7. Significance of Impacts

7.1. Significant Impact Assessment Definitions

The Significant Impact Guidelines provides specific definitions for '*important population*' and '*habitat critical to the survival of a species or ecological community*'. This definition is a key consideration when conducting significant impact assessments for a threatened species or ecological community listed under the EPBC Act. The definitions are presented below.

7.1.1 Important population

An '*important population*' is defined by the Significant Impact Guidelines as:
"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*
- *Populations that are near the limit of the species range*

7.1.2 Habitat critical to the survival of a species or ecological community

The Significant Impact Guidelines provide the following definition for '*habitat critical to the survival of a species*'
"Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- *For activities such as foraging, breeding, roosting or dispersal*
- *For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *To maintain genetic diversity and long-term evolutionary development*
- *For the reintroduction of populations or recovery of the species or ecological community.*

Such habitat may be, but is not limited to:

- *Habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community*
- *Habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.*

Critical habitat can be further explained as an identified area of viable habitat that contains habitat attributes that are essential for the conservation of a threatened species. These areas are typically under a regime of special protection and management to ensure the critical habitat remains a stronghold for the species to ensure its long-term survival and viability in the wild. Critical habitat may also include an area of land not currently occupied by the species, but can act as a sanctuary by possessing the necessary habitat attributes to facilitate the recovery of a declining population of the species.

7.2. *Hirundapus caudacutus* (White-throated Needletail)

7.2.1 Conservation Status

The White-throated Needletail is listed as Vulnerable under the EPBC Act.

7.2.2 Description

The White-throated Needletail is a large swift with a thick-set, cigar-shaped body with a stubby tail and long pointed wings. Adults have a dark olive head and neck, with an iridescent gloss on the crown. The mantle and back are a paler, greyish colour and upper wings are blackish, sometimes with a greenish gloss. The face is a dark olive with a narrow white band across the forehead and lores with a white patch on the chin and throat.

7.2.3 Distribution

The White-throated Needletail is widespread in eastern and south-eastern Australia. In Queensland it is recorded in all coastal regions, extending inland towards the Great Dividing Range and occasionally onto the adjacent plains.

7.2.4 Habitat

The White-throated Needletail is almost exclusively aerial, from heights of less than 1m to more than 1000m above the ground. They are recorded more often over wooded areas, including open forest and rainforest. They may also fly between trees in clearings, below the canopy and less commonly recorded flying above woodland.

7.2.5 Recovery Actions

There is no adopted Recovery Plan as the Conservation advice provides sufficient direction. In Australia population survival depends on the retention of habitat the provides aerial insects such as intact grassland, woodland and forest vegetation. The conservation advice prioritises the identification and protection of important habitat to the White-throated Needletail and invertebrate prey as well as minimising threats.

7.2.6 Significant Impact Assessment

EPBC Act, The White-throated Needletail populations are listed as Vulnerable. The species is listed as Vulnerable under Queensland's *Nature Conservation Act 1992* (Qld) (NCA). The removal of the vegetation is considered to have a minimal impact on the White-throated Needletail given that the species is almost exclusively aerial and occurs over most habitat types.

To determine whether the proposed action is likely to have a significant impact on the White-throated Needletail, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 11**.

Table 10: Significant Impact Assessment – Vulnerable White-throated Needletail

Significant Impact Criteria	Description	Impact
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	Extensive field surveys have been conducted over the subject site and the species was not detected. As the species is considered almost exclusively aerial and occurs over most habitat types, including residential landscapes. The development is not considered to be significant to the species. The development site is not considered to support an important population of the species and the proposed action is unlikely to lead to a long term decrease in the size of any local White-throated Needletail populations.	No significant impact
2. Reduce the area of occupancy of an important population	WildNet records only three (3) observations within 5km of the subject site since 1980. The proposed action will not reduce the area of occupancy of an important population of White-throated Needletails as no part of the action will occur within an area known to be regularly occupied by the species.	No significant impact
3. Fragment an existing important population into two or more	The proposed development proposes to remove 26.65 ha of vegetation on-site. The area proposed to be removed is non-remnant vegetation with the remnant vegetation to be retained and the wetland vegetation retained and rehabilitated. In addition, given the high mobility of the species, the proposed action is unlikely to fragment a population into two or more populations.	No significant impact
4. Adversely affect habitat critical to the survival of a species	The White-throated Needletail is considered almost exclusively aerial and is known to be recorded over most habitat sites. The vegetation proposed to be removed is highly modified, non-remnant vegetation. The development will result in the removal of 26.65 ha of vegetation, with 16.217 ha of open space park, remnant vegetation and waterway corridor retained and rehabilitated. This habitat is not considered critical habitat under the conservation advice for *Hirundapus caudacutus.*	No significant impact
5. Disrupt the breeding cycle of an important population	White-throated Needletails are a migratory species and breeds in forest in south-eastern Siberia, Mongolia, the Korean Peninsula and northern Japan. Therefore, as White-throated Needletails do not breed in Australia, the development will not impact the breeding cycle.	No significant impact

6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The white-throated Needletail is almost exclusively aerial. As the species is recorded over most habitat types, it is unlikely that the species relies on the highly disturbed vegetation located on-site. The removal of vegetation located on-site is unlikely to have a significant impact on the availability of habitat in the landscape, given the vast quantity and availability of foraging habitat in the surrounding area.	No significant impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the introduction of invasive species. The development has a detailed rehabilitation plan for the core corridor habitat areas. The implementation on the rehabilitation plan will not result in an increase in invasive species.	No significant impact
8. Introduce disease that may cause the species to decline	The project is unlikely to introduce disease into the area.	No significant impact
9. Interfere substantially with the recovery of the species	There are no recovery plans or actions listed for the recovery of the White-throated Needletail. The conservation advice on the SPRAT profile listed for the White-throated Needletail states that a recovery plan is not required as the approved conservation advice provides sufficient direction. Threats to the species listed in the approved conservation advice includes collision with wind turbines, overhead wires, windows and lighthouses. Insecticides is considered another reason causing the decline in the species. The loss of roosting sites in Australia including forest and woodland habitats is also considered a threat to the species and resulted in a loss of invertebrate prey. The removal of the highly disturbed vegetation located on the subject site offers limited habitat value to the species and is not considered to interfere with the recovery of the species. White-throated Needletails are considered an aerial insectivore that is known to fly over a variety of habitats. Therefore, the removal of this vegetation is unlikely to significantly impact the species.	No significant impact

7.3. *Pteropus poliocephalus* (Grey-headed Flying-fox)

7.3.1 Conservation Status

The GHFF is listed as Vulnerable under the EPBC Act.

7.3.2 Description

The GHFF is the largest Australian bat with a wingspan of up to one metre. It has dark-grey body fur, a grey head, and a distinctive reddish-brown collar. It is also the only flying-fox with hairy legs right down to its ankles.

7.3.3 Distribution

The GHFF occurs along the south-east coast of Australia, from Rockhampton in central Queensland through New South Wales to western Victoria. During the last few years, the GHFF has also been recorded from Adelaide.

7.3.4 Habitat

The GHFF is heavily dependent on the availability of foraging resources and roost sites. As canopy feeding frugivores and nectavores, GHFFs frequent fruiting and flowering trees in rainforests, open eucalypt forests, woodlands, *Melaleuca sp.* swamps and Banksia woodlands (Duncan *et al*. 1999). The GHFF is also known to forage in fruit crops and introduced tree species within urban environments. Roost sites for the GHFF are commonly within dense vegetation close to water, primarily rainforest patches, stands of *Melaleuca sp.*, mangroves or riparian vegetation.

7.3.5 Recovery Actions

There is no adopted or made Recovery Plan for this species at the federal level. The Queensland Government identifies the following recovery actions:

- Identify and map important foraging and roosting habitats
- Prevent the destruction and degradation of important forested habitat, through: identifying guidelines to protect habitat; appropriate zoning; identifying development alternatives and incentives to retain habitat and educating communities.
- Encourage community partnerships and initiatives that protect important habitats, and where possible re-vegetate with foraging trees for GHFF
- Work with orchardists to improve the image of GHFF, and to identify and implement non-destructive methods to protect fruit crops, such as: appropriate netting (not monofilament netting) that is not hung loose over trees (which can entangle bats and birds)
- Reduce negative public attitudes and conflict with humans
- Develop accurate methods for monitoring population size

7.3.6 Significant Impact Assessment

EPBC Act, Grey-headed Flying-fox populations are listed as Vulnerable. The species is not listed as Threatened under Queensland's *Nature Conservation Act 1992* (Qld) (NCA), but retains a Least Concern status for the purposes of the Act. The *Referral guideline for management actions in grey-headed and spectacled flying-fox camps* summarise the decision

process in considering the likelihood of a significant impact on the Grey-headed Flying-fox or Spectacled Flying-fox schematically. The Guidelines are specifically for the assessment of impacts on Flying-fox camps. Given no roosting sites are located on-site or in proximity, it is highly unlikely that the action will involve impacts on the Grey-headed Flying-fox according to the Guidelines. However, the Guidelines also state that, '*It does not apply to the following actions... Actions which may impact on the foraging habitat of EPBC Act-listed flying-fox species. Proponents of actions of this kind should refer to the Significant Impact Guidelines 1.1.*'

To determine whether the proposed action is likely to have a significant impact on the Grey-headed Flying-fox, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 11**.

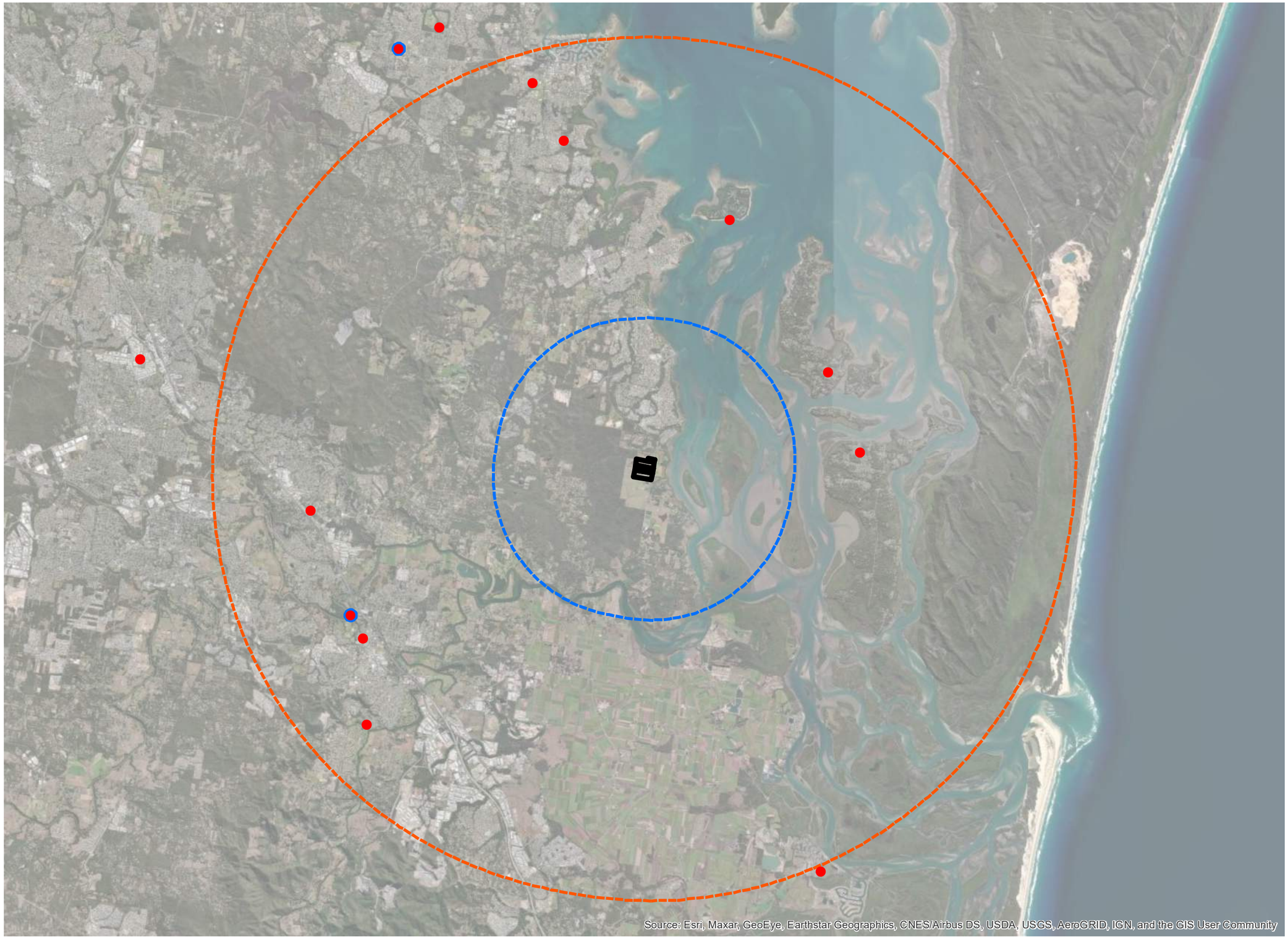
Table 11: Significant Impact Assessment – Vulnerable Grey-headed Flying-fox

Significant Impact Criteria	Description	Impact
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	This species was not observed utilising the site nor observed as a fly over species. However, a species of *Pteropus* was recorded during field surveys and unable to be identified. However, no suitable roosting sites occur on or adjacent to the site (refer **Plan 4**). A Flying-fox camp containing the GHFF has previously been observed in Loganholme, approximately 12 km to the west. However, GHFF surveys have not been conducted on this camp since November 2019. SEQ has a permanent and abundant population of GHFF and available habitat is spread throughout the region given the high prevalence of *Eucalypts*. While vegetation on site is considered appropriate foraging habitat for the species, due to the poor level of habitat quality and fragmentation, proximity to development and absence of evidence of the species utilising the site even as a transient visitor, the site is not considered to support an important population of the species and the proposed action is unlikely to lead to a long term decrease in the size of any local GHFF populations.	No significant impact
2. Reduce the area of occupancy of an important population	This species was not observed utilising the site nor observed as a fly over species. However, one individual of *Pteropus* genus was recorded during field surveys but the species was unable to be determined. However, no suitable roosting sites occur on or adjacent to the site. The proposed action will not reduce the area of occupancy of an important population of GHFF as no part of the action will occur within an area known to be occupied by the species.	No significant impact

3. Fragment an existing important population into two or more	The SPRAT species profile outlines that while there are spatially structured colonies of GHFF, there are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout the species' geographic range. In addition, given the high mobility of the species, and comparatively, the small scale of the site in relation to this mobile behaviour, the proposed action is unlikely to fragment a population into two or more populations. Of note, the species was not observed utilising the site nor observed as a fly over species.	No significant impact
4. Adversely affect habitat critical to the survival of a species	An individual of the *Pteropus* was observed on-site, however the species was unable to be determined. Despite this, vegetation across the site is considered to be foraging habitat for the species. The proposal will result in the removal of approximately 16.15 ha of GHFF foraging habitat with the retention and enhancement of 16.217 ha in open space park and corridor. Due to the lack of sightings and the retention of 16.217 ha of vegetation to be rehabilitated, the development is not considered to adversely affect habitat critical to GHFF.	No significant impact
5. Disrupt the breeding cycle of an important population	The site surveys did not identify any evidence of breeding GHFF. Mating normally occurs within autumn, and females generally give birth in October, where they carry their young to feeding sites for four to five weeks after giving birth. As no roosting camps were observed on or near the site, the proposed action is unlikely to disrupt the breeding cycle of an important population.	No significant impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	While suitable foraging habitat is located across the site, the removal of the non-remnant vegetation is unlikely to have a significant impact on the availability of habitat in the landscape, given the vast quantity and availability of foraging habitat in the surrounding area.	No significant impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the introduction of invasive species. Further, the detailed rehabilitation plan that was been completed for the retained vegetation will reduced the risk of invasive species on-site.	No significant impact

8. Introduce disease that may cause the species to decline	The project is unlikely to introduce disease into the area.	No significant impact
9. Interfere substantially with the recovery of the species	Recovery of the species has specifically targeted the broad scale culling of the species. In addition, conservation efforts have led to the protection of known roosting sites and important habitat. The site has not been identified as an important habitat or roost site and the action is unlikely to interfere with the recovery of the species.	No significant impact

4. Contextual GHFF Roost Survey Results



Notes:
This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources
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Legend

- Project Site DCDB
- Qld DCDB
- Site 15km Buffer
- Grey-headed Flying Fox Roost/Camp Active in Recent Surveys
- Grey-headed Flying Fox Survey Population Level 3 or Higher

Issue	Date	Description	Drawn	Checked
B	2/09/2021	Updated civil design	LS	KH

0 1 2 3 Kilometers

Transverse Mercator | GDA 1994 | Zone 56 | 1:135,000 @ A3

saunders havill group

Stockland it's your place

Serpentine Creek Road, Redland Bay

RPD: 1RP89514, 2RP89514, 3RP89514

2/09/2021 | 9080 E 03 GHFF Roosts A

7.4. *Phascolarctos cinereus* (Koala)

7.4.1 Conservation Status

The Koala is listed as Vulnerable under the EPBC Act.

7.4.2 Description

Koalas (*Phascolarctos cinereus*) are native Australian tree-dwelling marsupials with predominantly grey coloured fur. The species feed exclusively on leaves of Eucalypt and Corymbia genera, whose presence and densities within a vegetation community dictates the favourability of habitat for koala.

7.4.3 Distribution

The Koala is found from north-east Queensland to the south-east corner of South Australia. As a consequence of translocations, the Koala are found outside their historic range, for example, Kangaroo Island. The distribution of the Koala is influenced by altitude, temperature and leaf moisture. The density of the Koala population in coastal regions is generally greater than inland areas. Koalas are known to naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by *Eucalyptus* sp.

7.4.4 Habitat

Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland and emergent food trees. Preferred food and shelter trees are naturally abundant on fertile clay soils. Along the Great Dividing Range and the coastal belt throughout the species' range, Koalas inhabit moist forests and woodlands mostly dominated by *Eucalyptus* sp.

The Koala species is not specifically territorial and the home ranges of individuals extensively overlap although males often attempt to maintain dominant status over female territories during breeding season. Home ranges are variable depending on the location, with those in "poorer" habitats being larger than in higher quality habitats. There is little evidence for longer movements in most cases, though dispersing individuals, mostly young males, may occasionally cover distances of several kilometres over land with little vegetation. In SEQ, the average distance between natal and breeding home ranges was similar for males and females, at approximately 3.5 km. Maximum dispersal distances were up to approximately 10 km for males and females. Other studies have reported movement of up to 16 km in rural SEQ.

7.4.5 Threats

Habitat loss and fragmentation, vehicle strike and predation by domestic or feral dogs are the main threats to the Koala. Extreme environmental events, such as drought, can also cause significant mortality.

7.4.6 Significant Impact Assessment

The *EPBC Act referral guidelines for the vulnerable Koala* summarise the significant impact decision for the Koala. The following points help to summarise the guideline:

- Impacts on 'habitat critical to the survival of the species' and impacts that 'substantially interfere with the recovery of the species' are the focus of assessing significance;

- Habitat protection and impact mitigation is focused on areas of habitat that are large and well connected;
- The loss of 20 hectares or more of high-quality habitat critical to the survival (habitat score of 8) is highly likely to have a significant impact for the purposes of the EPBC Act;
- The loss of two hectares or less of marginal quality habitat critical to the survival (habitat score of 5) is highly unlikely to have a significant impact on the koala for the purposes of the EPBC Act;
- The loss of between 2 and 20 ha of habitat critical to the survival may have a significant impact on the koala for the purposes of the EPBC Act. Whether this is more likely or unlikely depends on the characteristics of your action.

To determine whether the proposed action is likely to have a significant impact on the Koala, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 12**. An assessment against the *EPBC Act referral guidelines for the vulnerable Koala* is provided in **Section 7.4**.

Table 12: Significant Impact Assessment – Vulnerable Koala

Significant Impact Criteria	Description	Impact
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	Vegetation on-site is highly disturbed as a result of historical land uses. While the site does contain habitat assessed as critical for the Koala, field assessments failed to directly locate Koalas on-site despite targeted searches, with no indirect evidence of Koala usage recorded in the form of scats or scratches. As such, Koalas that could potentially utilise the site are considered transient individuals. It is therefore unlikely that an important population is present on-site, and so the action is considered unlikely to decrease the size of an important population.	No significant impact
2. Reduce the area of occupancy of an important population	An important population is not considered present on the subject site for the following reasons: ▪ No Koalas have been recorded on-site, despite the proximity to over 2500 ha of bushland to the west of the site. ▪ The site contains 32.27 ha of quality critical habitat with 10.6 ha not considered koala habitat due to this community being reflective of cleared open grazing paddock and land surrounding residential dwellings. The retention of 16.217 ha of vegetation will allow for connectivity and koala usage, regardless of no koalas being observed on-site. The proposal is not considered likely to reduce the area of occupancy for an important population as as no evidence of an important population was observed on-site.	No significant impact

3. Fragment an existing important population into two or more	An important population is not considered to utilise the site given widespread disturbance of vegetation and low evidence of Koala use. Consequently, the project is not considered likely to fragment an existing important population as no evidence of an important population was observed on site.	No significant impact
4. Adversely affect habitat critical to the survival of a species	Despite the subject site consisting predominantly of cleared paddocks retaining scattered eucalypts, this marginal habitat is considered as critical Koala habitat for the purpose of EPBC referral. The proposed action will result in the clearing of approximately 16.15 ha of critical Koala habitat as defined for the purpose of EPBC Act determination. In addition, no evidence of koala was detected during extensive field survey within the site, inclusive of the highly modified area deemed habitat critical to the survival of the koala onsite. Due to the small size (<20ha) of the proposed impact on "critical koala habitat", in conjunction with the retention and restoration of the habitat corridor, the action is unlikely to adversely affect habitat considered critical to the survival of the koala.	No significant impact
5. Disrupt the breeding cycle of an important population	Site surveys did not identify any breeding Koalas. No evidence of Koala activity was recorded on-site, and no individuals were recorded despite targeted searches. As such, the site is considered to most likely support transient individuals unlikely to constitute a breeding population or an important population.	No significant impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	While 16.15 ha of vegetation to be impacted across the site meets the broad definition of habitat critical to the Koala under the EPBC referral process, its removal is unlikely to have a significant impact on the availability of habitat in the landscape, given the vast quantity and availability of Eucalypts in the surrounding area. In addition, a central vegetated corridor comprising retained koala habitat trees and restoration of functional habitat, is to be implemented, reducing edge effects and fragmentation of habitat and providing continuous connectivity across the site towards to conservation area to the west. The restoration and enhancement of this corridor decreases fragmentation onsite and increases the quality of available vegetation in respect to the ecological and physical requirements of the koala as well as integrating safe movement within the development.	No significant impact

7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Domestic dogs have the potential to become feral, are considered a major threat to Koala survival and are currently present in the surrounding landscape, with large dog breeds currently known to inhabit the site as domestic pets. The proposed action is likely to increase the density of domestic dogs in the area, however, their potential to increase impacts on Koalas will be mitigated by effective governance as part of the policies for the retirement living complex. It is unlikely that the proposal will augment invasive species impacts already present in the area.	No significant impact
8. Introduce disease that may cause the species to decline	Most of South East Queensland's Koala populations already have a high prevalence of Chlamydia infection and Koala Retrovirus (KoRV), and sick Koalas have been recorded in the vicinity of the subject site. As such, the project is considered unlikely to cause pressure on the local Koala population to the point where these diseases manifest and the project is extremely unlikely to introduce or spread disease or pathogens into Koala habitat areas.	No significant impact
9. Interfere substantially with the recovery of the species	Analysis suggests the action is unlikely to interfere substantially with the recovery of the Koala, primarily due to the highly disturbed nature of the site and a lack of records of the Koala utilising the site. Further, the proposed development intends to retain and rehabilitate areas of core koala habitat and core corridors to facilitate connectivity. The site is presently connected to over 2500 ha of koala bushland to the west of the site, which is located within conservation areas and neighbouring bushland. The proposed development will not reduce this area of connectivity, with the proposed retained corridors located across the site (refer **Appendix A)** strategically located to enable continued connectivity from the site into the core koala habitat areas. The proposed retained corridors will also be rehabilitated and revegetated to ultimately lead to enhanced ecological outcomes within these corridors, and to ensure safe fauna movement throughout them can be retained.	No significant impact

7.5. Assessment against the Koala Referral Guidelines

On 30 April 2012, the Koala populations of Queensland, New South Wales and the Australian Capital Territory were scheduled as Vulnerable under the EPBC Act. This had the effect of making the Koala population in South East Queensland a MNES. As such, an action considered likely to have a significant impact on the Koala or Koala habitat must be referred for controlled action assessment. In December 2014, the '*EPBC Act Referral Guidelines for the Vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)*' ('Koala Referral Guidelines') were released to guide proponents in determining whether an action will have an impact on the Koala and require referral.

The report considers the environmental impacts against the Significant Impact Guidelines (refer **Section 7.4.6** above) and the Koala Referral Guidelines which support the Commonwealth Government scheduling of the Koala as a Vulnerable species under the provisions of the EPBC Act. The assessment methodology included site surveys (including Koala SAT survey techniques) and consideration of Commonwealth, State and Local Government environmental database searches.

To determine whether the proposed development will have an impact on the Koala, the flow chart **(Figure 6**) in the Koala referral Guidelines has been responded to in the following sections of the report along with an assessment against the Koala Habitat Assessment Tool (refer to **Table 13**).

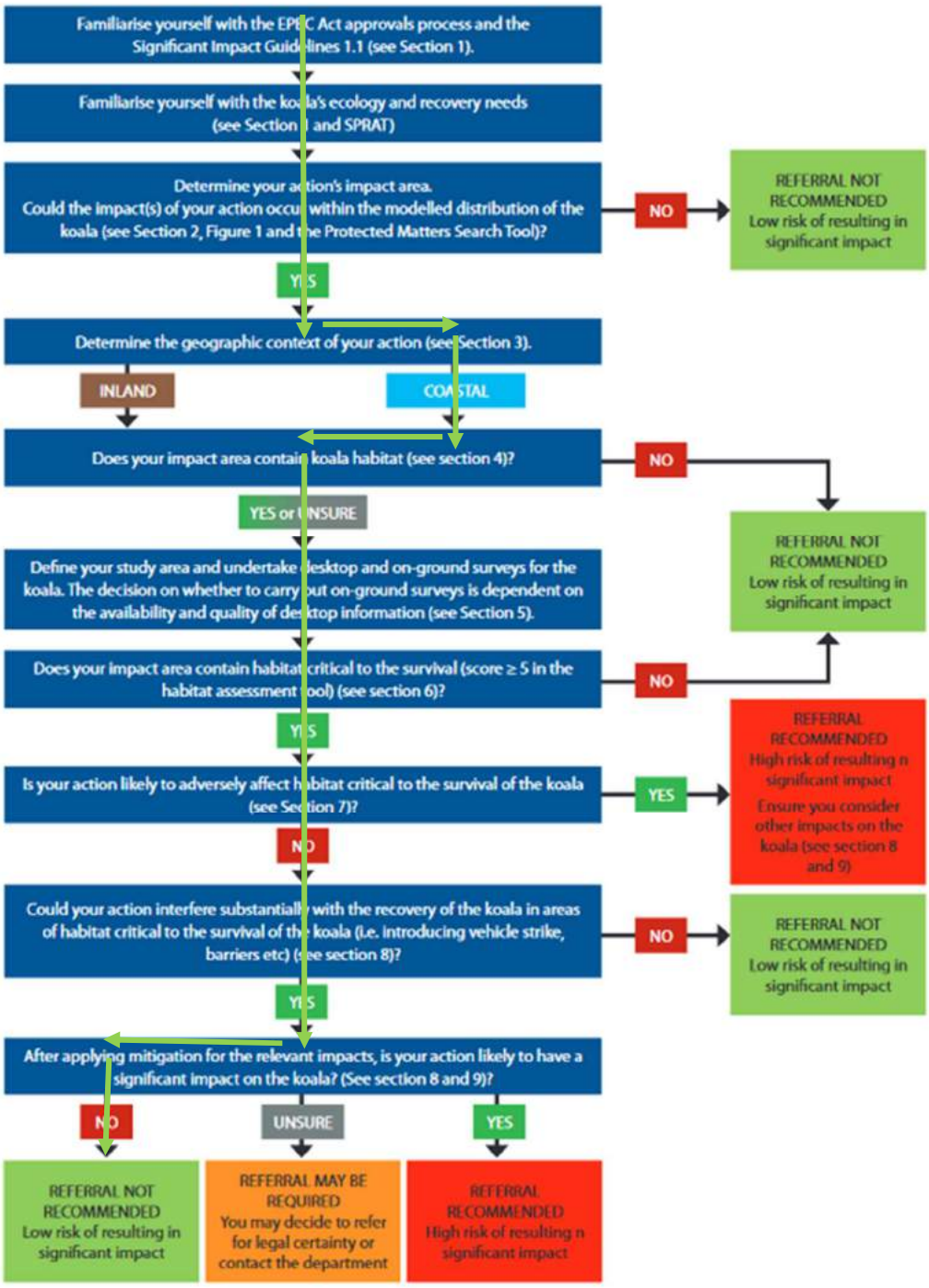

Figure 6: Summary of the EPBC Act referral guidelines for the Koala

Table 13: Koala Habitat Assessment Tool Assessment

Attribute	Score	Comment
Koala occurrence	**+1 (medium)**	**Desktop** The PMR using a 5 km radius identified the Koala as having the potential to occur on-site. WildNet identified 436 records of Koala within a 5 km radius of the site and ALA producing 32 records. AKF Koala map demonstrates that many koalas have been sighted within 10 km of the subject site, with many sick, injured, wasted or deceased reports (refer to **Plan 7** for Koala hospital incidents). **On-ground** Surveys conducted by SHG (May 2020, January 2021 and August 2021) resulted in no direct observations or indirect detections of Koalas in the form of scats. **There is evidence that one (1) or more Koalas within 2km of the edge of the impact area within the last 5 years. This attribute has been given a score of 1.**
Vegetation composition	**+2 (high)**	**Desktop** Regional ecosystem mapping published by the Queensland Government identifies the project area as containing both non-remnant (Category X) and remnant (Category B) vegetation (refer **Figure 4**). **On-ground** The site contains three (3) distinct vegetation communities, being: • High quality intact koala habitat dominated by *Eucalyptus racemosa* with *E. seeana*; • Good quality koala habitat dominated by *Melaleuca quinquenervia* with scattered *Eucalyptus tereticornis* and *E. siderophloia*; • Historically cleared, open understorey paddocks with canopy dominated by *Eucalyptus racemosa;* The remnant vegetation communities meets the definition of containing a vegetation structure of a 'woodland' or 'open forest'. **The site contains a 'woodland' or 'open forest' with two (2) or more known Koala food tree species, the vegetation composition attribute is given a score of 2.**
Habitat connectivity	**+2 (high)**	At present, the site has limited connectivity (in the form of open paddocks) to over 2500 ha of koala habitat to the west of the site within conservation area and connecting bushland. The proposed development will create full connectivity into this area of bushland through the retention and restoration

		of a lineal network of vegetated corridors across the site (refer **Appendix A** for the proposed Master Plan). The network of retained open space corridors are proposed along Fisheries waterways. These corridors will be wide enough such that they will allow for open space function while retaining the mapped waterways. Anticipated rehabilitation and restoration within these retained corridors are also expected to lead to overall enhanced riparian vegetation, waterway function and safe fauna movement opportunities than that which is present currently. The reinstatement of riparian vegetation is proposed to be reflective of the species composition of Least Concern RE12.3.6 *Melaleuca quinquenervia* open forest which is mapped on the VMA pre-clear mapping as naturally occurring along the alluvial plains in this region. RE12.3.6 is an essential habitat type for the Koala and as such, rehabilitation and revegetation of the retained waterway corridors with RE12.3.6 consistent species is considered to provide improved habitat values and connectivity on site into the future. Of note, earthworks may be required within the retained waterway corridors to achieve access to the north-eastern corner of the site, however as mentioned previously, an overall enhanced ecological environment is anticipated as a result of the development within the retained corridors. The site is presently minimally connected to some areas of koala habitat to the west of the site, via the north eastern corner of the site. However, the connectivity of the site is limited with the neighbouring lots cleared paddock with scattered trees present. The proposed development intends to enhance the waterway corridor on-site will in increase potential connectivity to suitable koala habitat in the west. Connectivity to the east is virtually non-existent due to highly modified landscapes due to historical land clearing, as well as the presence of Serpentine Creek Road severing connectivity east. Despite the site being connected to over 2500 ha of koala bushland immediately south of the site, no direct sightings of Koalas were recorded during the field survey. There was no evidence of koala usage identified during the eight (8) SAT surveys which were undertaken across the site. As such, no koalas were recorded utilising the site. Habitat on site is considered of only marginal value at best, and it is therefore considered likely that Koalas would choose to preferentially utilise intact bushland west of the site by comparison to the site which necessitates large areas of open ground to be covered between patches of relatively isolated trees. Further, threats to the persistence of koalas on site are considered high due to the presence of cattle on site and the sparse nature of vegetation on site necessitating koalas to travel distances on ground.

		The current connectivity of the site to surrounding areas of Koala habitat is over 2500 hectares. The proposed development will retain this area of connectivity. **Therefore, this attribute has been given a score of 2.**
Key existing threats	**0 (low)**	Two key existing threats pose a risk to survival of local Koala populations, vehicle strike and dog attack. **Vehicle Strike:** A review of the AKF Koala map, ALA Koala data and recent wildlife organisational publications shows that one (1) Koala vehicle hit has occurred along Serpentine Creek Road, approximately 1 km north of the site. It should be noted that many live sightings of the Koala in the broader region have been along or proximal to major road networks or highly modified environments. The location of these sightings indicates the risk of motor vehicle strike is considerably high. Additionally, it is noted that anticipated growth and planned residential development will result in increased traffic flow. **Dog Attack:** Large breeds of domestic dogs have been observed accessing the site unrestrained more than once across the subject site. A recent study completed by Gonzalez-Astudillo *et al.* (2017) analysed the Queensland Koala hospital data from 1997-2013 and found that 1,561 Koalas had injuries associated with trauma from animals, namely dogs. Further, Ipswich City Council's *Koalas in Urban Ipswich* guide suggests dog attacks can account for 40% of total Koala mortalities within an area. The likelihood of a Koala attack is increased when more than one dog is in a backyard, and during the periods of dawn and dusk when Koalas are most active. Further, studies completed as part of the Moreton Bay Rail project (DTMR 2016) found that between 2013 and 2016, 113 koalas had been killed by wild dogs with an additional 38 koala deaths suspected as wild dog predation, 82 koala deaths caused by illness and nine (9) vehicle strike deaths. These figures indicate that the threat of wild dog predation is at the forefront, while disease and vehicle strikes are also ongoing contributors to koala deaths. Refer to **Plan 7** for the hospital incidence within the locality.

		As threats from vehicle strikes and dog attacks are present in the area, the key existing threats attribute has been given a score of 0.
Recovery value	**+1 (medium)**	The interim recovery objective for coastal areas is based upon protecting and conserving large, connected areas of Koala habitat, particularly where Koalas are genetically diverse or distinct, free of disease or have a low incidence of disease or where there is evidence of breeding and to maintain corridors and connective habitat that allows movement of Koalas between large areas of habitat. The local Koala population is not considered genetically distinct from other Koala populations in SEQ. While the health of the local Koalas is unknown, diseases such as Chlamydia and Koala Retrovirus are extremely prevalent amongst SEQ Koalas. No evidence of breeding by koalas was observed on site. No juvenile or mature direct sightings were made of koalas, with eight (8) SAT surveys undertaken across the site identifying no usage of the site by the species. The proposed development intends to maintain and rehabilitate corridors and connective habitat areas that will allow for koala connectivity to the mapped core koala habitat areas. **The 'recovery value' attribute has been given a score of +1.**
Total	**6**	**As the habitat score is greater than five (5), the site is considered to provide critical habitat for the Koala.**

5. Critical Koala Habitat Analysis

Notes:
This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

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Legend

- Project Site Boundary
- Qld DCDB
- Site 1km buffer
- Percentage of Koala Critical Habitat within 1km of Impact Site - 35%
- Size of Koala Critical Habitat Adjoining the Impact Site - 2528 ha
- Percentage of Impact Area Boundary Length Supporting Koala Critical Habitat Connection - 2%
- Major Roads

Issue	Date	Description	Drawn	Checked
B	2/09/2021	Updated civil design	LS	KH

0 100 200 300 400 Meters

Transverse Mercator | GDA 1994 | Zone 56 | 1:15,000 @ A3

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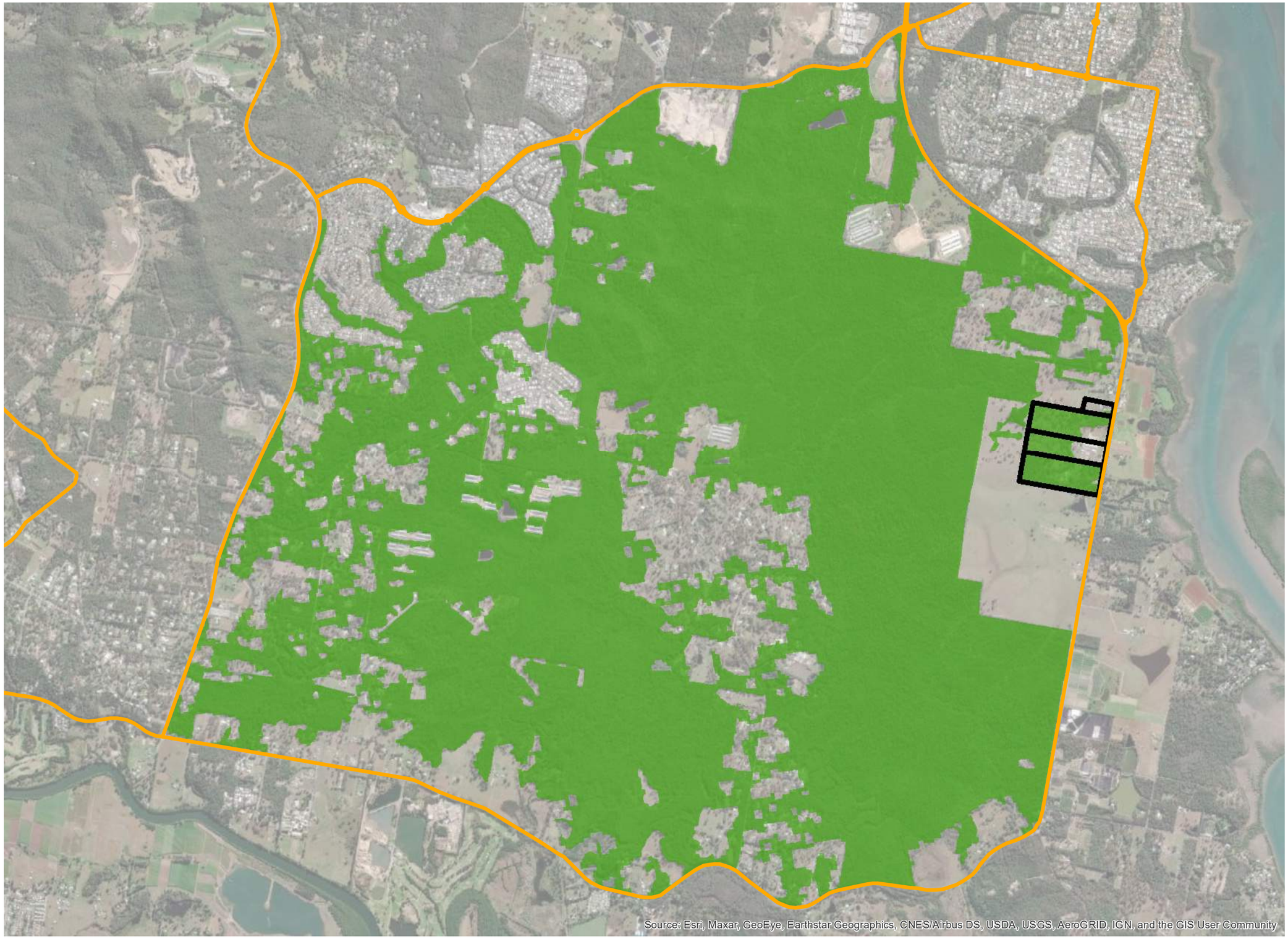
Serpentine Creek Road, Redland Bay

RPD: 1RP89514, 2RP89514, 3RP89514

2/09/2021 | 9080 E 04 Koala Context A

6. Contiguous Landscape Analysis



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Legend

- Project Site DCDB
- Qld DCDB
- Contiguous Landscape (2528ha)
- Major Roads

Issue	Date	Description	Drawn	Checked
B	2/09/2021	Updated civil design	TC	MM

0 200 400 600 800 1,000 Meters

Transverse Mercator | GDA 1994 | Zone 56 | 1:30,000 @ A3

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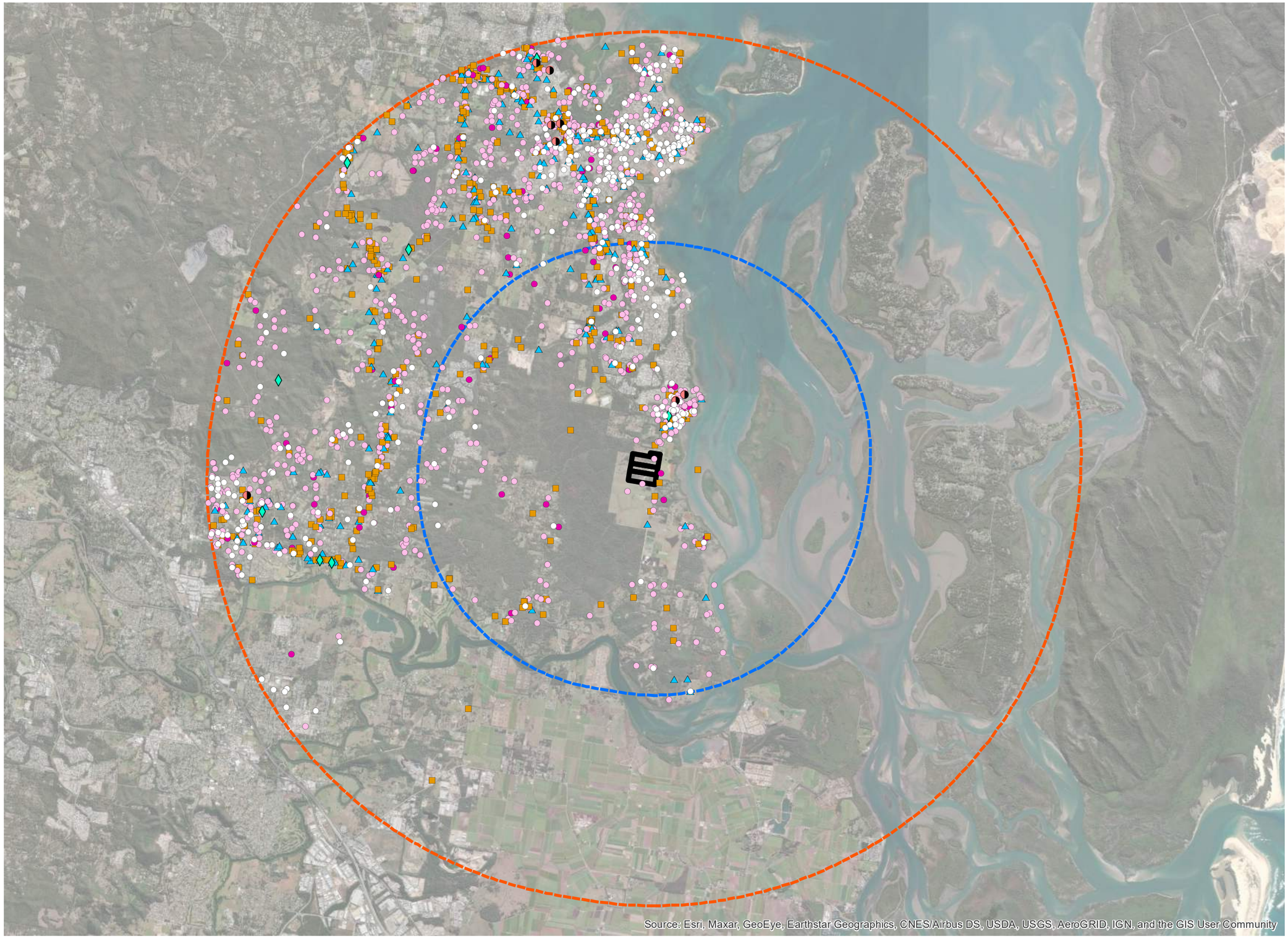
Serpentine Creek Road, Redland Bay

RPD: 1RP89514, 2RP89514, 3RP89514

2/09/2021 | 9080 E 05 Contiguous Landscape A

7. Koala Hospital Incident Locations



Notes:
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Legend

- Project Site DCDB
- Qld DCDB
- Site 10km Buffer

Qld Koala hospital records (all)

- Deceased (1,721)
- Injured (1,038)
- Sick and/or wasted (3,399)
- Sick & Injured (245)
- Vehicle hit (30)
- Orphaned (39)
- Fall & orphaned (1)
- Vehicle hit & orphaned (2)
- Other (2,415)

Issue	Date	Description	Drawn	Checked
B	2/09/2021	Updated civil design	LS	KH

0 1 2 3 Kilometers

Transverse Mercator | GDA 1994 | Zone 56 | 1:90,000 @ A3

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RPD: 1RP89514, 2RP89514, 3RP89514

2/09/2021 | 9080 E 06 Koala Hospital A