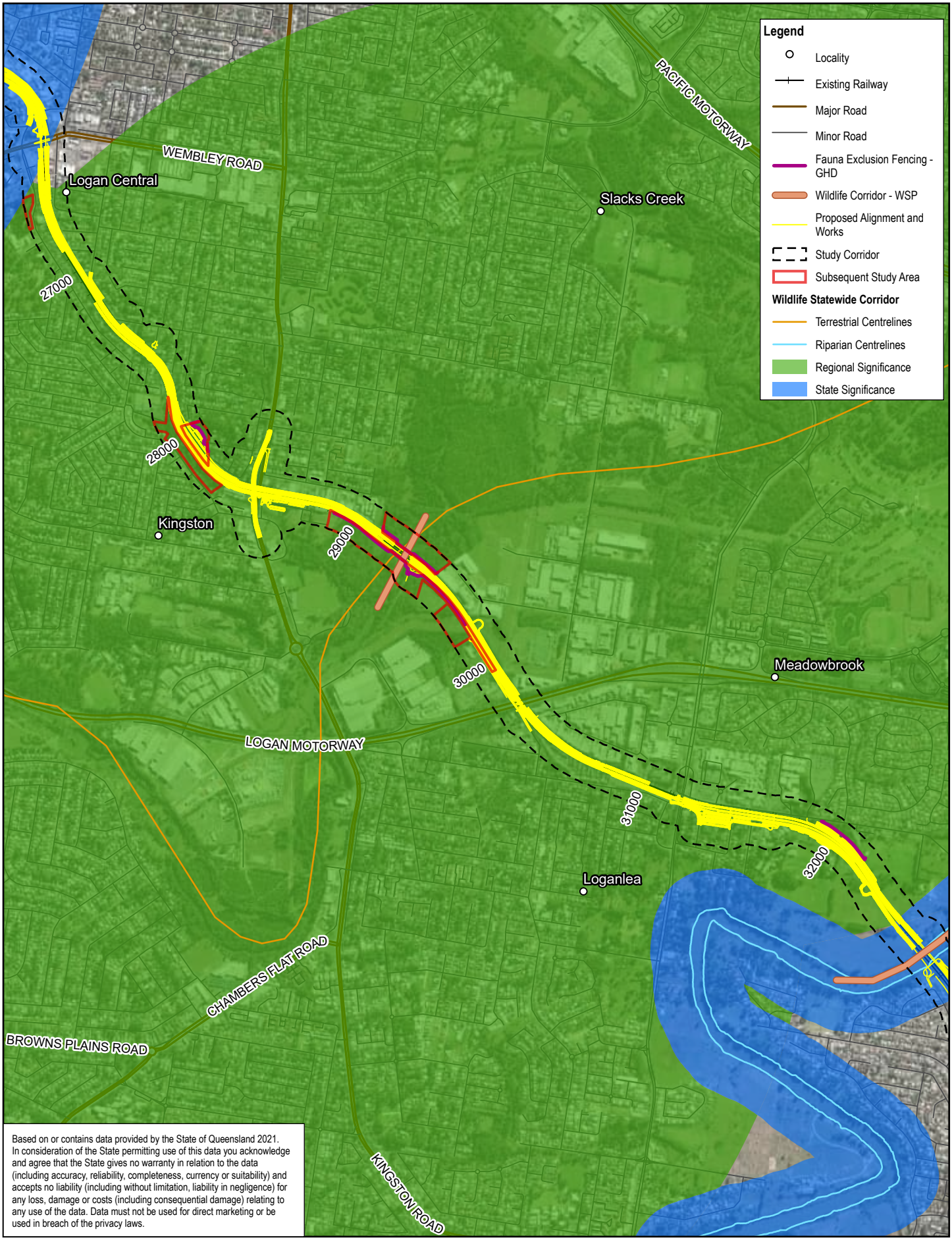

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Department of Transport and Main Roads
Logan and Gold Coast Faster Rail
(Kuraby to Beenleigh) Project

Distribution of biodiversity corridors and proposed fauna movement pathways within the subsequent study area

Project No. **12534697**
Revision No. **2**
Date **9/08/2021**

FIGURE 3-9b

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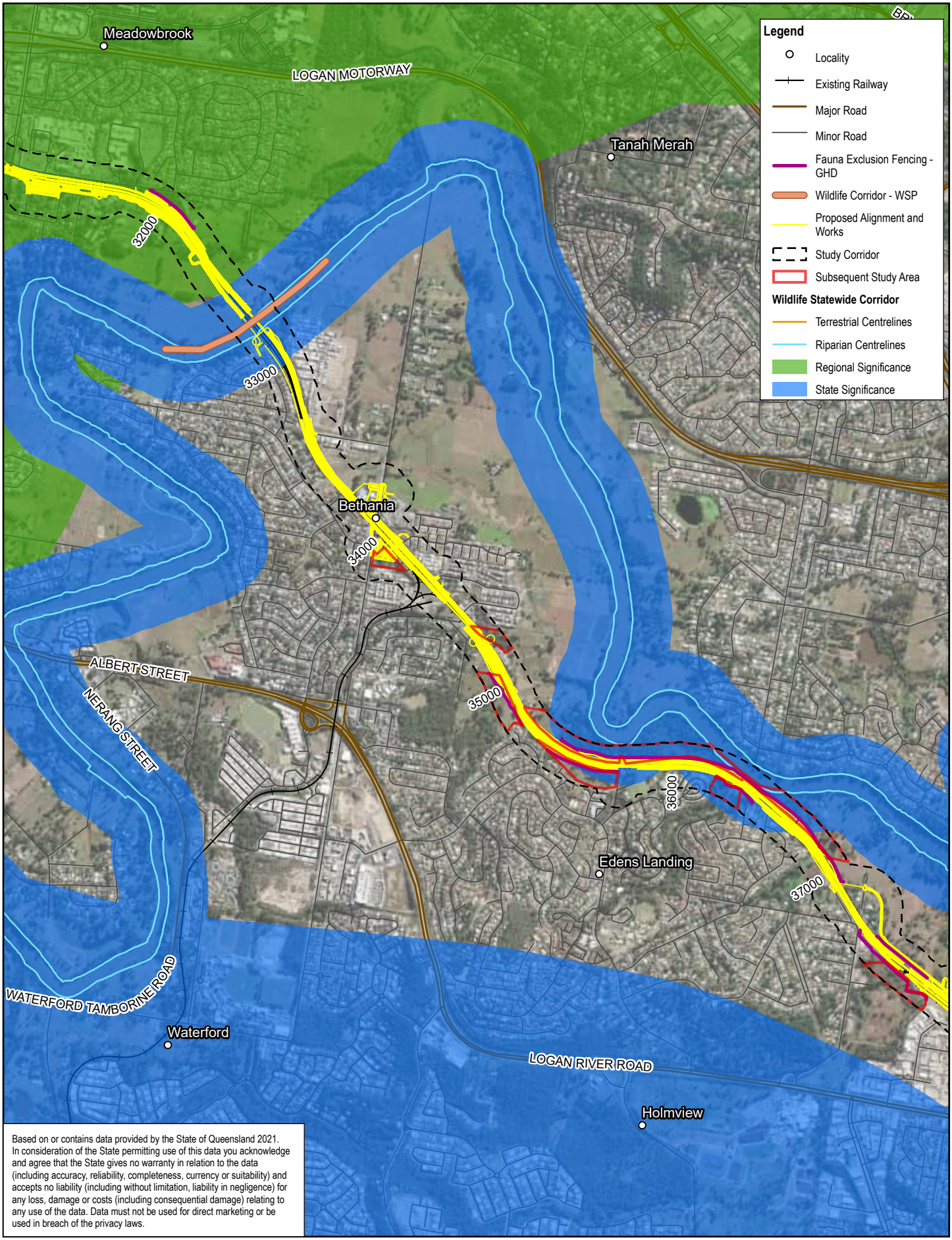

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Department of Transport and Main Roads
Logan and Gold Coast Faster Rail
(Kuraby to Beenleigh) Project

Distribution of biodiversity corridors and proposed fauna movement pathways within the subsequent study area

Project No. **12534697**
Revision No. **2**
Date **9/08/2021**

FIGURE 3-9c

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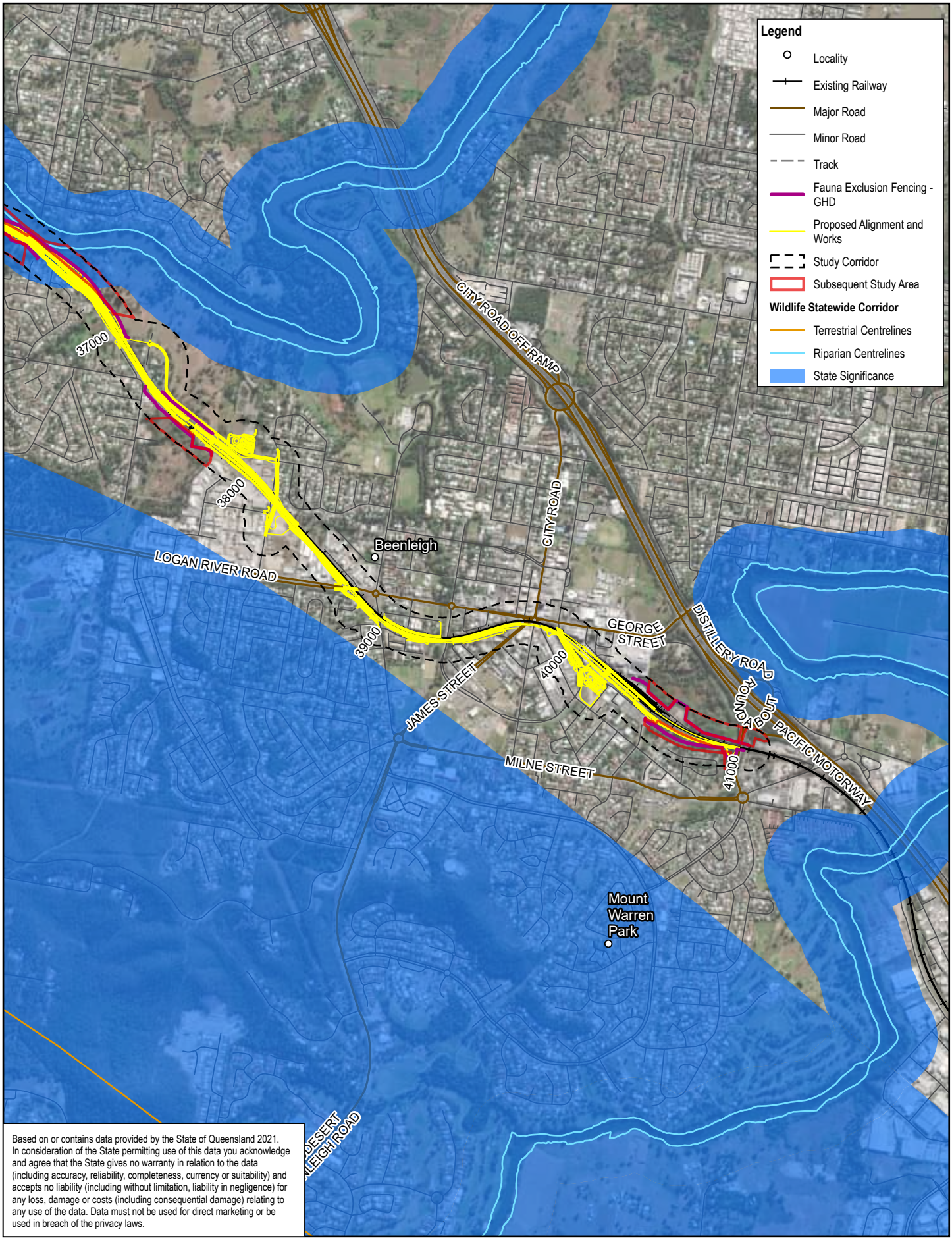

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(Kuraby to Beenleigh) Project

Distribution of biodiversity corridors and proposed fauna movement pathways within the subsequent study area

Project No. **12534697**
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Date **9/08/2021**

FIGURE 3-9d

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3.11 Biosecurity matters

3.11.1 Invasive flora

Desktop assessment

At a Commonwealth level, invasive flora species are assessed based on species specific levels of weed invasiveness, potential for spread and environmental, social and economic impacts.

Invasive flora species deemed to be high risk have been listed as Weeds of National Significance (WoNS). There are currently 32 WoNS listed by the Australian government.

The EPBC PMST indicated that 18 WoNS are predicted to occur within 1 km of the Project area (Table 3-12 and Appendix A). A search of DES's Wildlife Online database indicates that 32 introduced flora species that have been historically recorded within 1 km of the Project area, including two restricted invasive species under the *Biosecurity Act 2014*, one of which is also listed as a WoNS (Appendix A). These being:

- Lantana (*Lantana camara**) – WoNS and Category 3 restricted invasive matter
- Groundsel bush (*Baccharis halimifolia**) – Category 3 restricted invasive matter.

Table 3-12 Introduced flora identified within the desktop assessment

Scientific name	Common name	WoNS	Restricted matter
Alternanthera philoxeroides	Alligator weed	Y	Category 3
Anredera cordifolia	Madeira vine	Y	Category 3
Asparagus africanus	Climbing asparagus	Y	Category 3
Asparagus plumosus	Climbing asparagus-fern	Y	Category 3
Cabomba caroliniana	Cabomba	Y	Category 3
Chrysanthemoides monilifera	Bitou bush	Y	Category 5
Chrysanthemoides monilifera. rotundata	Bitou bush	Y	Category 5
Cryptostegia grandiflora	Rubber vine	Y	Category 3
Eichhornia crassipes	Water hyacinth	Y	Category 3
Genista monspessulana	Montpellier broom	Y	Category 3
Hymenachne amplexicaulis	Hymenachne	Y	Category 3
Lantana camara	Lantana	Y	Category 3
Parthenium hysterophorus	Parthenium weed	Y	Category 3
Sagittaria platyphylla	Delta arrowhead	Y	Category 3
Salix spp.	Willow spp.	Y	Category 3
Salvinia molesta	Salvinia	Y	Category 3
Senecio madagascariensis	Fireweed	Y	Category 3
Baccharis halimifolia	Groundsel bush	N	Category 3
Alternanthera philoxeroides	Alligator weed	Y	Category 3

Field assessment

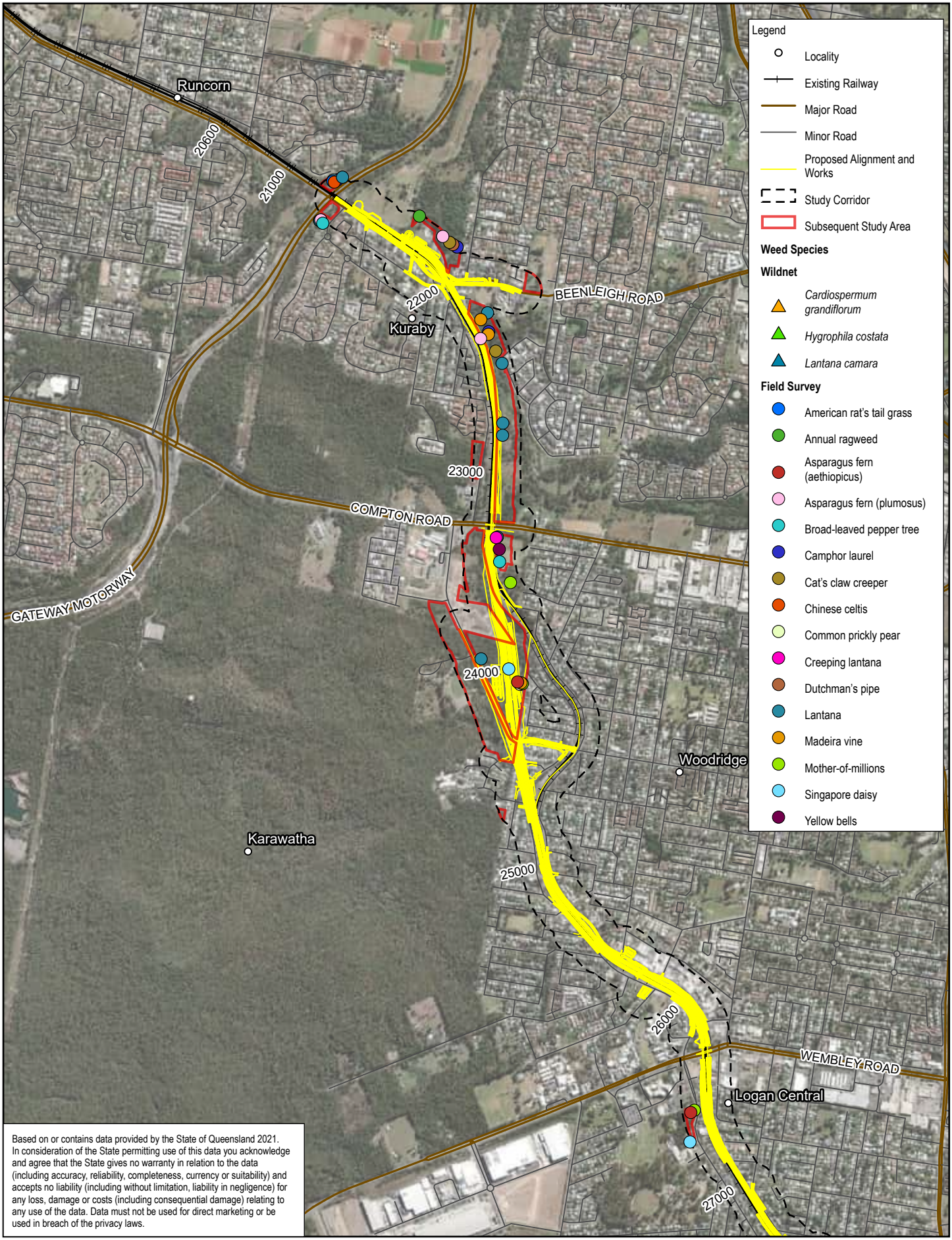
During the field survey, 17 restricted invasive species were recorded throughout the Subsequent study areas (Table 3-13). As the Study corridor is located in a highly urbanised area, a high number of restricted invasive species is expected. All vegetation communities recorded were impacted by introduced species and most were recorded to contain restricted invasive species. No prohibited invasive species were recorded from the Subsequent study areas.

Multiple species were considered to be common and widespread; these species were typically species that are dispersed by birds with the exception of *Sphagneticola trilobata** that primarily disperses vegetatively. Those species identified as occurring occasionally throughout the Subsequent study area were typically wind or water spread. Figure 3-10 provides a summary of the occurrence of introduced flora species within the Subsequent study areas.

Table 3-13 Introduced flora identified within the Subsequent study areas

Scientific name	Common name	WoNS	Restricted matter	Occurrence
Bryophyllum delagoense	Mother of millions	N	Category 3	Isolated
Anredera cordifolia	Madeira vine	Y	Category 3	Isolated
Asparagus aethiopicus	Basket	Y	Category 3	Common widespread
Asparagus plumosus	Climbing	Y	Category 3	Common widespread
Opuntia stricta	Spiny pest pear	Y	Category 3	Isolated
Ambrosia artemisiifolia	Annual ragweed	N	Category 3	Occasional
Dolichandra unguis-cacti	Cats claw creeper	Y	Category 3	Occasional
Sphagneticola trilobata	Singapore daisy	N	Category 3	Common widespread
Eichhornia crassipes	Water hyacinth	Y	Category 3	Isolated
Aristolochia elegans	Dutchman’s pipe	N	Category 3	Isolated
Celtis sinense	Chinese elm	N	Category 3	Common widespread
Lantana camara	Lantana	Y	Category 3	Common widespread
Lantana montevidensis	Creeping lantana	N	Category 3	Occasional
Cinnamomum camphora	Camphor laurel	N	Category 3	Common widespread
Schinus terebinthifolius	Broad leaf	N	Category 3	Common widespread
Baccharis halimifolia	Groundsel bush	N	Category 3	Isolated
Tecoma stans	Yellow bells	N	Category 3	Occasional
Bryophyllum delagoense	Mother of millions	N	Category 3	Isolated
Anredera cordifolia	Madeira vine	Y	Category 3	Isolated

Scientific name	Common name	WoNS	Restricted matter	Occurrence
Asparagus aethiopicus	Basket	Y	Category 3	Common widespread
Asparagus plumosus	Climbing	Y	Category 3	Common widespread



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(Kuraby to Beenleigh) Project

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Records of invasive flora species within the subsequent study area

FIGURE 3-10a

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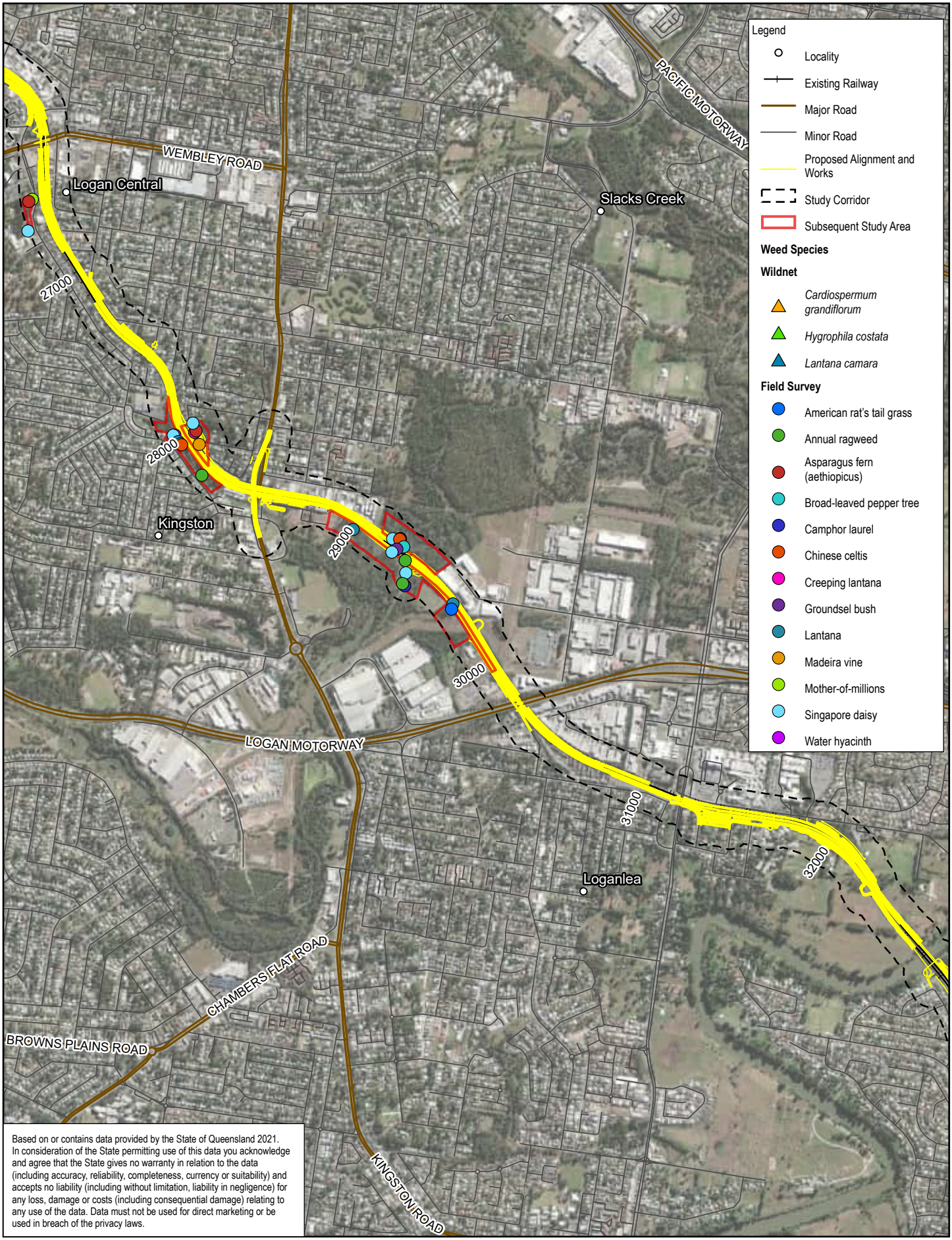
Print date: 09 Aug 2021 - 16:36

Data source: DoR: Road, Railway, Locality (2020); DES: Wildnet Records - Weeds (2021); GHD: Proposed Alignment, Study Area, Weed Species Field Records (2021); ESRI World Imagery: Maxar. Created by: xlee



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Project No. **12534697**
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Records of invasive flora species within the subsequent study area

FIGURE 3-10b

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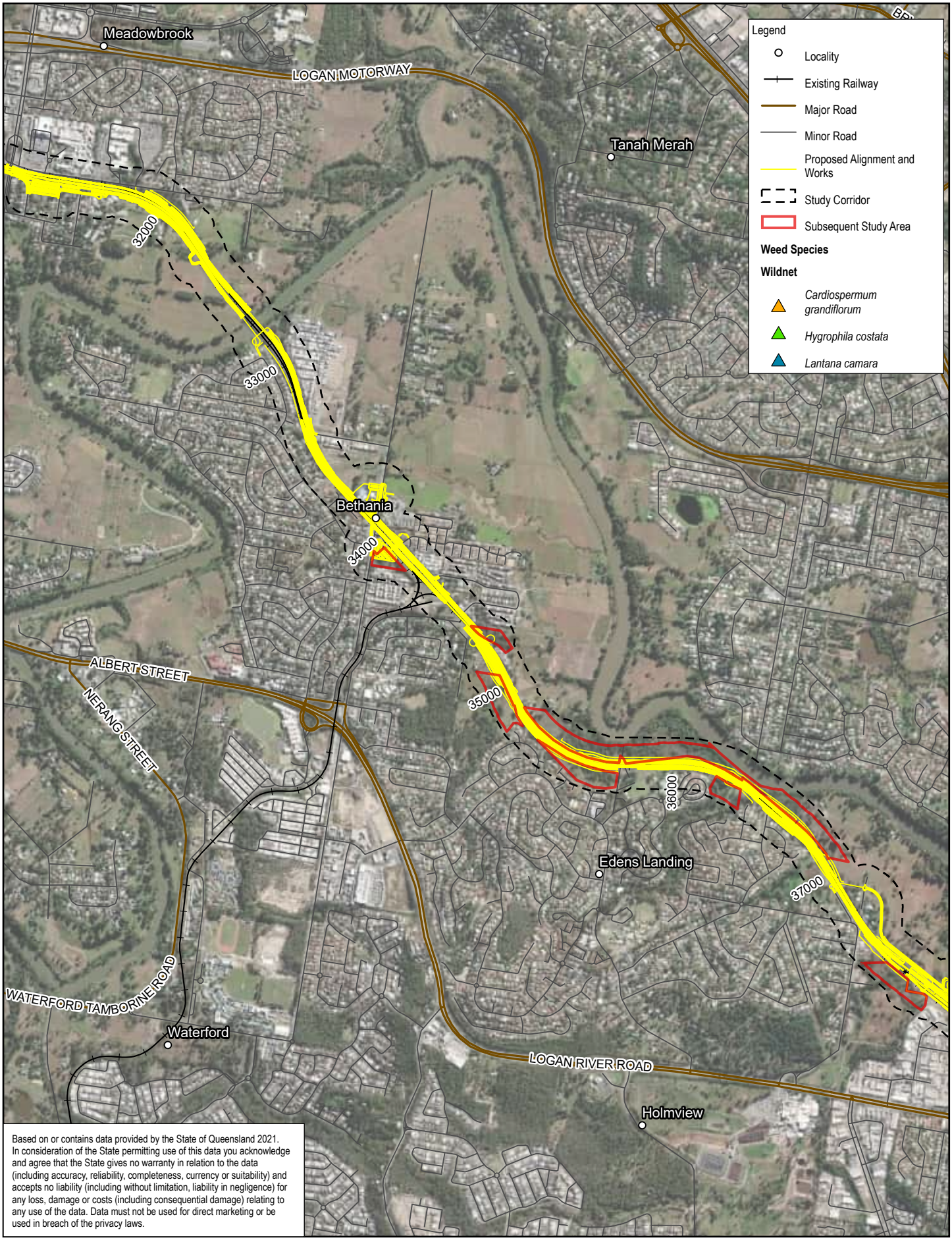

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Logan and Gold Coast Faster Rail
(Kuraby to Beenleigh) Project

Records of invasive flora species within the subsequent study area

Project No. **12534697**
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FIGURE 3-10c

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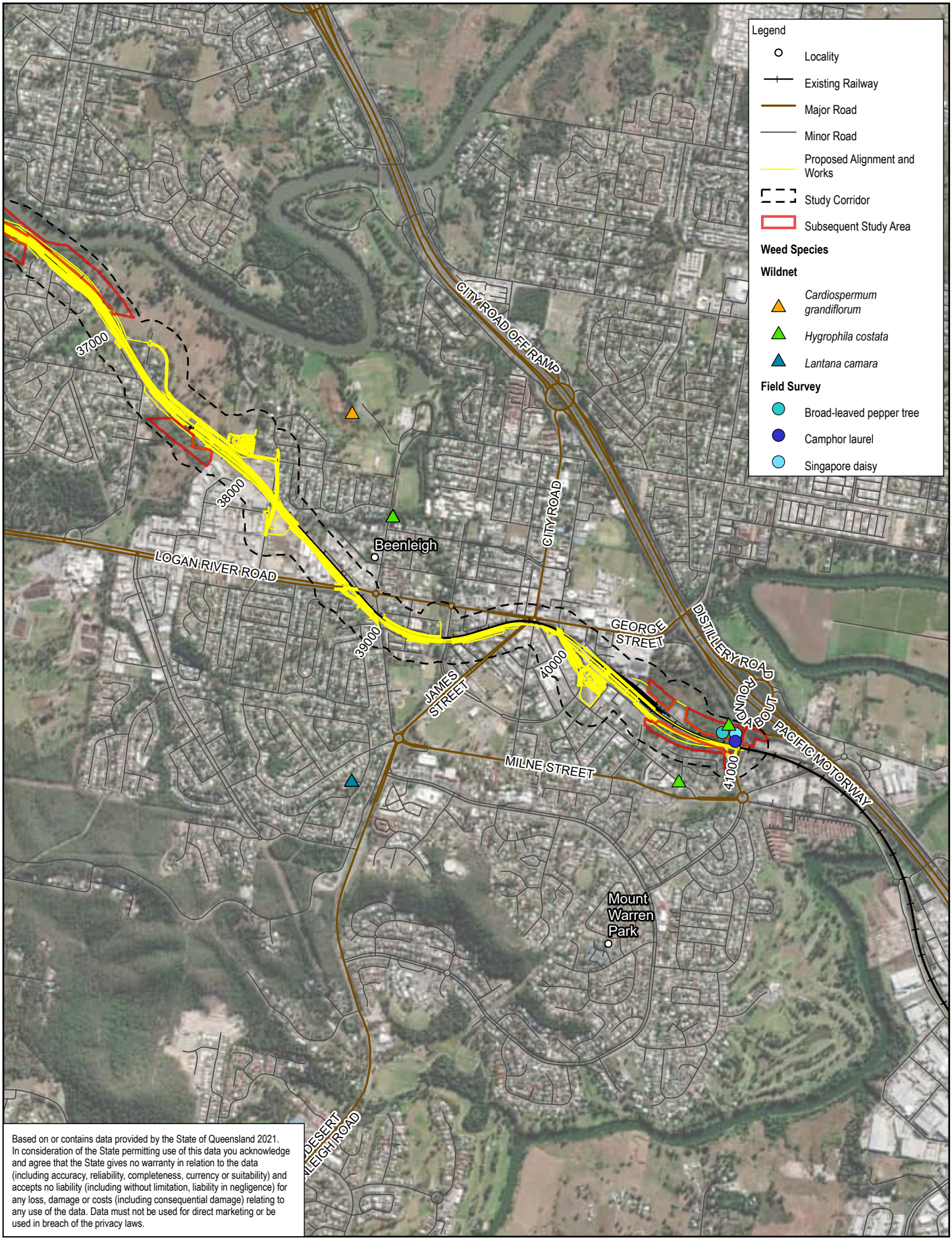

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Department of Transport and Main Roads
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Project No. **12534697**
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Date **9/08/2021**

Records of invasive flora species within the subsequent study area

FIGURE 3-10d

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4. Significant impact assessment

4.1 MNES

This section assesses the significance of the Project's impacts on Matters of National Environmental Significance (MNES) that have been confirmed present or considered likely to occur within the Study corridor. The significance of impact assessment has been undertaken in accordance with the Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DotE, 2013).

4.1.1 Koala

This assessment was undertaken using the toolkit in the EPBC referral guidelines for the vulnerable koala (DotE, 2014). Scoring utilised the framework recommended for coastal koala populations, as the Subsequent study areas fall within the coastal koala distribution mapped in the referral guidelines. Based on the assessment toolkit, koala habitats within the Study corridor represent habitat critical to the survival of the species, attaining a score of + 8. In accordance with the referral guidelines, any score equal to or greater than 5 constitutes habitat critical to the survival of the koala. Scoring for the Subsequent study areas is detailed below:

- Koala occurrence – Evidence of one or more koalas within 2 km of the edge of the impact area within the last 5 years (Score + 1)
- Vegetation composition – Has forest or woodland with 2 or more known koala food tree species (Score +2)
- Habitat connectivity – Area is part of a contiguous landscape ≥ 500 ha (Score +2)
- Key existing threats – Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, (Score +1)
- Recovery value – Habitat is likely to be important for achieving the interim recovery objectives for the relevant context (Score + 2)

  Overall score – + 8 Habitat critical to the survival of the koala.

Significance of impact due to loss of habitat critical to the survival of the koala

The Project will result in the direct loss of habitat for the koala. Based on flowchart detailed in Table 2 of the Referral guidelines for the vulnerable koala (DotE, 2014) any loss of more than 20 ha of habitat critical to the survival of the koala constitutes a significant impact under the EPBC Act. Accordingly, the Project has the potential to generate a significant impact on the koala due to the loss of habitat critical to the species. Detailed ecological surveys are advised to be conducted during the detailed design phase of the Project to determine the extent of impacts on koala habitat.

Significance of impact due to interference with the recovery of the species

As detailed in the Referral guidelines for the vulnerable koala (DotE, 2014), for all areas of koala habitat scoring ≥ 5 on the koala habitat assessment toolkit, an assessment of the potential interference with the recovery of the species must be undertaken considering the following factors:

- ***Will the Project increase fatalities due to dog attacks to a level that is likely to result in multiple, ongoing fatalities?***

The Project is not expected to result in any change in the abundance of wild dogs. While the Project will result in the creation of temporary construction routes and access tracks that may

facilitate local movement of domestic dogs, the Study corridor is to be fenced to restrict fauna access. Furthermore, a large number of road and path networks currently exist throughout the Study corridor.

- ***Will the Project increase koala fatalities due to vehicle strikes to a level that is likely to result in multiple ongoing fatalities?***

  The Project will result in an increase in vehicle movements during the construction period. This carries a risk of increased vehicle strike; however, this will be mitigated through standard controls such as speed limits and workforce awareness. During operation, staff vehicle movements will be significantly reduced and will be limited to maintenance vehicles. This risk will be mitigated using fauna awareness signage in predicted koala habitat and by enforcing strict speed limits for workers and maintenance staff. Fauna fencing will be implemented in strategic locations to restrict koalas for venturing into the Study corridor. Fauna connectivity will also be considered during the design phase to allow continued fauna movements and reduce the need and/or the likelihood of koalas attempted to enter the Study corridor.

- ***Will the Project facilitate the introduction or spread of pathogens such as Chlamydia or Phytophthora cinnamomi that are likely to significantly reduce the reproductive output or the carrying capacity of the habitat?***

  The use of standard biosecurity protocols in vehicle movements during construction and operation means that the potential for introduction of chlamydia is relatively limited. The Project is relatively benign during the operational phase and is unlikely to have any impact on levels of Chlamydia in the local koala population (DotE, 2014).

- ***Will the Project create a barrier to movement between or within habitat critical to the survival of the koala that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the koala?***

  Overall, the Project has been designed to generate as little ecological disturbance as possible. The Project predominantly extends along the already existing Gold Coast to Brisbane rail line and therefore is unlikely to contribute to additional habitat fragmentation along the majority of the alignment. However, koala habitat is intersected at one location in the north of the Study corridor. This area, Acacia Forest Park, contains suitable habitat for the species, with approximately 3.6 ha of habitat proposed to be intersected. This impact can be mitigated by the inclusion of fauna connectivity assessments during the detailed design phase to identify strategic areas for fauna crossings, fauna fencing and koala escape poles to facilitate increased regional habitat connectivity.

- ***Will the Project change hydrology which degrades habitat critical to the survival of the koala to the extent that the carrying capacity of the habitat is reduced in the long- term?***

  The hydrology of local areas within and downstream of the Project will not be dramatically altered from the natural state. Where watercourse are intersected, the Project has proposed to construct bridges or implement culverts to maintain downstream hydrology. Therefore, hydrology of adjacent koala habitat areas will not be substantially impacted in any way that the carrying capacity of the habitat is reduced.

Significant Impact Assessment

The Project is considered likely to result in a significant impact on the koala. The significance of the Project's impacts on koala has been assessed with consideration to the EPBC Referral Guidelines for the vulnerable koala (DotE, 2014b), specifically:

- An assessment of the potential to impact 'habitat critical to the survival of the koala.
- An assessment of the potential to interference with the recovery of the species.

The significance of impacts have been summarised using the framework detailed in the Significant Impact Guidelines 1.1 (DotE, 2013) to provide consistency of approach with other conservation significant species listed under the EPBC Act. Justification for the significance of impact assessment is provided in Table 4-1.

Table 4-1 Significant impact assessment – koala

Significant impacts criteria	Assessment
Lead to a long-term decrease in the size of an important population of the species	**Possible** The concept of 'important populations' has not been applied for koala, given a lack of sufficient information on the national population (DAWE, 2021) and the Project does not occur near the edge of the species' known range (for combined populations of Qld, NSW and the ACT). However, the Study corridor is located in with the Koala Coast (comprises the Redlands Coast, eastern Logan City and south eastern Brisbane City), which has experienced koala population declines of between 64 and 80 percent since the mid-90s, largely due to habitat loss, disease, vehicle-strike and dog attacks (Rhodes et al., 2015; Wallis et al., 2020). Therefore, any population known to persist within this region could be considered important for the species ongoing conservation.
Reduce the area of occupancy of an important population	**Unlikely** The Project has the potential to reduce the area of occupancy for the koala where track widening extends into woodland ecosystems. Areas of concern include around Acacia Forest Park and Nealdon Park. However, the Project extents throughout an already highly-fragmented region and has the ability to increase koala movement opportunities through strategic fauna movement locations and structures (e.g. underpasses and koala safe transport infrastructure). Such options are recommended to be considered during the detailed design phase and should be designed in accordance with the Queensland Koala Sensitive Design Guidelines (DES, 2019b). To reduce the extent of required clearing, previously cleared areas will also be utilised for site laydown and stock-pile areas and pre-existing road networks will be used where possible. Whilst the Project will inevitably reduce the area of occupancy for the local koala population, it is unlikely to impact a population currently listed as important.
Fragment an existing important population into two or more populations	**Unlikely** As previously mentioned, the Project is proposed to fragment a small area of eastern Acacia Forest Park and widen the existing rail corridor across Scrubby Creek and Nealdon Park. Unmitigated, this has the potential to fragment koala habitats, as the Project would represent a barrier for the species. However, one dedicated fauna crossing structure is proposed at Ch 23,700 m to enable terrestrial fauna to move between bushland on either side of the Project within Acacia Park.

Significant impacts criteria	Assessment
	The anticipated impact is unlikely to have a significant impact at a population level, as koala movement pathways can be facilitated by the implementation of fauna connectivity structures.
Adversely affect habitat critical to the survival of a species	**Likely** The Project is likely to have an adverse impact on habitat critical to the survival of the species. The Project is likely to result in a relatively small magnitude of impact on habitat critical to the survival of the koala. As stated in the Referral guidelines for the vulnerable koala (DotE 2014), any loss of more than 20 ha of habitat critical to the survival of the koala constitutes a significant impact under the EPBC Act. Detailed assessments are recommended to be conducted during the detailed design stage to determine and reduce the extent of impacts on koala habitat categorised as habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	**Unlikely** The Project is not expected to disrupt the breeding cycle of the population. The koala breeding season is generally between September and March, with females giving birth to a single young between October and May (DAWE, 2021). During the breeding season, males actively seek females and koala movements are more extensive. Without mitigation, the Project could lead to an increased risk of vehicle strike. Traffic volume, speed and visibility influence the koala collision rate. Prevett et al., (1995) found that road kills occurred where vehicle speeds exceeded 80 km/hr and where wider habitat corridors or linear forests occurred on both sides of the road. Potential impacts will be mitigated through the incorporation of approximately 10.8 km of fauna exclusion fencing which has been proposed in bushland areas. This fauna exclusion fencing is in addition to noise barriers and security fencing which may also act as a deterrent to koalas. Clearing within koala habitat areas will be planned to occur outside of peak breeding season (if possible) and standard best practice sequential clearing using suitable qualified koala spotters will be exercised.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely** Although clearing will cause minor additional fragmentation of habitat and reduce the area of available habitat, the extent of habitat disturbance is not likely to decrease the availability or quality of habitat available to the local population to the extent that the species will decline. Furthermore, increases in the level of noise at a local scale are anticipated to be short-term. Given the method of clearing, incorporating a mix of selective and sequential clearing under the direction of koala-specialist spotter-catchers, the lack of anticipated fragmentation and the low density at which koalas occur, the Project is considered unlikely to have a significant adverse impact on habitat critical to the survival of the species in the context of the existing

Significant impacts criteria	Assessment
	receiving environment. Rather, the enhancement of koala movement opportunities throughout the Study corridor has the potential to benefit the local population.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Unlikely** Invasive species including wild dogs already occur throughout the Study corridor. Predatory species are attracted to prey opportunities presented by cleared corridors or prey moving away from disturbance areas. New infrastructure has the potential to increase the risk of wild dog attack on koala by facilitating regional movement, however these threats are already present within the receiving environment. Feral animal control measures will be implemented throughout the duration of the Project and have been designed to mitigate such risks. There is also potential for the spread of invasive weeds during the construction and operation phase. This potential will be addressed within the Environmental Management Plan (Construction) (EMP(C)) and could provide the opportunity to enhance the quality of the environment utilised by the koala by providing mitigation measures to combat introduced species. The eradication of ground-covering weeds (particularly lantana) could enhance local koala movement. If mitigation measures are implemented correctly, the Project is unlikely to result in the introduction of invasive species that are harmful to the koala.
Introduce disease that may cause the species to decline	**Unlikely** The Project is not anticipated to introduce new diseases that may cause the species to decline. However, stress may lead to an increase in the expression of chlamydia in koalas. A recent study by Biolink (2019) in the neighbouring Redland City Council LGA reported disease to be the largest contributed to koala reductions in the past three years, with large numbers (n = 2,292) euthanised between 1997 and 2014. Mitigation measures have been proposed to reduce stress during Project construction and operation, including sequential clearing, site speed limits, the use of an experienced spotter-catcher during clearing and the requirement to allow koalas to self-disperse, which will reduce disturbance-related stress and risk of disease emergence and transmission. Additionally, the species is susceptible to *Phytophthora cinnamomi* due the soil fungus's ability to infect eucalypt species. Biosecurity requirements (e.g. weed and seed declarations) will be implemented throughout the Project, and thus, this risk has been assessed as low.
Interfere sustainably with the recovery of the species	**Unlikely** The Project is not situated at the edge of the species distribution and is anticipated to result in only a relatively small reduction in the species habitat. Whilst this could be to the detriment of the local population (due to habitat loss and indirect impacts to habitat quality), the impacts are unlikely to be significant and will not interfere with the

Significant impacts criteria	Assessment
	recovery of the species. The risk of koala mortality of injury will be managed by the mitigation measures contained within the EMP(C), and an experienced and suitably qualified fauna spotter-catcher will be employed during all clearing works.

4.1.2 Grey-headed flying-fox

The Project has the potential to result in a significant impact on grey-headed flying-fox. A significance of impact assessment of the Project on the grey-headed flying-fox (vulnerable under the EPBC Act only) is provided in Table 4-2.

Table 4-2 Significant impact assessment – grey headed flying-fox

Significant impacts criteria	Assessment
Lead to a long-term decrease in the size of an important population of the species	**Unlikely** The grey-headed flying-fox migrates and forages over a broad geographic range and is therefore considered one nationally intermixing population (DAWE, 2021). Therefore, no important populations for the species have been listed. The proposed works are likely to result in the localised loss of a small area of suitable foraging habitat for the species. Most of the Study corridor will retain suitable foraging habitat for the species. Given the small, localised nature of the loss of foraging habitat, the prevalence of suitable foraging habitat within the region, and the lack of impact on breeding/roosting habitat the Project is considered unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population	**Unlikely** The potential loss of a relatively small area of potential foraging habitat will not reduce the area of occupancy of the population. Suitable foraging habitat persists within most of the Study corridor and is prevalent within the surrounding region. Therefore, the species is considered likely to occur within the Study corridor after construction. As such, the Project is predicted to have negligible impact on the population's area of occupancy.
Fragment an existing important population into two or more populations	**Unlikely** The grey-headed flying fox forages widely and has a high capacity to overcome gaps in vegetation. Given the species' capacity for movement, the widening of a pre-existing linear corridor is unlikely to fragment the local population.
Adversely affect habitat critical to the survival of a species	**Possible** The loss of foraging habitat is considered to be the primary threat to the species, and as such, habitats that contain winter and spring-flowering food tree species are listed as habitat critical to the survival of the species (DoEE, 2017). This is due to limited foraging

Significant impacts criteria	Assessment
	species flowering in winter, with those that flower reliably occur on coastal lowlands in northern New South Wales and southern Queensland (Eby et al., 1999; Eby and Lunney, 2002). The Subsequent study areas contain several winter-flowering foraging species, particularly forest red gum (*E. tereticornis*), northern grey ironbark (*E. siderophloia*) and Moreton Bay ash (*Corymbia tessalaris*), which would represent critical habitat for the local population.
Disrupt the breeding cycle of an important population	**Unlikely** The Project will not directly impact on roosting or breeding habitat. The nearest flying-fox camp is located approximately 4 km to the south at Sunshine Acres. As such, the Project is not expected to have an impact on the breeding cycle of the grey-headed flying fox population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Possible** The Project will result in a small loss of foraging habitat for the species. Despite these habitats containing winter flowering feed species, similar suitable foraging habitat is widespread and relatively abundant within the southeast Queensland region. As a result, the loss of foraging habitat is considered unlikely to cause the species to decline given its restricted, localised extent. The Project is not predicted to have an impact on breeding habitat. However, the loss of foraging habitat is considered to be the primary threat to the species, with the clearing of winter forage being a particular concern (DoEE, 2017). Therefore, the removal of winter foraging habitat has the potential to represent an impact that removes habitat that could cause a decline in the local population.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Unlikely** The grey-headed flying fox is not considered to be at risk to introduced species. However, the black flying-fox (Pteropus alecto) is considered to be a threat to the grey-headed flying-fox, given its' potential for competition for habitat. The Project is not expected to have an impact on the black flying-fox's prevalence within the local or regional environment.
Introduce disease that may cause the species to decline	**Unlikely** There are no known diseases that pose a significant threat to the grey- headed flying-fox (DoEE, 2017) and the Project is expected to be relatively benign in its impact. It is unlikely to result in the increased incidence of any species that could be a vector for disease. As such, the Project is considered unlikely to introduce disease to the species.

Significant impacts criteria	Assessment
Interfere sustainably with the recovery of the species	**Unlikely** The Project will result in a small-scale localised loss of foraging habitat from a region in which similar foraging habitat is widespread and abundant. As such, the Project has is unlikely to interfere substantially with the recovery of the species.

4.1.3 Migratory species

The Project has the potential to result in a significant impact on migratory species, particularly the glossy ibis. A significance of impact assessment of the Project on the glossy ibis (migratory under the EPBC Act and special least concern under the NC Act) is provided in Table 4-3.

Table 4-3 Significant impact assessment - migratory species

Significant impact criteria	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	**Unlikely** The Project area does not contain important habitat for the glossy ibis as habitats observed during field surveys did not represent: a) habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or b) habitat that is of critical importance to the species at particular life-cycle stages, and/or c) habitat utilised by a migratory species which is at the limit of the species range, and/or d) habitat within an area where the species is declining. Therefore, the proposed works are unlikely to substantially modify, destroy or isolate an area of important habitat for a migratory species. Whilst the species was not recorded during field surveys of the subsequent study areas by GHD, the glossy ibis was recorded in the southern end of the Project area by WSP in 2019 (WSP, 2019b). This area supports sub-optimal habitat for the species, with heavy weed establishment and significant habitat degradation. Potential impacts to this area from the Project are anticipated to be minor and limited to indirect impacts only (e.g. increased noise and light, erosion). Indirect degradation of habitat due to erosion and/or sediment deposition will be addressed in an Erosion and Sediment Control Plan designed to maintain water quality and limit scouring and the movement of sediment. Furthermore, weed management is proposed throughout the Project lifecycle and could positively impact the specie's habitat by reducing the prevalence of invasive species. Considering the availability of high-quality habitat for species occurring with 2 km of the Project (e.g. along the Logan River, Scrubby Creek and the Albert River), the indirect impacts to a small area of sub-optimal habitat for the species is unlikely to significantly impact the glossy ibis.

Significant impact criteria	Assessment
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	**Unlikely** As previously mentioned, no important habitat for the glossy ibis is present within the Project area. Similarly, no areas of continuous 'prime habitat' occurs within the Project area or is known from the region (DAWE, 2021). Regardless, invasive species are known to occur within the area which could be harmful to the glossy ibis, namely, feral cats and exotic weeds. The potential for invasive species to be further distributed or becoming increasingly established will be addressed in the Project-specific Weed and Pest Management Plan. This will include an outline of routine management actions designed to reduce weed abundance and rules around waste management and domestic animals on site.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	**Unlikely** The Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the glossy ibis population. Although the specie is common with the southern Queensland region, the species is most common in Northern Australia and no core breeding habitat or 'prime' habitat is known from the region (DAWE, 2021). As the species undergoes post-breeding dispersal and was not recorded during subsequent surveys, it is likely the habitat within the Project area is utilised on a temporary basis only. Therefore, the potential for minor and indirect impacts are unlikely to be detrimental to the species.

4.1.4 Macadamia integrifolia

Six *Macadamia integrifolia* individuals were recorded across the Subsequent study area (outside the Project area), with most of them occurring within the parkland area as maintained amenity trees. *Macadamia integrifolia* are listed as vulnerable under the EPBC Act and therefore a significance of impact assessment has been completed in Table 4-4. Outcomes of this assessment have assessed the Project as unlikely to have a significant impact on *Macadamia integrifolia*.

Table 4-4 Significant impact assessment – Macadamia integrifolia

Significant impact criteria	Assessment
Lead to a long-term decrease in the size of an important population of a species	**Unlikely** The current Reference Design will not result in the direct removal or damage of the recorded six *Macadamia integrifolia's.* Indirect impacts will be managed through a series of management plans such as a species specific Impact Management Plan as required under the State NC Act, the Contractor's EMP(C) which will be required at the construction phase of the Project. These mitigation measures will result in no decrease to the size of the population.

Significant impact criteria	Assessment
Reduce the area of occupancy of an important population	**Unlikely** The current Reference Design will not result in the direct removal or damage of the recorded six *Macadamia integrifolias'.* Therefore, no reduction in the area of occupancy of the population will occur.
Fragment an existing important population into two or more populations	**Unlikely** The current Project area based on the Reference Design does not directly impacted upon the recorded individuals and therefore the Project is unlikely to fragment an existing population into two. Further, the Macadamia Species Recovery Plan 2019-2024 defines includes a list of all priority populations which does not include the population recorded within the Subsequent study areas (Powell and Gould, 2019).
Adversely affect habitat critical to the survival of a species	**Unlikely** The Macadamia Species Recovery Plan 2019-2024 defines habitat critical to the survival of *Macadamia integrifolia,* which can include non-remnant vegetation where all surrounding vegetation has been cleared but individuals of *Macadamia integrifolia* preserved (Powell and Gould, 2019). Noting that five of the six individuals recorded were planted and currently occur in a maintained environment the Project is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	**Unlikely** The Macadamia Species Recovery Plan 2019-2024 defines the priority populations which is based on their population size, proximity to other populations (based on pollen transfer distance) and occurrence within remnant vegetation. The recorded population was not identified in the priority population list (Powell and Gould, 2019). Further, no direct impact to the recorded individuals will occur as a result of the Project therefore no impacts are anticipated to occur to the breeding population of known individuals.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely** The Project will not directly impact any individuals, furthermore the recorded habitat is not considered to be habitat critical to the survival of the species given majority of the recorded individuals present were planted as amenity vegetation with parkland. The one individual recorded within native bushland will not be impacted by the Project and the Project will not significantly remove the habitat surrounding the individual.
Result in invasive species that are harmful to a vulnerable species becoming established in the	**Unlikely** Currently, the field investigation found that five of the six recorded individuals were being maintained with herbicide treatment to the ground layer directly surrounding the base. One juvenile individual was recorded as planted within the bushland area. This individual

Significant impact criteria	Assessment
vulnerable species' habitat	had a tree guard on and up until recently appears to have been maintained. The Project is not expected to directly impact upon these individuals and furthermore the Contractor will be required to implement strict weed management measures during construction through the implementation of an EMP(C). As a result, the Project is unlikely to results in the introduction of an invasive species.
Introduce disease that may cause the species to decline	**Unlikely** There are several documented pathogens that affect the Macadamia nut, including *Pseudocercospora macadamiae* (causing husk spot), other diseases affecting the fruit (husk rot, anthracnose and raceme blight), and those affecting the trunk and root system (such as trunk canker and root rot, caused by *Phytophthora cinnamomi*, gall canker and pink limb blight) (Drenth *et al*., 2009). The Contractor will be required to confirm that all soil or plant material (e.g. hydromulch with seed mix for stabilising and revegetating banks post-construction) is clean and declared free from plant pathogens in order to meet their General Biosecurity Obligation under the *Biosecurity Act 2015*. Therefore, it is considered unlikely that the proposed works would introduce disease that could cause a decline in the *Macadamia integrifolia*.
Interfere substantially with the recovery of the species	**Unlikely** Recovery actions include revegetating around populations, weed control and preventing wildfires. Due to the surrounding urban environment, maintained nature of five of the six recorded individuals within parkland habitat it is considered unlikely that the Project would interfere with the recovery of the species.

4.2 MSES

A significant impact assessment has been completed for the glossy black cockatoo as the species is currently listed on the Finalised Priority Assessment List by DAWE. The Priority Assessment List is the list of nominated species, ecological communities and key threatening processes that have been approved for assessment by the Minister responsible for the EPBC Act for a particular assessment year. The glossy black-cockatoo threatened species listing under the EPBC will be completed by the 30 April 2022 which is the statutory timeframe in which the assessment must be completed.

A significance of impact assessment has not been completed for other State listed species as the *Queensland Environmental Offsets Policy, Significant Residual Impact Guideline (December 2014)* is only relevant to prescribed activities under the *Environmental Offsets Regulation* that require approval in relation to MSES under either the NC Act, *Marine Parks Act 2004* or the *Environmental Protection Act 1994*. While the Project is likely to require a clearing permit under the NC Act an additional targeted protected plants survey will be required to be completed during the DD phase which will inform the significant residual impact assessment for MSES threatened flora species. It is noted that a SMP (high risk) is not an approval under the NC Act rather a management program. No approvals are anticipated to be required under either the *Marine Parks Act 2004* or the *Environmental Protection Act 1994*.

4.2.1 Glossy black-cockatoo

The Project has the potential to result in a significant impact on glossy black-cockatoo. A significance of impact assessment of the Project on the glossy black-cockatoo (vulnerable under the NC Act only) is provided in Table 4-5.

Table 4-5 Significant impact assessment - glossy black-cockatoo

Significant impacts criteria	Assessment
Lead to a long-term decrease in the size of a local population	**Unlikely** The Project has the potential to result in a decrease in foraging activity for the glossy black-cockatoo. Considering the species is known to fly up to 12 km to forage (Garnett et al., 1999), the removal of a small portion of foraging habitat is unlikely to lead to a long-term decrease in the local population. Nesting habitat was not identified within the Study corridor, largely due to low hollow densities and high competition for nest sites due to sulphur crested cockatoos and arboreal mammals. Regardless, pre-clearance surveys will be conducted prior to clearing to identify potential nesting sites. Sequential clearing and the use of a fauna spotter catcher during clearing will also be included to further reduce the potential impacts on the species. Although the Project has the potential to disturb the species, it is unlikely to lead to a long-term decrease in the size of the population.
Reduce the extent of occurrence of the species	**Unlikely** The loss of foraging habitat is unlikely to significantly reduce the extent of occurrence for the species as *Allocasuarina* dominated communities (a habitat requirement) were widespread at patches within the Subsequent study areas, particularly Acacia Forest Park and Kingston. Furthermore, nesting habitat is unlikely to be present within the Subsequent study areas as hollows were not identified during field surveys. However, as the abundance of nesting hollows is a limited resources for the species (Cameron, 2006; Hourigan, 2012), the loss of nesting habitat could reduce the occurrence of species should woodlands with high hollow density be identified during the detailed design phase.
Fragment an existing population.	**Unlikely** Despite the required clearing, the Project is unlikely to fragment an existing population as the majority of clearing will be concentrated in two locations, specifically, Acacia Forest Park and Kingston. These areas were assessed to contain only foraging habitat due to the low abundance of hollows. Considering the glossy black-cockatoo is known to travel up to 12 km to forage (Garnett et al., 1999), the removal of a small area of foraging habitat is unlikely to result in the fragmentation of an existing population. Where foraging evidence was identified in the field, orts were recorded under three trees within a relatively small (approx. 2.3 ha) patch of woodland (Figure 3-6). This area is likely to utilised by only a small number of

Significant impacts criteria	Assessment
	individuals and unlikely to support a population of sufficient size to become fragmented.
Result in genetically distinct populations forming as a result of habitat isolation.	**Unlikely** As detailed above, although the Project will result in a loss of foraging habitat for the species, the geographical extent of disturbances is not proposed to be of sufficient size to fragment an existing population. The proposed clearing impacts for the Project are limited to within a narrow rail corridor, dispersal pathways are not expected to be impacted. Furthermore, indirect impacts of the Project on species behaviour are not anticipated as the species is known to utilise urban areas as foraging habitat and the Project aligns with current land uses with the area.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	**Unlikely** There is the potential for the spread of invasive weeds during the construction and operation phase. This potential will be addressed within the Project EMP and could provide the opportunity to enhance the quality of the environment utilised by the glossy black-cockatoo by providing mitigation measures to combat introduced species. If mitigation measures are implemented correctly, the Project is unlikely to result in the introduction of invasive species that are harmful to the glossy black-cockatoo.
Introduce disease that may cause the population to decline.	**Unlikely** The Project is not anticipated to introduce new diseases that may cause the species to decline. Although the glossy-black-cockatoo is susceptible to Psittacine Beak and Feather Disease (PBFD), this disease has not been recorded within Queensland populations and the Project has no capacity to facilitate an increase in the transmission or incidence of this disease.
Interfere with the recovery of the species.	**Unlikely** As previously mentioned, the Project is anticipated to impact only a relatively small area of foraging habitat for the species. This is unlikely to interfere with the recovery of the species. Although the Project presents the potential injury or mortality to the species during clearing, targeted pre-clearance surveys will be employed to mitigate the potential impacts during vegetation clearing.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	**Possible** The glossy black-cockatoo shows a high degree of dietary specificity, often returning the same trees each year (Clout, 1989; Pepper et al., 2000). Considering known and potential foraging habitat for the species has the potential to be impacted by the Project, the proposed works are likely to disrupt foraging locations. However, these locations represent only a small percentage of the foraging habitat available within the Study corridor.

5. Conclusion

The surveys have shown the Subsequent study areas are located within a fragmented urban environment; nevertheless, areas of ecological value are present. The Study corridor intersects four major waterways being the Logan River, Slacks Creek, Spring Creek and Scrubby Creek. Aside from the waterways and associated riparian vegetation intersected by the Study corridor, the most significant environmental feature is Acacia Park associated with Karawatha Forest Park which adjoins Compton Road at Karawatha. Karawatha Forest Park is a Brisbane City Council managed reserve which includes 900 ha of remnant bushland. The Karawatha Forest Park contributes to the Flinders Karawatha Corridor which is a State Biodiversity Corridor extending from Karawatha Forest to Flinders Peak in Ipswich to Wyaralong Dam near Boonah.

During the field studies, verification of REs confirmed that tracts of remnant vegetation area present, although a number of vegetation communities did not align with the mapped description. This did not impact the identification of habitat for conservation significant species as the vegetation communities held similar values. One TEC was considered to have high potential of occurring within the Study corridor, namely Coastal Swamp Oak (*Casuarina glauca*) Forest of South-east Queensland and New South Wales. However, an assessment of locations likely to contain TEC found that vegetation communities present did not meet the key characteristics or condition threshold for this TEC at the time of the field survey.

Two conservation significant species considered to be 'in the wild' in accordance with the NC Act were confirmed present within the Subsequent study areas:

- *Macadamia integrifolia* (Macadamia), vulnerable under the EPBC Act and NC Act
- Glossy black-cockatoo (*Calyptorhynchus lathami*), vulnerable under the NC Act

One species listed as migratory under the EPBC Act, glossy ibis (*Plegadis falcinellus*) and special least concern under the NC Act was also confirmed present within the Study corridor during WSP (2019b) field survey.

Seven conservation significant species were considered likely to occur within the Subsequent study areas based on the type and condition of habitats observed and the proximity of historical records:

- *Marsdenia coronata* (slender milk vine), vulnerable under the NC Act
- *Melaleuca irbyana* (swamp tea-tree), endangered under the NC Act
- *Gossia gonoclada* (angle stemmed myrtle), vulnerable under the NC Act
- *Coleus habrophyllus,* endangered under the EPBC Act and NC Act
- Koala (*Phascolarctos cinereus*), vulnerable under the EPBC Act and NC Act
- Grey-headed flying-fox (*Pteropus poliocephalus*), vulnerable under the EPBC Act
- Wallum froglet (*Crinia tinnula*), vulnerable under the NC Act

Numerous restricted invasive species listed under *Biosecurity Act 2014* were recorded across the Subsequent study areas.

An assessment of impacts found that works are likely to result in a significant impact to the koala due to the vegetation proposed to be cleared scoring a habitat value greater than eight (habitat critical to survival) and the extent of clearing for high value habitat will be greater than 10 ha. Additionally, there is potential for a significant impact on the Grey headed flying fox and

the glossy black-cockatoo. The Grey headed flying fox may be impacted due to the clearing of potential winter flowering foraging resources, while the glossy black-cockatoo may be impacted through the clearing of tree species constituting the highly specialised diet for the species as well as ecological significant habitat. The significance of impacts should be confirmed at the detailed design stage when finer Project details and extents have been confirmed.

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Appendices

Appendix A – Desktop search results

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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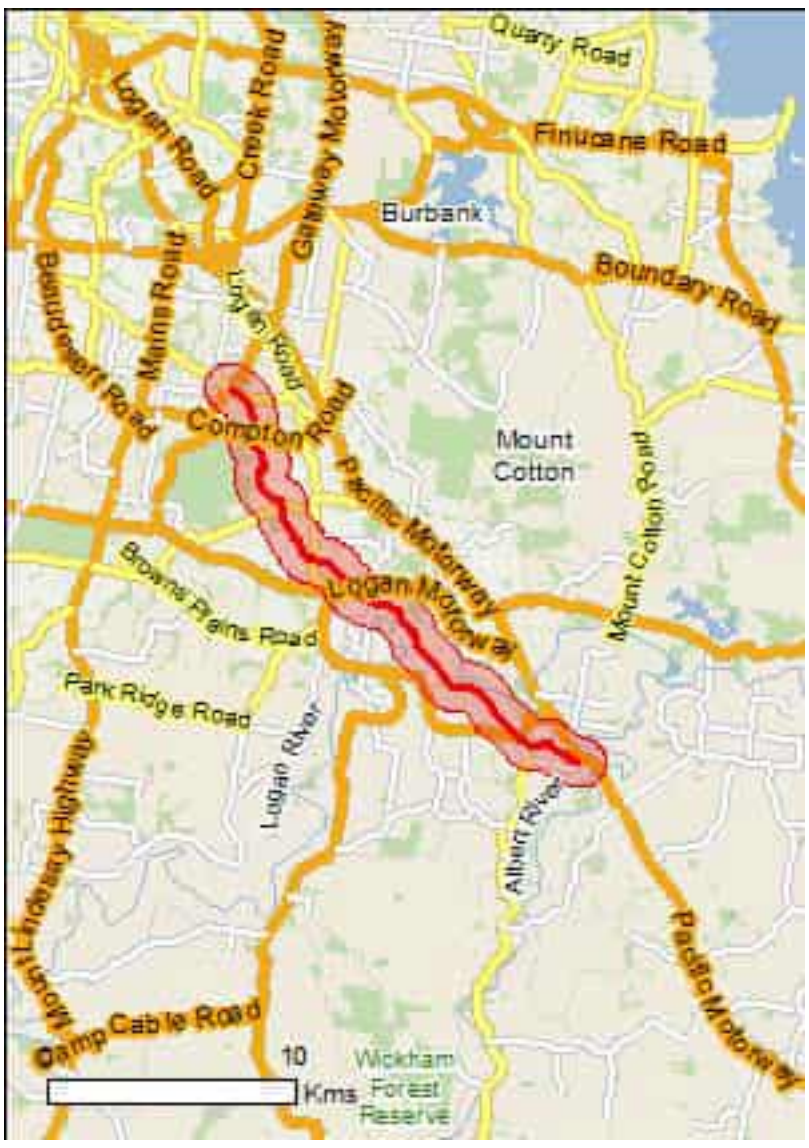
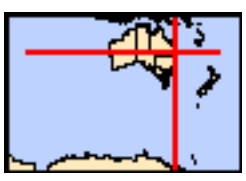


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	69
Listed Migratory Species:	38

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	43
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	39
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Moreton bay	Within 10km of Ramsar

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur within area
Thinornis cucullatus cucullatus Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Turnix melanogaster		
Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Maccullochella mariensis		
Mary River Cod [83806]	Endangered	Translocated population known to occur within area
Frogs		
Mixophyes fleayi		
Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area
Insects		
Argynnis hyperbius inconstans		
Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Xeromys myoides		
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Baloghia marmorata		
Marbled Balogia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat may occur within area
Bosistoa transversa		
Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Corchorus cunninghamii		
Native Jute [14659]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat may occur within area
Diploglottis campbellii Small-leaved Tamarind [21484]	Endangered	Species or species habitat may occur within area
Endiandra floydii Floyd's Walnut [52955]	Endangered	Species or species habitat may occur within area
Fontainea venosa [24040]	Vulnerable	Species or species habitat likely to occur within area
Gossia gonoclada Angle-stemmed Myrtle [78866]	Endangered	Species or species habitat known to occur within area
Lepidium peregrinum Wandering Pepper-cress [14035]	Endangered	Species or species habitat may occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area
Notelaea ipsviciensis Cooneana Olive [81858]	Critically Endangered	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Tylophora woollsii [20503]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur

Name	Status	Type of Presence
		within area
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat likely to occur within area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Breeding likely to occur

Name	Threatened	Type of Presence within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
[Lepidochelys olivacea](#) Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
[Orcaella brevirostris](#) Irrawaddy Dolphin [45]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Kuraby	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus africanus Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Karawatha Forest Park	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27.602489 153.087396,-27.605475 153.092246,-27.60635 153.092954,-27.609202 153.094778,-27.60962 153.09495,-27.612491 153.095486,-27.613328 153.09555,-27.618423 153.095271,-27.619374 153.095465,-27.620572 153.096044,-27.621674 153.096967,-27.622188 153.097331,-27.623842 153.098254,-27.624754 153.099027,-27.625268 153.099456,-27.625914 153.099842,-27.626541 153.099971,-27.627188 153.099885,-27.627815 153.099541,-27.628442 153.098941,-27.628918 153.098426,-27.629507 153.097997,-27.629868 153.097846,-27.630477 153.097696,-27.63099 153.097696,-27.632625 153.098104,-27.633309 153.098297,-27.63407 153.098662,-27.635476 153.099928,-27.636731 153.101129,-27.637396 153.102095,-27.638385 153.104412,-27.63886 153.105228,-27.639506 153.10585,-27.640172 153.106215,-27.640761 153.106344,-27.642491 153.106429,-27.644125 153.106494,-27.644753 153.10658,-27.645608 153.106923,-27.649562 153.109777,-27.650075 153.11027,-27.651006 153.111665,-27.651462 153.112202,-27.651975 153.112566,-27.652698 153.112845,-27.653895 153.113081,-27.654313 153.113253,-27.655834 153.114412,-27.656366 153.11497,-27.656765 153.115592,-27.657107 153.116429,-27.657848 153.120677,-27.658057 153.121364,-27.658343 153.122051,-27.659027 153.123317,-27.660566 153.125613,-27.661516 153.12675,-27.662106 153.127286,-27.663379 153.12823,-27.666363 153.130333,-27.667408 153.13117,-27.667921 153.131792,-27.668738 153.132865,-27.669346 153.134045,-27.669992 153.135869,-27.671095 153.138895,-27.671418 153.140118,-27.67157 153.141534,-27.671798 153.143358,-27.672045 153.144624,-27.67252 153.145869,-27.673223 153.146963,-27.673812 153.147628,-27.67518 153.148615,-27.675655 153.148916,-27.67672 153.149838,-27.679399 153.152413,-27.679988 153.152821,-27.680653 153.153164,-27.683598 153.154151,-27.684586 153.154774,-27.692883 153.163293,-27.694327 153.164238,-27.695704 153.164956,-27.696588 153.16574,-27.697328 153.16677,-27.697851 153.167939,-27.698155 153.169184,-27.698202 153.170417,-27.698031 153.171801,-27.697984 153.172853,-27.698098 153.173829,-27.698392 153.174891,-27.698744 153.175696,-27.701214 153.179108,-27.702012 153.179923,-27.702563 153.180417,-27.706248 153.18297,-27.70678 153.183507,-27.710636 153.188656,-27.715499 153.19357,-27.716259 153.194557,-27.716867 153.195931,-27.717038 153.196982,-27.716981 153.198119,-27.716715 153.199256,-27.716297 153.200716,-27.716202 153.201574,-27.716335 153.202346,-27.716582 153.203119,-27.717095 153.20402,-27.718501 153.205887,-27.720742 153.20902,-27.721122 153.209706,-27.72154 153.210693,-27.721996 153.212539,-27.722243 153.213998

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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WildNet Records
Species List

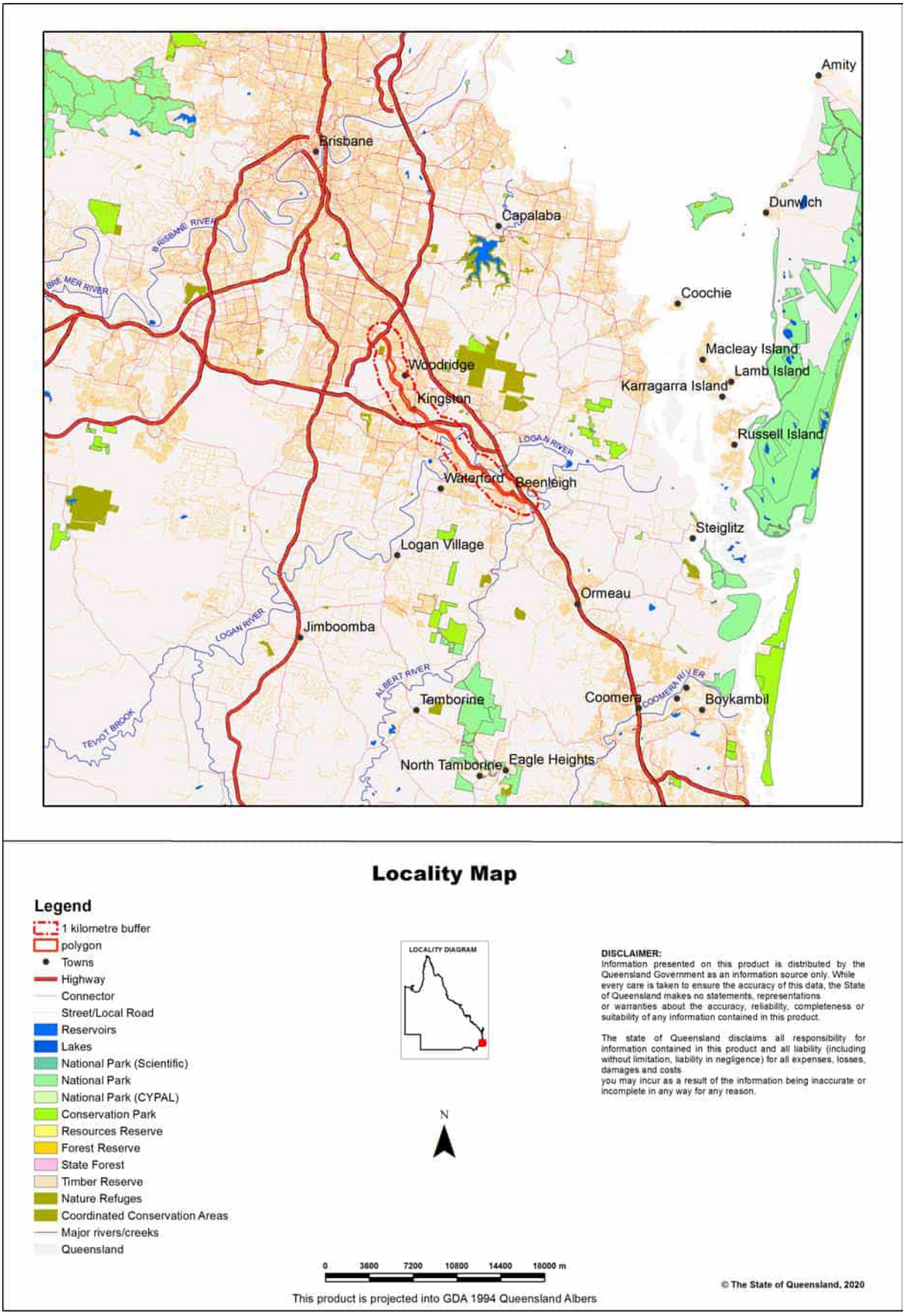
For the selected area of interest 421.19ha

Current as at 06/11/2020

12534697

Queensland Government

Map 1. Locality Map



Summary Information

The following table provides an overview of the area of interest .

Table 1. Area of interest details

Size (ha)	421.19
Local Government(s)	Brisbane City, Logan City
Bioregion(s)	Southeast Queensland
Subregion(s)	Burringbar - Conondale Ranges, Moreton Basin
Catchment(s)	Logan-Albert, Brisbane

Protected Area(s)
No estates or reserves are located within the area of interest.

World Heritage Area(s)
No World Heritage Areas are located within the area of interest.

Ramsar Area(s)
No Ramsar Areas are located within the area of interest.

Species List

Introduction
This Species List report is derived only from records from the WildNet database managed by the Department of Environment and Science. Other data sources may provide additional information on species occurrence.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species does not occur in the report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area.

Table 2 lists the animals recorded within the area of interest and its one kilometre buffer.

Table 3 lists the plants recorded within the area of interest and its one kilometre buffer.

Table 4 lists the fungi recorded within the area of interest and its one kilometre buffer.

Table 5 lists the protists recorded within the area of interest and its one kilometre buffer.

Table 2. Animals recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
26914	Actinopterygii	Ariidae	*Neoarius graeffei*	blue catfish	None	None	0	2	30/04/1983
27055	Actinopterygii	Poeciliidae	*Gambusia holbrooki*	mosquitofish	None	None	0	1	31/12/1978
716	Amphibia	Bufonidae	*Rhinella marina*	cane toad	None	None	0	27	04/03/2011
624	Amphibia	Hylidae	*Cyclorana alboguttata*	greenstripe frog	C	None	1	2	17/01/2003
626	Amphibia	Hylidae	*Litoria brevipalmata*	green thighed frog	C	None	0	25	04/03/2011
627	Amphibia	Hylidae	*Litoria caerulea*	common green treefrog	C	None	0	11	02/03/2010
617	Amphibia	Hylidae	*Litoria dentata*	bleating treefrog	C	None	0	9	30/11/2013
608	Amphibia	Hylidae	*Litoria fallax*	eastern sedgefrog	C	None	0	23	11/09/2015
611	Amphibia	Hylidae	*Litoria gracilenta*	graceful treefrog	C	None	0	23	04/03/2011
614	Amphibia	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog	C	None	1	6	14/02/1995

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
604	Amphibia	Hylidae	*Litoria nasuta*	striped rocketfrog	C	None	0	6	12/12/2015
600	Amphibia	Hylidae	*Litoria rubella*	ruddy treefrog	C	None	0	11	30/10/2007
601	Amphibia	Hylidae	*Litoria sp.*	None	C	None	1	1	13/08/1954
29174	Amphibia	Hylidae	*Litoria wilcoxii*	eastern stony creek frog	C	None	1	1	26/09/1954
706	Amphibia	Limnodynastidae	*Adelotus brevis*	tusked frog	V	None	1	1	26/09/1954
681	Amphibia	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog	C	None	0	13	11/09/2015
684	Amphibia	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog	C	None	1	3	17/11/1997
673	Amphibia	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk	C	None	4	15	04/03/2011
680	Amphibia	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog	C	None	0	27	04/03/2011
696	Amphibia	Myobatrachidae	*Crinia parinsignifera*	beeping froglet	C	None	0	18	11/10/2015
698	Amphibia	Myobatrachidae	*Crinia signifera*	clicking froglet	C	None	0	9	04/03/2011
686	Amphibia	Myobatrachidae	*Crinia tinnula*	wallum froglet	V	None	0	5	24/10/2001
672	Amphibia	Myobatrachidae	*Pseudophryne coriacea*	red backed broodfrog	C	None	0	1	12/01/1994
659	Amphibia	Myobatrachidae	*Pseudophryne major*	great brown broodfrog	C	None	1	8	09/06/2011
661	Amphibia	Myobatrachidae	*Pseudophryne raveni*	copper backed broodfrog	C	None	1	17	04/03/2011
633	Amphibia	Myobatrachidae	*Uperoleia fusca*	dusky gungan	C	None	0	2	17/11/1997
1419	Aves	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill	C	None	0	1	24/05/1992
1422	Aves	Acanthizidae	*Acanthiza nana*	yellow thornbill	C	None	0	2	13/05/2005
1423	Aves	Acanthizidae	*Acanthiza pusilla*	brown thornbill	C	None	0	7	15/02/2007
1425	Aves	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill	C	None	0	3	26/07/1995
1408	Aves	Acanthizidae	*Gerygone levigaster*	mangrove gerygone	C	None	0	8	31/10/1993
1396	Aves	Acanthizidae	*Gerygone olivacea*	white-throated gerygone	C	None	0	39	04/07/2007
1382	Aves	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren	C	None	0	5	14/04/2005
1371	Aves	Acanthizidae	*Smicrornis brevirostris*	weebill	C	None	0	14	16/09/2000
1742	Aves	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk	C	None	0	1	31/12/1994
1729	Aves	Accipitridae	*Accipiter fasciatus*	brown goshawk	C	None	0	4	27/09/2006
1730	Aves	Accipitridae	*Accipiter novaehollandiae*	grey goshawk	C	None	0	2	20/09/1998
1732	Aves	Accipitridae	*Aquila audax*	wedge-tailed eagle	C	None	0	5	27/05/2012
1721	Aves	Accipitridae	*Aviceda subcristata*	Pacific baza	C	None	0	3	05/05/1990
1725	Aves	Accipitridae	*Elanus axillaris*	black-shouldered kite	C	None	0	14	04/07/2007

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
1718	Aves	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle	C	None	0	2	15/09/2005
1720	Aves	Accipitridae	*Haliastur indus*	brahminy kite	C	None	0	6	06/04/2006
1707	Aves	Accipitridae	*Haliastur sphenurus*	whistling kite	C	None	0	3	14/04/2005
1710	Aves	Accipitridae	*Hieraaetus morphnoides*	little eagle	C	None	0	2	31/12/1994
1714	Aves	Accipitridae	*Milvus migrans*	black kite	C	None	0	1	12/05/1978
1702	Aves	Accipitridae	*Pandion cristatus*	eastern osprey	SL	None	0	2	04/07/2007
1305	Aves	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler	C	None	0	4	15/09/2005
1973	Aves	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar	C	None	0	2	26/07/1995
1993	Aves	Anatidae	*Anas gracilis*	grey teal	C	None	0	6	06/04/2006
1994	Aves	Anatidae	*Anas platyrhynchos*	northern mallard	None	None	0	11	15/02/2007
1998	Aves	Anatidae	*Anas superciliosa*	Pacific black duck	C	None	0	56	10/06/2012
1999	Aves	Anatidae	*Aythya australis*	hardhead	C	None	0	10	27/09/2006
2003	Aves	Anatidae	*Chenonetta jubata*	Australian wood duck	C	None	0	36	04/07/2007
2005	Aves	Anatidae	*Cygnus atratus*	black swan	C	None	0	5	10/06/2012
1977	Aves	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck	C	None	0	2	21/05/2006
1978	Aves	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck	C	None	1	1	26/05/2004
1982	Aves	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose	C	None	0	1	14/07/2004
1983	Aves	Anatidae	*Nettapus pulchellus*	green pygmy-goose	C	None	0	1	15/07/2004
1996	Aves	Anatidae	*Spatula rhynchotis*	Australasian shoveler	C	None	0	1	12/09/1967
1279	Aves	Anhingidae	*Anhinga novaehollandiae*	Australasian darter	C	None	0	15	04/07/2007
1963	Aves	Anseranatidae	*Anseranas semipalmata*	magpie goose	C	None	0	3	05/03/2005
1971	Aves	Apodidae	*Hirundapus caudacutus*	white-throated needletail	V	V	0	3	31/12/1994
1829	Aves	Ardeidae	*Ardea alba modesta*	eastern great egret	C	None	0	18	04/07/2007
1831	Aves	Ardeidae	*Ardea intermedia*	intermediate egret	C	None	0	7	04/07/2007
1832	Aves	Ardeidae	*Ardea pacifica*	white-necked heron	C	None	0	2	28/10/2001
1830	Aves	Ardeidae	*Bubulcus ibis*	cattle egret	C	None	0	35	04/07/2007
1839	Aves	Ardeidae	*Butorides striata*	striated heron	C	None	0	11	16/05/2005
1840	Aves	Ardeidae	*Egretta garzetta*	little egret	C	None	0	2	11/08/2005
1826	Aves	Ardeidae	*Egretta novaehollandiae*	white-faced heron	C	None	0	43	27/09/2006
1818	Aves	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron	C	None	0	1	10/12/2004
1660	Aves	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow	C	None	0	7	15/02/2007

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1654	Aves	Artamidae	*Cracticus nigrogularis*	pied butcherbird	C	None	0	85	24/09/2007
1656	Aves	Artamidae	*Cracticus torquatus*	grey butcherbird	C	None	0	35	15/09/2005
1644	Aves	Artamidae	*Gymnorhina tibicen*	Australian magpie	C	None	0	112	24/09/2007
1645	Aves	Artamidae	*Strepera graculina*	pied currawong	C	None	0	6	27/09/2006
1956	Aves	Burhinidae	*Burhinus grallarius*	bush stone-curlew	C	None	0	1	01/02/2005
1191	Aves	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo	C	None	0	46	04/07/2007
1194	Aves	Cacatuidae	*Cacatua sanguinea*	little corella	C	None	0	5	04/07/2007
21967	Aves	Cacatuidae	*Cacatua tenuirostris*	long-billed corella	C	None	0	4	04/07/2007
22494	Aves	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)	V	None	0	1	30/06/1993
1193	Aves	Cacatuidae	*Eolophus roseicapilla*	galah	C	None	0	69	24/09/2007
1173	Aves	Cacatuidae	*Nymphicus hollandicus*	cockatiel	C	None	0	1	31/12/1994
1635	Aves	Campephagidae	*Coracina maxima*	ground cuckoo-shrike	C	None	0	2	18/04/1974
1636	Aves	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike	C	None	0	102	24/09/2007
1637	Aves	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike	C	None	0	3	26/02/2000
1639	Aves	Campephagidae	*Coracina tenuirostris*	cicadabird	C	None	0	7	10/12/2004
1640	Aves	Campephagidae	*Lalage leucomela*	varied triller	C	None	0	1	10/12/2004
1642	Aves	Campephagidae	*Lalage tricolor*	white-winged triller	C	None	0	2	15/09/2005
1940	Aves	Charadriidae	*Elseyornis melanops*	black-fronted dotterel	C	None	0	1	21/07/2004
1942	Aves	Charadriidae	*Erythrogonys cinctus*	red-kneed dotterel	C	None	0	1	05/06/2005
27774	Aves	Charadriidae	*Vanellus miles*	masked lapwing	C	None	0	18	04/07/2007
1933	Aves	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)	C	None	0	54	29/12/2001
1820	Aves	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork	C	None	1	2	21/01/1999
1294	Aves	Cisticolidae	*Cisticola exilis*	golden-headed cisticola	C	None	0	16	04/07/2007
1617	Aves	Climacteridae	*Cormobates leucophaea*	white-throated treecreeper	C	None	0	1	15/02/2007
18293	Aves	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)	C	None	0	19	10/12/2004
1804	Aves	Columbidae	*Columba livia*	rock dove	None	None	0	6	04/07/2007
1809	Aves	Columbidae	*Geopelia cuneata*	diamond dove	C	None	0	1	30/09/2000

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1810	Aves	Columbidae	*Geopelia humeralis*	bar-shouldered dove	C	None	0	18	15/09/2005
1797	Aves	Columbidae	*Geopelia striata*	peaceful dove	C	None	0	38	27/09/2006
1793	Aves	Columbidae	*Ocyphaps lophotes*	crested pigeon	C	None	0	85	24/09/2007
1795	Aves	Columbidae	*Phaps chalcoptera*	common bronzewing	C	None	0	4	28/11/1999
1773	Aves	Columbidae	*Ptilinopus superbus*	superb fruit-dove	C	None	0	1	25/05/1984
1774	Aves	Columbidae	*Streptopelia chinensis*	spotted dove	None	None	0	87	04/07/2007
1779	Aves	Coraciidae	*Eurystomus orientalis*	dollarbird	C	None	0	10	15/09/2005
1609	Aves	Corvidae	*Corvus orru*	Torresian crow	C	None	0	136	24/09/2007
1754	Aves	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo	C	None	0	4	26/07/1995
1743	Aves	Cuculidae	*Cacomantis variolosus*	brush cuckoo	C	None	0	2	15/09/2005
1751	Aves	Cuculidae	*Centropus phasianinus*	pheasant coucal	C	None	0	7	15/09/2005
1745	Aves	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo	C	None	0	4	18/05/2005
1756	Aves	Cuculidae	*Chalcites minutillus barnardi*	Eastern little bronze-cuckoo	C	None	0	1	31/12/1994
1738	Aves	Cuculidae	*Eudynamys orientalis*	eastern koel	C	None	0	36	17/01/2012
1740	Aves	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo	C	None	0	2	15/02/2007
1601	Aves	Dicruridae	*Dicrurus bracteatus*	spangled drongo	C	None	0	21	15/02/2007
1366	Aves	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin	C	None	0	7	15/02/2007
1367	Aves	Estrildidae	*Lonchura punctulata*	nutmeg mannikin	None	None	0	1	05/05/1990
1359	Aves	Estrildidae	*Neochmia temporalis*	red-browed finch	C	None	0	18	15/02/2007
1342	Aves	Estrildidae	*Taeniopygia bichenovii*	double-barred finch	C	None	0	17	04/07/2007
1949	Aves	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar	C	None	0	1	26/07/1995
1716	Aves	Falconidae	*Falco berigora*	brown falcon	C	None	0	2	21/07/2004
1704	Aves	Falconidae	*Falco cenchroides*	nankeen kestrel	C	None	0	5	13/05/2005
1691	Aves	Falconidae	*Falco longipennis*	Australian hobby	C	None	0	3	06/04/2006
1926	Aves	Haematopodidae	*Haematopus longirostris*	Australian pied oystercatcher	C	None	0	1	14/01/2004
1767	Aves	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra	C	None	0	85	24/09/2007
1760	Aves	Halcyonidae	*Todiramphus macleayii*	forest kingfisher	C	None	0	14	27/09/2006
1761	Aves	Halcyonidae	*Todiramphus pyrrhopygius*	red-backed kingfisher	C	None	0	1	28/06/1979

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1762	Aves	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher	C	None	0	50	15/02/2007
1572	Aves	Hirundinidae	*Hirundo neoxena*	welcome swallow	C	None	0	70	24/09/2007
1585	Aves	Hirundinidae	*Petrochelidon ariel*	fairy martin	C	None	0	8	05/06/2005
1573	Aves	Hirundinidae	*Petrochelidon nigricans*	tree martin	C	None	0	7	04/07/2007
1928	Aves	Jacanidae	*Irediparra gallinacea*	comb-crested jacana	C	None	0	1	05/06/2005
1912	Aves	Laridae	*Chroicocephalus novaehollandiae*	silver gull	C	None	0	2	14/01/2004
1570	Aves	Maluridae	*Malurus cyaneus*	superb fairy-wren	C	None	0	66	04/07/2007
1556	Aves	Maluridae	*Malurus lamberti*	variegated fairy-wren	C	None	0	18	06/04/2006
1558	Aves	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren	C	None	0	33	04/07/2007
1289	Aves	Megaluridae	*Megalurus timoriensis*	tawny grassbird	C	None	0	6	04/07/2007
1694	Aves	Megapodiidae	*Alectura lathami*	Australian brush-turkey	C	None	0	1	31/12/1989
1555	Aves	Meliphagidae	*Acanthorhynchus tenuirostris*	eastern spinebill	C	None	0	5	13/05/2005
1542	Aves	Meliphagidae	*Anthochaera chrysoptera*	little wattlebird	C	None	0	5	11/08/2005
1523	Aves	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater	C	None	0	55	04/07/2007
1539	Aves	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater	C	None	0	40	04/07/2007
1497	Aves	Meliphagidae	*Lichmera indistincta*	brown honeyeater	C	None	0	46	24/09/2007
1500	Aves	Meliphagidae	*Manorina melanocephala*	noisy miner	C	None	0	80	28/09/2015
1504	Aves	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater	C	None	0	21	21/07/2004
1507	Aves	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater	C	None	0	33	27/09/2006
1483	Aves	Meliphagidae	*Melithreptus gularis*	black-chinned honeyeater	C	None	0	1	31/12/1980
1485	Aves	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater	C	None	0	1	15/09/2005
1489	Aves	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater	C	None	0	40	27/09/2006
1493	Aves	Meliphagidae	*Philemon citreogularis*	little friarbird	C	None	0	15	15/09/2005
1494	Aves	Meliphagidae	*Philemon corniculatus*	noisy friarbird	C	None	0	52	15/09/2005
1471	Aves	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater	C	None	0	5	05/06/2005
1467	Aves	Menuridae	*Menura alberti*	Albert's lyrebird	NT	None	0	1	14/04/2005
1764	Aves	Meropidae	*Merops ornatus*	rainbow bee-eater	C	None	0	36	04/07/2007
1589	Aves	Monarchidae	*Grallina cyanoleuca*	magpie-lark	C	None	0	96	04/07/2007
1595	Aves	Monarchidae	*Monarcha melanopsis*	black-faced monarch	SL	None	0	2	11/02/2006

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1586	Aves	Monarchidae	*Myiagra rubecula*	leaden flycatcher	C	None	0	9	10/12/2004
1455	Aves	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit	C	None	0	3	15/07/2004
1611	Aves	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird	C	None	0	20	27/09/2006
1453	Aves	Neosittidae	*Daphoenositta chrysoptera*	varied sittella	C	None	0	7	03/05/1999
1442	Aves	Oriolidae	*Oriolus sagittatus*	olive-backed oriole	C	None	0	13	27/09/2006
1444	Aves	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird	C	None	0	27	17/01/2012
1449	Aves	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush	C	None	0	37	27/09/2006
1436	Aves	Pachycephalidae	*Pachycephala pectoralis*	golden whistler	C	None	0	27	27/09/2006
1437	Aves	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler	C	None	0	45	04/07/2007
1389	Aves	Pardalotidae	*Pardalotus punctatus*	spotted pardalote	C	None	0	17	04/07/2007
1392	Aves	Pardalotidae	*Pardalotus striatus*	striated pardalote	C	None	0	61	04/07/2007
1360	Aves	Passeridae	*Passer domesticus*	house sparrow	None	None	0	49	21/01/2002
1284	Aves	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican	C	None	0	16	06/04/2006
1347	Aves	Petroicidae	*Eopsaltria australis*	eastern yellow robin	C	None	0	11	20/05/2005
1339	Aves	Petroicidae	*Microeca fascinans*	jacky winter	C	None	0	2	31/08/2002
1332	Aves	Petroicidae	*Petroica rosea*	rose robin	C	None	0	9	16/05/2005
1261	Aves	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant	C	None	0	11	04/07/2007
1275	Aves	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant	C	None	0	1	05/06/2005
1263	Aves	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant	C	None	0	12	04/07/2007
1264	Aves	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant	C	None	0	1	26/07/1992
1699	Aves	Phasianidae	*Coturnix pectoralis*	stubble quail	C	None	0	1	31/07/1991
1687	Aves	Phasianidae	*Coturnix ypsilophora*	brown quail	C	None	0	5	16/05/2005
1955	Aves	Podargidae	*Podargus strigoides*	tawny frogmouth	C	None	0	9	28/09/2015
1249	Aves	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe	C	None	0	14	04/07/2007
1318	Aves	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler	C	None	0	1	25/12/1923
1180	Aves	Psittacidae	*Alisterus scapularis*	Australian king-parrot	C	None	0	1	26/07/1995
1147	Aves	Psittacidae	*Parvipsitta pusilla*	little lorikeet	C	None	0	10	04/07/2007
1136	Aves	Psittacidae	*Platycercus adscitus*	pale-headed rosella	C	None	0	95	24/09/2007

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21976	Aves	Psittacidae	*Platycercus adscitus palliceps*	pale-headed rosella (southern form)	C	None	0	1	10/12/2004
1138	Aves	Psittacidae	*Platycercus elegans*	crimson rosella	C	None	0	1	18/06/1992
1139	Aves	Psittacidae	*Platycercus eximius*	eastern rosella	C	None	0	3	21/01/2002
1124	Aves	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet	C	None	0	31	04/07/2007
1125	Aves	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet	C	None	0	117	28/09/2015
1623	Aves	Psophodidae	*Psophodes olivaceus*	eastern whipbird	C	None	0	6	15/09/2005
1673	Aves	Rallidae	*Gallinula tenebrosa*	dusky moorhen	C	None	0	20	10/06/2012
1662	Aves	Rallidae	*Porphyrio melanotus*	purple swamphen	C	None	0	33	04/07/2007
1893	Aves	Recurvirostridae	*Himantopus himantopus*	black-winged stilt	C	None	0	2	05/06/2005
1575	Aves	Rhipiduridae	*Rhipidura albiscapa*	grey fantail	C	None	0	64	04/07/2007
1576	Aves	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail	C	None	0	93	24/09/2007
1578	Aves	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail	SL	None	0	6	14/04/2005
1874	Aves	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper	SL	None	0	1	14/01/2004
1857	Aves	Scolopacidae	*Gallinago hardwickii*	Latham's snipe	SL	None	3	3	24/11/1999
1845	Aves	Scolopacidae	*Numenius phaeopus*	whimbrel	SL	None	0	1	14/01/2004
1841	Aves	Scolopacidae	*Tringa stagnatilis*	marsh sandpiper	SL	None	0	1	14/01/2004
1102	Aves	Strigidae	*Ninox boobook*	southern boobook	C	None	0	9	10/12/2004
1314	Aves	Sturnidae	*Acridotheres tristis*	common myna	None	None	0	66	04/07/2007
1303	Aves	Sturnidae	*Sturnus vulgaris*	common starling	None	None	0	29	29/12/2001
1823	Aves	Threskiornithidae	*Platalea regia*	royal spoonbill	C	None	0	8	20/05/2005
1825	Aves	Threskiornithidae	*Plegadis falcinellus*	glossy ibis	SL	None	0	4	15/02/2007
1812	Aves	Threskiornithidae	*Threskiornis molucca*	Australian white ibis	C	None	0	38	24/09/2007
1800	Aves	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis	C	None	0	48	04/07/2007
1276	Aves	Timaliidae	*Zosterops lateralis*	silvereye	C	None	0	90	04/07/2007
19177	Insecta	Nymphalidae	*Danaus plexippus*	monarch	None	None	0	1	31/10/1992
19185	Insecta	Nymphalidae	*Euploea corinna*	common crow	None	None	0	4	26/05/1993
19122	Insecta	Nymphalidae	*Melanitis leda bankia*	evening brown	None	None	0	3	31/01/1993
19061	Insecta	Papilionidae	*Graphium choredon*	blue triangle	None	None	0	1	31/01/1993

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19068	Insecta	Papilionidae	*Papilio aegeus aegeus*	orchard swallowtail (Australian subspecies)	None	None	0	2	31/01/1993
19084	Insecta	Pieridae	*Eurema smilax*	small grass-yellow	None	None	0	1	31/10/1992
19118	Insecta	Pieridae	*Pieris rapae*	cabbage white	None	None	0	3	31/01/1993
930	Mammalia	Acrobatidae	*Acrobates pygmaeus*	feathertail glider	C	None	1	1	28/02/1969
22485	Mammalia	Dasyuridae	*Antechinus flavipes flavipes*	yellow-footed antechinus (south-east Queensland)	C	None	0	1	10/12/2004
808	Mammalia	Dasyuridae	*Phascogale tapoatafa tapoatafa*	brush-tailed phascogale	C	None	1	1	31/12/1949
793	Mammalia	Dasyuridae	*Sminthopsis murina*	common dunnart	C	None	0	3	26/07/1995
1006	Mammalia	Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat	C	None	0	2	28/02/1995
832	Mammalia	Leporidae	*Lepus europaeus*	European brown hare	None	None	0	3	26/07/1995
901	Mammalia	Macropodidae	*Macropus giganteus*	eastern grey kangaroo	C	None	0	2	26/07/1995
904	Mammalia	Macropodidae	*Notamacropus rufogriseus*	red-necked wallaby	C	None	0	4	04/05/2001
885	Mammalia	Macropodidae	*Wallabia bicolor*	swamp wallaby	C	None	0	2	26/07/1995
954	Mammalia	Miniopteridae	*Miniopterus australis*	little bent-wing bat	C	None	0	1	26/07/1995
998	Mammalia	Molossidae	*Mormopterus lumsdenae*	northern free-tailed bat	C	None	0	1	26/07/1995
989	Mammalia	Molossidae	*Tadarida australis*	white-striped freetail bat	C	None	0	5	26/07/1995
759	Mammalia	Muridae	*Melomys cervinipes*	fawn-footed melomys	C	None	0	1	26/07/1995
764	Mammalia	Muridae	*Mus musculus*	house mouse	None	None	0	4	26/07/1995
743	Mammalia	Muridae	*Rattus lutreolus*	swamp rat	C	None	0	1	31/12/1994
731	Mammalia	Muridae	*Rattus rattus*	black rat	None	None	0	3	10/12/2004
784	Mammalia	Peramelidae	*Isoodon macrourus*	northern brown bandicoot	C	None	0	2	10/12/2004
877	Mammalia	Petauridae	*Petaurus breviceps sensu lato*	sugar glider	C	None	0	3	27/05/2007
879	Mammalia	Petauridae	*Petaurus norfolcensis*	squirrel glider	C	None	0	4	27/05/2007
859	Mammalia	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum	C	None	0	5	27/05/2007
860	Mammalia	Phascolarctidae	*Phascolarctos cinereus*	koala	V	V	0	189	11/01/2018
2455	Mammalia	Pseudocheiridae	*Petauroides volans volans*	southern greater glider	V	V	2	5	27/05/2007
851	Mammalia	Pseudocheiridae	*Pseudocheirus peregrinus*	common ringtail possum	C	None	0	6	14/12/2015
984	Mammalia	Pteropodidae	*Pteropus alecto*	black flying-fox	C	None	0	14	13/01/2015
962	Mammalia	Pteropodidae	*Pteropus poliocephalus*	grey-headed flying-fox	C	V	0	2	13/01/2015

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
963	Mammalia	Pteropodidae	*Pteropus scapulatus*	little red flying-fox	C	None	0	4	03/02/2015
838	Mammalia	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna	SL	None	0	3	26/07/1995
972	Mammalia	Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat	C	None	0	3	24/08/2004
961	Mammalia	Vespertilionidae	*Chalinolobus nigrogriseus*	hoary wattled bat	C	None	0	1	31/12/1994
931	Mammalia	Vespertilionidae	*Scotorepens greyii*	little broad-nosed bat	C	None	0	2	17/01/2003
567	Reptilia	Agamidae	*Diporiphora australis*	tommy roundhead	C	None	0	2	31/12/1994
554	Reptilia	Agamidae	*Intellagama lesueurii*	eastern water dragon	C	None	0	7	15/09/2017
556	Reptilia	Agamidae	*Pogona barbata*	bearded dragon	C	None	0	6	10/12/2004
519	Reptilia	Boidae	*Morelia spilota*	carpet python	C	None	0	13	15/09/2017
522	Reptilia	Colubridae	*Boiga irregularis*	brown tree snake	C	None	1	2	31/12/1996
512	Reptilia	Colubridae	*Dendrelaphis punctulatus*	green tree snake	C	None	0	10	08/01/2016
429	Reptilia	Diplodactylidae	*Diplodactylus vittatus*	wood gecko	C	None	1	8	06/12/2008
391	Reptilia	Diplodactylidae	*Nebulifera robusta*	robust velvet gecko	C	None	0	2	31/12/1994
457	Reptilia	Elapidae	*Cryptophis nigrescens*	eastern small-eyed snake	C	None	0	2	26/07/1995
493	Reptilia	Elapidae	*Demansia psammophis*	yellow-faced whipsnake	C	None	0	6	15/09/2017
462	Reptilia	Elapidae	*Pseudechis porphyriacus*	red-bellied black snake	C	None	1	6	21/03/2005
420	Reptilia	Gekkonidae	*Gehyra dubia*	dubious dtella	C	None	0	1	31/12/1994
325	Reptilia	Pygopodidae	*Lialis burtonis*	Burton's legless lizard	C	None	0	2	24/10/2001
308	Reptilia	Scincidae	*Anomalopus verreauxii*	three-clawed worm-skink	C	None	1	5	24/09/2016
221	Reptilia	Scincidae	*Bellatorias frerei*	major skink	C	None	0	1	31/12/1980
312	Reptilia	Scincidae	*Calyptotis scutirostrum*	scute-snouted calyptotis	C	None	0	3	24/07/2015
297	Reptilia	Scincidae	*Carlia pectoralis sensu lato*	None	C	None	0	1	10/12/2004
277	Reptilia	Scincidae	*Carlia vivax*	tussock rainbow-skink	C	None	0	6	10/12/2004
188	Reptilia	Scincidae	*Concinnia martini*	dark bar-sided skink	C	None	0	2	26/07/1995
31898	Reptilia	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink	C	None	0	16	11/10/2015
240	Reptilia	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus	C	None	0	5	31/12/1994
243	Reptilia	Scincidae	*Ctenotus taeniolatus*	copper-tailed skink	C	None	0	4	31/12/1994
190	Reptilia	Scincidae	*Eulamprus quoyii*	eastern water skink	C	None	0	2	31/12/1994
192	Reptilia	Scincidae	*Eulamprus sp.*	None	C	None	0	1	03/11/1993
180	Reptilia	Scincidae	*Lampropholis amicula*	friendly sunskink	C	None	0	1	31/12/1994

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
184	Reptilia	Scincidae	*Lampropholis delicata*	dark-flecked garden sunskink	C	None	1	13	29/09/2015
150	Reptilia	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink	C	None	1	2	26/07/1995
138	Reptilia	Scincidae	*Morethia taeniopleura*	fire-tailed skink	C	None	0	1	03/11/1993
120	Reptilia	Scincidae	*Saiphos equalis*	three-toed skink	C	None	1	1	15/08/1954
104	Reptilia	Scincidae	*Tiliqua scincoides*	eastern blue-tongued lizard	C	None	0	3	25/01/2018
61	Reptilia	Varanidae	*Varanus varius*	lace monitor	C	None	0	1	10/12/2004

Table 3. Plants recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
22665	Equisetopsida	Acanthaceae	*Dyschoriste depressa*	None	None	None	1	2	31/07/2019
22381	Equisetopsida	Acanthaceae	*Hygrophila costata*	None	None	None	4	4	06/09/2005
16263	Equisetopsida	Acanthaceae	*Rostellularia obtusa*	None	C	None	1	1	29/04/2003
34960	Equisetopsida	Adoxaceae	*Viburnum odoratissimum var. awabuki*	sweet viburnum 'emerald lustre'	None	None	1	1	16/11/2015
15807	Equisetopsida	Aizoaceae	*Tetragonia tetragonoides*	New Zealand spinach	C	None	1	1	08/01/1995
18029	Equisetopsida	Amaranthaceae	*Alternanthera nana*	hairy joyweed	C	None	1	1	29/04/2003
14256	Equisetopsida	Anacardiaceae	*Rhodosphaera rhodanthema*	tulip satinwood	C	None	1	1	12/09/2003
11205	Equisetopsida	Apocynaceae	*Marsdenia coronata*	slender milkvine	V	None	1	1	02/08/2007
5944	Equisetopsida	Apocynaceae	*Parsonsia brisbanensis*	broad-leaved monkey vine	C	None	1	1	30/11/1998
15612	Equisetopsida	Asteraceae	*Baccharis halimifolia*	groundsel bush	None	None	0	4	31/08/2016
33049	Equisetopsida	Asteraceae	*Enydra woollsii*	None	C	None	1	1	08/01/1995
27691	Equisetopsida	Brassicaceae	*Lepidium didymum*	None	None	None	1	1	03/08/2008
30090	Equisetopsida	Bruchiaceae	*Trematodon longicollis*	None	C	None	1	1	31/08/1887
15918	Equisetopsida	Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell	C	None	1	1	30/11/1989
14214	Equisetopsida	Caryophyllaceae	*Spergularia rubra*	sand spurry	None	None	1	1	22/02/1933
17643	Equisetopsida	Cyperaceae	*Chorizandra cymbaria*	None	C	None	1	1	14/10/1994
17516	Equisetopsida	Cyperaceae	*Cyperus enervis*	None	C	None	1	1	29/04/2003
17527	Equisetopsida	Cyperaceae	*Cyperus laevis*	None	C	None	1	1	29/04/2003
14580	Equisetopsida	Cyperaceae	*Eleocharis atricha*	tuber spikerush	C	None	1	1	22/05/1977
14511	Equisetopsida	Cyperaceae	*Fimbristylis tristachya*	None	C	None	1	1	31/03/1994
13916	Equisetopsida	Cyperaceae	*Gahnia clarkei*	tall sawsedge	C	None	1	1	28/09/1994
29533	Equisetopsida	Cyperaceae	*Machaerina teretifolia*	None	C	None	1	1	14/10/1994
9452	Equisetopsida	Dilleniaceae	*Hibbertia stricta*	None	C	None	1	1	14/10/1994
24663	Equisetopsida	Ditrichaceae	*Eccremidium minutum*	None	C	None	2	2	04/03/2008

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
15663	Equisetopsida	Fabaceae	*Aeschynomene brevifolia*	None	C	None	1	1	31/12/1998
15448	Equisetopsida	Fabaceae	*Daviesia umbellulata*	None	C	None	1	1	18/03/1994
14630	Equisetopsida	Fabaceae	*Daviesia villifera*	prickly daviesia	C	None	1	1	01/12/2014
15352	Equisetopsida	Fabaceae	*Glycine clandestina var. clandestina*	None	C	None	1	1	28/09/1994
15355	Equisetopsida	Fabaceae	*Glycine microphylla*	None	C	None	1	1	31/12/2013
15356	Equisetopsida	Fabaceae	*Glycine tabacina*	glycine pea	C	None	1	1	31/01/1994
18269	Equisetopsida	Fabaceae	*Hovea heterophylla*	None	C	None	1	1	14/10/1994
22168	Equisetopsida	Fabaceae	*Hovea ramulosa*	None	C	None	1	1	31/07/2002
10846	Equisetopsida	Fabaceae	*Indigofera spicata*	creeping indigo	None	None	1	1	07/01/2010
15260	Equisetopsida	Fabaceae	*Jacksonia scoparia*	None	C	None	1	1	01/12/2014
15228	Equisetopsida	Fabaceae	*Lotononis bainesii*	lotononis	None	None	1	1	03/01/2010
15085	Equisetopsida	Fabaceae	*Pultenaea myrtoides*	None	C	None	1	1	18/03/1994
15087	Equisetopsida	Fabaceae	*Pultenaea petiolaris*	None	C	None	1	1	14/10/1994
15088	Equisetopsida	Fabaceae	*Pultenaea retusa*	None	C	None	1	1	18/03/1994
15092	Equisetopsida	Fabaceae	*Pultenaea villosa*	hairy bush pea	C	None	1	1	01/12/2014
14922	Equisetopsida	Fabaceae	*Zornia muriculata subsp. angustata*	None	C	None	1	1	31/03/1994
24678	Equisetopsida	Fabroniaceae	*Fabronia sp. (Brisbane F.M.Bailey 296)*	None	C	None	1	1	31/08/1887
24685	Equisetopsida	Fissidentaceae	*Fissidens sp. (Beenleigh C.J.Wild 589)*	None	C	None	2	2	10/03/2008
9247	Equisetopsida	Geraniaceae	*Geranium solanderi var. solanderi*	native geranium	C	None	1	1	03/08/2008
17062	Equisetopsida	Goodeniaceae	*Goodenia hederacea subsp. hederacea*	None	C	None	1	1	31/10/1998
17065	Equisetopsida	Goodeniaceae	*Goodenia rotundifolia*	None	C	None	1	1	31/10/1998
15947	Equisetopsida	Goodeniaceae	*Velleia spathulata*	wild pansies	C	None	1	1	10/07/1982
17053	Equisetopsida	Haloragaceae	*Gonocarpus chinensis subsp. verrucosus*	None	C	None	1	1	14/10/1994
17464	Equisetopsida	Hemerocallidaceae	*Dianella caerulea*	None	C	None	1	1	07/09/1985
17463	Equisetopsida	Hemerocallidaceae	*Dianella caerulea var. vannata*	None	C	None	1	1	29/09/1994
24769	Equisetopsida	Hypnaceae	*Hypnum sp. (Burpengary C.J.Wild AQ733958)*	None	C	None	1	1	25/03/2008
15286	Equisetopsida	Hypoxidaceae	*Hypoxis pratensis var. pratensis*	None	C	None	1	1	18/03/1994
16537	Equisetopsida	Iridaceae	*Patersonia sericea var. sericea*	None	C	None	1	1	14/10/1994
15974	Equisetopsida	Johnsoniaceae	*Tricoryne elatior*	yellow autumn lily	C	None	1	1	30/11/1999
14476	Equisetopsida	Juncaceae	*Juncus planifolius*	None	C	None	1	1	14/10/1994
34798	Equisetopsida	Juncaginaceae	*Cycnogeton multifructus*	None	C	None	2	2	22/05/1977

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
15977	Equisetopsida	Juncaginaceae	*Triglochin striata*	streaked arrowgrass	C	None	1	1	08/01/1995
41024	Equisetopsida	Lamiaceae	*Coleus habrophyllus*	None	E	E	1	1	25/06/2019
11835	Equisetopsida	Lamiaceae	*Leonotis nepetifolia*	None	None	None	1	1	03/08/2008
14415	Equisetopsida	Laxmanniaceae	*Lomandra confertifolia subsp. pallida*	None	C	None	1	1	14/10/1994
16773	Equisetopsida	Laxmanniaceae	*Lomandra laxa*	broad-leaved matrush	C	None	1	1	29/04/2003
41230	Equisetopsida	Linderniaceae	*Torenia crustacea*	None	C	None	1	1	08/01/2014
15197	Equisetopsida	Loganiaceae	*Mitrasacme paludosa*	None	C	None	1	1	14/10/1994
41045	Equisetopsida	Lycopodiaceae	*Palhinhaea cernua*	None	C	None	1	1	28/09/1994
16741	Equisetopsida	Lygodiaceae	*Lygodium microphyllum*	snake fern	C	None	1	1	14/10/1994
15990	Equisetopsida	Malvaceae	*Urena lobata*	urena weed	None	None	0	1	04/06/2018
15790	Equisetopsida	Mimosaceae	*Acacia concurrens*	None	C	None	1	1	30/08/1992
15745	Equisetopsida	Mimosaceae	*Acacia fimbriata*	Brisbane golden wattle	C	None	1	1	03/06/1992
14938	Equisetopsida	Mimosaceae	*Acacia hispidula*	None	C	None	1	1	14/10/1994
6372	Equisetopsida	Mimosaceae	*Acacia juncifolia*	None	C	None	1	1	01/08/2008
15709	Equisetopsida	Mimosaceae	*Acacia ulicifolia*	None	C	None	1	1	14/10/1994
22707	Equisetopsida	Moraceae	*Artocarpus heterophyllus*	None	None	None	1	1	19/09/2016
6443	Equisetopsida	Myrtaceae	*Corymbia trachyphloia subsp. trachyphloia*	None	C	None	1	1	01/08/2008
17242	Equisetopsida	Myrtaceae	*Eucalyptus baileyana*	Bailey's stringybark	C	None	1	1	01/08/2008
17240	Equisetopsida	Myrtaceae	*Eucalyptus pilularis*	blackbutt	C	None	1	1	30/04/1918
17192	Equisetopsida	Myrtaceae	*Eucalyptus resinifera*	red mahogany	C	None	2	2	01/08/2008
27386	Equisetopsida	Myrtaceae	*Gossia gonoclada*	None	E	E	2	2	30/06/1995
16684	Equisetopsida	Myrtaceae	*Melaleuca bracteata*	None	C	None	1	1	05/07/2013
13592	Equisetopsida	Myrtaceae	*Melaleuca decora*	None	C	None	1	1	03/12/1968
26403	Equisetopsida	Myrtaceae	*Melaleuca irbyana*	None	E	None	2	2	10/11/2016
14389	Equisetopsida	Myrtaceae	*Melaleuca sieberi*	None	C	None	1	1	14/10/1994
9275	Equisetopsida	Orchidaceae	*Dipodium variegatum*	None	C	None	1	1	19/12/1985
36226	Equisetopsida	Orchidaceae	*Pterostylis antennifera*	None	C	None	1	1	30/06/2000
14746	Equisetopsida	Orobanchaceae	*Centranthera cochinchinensis*	None	C	None	1	1	12/02/2002
12739	Equisetopsida	Oxalidaceae	*Oxalis exilis*	None	C	None	1	1	30/11/1989
36589	Equisetopsida	Pittosporaceae	*Pittosporum tinifolium*	None	C	None	1	1	06/12/2019
12727	Equisetopsida	Plantaginaceae	*Plantago debilis*	shade plantain	C	None	1	1	07/12/1976
15676	Equisetopsida	Poaceae	*Andropogon virginicus*	whiskey grass	None	None	1	1	21/06/2003
15648	Equisetopsida	Poaceae	*Aristida benthamii var. benthamii*	None	C	None	2	2	31/03/1994
9661	Equisetopsida	Poaceae	*Aristida ramosa*	purple wiregrass	C	None	1	1	29/04/2003
15658	Equisetopsida	Poaceae	*Aristida vagans*	None	C	None	1	1	31/03/1994
11127	Equisetopsida	Poaceae	*Aristida warburgii*	None	C	None	1	1	31/03/1994

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
10423	Equisetopsida	Poaceae	*Chrysopogon aciculatus*	Mackie's pest	None	None	1	1	28/02/2001
15426	Equisetopsida	Poaceae	*Digitaria parviflora*	None	C	None	1	1	29/04/2003
10882	Equisetopsida	Poaceae	*Eragrostis pilosa*	soft lovegrass	None	None	1	1	05/01/2010
15374	Equisetopsida	Poaceae	*Eragrostis spartinoides*	None	C	None	1	1	14/10/1994
15332	Equisetopsida	Poaceae	*Eriochloa pseudoacrotricha*	None	C	None	1	1	31/12/1912
9591	Equisetopsida	Poaceae	*Microlaena stipoides var. stipoides*	None	C	None	1	1	10/01/1932
15030	Equisetopsida	Poaceae	*Setaria pumila subsp. pumila*	None	None	None	1	1	31/12/1968
29242	Equisetopsida	Poaceae	*Urochloa foliosa*	None	C	None	1	1	29/04/2003
14715	Equisetopsida	Polygalaceae	*Comesperma hispidulum*	None	C	None	1	1	14/10/1994
13129	Equisetopsida	Polygalaceae	*Polygala virgata*	None	None	None	1	1	25/04/2004
31894	Equisetopsida	Pontederiaceae	*Heteranthera reniformis*	None	None	None	2	2	10/11/2009
16062	Equisetopsida	Portulacaceae	*Talinum paniculatum*	talinum	None	None	0	1	04/06/2018
17898	Equisetopsida	Proteaceae	*Banksia robur*	broad-leaved banksia	C	None	1	1	18/03/1994
31417	Equisetopsida	Proteaceae	*Xylomelum benthamii*	None	C	None	1	1	05/06/1997
13110	Equisetopsida	Ranunculaceae	*Ranunculus sessiliflorus var. sessiliflorus*	None	C	None	1	1	03/08/2008
17840	Equisetopsida	Rutaceae	*Boronia polygalifolia*	dwarf boronia	C	None	2	2	14/10/1994
17738	Equisetopsida	Sapindaceae	*Cardiospermum grandiflorum*	heart seed vine	None	None	1	1	08/01/1995
16205	Equisetopsida	Schizaeaceae	*Schizaea bifida*	forked comb fern	C	None	1	1	14/10/1994
16169	Equisetopsida	Solanaceae	*Solanum linnaeanum*	apple of Sodom	None	None	1	1	02/02/2001
16118	Equisetopsida	Solanaceae	*Solanum pseudocapsicum*	Madeira winter cherry	None	None	1	1	02/02/2001
13998	Equisetopsida	Thelypteridaceae	*Christella dentata*	creek fern	C	None	1	1	08/09/2009
27743	Equisetopsida	Verbenaceae	*Citharexylum spinosum*	None	None	None	1	1	22/05/1977
19905	Equisetopsida	Verbenaceae	*Lantana camara*	lantana	None	None	3	3	02/03/1966

Table 4. Fungi recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
25875	Agaricomycetes	Agaricaceae	*Agaricus*	None	None	None	1	1	16/12/1963
25531	Agaricomycetes	Amanitaceae	*Amanita*	None	None	None	2	2	21/02/2020
35743	Agaricomycetes	Boletaceae	*Boletellus deceptivus*	None	C	None	3	3	21/02/2020
34618	Agaricomycetes	Boletaceae	*Leccinellum*	None	None	None	1	1	21/02/2020

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
32302	Agaricomycetes	Boletaceae	*Strobilomyces strobilaceus*	None	C	None	1	1	21/02/2020
35391	Agaricomycetes	Boletaceae	*Xerocomus*	None	None	None	1	1	21/02/2020
26284	Agaricomycetes	Cortinariaceae	*Gymnopilus*	None	None	None	1	1	21/02/2020
26291	Agaricomycetes	Hydnangiaceae	*Laccaria*	None	None	None	1	1	21/02/2020
27418	Agaricomycetes	Hymenochaetaceae	*Coltricia cinnamomea*	None	C	None	2	2	21/02/2020
25934	Agaricomycetes	Hymenochaetaceae	*Phellinus*	None	None	None	1	1	21/02/2020
26224	Agaricomycetes	Inocybaceae	*Inocybe*	None	C	None	1	1	21/02/2020
25522	Agaricomycetes	Panaeolaceae	*Panaeolus antillarum*	None	C	None	1	1	16/12/1963
26267	Agaricomycetes	Phallaceae	*Aseroe rubra*	None	C	None	1	1	30/11/1997
33192	Agaricomycetes	Phallaceae	*Phallus multicolor*	None	C	None	1	1	04/12/1997
28759	Agaricomycetes	Polyporaceae	*Phaeotrametes decipiens*	None	C	None	2	2	21/02/2020
26307	Agaricomycetes	Psathyrellaceae	*Psathyrella*	None	None	None	1	1	16/12/1963
28689	Agaricomycetes	Strophariaceae	*Psilocybe cubensis*	None	C	None	2	2	16/12/1963
26317	Agaricomycetes	Strophariaceae	*Stropharia*	None	None	None	2	2	10/10/1973
22945	Arthoniomycetes	Arthoniaceae	*Arthonia*	None	None	None	4	4	22/12/1975
23706	Eurotiomycetes	Sphinctrinaceae	*Stenocybe*	None	None	None	1	1	22/12/1975
25414	Lecanoromycetes	Caliciaceae	*Amandinea punctata*	None	C	None	1	1	22/12/1975
22970	Lecanoromycetes	Caliciaceae	*Buellia curatellae*	None	C	None	1	1	22/12/1975
23677	Lecanoromycetes	Caliciaceae	*Buellia dialyta*	None	C	None	1	1	22/12/1975
25429	Lecanoromycetes	Caliciaceae	*Buellia dissa*	None	C	None	1	1	22/12/1975
34192	Lecanoromycetes	Graphidaceae	*Halegrapha mucronata*	None	C	None	2	2	22/12/1975
23215	Lecanoromycetes	Lecanoraceae	*Lecanora helva*	None	C	None	1	1	22/12/1975
23428	Lecanoromycetes	Pertusariaceae	*Pertusaria*	None	None	None	1	1	22/12/1975
23410	Lecanoromycetes	Pertusariaceae	*Pertusaria leioplacella*	None	C	None	1	1	22/12/1975

Table 5. Protists recorded within the area of interest and its one kilometre buffer

No species found within the area of interest and its one kilometre buffer.

Species table headings and codes

Taxon Id: Unique identifier of the taxon from the WildNet database.

NCA: Queensland conservation status of the taxon under the *Nature Conservation Act 1992* (Least Concern (C), Critically Endangered (CR), Endangered (E), Extinct (EX), Near Threatened (NT), Extinct in the Wild (PE), Special Least Concern (SL), and Vulnerable (V)).

EPBC: Australian conservation status of the taxon under the *Environment Protection and Biodiversity Conservation Act 1999* (Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Vulnerable (V), and Extinct in the Wild (XW)).

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of latest record of the taxon.

Links and Support

Other sites that deliver species information from the WildNet database include:

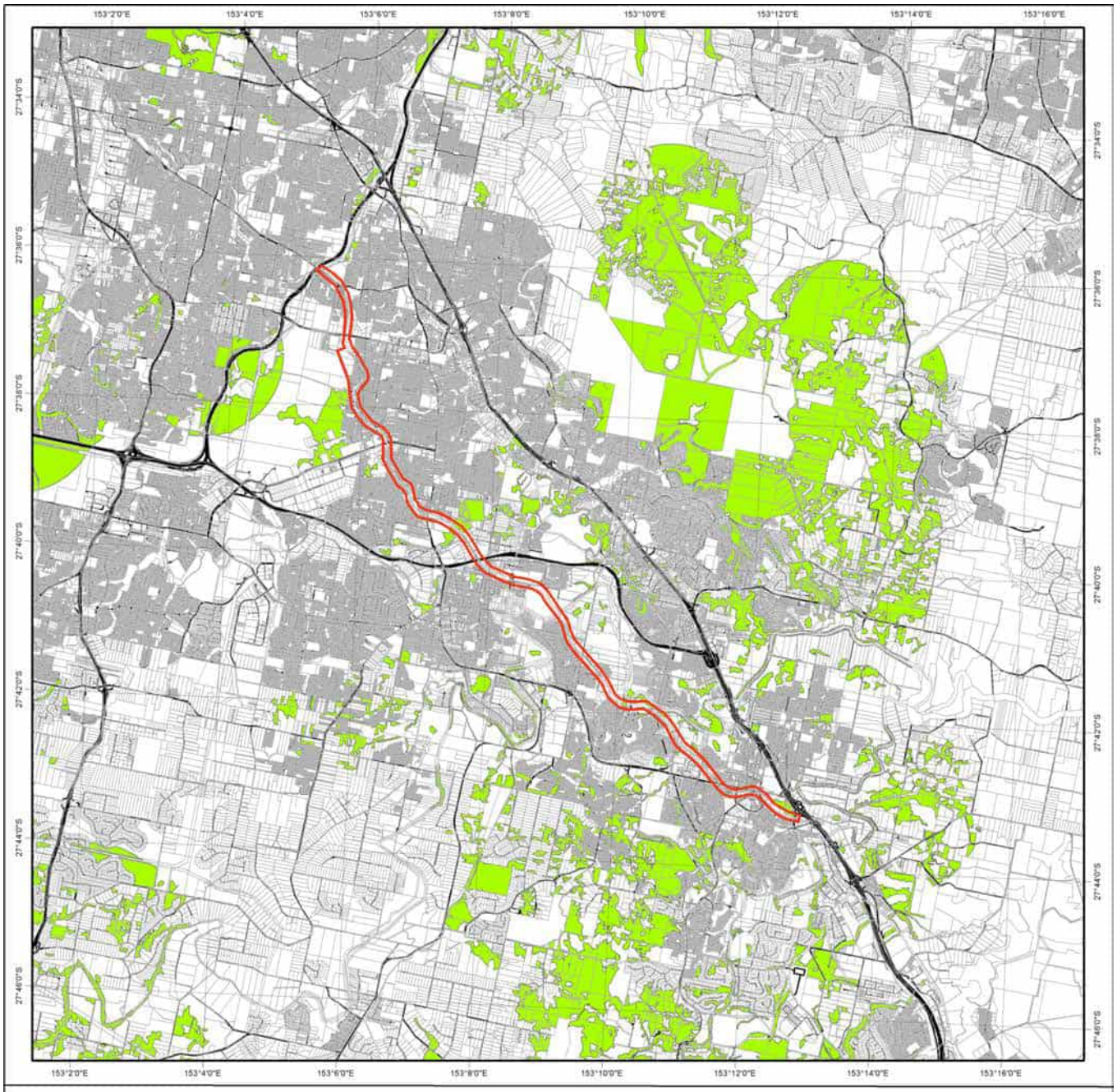
- Species profile search - access species information approved for publication including species names, statuses, notes, images, distribution maps and records
- Species lists - generate species lists for Queensland protected areas, forestry areas, local governments and areas defined using coordinates
- Biomaps - view biodiversity information, including species information approved for publication, and generate reports
- Qld wildlife data API - access species information approved for publication such as notes, images and records etc.
- Wetland*Maps* - view species records, survey locations etc. approved for publication
- Wetland*Summary* - view wildlife statistics, species lists for a range of area types, and access species profiles
- Generalised distribution and densities of Queensland wildlife - Queensland species distributions and densities generalised to a 10 km grid resolution
- Conservation status of Queensland wildlife - access current lists of priority species for Queensland including nomenclature and status information
- Queensland Confidential Species - the list of species flagged as confidential in the WildNet database.

Other useful sites for accessing biodiversity data include:

- Queensland Government Data
- Atlas of Living Australia
- OZCAM - Online Zoological Collections of Australian Museums
- AVH - Australia's Virtual Herbarium
- Protected Matters Search Tool

Please direct queries about this report to the WildNet Team.

Disclaimer



Protected Plants Flora Survey Trigger Map

Legend

- polygon
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets

N

0 975 1,950 2,925 3,900 4,875 m

This product is projected into:
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@ehp.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

Appendix B – Likelihood of occurrence – flora

Species	Conservation status		Habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Arthraxon hispidus Hairy-joint grass	V	V	Slender, tufted, creeping perennial grass. Found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps. The species has been recorded from scattered locations throughout Queensland and on the northern tablelands and north coast of NSW. The species flowers during summer-autumn (DES, 2021c).	**May occur** Suitable habitat for this species was recorded within the Project area however the nearest historical record is over 50 km away from the Project. Nearest historical record to the Project area is located approximately 50.6 km east.
Baloghia marmorata Marbled Baloghia	V	V	Small tree found in subtropical rainforest, notophyll vine forest and wet sclerophyll forest on soils derived from basalt between 150m and 550m above sea level (NSW OEH, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 15 km south.
Bosistoa transversa Three-leaved bosistoa	V	LC	A small tree found in wet sclerophyll forest, dry sclerophyll forest and rainforest up to 300 m above sea level. Occurs from the Richmond River, NSW, to Mt Larcom near Gladstone, QLD. Flowering between December and July. Fruiting has been recorded most of the year (DES, 2021).	**May occur** Suitable habitat for this species was recorded within the Project area, however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 19.8 km northeast.
Coleus habrophyllus	E	E	A woody, square-stemmed herb, recorded growing on chert or sandstone outcrops, in open woodlands often in shaded situations near vine forest. (DAWE, 2021).	**Likely to occur** Marginally suitable habitat for this species was recorded adjacent to the Project area. Nearest historical record to the Project is located approximately 0.5 km south.

Species	Conservation status		Habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Corchorus cunninghamii Native jute	E	E	A herbaceous shrub growing to 1.5 m tall. It generally occurs on upper hillslopes or hillcrests at elevations of 110-430 m above sea level. The species is found in the narrow ecotone between subtropical rainforest and open eucalypt forest. It occurs between Brisbane, south-east Queensland and Lismore, north- east New South Wales. Flowers occur throughout the year, but the peak flowering period is from November to May (DES, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 11.1 km northwest.
Cryptocarya foetida Stinking cryptocarya	V	V	A long-lived tree growing in littoral rainforest, usually on sandy soils, with mature trees also growing on basalt soils. Occurs in south-east QLD south to northern NSW. The main flowering and fruiting period occurs in February, however it has also been occurring from December to February with fruiting recorded in January, June, July and August (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 31 km northeast.
Cryptostylis hunteriana Leafless tongue-orchid	V	LC	It produces an upright flower-stem to 45 cm tall, bearing five to 10 flowers between November and February. The species is known from a range of communities, including swamp-heath and woodland. Can reproduced from both seed and vegetatively hence can form colonies which become permanent at a site (NSW OEH, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 63 km northwest.
Cupaniopsis shirleyana Wedge-leaf tuckeroo	V	V	This species is a long-lived tree to 6 m. occurs between 20 to 550 m ASL. Found in a variety of rainforest types including vine thicket and dry rainforest. Recorded on hillsides, mountain tops, lower slopes of valleys, stream beds and along riverbanks. Grows in a variety of soil types throughout south-east Queensland, from Brisbane, north to Bundaberg. The main flowering period is May to July with fruiting occurring July to December (DES, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 11 km northeast.

Species	Conservation status		Habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Diploglottis campbellii	E	E	In Queensland most of the wild populations occur in degraded lowland tropical rainforest, with deep brown loamy soils on level to slightly inclined alluvial terraces and levees at altitudes of 5-60 m asl (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 5 km south.
Endiandra floydii	E	E	An erect perennial grass to about 70 cm tall. Occurs in heavy soils (predominantly cracking clays or alluvium, often in gilgai) in woodland or open woodland usually dominated by Acacia (brigalow) and/or *Eucalyptus* species. Occurs from Toowoomba in the south to the Lynd Junction in the north (DES, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 13 km south.
Eucalyptus curtisii	NL	NT	Two forms with different habitat. The shorter mallee form is found on poorly drained lowland sites in shrubland dominated by *Banksia*, with an understorey of heath plants, usually the only eucalypt but sometimes *E. conglomerata* is present. The larger growth form occurs as scattered individuals on better drained soils in the more open areas of mixed eucalypt forests. E. curtisii occurs on sandy podsoils with impeded drainage, shallow stony soils, clay loams and stony clays with a surface layer of loose stones (DES, 2021c)	**May occur** Suitable habitat for this species was recorded within the Project area, however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 3 km west.
Dichanthium setosum Bluegrass	V	LC	An erect perennial grass found in heavy soils (predominantly cracking clays or alluvium, often in gilgai) in woodland or open woodland usually dominated by *Acacia* (brigalow) and/or *Eucalyptus* species. The climate is tropical to subtropical and markedly seasonal with the habitat drying out for part of the year (DES, 2021)	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 99.5 km west.

Species	Conservation status		Habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Fontainea venosa	V	V	A shrub or tree growing to 18 m tall. Occurs in notophyll vine forest and vine thicket with a mean annual rainfall of 1000-1100 mm on soils derived from and containing abundant andesitic rocks, often on rocky outcrops or along creeks. Occurs south west of Beenleigh near Brisbane, along the Koolkooroon Creek in the Boyne Valley, and near Littlemore, in Queensland. Flowering and fruiting have been recorded throughout the year (DES, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 23 km southeast.
Gossia gonoclada Angle-stemmed myrtle	E	E	A tree 3-12 m high with a dense canopy of glossy, deep green foliage. It is found in lowland riparian rainforest and notophyll vine forest, along permanent watercourses subject to tidal influence. It usually grows below the peak flood level, on steep slopes and at low elevations of 5-50 m. It occurs on moderately well drained clay soils, sandy loams and alluvial soils It is currently known from sites along the lower reaches of the Brisbane and Logan Rivers and their tributaries. It reproduces both vegetatively and from seed with flowering occurring in late spring (October to November) with fruits ripening from January to February (DES, 2021).	**Likely to occur** Marginally suitable habitat for this species was recorded adjacent to the Project area. Nearest historical record to the Project is located approximately 3 km north.
Lepidium peregrinum Wandering Pepper Cress	E	LC	A spreading soft-stemmed perennial herb. Occurs in an open riparian forest on the banks on sandy alluvium (NSW OEH, 2021).	**May occur** Suitable habitat for this species was recorded within the Project area, however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 41 km north
Macadamia integrifolia Macadamia nut	V	V	This species is a long-lived tree which grows in remnant rainforest, preferring partially open areas such as rainforest edges. Occurs on a wide range of landforms. Occurs in northern NSW and south-east QLD. In Queensland this species is known from Mt Bauple, north of Gympie, to the Gold Coast hinterland. Known to flower and fruit over summer months (DAWE, 2021).	**Confirmed present** Habitat recorded is only marginally suitable for this species however planted street trees have provided a seed source that was found to be recruiting. No historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 11.3 km northeast.

Species	Conservation status		Habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Macadamia tetraphylla Rough-shelled bush nut	V	V	Tree to shrub which grows in subtropical rainforest in coastal areas containing sandy soils that are almost always damp, but not flooded for lengthy periods. Occurs in south-east QLD and northern NSW. Flowering occurs from March to April with fruiting in November to December (DES, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 23.5 km southeast.
Marsdenia coronata Slender milkvine	-	V	Herbaceous vine that commonly grows in rainforest and margins or moist areas of open eucalypt forest. Also recorded from an area of natural grassland on the top of Mt Kandanga, Imbil State Forest. The vine has been found between 40 and 780 m asl, and usually occurs on sandstone or stony soils (DES, 2021).	**Likely to occur** Marginally suitable habitat for this species was recorded adjacent to the Project area. Nearest historical record to the Project is located approximately 1 km south.
Melaleuca irbyana	-	V	Small tree that grows in flat areas that are periodically waterlogged, in eucalypt forest, mixed forest and *Melaleuca* woodland with a sparse and grassy understorey. It grows on poorly draining, heavy clay soils (DES, 2021).	**Likely to occur** Suitable habitat for this species was recorded adjacent to the Project area. Nearest historical record to the Project is located approximately 50 m south. Recorded within the Project area as planted in an area that does not meet the habitat requirements for this species.
Persicaria elatior Tall knotweed	V	V	An erect herb growing to 90 cm tall, found in damp places, including coastal with swampy areas, along watercourses, streams and lakes, swamp forest and disturbed areas (DAWE, 2021).	**May occur** Suitable habitat for this species was recorded within the Project area, however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 3 km east.
Phaius australis Lesser swamp-orchid	E	E	Primarily occurs in coastal environments in QLD and NSW (ALA, 2021). Flowering predominantly occurs between August and December with foliage present year-round (DES, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Project area and no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 22 km east.

Species	Conservation status		Habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Rhodamnia rubescens Scrub turpentine	CE	CE	Shrub or small tree to 25 m high. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. Occurs in coastal regions and occasionally inland onto escarpments up to 600 m ASL in areas with rainfall of 1,000-1,600 mm. Occurs along the coast from Bundaberg, QLD south to Bateman's Bay, NSW (NSW OEH, 2021).	**May occur** Marginally suitable habitat for this species was recorded within the Scrubby Creek area, however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 7.8 km east. One individual was recorded as planted outside of its naturally occurring habitat and not considered 'in the wild'.
Rhodomyrtus psidioides Native guava	CE	CE	A shrub or small tree to 12 m. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. Occurs from Maryborough, QLD south to Broken Bay, NSW throughout coastal and sub-coastal areas at low elevations (NSW OEH, 2021)	**May occur** Marginally suitable habitat for this species was recorded within the Project area, however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 7.9 km west.
Samadera bidwillii Quassia	V	V	Long lived shrub. Occurs in lowland rainforest or on rainforest margins. Also found in open forests and woodlands. Associated with permanent and temporary watercourses. Occurs on a range of soil types. Known to occur in several localities between Scawfell Island, near Mackay, and Goomboorian, north of Gympie. This species flowers from November to March (DAWE, 2021).	**May occur** Suitable habitat for this species was recorded within the Project area, however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 77.6 km southeast.
Thesium australe Austral toadflax	V	V	Short-lived erect herb to 40 cm high which grows in grasslands or woodlands, often in damp sites. It occurs from Bundaberg QLD south to Victoria. Flowering occurs from October through to April (DES, 2021).	**May occur** Suitable habitat for this species was recorded within the Project area, however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 19.8 km northeast.

Species	Conservation status		Habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Vincetoxicum woollsii	E	E	Recorded from wet sclerophyll/rainforest margins Eucalypt dominated open forests and disturbed road verges. It grows on brown clay over metasediments at altitudes between 10–750 m above sea level (DEWHA, 2008)	**Unlikely to occur** Suitable habitat for this species was recorded within the Project area however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 59 km south. It is likely that the Project is outside of this species distribution.
Zieria furfuracea	NL	CE	This species is a shrub in the understorey of open forest of *Acacia disparrima*, *Allocasuarina littoralis*, *Lophostemon confertus* and Eucalyptus species. It has also been found in regrowth vegetation dominated by guinea grass (*Megathyrsus maximus var. pubiglumis*) and *A. disparrima* (DES, 2021c)	**Unlikely to occur** Suitable habitat for this species was recorded within the Project area however no historical records occur within 1 km of the Project. Nearest historical record to the Project area is located approximately 8.5 km north. It is likely that the Project is outside of this species distribution with the entire known population recorded within a 3 km radius in Carindale.

Key to table – CE = Critically endangered, E = Endangered, V = Vulnerable, NT = Near threatened, Mig = Migratory, Mar = Marine, NL = Not listed, LC = Least concern

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Appendix C – Likelihood of occurrence – fauna

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Birds				
Regent honeyeater *Anthochaera Phrygia*	CE	E	Eastern distribution from Bundaberg, Qld to Warrnambool, Victoria. Species has experienced extensive range reduction due to habitat clearing and fragmentation and is considered 'uncommon' in Queensland (DAWE, 2021). Species occurs in drier scrubs, woodlands, coastal banksia and paperbark forests, mangrove and swamp/savannah woodlands (Pizzey and Knight, 1999).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor.
Australasian bittern *Botaurus poiciloptilus*	E	E	Occurs within eastern and south-eastern Australia. Considered uncommon throughout much of its range (Pizzey and Knight, 1999). Occurs in and about water in reedbeds, sedges and rushes. Occasionally seen in tussock paddocks, saltmarshes and brackish wetlands.	**May occur** Despite suitable habitat for this species occurring with the Subsequent study areas, no historical records of the species are known from within the 1 km of the Study corridor and the species is considered rare within the region.
Red knot *Calidris canutus*	E	E	In Australasia, this species mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets and lagoons (Higgins and Davies 1996). Foraging habitat consists of intertidal mudflats or sand flats exposed by low tide. At high tide they may occur within lakes, sewage ponds and floodwaters (Higgins and Davies 1996), and have also been recorded on tidal sand flats, in shallow water, and in shallow pools on coral reef (Higgins and Davies 1996).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor.
Greater sand plover *Charadrius leschenaultii*	V	V	The greater plover is widespread around Australia's coastline, though most in Northern Australia and rare along the east coast (Pizzey and Knight, 1999). The species favours sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. (Pizzey and Knight, 1999). This species is a non-breeding visitor to Australia.	**May occur** Sub-optimal habitat for this species was encountered during field surveys and one historical record exist within 1 km of the Study corridor. Species may occur infrequently though is unlikely to be a resident.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Lesser sand plover *Charadriusmongolus*	E	E	In Australia, the lesser sand plover is found around the entire coast, but is most common in the Gulf of Carpentaria, and along the east coast of Queensland and northern NSW (NSW EOH, 2021). This species is almost exclusively coastal in its occurrence, and favours beaches of sheltered bays, saltmarshes, mangroves, harbours and estuaries with large intertidal sandflats or mudflats (Pizzey and Knight, 1999).	**May occur** Sub-optimal habitat for this species was encountered during field surveys and one historical record exist within 1 km of the Study corridor. Species may occur infrequently though is unlikely to be a resident.
Curlew sandpiper *Calidris ferruginea*	CE	LC	In Australia, curlew sandpiper occurs around the coasts and are also quite widespread inland, though in smaller numbers (DAWE 2021). This species mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor.
Gibson's albatross *Diomedea antipodensis gibsoni*	V	V	Gibon's albatross is widely distributed across the southern Pacific, however, is essential considered endemic to the Auckland Islands of New Zealand (DAWE, 2021). The species is regularly encountered off the NSW southern coast, however no historical records are known from Queensland (DAWE, 2021).	**Unlikely to occur** This species inhabits coastal and pelagic environments. Suitable habitat was not recorded during field surveys and the Study corridor is situated approximately 10 km from the coast.
Wandering albatross *Diomedea exulans*	V	V	The wandering albatross spend most of their life in flight, landing only to breed and feed. It is known to visits Australian waters from Fremantle, Western Australia to southern Queensland. Species has a coastal distribution and has been recorded multiple times of Queensland's North Stradbroke Island (DES, 2021c).	**Unlikely to occur** This species inhabits coastal and pelagic environments. Suitable habitat was not recorded during field surveys and the Study corridor is situated approximately 10 km from the coast.
Red goshawk *Erythrotriorchis radiatus*	V	E	It is very sparsely dispersed across coastal and sub-coastal Australia from western Kimberley Division to north-eastern NSW (DAWE, 2021). Prefers mosaic of vegetation types of wooded and forested areas. Areas close to permanent water also preferred. Variation in structures provides cover for ambush of prey with areas open enough for fast attack and flight. Nesting occurs in tall trees within 1 km of permanent water (DAWE 2021).	**Unlikely to occur** Despite sub-optimal habitats being observed adjacent to the Subsequent study areas, no historical records exist within the region. This species is not adapted to urban environments and requires large, contiguous habitats.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Grey falcon *Falco hypoleucos*	V	V	The grey falcon is widely distributed throughout the arid and semi-arid zones of Australia, where the mean annual rainfall is less than 500 mm (Pizzey and Knight, 1999; DAWE, 2021). This species is known to inhabit areas of lightly timbered lowland plains, typically on inland drainage systems, sand ridges and pastoral plains (Pizzey and Knight, 1999).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. This species inhabits arid Australia and is not known from the region.
Squatter pigeon(southern) *Geohaps scripta scripta*	V	V	The known distribution of squatter pigeon (southern) extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland (DAWE, 2021). Remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by *Eucalyptus, Corymbia, Acacia* or *Callitris* species, within 3 km of a suitable, permanent or seasonal waterbody. Well-draining, gravelly, sandy or loamy soils with patchy, tussock-grassy understories (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. The species current distribution does not encompass the Study corridor and the species is unlikely to occur.
Painted honeyeater *Grantiella picta*	V	V	The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The greatest concentrations of records come from inland slopes of the Great Dividing Range between the Grampians, Victoria and Roma, Queensland (DAWE, 2021). The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens (DAWE, 2021).	**May occur** Marginally suitable habitat was identified within the Subsequent study areas during field surveys and mistletoe was abundant in some woodland habitats. However, no historical records occur within 1 km of the Study corridor.
White-throated needletail *Hirundapus caudacutus*	V	V	Almost exclusively aerial, it does prefer wooded, inland areas and heathland. In coastal areas they have been seen flying over mudflats and beaches. Widespread throughout eastern and south-eastern Australia. It has been recorded along all coastal regions of QLD and NSW (Pizzey and Knight, 1999).	**May occur** Due to its aerial nature, the Subsequent study areas have the potential to provide temporary forging habitat for the species, however no historical records occur within 1 km of the Study corridor.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Swift parrot *Lathamus discolor*	CE	E	The swift parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia for the winter (DAWE, 2021). The swift parrot inhabits dry sclerophyll eucalypt forests and woodlands and occasionally occurs in wet sclerophyll forests (DAWE, 2021).	**May occur** Suitable habitat for this species was not observed within the Subsequent study areas though no historical records for this species exist within 1 km of the Study corridor. Species does not breed or nest in Qld.
Bar-tailed godwit *Limosa lapponica baueri*	V	V	Occurs around much of Australia, only absent from southern WA, SA and inland deserts. Preferred habitats include tidal mudflats, estuaries, sandspits, shallow river margins and shallow wetlands in coastal, brackish and saline environments (Pizzey and Knight, 1999).	**May occur** Suitable habitat for this species was observed adjacent to the Study corridor. Despite no historical records occurring within the Study corridor, the species is known from the region and has a low potential to occur
Northern Siberian bar-tailed godwit *Limosa lapponica menzbieri*	CE	E	Species has a coastal distribution around much of Australia, including the entirety of the Queensland coastline. Commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species does not nest in Qld.
Southern giant-petrel *Macronectes giganteus*	E	E	The southern giant-petrel contains a circumpolar distribution and is widespread throughout Australia's southern oceanic waters. This pelagic species is mostly marine foraging habitat consists of ocean oceans. Breeding occurs within ice-free coastal areas, rocky bluffs, open flats, edges of plateaux or offshore rocks.	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species is almost entirely marine.
Northern giant petrel *Macronectes halli*	V	V	The Northern Giant-petrel has a circumpolar pelagic distribution, predominantly in sub-Antarctic to Antarctic waters north of the Antarctic convergence, usually between 40 - 64°S in open oceans (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species is almost entirely marine.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Curlew sandpiper *Numenius madagascariensis*	CE	V	This species has a coastal distribution continuous from Barrow Island and Dampier Archipelago, Western Australia, through the Kimberley and along the Northern Territory, Queensland, and NSW coasts and the islands of Torres Strait (DAWE, 2021). During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (DAWE, 2021).	**Unlikely to occur** No suitable habitat or potentially suitable habitat for the species is known to occur within 1 km of the Study corridor.
Fairy prion (southern) *Pachyptila turtur subantarctica*	V	NL	The species has a circumpolar distribution with breeding occurring on subantarctic and cool temperate islands (DAWE, 2021). The species is thought to frequent subtropical waters during non-breeding months	**Unlikely to occur** This species has a coastal distribution. No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor.
Australian painted snipe *Rostratula australis*	E	E	It is most common in eastern Australia, where it has been recorded at scattered locations throughout much of Queensland, NSW, Victoria and south-eastern South Australia (DAWE, 2021). Prefers shallow freshwater wetlands and other ephemeral or permanent waterbodies (e.g. lakes, swamps, dams) with emergent vegetation. Nests among tall rank grass, reeds, rushes or samphire (DAWE, 2021).	**May occur** Suitable habitat for this species was identified within the wetlands and watercourses in the Study corridor. Although no historical records are known from the area, the species may still occasionally occur.
Australian fairy tern *Sternula nereis*	V	NL	Species occurs within coastal environments from Hervey Bay (Queensland) south to Port Hedland in Western Australia. The species nests on sheltered sandy beaches, spits and banks. The subspecies has been found in a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline (DAWE, 2021).	**Unlikely to occur** This species has a coastal distribution. No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor.
Shy Albatross *Thalassarche cauta*	E	NL	This species has a southern distribution, from the Central Coast NSW to Perth Western Australia. Species seldom ranges north along the east coast to Gladstone. Species is pelagic and spend majority of non-breeding time on the open ocean. Breeding occurs at mainland sites in Tasmania (Pizzey and Knight, 1999).	**Unlikely to occur** No suitable habitat or historic records of this species exist within the 1 km of the Study corridor. Species is almost entirely marine and considered uncommon in southeast Queensland.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Chatham albatross *Thalassarche eremita*	E	NL	The chatham albatross is a marine species and occurs in subantarctic and subtropical waters. The principal foraging range for this species is in coastal waters off eastern and southern New Zealand, and Tasmania. Breeding is restricted to Pyramid Rock, Chatham Islands, off the coast of New Zealand (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species is almost entirely marine.
Campbell albatross *Thalassarche impavida*	V	SL	The Campbell albatross is a marine sea bird inhabiting sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats (DAWE, 2020). The species is a non-breeding visitor to Australian waters and are most commonly seen foraging over the oceanic continental slopes off Tasmania, Victoria and New South Wales (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species is almost entirely marine.
Black-browed albatross *Thalassarche melanophris*	V	NL	This species has a circumpolar distribution and migrates to Australia's southern islands during the breeding season. Outside of the breeding season, the species is observed in low numbers along the continental shelf of south-eastern Queensland.	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species is almost entirely marine.
Salvin's albatross *Thalassarche salvini*	V	SL	Occurs in subantarctic and subtropical waters, foraging over the southern Pacific Ocean and is a nonbreeding visitor to Australian waters (DAWE, 2021). It forages around the breaks of continental and island shelves and across nearby underwater banks.	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species is almost entirely marine.
White-capped albatross *Thalassarche steadi*	V	V	The white-capped albatross is a marine species and occurs in both inshore and offshore subantarctic and subtropical waters, particularly around the continental shelf. Birds nest on slopes vegetated with tussock and succulents on Auckland Island.	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species is almost entirely marine.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Hooded plover (eastern) *Thinornis cucullatus*	V	LC	This species has a coastal distribution from Bundaberg (Queensland) to Lake Macleod (Western Australia). Preferred habitats include beaches with large amounts of beach-washed seaweed. Less common on narrow, steep beaches, where there are few or no dunes (DAWE, 2021).	**Unlikely to occur** No suitable habitat for this species was recorded within the Subsequent study areas and no historical records occur within 1 km of the Study corridor. Species is almost entirely marine.
Black-breasted button quail *Turnix melanogaster*	V	V	It is restricted to coastal and near-coastal regions of south-eastern Queensland and north-eastern New South Wales (DAWE, 2021). Rainforest and forests experiencing 770-1200 mm rainfall per annum. Prefers low closed forest in particular semi-evergreen vine thicket and other vine forest complexes. Required deep leaf litter. Nests within rainforest or under lantana thicket (DAWE, 2021).	**Unlikely to occur** Suitable habitat was not encountered during field surveys and no historical records exist within the study area. No rainforest communities exist nearby, and the species is unlikely to occur.
Mammals				
Spotted-tail quoll *Dasyurus maculatus*	E	V	Once distributed throughout much of eastern Australia, the species has experienced significant range reductions in recent decades. Known to inhabit a range of forest environments, from rainforest to open woodland. They require forests with suitable den sites such as rock crevices, caves, hollow logs, burrows and tree hollows.	**May occur** Suitable habitats for the species was observed within the remnant woodland patches in the north of the Study corridor. However, the species is considered rare and no historical records occur within the study area.
Large-eared pied bat *Chalinolobus dwyeri*	V	V	Records exist from Shoalwater Bay, north of Rockhampton, through to the vicinity of Ulladulla, NSW in the south (DAWE, 2021). Most commonly found in dry sclerophyll forests and woodlands, but also known from rainforest edges and wetter sclerophyll forests. Roosting occurs in sandstone cliff/escarpment adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors which are used for foraging (DAWE, 2021).	**Unlikely to occur** No suitable roosting sites were identified during field surveys and the species has not been historically recorded within 1 km of the Study corridor.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Long-nosed potaroo *Potorous tridactylus*	V	V	The long-nosed potoroo is found on the south-eastern coast of Australia, from Queensland to eastern Victoria and Tasmania. They inhabit coastal heaths and dry and wet sclerophyll forests with a dense understorey of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature (NSW OEH, 2020).	**May occur** Sub-optimal habitats for the species were encountered during field surveys of the Subsequent study areas, however no historical records exist within 1 km of the Study corridor.
Greater glider *Petauroides volans*	V	LC	The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria. This species is largely restricted to eucalypt forests and woodlands (DAWE, 2021). Species requires abundance of hollow-bearing trees which provide den sites and is generally restricted to extensive forest networks larger than 160 km^2 (DAWE, 2021).	**May occur** Large patches of suitable foraging habitat were encountered during field surveys, however suitable denning habitat (hollows) were mostly absent. Potential to occur along riparian corridors where mature vegetation persists.
Koala *Phascolarctos cinereus*	V	V	The range of the species extends from north-eastern Queensland to the south-east corner of South Australia (DAWE, 2021). Inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by *Eucalyptus* species. In Queensland, Koalas are also found in vegetation communities dominated by *Melaleuca* or *Casuarina* species (DAWE, 2021).	**Likely to occur** Suitable habitat for the species was recorded within woodland habitats and historical records exist within the study area. The species is likely to occur due to habitat connectivity with the surrounding area.
Grey-headed flying-fox *Pteropus poliocephalus*	V	LC	This species occurs in the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria (DAWE, 2021). The species is organised around roost sites commonly formed in gullies, typically not far from water and usually in vegetation with a dense canopy. Bats commute daily to foraging areas, typically within 15 km of the day roost where they feed on a wide variety of flowering and fruiting plants including the blossoms of eucalypts (DAWE, 2021).	**Likely to occur** Suitable foraging habitat for this species was encountered during field surveys, however no roosting colonies were observed. Species is likely to forage within the eucalypt woodlands within the Subsequent study areas.
Amphibians				

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Fleay's barred frog *Mixophyes fleayi*	E	E	This species has a narrow and disjunct distribution from the Conondale Range in south-east Queensland to the Upper Richmond River in northern NSW. Known to occurs in rainforest and wet sclerophyll forest, usually close to permanent running water from mid to high elevations (DAWE, 2021).	**Unlikely to occur** Preferred habitats for the species were not observed during field studies and historical records are absent from within 1 km of the Study corridor.
Tusked frog *Adelotus brevis*			This species occurs between Rockhampton and northern NSW. Preferred habitats includes wet eucalypt forest, rainforest, and sometimes dry eucalypt forest, where it can be found in close proximity to suitable breeding habitat such as ponds and slow-moving sections of streams (Rowland, 2013).	**May occur** Essential habitat for the tusked frog has is mapped adjacent to the Subsequent study areas near the Logan River. No historical records exist within 1 km of the Study corridor. However the species may still occur within moist habitats adjacent to water sources.
Wallum froglet *Crinia tinnula*	NL	V	The wallum froglet is distributed along the coastal margin from Litabella National Park in south-east Queensland to Kurnell in Sydney. Preferred habitats include a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests.	**Likely to occur** Suitable habitat for the wallum froglet was identified along Spring Creek, Slacks Creek and Scrubby Creek. Additionally, the Study corridor contains essential habitat and historical records of the species. Therefore, the species is likely to occur.
Reptiles				
Loggerhead turtle *Caretta caretta*	E, Mar, Mig	E	This species has a coastal distribution throughout Australia and surrounding islands. In Australia, loggerhead turtles nest on open, sandy beaches. The species forages throughout open oceans and waters with both hard and soft substrates including rocky and coral reefs, muddy bays, sandflats, estuaries and seagrass meadows (DAWE, 2021).	**Unlikely to occur** This species inhabits coastal and open-ocean habitats. No historical records for the species occur within 1 km of the Study corridor and the Project is not located within a coastal environment.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Green turtle *Chelonia mydas*	V, Mar, Mig	V	This species nests, forages and migrates across much of tropical northern Australia. They usually occur between the 20°C isotherms although individuals infrequently visit temperate waters (DAWE, 2021). Green turtles spend their first five to ten years drifting on open ocean currents. As individuals mature, they move inshore and inhabit shallow benthic foraging habitats such as tropical tidal and sub-tidal coral and rocky reef habitat or seagrass beds.	**Unlikely to occur** This species inhabits coastal and open-ocean habitats. No historical records for the species occur within 1 km of the Study corridor and the Project is not located within a coastal environment.
Three-toed snake-tooth skink *Coeranoscincus reticulatus*	V	LC	The three-toed snake-tooth skink occurs on the coast and ranges from the Macleay valley in NSW to south-eastern Queensland. Preferred habitats include rainforests and occasionally moist eucalypt forest, on loamy or sandy soils where the species lives in loose soil, leaf litter and rotting logs (DAWE, 2021).	**Unlikely to occur** Sub-optimal habitat for this species was encountered during field surveys, however no historical records were reported from within 1 km of the Study corridor.
Collared delma *Delma torquata*	V	V	This species is endemic to south-eastern Queensland and known to occur from Rockhampton in the north to the Queensland / New South Wales border. Normally inhabits eucalypt-dominated woodlands and open-forests on alluvium (river and creek flats), undulating country on fine-grained sedimentary rocks, and sandstone ranges. Requires rocks, logs, bark and other coarse woody debris, and mats of leaf litter (DAWE, 2021).	**Unlikely to occur** No suitable habitat was identified during field surveys and no historical records are known within 1 km of the Study corridor.
Leatherback turtle *Dermochelys coriacea*	E, Mar, Mig	E	This species has a coastal distribution throughout Australia and surrounding islands. This species is a highly pelagic species and forages within Australia's open oceans year-round. Sandy beaches are required for nesting (DAWE, 2021)	**Unlikely to occur** This species inhabits coastal and open-ocean habitats. No historical records for the species occur within 1 km of the Study corridor and the Project is not located within a coastal environment.
Hawksbill turtle *Eretmochelys imbricata*	V, Mar, Mig	E	Hawksbill Turtles are found in tropical, subtropical and temperate waters in all the oceans of the world. In Australia the species can be found from the Bass Straight, north to Shark Bay in Western Australia. Juveniles spend their first 5 - 10 years drifting on ocean currents before maturing and moving inshore to settle and forage in tropical tidal and sub-tidal coral and rocky reef habitat (DAWE, 2021).	**Unlikely to occur** This species inhabits coastal and open-ocean habitats. No historical records for the species occur within 1 km of the Study corridor and the Project is not located within a coastal environment.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Olive ridley turtle *Lepidochelys olivacea*	E, Mar, Mig	E	In Australia, the olive ridley turtle occurs along the coast from southern Queensland and the Great Barrier Reef, northwards to Torres Strait, and across to the Western Australia. Olive Ridley turtles typically occur in shallow soft-bottomed habitats of protected waters.	**Unlikely to occur** This species inhabits coastal and open-ocean habitats. No historical records for the species occur within 1 km of the Study corridor and the Project is not located within a coastal environment.
Flatback turtle *Natator depressus*	V, Mar, Mig	V	The flatback turtle is found in the tropical waters of northern and eastern Australia with nesting occurring north of Bundaberg to the Torres Strait. Adults inhabit soft bottom habitat over the continental shelf of northern Australia and forage within turbid, shallow inshore waters in depths from less than 10 m to depths of over 40 m (DAWE, 2021).	**Unlikely to occur** This species inhabits coastal and open-ocean habitats. No historical records for the species occur within 1 km of the Study corridor and the Project is not located within a coastal environment.
Insects				
Australian fritillary *Argynnis hyperbius inconstans*	CE	E	This species is restricted to south-east Queensland and north-east NSW in open swampy coastal areas where the larval food plant *Viola betonicifolia* (arrowhead violet) occurs. Most recently known from a few widespread localities between Port Macquarie and Gympie, populations have declined dramatically to the extent that the butterfly has not been verified at any site for over a decade.	**Unlikely to occur** This species hasn't been recorded in Queensland in over 25 years and suitable habitat for the species was not encountered within the Subsequent study areas. Species is unlikely to occur within the Study corridor.
Migratory marine species				
Fork-tailed swift *Apus pacificus*	Mig, Mar	SL	In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand- dunes.	**May occur** Suitable habitat for this species was encountered during field surveys. Although no historical records exist within 1 km of the Study corridor, the species may still occur.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Sooty shearwater *Ardenna grisea*	Mig, Mar	SL	The Sooty Shearwater forages in pelagic (open ocean) sub-tropical,sub-Antarctic and Antarctic waters. The species migrates and forages in the North Pacific and Atlantic Oceans during the non- breeding season. Sooty Shearwaters may forage inshore occasionally, especially during rough weather (DAWE, 2021). In Australian waters, the sooty shearwater occurs in areas with sea surface-temperatures between 8.7 - 22.0°C (DAWE, 2021).	**Unlikely to occur** This species occurs predominantly within open-ocean environments. Suitable habitat for this species was not encountered during field surveys and no historical records occur within 1 km of the Study corridor. .
Streaked shearwater *Calonectris leucomelas*	Mig, Mar	SL	Streaked shearwaters breed on islands off the southern Russian, east China, Korea and Taiwan. In the non-breeding season, they migrate to waters off New Guinea and around northern Australia.	**Unlikely to occur** This species occurs predominantly within open-ocean environments. Suitable habitat for this species was not encountered during field surveys and no historical records occur within 1 km of the Study corridor. .
Migratory terrestrial species				
Oriental cuckoo *Cuculus optatus*	Mig	SL	The species inhabits coastal regions across northern and eastern Australia, as well as offshore islands (DAWE, 2021). Species utilises a range of vegetated habitats, including monsoon rainforests, wet sclerophyll forests, open woodlands and along the edges of forests (DAWE, 2021).	**May occur** Sub-optimal habitat for this species was encountered during field surveys, though no historical records exist within 1 km of the Study corridor.
Black-faced monarch *Monarcha melanopsis*	Mig	SL	Species inhabits rainforest ecosystems that include semi-deciduous vine thickets, complex notophyll vine-forests, tropical rainforests, subtropical rainforests, mesophyll thicket/shrubland, warm and cool temperate rainforest, and dry rainforest (DAWE, 2021).	**Unlikely to occur** Suitable habitat for this species was not encountered during field surveys and no historical records exist within 1 km of the Study corridor. This species is not commonly encountered within urban areas.
Spectacled monarch *Monarcha trivirgatus*	Mig	SL	The spectacled monarch is found in coastal north-eastern and eastern Australia, from Cape York to Port Stephens. The species prefers thick understory habitats in rainforests, wet sclerophyll forests and mangroves (DAWE, 2021).	**Unlikely to occur** Suitable habitat for this species was not encountered during field surveys and no historical records exist within 1 km of the Study corridor. This species is not commonly encountered within urban areas.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Satin flycatcher *Myiagra cyanoleuca*	Mig	SL	The satin flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania. The species occurs in heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, typically near wetlands and watercourses (DAWE, 2021).	**May occur** Sub-optimal habitats for this species were recorded during field surveys however no historical records exist within 1 km of the Study corridor. Regardless, the species still has a low probability to occur.
Rufous fantail *Rhipidura rufifrons*	Mig	SL	The rufous fantail is distributed throughout northern and eastern coastal Australia, however, is considered more common in the north. Species inhabits wet sclerophyll forests, often in gullies dominated by eucalypts and usually within a dense shrubby understorey that often includes ferns (DAWE, 2021).	**May occur** This species was not encountered during field surveys; however suitable habitat exists within 1 km of the Study corridor. This species has the potential to infrequently occur within the Project area.
Migratory wetland species				
Common sandpiper *Actitis hypoleucos*	Mig	SL	Found along all coastlines of Australia and in many areas inland, the common sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia (Higgins and Davies, 1996).	**May occur** This species was not encountered during field surveys; however suitable habitat exists within 1 km of the Study corridor. This species has the potential to infrequently occur within the Study corridor.
Sharp-tailed sandpiper *Calidris acuminata*	Mig	SL	Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage (Cramp 1985; Higgins and Davies, 1996). In Queensland, they are recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland (Higgins and Davies, 1996).	**May occur** Suitable habitat for this species was identified during field surveys and a historical record were identified within 1 km of the Study corridor. When in Australia, the species has the potential to temporarily utilise the Subsequent study areas as foraging and roosting habitat.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Pectoral sandpiper *Calidris melanotos*	Mig	SL	Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitats but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation ((Higgins and Davies, 1996). In Queensland, most records for the Pectoral Sandpiper occur around Cairns	**May occur** This species was not encountered during field surveys; however suitable habitat exists within the study area. This species has the potential to infrequently occur within the Project area.
Latham's snipe *Gallinago hardwickii*	Mig	SL	The species inhabits permanent and ephemeral freshwater wetlands with low, dense vegetation (DAWE, 2021). Species sometimes occurs in habitats that have saline or brackish water, such as saltmarshes, mangrove creeks, around bays and beaches (DAWE, 2021).	**May occur** This species was not encountered during field surveys; however suitable habitat exists within 1 km of the Study corridor. This species has the potential to infrequently occur within the Study corridor.
Little curlew *Numenius minutus*	Mig	SL	Within Australia, the little curlew is nomadic and very mobile (Bellio et al., 2006). The species is known to gather in large flocks on coastal and inland grasslands, playing fields, tidal mudflats, paddocks and sewage ponds (Pizzey and Knight, 1999).	**May occur** Suitable habitat for the species was encountered during field surveys however no historical records exists within 1 km of the Study corridor. The species has the potential to occur between September – May.
Whimbrel *Numenius phaeopus*	Mig	SL	The whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It has been infrequently recorded using saline or brackish lakes near coastal areas. It also used saltflats with saltmarsh, or saline grasslands with standing water left after high spring-tides, and in similar habitats in sewage farms and saltfields (Higgins and Davies, 1996).	**Unlikely to occur** This species was not encountered during field surveys; however suitable habitat exists within 1 km of the Study corridor.

Species	Conservation status		Distribution and habitat requirements	Likelihood of occurrence
	EPBC Act	NC Act		
Osprey *Pandion haliaetus*	Mig	SL	The species occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DAWE, 2021). They are mostly found in coastal areas but occasionally travel inland along major rivers (DAWE, 2021). They require extensive areas of open fresh, brackish or saline water for foraging (DAWE, 2021).	**May occur** Sub-optimal habitat for the species was not identified within the Subsequent study area, however has may occur within the Study corridor. This species has the potential to occur along the Logan River.
Glossy ibis *Plegadism falcinellus*	Mig	SL	The glossy ibis preferred habitat for foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, flood- plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons. Within Australia, the largest contiguous areas of prime habitat are inland and upon northern floodplains (Marchant and Higgins, 1990).	**May occur** This species was not encountered during field surveys; however suitable habitat exists within 1 km of the Study corridor. This species was previously recorded within the Study corridor (WSP, 2019).
Common greenshank *Tringa nebularia*	Mig	SL	The common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores (DAWE, 2021).	**May occur** This species was not encountered during field surveys; however suitable habitat exists within 1 km of the Study corridor. This species has the potential to infrequently occur within the Subsequent study areas.
Marsh sandpiper *Tringa stagnatilis*	Mig	SL	The marsh sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore- drain swamps and flooded inland lakes	**May occur** This species was not encountered during field surveys; however suitable habitat exists within 1 km of the Study corridor. This species has the potential to infrequently occur within the Subsequent study areas.

Key to table – CE = Critically endangered, E = Endangered, V = Vulnerable, Mig = Migratory, Mar = Marine, NL = Not listed, LC = Least concern.

Appendix D – Fauna species list

Scientific name	Common name
Birds	
Chenonetta jubata	Australia wood duck
Ardea modesta	Eastern great egret
Anhinga novaehollandiae	Australasian darter
Gallinula tenebrosa	Ducky moorhen
Malurus cyaneus	Superb fairy-wren
Trichoglossus moluccanus	Rainbow lorikeet
Corvus orru	Torresian crow
Philemon citreogularis	Little friarbird
Philemon corniculatus	Noisy friarbird
Malurus lamberti	Variegated fairy-wren
Dacelo novaeguineae	Laughing kookaburra
Eopsaltria australis	Eastern yellow robin
Meliphaga lewinii	Lewin's honeyeater
Coracina novaehollandiae	Black-faced cuckoo shrike
Dicrurus bracteatus	Spangled drongo
Manorina melanocephala	Noisy minor
Gymnorhina tibicen	Magpie-lark
Cacatua galerita	Sulphur-crested cockatoo
Alectura lathami	Australian brush turkey
Cacomantis flabelliformis	Fan-tailed cuckoo
Neochmia temporalis	Red-browed finch
Centropus phasianinus	Pheasant coucal
Porphyrio porphyrio	Purple swamphen
Phalacrocorax varius	Pied cormorant
Todiramphus chloris	Collared kingfisher
Reptiles	
Cryptoblepharus pulcher	Elegant snake-eyed skink
Carlia pectoralis	Open-litter rainbow skink
Pseudonaja textilis	Eastern brown snake
Intellagama lesueurii	Eastern water dragon

Scientific name	Common name
Emydura macquarii	Brisbane River turtle
Mammals	
Macropus giganteus	Eastern grey kangaroo
Macropus bicolor	Swamp wallaby

Appendix E – Animal breeding places

ID	Coordinates	Description	Representative photo
1	-27.60326 153.08679	Hollowed out arboreal terminate mount located within patch of eucalypt woodland.	
2	-27.60310 153.08693	Hollowed out arboreal terminate mount located within patch of eucalypt woodland.	
3	-27.60335 153.08695	Hollowed out arboreal terminate mount located within patch of eucalypt woodland.	
4	-27.60886 153.09568	Hollow located in mature canopy tree.	

ID	Coordinates	Description	Representative photo
5	-27.60376 153.09320	Nesting box placed approximately 4 m off the ground within eucalypt woodland.	
6	-27.62362 153.09498	Hollowed out dead stag with opening at base. Located within eucalypt woodland with dense *Allocasuarina* understorey.	

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Document Status

Revision	Author	Reviewer		Approved for Issue		
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0	L. O'Brien H. Rosnell	M. Ward S. Chadwick	*On file	C. Gillanders	*On file	20/05/2021
1	H. Rosnell	S. Chadwick	*On file	C. Gillanders	*On file	18/06/2021
2	H. Rosnell	S. Chadwick	*On file	C. Gillanders	*On file	10/08/2021

What you told us

Community members and stakeholders told us their top priorities for the Logan and Gold Coast Faster Rail project are:

More, and faster, train journeys

People in the Logan and Gold Coast area rely on train services to connect them to jobs, education, health, and other essential services. They would like to see more train services and faster journey times.

Upgraded stations

There was strong support for all stations between Kuraby and Beenleigh to be upgraded with modern facilities so all customers can access the stations easily. Being able to travel from one side of the rail corridor to the other side was also important. Where stations are in high traffic areas, separating pedestrians and vehicles to provide safe access to stations is a key factor.

Integrated station precincts

There was strong support for integrating stations with nearby shops, facilities, and essential services to create community-focused spaces and precincts.

Improved access and safety

Maintaining access to stations, minimising traffic impacts from changes to local road networks, visual, safety, and noise considerations are all important aspects of the design to the community. Maintaining safe pedestrian and vehicle access for school children and the elderly community is also important.

Active transport

An active transport corridor that connects with existing pedestrian and local cycle links is supported by the community.

Level crossing upgrades

There was support for removal of level crossings to improve traffic congestion and safety.

Minimising property impacts

Minimising the number of properties impacted by the project design and proposed construction where possible is important.

Project need

South East Queensland's (SEQ) population is expected to grow by an extra 1.2 million people living in the region by 2036. To harness this growth and support our region's thriving communities we must keep evolving the rail network so that it plays a bigger role in moving people around SEQ.

Currently, trains between Kuraby and Beenleigh share a single track in each direction, limiting the number of services that can run during peak times. Jointly funded by the Australian and Queensland governments, the Logan and Gold Coast Faster Rail project proposes to increase the number of tracks between Kuraby and Beenleigh from two to four, with modernised rail systems, station upgrades and level crossing removals.

Logan and Gold Coast Faster Rail

Project benefits

- A plan for faster rail, providing more frequent and reliable services
- Space for more new trains, moving people quickly and comfortably
- Less time waiting at stations
- A more efficient local road network, through intersection upgrades and level crossing removals
- Improved accessibility to, from and within stations
- Better connectivity across the rail corridor
- More park 'n' ride facilities
- Improved connections along the corridor for pedestrians and cyclists
- New signalling technology, allowing more trains to run more often, enhancing capacity and safety

Next steps

Engagement with the community and stakeholders has highlighted a diverse range of feedback and local insights to help shape the project.

This feedback will be considered in refining the proposed project design. Further consultation will occur with the community and stakeholders on targeted aspects of the design as it is refined to address potential impacts and to identify opportunities for the project.

The project remains in the planning phase and is still subject to further approvals by the Australian Government and Queensland Government.

WE ARE HERE

Project launch	Community consultation	Refine design and planning	Design and delivery
Completed Sept 2021	Completed late 2021	2022	Subject to government approval

Contact us **Phone:** 1800 957 066* **Email:** logangoldcoastrail@tmr.qld.gov.au

** Free call from anywhere in Australia, call charges apply for mobile phones and payphones. Check with your service provider for call costs.*

If you need an interpreter call the Translating and Interpreting Service (TIS National) on 131 450. If you are deaf or have a hearing or speech impairment, contact us through the National Relay Service, www.replayservice.gov.au

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Logan and Gold Coast Faster Rail

Consultation summary February 2022

In September and October 2021, community consultation was undertaken on the proposed Logan and Gold Coast Faster Rail project.

The project will upgrade a key part of the South East Queensland (SEQ) rail network, allowing for more frequent and reliable services between Brisbane, Logan and the Gold Coast.

Thank you to everyone who provided their feedback which will help refine the project and inform future design work.

The project remains in the planning phase and is subject to further approvals and funding by the Australian Government and Queensland Government.

2200+ community interactions

How we consulted

- **8 week** consultation period
- **25,000** newsletters delivered
- **12** information pop-ups
- **7** community information sessions
- **172** stakeholder and property owner meetings

How people participated

- **332** comments on interactive map
- **300+** letters out
- **293** phone calls
- **391** emails
- **101** surveys
- **34** feedback forms
- **579** people engaged face-to-face
- **11** formal submissions

Australian Government

BUILDING OUR FUTURE

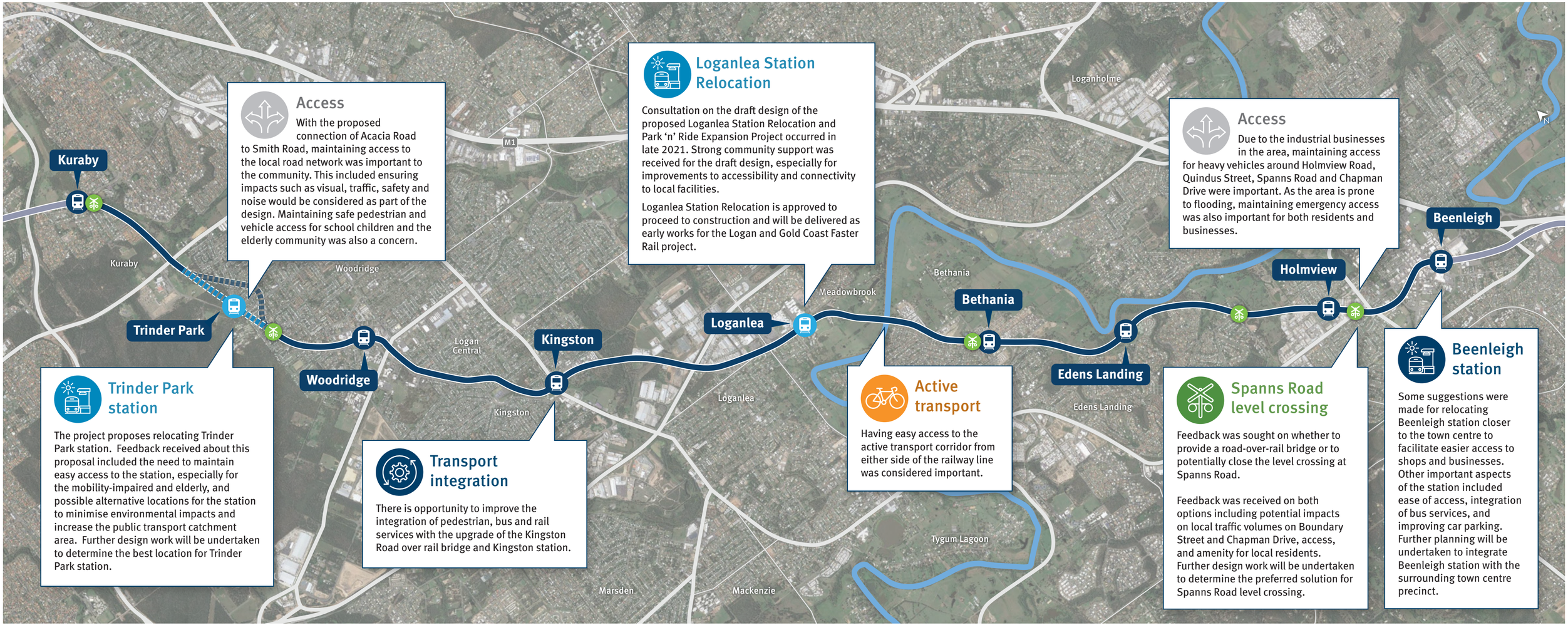
Queensland Government

Logan and Gold Coast Faster Rail

Legend

- Existing rail line
- Roads
- River
- Station upgrade
- Level crossing removal or upgrade
- Station relocation
- Proposed straightened section of track
- Existing corridor to be re-purposed

The map below is a draft only. Logan and Gold Coast Faster Rail is subject to further design and approvals.



Access

With the proposed connection of Acacia Road to Smith Road, maintaining access to the local road network was important to the community. This included ensuring impacts such as visual, traffic, safety and noise would be considered as part of the design. Maintaining safe pedestrian and vehicle access for school children and the elderly community was also a concern.

Loganlea Station Relocation

Consultation on the draft design of the proposed Loganlea Station Relocation and Park 'n' Ride Expansion Project occurred in late 2021. Strong community support was received for the draft design, especially for improvements to accessibility and connectivity to local facilities.

Loganlea Station Relocation is approved to proceed to construction and will be delivered as early works for the Logan and Gold Coast Faster Rail project.

Access

Due to the industrial businesses in the area, maintaining access for heavy vehicles around Holmview Road, Quindus Street, Spanns Road and Chapman Drive were important. As the area is prone to flooding, maintaining emergency access was also important for both residents and businesses.

Trinder Park station

The project proposes relocating Trinder Park station. Feedback received about this proposal included the need to maintain easy access to the station, especially for the mobility-impaired and elderly, and possible alternative locations for the station to minimise environmental impacts and increase the public transport catchment area. Further design work will be undertaken to determine the best location for Trinder Park station.

Transport integration

There is opportunity to improve the integration of pedestrian, bus and rail services with the upgrade of the Kingston Road over rail bridge and Kingston station.

Active transport

Having easy access to the active transport corridor from either side of the railway line was considered important.

Spanns Road level crossing

Feedback was sought on whether to provide a road-over-rail bridge or to potentially close the level crossing at Spanns Road.

Feedback was received on both options including potential impacts on local traffic volumes on Boundary Street and Chapman Drive, access, and amenity for local residents. Further design work will be undertaken to determine the preferred solution for Spanns Road level crossing.

Beenleigh station

Some suggestions were made for relocating Beenleigh station closer to the town centre to facilitate easier access to shops and businesses. Other important aspects of the station included ease of access, integration of bus services, and improving car parking. Further planning will be undertaken to integrate Beenleigh station with the surrounding town centre precinct.

Logan and Gold Coast Faster Rail

Project update September 2022

To support growing population and rail patronage demand between Brisbane, Logan and the Gold Coast, the number of Beenleigh and Gold Coast train services will need to double over the next 20 years. The rail line between Kuraby and Beenleigh is a key capacity bottleneck on the rail corridor.

The Queensland Government, together with the Australian Government, is planning to increase the number of tracks between Kuraby and Beenleigh from 2 to 4 tracks, with modernised rail systems, station upgrades and level crossing removals.

Latest news

The Department of Transport and Main Roads (TMR) is refining the reference design for the Logan and Gold Coast Faster Rail (LGC) project and considering the feedback received during community consultation activities in late 2021. As this is a complex infrastructure project along an existing 20km rail corridor, this process will take some time to work through, likely the remainder of 2022.

Other project activities underway include:

- Commencing detailed design for the Loganlea Station Relocation and Park 'n' Ride Expansion Project
- Securing land along the project corridor
- Preparing for environmental approvals
- Developing the project delivery strategy.

The project remains in the planning and design phase and is subject to further approvals by the Australian and Queensland governments. We will keep you updated as further information and timeframes are confirmed. Further consultation will also occur with the community and stakeholders in the future on specific aspects of the design.

Project launch
Sept 2021

Community consultation
See project website for summary of feedback received.
Late 2021

WE ARE HERE

Reference design refinement and project readiness activities
2022

Design and delivery
Subject to government approvals

Australian Government

Queensland Government

Logan and Gold Coast Faster Rail

Field investigations

A variety of field investigations have commenced at selected sites throughout the corridor. This information is needed to help us understand more about the existing conditions and environment along the rail corridor. Activities are expected to be non-intrusive and generally consist of observations or taking photos. Where investigations require entry to private property, we will contact owners in advance to make suitable arrangements.

Property information

Property owners who are directly impacted by the project may be eligible for a strategic purchase of their property by TMR. A strategic purchase allows owners to sell their property to TMR ahead of the formal resumption process.

If you have been advised by TMR that your property is directly impacted by the project, you can apply for a strategic purchase by contacting the project team on 1800 957 066 or logangoldcoastrail@tmr.qld.gov.au.

TMR will review your application and advise the next steps.

TMR has received around 100 strategic purchase requests from property owners along the project corridor. To date, the vast majority have been determined eligible for purchase.

We want to ensure that people considering property purchases in the area are also aware of the project. If a prospective purchaser undertakes a TMR property search, TMR can advise if there is a property requirement for the land. Potential owners can also contact the project team by phone or email with any queries.

Contact us

If you have a question, or concern about the project, please contact the project team via phone or email.

From time to time councils, utility providers or Queensland Rail may undertake other work within the project corridor. Please contact us directly if you have a query so we can provide you with the right information.

We can be contacted on 1800 957 066 during business hours. If you prefer email, please send your enquiry to logangoldcoastrail@tmr.qld.gov.au and we will get back to you.

JOIN THE PROJECT MAILING LIST

Joining the project mailing list is the best way of being updated about any news on the project.

To join, please send an email to logangoldcoastrail@tmr.qld.gov.au

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