Assessment of options to reduce koala road-kill on Boundary Rd at Whites Hill Reserve

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Title: Assessment of options to reduce koala road-kill on Boundary Rd at Whites Hill Reserve

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Google Earth is acknowledged for the use of aerial imagery within the report and for the 'street view' images. Brisbane City Council is acknowledged for the map showing koala strike locations (Figure 2).

EXECUTIVE SUMMARY

Although no official population estimates have been derived, it is clear that koalas are currently thriving in Whites Hill Reserve (WHR) on Brisbane's southside. Our (University of Qld) previous surveys in limited sections of the reserve support this assertion, as does the experience of koala rescuers that regularly work in the area.

Given the demise of koalas throughout much of their range, it is extremely encouraging that WHR contains an abundant and evidently healthy population. However, this abundance poses its own management challenges.

The high number of vehicle strikes (>25 since 2006) and rescues for other reasons (e.g. 'misadventure'), from urban areas around WHR, is directly linked to the abundance of koalas in the reserve. Sadly, in the last five years many koalas (>10) have been hit and killed on Boundary Rd, at the western edge of the reserve.

This report provides recommendations on where/if exclusion fencing should be installed on Boundary Road to reduce the incidence of koala-vehicle strikes. The report is based on an examination of habitat and features of Boundary Rd at WHR. Several small habitat patches located on the opposite side of Boundary Rd to WHR were also examined for koalas and habitat values. Consideration was given to the importance of connectivity between these patches and WHR, and how exclusion fencing on Boundary Rd would affect this.

It is recommended that fauna exclusion fencing be installed at the northern end of Boundary Rd, near Indus Street and Eric Sivell Park. BCC mapping shows that this is a koala strike hotspot. It is also recommended that existing exclusion fencing at the southern end of Boundary Rd (at the koala bridge) be extended a considerable distance, to keep koalas off the curved stretch of the road where motorists have the least time to react. A map is provided to show the exact stretches of the road where fencing is recommended.

The proposed plan still leaves a long stretch of Boundary Rd unfenced. The main reason for this is to allow koala movement across the road. This may seem counterintuitive, but as outlined in the report, the long-term persistence of

koalas in habitat on the western edge of Boundary Rd and the neighbouring small bush patches is considered dependent upon connection to WHR. It has to be understood that koalas frequently cross roads without being hit, and the movement of individuals through the urban landscape has ecologically important consequences, especially for gene flow and avoidance of inbred populations.

The recommendations provided here have been difficult to settle on. There are no clear and obvious solutions that will 1. Eliminate the potential for koala road strike on Boundary Rd, and 2. Maintain connectivity and movement of koalas between WHR and the nearby occupied bush patches and parklands. Much consideration was given to the possible installation of structures that would provide safe movement solutions, in conjunction with fencing. Box culverts beneath roads are known to be used by koalas but no suitable culverts exist along Boundary Rd. All observed drainage channels/pipes beneath Boundary Rd were considered too small to be used by koalas.

The recommendations made in this report seek to strike a balance between reducing koala road-kill and maintaining connectivity across the broader landscape. It is also highly recommended that regardless of what measures are adopted, the situation should be reassessed within 2-3 years of completion, under an adaptive management framework. Such a review (of road-strike data etc) may highlight that more effective measures are required to help protect the important koala population in Whites Hill Reserve and associated bush patches.

ASSESSMENT AIMS

- Undertake an assessment and provide expert opinion on whether fauna exclusion fencing should be installed at additional sections of Boundary Road (Camp Hill); and

- Examine habitat that is located west of Boundary Road (incl. Coorparoo finger gullies and Eric Sivell Park), and confirm if occupied by koalas (based on koala sightings or presence of koala scat); and

- Produce a brief report with supporting map(s) that identify sections of the Boundary Road corridor where additional exclusion fencing is recommended (including the type & location of supplementary Wildlife Movement Solutions/management measures).

  In the following report, management recommendations and suggested movement solutions are provided in grey text boxes, immediately after discussion of each issue.

FIELD EXAMINATION

- An examination of habitat lining Boundary Road was conducted by Dr S. FitzGibbon in late September 2023. This involved walking along the edge of Boundary Rd from the intersection with Cavendish Rd, northwards along the edge of Whites Hill Reserve (WHR) to where Boundary Rd adjoins Eric Sivell Park (opposite Indus Street). The opposite side of the road was walked on return. Several structures and signs have already been installed along this stretch of Boundary Rd to support safe wildlife movement, including Wildlife Awareness Monitors (i.e. green LED signs with koala image), relocatable Variable Message Signs, overhead fauna bridge structure, wooden climb-outs, wildlife exclusion fencing and escape poles.
- During the field examination, observations were made on the current extent of fauna exclusion fencing, lighting, road-side vegetation, signage, visibility, and topographic features that likely influence collisions between vehicles and koalas.

- In addition to walking Boundary Rd, a brief examination was conducted of habitat at Eric Sivell Park, Satellite Street Park and the three small patches of bush situated between Mars Street and Orion Street (hereon referred to as the three 'finger gully patches') (Figure 1). The aim was to determine if these areas contained koalas, based on the observation of koalas or fresh scats.

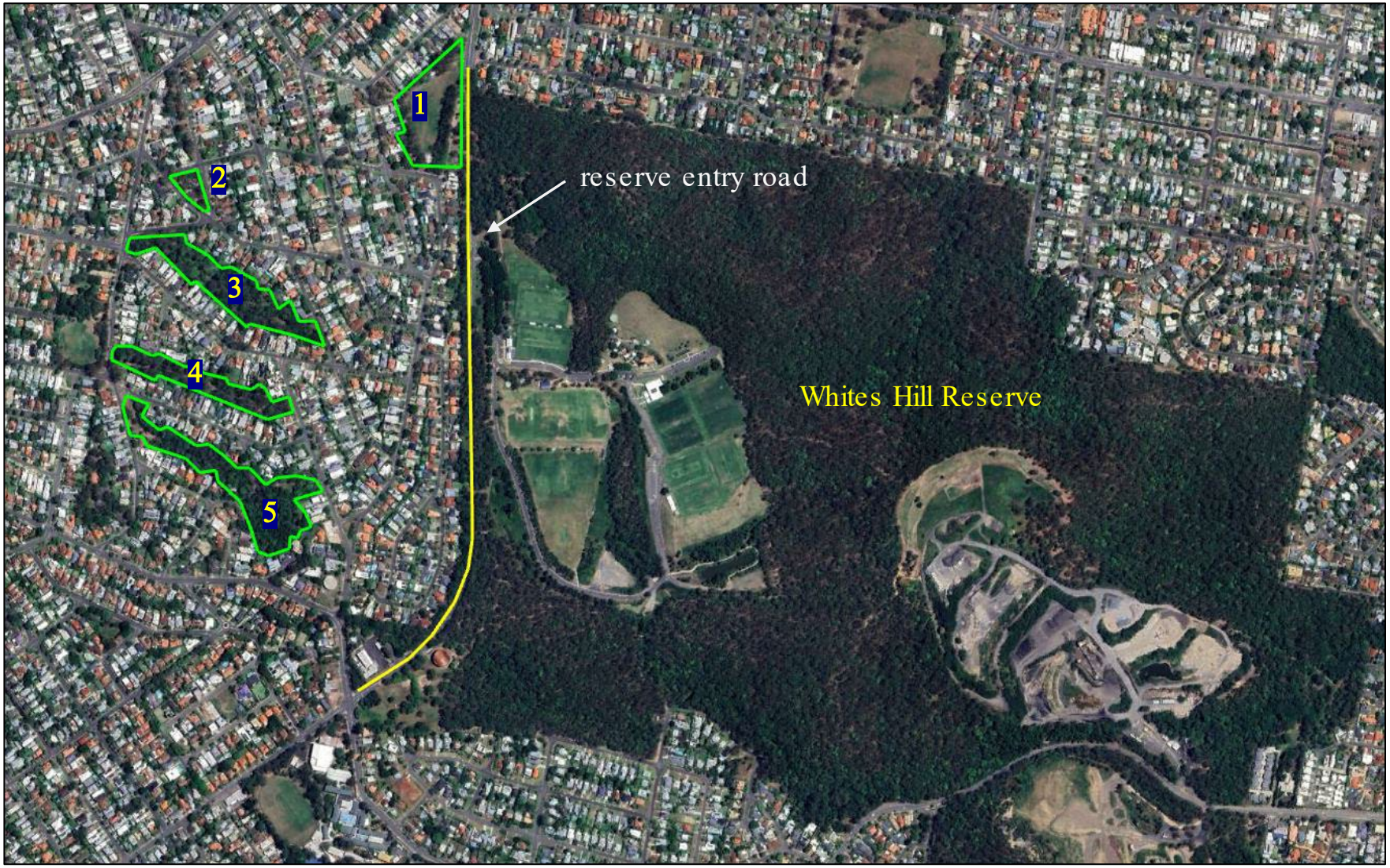

Figure 1. Aerial image showing the examined section of Boundary Rd, adjoining Whites Hill Reserve (yellow line) and examined habitat to the west: Eric Sivell Park (1), Satellite Street Park (2), and the finger gully patches (3-5).

BOUNDARY ROAD ASSESSMENT & RECOMMENDATIONS

1. **VEGETATION STRIP ON WESTERN SIDE OF BOUNDARY ROAD.**

The strip of vegetation on the western side of Boundary Rd (non-reserve side) provides habitat for koalas. The strip is 10-15m wide in most areas and contains a diversity of koala food and shelter trees. During the field assessment in September 2023, a mature female koala with back young was observed in this strip, following a very brief search. Koala scats were also found at numerous points along the western vegetation strip suggesting it is used by multiple koalas.

Our previous koala collaring program revealed that the strip of vegetation on the western side of Boundary Rd formed part of the home range of a monitored koala (see FitzGibbon et al. 2023). During the collaring study, additional individuals were regularly observed in the strip of vegetation. These were likely resident koalas that used the strip as part of their home range.

RECOMMENDATION 1:
The strip of vegetation lining the western side of Boundary Rd contains resident breeding koalas and should be managed as valuable koala habitat. The koalas in this strip should be considered as part of the WHR koala population. Connectivity between WHR and habitat on the western edge of Boundary Rd should be maintained.

2. **HABITAT AT ERIC SIVELL PARK, SATELLITE ST PARK & THE THREE FINGER GULLIES.**

The field assessment in September 2023 confirmed that the three finger gully patches are inhabited by koalas. Fresh koala scats were found in all three patches and koalas were observed in two. A koala (female with back young) was also observed in Satellite Street Park, and koala scats were found widely distributed in Eric Sivell Park. Each of these areas contains mature koala food

trees that are clearly providing habitat for resident koalas.
Brief discussions with several local residents suggest there is a high level of appreciation that koalas occur in these small bushland areas amongst residential estates.

The combined area of habitat contained in the three finger gully patches (7.7ha), Eric Sivell Park (1.7ha) and Satellite Street Park (0.3ha) is considered too small to support a viable population of koalas, without connectivity to a larger source population. The only nearby habitat that contains an abundant source of dispersing koalas is Whites Hill Reserve. This should be borne in mind when considering fencing options for Boundary Rd.

It is highly likely that koalas move regularly between WHR and the examined areas (three finger gully patches, Eric Sivell Park, Satellite Street Park). Koalas are very mobile and frequently attempt to traverse urban areas and roadways to access habitat and potential mates. This is discussed further at Pt 3 below.

The strip of vegetation on the western edge of Boundary Rd also likely serves as a linkage between WHR and Eric Sivell Park. Similarly, there is a strip of vegetation at the southern end of Capella St which likely enhances the connectivity between WHR and the most southerly finger gully patch. The examined small habitat patches may act as important 'stepping stones' for individuals dispersing between them, WHR and possibly more distant habitat.

The long-term persistence of koalas in the examined small patches and parklands is considered dependent upon connectivity to the WHR koala population. If this connectivity was severed, then it is considered likely that koalas would eventually become locally extinct in these small bush areas.

RECOMMENDATION 2:
Koalas that occur in Eric Sivell Park, Satellite St Park and the three finger gully patches should be conserved and managed as part of the WHR population. The long-term persistence of koalas in Eric Sivell Park, Satellite St Park and the three finger gully patches is considered dependent upon the maintenance of koala movement between these areas and WHR.

3. **BALANCING VEHICLE STRIKE THREAT AND THE MAINTENANCE OF CONNECTIVITY – AN EXAMINATION OF TOPOGRAPHIC FEATURES, EXISTING STRUCTURES, FENCING OPTIONS AND POTENTIAL MOVEMENT SOLUTIONS.**

Currently, although koalas are occasionally hit on Boundary Road, it also provides connectivity between WHR and habitat on the western road edge and the examined small bush patches. Koalas are very capable of traversing Boundary Rd (it is relatively narrow), but this puts them at risk of vehicle strike, especially during periods of high traffic flow after dark. During the field assessment in September 2023, there was a focus on possible measures to reduce the threat of koala strikes by vehicles, while maintaining functional connectivity across the road.

BCC mapping shows that numerous koalas have been hit by vehicles along the examined stretch of Boundary Rd between 2016 and 2022 (Figure 2). In addition, the recent submission by the *Save the Koalas and Wallabies of Whites Hill* community group suggests there have been numerous other koala road-strikes in 2023 (STK&W of WH community submission, 2023). These data were collected prior to the recent speed limit reduction (from 70km/hr to 60km/hr).

Figure 2. Aerial image showing the mapped locations of recorded koala-vehicle strikes around Whites Hill Reserve, between 2016 and 2022.

Image attribution: Brisbane City Council 2023.

Based on the field inspection in September 2023, it would not be possible to install fauna exclusion fencing along the entire length of Boundary Rd that is the subject of this assessment. This is due to the reserve entrance road at the set of traffic lights (see label in Figure 1). This entrance road would form an unavoidable break in the fence, if one was to be installed on the reserve side.

This creates a challenging situation in that incomplete fencing can have unintended negative consequences if koalas (and other wildlife) are able to access the road corridor through breaks, but have limited opportunity to escape from it due to fencing. Escape poles / egress devices can be installed to try and mitigate this issue but if these are not utilised by koalas (as has been observed to sometimes occur), incomplete fencing can act as a 'road corridor trap', keeping koalas in the road corridor where they are at risk of vehicle strike. This issue is more pronounced for macropods (e.g. wallabies) if they access such roads through fence breaks, as they are unable to utilise escape poles.

Following on from Recommendations 1 & 2 above, even if exclusion fencing was installed along the full length of Boundary Rd (excl. the reserve entrance road), this would essentially sever the connection between WHR koalas and koalas in 1. habitat on the western side of Boundary Rd, and 2. the examined small bush patches. If exclusion fencing was to be installed along the full length of Boundary Rd, the concomitant installation of one or more effective wildlife crossing structures would be required to maintain this connectivity. The most common wildlife crossing structures that are known to be effective for koalas to cross fenced roads are culverts / drainage channels (Taylor 2023). Culverts can offer a safe passage for koalas and other wildlife to cross beneath roads, especially when exclusion fencing is able to help guide them to such structures.

Based on the results of the field inspection conducted in September 2023, there are no obvious options to encourage koalas to travel under Boundary Rd through existing culverts. All drainage channels / pipes that could be found under Boundary Rd appeared too small and narrow, and several were also unsuitable due to the presence of pit collection drains on one side (resulting in the pipe being well below ground level). The installation of suitable culverts under Boundary Rd could be considered, but this is not recommended at this stage. This measure would also likely come at considerable expense (due to required road excavation) and these funds might be better utilised on other koala conservation measures.

A length of fauna exclusion fencing was recently installed at the southern end of Boundary Rd (nr. the water reservoir & dog park). This fencing was installed as part of the koala bridge construction. The exclusion fencing extends part way along the curved section of Boundary Rd. On the reserve side of Boundary Rd this fence is relatively short (30m long). On the other side (western) the fence is much longer (160m). Again, this creates a potential 'road corridor trap' for koalas that may cross Boundary Rd from the unfenced stretch on the reserve side, where there is fencing installed opposite. In this section, it is easy for koalas to cross from the east to the west, but the fencing prevents a quick exit off the road corridor (Figure 3).

To alleviate this situation, numerous escape poles have been installed (see yellow arrows, Figure 3). However, if koalas fail to utilise the escape poles then the fencing can act to keep koalas in the road corridor, increasing the risk of vehicle strike. As mentioned, this issue is exacerbated for macropods as they are unable to climb and utilise escape poles.

Figure 3. Image looking north-east along Boundary Rd where fauna exclusion fencing has only been installed on the non-reserve (western) side of the road. Numerous escape poles have been installed to provide koalas with an option to exit the road corridor (two examples indicated by yellow arrows).

Image attribution: Google Earth (Street View) 2023.

Given the koala road-strike mapping and the site-specific challenges to reducing strike potential while maintaining connectivity across Boundary Rd, it is suggested that a combination of management actions be adopted.

RECOMMENDATION 3:

The fauna exclusion fencing at the southern end of Boundary Road should be extended northwards down the entire curved section of Boundary Rd, terminating just past the first cutting where the road straightens (Figure 4). This will help keep koalas and other wildlife off the curved stretch of Boundary Rd where motorists have reduced visibility and time to react to wildlife on the road.

The fence should terminate at the same point on each side of the road to reduce the potential for creating a 'road corridor trap' (see Figure 4). Taking the fencing past the first cutting would remove the potential for this physical barrier to result in road-strikes.

Escape poles should be installed at regular intervals on each side of the road, along the length of the fence.

RECOMMENDATION 4:

Given the cluster of mapped koala strikes near Indus Street / Eric Sivell Park, fauna exclusion fencing could be installed in this section of Boundary Rd (Figure 4).

At the northern end, the fence should wrap near, or just before, Indus St to try to prevent koalas from WHR walking around the fence end. On the Eric Sivell Park side, the fence should extend to the northern tip of the park and also wrap around to prevent koalas moving from the park towards the intersection with Winstanley Street.

It is suggested the fence extend southwards on both sides to the existing gated entrance to the WHR management track (Figure 4). This would result in approximately 150m of exclusion fencing.

Escape poles should be installed at regular intervals on each side of the road, along the length of the fence.

The fencing recommendations will leave a stretch of Boundary Rd unfenced (approximately 740m), where koalas may still attempt to cross the road. As previously mentioned, this natural movement is of ecological importance. It also means that there is still the potential for koala strikes, and some level of annual road mortality is to be expected. Additional measures such as improved lighting and verge visibility will help to reduce this potential and limit mortalities of koalas and other wildlife on Boundary Rd.

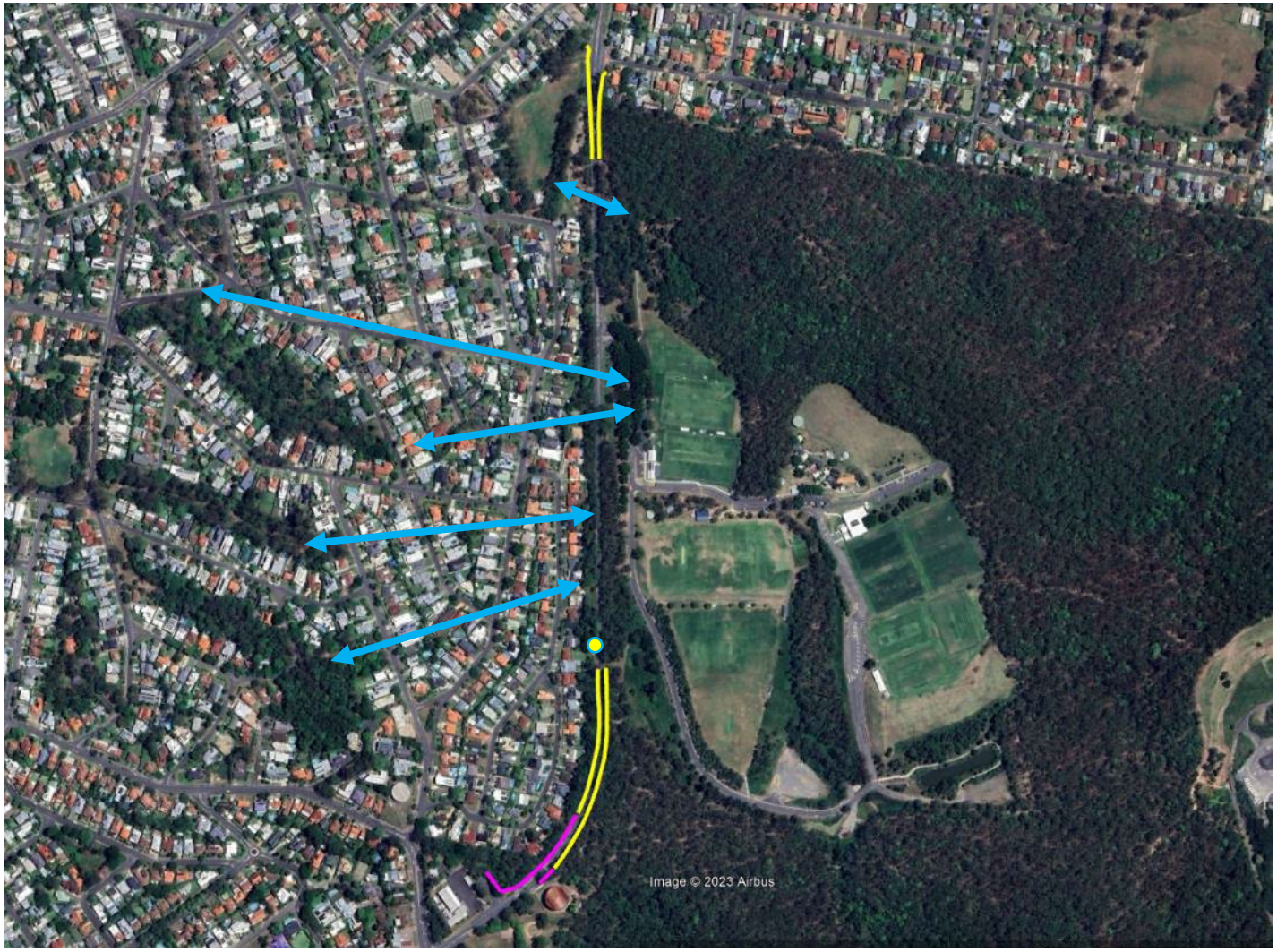

Figure 4. Aerial image showing the existing fauna exclusion fencing (pink lines) at the southern end of Boundary Rd. It is recommended that this fence be extended (yellow lines). It is also recommended that new fences be installed at the northern end of Boundary Rd (yellow lines). Potential koala movement pathways into and out of WHR are shown (blue arrows). The location of a gap in overhead road lighting is indicated near the end of the proposed southern fence extension (yellow dot).

CONCLUSION

The abundance of koalas in Whites Hill Reserve is extremely encouraging but poses its own management challenges. The high number of vehicle strikes (>25 since 2006) and rescues for other reasons (e.g. 'misadventure'), from urban areas around WHR, is directly linked to the abundance of koalas in the reserve.

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Regardless of what measures are adopted, it is highly recommended that the situation be reassessed within 2-3 years of completion, under an adaptive management framework. Such a review (of road-strike data etc) may highlight that more effective measures are required to help protect the important koala population in Whites Hill Reserve and associated bush patches.

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