Pitt Town Bypass

Review of environmental factors consistency review

Roads and Maritime Services | November 2019

NSW GOVERNMENT

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Prepared by Arcadis and Roads and Maritime Services

Document controls

Approval and authorisation

Title	Pitt Town Bypass review of environmental factors consistency review
Accepted on behalf of Roads and Maritime NSW by	Panduka Manamperi Project Development Manager
Signed:	
Dated:	November 2019

Document status

Document status	Date	Prepared by	Reviewed by
Draft	19/08/2019	Ben Fethers / Javier Valderrama	Peter Rand / Faraz Ahmed
Final	4/11/2019	Javier Valderrama	Javier Valderrama

Contents

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Appendices

1. Introduction

1.1 The determined project

Roads and Maritime Services (Roads and Maritime) completed a review of environmental factors (REF) of the Pitt Town Bypass in November 2018. The REF described the project, assessed the potential environmental and social impacts associated with the construction and operation of the project and identified safeguards and management measures to avoid, mitigate or manage those potential impacts.

The REF was placed on public display between Monday 12 November and Monday 10 December 2018. Following public display, submissions received were considered and responded to by Roads and Maritime in the *Pitt Town Bypass REF Submissions Report*.

After consideration of the REF and submissions report, Roads and Maritime made a decision to proceed with the project as defined in the REF on February 2019.

1.2 Purpose

This consistency review is prepared when there is a proposed modification to a determined REF. It helps to ensure that any proposed modifications are undertaken in accordance with the statutory requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The purpose of this consistency review is to:

- Describe the determined project and the proposed modification
- Review the potential environmental impacts of the proposed modification against the environmental impacts of the determined project
- Decide whether or not the proposed modification is consistent with the determined project in accordance with the EP&A Act and the EPBC Act requirements
- Based on the decision of whether or not the proposed modification is consistent with the determined project, identify any further environmental impact assessment or environmental management requirements applicable to the proposed modification.

2. The proposed modifications

2.1 Description and need of proposed modifications

Design development carried out since the project was determined has resulted in a number of locations where the design extends outside the project REF boundary. These locations are shown in Figure 2-1, Figure 2-2, and Figure 2-3and described in Table 2-1..

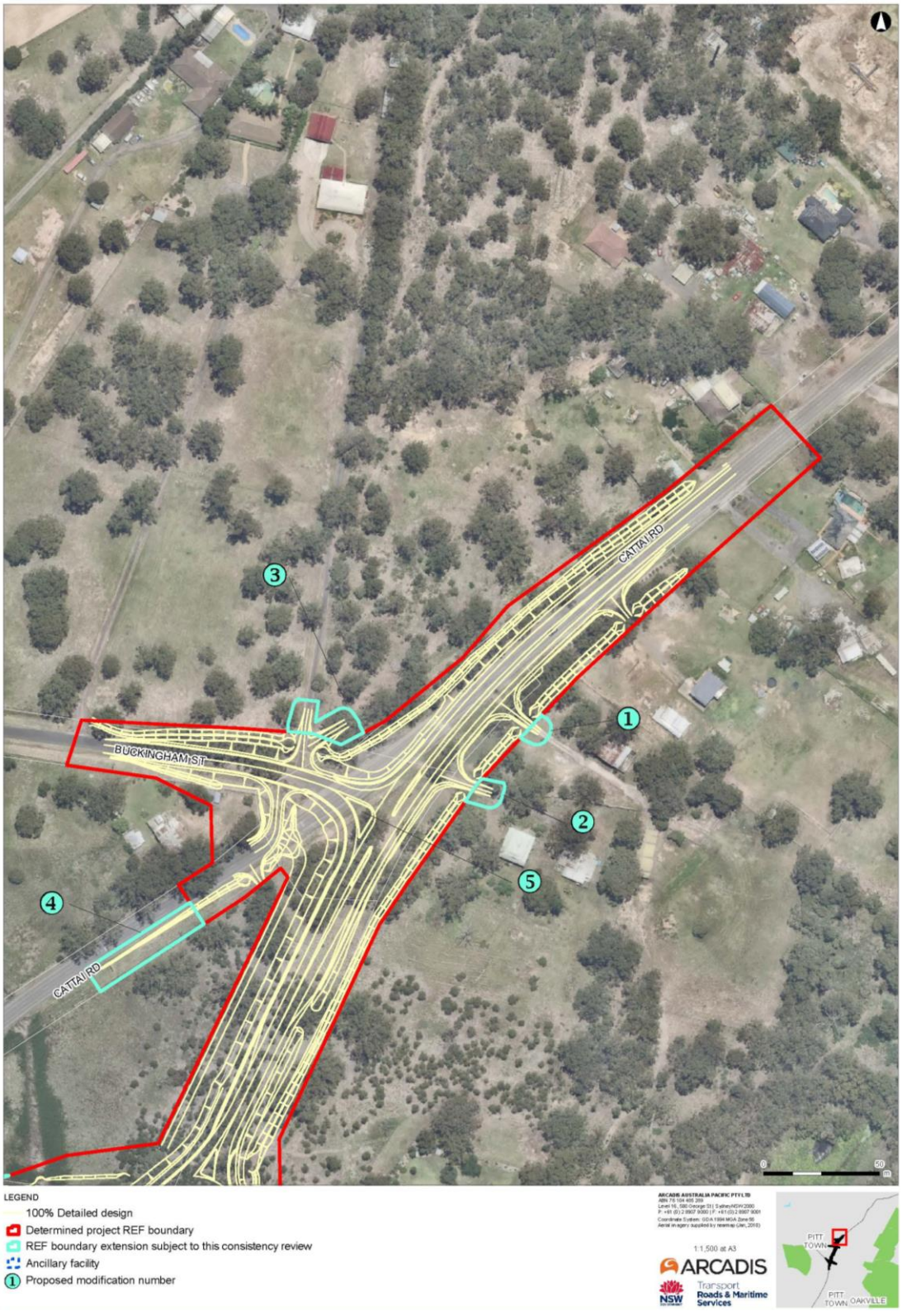


Figure 2-1 Proposed modifications (map 1)

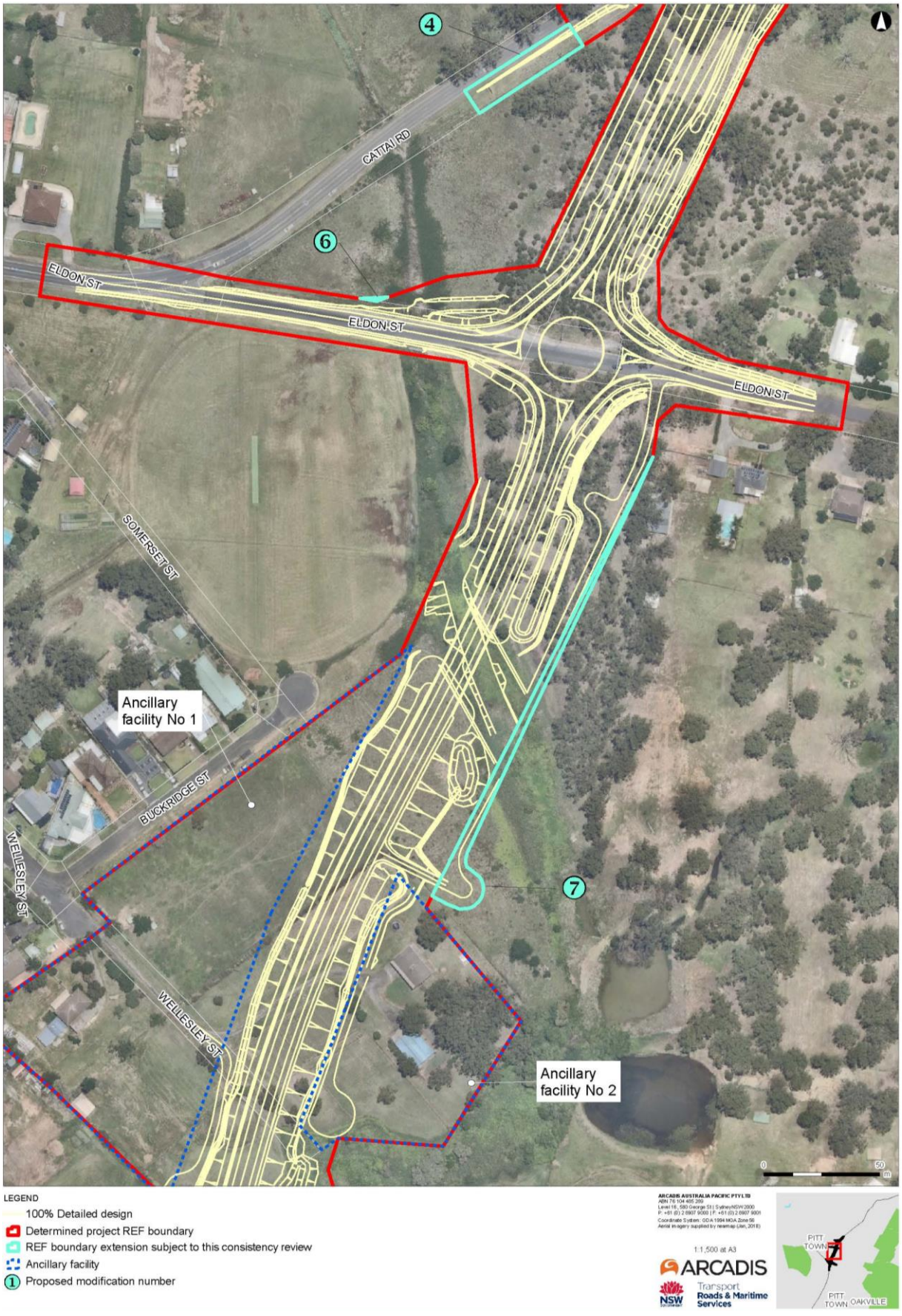


Figure 2-2 Proposed modifications (map 2)

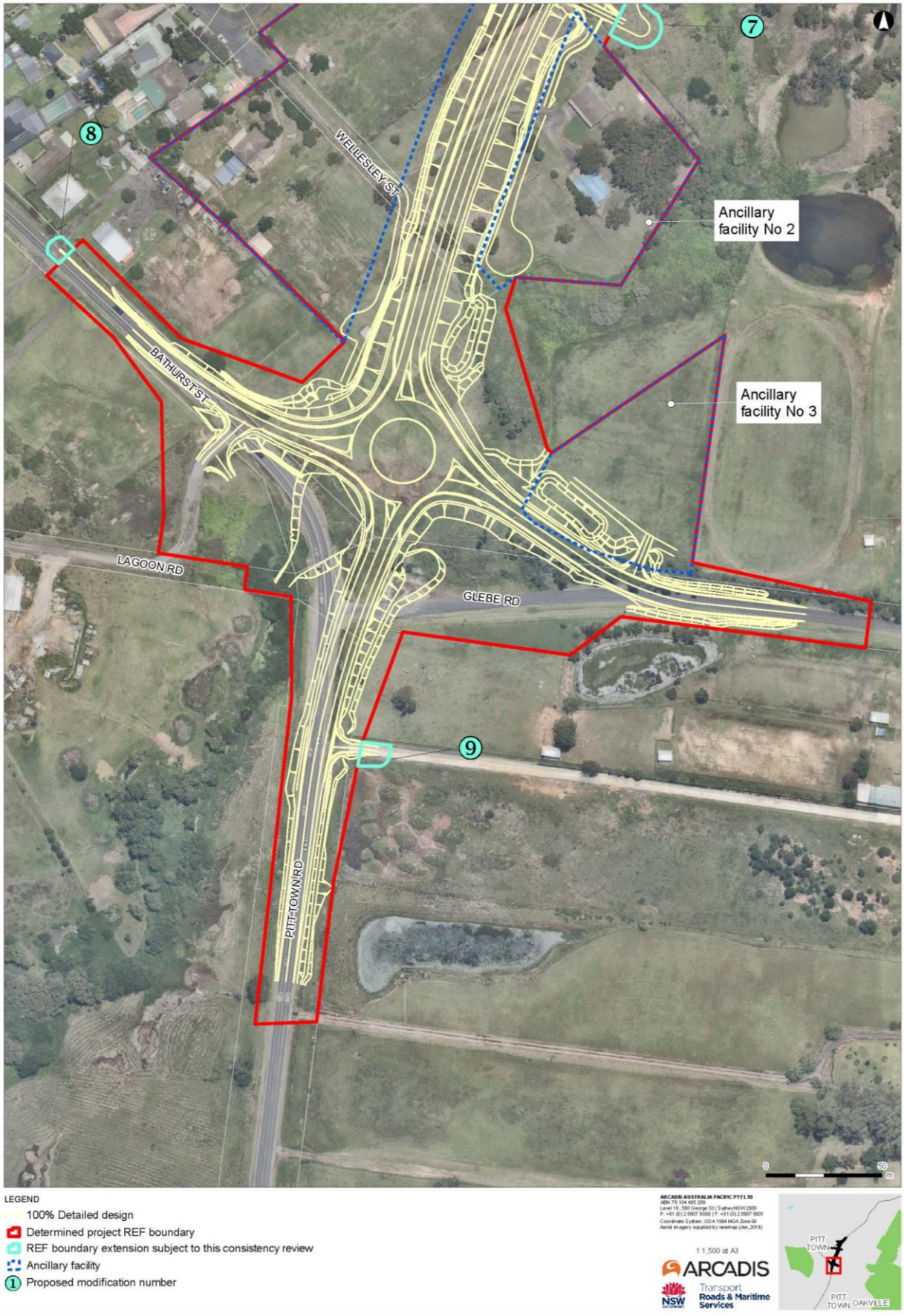


Figure 2-3 Proposed modifications (map 3)

Table 2-1 Proposed modifications

Modification number (see Figure 2-1)	Modification description	Modification need
1	Private property access road design slightly extends outside the REF boundary.	Modification is required to provide safe access to the residents of 38 Cattai Road, Pitt Town. This modification is consistent with the project objective of improving connectivity and safety for road users and the local community.
2	Private property access road design slightly extends outside the REF boundary.	Modification is required to provide safe access to the residents of 8 Cattai Road, Pitt Town. This modification is consistent with the project objective of improving connectivity and safety for road users and the local community.
3	Private property access road design and drainage infrastructure slightly extends outside the REF boundary.	Modification is required to provide safe access to the residents of 61 Buckingham Street, Pitt Town. This modification is consistent with the project objectives of improving connectivity and safety for road users and the local community and minimising environmental impacts.
4	Cattai Road drainage and road design slightly extends outside the REF boundary.	Modification is required to maintain and improve drainage conditions and minimise flood impacts to adjacent land uses. It is also required to enable tie in with the existing road infrastructure. This modification is consistent with the project objectives of improving travel times and conditions for general traffic and freight through movements; maintaining acceptable operation of intersections with sufficient separation or storage of turning traffic from through traffic; and improving connectivity and safety for road users and the local community.

Modification number (see Figure 2-1)	Modification description	Modification need
5	Traffic movements at the Buckingham Street / Cattai Road intersection were left turn in and out of Buckingham Street only in the project REF. A right turn from Buckingham Street onto Cattai Road, and a right turn from Cattai Road into Buckingham Street have been added to the allowed traffic movements at this intersection.	Modification is required to address community feedback received during the REF public display and to address environmental safeguard No TT6: *Roads and Maritime will examine potential options for a right turn from Buckingham Street onto Cattai Road, and for a right turn from Cattai Road into Buckingham Street, where these can be designed to meet established road safety standards including adequate visibility and stopping distances for approaching traffic.* This modification is consistent with the project objectives of improving travel times and conditions for general traffic and freight through movements; maintaining acceptable operation of intersections with sufficient separation or storage of turning traffic from through traffic; and improving connectivity and safety for road users and the local community.
6	The REF boundary has been slightly extended to match the property acquisition boundary.	Modification is required to ensure construction contractor has adequate space for the construction of new infrastructure. This modification is consistent with the project objective of improving connectivity and safety for road users and the local community.
7	Drainage infrastructure and maintenance access track extend outside the REF boundary.	Modification is required to provide sufficient space for these design elements. This modification is consistent with the project objective of improving connectivity and safety for road users and the local community and minimising environmental impacts.
8	Bathurst Street road design slightly extends outside the REF boundary.	Modification is required to enable tie in with the existing road infrastructure. This modification is consistent with the project objectives of improving travel times and conditions for general traffic and freight through movements; maintaining acceptable operation of intersections with sufficient separation or storage of turning traffic from through traffic; and improving connectivity and safety for road users and the local community.

Modification number (see Figure 2-1)	Modification description	Modification need
9	Private property access road design and drainage infrastructure slightly extends outside the REF boundary.	Modification is required to provide safe access to the residents of 402 Pitt Town Road, Pitt Town. This modification is consistent with the project objectives of improving connectivity and safety for road users and the local community and minimising environmental impacts.

2.2 Consultation

Given that the proposed modifications are minor in nature, no specific stakeholder and/or community consultation for the proposed modification has been carried out.

3. Consistency review

3.1 Potential environmental impacts

Table 3-1 compares the potential environmental impacts of the proposed modifications against the environmental impacts of the determined project. Relative impacts (ie additional positive, negative and/or neutral construction and operational impacts) that would result from the proposed modifications are compared against impacts of the determined project for each environmental aspect.

Table 3-1: Comparison of environmental impacts

<table>
<tr><th>Environmental aspect</th><th>Relative environmental impacts of the proposed modifications compared to the determined project</th></tr>
<tr><td>Biodiversity</td><td>The proposed modifications would result in a minor increase vegetation removal as follows:
<table>
<tr><th>Vegetation community</th><th>Impacted area (ha)</th></tr>
<tr><td colspan="2">Native vegetation</td></tr>
<tr><td>Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion (PCT 724)</td><td>0.041</td></tr>
<tr><td>Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT849)</td><td>0.015</td></tr>
<tr><td>Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion (PCT 1071)</td><td>0.013</td></tr>
<tr><td colspan="2">Non-native vegetation</td></tr>
<tr><td>Mixed native and exotic vegetation</td><td>0.004</td></tr>
<tr><td>Exotic Grassland</td><td>0.133</td></tr>
</table>
Vegetation removal areas are minor extensions to the existing clearing boundary, such that no new edge effects would be incurred by the design modifications. Vegetation removal would not result in any additional direct impacts to threatened flora species.

The project REF concluded the project would not result in a significant impact to threatened species, populations and ecological communities listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) or Biodiversity Conservation Act 2016 (BC Act). The additional impacts from design modifications would not change this conclusion and no significant impacts are anticipated.

The safeguards and mitigation measures outlined in the REF are considered suitable to mitigate, manage or safeguard any additional impacts generated as a result of the design modifications. Updated significance assessments to account for incremental impacts to biodiversity values listed under the BC Act and EPBC Act as well as an updated biodiversity offset strategy (BOS) has been prepared to account for the design modifications and are presented in Appendix A.</td></tr>
<tr><td>Noise and vibration</td><td>During construction, the proposed modifications would have minor short-term construction noise impacts; however, these impacts are unlikely to be substantially different from the impacts assessed in the project REF. Project REF measures to manage construction noise and vibration impacts will be sufficient to manage impacts from the design modifications.

No additional impacts are expected during operation.</td></tr>
</table>

Environmental aspect	Relative environmental impacts of the proposed modifications compared to the determined project
Aboriginal cultural heritage	During construction, the proposed modifications would result on a minor (less than 0.01 hectare) additional impact on two potential archaeological deposit sites: PTBP AFT 1 and PTBP 1. However, project REF measures to manage Aboriginal cultural heritage impacts include archaeological salvage excavations and application for an AHIP for the above sites. No additional impacts are expected during operation.
Non-Aboriginal heritage	A revised statement of heritage impacts has been prepared for this consistency assessment as is presented in Appendix B. No additional impacts to the curtilage of the 'the Cottage' are anticipated as a result of the proposed modifications during construction or operation. No additional impacts to areas with potential for significant archaeological remains have been identified as a result of the proposed modifications.
Hydrology	During construction, no additional impacts are anticipated as there would be no additional creek diversions, in-stream structures in watercourses or design elements upstream from waterways to those assessed in the project REF. During operation, the design modifications would reduce predicted afflux at some locations and allow stormwater to continue to travel underneath new access driveways.
Water quality	No additional water quality impacts are anticipated as a result of the proposed modifications during construction or operation.
Soils and contamination	During construction, there is potential to encounter acid sulfate soils (ASS) at some locations. The project REF outlines environmental safeguards to manage ASS including the preparation of an ASS management plan. These safeguards will be sufficient to manage impacts generated by the design modifications. No additional impacts are expected during operation.
Landscape character and visual	During construction, construction activities, equipment and vegetation clearing would be slightly closer to some sensitive receivers; however, this would not change the visual impact assessment documented in the project REF. During operation, the proposed modifications would not change the visual and landscape character impact assessments documented in the project REF.
Property and land use	The proposed modifications would not require additional temporary or permanent acquisition of land, would not change property access arrangements or result on the creation of residual lots during construction or operation.
Socio-economic	The proposed modifications would not result on impacts to business, employment, community values, population and demography during construction and operation. During operation, the additional right turn from Buckingham Street onto Cattai Road, and right turn from Cattai Road into Buckingham Street are expected to have a marginal improvement on access and connectivity within the Pitt Town community. These additional intersection movements have been included at community request.

Environmental aspect	Relative environmental impacts of the proposed modifications compared to the determined project
Traffic and access	During construction, the proposed modifications would not substantially change the construction traffic movements, predicted intersections level of service of the impacts on evacuation routes. During operation, the Buckingham Street / Cattai Road intersection would have a right turn from Buckingham Street onto Cattai Road, and a right turn from Cattai Road into Buckingham Street. Local traffic would not need to travel via local streets before accessing the bypass which is considered an improvement on the bypass access and connectivity. The intersection has been designed to meet established road safety standards, including adequate visibility and stopping distances for approaching traffic.
Air quality	During construction, construction activities associated with the proposed modifications would generate dust and emissions; however, dust impacts are unlikely to be substantially different from the impacts assessed in the project REF. Project REF measures to manage dust and emissions will be sufficient to manage impacts from the design modifications. No additional impacts are expected during operation.
Greenhouse gas and climate change	During construction, the proposed modifications would marginally increase emissions from use of plant and equipment, construction materials and vegetation removal; however, emission increases would have no material change on the construction greenhouse gas emissions documented in the project REF. Project REF measures to manage greenhouse gas emissions will be sufficient to manage impacts from the design modifications. No additional greenhouse gas emissions are expected during operation.
Waste	During construction, the proposed modifications would not change the waste streams likely to be generated by the proposal but would marginally increase the amount of waste generated. Project REF measures to manage waste during construction will be relevant and sufficient to manage impacts from the design modifications. No additional waste streams are expected during operation.
Cumulative impact	No additional cumulative impacts are anticipated as a result of the proposed modifications during construction or operation.

3.2 EPBC Act factors

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered for the proposed modification.

Table 3-2: Comparison of EPBC Act factors

Factor	Consideration of the relative impact of the proposed modification compared to the determined project and if applicable any change to the EPBC strategic assessment or other EPBC approval
Any impact on a World Heritage property?	Nil (no change from Project REF).

Factor	Consideration of the relative impact of the proposed modification compared to the determined project and if applicable any change to the EPBC strategic assessment or other EPBC approval
Any impact on a National Heritage place?	Nil (no change from Project REF).
Any impact on a wetland of international importance?	Nil (no change from Project REF).
Any impact on a listed threatened species or communities?	The proposed modifications would result on removal of 0.04 hectares of Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT849). The project REF Significant Impact Criteria assessments for Matters of National Environmental Significance concluded that a significant impact to Matters of National Environmental Significance is not likely. The additional impacts from design modifications would not change this conclusion and no significant impacts are anticipated. Refer to project REF for mitigation measures to minimise impacts on listed threatened species and communities. Residual impacts on critically endangered ecological communities will be addressed through a Biodiversity Offset Strategy.
Any impacts on listed migratory species?	Nil (no change from Project REF).
Any impact on a Commonwealth marine area?	Nil (no change from Project REF).
Does the proposal involve a nuclear action (including uranium mining)?	Nil (no change from Project REF).
Additionally, any impact (direct or indirect) on Commonwealth land?	Nil (no change from Project REF).

3.3 Licences, permits and approvals

The determined project requires Aboriginal heritage impact permits under the *National Parks and Wildlife Act 1974* prior to commencement of works affecting sites PTBP 1, PTBP AFT 1, PTBP AFT 2 and PTBP AFT 3. The proposed modifications would not change this requirement.

The proposed modifications would not require any additional licence, permit of approval.

3.4 Consistency review

Table 3-3 below presents a set of questions to assist in identifying whether the proposed modification is consistent with the determined project, or if further environmental impact assessment is required. These questions are addressed with consideration to the information above.

Table 3-3: Consistency review questions

Consistency questions	Discussion	Response
Q1) Is the proposed modification to be carried out as part of a project which has a determined REF?	The proposed modifications are part of the determined REF.	Yes
Q2) Is the proposed modification so different in scope and impacts to the determined REF as to be a radical transformation and so, in reality, an entirely new project?	The proposed modifications do not constitute a new project. As described in Figure 2-3 Proposed modifications (map 3) Table 2-1, the proposed modifications are minor and nature and mainly small localised extensions of the REF boundary. Sections 3.1 and 3.2 demonstrate impacts from the proposed modifications are consistent with the impacts documented in the project REF.	No
Q3) If the proposal is subject to the EPBC strategic assessment or other EPBC Act approval, would the proposed modification change the potential impacts on matters of national environmental significant or the environment of Commonwealth land?	Table 3-2 shows impacts on matters of national environmental significance and Commonwealth land would not change and be as per the project REF. The proposed modifications do not require EPBC Act approval or additional assessment.	No
Q4) If the proposal is subject to a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR), would the proposed modification change the potential impacts on areas of outstanding biodiversity value, threatened species or ecological communities and their habitats as set out in the SIS or BDAR and its Conditions?	The proposed modifications are not subject to a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR)	N/A

Consistency questions	Discussion	Response
Q5) Would the proposed modification result in a reduction of the overall environmental impacts of the determined project including that it would not be likely to trigger the EPBC Act strategic assessment, other EPBC approval, SIS or BDAR?	Overall, the design modifications are expected to result in neutral or reduced environmental impacts. No additional mitigation to those stated in the project REF are required.	Yes
Q6) Whatever the outcome of the consistency review, are modifications to any other authorisations, or new authorisations, required, eg environment protection licences, Heritage Act permits, permits under the Fisheries Management Act etc?	Section 3.3 shows the proposed modifications would not require changes to permits required by the determined project. The proposed modifications would not require new licences, permits or approvals.	No

4. Conclusion

This assessment provides a true and fair consistency review of the scope and potential impacts of the proposed modification compared with the scope and potential environmental impacts of the determined project.

It has reviewed the scope and potential environmental impacts of the proposed modification against those of the determined project. The modification would be consistent with the overall environmental impacts of the determined project and as such, is exempt from further assessment under Part 5 of the Act.

5. Certification and endorsement

5.1 Certification – Consistency review preparer

This document provides a true and fair consistency review of the scope and potential impacts of the proposed modification compared with the scope and environmental impacts of the determined project.

Signed	Javier Valderrama
Name	Javier Valderrama
Position	Principal environmental planner
Date	4 November 2019

5.2 Roads and Maritime certification and endorsement

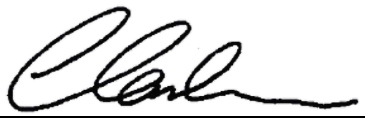
I have reviewed the scope and potential environmental impacts of the proposed modification against the determined project. The proposed modification would reduce the overall environmental impacts of the determined project and as such, in accordance with section 5.4(a) of the EP&A Act, is exempt from further environmental impact assessment. The proposed modification would not trigger the EPBC Act strategic assessment/other EPBC Act approval and/or a SIS or BDAR. The PEMP and associated design phase sub plans will be updated to incorporate the modification.

Signed		Signed	
Name	Jeremy Durward	Name	
Position	Roads and Maritime Environment officer	Position	Roads and Maritime Environment officer
Date	5 November 2019	Date	

5.2.1 Endorsement

I have examined consistency of the proposed modification with the determined Pitt Town Bypass.
In accordance with section 5.4(a) of the EP&A Act, I endorse the findings of this consistency review subject to adoption of my requirements in the table below.

Requirements	• The proposed modification would not constitute an entirely new project and would reduce the overall impacts of the determined project it is consistent. • The application for an AHIP is to be updated with the new minor boundary changes. • The biodiversity offset strategy is to be updated and re-calculated taking into account the minor increase in offset requirements (+1 credit).

Signed 

Name Con Lambous

Position Roads and Maritime Environment Manager

Date 06/11/2019

Appendix A

Updated BC & EPBC Act Test of Significance

BC ACT TESTS OF SIGNIFICANCE

Cumberland Plain Woodland in the Sydney Basin Bioregion

Cumberland Plain Woodland in the Sydney Basin Bioregion is listed as a critically endangered ecological community on Schedule 2 of the BC Act. Cumberland Plain Woodland has been recorded in the central portion of the study area and is typically in moderate condition owing to historical disturbances such as canopy thinning and mowing.

Within the study area the community is characterised by a canopy of *Eucalyptus moluccana* with associated *Eucalyptus tereticornis* and *Eucalyptus eugeniodies*. *Bursaria spinosa* and several wattles occur as shrubs and there is a mixed native and exotic grassy understorey.

The 100 per cent detailed design requires the removal of 1.45 ha of Cumberland Plain Woodland.

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

The study area contains 2.95 ha of Cumberland Plain Woodland, of which 1.45 ha would be removed by the proposal. The study area is towards the north western extent of the community as to the west of the Hawkesbury River, the geology and topography chances from the Cumberland Plain to the Hornsby and Blue Mountains Plateau. Regional vegetation mapping of the locality (being a 10 km radius from the study area) (Tozer et al 2003) shows that about 2,806 ha of Cumberland Plain Woodland occurs within the locality. The clearing of 1.45 ha of Cumberland Plain Woodland represents about 49 per cent of the Cumberland Plain Woodland within the study area and about 0.05 per cent of the Cumberland Plain Woodland in the locality. Further, the Cumberland Plain Woodland in the study area is considered to be in moderate condition owing to historical and ongoing disturbances. To the

east of the study area, Scheyville National Park provides a far more expansive and intact representation of the community. Scheyville National Park is also mapped as Priority Conservation Lands in the Cumberland Plain Recovery Plan

The Cumberland Plain Woodland within the study area is on the western edge of a patch of bushland that extends east to Scheyville National Park. It exhibits edge effects, such as increased weed recruitment, and is subject to ongoing disturbances, including mowing. The surrounding Cumberland Plain Woodland that would not be directly impacted by the proposal is in similar condition, with exotic species common throughout.

Based on the condition of the immediately surrounding Cumberland Plain Woodland that would be retained, plus the presence of a large area of well protected Cumberland Plain Woodland within Scheyville National Park, it is unlikely that the proposal would affect the extent or composition of the ecological community, such that it is placed at risk of extinction.

c) in relation to the habitat of a threatened species or ecologial community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The proposal will result in the removal of a total of 1.45 ha of Cumberland Plain Woodland, in addition to about 20.03 ha of non-native vegetation. This non-native vegetation is not considered potential habitat for Cumberland Plain Woodland since it has been entirely cleared, and in the most part the soil has been enriched and modified. Therefore the extent of habitat for Cumberland Plain Woodland that would be lost is the 1.45 ha that aready contains the community.

The Cumberland Plain Woodland within the study area occurs in a patch either side of Old Pitt Town Road. More broadly, Cumberland Plain Woodland in the locality has been highly fragmented by past clearing for agriculture and later residential purposes. The proposal would bisect the existing patch of Cumberland Plain Woodland in the study area, leaving two small fragmented and isolated patches to the west of the proposed alignment.

The condition of the Cumberland Plain Woodland within the study area is moderate and it is currently being regularly mowed to the south of Old Pitt Town Road. Despite this, there is a population of *Dillwynia tenuifolia* growing in this patch. The patch to the north of Old Pitt Town Road has a large number of regenerating eucalypts and the patch to the south has a good diversity of native understorey species, therefore the Cumberland Plain Woodland is considered to be of low-moderate importance to the survival of the community.

In light of the above, it is considered unlikely that the proposal would have a significant impact on the habitat of Cumberland Plain Woodland.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with Cumberland Plain Woodland.

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, the following are relevant to the potential impacts of the proposal on Cumberland Plain Woodland:

Clearing of native vegetation – Approximately 1.45 ha of native vegetation that contains Cumberland Plain Woodland would be cleared. This does not represent a significant area of this community in the context of the locality.

Invasion of native plant communities by exotic perennial grasses – Exotic grasses are abundant in the study area and the proposed action may exacerbate the KTP by facilitating the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of potential habitat for the community.

It is unlikely that the exacerbation of these KTPs would have a significant impact on Cumberland Plain Woodland.

Conclusion

The proposal will result in the removal of 1.45 ha of Cumberland Plain Woodland and its habitat, representing about 49 per cent of the Cumberland Plain Woodland within the study area and about 0.05 per cent of the Cumberland Plain Woodland in the locality. The study area is located on the edge of a larger patch of Cumberland Plain Woodland (and other TECs), however the proposal would fragment this edge vegetation and leave a narrow strip of the community, isolated to the west of the proposed alignment. The Cumberland plain woodland in the study area is in moderate condition having been modified by previous and ongoing land management practices such as canopy thinning and mowing. Despite this, it does contain a population of five *Dillwynia tenuifolia* stems. This patch is considered to be of low-moderate importance to the survival of the community.

Based on the relatively small area, the moderate condition and low-moderate importance of the Cumberland Plain Woodland that would be removed, it is considered unlikely that the proposal would have a significant impact on the community.

Shale Gravel Transition Forest in the Sydney Basin Bioregion

Shale Gravel Transition Forest is listed as critically endangered on Schedule 2 of the BC Act. This community was recorded at the northern extent of the study area, to the north of Cattai Road. The patch of Shale Gravel Transition Forest within the study area is in low-moderate condition, and subject to ongoing equine grazing. The canopy is characterised by *Eucalyptus fibrosa* and *Eucalyptus moluccana* with a mid-storey of *Bursaria spinosa* and the EPBC Act and BC Act listed *Acacia pubescens* and a predominantly exotic grassy understorey.

in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable, Shale Gravel Transition Forest is not a threatened species.

d) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

About 1.78 ha of Shale Gravel Transition Forest was recorded within the study area, of which 0.44 ha would be removed by the proposal. The study area is at the northern extent of the community as to the west of the Hawkesbury River, the geology and topography chances from the Cumberland Plain to the Hornsby and Blue Mountains Plateau. Regional vegetation mapping of the locality (Tozer et al 2003) shows that about 403 ha of Shale Gravel Transition Forest occurs within the locality. The clearing of 0.44 ha of Shale Gravel Transition Forest represents about 25 per cent of the Shale Gravel Transition Forest within the study area and about 0.11 per cent of the Shale Gravel Transition Forest in the locality. The Shale Gravel Transition Forest in the study area is considered to be in low-moderate condition owing to historical clearing and ongoing equine grazing. To the south west of the study area, Castlereagh Nature Reserve, Windsor Downs Nature Reserve and Wianamatta Nature Reserve provides a far more expansive and intact representation of the community (amongst other TECs). These nature reserves are also mapped as Priority Conservation Lands in the Cumberland Plain Recovery Plan

The Shale Gravel Transition Forest within the study area has been degraded by historical and ongoing land management practices. The species composition of the understory and mid-storey has been highly modified due to recruitment of exotic species and systematic removal of native species. The Shale Gravel Transition Forest in the immediately surrounding area (that would be retained) is in similar degraded condition. It is unlikely that the proposal would substantially modify the composition of surrounding vegetation to be retained.

Based on the condition of the immediately surrounding Shale Gravel Transition Forest that would be retained, plus the presence of larger areas of well protected Shale Gravel

Transition Forest within Nature Reserves to the south of the study area, it is unlikely that the proposal would affect the extent or composition of the ecological community, such that it is placed at risk of extinction.

e) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The proposal will result in the removal of a total of 0.44 ha of Shale Gravel Transition Forest, in addition to about 20.03 ha of non-native vegetation. This non-native vegetation is not considered potential habitat for Shale Gravel Transition Forest since it has been entirely cleared, and in the most part the soil has been enriched and modified. Therefore the extent of habitat for Shale Gravel Transition Forest that would be lost is the 0.44 ha that already contains the community.

The Shale Gravel Transition Forest within the study area occurs to the north of Cattai Road, in a patch that extends to the north. The entire patch is edge effected due to its location on the interface between more intact patches and the developed area of Pitt Town. The proposal would result in the clearing of vegetation on the edge of this patch and would therefore not fragment or further isolate Shale Gravel Transition Forest.

The condition of the Shale Gravel Transition Forest within the study area is low-moderate and it is currently being grazed by horses. Despite this, there is a population of *Acacia pubescens* growing in this patch. The Shale Gravel Transition Forest in the study area appears to have relatively low resilience and is unlikely to return to a higher condition without substantial intervention. There is, however, a mature canopy present and some indicative shrub and ground cover species present. About 403 ha of Shale Gravel Transition Forest occurs within the locality (which covers about 31,000 ha) making it relatively scarce in the region. Accordingly, the patch within the study area is considered to be moderately important to the survival of the community.

In light of the above, it is considered unlikely that the proposal would have a significant impact on the habitat of Shale Gravel Transition Forest.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with Shale Gravel Transition Forest.

f) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, the following are relevant to the potential impacts of the proposal on Shale Gravel Transition Forest:

Clearing of native vegetation – Approximately 0.44 ha of native vegetation that is equivalent to Shale Gravel Transition Forest would be cleared. This does not represent a significant area of this community in the locality.

Invasion of native plant communities by exotic perennial grasses – Exotic grasses are abundant in the study area and the proposed action may exacerbate the KTP by facilitating the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of Shale Gravel Transition Forest.

It is unlikely that the exacerbation of these KTPs would have a significant impact on Shale Gravel Transition Forest.

Conclusion

The proposal will result in the removal of 0.44 ha of Shale Gravel Transition Forest and its habitat, representing about 25 per cent of the Shale Gravel Transition Forest within the study area and about 0.11 per cent of the Shale Gravel Transition Forest in the locality. The study area is located on the edge of a larger patch of Shale Gravel Transition Forest which would not be fragmented or futher isolated by the proposal.

The Shale Gravel Transition Forest in the study area is in low-moderate condition having been modified by previous and ongoing land management practices such as canopy thinning and equine grazing. Despite this, it does contain a population of *Acacia pubescens*. Based on the relative scarcity of community in the locality, this patch is considered to be of moderate importance to the survival of the community.

Based on the small area, the low-moderate condition and moderate importance of the Shale Gravel Transition Forest that would be removed, it is considered unlikely that the proposal would have a significant impact on the community.

Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Freshwater Wetlands on Coastal Floodplains is listed as endangered on Schedule 2 of the BC Act. This community was recorded along an un-named tributary of Hortons Creek through the central portion of the study area. It is comprised of a dense stand of *Phragmites Australis* and *Typha orientalis* and has an extent of about 1.46 ha within the study area.

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. Freshwater Wetlands on Coastal Floodplains is not a threatened flora species.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

About 1.46 ha of Freshwater Wetlands on Coastal Floodplains was recorded within the study area, of which 0.70 ha would be removed by the proposal. The study area occurs in the Cumberland Plain Lowlands around the Hawkesbury River. There are three substantial areas of mapped Freshwater Wetlands on Coastal Floodplains within the locality, being Pitt Town Lagoon (to the west), Bushells Lagoon (to the north west) and Longneck Lagoon (to the north east).

Regional vegetation mapping of the locality (Tozer et al 2003) shows that about 266 ha of Freshwater Wetlands on Coastal Floodplains occurs within the locality. The clearing of 0.70 ha of Shale Gravel Transition Forest represents about 48 per cent of the Shale Gravel Transition Forest within the study area and about 0.26 per cent of the Freshwater Wetlands on Coastal Floodplains in the locality. The Freshwater Wetlands on Coastal Floodplains in the study area is considered to be in moderate condition owing to the lack of native species diversity and lack of variability in habitat present. There are high proportions of weeds in some locations that are historical clearing and ongoing equine grazing.

The Freshwater Wetlands on Coastal Floodplains within the study area has been degraded by historical and ongoing land management practices. The species composition has been affected by a lack of habitat variability, leaving it as a dense stand of reeds and rushes. Nutrient runoff from surrounding farm land and modified pasture have also lead recruitment of exotic species, such as Blackberry, Privet and Japanese Honeysuckle. It is unlikely that the proposal would substantially modify the composition of surrounding vegetation to be retained.

Based on the condition of the immediately surrounding Freshwater Wetlands on Coastal Floodplains that would be retained, plus the presence of larger areas of well protected Freshwater Wetlands on Coastal Floodplains within Pitt Town Lagoon, Bushells Lagoon and Longneck Lagoon, it is unlikely that the proposal would affect the extent or composition of the ecological community, such that it is placed at risk of extinction.

c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The proposal will result in the removal of a total of 0.70 ha of Freshwater Wetlands on Coastal Floodplains, in addition to about 20.03 ha of non-native vegetation. This non-native vegetation is not considered potential habitat for Freshwater Wetlands on Coastal Floodplains since it is not inundated sufficiently frequently to support characteristic species. Therefore the extent of habitat for Freshwater Wetlands on Coastal Floodplains that would be lost is the 0.70 ha that already contains the community.

The Freshwater Wetlands on Coastal Floodplains within the study area occurs in a linear strip along an un-named tributary of Hortons Creek. The proposal would result in two new crossings of this un-named tributary and would fragment the existing patch into several smaller patches. Pitt Town Road and Old Pitt Town Road have both been constructed over the patch of Freshwater Wetlands on Coastal Floodplains therefore the proposal would further fragment an already fragmented patch.

The condition of the Freshwater Wetlands on Coastal Floodplains within the study area is moderate due to a lack of native species diversity and recruitment of several exotic species. there is little in the way of habitat variability, with the majority of the Freshwater Wetlands on Coastal Floodplains within the study area being predominantly comprised of *Typha orientalis* and *Phragmites australis*. This vegetation provides little aquatic habitat and it would appear that water is only present for a short period following rain, and that it flows through the study area at a relatively high velocity. As such, the Freshwater Wetlands on Coastal Floodplains in the study area is considered to be of low importance to the long-term survival of the community.

Based on the relatively small area of required clearing and the already degraded and fragmented nature of the Freshwater Wetlands on Coastal Floodplains in the study area, it is considered unlikely that the proposal would result in a significant impact to the community.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with Freshwater Wetlands on Coastal Floodplains.

g) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, the following are relevant to the potential impacts of the proposal on Freshwater Wetlands on Coastal Floodplains:

Clearing of native vegetation – Approximately 0.70 ha of native vegetation equivalent to Freshwater Wetlands on Coastal Floodplains would be cleared. This does not represent a significant area of this community in the locality.

Invasion of native plant communities by exotic perennial grasses – Exotic grasses are abundant in the study area and the proposed action may exacerbate the KTP by facilitating the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of Freshwater Wetlands on Coastal Floodplains.

Conclusion

The proposal will result in the removal of 0.70 ha of Freshwater Wetlands on Coastal Floodplains and its habitat, representing about 48 per cent of the Freshwater Wetlands on Coastal Floodplains within the study area and about 0.26 per cent of the Shale Gravel Transition Forest in the locality. Larger, more intact patches of Freshwater Wetlands on Coastal Floodplains occur in Pitt Town Lagoon (to the west of the study area), Bushells Lagoon (to the north west) and Longneck Lagoon (to the north east).

The Freshwater Wetlands on Coastal Floodplains in the study area is in moderate condition due to the lack of complexity and native species diversity. This patch is therefore considered to be of low importance to the survival of the community.

Based on the small area, the moderate condition and low importance of the Freshwater Wetlands on Coastal Floodplains that would be removed, it is considered unlikely that the proposal would have a significant impact on the community.

Acacia pubescens (Downy Wattle)

Acacia pubescens is listed as vulnerable under the BC and has a concentrated distribution around the Bankstown-Fairfield-Rockdale area and the Pitt Town area. It typically occurs on alluviums, shales, and at the intergrade between shales and sandstones, in association with open woodland and forest communities including Cooks River Castlereagh Ironbark Forest, Shale/Sandstone Transition Forest and Cumberland Plain Woodland.

Acacia pubescens commonly reproduces via vegetative reproduction rather than seedlings, resulting in dense patches of the species formed from one individual. The species also need a minimum fire free period of 5-7 years for an adequate seedbank to develop.

Two populations of *Acacia pubescens* were recorded in the study area. Both were situated in Broad-leaved Ironbark - Grey Box -Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion. An additional population was recorded approximately 50 m outside the western study area boundary.

d) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The proposed action would result in the removal of one of the populations of *Acacia pubescens,* containing five stems*,* and consequently have an adverse impact on the life cycle of that population. By removing the plants as well as the nearby soil, the seed bank is cleared resulting in the disruption of the species life cycle. About 0.21 ha of occupied habitat for the species would be removed and it is likely that *Acacia pubescens* is present in the soil seed bank of this habitat area. Many other populations of the species have been recorded in the vicinity around the study area which will not be impacted by the proposal. Therefore, while the life cycle of the species within the study area will be adversely impacted, the local population of *Acacia pubescens* will unlikely be placed at risk of extinction due to the large number of individuals nearby.

e) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. *Acacia pubescens* is a threatened flora species.

f) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The proposal will result in the removal of a total of 0.21 ha of occupied habitat and 1.89 ha of potential habitat *A. pubescens* habitat including 0.44 ha of Broad-leaved Ironbark - Grey Box -Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion and 1.45 ha of Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion.

The suitable habitat in the study area is already heavily modified and isolated from other areas of habitat. The study area forms a small fragment of habitat within a highly developed and urbanised context and therefore any further fragmentation as a result of the proposal is not deemed significant.

A. pubescens is associated with a variety of vegetation types and has large numbers of recordings in the locality and therefore, it is unlikely that the habitat is important to the species such that its removal impacts its long-term survival.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with *A. pubescens.*

h) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, the following are relevant to the potential impacts of the proposal on *A. pubescens*:

Clearing of native vegetation – Approximately 1.89 ha of native vegetation that contains potential habitat would be cleared. This does not represent a significant area of this species' habitat in the locality.

Invasion of native plant communities by exotic perennial grasses – Exotic grasses are abundant in the study area and the proposed action may exacerbate the KTP by facilitating the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of potential habitat for the species.

Conclusion

The proposal will result in the removal of one population of *A. pubescens* containing approximately 5 stems and 0.21 ha of occupied habitat. There are a large number of individuals near the site which will not be impacted by the proposal and therefore the local population will unlikely be put at risk of extinction. This vegetation to be cleared is not deemed to be a significant area of habitat or of importance to the long-term survival of the species. As a result, it is considered unlikely that the proposal represents a significant impact to this threatened species. A species impact statement is not required for this species.

Dillwynia tenuifolia

Dillwynia tenuifolia is listed as vulnerable under the BC Act. Its core distribution is the Cumberland Plain from Windsor and Penrith east to Dean Park near Colebee. However other populations are present in the Liverpool and Penrith LGA and Baulkham Hills Shire as well as in disjunct localities in the lower Blue Mountains and Bulga Mountains.

Dillwynia tenuifolia is commonly associated with scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. It can also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.

Four individual stems in two locations were recorded within Cumberland Plain Woodland in the study area. These individuals will be cleared during construction.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Four individual *Dillwynia tenuifolia* were recorded in two locations, about 10 m apart, growing in a gravel patch in an area of Cumberland Plain Woodland. The lifecycle for these plants would be adversely affected as they would be removed by the proposal. The environmental impact assessment guidelines for *Dillwynia tenuifolia* (NPWS 2002) state that:

All populations should be considered viable unless proven otherwise ie. They consist of a few individuals in highly insecure, disturbed and weed impacted locales such as roadsides.

The population within the study area is in a patch of Cumberland Plain Woodland that is mown on and ongoing basis. It is zoned SP2 Road Infrastructure in the Hawkesbury Local Environment Plan (Hawkesbury Shire Council 2012) and surrounded by residential development, which is not conducive or conservation. Based on the very small population size (this species can be locally dominant in preferred habitat), the insecurity of the land on which it occurs (from a conservation perspective) and the partially disturbed nature of this habitat, this population of 4 stems is not considered viable.

A large population of *Dillwynia tenuifolia* exists approximately one kilometre to the east of the study area within Scheyville National Park. This is the closest known viable population. The proposed action would result in the removal of the four individuals of *Dillwynia tenuifolia* within the study area and consequently there would be no impact on the nearby viable population and it would not be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. *Dillwynia tenuifolia* is a threatened flora species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The proposal will result in the removal of a total of 1.89 ha of suitable *Dillwynia tenuifolia* habitat (0.31 ha of occupied habitat) including 0.44 ha of Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion and 1.45 ha of Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion.

The suitable habitat in the study area is already heavily modified and isolated from other areas of habitat. The study area forms a small fragment of habitat within a highly developed and urbanised context and therefore any further fragmentation as a result of the proposal is not deemed significant.

Dillwynia tenuifolia has large numbers of recordings in the locality and therefore, it is unlikely that the habitat is important to the species such that its removal impacts its long-term survival.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with *Dillwynia tenuifolia.*

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, the following are relevant to the potential impacts of the proposal on *Dillwynia tenuifolia*:

Clearing of native vegetation – Approximately 1.89 ha of native vegetation that contains potential habitat would be cleared. This does not represent a significant area of this species' habitat in the locality.

Invasion of native plant communities by exotic perennial grasses – Exotic grasses are abundant in the study area and the proposed action may exacerbate the KTP by facilitating the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of potential habitat for the species.

Conclusion

The proposal will result in the removal of 2 individuals and 0.31 ha of occupied habitat habitat. There are a large number of individuals near the site which will not be impacted by the proposal and therefore the local population will unlikely be put at risk of extinction. This vegetation to be cleared is heavily modified and is not deemed to be a significant area of habitat or of importance to the long-term survival of the species. As a result, it is considered unlikely that the proposal represents a significant impact to this threatened species. A species impact statement is not required for this species.

Micromyrtus minutiflora

Micromyrtus minutiflora is Endangered under the BC Act. It is a slender spreading shrub to two metres high and is restricted to the general area between Richmond and Penrith in Western Sydney.

Suitable habitat for *Micromyrtus minutiflora* includes Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments.

No sightings of *Micromyrtus minutiflora* were recorded in the study area and there are no records of the species in the area immediately adjacent to the study area. 0.44 ha of suitable habitat for *Micromyrtus minutiflora* will be removed during construction of the proposed action.

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

Little is known about the life cycle of *Micromyrtus minutiflora* and its response to fire and disturbance. Regeneration may be due to resprouting or germination of soil-stored seed. No individuals of *Micromyrtus minutiflora* will be removed as a result of the proposed action and no individuals have been recorded adjacent to the study area. Therefore, impacts to the life cycle of *Micromyrtus minutiflora* are considered unlikely due to the absence of a population of the species in the study area. As such, the proposal is unlikely to affect a local viable population such that it is placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. *Micromyrtus minutiflora* is a threatened flora species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

0.44 ha of suitable *Micromyrtus minutiflora* habitat will be removed as a result of the proposal. This suitable habitat consists of Shale Gravel Transition Forest in the Sydney Basin Bioregion.

The habitat in the study area is already heavily modified and isolated from other areas of habitat. The study area forms a small fragment of habitat within a highly developed and urbanised context and therefore any further fragmentation as a result of the proposal is not deemed significant.

As the suitable habitat on site is already heavily modified, the 0.44 ha to be cleared is a negligible area. It is therefore unlikely that the habitat is important to the species such that its removal impacts its long-term survival.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with *Micromyrtus minutiflora.*

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, the following are relevant to the potential impacts of the proposal on *Micromyrtus minutiflora*:

Clearing of native vegetation – Approximately 0.44 ha of native vegetation that contains potential habitat would be cleared. This does not represent a significant area of this species' habitat in the locality.

Invasion of native plant communities by exotic perennial grasses – Exotic grasses are abundant in the study area and the proposed action may exacerbate the KTP by facilitating the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of potential habitat for the species.

Conclusion

The proposed action will not involve the removal of any *Micromyrtus minutiflora* individuals but will involve the clearing of 0.44 ha of suitable habitat. As no individuals have been recorded in or adjacent to the study area, the proposal is deemed unlikely to affect a local viable population such that it is placed at risk of extinction. Furthermore, as the suitable habitat present has already been heavily modified and fragmented, it is unlikely that the habitat is important to the species such that its removal impacts its long-term survival. Therefore, it is considered unlikely that the proposal represents a significant impact to this threatened species. A species impact statement is not required for this species.

Pimelea spicata (Spiked Rice-flower)

Pimelea spicata is listed as Endangered under the BC Act.

Pimelea spicata is a slender decumbent or erect shrub to 50 cm high (RBG&DT February 2012). This species is endemic to NSW and is known from two disjunct areas, the Cumberland Plain west of Sydney and coastal Illawarra south of Sydney. In western Sydney, the species is restricted to areas supporting the Cumberland Plain Woodland vegetation community (DEC 2005). The species is cryptic and difficult to detect, particularly when not in flower, so surveys should not be relied upon unless undertaken whilst the species is flowering (NPWS 2004).

Various flowering times for the species have been noted, as the species is known to flower in response to rain, and peak flowering time may vary from year to year. Benson and McDougall (2001) stated the peak flowering period as March to April, however it has also been observed flowering in May–January and in June-September in response to rain (NPWS 2004).

Pimelea spicata was targeted during flora surveys of native woodland in the study area. The species was not recorded, however potential habitat was identified in the Cumberland Plain Woodland in the study area.

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The following is known about the lifecycle of *Pimelea spicata* (DEC 2005)*:*

Flowering occurs sporadically throughout the year and is likely to be dependent on climatic conditions, particularly rain;

Pimelea spicata is not capable of vegetative spread, and hence is dependent on seed production for recruitment.

The pollinator has not been identified; native bees have been observed visiting flowers, and it has been suggested that moths contribute to pollination. The species may be capable of self-pollination.

Fruit production is highly variable within and between populations, and between years, and is likely to be associated with environmental conditions. Seed viability has been recorded as relatively high.

Dispersal mechanisms for the species are unknown, but seed dispersal is likely to be very low, with most seedlings observed in proximity to adult plants.

P. spicata is capable of maintaining a long-lived, persistent soil seed bank and germination may occur following fire, slashing and mowing, grazing and soil disturbance.

Germination is significantly increased by smoke application.

1.45 ha of suitable habitat for *Pimelea spicata* will be removed from the study area during construction. While no individuals will be removed, it is possible that the species occurs in the seedbank. However, as no individuals have been recorded in close proximity to the study area this is unlikely as *Pimelea spicata* have a low seed dispersal range. Therefore, it is unlikely that the species would be impacted by the proposed action such that a viable local population is placed at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. *Pimelea spicata* is a threatened flora species.

c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The proposed action will result in the clearing of 1.45 ha of suitable habitat in the form of Cumberland Plain Woodland. This habitat is currently heavily modified and fragmented by existing roads and rural development. It is also isolated from other areas of suitable habitat. The proposed action will further fragment the vegetation however due to its current extensive modification, any further fragmentation is negligible. Therefore, it is unlikely that the habitat is important to the species such that its removal impacts its long-term survival.

g) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with *Pimelea spicata.*

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, the following are relevant to the potential impacts of the proposal on *Pimelea spicata*:

Clearing of native vegetation – Approximately 1.45 ha of native vegetation that contains potential habitat would be cleared. This does not represent a significant area of this species' habitat in the locality.

Invasion of native plant communities by exotic perennial grasses – Exotic grasses are abundant in the study area and the proposed action may exacerbate the KTP by facilitating the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of potential habitat for the species.

Conclusion

The proposed action will involve the removal of 1.45 ha of suitable *Pimelea spicata* habitat. However, this habitat is heavily modified and fragmented and therefore any further fragmentation is considered negligible. As a result, it is unlikely that the habitat is critical to the long-term survival of the species. As no individuals were found in the study area and it is unlikely they occur in the seedbank, the proposal is not deemed likely to have an adverse effect on the life cycle of the species. Therefore, it is considered unlikely that the proposal represents a significant impact to this threatened species. A species impact statement is not required for this species.

Cumberland Plain Land Snail (*Meridolum corneovirens*)

The Cumberland Plain Land Snail is listed as Endangered under the BC Act. The Cumberland Plain Land Snail is distributed from Richmond and Windsor in the north of the Cumberland Plain, from Cattai in the north to Picton in the south, and from Prospect Reservoir in the east to Yarramundi in the west. In this region, the Cumberland Plain Land Snail is known only from Cumberland Plain and Castlereagh Woodlands; grassy, open woodland with occasional dense patches of shrubs.

The Cumberland Plain Land Snail is found under logs and debris, amongst accumulations of leaf and bark around bases of trees, and occasionally under grass clumps. It has also been recorded under debris such as building materials and car parts. Where possible it will burrow into loose soil.

The Cumberland Plain Land Snail is a fungal feeder and is generally active at night. Very little is currently known about the biology and life history of the species. It is hermaphroditic and lays clutches of around 20-25 small round white eggs, in moist and dark areas such as under logs.

The Cumberland Plain Woodland in the study area is characteristic of the preferred habitat of the Cumberland Plain Land Snail. The canopy of this community is dominated by *E. moluccana* and *E. tereticornis.* To the north of Old Pitt Town Road this community has a shrubby understory of *Bursaria spinosa* and regenerating eucalypts while to the south of Old Pitt Town Road the community is subject to ongoing mowing and so is lacking a shrub strata. Shale gravel Transition Forest present in the northern extent of the study area also provides potential habitat to the species. As these potential habitats were identified, targeted snail surveys were performed in these areas. No Cumberland Plain Land Snails were recorded.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Proposal could affect the lifecycle of the Cumberland Plain Land Snail as a result of habitat removal and potential mortality of live snails, if the species occurs at the site. However, after targeted snail surveys were performed no individuals were sighted within the study area. It is therefore assumed that there is no viable population within the study area.

There is a large population of Cumberland Plain Land Snail to the east of the study area within Scheyville National Park and further individuals recorded to the north of the study area. It is unlikely that these populations will be impacted by the proposed action as there are already several barriers from roads and residential developments fragmenting these areas of suitable habitat.

Therefore, it is unlikely that the proposed action will have an adverse effect on the life cycle of the species such that a viable local population is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. Cumberland Plain Land Snail is a threatened fauna species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

Approximately 1.89 ha of potential habitat for the species will be removed as a result of the proposed action. This is a small area in comparison to the suitable habitat in the wider locality. There are vast areas of suitable habitat which are protected and situated within the Scheyville National Park. This area is uninterrupted by roads and developments and ideal for the Cumberland Plain Land Snail.

The vegetation to be cleared will further fragment the habitat to a small degree. However, the area is already heavily fragmented and modified by rural residential developments and several roads. These have already created barriers to the dispersal of the species. The population to the north of the study area has already been isolated from the study area due to several roads crossing the area between the sites. Therefore, fragmentation caused by the proposed action will occur on a very small scale and is considered negligible.

As the habitat in the study area is already isolated from other areas of suitable habitat and known populations, and no individuals were recorded on site, the habitat to be removed is not considered important to the species. It is unlikely that populations would be able to inhabit the site in the future due to the barriers from roads and houses. Therefore, the removal of the 1.89 ha of habitat within the study area is not considered to be important to the long-term survival of the species in the locality.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with Cumberland Plain Land Snail.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, one is relevant to the potential impacts of the proposed action on the Cumberland Plain Land Snail:

Clearing of native vegetation – Approximately 1.89 ha of native vegetation that contains potential habitat would be cleared. This habitat is heavily fragmented and isolated and is not known to be used by any individuals. Furthermore, it represents a small amount of habitat in comparison to the vast areas of protected and suitable habitat in the wider locality.

Removal of dead wood and dead trees – While there are few dead trees and dead wood in the study area, the removal of them will affect any Cumberland Plain Land Snails in the study area as they represent a component of habitat for the species.

Conclusion

In consideration of the above five factors, the proposed action is unlikely to have a significant impact on the Cumberland Plain Land Snail in the study area or wider locality as a result of the current proposed action, as:

As no individuals were recorded in the study area, the proposed action is unlikely to adversely affect the lifecycle of the species such that a viable local population is likely to be placed at risk of extinction.

The proposed action would remove habitat for the species, however, this is unlikely to comprise a significant area of habitat for the species.

The proposed action would not substantially fragment habitat for the species.

Consequently, a Species Impact Statement is not required to be prepared.

Hollow-dependant Microbats; Eastern Freetail-bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Southern Myotis, Yellow-bellied Sheathtail-bat

Eastern Freetail-bat (Mormopterus norfolkensis)

The Eastern Freetail-bat is listed as Vulnerable under the BC Act. It is found east of the Great Dividing Range, from Brisbane in south-east Queensland to Sydney in NSW, where it is most commonly recorded in dry eucalypt forest and woodland, and shows a preference for open spaces in woodland or forest. The species has also been recorded in swamp forests and mangrove forests. The Eastern Freetail-bat forages in openings and gaps in the forest including over larger waterways (Churchill 2008). The Eastern Freetail-bat roost mainly in tree hollows; usually in hollow spouts of large mature trees, but will also roost under exfoliating bark or in man-made structures and buildings (Churchill 2008).

The study area provides potential foraging habitat for the species within the Cumberland Plain Woodland and Shale-Gravel Transition Forest as well as limited roosting habitat. The species was recorded in the study area during surveys.

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

The Eastern False Pipistrelle is listed as Vulnerable under the BC Act. It is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania (OEH 2018). It prefers moist habitats, with trees taller than 20 metres and generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. It hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. It breeds between late spring and early summer (Churchill 2008).

The study area provides potential foraging habitat for the species within the Cumberland Plain Woodland and Shale-Gravel Transition Forest as well as limited roosting habitat. The species was not recorded in the study area during surveys.

Greater Broad-nosed Bat (*Scoteanax rueppellii*)

The Greater Broad-nosed Bat is listed as Vulnerable under the BC Act. It is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland (OEH 2018). Greater Broad-nosed Bat extends to the coast over much of its range. In NSW, it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m. It utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. The Greater Broad-nosed Bat forages after sunset, flying slowly and directly along

creek and river corridors at an altitude of 3 to 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.

The study area provides potential foraging habitat within woodland areas and limited roosting habitat within hollow-bearing trees. The Greater Broad-nosed Bat was recorded in the study area during surveys.

Southern Myotis (*Myotis macropus*)

The Southern Myotis is listed as Vulnerable under the BC Act. The Southern Myotis occurs across the northern and eastern coasts of Australia (from the Kimberley to Victoria) and is rarely found more than 100 km inland (OEH 2018). The species is found in vegetated habitats associated with streams and permanent waterways, most commonly at low elevations in flat or undulating terrain (Churchill 2008). Habitats include riparian vegetation and also in mangroves, paperbark swamps, rainforest, wet and dry sclerophyll forest and open woodland (OEH, 2018). The species forages over water for insects and small fish that they catch by raking their large feet of the water surface. They also forage aerially for moths, beetles, crickets and flies.

The Southern Myotis generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.

As the waterway in the study area is heavily vegetated and contains no open water the study area provides no foraging habitat for the species. However, limited roosting habitat is provided by the hollow-bearing trees in the study area. The species was not recorded during surveys.

Yellow-bellied Sheathtail Bat (Saccolaimus flaviventris)

The Yellow-bellied Sheathtail-bat is listed as Vulnerable under the BC Act. It occurs throughout tropical and south-east of Australia, excluding Tasmania. It is found in a variety of habitat types including wet and dry sclerophyll forest, open woodland, Acacia shrubland, mallee, grassland and desert. It roosts in tree hollows, abandoned sugar glider nests or animal burrows (OEH 2018).

The study area provides potential foraging habitat within woodland areas and limited roosting habitat within hollow-bearing trees. The Yellow-bellied Sheathtail-bat was not recorded in the study area during surveys.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

There has been no evidence of roosting sites within the study area. However, three hollow-bearing trees and three stags containing hollows have been recorded in the study area of which one hollow-bearing tree and one stag will be removed. These hollow-bearing trees provide potential roosting sites for all these species of hollow-dependant microbats. While the Eastern Freetail-bat and Greater Broad-nosed Bat were recorded in the study area it is likely they use the site for foraging rather than for roosting due to the limited number of hollow-bearing trees and lack of evidence of their use as roosting sites. However, if any of the microbat species do use the hollow-bearing trees as roosting sites, potential impacts to the breeding cycle of the microbats could include displacement of females with young or pregnant females. Whether these impacts occur is dependent on the timing of vegetation removal.

Microbats area highly mobile species and any local populations would extend beyond the study area to include the greater locality. The study area and vegetation to be removed represents a very small amount of potential foraging habitat in comparison to the foraging habitat in the greater locality. Therefore, while potential roosting habitat for the five species of microbats will be removed in the form of one hollow-bearing tree and one stag, this does not represent a significant amount of suitable habitat. Consequently, the proposed action is unlikely to have an adverse effect on the life cycle of the species such that a viable local population of any of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. The five hollow-dependant microbat species listed are threatened fauna species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The proposed action will involve the removal of 1.89 ha of suitable foraging habitat for the Eastern Freetail-bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, and Yellow-bellied Sheathtail-bat. This is in the form of Cumberland Plain Woodland and Shale-gravel Transition Forest. The Southern Myotis forages over open water and as such there is no suitable foraging habitat for this species in the study area. Its foraging habitat will therefore not be impacted. Potential roosting habitat for all five microbat species will be impacted with the removal of one hollow-bearing tree and one stag.

While roosting and foraging habitat will be affected this does not represent a large proportion of the 1.89 ha of suitable habitat which will be retained in the study area. Furthermore, as the foraging habitat of the microbats is expansive and nonspecific, this foraging and roosting habitat does not comprise a significant area of habitat within the locality. The loss of potential foraging and roosting habitat within the study area is not likely to be significant to the species, and is already heavily modified and fragmented from other areas of suitable habitat by rural residential development. As the species are highly mobile, these developments, and the proposed action, do not pose as barriers for the dispersal of the species. Therefore, any further fragmentation caused by the proposed action is negligible. The long-term survival of any of the five microbat species is unlikely to be affected by the removal of native vegetation.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with the Eastern Freetail-bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Southern Myotis or Yellow-bellied Sheathtail-bat.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, one is relevant to the potential impacts of the proposed action on the five microbat species:

Clearing of native vegetation – Approximately 1.89 ha of native vegetation that contains foraging habitat would be cleared and one hollow-bearing tree and one stag which provides potential roosting habitat. This does not represent a significant area of foraging or roosting habitat for the five microbat species in the locality.

Conclusion

In consideration of the above five factors, the proposed action is unlikely to have a significant impact on any of the five hollow dependent microbats in the study area or wider locality as a result of the current proposed action, as:

While one hollow-bearing tree and one stag containing hollows will be removed which contains potential roosting habitat, this represents only a small proportion of suitable roosting habitat in the wider locality and therefore it is unlikely that the proposed action will adversely affect the lifecycle of any of the species such that a viable local population is likely to be placed at risk of extinction.

The proposed action would remove foraging habitat for the species, however, this is a small and unimportant area in comparison to the large areas of foraging habitat in the locality.

The proposed action would not substantially fragment habitat for the species.

Consequently, a Species Impact Statement is not required to be prepared.

Cave/culvert dependent Microbats; Little Bentwing-bat, Eastern Bentwing-bat

Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)

Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) is listed as Vulnerable under the BC Act. It occurs along the east coast of Australia. The species primarily roosts in caves, but will also use a range of man-made structures. They hunt in forested areas, catching moths and other flying insects above the tree tops (OEH 2018). While there is no suitable roosting habitat in the study area, potential foraging habitat is present. This species was recorded in the study area during surveys.

Little Bentwing-bat (*Miniopterus australis*)

The Little Bentwing-bat is listed as Vulnerable under the BC Act and occurs along the east coast of NSW and ranges from the northern border south to Wollongong. The species is found in moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub (OEH 2018). Little Bentwing-bats roost in caves, tunnels, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. While there is no suitable roosting habitat in the study area, potential foraging habitat is present. This species was not recorded in the study area during surveys.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The study area contains no caves, bridges, stormwater drains or culverts which would be suitable roosting sites for the Eastern Bentwing-bat or Little Bentwing-bat. Therefore, the proposed action will not directly impact the breeding of the microbat species. The study area provides suitable foraging habitat for both the Little Bentwing-bat and Eastern Bentwing-bat in the form of the Cumberland Plain Woodland and Shale-gravel Transition Forest of which 1.89 ha will be removed. However, this is not a considerable amount in comparison to the larger areas of suitable habitat in the locality. While it is possible that breeding individuals may utilise this site for foraging, the high mobility of these species and the abundance of foraging habitat in the locality results in the proposed action being unlikely to have an adverse impact on their life cycle such that a viable local population is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. Little Bentwing-bat and Eastern Bentwing-bat are threatened fauna species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

1.89 ha of suitable foraging habitat will be removed as a result of the proposed action. This does not represent a large proportion of the of suitable habitat which will be retained in the study area and the locality. Furthermore, as the foraging habitat of the microbats is expansive and nonspecific, this foraging habitat does not comprise a significant area of habitat within the locality. The loss of potential foraging habitat within the study area is not likely to be significant to the species, and is already heavily modified and fragmented from other areas of suitable habitat by rural residential development. As the species are highly mobile, these developments, and the proposed action, do not pose as barriers for the dispersal of the species. Therefore, any further fragmentation caused by the proposed action is negligible. The long-term survival of any of the Little Bentwing-bat and Eastern Bentwing-bat is unlikely to be affected by the removal of native vegetation.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with the Little Bentwing-bat and Eastern Bentwing-bat.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, one is relevant to the potential impacts of the proposed action on the two microbat species:

Clearing of native vegetation – Approximately 1.89 ha of native vegetation that contains foraging habitat would be cleared. This does not represent a significant area of foraging habitat for the two microbat species in the locality.

Conclusion

In consideration of the above five factors, the proposed action is unlikely to have a significant impact on any of the two cave dependent microbats in the study area or wider locality as a result of the current proposed action, as:

As the study area contains no suitable roosting sites for the species, the proposed action is unlikely to adversely affect the lifecycle of any of the species such that a viable local population is likely to be placed at risk of extinction.

The proposed action would remove foraging habitat for the species. However, this is a small and unimportant area in comparison to the large areas of foraging habitat in the locality.

The proposed action would not substantially fragment habitat for the species.

Consequently, a Species Impact Statement is not required to be prepared.

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

Grey-Headed Flying-Fox (*Pteropus poliocephalus*) is listed as a Vulnerable species under the Biodiversity Conservation Act 2016 (BC Act).

The species was observed foraging in the canopy of flowering eucalypts in the study area and flying overhead.

The Grey-headed Flying-fox occurs from Bundaberg in Queensland in the north to Melbourne in Victoria to the south, typically between the coast and the western slopes of the Great Dividing Range. In NSW, it occurs along the east coast, eastern slopes of the Great Dividing Range and the tablelands. The species may be found in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps, while additional foraging is provided by urban gardens and cultivated fruit crops.

The Grey-Headed Flying-Fox is a highly mobile species with a nightly feeding range from a roosting camp of 20 to 50 km. Diet typically comprises a wide variety of flowering and fruiting plants (Tidemann 1995, Churchill 2008); in summer, diet mainly comprises fruits of rainforest trees and vines in addition to the nectar and blossom of Eucalyptus, Melaleuca and Banksia. In winter, diet is dominated by nectar and blossom. Non-indigenous and exotic tree species introduced to the urban landscape provide additional foraging habitat for this species within the locality; where previously existed a period of reduced availability of native food resource during the winter months, non-native species now supply food resources throughout the year (Parry-Jones & Augee 2001, Williams et al 2006).

Grey-headed Flying-foxes roost in large numbers, with up to tens of thousands of flying foxes using individual camps for mating, birth and rearing of young. Camps are typically located in gullies, close to water, in vegetation with a dense canopy, within 20km of a regular food source. Site fidelity to camps is high, with some camps being used for over 100 years (NPWS 2001). The closest known roosting camp to the study area is located at Yarramundi (Camp ID 97) approximately 16 km west of the site. Other camps are located further south at Emu Plains (Camp ID 237) and Paramatta Park (Camp ID 134), located 24 and 27 km from the study area, respectively.

Habitat features of the study area which may support the Grey-Headed Flying-Fox include foraging habitat provided by a number of flowering exotic and native trees, predominantly eucalypts, located within the study area.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

There is no evidence of roosting or suitable roosting habitat for Grey-headed Flying fox in the study area. This is due to the lack of gullies and dense canopy in the area. The nearest known roosting site is located 16 km west of the study area. Individuals recorded in the study area are likely from this camp.

The Grey-Headed Flying-Fox is a highly mobile species with a nightly feeding range from a roosting camp of 20 to 50 km. Their diet typically comprises a wide variety of flowering and fruiting plants, in particular, blossom from trees of the Myrtaceae family and native figs (Ficus

sp.) (Churchill 1998). Foraging resources during the final weeks of gestation, and during the weeks of birth, lactation and conception (September to May) is important to this species (DECCW 2009). The study area contains native flowering tree species that could be utilised across different seasons, including during the important times of the reproductive cycle.

The study area provides a potential foraging resource for three camps located 16, 24 and 27 km from the study area. Breeding individuals from nearby camps that utilise resources at the study area could be adversely impacted by the removal of foraging habitat. However, vegetation removal would be within a relatively small area (1.89 ha) in comparison to the vegetation retained within the study area as well as in comparison to the local area. This amount of clearing would therefore not significantly diminish the foraging resources in the region that would support breeding females.

The removal of seasonal foraging habitat as a result of the proposed action is highly unlikely to have an adverse effect on the life cycle of the Grey-Headed Flying-Fox such that a viable local population of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable. Grey-headed Flying-fox is a threatened fauna species.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The study area contains suitable foraging habitat for the Grey-headed Flying-fox with a number of preferred species in the species blossom diet being recorded in the study area. These consist of *Eucalyptus moluccana* which is common in the study area as well as *Eucalyptus tereticornis, Eucalyptus fibrosa and Melia azedarach.* In addition to these species, potential foraging habitat is present in the form of scattered exotic vegetation. The proposed action will result in the clearing of 1.89 ha of potential foraging habitat. This represents a small amount of the total amount of suitable foraging habitat to be retained in the study area. Furthermore, as the foraging habitat of Grey-headed Flying-foxes is expansive and nonspecific, this foraging resource does not comprise a significant area of foraging habitat within the locality.

The loss of potential foraging habitat within the study area is not likely to be significant to the species, and is already heavily modified and fragmented from other areas of suitable habitat

by rural residential development. Therefore, any further fragmentation caused by the proposed action is negligible. The long-term survival of the Grey-headed Flying-fox is highly unlikely to be affected by the removal of native vegetation in the study area.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

Under the BC Act, the Director-General maintains a register of areas of outstanding biodiversity value. To date, no area of outstanding biodiversity value has been associated with Grey-headed Flying-fox.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Of the key threatening processes listed in Schedule 4 of the BC Act, one is relevant to the potential impacts of the proposed action on Grey-Headed Flying-fox:

Clearing of native vegetation – Approximately 1.89 ha of native vegetation that contains foraging habitat would be cleared. This does not represent a significant area of foraging habitat for Grey-Headed Flying-Fox in the locality.

Conclusion

The proposed action would require the removal of 1.89 ha of native vegetation which provides potential foraging habitat for the Grey-headed Flying-fox. This is a negligible amount in comparison to the extensive amount of suitable foraging habitat in the wider locality. There is no roosting camp in the study area nor is there suitable roosting habitat. Therefore, the proposed action is highly unlikely to have an adverse impact on the life cycle of a local population, or impact the species habitat such that it will affect its long-term survival. As a result, it is considered unlikely that the proposed action represents a significant impact to the Grey-headed Flying-fox. A Species Impact Statement is not required for this species.

EPBC SIGNIFICANT IMPACT ASSESSMENTS

Cumberland Plain Woodland and Shale-Gravel Transition Forest

Cumberland Plain Woodland and Shale-Gravel Transition Forest is listed as critically endangered under the EPBC Act.

Will the action reduce the extent of an ecological community?

A total of 1.45 ha of Cumberland Plain Woodland and Shale-Gravel Transition Forest would be impacted by the investigations. An additional 0.44 of Shale Gravel Transition Forest (BC Act) was also recorded, however it was determined this this vegetation was not eligible for protection under the EPBC Act due to it not meeting the condition thresholds.

Regional vegetation mapping has identified that about 1717 ha of Cumberland Plain Woodland and Shale-Gravel Transition Forest occurs within the locality (based on the condition A and condition B map units). The clearing of 1.45 ha represents 0.08 per cent of the remaining Cumberland Plain Woodland and Shale-Gravel Transition Forest in the locality.

In 2009, the extent of the community was estimated at 12,300 ha. The removal or modification of up to 1.45 ha of Cumberland Plain Woodland and Shale-Gravel Transition Forest is not likely to have a significant impact on the community.

Will the action fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines

The propose investigations would result in linear impacts to an existing patch that would isolate and fragment the ecological community. The Cumberland Plain Woodland and Shale-Gravel Transition Forest in the broader landscape has been subject to clearing for residential, industrial and infrastructure purposes. As such it is an already fragmented condition. Although the proposal would further fragment this patch, it is not likely to result in a significant impact to the community because of the existing level of fragmentation.

Will the action adversely affect habitat critical to the survival of an ecological community

Habitat critical to the survival of an ecological community is defined as habitat required 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), or
- For the reintroduction of populations or recovery of the species or ecological community.

The Cumberland Plain Woodland and Shale-Gravel Transition Forest within the study area would not be considered critical to the survival of the community. The reason for this is the condition of the vegetation present in addition to the land tenure and lack of protection that this vegetation is afforded. The study area is located on the interface of bushland and the residential centre of Pitt Town and has been modified by previous land management practices. To the east of the study area, Scheyville National Park provides a well-protected remnant that would be considered critical to the survival of the community. This land would not be affected by the proposal.

Will the action modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns

Impacts associated with the investigations would be limited to the construction of new pavement through the patch of Cumberland Plain Woodland and Shale-Gravel Transition Forest in the study area. There is potential for short term impacts to water quality during construction, however it is anticipated that the operational impacts to water quality and quantity will be minimal. The proposal is not likely to substantially modify abiotic factors.

Will the action cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting?

Much of the Cumberland Plain Woodland and Shale-Gravel Transition Forest within the investigations area exhibits some level of weed ingress. Impacts would include vegetation clearing as well as earthworks and construction of pavement. Weed management protocols will be implanted as a part of the REF safeguards and exposed soil (such as batters) will be revegetated following construction. The clearing of native vegetation and movement of construction equipment will be strictly limited to the construction footprint. It is unlikely that the investigations would exacerbate the presence of weeds within the ecological community.

Will the action cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

assisting invasive species, that are harmful to the listed ecological community, to become established, or

Several exotic species were recorded in the Cumberland Plain Woodland and Shale-Gravel Transition Forest in the study area. Weed management protocols will be implanted as a part of the REF safeguards and exposed soil (such as batters) will be revegetated following construction. The clearing of native vegetation and movement of construction equipment will be strictly limited to the construction footprint.

A number of non-native fauna species were also recorded within the study area. The proposal is unlikely to assist any of these invasive species.

causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or

The investigations are unlikely to cause regular mobilisation of fertilisers herbicides or other chemicals.

interfere with the recovery of an ecological community.

The proposed investigations would result in the loss or modification of up to 1.45 ha of Cumberland Plain Woodland and Shale-Gravel Transition Forest within the investigations area. This is not consistent with the recovery of the community. However, based on the small

scale and existing condition of the vegetation to be impacted, it is unlikely that the proposed investigations would interfere with the recovery of the community.

Conclusions

It is unlikely that the proposed investigations would have a significant impact on Cumberland Plain Woodland and Shale-Gravel Transition Forest for the following reasons:

- The area that would be removed or modified is small and comprised of already modified and partially disturbed vegetation
- The investigations would further fragment or isolate the community, however the community is in an already fragmented and isolated condition.
- The investigations would not have an adverse effect on habitat critical to the survival of the community
- The investigations would not significantly modify the composition or any abiotic influences of the community.

For this reason, referral of the action to the Commonwealth Department of the Environment and Energy is not required.

Downy Wattle Acacia pubescens

Acacia Pubescens is listed as Vulnerable under the EPBC Act.

Will the action lead to a long-term decrease in the size of an important population of a species?

Two clusters of *Acacia pubescens* would be removed as a result of the proposed action. However, there are numerous other clusters of the species in close proximity to the study area. The removal of two clusters is negligible in comparison to the large number of individuals in the local area. Therefore, the proposed action would not lead to a long-term decrease in the size of an important population of a species.

Will the action reduce the area of occupancy of an important population?

The proposal will involve the removal of 1.89 ha of suitable habitat for *Acacia pubescens.* However, this habitat is heavily modified and fragmented, having only tenuous links to other areas of suitable habitat and the local population. Therefore, the removal of this vegetation will not reduce the area of occupancy of an important population.

Will the action fragment an existing important population into two or more populations?

The proposed action will occur in an area already heavily fragmented. Any fragmentation caused by the proposed action is therefore negligible. Two clusters of the species will be removed but other populations will not be impacted. Therefore, an existing important population will not be fragmented into two or more populations.

Will the action adversely affect habitat critical to the survival of a species?

No critical habitat has been declared for the species**.**

Will the action disrupt the breeding cycle of an important population?

By removing two clusters of *Acacia pubescens* the breeding cycle of these individuals will be impacted however the larger local population will not be impacted. Therefore, the breeding cycle of an important population will not be disrupted.

Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

1.89 ha of suitable habitat will be removed from the study area with additional areas of suitable habitat potentially impacted by indirect impacts and edge effects. However, in relation to the greater amount of habitat available in the area, particularly in Scheyville National Park, the habitat impacted is comparatively low. Furthermore, the habitat is highly modified and fragmented. As such, the proposed action will not remove or modify the habitat of *Acacia pubescens* such that the species is likely to decline.

Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

Exotic grasses are abundant in the study area and the proposed action may facilitate the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of potential habitat for the species. However, with the appropriate control measures enforced, the likelihood of this happening is significantly reduced.

Will the action introduce disease that may cause the species to decline?

The proposed action is unlikely to result in the introduction of disease to the population of *Acacia pubescens* in the study area.

Will the action interfere substantially with the recovery of the species?

The Commonwealth Conservation Advice for *Acacia pubescens* identifies the following local priority recovery and threat abatement actions to support the recovery of the species:

Threat	Priority action
Habitat loss and fragmentation	Use existing environmental regulations to prevent further loss of habitat. Prevent habitat disturbance. Control access routes by installing gates to suitably constrain public access to known sites on public land and manage access on private land and other land tenure to prevent damage through creation of additional illegal tracks through known downy wattle habitat. Ensure land managers, in particular local councils, are aware of the species' location and provide protection measures against key and potential threats, such a rubbish dumping and roadside maintenance.

Threat	Priority action
	Ensure that local recreational groups are aware of the presence of the downy wattle and the impacts of illegal track creation on the species. Prevent damage to the downy wattle though maintenance activities by ensuring that known populations of downy wattle are identified and buffers are left around individuals to prevent repeated damage by such activities
Invasive species	Identify and remove new weeds in the local area that could become a threat to the downy wattle using appropriate methods for controlling the density of weeds. Consider the possible disturbance/overspray threats associated with control methods.
Fire	Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of the downy wattle, that they support rather than degrade the habitat necessary to the downy wattle, that they do not promote invasion of exotic species.

Threat	Priority action
	Physical damage to the habitat and individuals of the downy wattle must be avoided during and after fire operations. Avoid successive fire intervals that are shorter than the period required to maintain recovery capacity of resprouting individuals. Provide maps of known occurrences to local and state Rural Fire Services and seek inclusion of mitigation measures in bush fire risk management plan/s, risk register and/or operation maps.
Hybridisation	Discourage planting of other bipinnate wattles in parks, gardens and roadsides near known downy wattle populations. Remove non-naturally occurring bipinnate wattles such as Cootamundra wattle, West Wylong wattle and A. jonessi that are in close proximity to populations of the downy wattle. Identify and remove hybrids of the downy wattle in proximity to known populations of downy wattle.

The proposal is broadly consistent with the identified local priority recovery and threat abatement actions, and would not interfere substantially with the recovery of *Acacia pubescens.*

Conclusion

In consideration of the above factors, the proposed activity is unlikely to have "a significant effect" on *Acacia pubescens* in the study area or wider locality as a result of the proposed action, as:

- The reduction in the population size and habitat of the species is negligible in comparison to the greater local population size and habitat.
- The proposed action would not fragment a population of the species, disrupt its breeding cycle or affect habitat critical to its survival; and
- Whilst the proposed action may exacerbate invasive species spread, invasive species currently dominate in the ground layer of most of the study area, and the *Acacia pubescens* habitat is already heavily modified.

Consequently, a referral to the Commonwealth Minister for the Environment is not required.

Micromyrtus minutiflora

Micromyrtus minutiflora is Vulnerable under the EPBC Act.

Will the action lead to a long-term decrease in the size of an important population of a species?

The proposed action will involve the clearing of 0.44 ha of habitat suitable to *Micromyrtus minutiflora* which does not currently contain any individuals of the species. The nearest record of the species is 5km to the south of the study area and its population size will not be impacted by the proposal.

Will the action reduce the area of occupancy of an important population?

0.44 ha of suitable *Micromyrtus minutiflora* habitat will be removed as a result of the proposal. This suitable habitat consists of Shale Gravel Transition Forest in the Sydney Basin Bioregion. This habitat is heavily modified and fragmented by rural residential development in the area. It is also isolated from populations of *Micromyrtus minutiflora* and therefore it is unlikely that they would inhabit this area. Therefore, the proposed action will not reduce the area of occupancy for any nearby populations.

Will the action fragment an existing important population into two or more populations?

As there are no populations in close proximity to the study area and the landscape is already modified and fragmented, the proposed action will not fragment an existing population into two or more populations.

Will the action adversely affect habitat critical to the survival of a species?

The site is not critical to the survival of the species. While a small area of suitable habitat will be removed, *Micromyrtus minutiflora* does not currently inhabit this area. Therefore, the proposed action will not adversely affect habitat critical to the survival of a species.

Will the action disrupt the breeding cycle of an important population?

As the closest population is over 5km away, they will not be impacted by the proposed action. Therefore, the breeding cycle of an important population will not be disrupted.

Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action would result in the removal of a small area (0.44 ha) of potential habitat for *Micromyrtus minutiflora*. The area of impact does not support any above-ground occurrence of the species and it is unlikely that it occurs in the soil seed bank in this location either. The closest plants of *Micromyrtus minutiflora* are approximately 5.5 km to the south of the area of impact. The species habitat would not be impacted by the proposed action such that it is likely to decline.

Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

Exotic grasses are abundant in the study area and the proposed action may facilitate the spread of seeds or fragments of plant to areas where these grasses are not present, via plant or contaminated topsoil. This could include areas of potential habitat for the species. However, with the appropriate control measures enforced, the likelihood of this happening is significantly reduced**.**

Will the action introduce disease that may cause the species to decline?

With the appropriate control measures in place, the proposed action is unlikely to introduce disease. As the closest species are over 5 km away it is unlikely that if any disease was introduced, that they would be impacted.

Will the action interfere substantially with the recovery of the species?

There is no recovery plan listed for *Micromyrtus minutiflora.*

The Commonwealth Conservation Advice for *Micromyrtus minutiflora* identifies the following local priority recovery and threat abatement actions to support the recovery of the species:

Threat	Priority action
Habitat loss, disturbance and modification	Monitor known populations to identify key threats.
	Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary (DECC, 2005c).
	Identify populations of high conservation priority.
	Manage threats to areas of vegetation that contain populations/occurrences/remnants of M. minutiflora.
	Ensure road widening and maintenance activities (or other infrastructure or development activities involving substrate or vegetation disturbance) in areas where M. minutiflora occurs do not adversely impact on known populations.
	Control access routes to suitably constrain public access to known sites on public land.

Threat	Priority action
	Minimise adverse impacts from land use, including dumping and trail bike riding, at known sites. Investigate formal conservation arrangements such as the use of covenants, conservation agreements or inclusion in reserve tenure (DECC, 2005c).
Invasive weeds	Manage sites to prevent introduction of invasive weeds, which could become a threat to M. minutiflora, using appropriate methods.
Fire	Develop and implement a suitable fire management strategy for M. minutiflora. Provide maps of known occurrences to local and state rural fire services and seek inclusion of mitigative measures in bush fire risk management plans, risk register and/or operation maps.
Trampling, browsing or grazing	Prevent grazing pressure at known sites on leased crown land through exclusion fencing or other barriers.

The proposal is broadly consistent with the identified local priority recovery and threat abatement actions, and would not interfere substantially with the recovery of *Micromyrtus minutiflora.*

Conclusion

In consideration of the above factors, the proposed activity is unlikely to have “a significant effect” on *Micromyrtus minutiflora* in the study area or wider locality as a result of the proposed action, as:

- The proposed action would not reduce the area of occupancy or population size of the species;
- The proposed action would not fragment a population of the species, disrupt its breeding cycle or affect habitat critical to its survival; and
- Whilst the proposed action may exacerbate invasive species spread, invasive species currently dominate in the ground layer of most of the study area, and the *Micromyrtus minutiflora* habitat is already heavily modified.

Consequently, a referral to the Commonwealth Minister for the Environment is not required.

Pimelea spicata (Spiked Rice-flower)

Pimelea spicata is listed as Endangered under the EPBC Act.

Will the action lead to a long-term decrease in the size of a population?

Pimelea spicata was not recorded in the study area during ecological surveys. The nearest known population of *P. spicata* is approximately 4 km to the east of the study area and will not be impacted by the proposed action. Furthermore, the species has a low seed dispersal range and therefore, as there are no recordings in or near the study area it is unlikely that *P. spicata* occurs in the seedbank. While the proposed action will result in the removal of 1.45 ha of potential habitat for *P. spicata,* as no individuals have been recorded in the area it is considered highly unlikely that it will result in a long-term decrease in the size of a population.

Will the action reduce the area of occupancy of the species?

The proposed action would result in the reduction of 1.45 ha of suitable habitat for *P. spicata* in the form of Cumberland Plain Woodland. This habitat is currently heavily modified and fragmented by existing roads and rural development. It is also isolated from other areas of suitable habitat. Due to this, the habitat is considered sub-optimal and any reduction to the area of occupancy of the species would be negligible.

Will the action fragment an existing population into two or more populations?

The potential habitat for *P. spicata* to be removed consists of patches of vegetation currently fragmented by roads and dwellings. In a larger context, the study area is situated within a mosaic of rural residential development with only patches of vegetation which have been heavily modified. Any further fragmentation caused by this proposed action would therefore be negligible. Furthermore, as the nearest record of the species is over 4 km away and the study area is not an important habitat corridor, the proposed action is unlikely to further isolate any individuals or groups of individuals. Therefore, the proposed action will not fragment an existing population of *P. spicata* into two or more populations.

Will the action adversely affect habitat critical to the survival of a species?

There is no critical habitat listed for *P. spicata.* The 1.45 ha of fragmented potential habitat to be removed is not considered to be habitat critical to the survival of this species.

Will the action disrupt the breeding cycle of a population?

P. spicata is dependent on seed production for recruitment and while dispersal mechanisms for the species are unknown, seed dispersal is likely to be very low, with most seedlings observed in proximity to adult plants. Due to this, and because the species has not been recorded in close proximity to the study area, it is highly unlikely that the proposed action will disrupt the breeding cycle of a population.

Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action will result in the clearing of 1.45 ha of suitable habitat in the form of Cumberland Plain Woodland. This habitat is currently heavily modified and fragmented by

existing roads and rural development. It is also isolated from other areas of suitable habitat. The proposed action will further fragment the vegetation however, due to its current extensive modification, any further fragmentation is negligible. As the species is not known to inhabit this area, it is highly unlikely that its removal will lead to the decline of the species.

Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?

While the proposed action may result in the spread of some exotic grasses, it is unlikely that the action will result in the establishment of an invasive species that is harmful to *P. spicata.*

Will the action introduce disease that may cause the species to decline?

The action is highly unlikely to introduce disease that may cause *P. spicata* to decline.

Will the action interfere with the recovery of the species?

A recovery plan has been prepared for *Pimelea spicata*. The overall objective of the recovery plan is "to ensure the continued and long-term survival of *P. spicata* in the wild by promoting the in-situ conservation of the species across its natural range".

This plan consists of six specific recovery objectives (DEC 2005 p18):

- Conserve *P. spicata* using land-use and conservation planning mechanisms

Actions associated with this recovery objective include ensuring that:

all relevant Environmental Planning Instruments (prepared under Pt 3 of the EP&A Act) are prepared, or reviewed, with reference to this recovery plan and any future advice from the Department of Environment and Conservation regarding the species.

all relevant consent and determining authorities (under Pt 4 & 5 of the EP&A Act) will assess developments and activities with reference to this recovery plan, environmental impact assessment guidelines... and any future advice from the Department of Environment and Conservation regarding the species.

The Proposal is being assessed with reference to the recovery plan, environmental impact assessment guidelines and all publicly available information regarding the species.

- identify and minimise the operation of threats at sites where *P. spicata* occurs

This recovery objective is aimed at minimising threats operating at known *P. spicata* sites (in addition to land clearing), including weed invasion; mowing and slashing; spraying of herbicide; dumping of rubbish and garden waste; inappropriate disturbance regimes; and grazing and associated trampling.

While there is a possibility that the proposed action may result in an increase in some of these threats, the study area is not a known *P. spicata* site and therefore this recovery objective is not applicable.

- implement a survey and monitoring program that will provide information on the extent and viability of *P. spicata.*

Not relevant to the current assessment.

- Provide the community with information that assists in conserving the species.

Not relevant to the current assessment.

- raise awareness of the species and involve the community in the recovery program

Not relevant to the current assessment.

- promote research questions that will assist future management decisions

Not relevant to the current assessment.

Conclusion

In consideration of the above factors, the proposed activity is unlikely to have “a significant effect” on *P. spicata* in the study area or wider locality as a result of the proposed action, as:

- The proposed action would not reduce the area of occupancy or population size of the species;
- The proposed action would not fragment a population of the species, disrupt its breeding cycle or affect habitat critical to its survival; and
- Whilst the proposed action may exacerbate invasive species spread, invasive species currently dominate in the ground layer of most of the study area, and the *P. spicata* habitat is already heavily modified.

Consequently, a referral to the Commonwealth Minister for the Environment is not required.

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

Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act.

Will the proposed action lead to a long-term decrease in the size of an important population of a species?

The closest known population of Grey-headed Flying-fox to the study area is at the roosting camp located at Yarramundi (Camp ID 97) approximately 16 km west of the site. Other camps are located further south at Emu Plains (Camp ID 237) and Paramatta Park (Camp ID 134), located 24 and 27 km from the study area, respectively. While these populations may utilise parts of the study area for foraging, this foraging resource does not comprise a significant area of foraging habitat within the locality. As Grey-headed Flying-foxes forage on a large variety of both native and exotic vegetation, their foraging habitat is extensive. Therefore, the vegetation to be cleared is negligible in comparison to the vast amount of foraging habitat in the locality. Furthermore, the species does not currently use the study area for permanent roosting or as a maternity camp. Therefore, the proposed action is highly unlikely to lead to a long-term decrease in the size of an important population of the species.

Will the proposed action reduce the area of occupancy of an important population?

There are three camps near the study area, 16, 24 and 27 km away. Individuals from these camps may utilise foraging resources within the study area however the 1.89 ha of potential foraging habitat to be cleared does not represent a substantial amount of habitat in comparison to the amount of suitable foraging habitat in the greater local area. The removal of a relatively small portion of potential foraging habitat from the study area would not significantly reduce the area of occupancy of the species.

Will the proposed action fragment an existing important population into two or more populations?

There are no roosting sites in or in close proximity to the study area. The nearest roosting camps will not be impacted by the proposed action. The removal of potential foraging habitat from the study area would not fragment the population of the Grey-Headed Flying-fox into two or more populations.

Will the proposed action adversely affect habitat critical to the survival of a species?

Whilst the Proposal would result in the removal of potential foraging habitat, this habitat is not likely to be habitat critical to the survival of this species.

Will the proposed action disrupt the breeding cycle of an important population?

There is no known maternity roosting camp of Grey-headed Flying-foxes within, or in close proximity to, the study area. The study area provides a potential foraging resource for a roosting camp 16 km to the west of the study area. Breeding individuals from nearby camps that utilise resources at the study area could be adversely impacted by the removal of foraging habitat. However, vegetation removal would be within a relatively small area (1.89 ha) in comparison to the vegetation that would be retained within the study area as well as in

comparison to the local area. This amount of clearing would therefore not significantly diminish the foraging resources in the region that would support breeding females.

Will the proposed action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action would result in the removal of 1.89 ha of potential foraging habitat for the Grey-headed Flying-fox. This represents a small amount of the total suitable foraging habitat to be retained in the study area and the locality. Furthermore, as the foraging habitat of Grey-headed Flying-foxes is expansive and nonspecific, this foraging resource does not comprise a significant area of foraging habitat within the locality. The loss of potential foraging habitat within the study area is not likely to be significant to the species, and is already heavily modified and fragmented from other areas of suitable habitat by rural residential development. Therefore, any further fragmentation caused by the proposed action is negligible. The proposed action is highly unlikely to impact the availability and quality of habitat to the extent that the species is likely to decline.

Will the proposed action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

The action is unlikely to result in the establishment of an invasive species that is harmful to the Grey-Headed Flying-fox. Known predators of the species include native reptiles and birds; no invasive exotic fauna species are known to predate upon Grey-Headed Flying-foxes. The action is highly unlikely to result in the establishment of invasive flora species that are harmful to the Grey-Headed Flying-fox.

Will the proposed action introduce disease that may cause the species to decline?

The action is highly unlikely to introduce disease that may cause the Grey-Headed Flying-fox to decline

Will the proposed action interfere substantially with the recovery of the species?

There is currently no approved Recovery Plan in place for the Grey-Headed Flying-fox. A Draft National Recovery Plan for the Grey-headed Flying-fox was prepared in January 2017. The Draft National Recovery Plan lists 9 Recovery Objectives to be completed in the 10 year time frame of the plan. These are listed in the table below.

Recovery Objective	Interference by proposed action
Identify, protect and enhance native foraging habitat critical to the survival of the Grey-	While the proposed action will result in the removal of native foraging habitat, it is

Recovery Objective	Interference by proposed action
headed Flying-fox.	not critical to the species' survival.
Identify, protect and enhance roosting habitat of Grey-headed Flying-fox camps.	There is no roosting habitat in the study area.
Determine population trends in Grey-headed Flying-foxes so as to monitor the species' national distribution and conservation status	Not applicable to this proposal
Build community capacity to coexist with flying-foxes and minimise the impacts on urban settlements from existing camps without resorting to dispersal.	Not applicable to this proposal

Recovery Objective	Interference by proposed action
Increase public awareness and understanding of Grey-headed Flying-foxes and the recovery program, and involve the community in the recovery program where appropriate	Not applicable to this proposal
Improve the management of Grey-headed Flying-fox camps in sensitive areas.	Not applicable to this proposal
Significantly reduce levels of deliberate Grey-headed Flying-fox destruction associated with commercial horticulture	Not applicable to this proposal
Support research activities that will improve the conservation status and	Not applicable to this proposal

Recovery Objective	Interference by proposed action
management of Grey-headed Flying-foxes	
Assess and reduce the impact on Grey-headed Flying-foxes of electrocution on power lines, and entanglement in netting and on barbed-wire.	Not applicable to this proposal

The proposed action will therefore not interfere with the recovery of the Grey-headed Flying-fox.

Conclusion

In consideration of the above factors, the proposed activity is unlikely to have "a significant effect" on the Grey-headed Flying-fox as a result of the proposed action, as:

- The reduction in the foraging habitat of the species is negligible in comparison to the greater habitat in the local area.
- The proposed action would not fragment a population of the species, disrupt its breeding cycle or affect habitat critical to its survival; and
- The proposed action would not interfere with the recovery of the species.

Consequently, a referral to the Commonwealth Minister for the Environment is not required.

Appendix B

SoHI addendum and non-Aboriginal heritage consistency review

16 August 2019

Ben Fethers
Environmental Consultant
Arcadis

Dear Ben,

Re: Pitt Town Bypass SoHI Addendum and Consistency Review: Heritage Memo DRAFT

As part of the Pitt Town Bypass Project, a one kilometre road corridor will be constructed through Pitt Town, linking Buckingham Street and Cattai Road with Pitt Town Road. To inform these works, a Statement of Heritage Impact (SoHI) was prepared by Artefact in 2018. 100% design has since been completed, resulting in several small areas for construction work extending outside the areas assessed in the 2018 SoHI. The additional areas in relation to the 2018 study area are shown in Figure **1**. This memo letter provides an addendum heritage impact assessment for the additional areas, and should be read in conjunction with the 2018 SoHI.

It should be noted that the study area of the current proposed works will hereafter be referred to as the Addendum Study Area, while the study area assessed in the 2018 SoHI will be referred to as the 2018 SoHI Study Area.

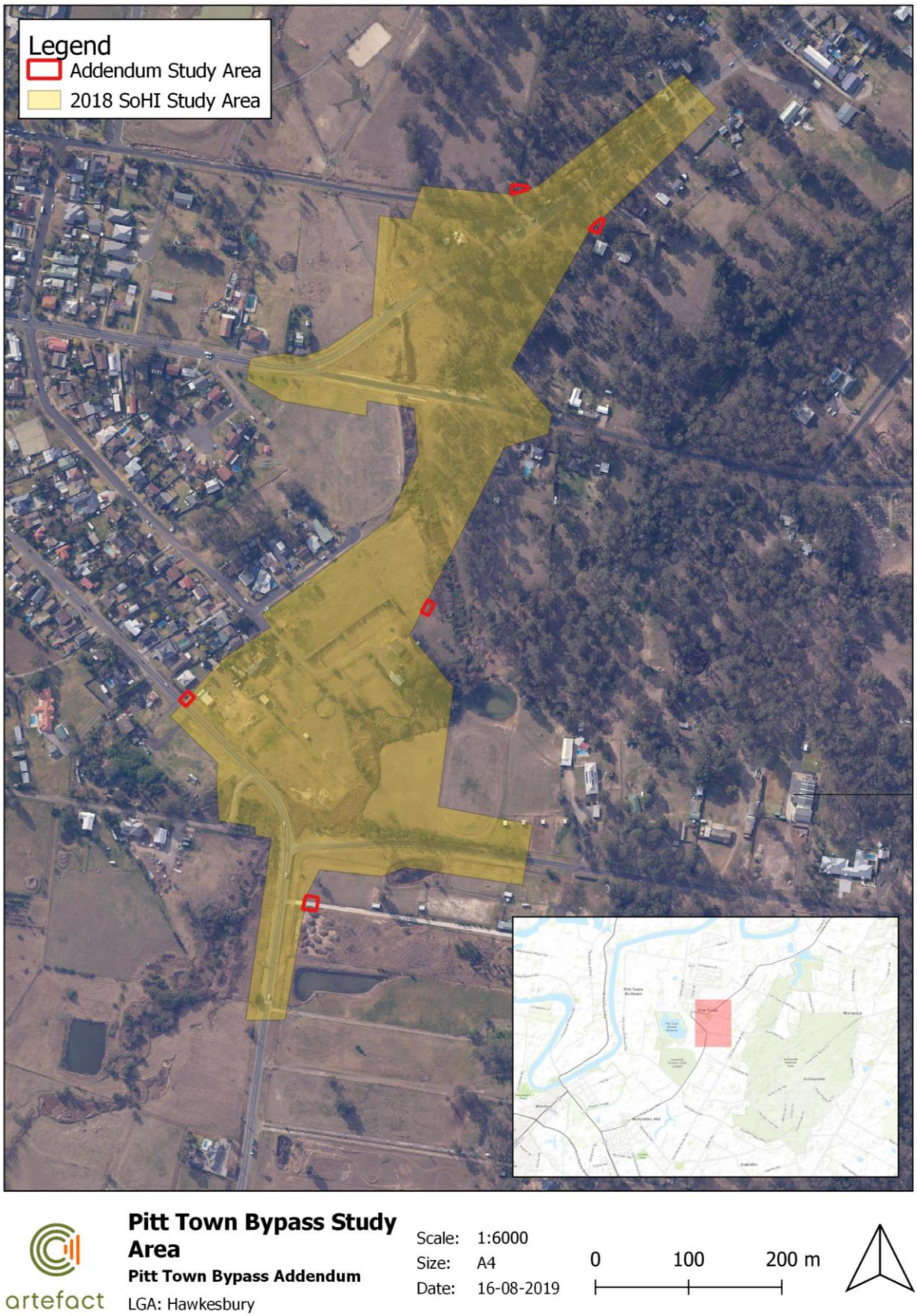
Proposal location

The proposal location is located at Pitt Town, situated in the Hawkesbury Local Government Area (LGA). The proposed bypass would extend between the intersection of Bathurst Street with Glebe Road in the south, through cleared land, across Old Pitt Town Road to Cattai Road in the north. The bypass would be approximately 1,060 m long.

The 2018 SoHI Study Area extended from 220m north of the intersection of Cattai Road and Buckingham Street to about 230m south of the intersection of Pitt Town Road and Glebe Road. The 2018 SoHI study area has not been reassessed in this memo.

The additional areas subject to assessment in this memo, the addendum study area, include five small land portions extending outside the 2018 SoHI study area boundary: One driveway at the junction of Buckingham Street and Cattai Road; One driveway on the eastern side of Cattai Road north of Buckingham Street; the western extent of the construction footprint on Bathurst Street; 1 Driveway on the eastern side of the Pitt Town Bypass south of Glebe Road. The addendum study area is illustrated in Figure **1**.

Figure 1. Current Study area and original study area



Heritage listings

Cottage (Hawkesbury LEP 2012 Item No. I277)

The 'Cottage' heritage item was likely constructed sometime in the 1860s or 1870s and may have been a town residence for a lowlands farmer. The item is a significant as it reflects the early settlement of Pitt Town and attests to the early rural character of the town. The heritage curtilage is evident in Figure 2.

Nearby heritage items

There are no additional heritage items within a 100-metre buffer zone of the study area.

Figure 2. Heritage Items in the vicinity of the study area

Proposed works

The proposed works involve the construction of the Pitt Town bypass. The bypass would be approximately one kilometre in length and link Buckingham Street and Cattai Road in the north with Pitt Town Road to the south. The key features of this proposal include:

- Extending Pitt Town Road past Bathurst Street onto Cattai Road, east of Eldon Street
- Installing a new roundabout at Eldon Street and Old Pitt Town Road
- Closing a portion of Cattai Road to maintain access from Buckingham Street
- Providing new crossings of Hortons Creek and the southern and central sections of the proposal
- Installing a new roundabout at Pitt Town Road/Bathurst Street and Glebe Road
- Modifying driveway access to four properties

Heritage significance

The following section provides a summary of the heritage significance of the 'Cottage' heritage item and of the individual elements that may be affected by the proposed Pitt Town Bypass study area extension.

Cottage

Statement of Significance

The NSW Department of Premier and Cabinet (DPC) State Heritage Inventory (SHI) database contains the following statement of significance for the item:

> *The cottage at 22 Bathurst Road, Pitt Town is an important mid-Victorian cottage. Close to the southern entry to the town it helps to establish the nineteenth century character of the village. The cottage has some research potential, revealing early vernacular systems of construction.*

Setting and character

The 2018 SoHI states that the 'Cottage' heritage item is notable for its rural landscape setting. The rural setting of the cottage contributes to the local significance of the item under three criteria within the NSW Significance Assessment, as outlined in Table 1:

Table 1. Extract of the significance assessment for the 'Cottage'

Criteria	Description
A – Historical Significance	*While little is known of the history of this cottage, it is clearly important as one of the early surviving cottages in the town, possibly built as the town cottage for one of the farmers on the lowlands.*

Criteria	Description
C – Aesthetic Significance	*The cottage at 22 Bathurst Road, Pitt Town is an important mid-Victorian cottage. Close to the southern entry to the town, the cottage helps to establish the nineteenth century character of the village.*
F – Rarity	*The cottage is a rare surviving early residence in the area dating from early years of settlement of the Pitt Town region.*

Archaeological Assessment

The 2018 SoHI identified potential for significant archaeological remains within the Pitt Town bypass project area. These areas of archaeological remains were identified through assessment of historic plans and aerial photographs. The archaeological assessment identified three separate phases (1828, 1843, and 1955) that reflected three distinct land uses: residential development, agricultural purposes, and road corridors. Potential for significant archaeology was determined on the south-eastern side of Buckridge Street associated with the 1828 and 1843 phases.

At the southern-most extent of the study area along Pitt Town Road, aerial imagery from 1955 shows that the land is cleared, but no structures are evident. The 1955 aerial imagery shows that along Bathurst Road opposite from the Cottage heritage item, a structure is evident immediately adjacent to the addendum study area. The structure is expected to date from the early to mid-twentieth century and as such, would not be significant. Throughout the remainder of the study area, the land is uncleared and there is no evidence of built structures. The 1955 aerial imagery is overlaid in Figure 3.

Figure 3. Overlay of 1955 aerial imagery with study areas and archaeological potential areas

Figure 4. Areas of Archaeological Potential

Impact assessment

Physical impact assessment

Impacts to Heritage Items

Works within the addendum study area will not occur within the curtilage of the 'Cottage' heritage item and as such, there will not be any physical impact to significant fabric at the 'Cottage' heritage item. The findings of this memo are consistent with those outlined in the Statement of Heritage Impact (2018) prepared for the Pitt Town Bypass.

Impacts to Archaeology

No areas with potential for significant archaeological remains have been identified within the addendum study area. While some former structures are evident in the 1955 aerial imagery, located immediately adjacent to the Bathurst Road land portion of the addendum study area, there is no evidence to suggest that these structures would be dated to the 1800s. Therefore, the structure would not be considered a significant archaeological remain.

Works within the addendum study area will result in **nil** physical impact to the 'Cottage' heritage item and any potential significant archaeological remains.

Visual impact assessment

The proposed expansion of the construction footprint along Bathurst Street would involve additional road improvements and associated works within the vicinity of the 'Cottage' heritage item. As the 'Cottage' has historically been located alongside an existing roadway, it is not anticipated that this aspect of the proposal would result in any significant changes to the visual setting of the heritage item.

However, the expansion of the Pitt Town Bypass along Bathurst Street would have an impact to the views from the 'Cottage'. The cumulative visual impacts of the Pitt Town Bypass and subsequent road upgrade projects may diminish the rural character of Pitt Town over time. As such it is recommended that actions such as replanting are undertaken to preserve the rural character of the area.

Works within the addendum study area will result in **minor** visual impact to the 'Cottage' heritage item.

Nearby heritage items

There are no other nearby heritage items that would be affected by the proposed works within the current study area.

Statement of Heritage Impact

The Statement of Heritage Impact for the addendum study area is consistent with the impacts outlined in the 2018 SoHI prepared by Artefact. An updated Statement of Heritage Impact for the 'Cottage' has been provided below in Table 2.

Table 2. Statement of Heritage Impact for the 'Cottage'

Impact	Discussion
What aspects of the proposal respect or enhance the heritage significance of the study area?	The proposal has been designed, where possible, to minimise direct impacts on adjacent heritage items. The roadworks assessed in this Memo would not physically impact any heritage items, however the works will increase the cumulative visual and indirect impacts associated with the overall study area (as discussed in the 2018 SoHI). The potential impacts of the proposal are consistent with those assessed in the 2018 SoHI.
What aspects of the proposal could have a detrimental impact on the heritage significance of the study area?	Of the proposed additions to the construction footprint, only the extension along Bathurst Street is in the vicinity of a heritage item, the 'Cottage'. The 'Cottage' would not be impacted directly as a result of the proposed works assessed in this memo, however the proposed works may contribute to some level of cumulative diminishing to the rural character of the 'Cottage' and its surroundings. The impacts throughout the remainder of the study area are minimal. Overall the proposed works assessed in this memo are consistent with the findings of the 2018 SoHI.
Have more sympathetic options been considered and discounted?	*Development of the proposal considered various options for the Pitt Town Bypass by Roads and Maritime. Options included:* • *Option 1 – 'Do nothing'* • *Option 2 – Construct a bypass of Pitt Town* *Only one horizontal alignment was investigated for the proposal, which follows the established bypass corridor. The main differences in options, as such, were between the intersection treatments and access provision at intersecting roads. The bypass was considered to require upgrades to three intersections including intersections at Bathurst Street/Glebe Road, Eldon Street/Old Pitt Town Road, and Cattai Road/Buckingham Street. Two strategic sub-options were developed for the proposed new intersection at Pitt Town Road/Bathurst Street and Glebe Road including:* • *Sub-option 1 – a new two-lane roundabout* • *Sub-option 2 – a new four-way intersection with traffic lights* *Selection of the preferred option was based on community consultation and analysis which identified that Option 2 (*assessed in the 2018 SoHI*) with roundabouts would best meet the proposal objectives by alleviating traffic congestion through Pitt Town and improving connectivity and safety, and would meet community preferences.*

Conclusions and recommendations

This assessment has found that proposed works within the addendum study area would result in nil physical impact and minor visual impact to the 'Cottage' (Hawkesbury LEP I722). There is no expectation that significant archaeological remains would be uncovered within the addendum study area.

The following recommendations (outlined within the 2018 Statement of Heritage Impact) should be adhered to for the addendum study area:

- Replanting of native vegetation should occur along the bypass alignment to mitigate impact on the views and setting within the study area
- As the proposed construction footprint is within 25m of the 'Cottage' heritage item, there is potential risk for impacts from vibration during construction, depending on the nature of equipment utilised. Construction vibration damage should be carefully managed and monitored. It is recommended that the construction methodology for works within a 25m range of the locally listed 'Cottage' heritage item be subject to approval by Roads and Maritime prior to commencement of works in this area
- If unexpected archaeological finds are discovered during the proposed works, the Roads and Maritime *Standard Management Procedure: Unexpected Heritage Items* (2015) must be followed. The NSW Heritage Division would be notified of the discovery of a relic in accordance with Section 146 of the NSW *Heritage Act* 1977. In areas where a permit to impact 'relics' under the Heritage Act is in place, a heritage consultant and Roads and Maritime would need to determine consistency of the unexpected find with existing approvals and advise if a notification to Heritage Division would be required.
- A heritage induction must be presented to works before commencement of construction of works in the vicinity of the 'Cottage' heritage item (LEP 2012 Item No. I277) and include values of the place, avoidance procedure, and contacts (site manager, RMS heritage officer) for reporting unexpected archaeological finds or inadvertent impacts to the heritage item

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Customer feedback
Roads and Maritime
Locked Bag 928,
North Sydney NSW 2059

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