

Review of Environmental Factors

Addendum

Biodiversity review – additional impacts within Parsley Bay Reserve, Refresh Vacluse Diamond Bay Project.

Background

Sydney Water has commenced the Refresh Vacluse and Diamond Bay project which will re-direct untreated wastewater away from Sydney's last remaining ocean outfalls in Vacluse and Diamond Bay and transfer it to the Bondi Water Resource Recovery Facility (WRRF) for treatment. The project involves construction of a new pumping station and associated infrastructure at Parsley Bay. The new pumping station will be located at the existing amenities block in the Parsley Bay Reserve car park. As part of the project new amenities facilities will be provided inside the caretaker's cottage and kiosk.

Sydney Water prepared a Review of Environmental Factors (REF) for the Refresh Vacluse Diamond Bay project in June 2020 and a Decision Report in December 2020. After feedback was received from the community and Council during exhibition of the REF, Sydney Water redesigned the pump station at Parsley Bay to reduce vegetation removal. A biodiversity assessment had been prepared to inform the REF, with additional biodiversity assessment undertaken for the Decision Report. Together, the REF and Decision Report form the approvals for the construction and operation of the Refresh Vacluse Diamond Bay project. Development consent for the new amenities within the caretaker's cottage was granted (with conditions) by the Woollahra Local Planning Panel on 6 October 2022.

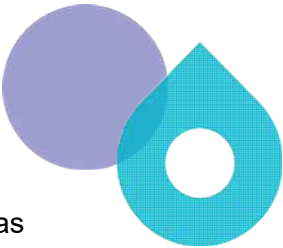
At the request of the community and due to the time since the REF and Decision Report were assessed and determined, Sydney Water engaged ecologists to review the biodiversity assessments. The scope of work involved verifying the existing ecology present within the area, assessing the impacts of the proposed work and determining if additional impacts were likely, and undertaking additional assessment and providing recommendations if needed.

The Specialist Ecology Services Report (April 2024) is included in Appendix C. The assessment found that the ecological community present at Parsley Bay was correctly classified as Sydney Coastal Sandstone Foreshores Forest, as described in the original biodiversity assessments for the REF and Decision Report. However, an additional threatened flora species was identified, and the report identified that the original biodiversity assessments did not assess potential impacts to the roosting/breeding habitat of threatened microbats (only suitable foraging habitat).

This REF Addendum is to document and assess the additional biodiversity impacts within Parsley Bay Reserve associated with the Refresh Vacluse Diamond Bay project.

1 Determination

This Review of Environmental Factors Addendum (REFA) assesses potential additional biodiversity impacts of work at Parsley Bay as part of the Refresh Vacluse Diamond Bay project. This REFA was prepared under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with Sydney Water both the proponent and determining authority.



The Sydney Water Project Manager is accountable for ensuring the proposal is carried out as described in this REFA, the *Review of Environmental Factors Refresh Vaucluse Diamond Bay* (June 2020) and the *Decision Report for the Refresh Vaucluse Diamond Bay Project* (December 2020) (approved REF and Decision Report). Additional environmental impact assessment may be required if the scope of work or work methods described in this REFA change significantly following determination.

Decision Statement

The additional biodiversity impacts assessed in this REFA are the removal of one juvenile plant of a new/ additional threatened species (*Macadamia tetraphylla*) and impacts associated with the removal of potential roosting/breeding habitat for hollow dependent threatened microbat species.

The Specialist Ecology Services Report was undertaken in accordance with the NSW *Biodiversity Conservation Act 2018* and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999*.

The proposal will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats. Therefore, a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR) is not required.

Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REFA and the approved REF and Decision Report, the proposed work is unlikely to have a significant impact on the environment. Therefore, an Environmental Impact Statement (EIS) is not required, and the proposal may proceed.

Certification

I certify that I have reviewed and endorsed this REFA and, to the best of my knowledge, it is in accordance with the EP&A Act and the Environmental Planning and Assessment Regulations (EP&A Regulation). The proposal has been considered against matters listed in section 171 (Appendix A) and the guidelines approved under section 170 of the EP&A Regulation and the information it contains is neither false nor misleading.

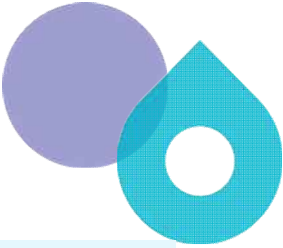
Prepared by:	Reviewed by:	Endorsed by:	Approved by:
Felix Salmon REFA author Sydney Water Date: 2/05/2024	Jill Berwick Lead Environmental Scientist Sydney Water Date: 2/05/2024	Bala Subramanian Senior Project Manager Sydney Water Date: 2/05/2024	Murray Johnson Environment and Heritage Manager Sydney Water Date 3/05/2024

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2 Proposal Summary

Aspect	Detailed description
Proposal location	The Refresh Vacluse Diamond Bay project is located in the Woollahra Municipal Council and Waverley Council local government areas, including Parsley Bay, Dover Heights, Vacluse, and Rose Bay. This REFA relates to the works in and around Parsley Bay Reserve.
Approval documents	<i>Review of Environmental Factors Refresh Vacluse Diamond Bay</i> (June 2020) <i>Decision Report for the Refresh Vacluse Diamond Bay Project</i> (December 2020)
Proposal scope	The Refresh Vacluse Diamond Bay project includes: - the transfer of dry weather wastewater flow from the Vacluse and Diamond Bay Ocean Outfalls to Bondi WRRF - the construction of two new wastewater pumping stations, one at Parsley Bay and one at Eastern Avenue Reserve - the construction of a new wastewater pipeline from Parsley Bay to Carlisle Street, at a depth of about 65 m - the construction of wastewater infrastructure, including reticulation pipelines and maintenance holes and ventilation points in Vacluse, Diamond Bay, Dover Heights, and Rose Bay. At Parsley Bay, the construction of the new pumping station (SP1216) and associated infrastructure (work to existing and new wastewater pipelines and maintenance pits) requires some vegetation removal for the new pumping station, and to access existing and new infrastructure.
Proposal change	No additional scope or changes to the project are proposed as part of this REFA. This REFA assesses the additional potential biodiversity impacts of the proposed works at Parsley Bay based on recent biodiversity investigations since the Approved REF and Decision Report were published. The additional biodiversity impacts include: - removal of a small <i>Macadamia tetraphylla</i> plant - potential impacts to suitable roosting/breeding habitat (the approved REF assessed only suitable foraging habitat), associated with the potential removal of the large Swamp Mahogany (<i>Eucalyptus robusta</i>).
Justification for proposal change	Tests of significance (under the BC Act) and Significant Impact Criteria (EPBC Act) were undertaken for the additional biodiversity impacts as part of the Specialist Ecology Services Report. The assessments found that: - the removal of one individual <i>Macadamia tetraphylla</i> would not be-significant because it is not considered important to the population's survival in the locality and the local specimens are outside their natural range and likely to be planted. - If the Swamp Mahogany <i>Eucalyptus robusta</i> needs to be removed, there would be a negligible impact on microbat species at the site because of the availability of suitable habitat within the immediate area. The <i>Eucalyptus robusta</i> has been assessed to be removed under the previous approvals and this REFA includes assessment of the hollows within the <i>E.robusta</i> as



potential habitat for the threatened microbats (an additional impact). However, in the Decision Report Sydney Water has committed to “optimising the design to avoid any impacts to the large mature *Eucalyptus robusta* and *Angophora costata* at Parsley Bay”. We recognise the importance of the *E.robusta* to the community and Woollahra Council and have committed to try and retain the tree. Further information is included in section 5.

Figure 1 shows the location of the project at Parsley Bay, the threatened *Macadamia tetraphylla* specimens and the *Eucalyptus robusta*.

3 Consultation

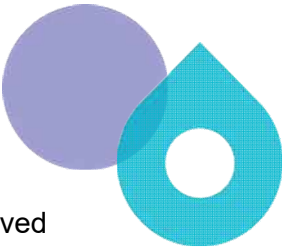
The Refresh Vaucluse Diamond Bay project commenced consultation in 2018 with the establishment of a community reference group (CRG) to help inform the options for the project. In June 2020, the REF for the project was placed on public exhibition on Sydney Water Talk and comment was invited. Thirty three submissions were received, mostly focused on works at Parsley Bay and impacts on vegetation. Sydney Water responded to the feedback re-designing part of the pumping station to reduce vegetation impacts and prepared a Decision Report (December 2020). The REF, Decision Report and associated documents are available on Sydney Water Talk.

Sydney Water has continued to engage with both Woollahra and Waverley Councils and the community. A particular concern raised by the community is that the biodiversity assessment did not correctly identify the ecological community present at Parsley Bay and as a result the REF and Decision Report did not adequately assess the biodiversity impacts. Representatives from the community suggested that the ecological community present is a Littoral Rainforest, which is listed as an Endangered and Critically Endangered Ecological Community under the BC Act and EPBC Acts as follows:

- Littoral Rainforest in the NSW North Coast, Sydney Basin and Southeast Corner Bioregions (BC Act, EEC)
- Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (EPBC Act, CEEC).

As well as being protected under state and Commonwealth biodiversity legislation, most work involving impact to littoral rainforests in NSW require an additional level of assessment (an Environmental Impact Statement) to be approved through Council/the Woollahra Local Planning Panel (under the State Environmental Planning Policy – Resilience and Hazards, 2021), and not by Sydney Water.

At the request of the community, an additional Specialist Ecology Services Report was undertaken to review the ecological community present (including if it is littoral rainforest) and to update the assessments undertaken given the time since approval, and to provide additional detail on the vegetation to be cleared. The Specialist Ecology Services Report (Appendix C) confirmed the ecological community is Plant Community Type (PCT) 3594 Sydney Coastal Sandstone Foreshores Forest and is not littoral rainforest, nor a listed Threatened Ecological Community under the BC or EPBC Acts. This is consistent with both the REF assessment and Council assessments. PCT 3594 is a native ecological community with some threatened species present within Parsley Bay, and Sydney Water aims to minimise impacts to this vegetation. Further detail about the Specialist Ecology Services Report is included in Section 5 and the full report can be found in Appendix C.



Sydney Water consulted with Councils and other authorities during preparation of the approved REF and Decision Report to meet *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) requirements, including for works to Council roads. The ISEPP has since been superseded by *the State Environmental Planning Policy (Transport and Infrastructure) 2021* (TISEPP). While there are no additional requirements to consult under the more recent TISEPP, Sydney Water continues to consult and work closely with Council on the project.

Sydney Water, and its contractor Abergeldie Complex Infrastructure, will continue to work with the community on this project.

4 Legislative consideration

The Specialist Ecology Services Report included review of the BC and EPBC Acts, as well as the *Fisheries Management Act* and the SEPP Resilience and Hazards 2021.

There are no additional legislative requirements above those already assessed in the approved REF and Decision Report.

The works are permissible in accordance with Clause 2.126(6) of the TISEPP which permits development for the purpose of sewage (wastewater) reticulation systems without consent on any land in the prescribed circumstances. Clause 2.126(8) notes that development for the purpose of sewage reticulation systems may be carried out on land reserved under the *National Parks and Wildlife Act 1974* only if the development is authorised by or under the Act. Clause 2.126(1) notes that development is carried out in the prescribed circumstances if the development is carried out by or on behalf of a public authority (2.126(1)(a)). As Sydney Water is a public authority and the works are not within land reserved under the *National Parks and Wildlife Act*, the project is permissible without development consent.

Instrument	Additional considerations
<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i> (TISEPP)	The TISEPP supersedes the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP). The works are permissible in accordance with clause 2.126(6) of the TISEPP.
<i>State Environmental Planning Policy – Resilience and Hazards 2021</i>	The SEPP Resilience and Hazards supersedes the State Environmental Planning Policy Coastal Management 2016. The works are not within a littoral rainforest or coastal wetland and approval is not required under the SEPP Resilience and Hazards 2021.

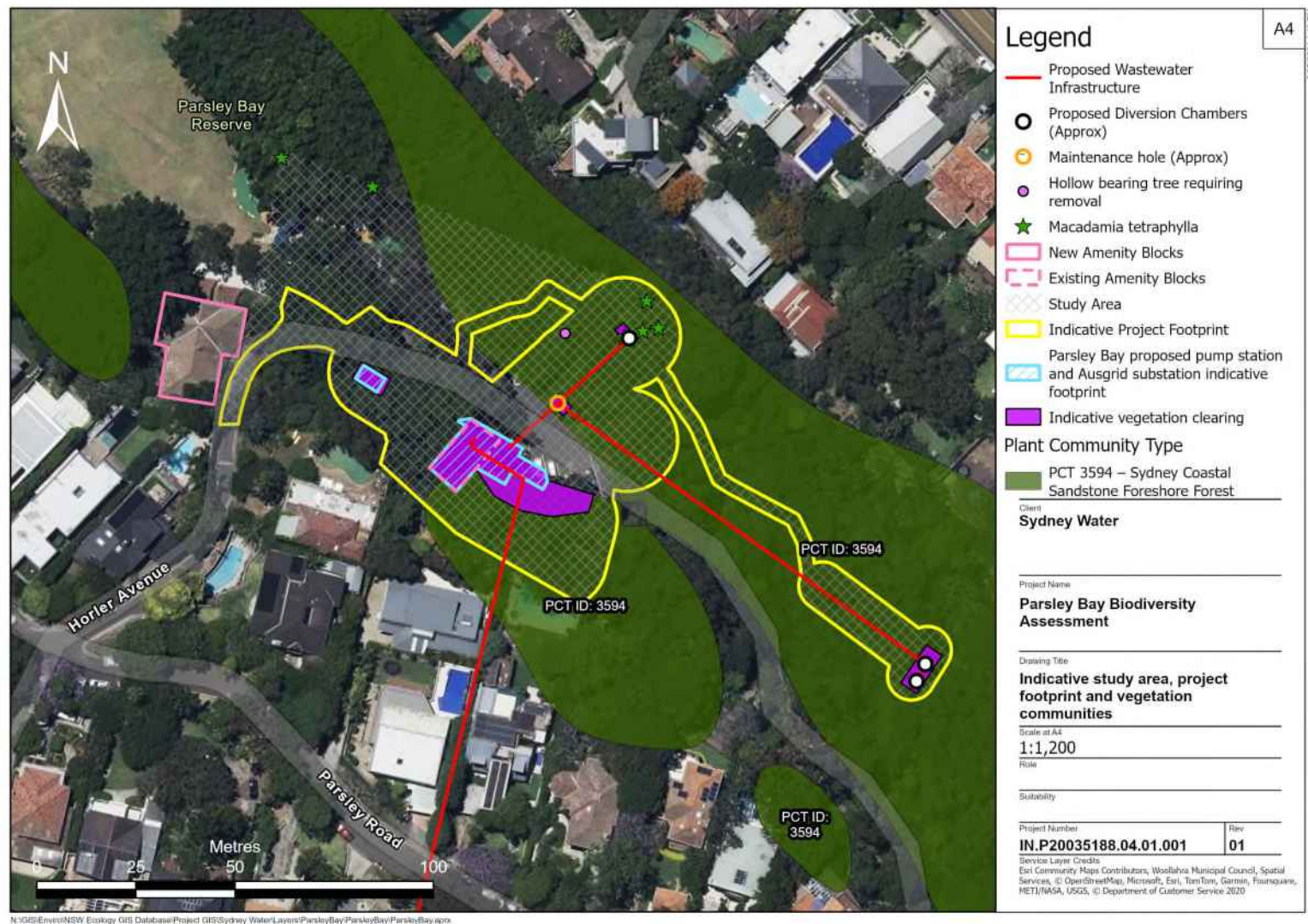


Figure 1 Indicative Parsley Bay Project Footprint Area and Amenities Block

5 Additional biodiversity impacts and mitigation measures

This section discusses the additional biodiversity impacts that have been considered compared to the approved REF and Decision Report and identifies additional mitigation measures. All other environmental impacts and mitigation measures identified in the approved REF and Decision Report remain the same and will be incorporated into the contractor’s CEMP.

Sydney Water engaged ecologists to conduct a Specialist Ecology Services Report for the proposed wastewater pumping station and associated wastewater carriers at Parsley Bay, Vaucluse.

The assessment aimed to:

- verify and further understand the nature of the ecological limitations within the Study Area
- assess the associated impacts of the proposed works at Parsley Bay, and if additional impacts or threatened species are identified that were not previously considered in the Biodiversity Assessment (GHD 2020) and REF or Decision Report (Sydney Water June/Dec 2020), undertake additional assessment/ assessments (tests) of significance.
- provide recommendations to Sydney Water on how to mitigate impacts to the ecological values on site, if not already identified in the REF or Decision Report (Sydney Water, December 2020).

The Specialist Ecology Services Report is provided in Appendix C and summarised here.

Desktop assessment

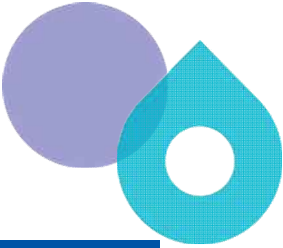
The ecologists conducted a desktop assessment of existing databases in October 2023. The desktop assessment was consistent with the previous Biodiversity Assessment (GHD, 2020) and identified Sydney Coastal Sandstone Foreshores Forest, PCT 3594, which has no associated TEC. No other TECs were identified within the Parsley Bay proposal area through the desktop assessment.

Historical records of threatened flora and fauna reviewed as part of the desktop assessment included 26 threatened flora and 56 threatened fauna within a 10 kilometre radius of the Study Area. Of these species, **Table 1** below lists those considered moderately to highly likely to occur in the Study Area based on the number and proximity of species sighting records and available habitat observed prior to the site investigation survey.

Table 1: Threatened species moderately to highly likely to occur in the Study Area (historical and desktop assessment)

Species	Common Name	Status – BC Act	Status – EPBC Act
Flora			
<i>Acacia terminalis</i> subsp. <i>Eastern Sydney</i>	Sunshine Wattle	Endangered	Endangered
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Endangered	Vulnerable
<i>Callistmon linearifolius</i>	Nettled Bottle Brush	Vulnerable	-
Fauna			
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	Vulnerable	-



Species	Common Name	Status – BC Act	Status – EPBC Act
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Vulnerable	-
<i>Myotis Macropus</i>	Southern Myotis	Vulnerable	-
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable

Field survey and impact assessment

A site assessment/field survey of the Proposal area was undertaken.

Vegetation community

The vegetation within the Proposal Area was consistent with that described in the Biodiversity Assessment conducted by GHD (2020). Species recorded were most consistent with the PCT 3594 Sydney Coastal Sandstone Foreshores Forest. PCT 3594 has no associated TEC under the BC Act or the *Environmental Protection and Biodiversity Conservation Act 1999*.

PCT 3594 was identified on the basis of overstorey trees of Swamp Mahogany *Eucalyptus robusta*, Sydney Redgum *Angophora costata* and Blackbutt *Eucalyptus pilularis*. As described by GHD (2020), the understorey contains some mesic elements including Brush Daphne (*Pittosporum undulatum*), Smooth Cheese-tree (*Glochidion ferdinandi* var. *ferdinandi*), and Blueberry Ash (*Elaeocarpus reticulatus*), as well as planted species including palms, tree ferns, paperbarks and lilly pillies.

The assessment noted that:

Whilst some areas of the broader Parsley Bay Reserve may resemble a community dominated by vine-thickets, which is typical of rainforest vegetation, the vegetation overall is most consistent with that of tall sclerophyll open forest and PCT 3594 specifically, and not the Littoral Rainforest listed as TEC under the BC Act as Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered Ecological Community, EEC) or the EPBC Act listed Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (Critically Endangered Ecological Community, CEEC).

The dominant species within the Study Area do not constitute the key diagnostic species for the TEC Littoral Rainforest, as per the listing advice under the EPBC Act or the final determination under the BC Act. While some species present may be listed within the listing advice and/or final determination, the vegetation within the proposal area at Parsley Bay does not meet the required threshold. The proposal area at Parsley Bay therefore does not constitute Littoral Rainforest TEC.

Threatened flora

Threatened flora identified during field survey included *Syzigium* sp. likely *Syzigium paniculatum* and *Macadamia tetraphylla*.

Syzigium paniculatum is listed as Endangered under the BC Act and as Vulnerable under the EPBC Act. There are several specimens of the threatened *S. paniculatum* occurring behind the amenity block and these were assessed under the approved REF and Decision Report. No further assessment of this threatened species is required.

Macadamia tetraphylla listed as Vulnerable under the BC Act and EPBC Act, was identified as an additional threatened species within the Proposal Area, located within one metre of the proposed maintenance pit location at the northwest end of the site. The species occurs mainly on the North Coast NSW into QLD and is a commonly planted species in Sydney. The individual within the proposal area for Parsley Bay was small but would likely be removed by the proposed works. The field survey recorded five additional larger individuals within the broader study area that would not be directly impacted by the proposal. Photos of the *Macadamia tetraphylla* to be removed are included below, and the location of the specimens identified in **Figure 1**.

The Biodiversity Assessments undertaken for the REF and Decision Report did not identify this species or assess its removal. A Test of Significance (ToS) (BC Act) and Significance Impact Criteria (SIC) Assessment (EPBC Act) were completed as part of the Specialist Ecology Services Report.

The ToS for *Macadamia tetraphylla* concluded:

- *removal of one individual Macadamia tetraphylla would not be considered important to the population's survival in the locality, especially given that the individual will be replanted elsewhere on site*
- *the extent of removal and overall impacts of the Proposal on Macadamia tetraphylla are considered negligible in context and would barely alter the local occurrence extent.*

The SIC Assessment for *Macadamia tetraphylla* found the proposal unlikely to cause significant impact.

Members of the community also raised concerns about several *Casuarina* sp. near the second pit location located at the eastern end of the proposal area at Parsley Bay that are likely to be directly impacted by the proposed works. The ecologists inspected these specimens and noted that *C. glauca*, whilst likely planted given its landscape positioning, is considered a diagnostic species of the described PCT 3594. *C. glauca* is not considered a threatened species as it is not a listed species under the BC Act nor EPBC Act. The removal of these specimens was assessed in the REF and Decision Report, and as this is not a project change no further assessment is required.



Photos 1 and 2: *Macadamia tetraphylla* within the project area (photo 1 and 2 above – small specimen to be removed, and photo 3 below – example of large specimen outside the construction area, no impact).



Photo 3: Example of large specimen of *Macadamia tetraphylla* outside the construction area, no impact.

Threatened fauna

Threatened fauna identified as moderate to highly likely to occur in the Study Area were bats and flying-fox species. Species included Yellow-bellied Sheath-tail-bat, Eastern False Pipistrelle, Southern Myotis and Grey-headed Flying-fox.

A Swamp Mahogany *Eucalyptus Robusta* may need to be removed as the root system is within an area of construction to access existing infrastructure. The *E. Robusta* includes hollows which are potentially used by the threatened microbats. A photo of the *E. Robusta* is included below and the location is shown in **Figure 1**. The removal of the *E. Robusta* was assessed as part of the REF and Decision Report, however these assessments did not include consideration of the potential for the hollows in the tree to be used for potential roosting and breeding habitat by threatened microbats.

Tests of significance (under the BC Act) and Significant Impact Criteria (EPBC Act) for removal of the potential roosting and breeding habitat were undertaken as part of the Specialist Ecology Services Report. The assessment found that:

hollow-dependent microbats potentially using hollows within the large Swamp Mahogany *Eucalyptus robusta* (which may need to be removed) for roosting/nesting is unlikely to result in a significant impact to species potentially using this habitat as other hollows are available in the area would not lead to an impact to the threatened microbats

Sydney Water and its contractor Abergeldie Complex Infrastructure recognise the importance of this tree and all reasonably practicable measures will be taken to retain the *Eucalyptus robusta*, including consultation with Woollahra Council's tree protection team. Mitigation measures to minimise impact are listed in **Table 3**.



Photo 4: Swamp Mahogany *Eucalyptus robusta* previously assessed for removal, which contains hollows that could be used as potential breeding and roosting habitat for threatened microbats.

Vegetation impacts

The Decision Report identified up to 0.07 ha (700m²) of vegetation may need to be removed for the project, which includes around 17 trees (mixture of mature and juvenile trees). This amount had been refined from the REF. The Specialist Ecology Services Report noted that the vegetation to be removed consisted of PCT 3594 Sydney Coastal Sandstone Foreshores Forest and urban native/exotic species that are not part of an identified ecological community. There is no change to the amount of vegetation to be removed from the Decision Report.

As noted in the approved REF and Decision Report, vegetation impacts will be avoided where possible and offsets will be provided where native vegetation is removed. **Table 2** below identifies the proposed offsets recommended by the ecologists, which are based on the Sydney Water Biodiversity Offset Guide. Offsetting and replanting vegetation will be undertaken in consultation with Woollahra Council.

[Review of Environmental Factors Addendum](#) | Biodiversity review – additional impacts, Refresh Vaucluse Diamond Bay, May 2024

Table 2. Summary of residual impacts and offset multiplier requirements

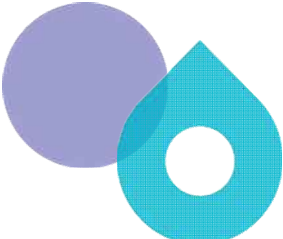
Biodiversity Value Impacted	Total impact	Residual loss of biodiversity values resulting from works	Impact type	Offset Multiplier Required
<i>Macadamia tetraphylla</i>	Up to one individual <1 m ²	Habitat area of a threatened flora and/or fauna	Minor impact	1 (or the individual may be transplanted to a nearby area)
Hollow bearing tree Swamp Mahogany (<i>Eucalyptus robusta</i>) potential habitat for threatened microbats	One tree	Hollow removal ¹	Minor impact	2 + On site: Nest boxes or salvaged hollows placed onto trees or posts onsite or at a nearby site
PCT 3594	Up to 0.07ha (700m ²)	Non-threatened native vegetation	Moderate impact	2
Urban native/exotic		Urban native or exotic vegetation	Minor impact	1

Additional mitigation measures

Despite significant impacts being unlikely, some additional mitigation measures regarding *Macadamia tetraphylla* removal, hollow bearing trees and weeds have been identified to further minimise risks to biodiversity. These measures will be included in the Construction Environmental Management Plan (CEMP) and Vegetation Management Sub-Plan (VMP) and are outlined in **Table 3**.

Table 3: Additional mitigation measures

Safeguards	Responsibility	Timing
Prior to commencement of works, an ecologist will undertake a pre-clearing survey of proposed disturbance areas for threatened plants. If any additional seedlings of <i>Macademia tetraphylla</i> are detected, measures would be taken to avoid the specimens if possible or alternatively to translocate seedlings to a nearby area of suitable habitat outside of the construction area. Any proposed translocation would be considered in consultation with Council bush care staff. Topsoil in areas that will be permanently disturbed for proposed infrastructure or operational requirements will be carefully removed and relocated as soon as possible to suitable locations nominated by Council bush care staff.	Contractor	Before start of works
Prior to commencement of works, an arborist will undertake assessment of the proposed impacts to the <i>Eucalyptus robusta</i> and provide recommendations to minimize impacts and avoid removal of the tree. This will be undertaken in consultation with Woolahra Council's tree protection team.	Contractor	Before start of works

Safeguards	Responsibility	Timing
Trimming of the foliage of trees containing habitat features would require a pre-clearing inspection by a suitably qualified ecologist/spotter-catcher. Additionally, a suitably qualified spotter catcher would be required to supervise the clearing of trees containing habitat features.	Sydney Water/ Contractor	Prior and during works
If unexpected threatened fauna species are discovered during works, stop work immediately and contact the environment/proposal manager. An ecologist should be engaged to determine management actions.	Contractor	During works
Ground Asparagus, Bitou Bush and African Olive previously identified within the Proposal Area need to be managed in line with recommendations from NSW WeedWise and removed and disposed of at a registered waste management facility.	Contractor	During works
All equipment and plant machinery to be appropriately cleaned before the start of works. All priority weeds within the Proposal Area are to be cleared and disposed of at a registered waste management facility. If herbicide is to be used, this must be applied by a person trained to do so and that has a certificate of competency, or a statement of attainment issued by a registered training organisation. Herbicide will only be used in accordance with the label/permit. Conduct toolbox talk to identify high risk priority weeds to on-site staff. Weed management plan/protocols will be established and implemented to avoid spread and establishment of weeds.	Contractor	Before and during works
If tree hollows within the <i>Eucalyptus robusta</i> are removed, nest boxes and salvaged hollows must be mounted to trees or posts on site or nearby. An offset multiplier of 1 is required for each hollow removed. Suitable trees and posts for mounting nest boxes and hollows will be selected in consultation with Council.	Contractor	During and after works

6 Conclusion

This REFA assesses the potential additional biodiversity impacts associated with works at Parsley Bay as part of the Refresh Vaucluse Diamond Bay project. The additional biodiversity impacts include the removal of an additional threatened species, and potential removal of roosting/breeding habitat of threatened microbats. These additional impacts, identified since publication of the approved REF and Decision Report are considered minor and can be mitigated through implementation of the measures outlined in this REFA, the approved REF and Decision Report. The potential additional biodiversity impacts are not likely to significantly impact the environment.

Appendix A – Section 171 checklist

Requirements for the additional environmental (biodiversity) impacts in addition to the approved REF and Decision Report are considered in the table below.

Section 171 checklist	REF finding
Any environmental impact on a community	Parsley Bay Reserve is highly valued by the community. The additional environmental (biodiversity) impacts will not have a significant impact on the community. Vegetation removal will be minimised where possible and offsets will be provided in accordance with the mitigation measures identified. Council and the local bush care community can be involved in replanting works. As noted in the approved REF, there may be short-term impacts on the community from traffic, dust and noise. There will be environmental improvements by eliminating the continuous flow of untreated wastewater into the surrounding environment.
Any transformation of a locality	The additional environmental (biodiversity) impacts will not transform the locality. The proposed work will result in construction of one new wastewater pumping station at Parsley Bay. This will result in minor to moderate visual changes to the locality. The majority of structures will be located below ground which will minimise the visual impact during operation.
Any environmental impact on the ecosystems of the locality	No threatened ecological communities or ecosystems will be impacted however an additional specimen of a threatened flora species (<i>Macadamia tetraphylla</i>) will need to be removed. These are in addition to the impacts identified in the approved REF and Decision Report. Overall, the proposal will reduce environmental impacts to ecosystems of the locality. The receiving environment around the ocean outfalls at Vaocluse and Diamond Bay will be improved with a 93 percent reduction in untreated wastewater discharge.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	No change as a result of the additional biodiversity impacts. The proposed work will not result in a reduction of the aesthetic, scientific or other environmental quality or value of the locality. The proposal will reduce the environmental impact associated with discharge of untreated wastewater. There will be a short-term reduction in the recreational value and use of Parsley Bay reserve during construction.
Any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or any other special value for present or future generations	No change as a result of the additional biodiversity impacts. The proposed work will have a minor to moderate visual impact at Parsley Bay at the pumping station location.



Section 171 checklist

REF finding

Any impact on the habitat of any protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)

The proposed work has potential to impact the habitat of some protected animals (threatened microbats), if the *Eucalyptus robusta* needs to be removed. The potential impacts to protected animals are anticipated to be negligible.

Any endangering of any species of animal or plant or other form of life, whether living on land, in water or in the air

The proposed work will not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air. There will be minor impacts to threatened flora species (including *Macadamia tetraphylla*) and potential impacts to the habitat of threatened fauna (microbats) in addition to the impacts identified in the approved REF and Decision Report. No threatened ecological communities will be cleared.

Any long-term effects on the environment

No change as a result of the additional biodiversity impacts. The proposed work will not have any long-term impacts on the environment but will have a long-term benefit by providing a reliable and modern wastewater service for the area. The reduction of untreated wastewater discharge to the environment at the three ocean outfalls will result in long-term positive impacts on the receiving environment.

Any degradation of the quality of the environment

No change as a result of the additional biodiversity impacts. The proposed work will not result in a permanent degradation of the quality of the environment, once construction has finished and vegetation offsets have been provided. The works will increase the quality of the environment by reducing the amount of untreated wastewater entering the environment.

Any risk to the safety of the environment

No change as a result of the additional biodiversity impacts. The proposed work will not increase risk to the safety of the environment. The proposal will reduce the risk to human health near the three ocean outfalls.

Any reduction in the range of beneficial uses of the environment

No change as a result of the additional biodiversity impacts. The proposed work will not have any reduction in the range of beneficial uses of the environment.

Any pollution of the environment

No change as a result of the additional biodiversity impacts. Environmental safeguards will mitigate the potential for the proposed work to pollute the environment. No pollution of the environment is expected. The proposal will significantly reduce pollution to the environment by eliminating dry weather wastewater entering the environment from the existing ocean outfalls.

Any environmental problems associated with the disposal of waste

No change as a result of the additional biodiversity impacts. The disposal of wastes will be conducted in accordance with the environmental safeguards, and no environmental problems associated with the disposal of waste are expected. There will be a

Section 171 checklist

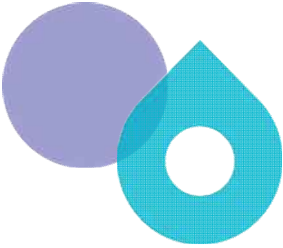
REF finding

	significant reduction in the amount of wastewater entering the environment via the three ocean outfalls.
Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	No change as a result of the additional biodiversity impacts. The proposed work will not increase demand on resources, that are, or are likely to become, in short supply.
Any cumulative environmental effect with other existing or likely future activities	No change as a result of the additional biodiversity impacts. There is unlikely to be any cumulative environmental effects with other existing or likely future activities.
Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	No change as a result of the additional biodiversity impacts. The proposed work will not have any impact on coastal processes or hazards, and coastal processes and coastal hazards will not have any impact on the proposed activity.
Any applicable local strategic planning statements, regional strategic plans or district strategic plans made under the EP&A Act, Division 3.1	The proposal is consistent with Woollahra Municipal Council Community Strategic Plan 2032, and in particular: • Goal 7.1 Protect trees, streetscapes, natural landscapes and biodiversity including the protection and restoration of bushland areas. • Goal 7.2 Support cleaner, healthier waterways including improved water quality and healthy water catchments, creeks and harbour. While the proposal will result in some vegetation removal, there are mitigation measures to minimise this removal and revegetate areas.
Any other relevant environmental factors.	The proposal has been assessed against the factors listed above, and there are no other relevant environmental factors to consider.

Appendix B – Consideration of TISEPP consultation

TISEPP section	Yes	No
Section 2.10, council related infrastructure or services – consultation with council		
Will the work:		
Potentially have a substantial impact on stormwater management services provided by council?		N
Be likely to generate traffic that will strain the capacity of the road system in the LGA?		N
Connect to, and have a substantial impact on, the capacity of a council owned sewerage system?		N
Connect to, and use of a substantial volume of water from a council owned water supply system?		N
Require temporary structures on, or enclose, a public space under council's control that will disrupt pedestrian or vehicular traffic that is not minor or inconsequential?	Y	
Excavate a road or a footpath adjacent to, a road for which the council is the roads authority that is not minor or inconsequential?	Y	
Section 2.11, local heritage – consultation with council		
Is the work likely to affect the heritage significance of a local heritage item, or of a heritage conservation area (not also a State heritage item) more than a minor or inconsequential amount?	Y	
Section 2.12, flood liable land – consultation with council		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and will works alter flood patterns other than to a minor extent?		N
Section 2.13, flood liable land – consultation with State Emergency Services		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and undertaken under a relevant provision*, but not the carrying out of minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance? * (e) Div.14 (Public admin buildings), (g) Div. 16 (Research/ monitoring stations), (i) Div. 20 (Stormwater systems)?		N
Section 2.14, development with impacts on certain land within the coastal zone– council consultation		
Is the work on land mapped as coastal vulnerability area and inconsistent with a certified coastal management program?		N
Section 2.15, consultation with public authorities other than councils		
Will the proposal be on land adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> or to land acquired under Part 11 of that Act? <i>If so, consult with DPIE (NPWS).</i>		N
Will the proposal be on land in Zone E1 National Parks and Nature Reserves or on a land use zone that is equivalent to that zone? <i>If so, consult with DPIE (NPWS)</i>		N
Will the proposal include a fixed or floating structure in or over navigable waters? <i>If so, consult TfNSW</i>		N
Will the proposal be on land in a mine subsidence district within the meaning of the <i>Coal Mine Subsidence Compensation Act 2017</i> ? <i>If so, consult with Subsidence Advisory NSW.</i>		N
Will the proposal be on land in a Western City operational area specified in <i>the Western Parkland City Authority Act 2018</i> , Schedule 2 and have a capital investment value of \$30 million or more? <i>If so, consult the Western Parkland City Authority.</i>		N
Will the proposal clear native vegetation on land that is not subject land (ie non-certified land)? <i>If so, notify DPIE at least 21 days prior to work commencing. (Requirement under s3.24 Chapter 3 Sydney Region Growth Centres - of the SEPP (Precincts – Central River City) 2021).</i>		N

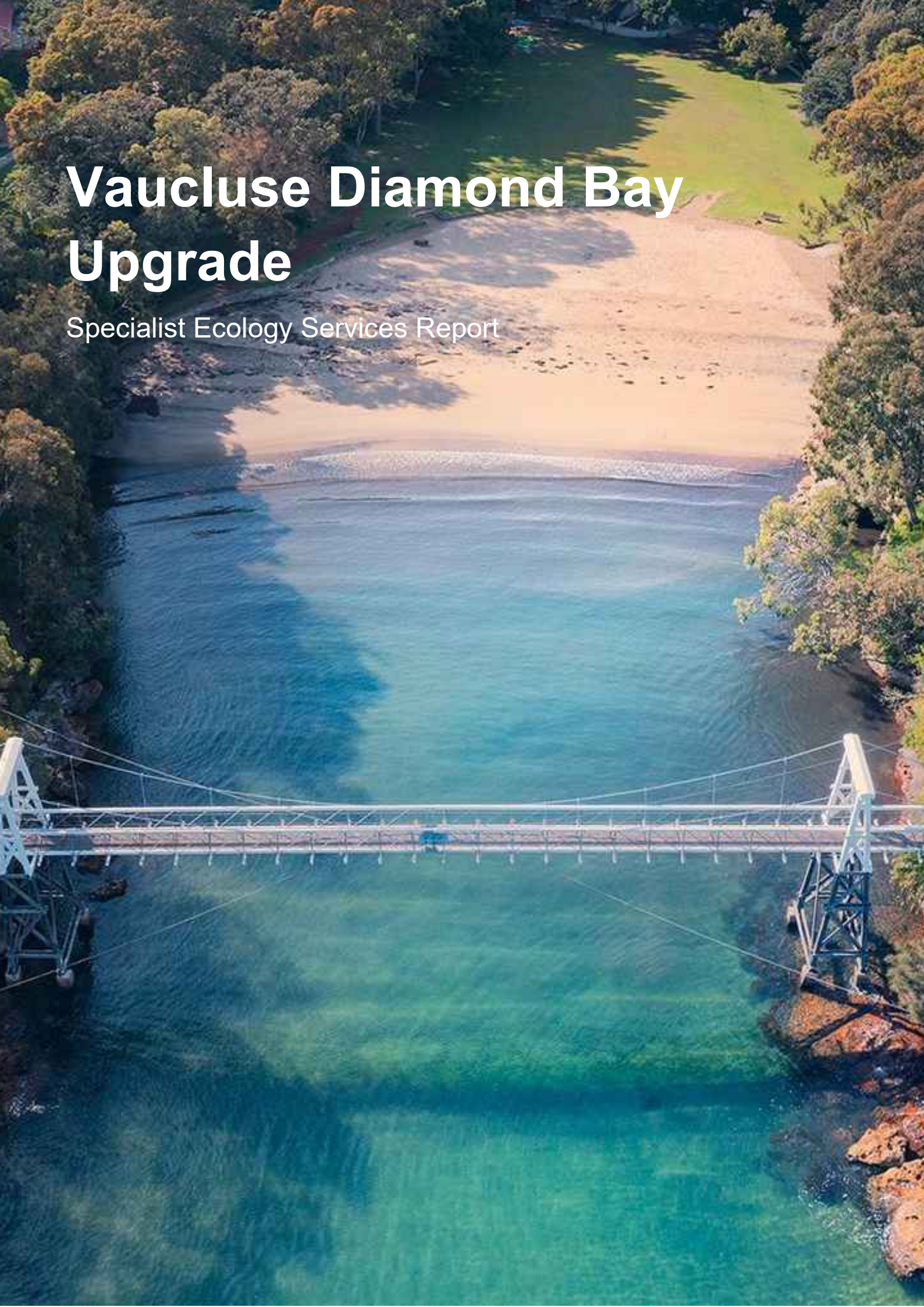




Appendix C – Specialist Ecology Services Report

Vaucluse Diamond Bay Upgrade

Specialist Ecology Services Report



Job title		Vaucluse Diamond Bay Upgrade		Job number		
				IN.P20035188.04.01.001		
Document title		Specialist Ecology Services report		File reference: as above		
Document ref						
Revision	Date	Filename	SWPP_ParsleyBay_Report			
Draft 1	20 November 2023	Description	Biodiversity assessment memo			
			Prepared by	Checked by	Approved by	
		Name	Helen Steinberg	Craig Chargulaf	Craig Chargulaf	
		Signature				
Draft 2	18 March 2024	Description	Specialist Ecology Services Report			
			Prepared by	Checked by	Approved by	
		Name	Adriana Corona Mothe	Adriana Corona Mothe	Adriana Corona Mothe	
		Signature				
Final	17 April 2024	Description	Specialist Ecology Services Report			
			Prepared by	Checked by	Approved by	
		Name	Helen Steinberg	Lesley-Anne Stone	Justin Sullivan	
		Signature				
Issue Document Verification with Document						✓

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1 Background and aim

Sydney Water have engaged the Planning Partnership Ecologists to conduct and provide a Biodiversity Assessment for the proposed sewage pumping station and associated wastewater carriers at Parsley Bay, Vacluse.

The aim of the assessment is to:

- verify and further understand the nature of the ecological limitations within the Study Area;
- review the identified impacts of the proposed works at Parsley Bay and, if additional impacts or threatened species are identified that were not previously considered in the Biodiversity Assessment (GHD 2020) and REF or Decision Reports (Sydney Water June/Dec 2020), undertake additional assessment/ assessments of significance
- provide recommendations to Sydney Water on how to mitigate impacts to the ecological values on site, if not already identified in the REF or Decision report (Sydney Water, December 2020).

For this assessment, the following definitions apply:

- **Indicative Construction Footprint:** Proposed construction works at Parsley Bay, including works for the new sewage pumping station, wastewater carriers/pipes and the existing and new wastewater maintenance pits. The indicative construction footprint is also referred to as the 'Proposal Area' in this report.
- **Existing Amenity Block:** existing amenity block proposed for demolition.
- **New Amenity Block:** construction of a new amenity block at the existing kiosk. The new amenity block is subject to approvals through Council and is not part of this assessment.
- **Study Area:** includes the indicative construction footprint and immediately adjoining areas that may be affected by indirect impacts (Figure 3). A larger area, including the entirety of Parsley Bay Reserve is also subject to this and previous assessments, important for optioneering and understanding overall ecological constraints.
- **Locality:** 10 km buffer surrounding the Study Area.

2 Methodology

The methodology included a desktop assessment, field survey and impact assessment as described in sub-sections below.

2.1 Desktop Assessment

A desktop assessment of existing databases was conducted to inform the survey in October 2023. The following resources were reviewed to inform the investigation:

- NSW BioNet Atlas (DPE, 2024a)
- Protected Matters Search Tool (PMST) (Commonwealth DCCEEW, 2024)
- Existing Vegetation Mapping (State Vegetation Type Map (SVTM), NSW extant PCT (DPE, 2024b)
- State Environmental Planning Policy (Resilience and Hazards) 2021 (SEPP) – Coastal Wetland Mapping (NSW Government, 2021)
- National Atlas of Groundwater Dependent Ecosystems (GDE) (BoM, 2024)
- DPI Fisheries NSW Spatial Data Portal for Key Fish Habitat (DPI, 2024)
- Vaucluse Diamond Bay – Concept Design Biodiversity Assessment (GHD, 2020).

2.2 Field Survey

Following the review of database searches, two Ecologists conducted a site survey on 1st November 2023. The site survey consisted of a random meander transect with aims to:

- Determine if/which native Plant Community Types (PCTs) occur within the Study Area
- Determine presence/absence of Threatened Ecological Communities (TECs)
- Identify threatened flora and fauna within the Study Area (non-targeted surveys)
- Identify and map trees containing habitat features including nests, hollows, dreys, or decorticated bark
- Conduct a habitat suitability assessment for threatened flora and fauna
- Determine if the site is in proximity to or within a Coastal Wetland Area or a Littoral Rainforest under the SEPP.

2.3 Impact Assessment

Under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), Sydney Water must assess the environmental impact of all its activities. Sydney Water must seek to avoid, minimise, and mitigate these impacts.

2.3.1 Statutory Impacts

Where impacts to threatened biodiversity (i.e., TECs, threatened species or their habitat) are likely to occur, an assessment of significance is undertaken to evaluate if the impacts resulting from the project would be significant. Assessment of significance is undertaken based on:

- Test of Significance (ToS) for threatened biodiversity listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and based on the criteria listed in OEH (2018) Threatened Species Test of Significance Guidelines. If a project is predicted to result in significant impacts on threatened biodiversity, a Biodiversity Development Assessment Report (BDAR) in accordance with the Biodiversity Assessment Method (BAM) is required and offsets as per Biodiversity Offsets Scheme (BOS) apply.
- Significant Impact Assessment (SIA) for Matters of National Environmental Significance (MNES) listed under the Commonwealth EPBC Act based on the Significant Impact Criteria (SIC) for each MNES as per the Department of Environment (2013) Significant impact guidelines 1.1 for MNES. If a project is predicted to result in significant impacts on MNES, a referral DCCEEW (formerly DAWE) is required for approval. Where required, offsets on MNES must meet the EPBC Act Environmental Offsets Policy. MNES include:
 - 1) World Heritage Properties
 - 2) National Heritage Places
 - 3) Wetlands of International Importance
 - 4) TECs and threatened species
 - 5) migratory birds
 - 6) marine areas
 - 7) The Great Barrier Reef Marine park
 - 8) Nuclear actions and
 - 9) a water resource, in relation to coal seam gas development and large coal mining development.

Statutory impacts are likely, predicted or known significant impacts on threatened biodiversity and MNES. Those impacts need to be offset in accordance with the above corresponding legislative instruments.

2.3.2 Non-statutory Impacts

Non-statutory impacts are non-significant impacts to native vegetation, trees, threatened biodiversity (i.e., TECs, threatened species, habitat of threatened species) or MNES. Non-significant residual impacts must be offset based on Sydney Water's Biodiversity Offsets Guideline. Non-significant impacts apply to:

- Minor Impact: localised impacts, usually associated with maintenance works, such as removal of an individual isolated tree, or a small amount (≤ 100 m²) of native vegetation removal.
- Moderate Impact: larger scale impacts (≥ 100 m², e.g., removal of native vegetation, or more than one tree, or trees with hollows), but that are not considered to be significant.

Where minor and moderate residual impacts are identified, residual impacts must be offset in accordance with the multipliers provided in Sydney Water's Biodiversity Offset Guideline.

3 Results

3.1 Desktop Assessment

The vegetation within the Proposal Area was identified in the previous Biodiversity Assessment (GHD, 2020) as Sydney Coastal Sandstone Foreshores Forest, PCT 3594, which has no associated TEC. No other TECs were identified within the Study Area through the desktop assessment.

Historical records of threatened entities reviewed as part of the desktop assessment included 26 threatened flora and 56 threatened fauna within a 10 kilometre radius of the Study Area. Of these species, the following were considered moderately to highly likely to occur in the Study Area based on the number and proximity of species sighting records and available habitat observed prior to the site investigation survey:

- **Flora:**
 - o *Acacia terminalis* subsp. *Eastern Sydney* – Sunshine Wattle (Endangered, BC Act and EPBC Act)
 - o *Syzygium paniculatum* – Magenta Lilly Pilly (Endangered, BC Act and Vulnerable, EPBC Act)
 - o *Callistemon linearifolius* – Nettle Bottle Brush (Vulnerable BC Act)
- **Fauna:**
 - o *Saccolaimus flaviventris* – Yellow-bellied Sheath-tail-bat (Vulnerable BC Act)
 - o *Falsistrellus tasmaniensis* – Eastern False Pipistrelle (Vulnerable BC Act)
 - o *Myotis Macropus* – Southern Myotis (Vulnerable BC Act)
 - o *Pteropus poliocephalus* – Grey-headed Flying-fox (Vulnerable BC Act and EPBC Act)

Cave-dwelling bats

The desktop assessment discovered some historical records for the following threatened cave-dwelling bats:

- *Miniopterus australis* – Little Bent-winged Bat (Vulnerable BC Act)
- *Miniopterus orianae oceanensis* – Large Bent-winged Bat (Vulnerable, BC Act)
- *Chalinolobus dwyeri* – Large-eared Pied Bat (Vulnerable BC Act and EPBC Act)

However, all three species rely upon caves for roosting, using forested areas close to their roosting caves as foraging habitat. The Proposal Area does not contain any caves, and there are no caves within close proximity as the surroundings areas are highly urbanised. Consequently, it is unlikely that these cave-dwelling bats would utilise the trees within the Proposal Area as foraging habitat. Therefore, these species are considered unlikely to occur, and subsequently no ToS or SIAs have been undertaken.

Key Fish Habitat

Fisheries Data Spatial Portal shows that the nearest aquatic habitat is in Parsley Bay, which is part of Sydney Harbour and is mapped as Key Fish Habitat (DPI, 2020), located 200m west of the Study Area (Figure 1). The Proposal would not be directly impacting any aquatic environments; therefore, Key Fish Habitat is not further assessed within this report.

Coastal Wetland and Littoral Rainforest

No areas of coastal wetland or littoral rainforest were identified within the Proposal Area under the SEPP Resilience and Hazards 2021. The closest mapped coastal wetland and littoral rainforest is littoral rainforest at Clifton Gardens located 2.4km north-west from the Study Area and across Sydney Harbour (Figure 2).

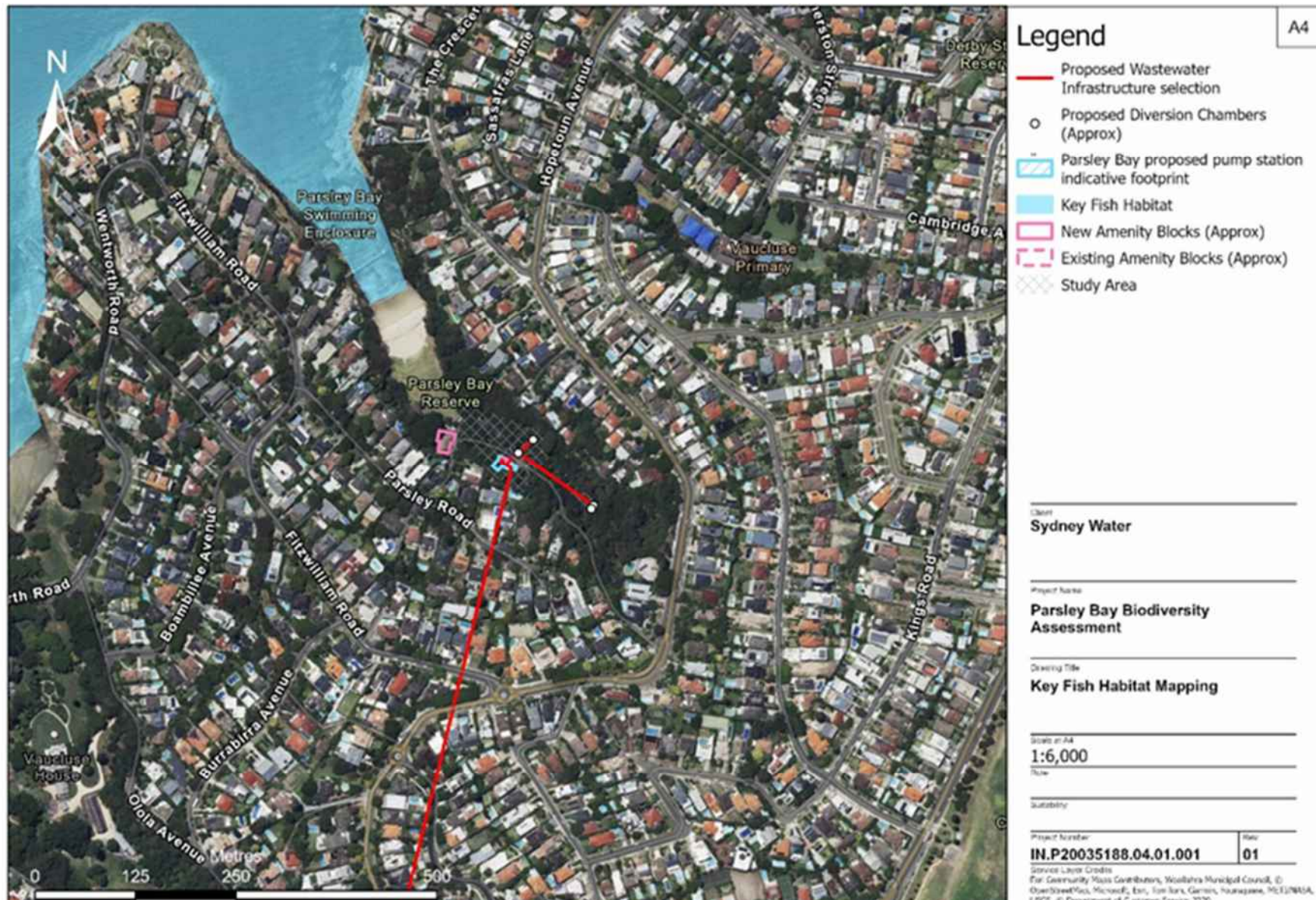


Figure 1: Key Fish Habitat mapped in Parsley Bay in proximity to the Study Area

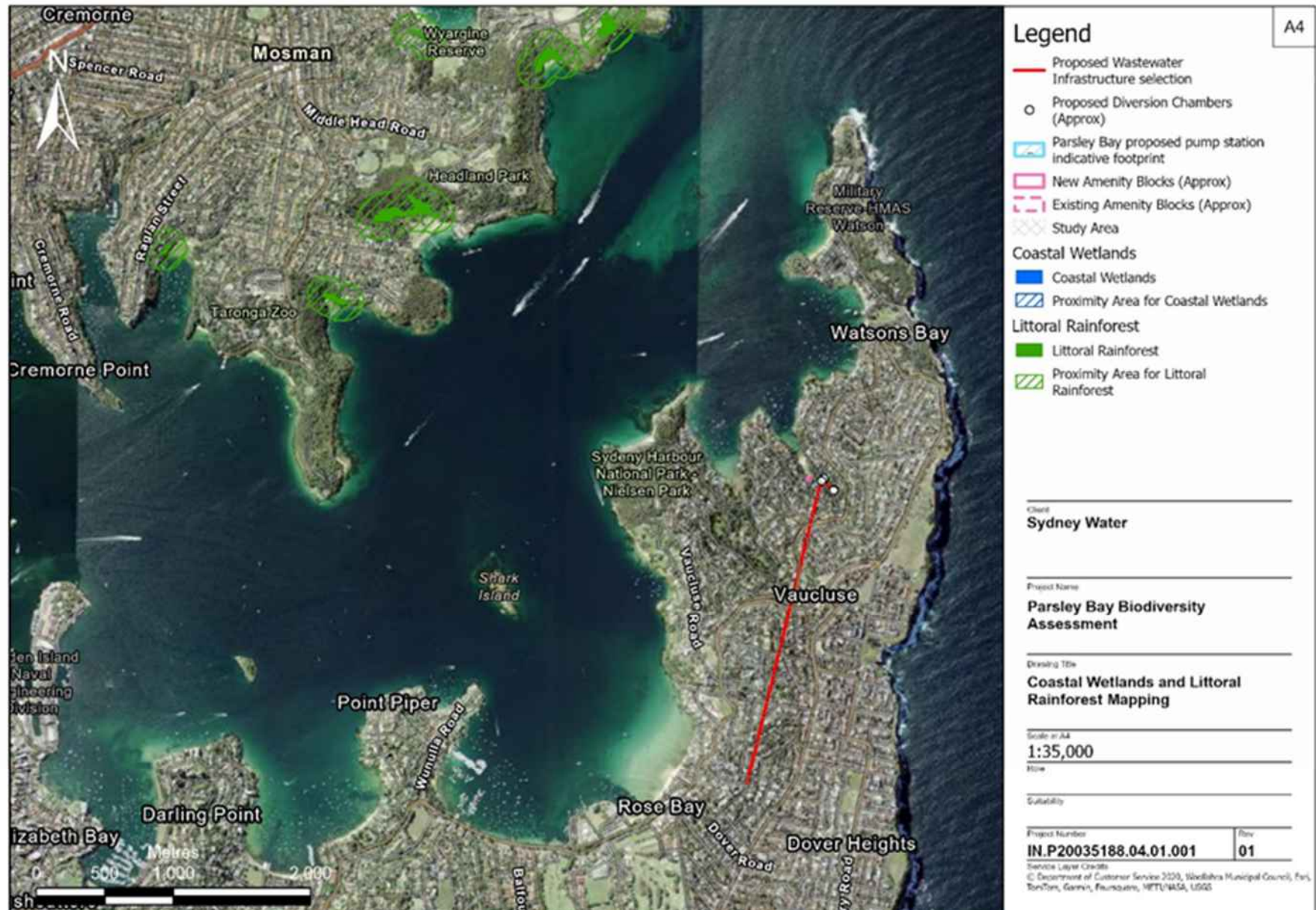


Figure 2: Coastal Wetlands and Littoral Rainforest mapped in Sydney Harbour in proximity to the Study Area

Groundwater Dependent Ecosystems

- The Bureau of Meteorology (BoM) Groundwater Dependent Ecosystems Atlas indicated that: No aquatic GDE is mapped at Parsley Bay. The nearest aquatic GDE is Manly Lagoon located approximately 7km north from the Study Area.
- No terrestrial GDE is mapped at Parsley Bay. The nearest terrestrial GDEs are Coastal Sandstone Gully Forest and Littoral Thicket at Point Piper located approximately 2.5km south-west from the Study Area.
- The Subterranean GDE map shows that Parsley Bay is part of the Greater Metropolitan Region Metropolitan Coastal Sands, a Groundwater management area, which has a water sharing plan under the Water Management Act 2000. The Greater Metropolitan Region Groundwater Sources map indicates that the subterranean groundwater at Parsley Bay is sourced from the Sydney Basin Central Groundwater.

The proposal would not extract subterranean groundwater. Sydney Water Corporation would ensure that construction methodology meet the objectives of the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023 (NSW Department of Water 2023), in particular with objective (e) to help prevent structural damage to aquifers resulting from groundwater extraction and strategy (1)(b) manage the construction and use of water supply works to minimise impacts on highly priority groundwater-dependent ecosystems and groundwater quality, groundwater-dependent cultural significant areas, basic landholder rights, town water supply, and other licence holders.

3.2 Results from Site Assessment/Field Survey

Plant Community Types (PCT)

The vegetation within the Proposal Area was consistent with that described in the Biodiversity Assessment conducted by GHD (2020). Species recorded were most consistent with the PCT 3594 Sydney Coastal Sandstone Foreshores Forest. This PCT is identified on the basis of overstorey trees of Swamp Mahogany *Eucalyptus robusta*, Sydney Redgum *Angophora costata* and Blackbutt *Eucalyptus pilularis*. As described by GHD (2020), the understorey contains some mesic elements including Brush Daphne (*Pittosporum undulatum*), Smooth Cheese-tree (*Glochidion ferdinandi* var. *ferdinandi*), and Blueberry Ash (*Elaeocarpus reticulatus*), as well as planted species including palms, tree ferns, paperbarks and lilly pillies.

PCT 3594 is identified on the site by referencing the BioNet Vegetation Information System database published PCT descriptions. PCT 3594 is described as follows:

'A tall, occasionally very tall, sclerophyll open forest with a mixed understorey of dry shrubs and mesic small trees found along the foreshores of major waterways and coastal escarpments of Sydney. The tree canopy is very frequently dominated by *Angophora costata* with occasional local stands of *Eucalyptus botryoides* or rarely other eucalypt species. A sparse taller layer in the mid-stratum commonly includes *Banksia integrifolia* or *Allocasuarina littoralis* and occasionally *Ficus rubiginosa*. A combination of hardy mesic small trees including *Pittosporum undulatum*, *Glochidion ferdinandi* and *Elaeocarpus reticulatus* are almost always present with *Notelaea longifolia* also common. In the suburban environment, the proliferation of these mesic species in the understorey at long unburnt sites has generated considerable debate, particularly as there appears to be strong correlation between time since fire and their density. Our data suggests these species are also more common in these littoral zones than other sheltered sandstone forests situated further away from the coast. Sclerophyll shrubs are less frequent however include *Acacia longifolia*, *Acacia suaveolens*, *Breynia oblongifolia* and *Monotoca elliptica*. The

ground layer is characterised by a mid-dense cover of ferns, graminoids, climbers and grasses. The low elevations adjoining major waterways expose the vegetation to a maritime influence brought by salt laden southerly winds. This PCT is mainly distributed between the Hacking River and Pittwater. With increased elevation and distance from waterways this community typically grades into PCT 3592.'

PCT 3594 has no associated TEC under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) or the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Threatened Ecological Communities (TEC)

Appendix A (Section 7) lists the flora species identified within the Proposal Area during the field survey. Whilst some areas of the broader Parsley Bay Reserve may resemble a community dominated by vine-thickets, which is typical of rainforest vegetation, the vegetation overall is most consistent with that of tall sclerophyll open forest and PCT 3594 specifically, and not the Littoral Rainforest listed as TEC under the BC Act as Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered Ecological Community, EEC) or the EPBC Act listed Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (Critically Endangered Ecological Community, CEEC).

The dominant species within the Study Area do not constitute the key diagnostic species for the TEC Littoral Rainforest, as per the listing advice under the EPBC Act or the final determination under the BC Act. While some species present may be listed within the listing advice and/or final determination, the vegetation within the Indicative Construction Footprint does not meet the required threshold. Therefore, the Proposal Area/indicative construction footprint specifically does not constitute Littoral Rainforest TEC.

Figure 3 shows the extent of PCT 3594 at Parsley Bay.

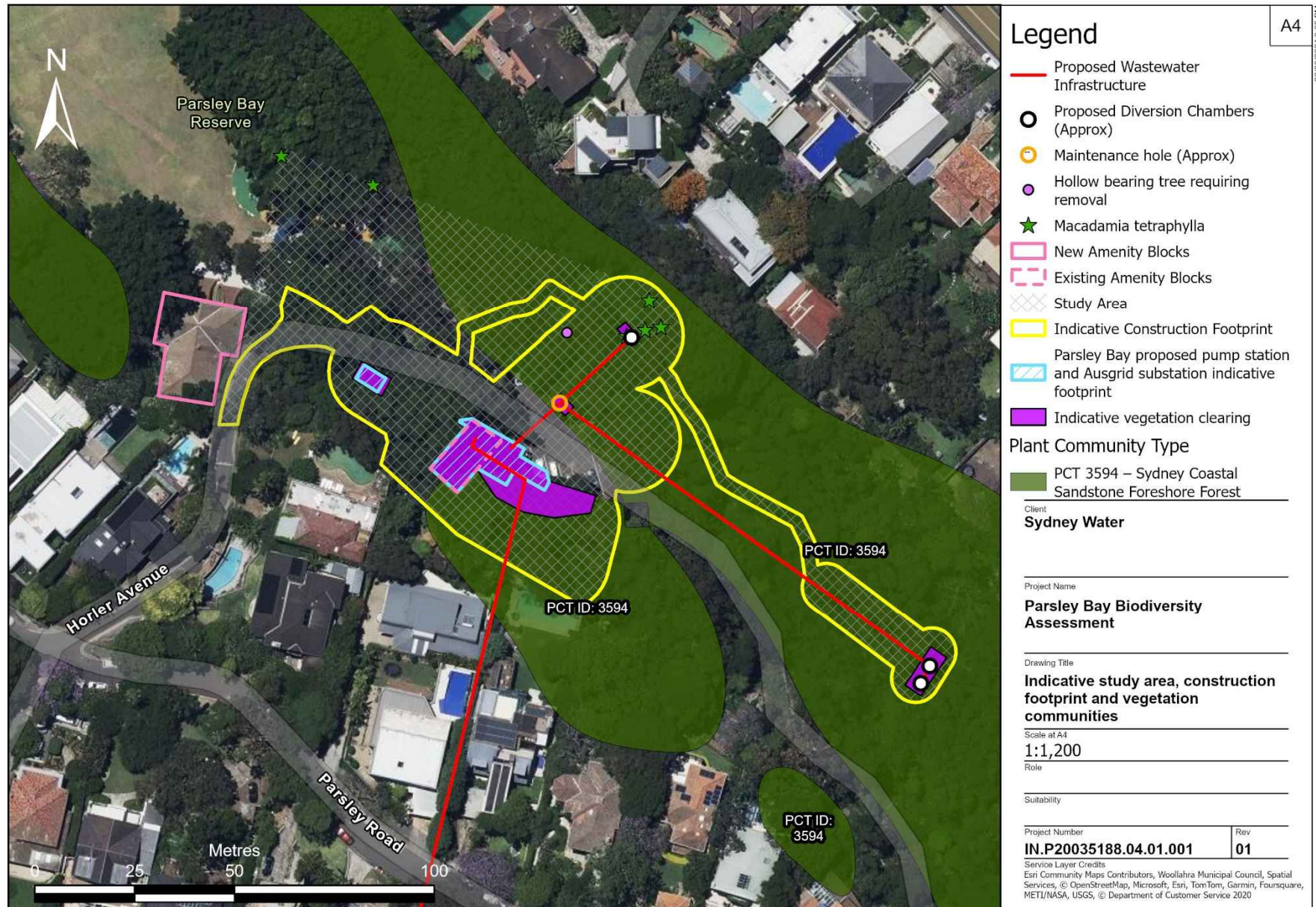


Figure 3: Indicative study area, construction footprint and vegetation identified from site visit

Threatened Flora

Syzigium

Within the Proposal Area, some specimens of *Syzigium* sp. were collected from behind the amenities block during the field survey for identification purposes. *Syzigium paniculatum* is listed as Endangered under the BC Act and as Vulnerable under the EPBC Act. The specimens collected resemble *S. paniculatum* more than *S. australe*. There was no fruit available for identification. Precautionarily, it is agreed that there are several specimens of the threatened *S. paniculatum* occurring behind the amenity block, within the Proposal Area, already assessed under the Biodiversity Assessment, and REF/Decision Report. No further assessment of this threatened species would be required.

Casuarina

Concerns were raised about several *Casuarina* sp. near the second pit location located at the eastern end of the site that are likely to be directly impacted by the proposed works. Voucher specimens were taken for identification purposes. From the samples collected, the species were considered to most closely resemble Swamp She-Oak *Casuarina glauca*. *C. glauca*, whilst likely planted given its landscape positioning, is considered a diagnostic species of the described PCT 3594. *C. glauca* is not a listed species under the BC Act nor EPBC Act so no further assessment is required.

Macadamia tetraphylla

While inspecting the potential maintenance pit locations, an additional threatened species; *Macadamia tetraphylla* listed as Vulnerable under the BC Act and EPBC Act, was identified within the Proposal Area (Plate 1) within one metre of the first maintenance pit location at the northwest end of the site. The species occurs mainly on the North Coast NSW into QLD and is a commonly planted species in Sydney. The individual within the Proposal Area was small but would likely be removed by the proposed works. Five additional larger individuals (Plate 2) were recorded within the broader Study Area that would not be directly impacted by the Proposal. The original Biodiversity Assessment and REF did not identify this species or assess its removal. A Test of Significance (ToS) (BC Act) and Significance Impact Criteria (SIC) Assessment (EPBC Act) is required to be conducted as an addendum to the Biodiversity Assessment for impacts to this species (Appendix A and B). Whilst there is potential the species is naturally occurring; it has likely derived from an originally planted individual.



Plate 1: *Macadamia tetraphylla* within the Proposal Area



Plate 2: Large *Macadamia tetraphylla* outside the Proposal Area

Threatened Fauna and Fauna Habitat

Threatened microbats

Numerous trees containing hollows were identified across Parsley Bay Reserve that may provide suitable roosting/breeding habitat for hollow-dependent threatened microbats. The existing Biodiversity Assessment/REF has considered suitable foraging habitat but did not assess removal of hollows and roosting/breeding habitat (GHD, 2020).

A large Swamp mahogany *Eucalyptus robusta* was identified in close proximity to the first proposed maintenance pit location in the Indicative Construction Footprint and it is apparent that proposed works in this area are likely to impact the tree's critical root zones, and therefore may require removal of the tree. As the tree identified also hosts numerous hollows, potentially suitable for threatened microbats, a ToS is required to assess its potential removal as an addendum to the Biodiversity Assessment/REF. A ToS has been included in Appendix D (Section 10) of this report. The ToS found that although there is the potential to impact the *E. robusta* as part of the works, which would reduce habitat, the availability of other hollows in the area would not lead to an impact to the threatened microbats.

Powerful Owl

Habitat suitability surveys were conducted for the Powerful Owl *Ninox strenua* throughout the Study Area. Arboreal mammal remains were identified within the Proposal Area, providing evidence of foraging within the area. The broader area (within 100m from the Proposal Area) was surveyed for larger trees containing large hollows that would be considered suitable for nesting for the Powerful Owl. No trees possessed large enough hollows to be suitable for breeding within this area. It is therefore considered unlikely that the Powerful Owl would currently be breeding within the Proposal Area.

Although no suitable breeding trees for Powerful Owl were recorded during surveys in the Proposal Area, information was provided by birdwildlife.org and a volunteer of the Powerful Owl Project regarding presence of a breeding pair of Powerful Owls whose territory includes Parsley Bay. The breeding pair

have been recorded roosting in Parsley Bay. The community volunteer also indicated that another single Powerful Owl adult roosts in Parsley Bay. The advice is that owls have been observed to roost in *Melaleuca* sp. and *Angophora* sp. trees at Parsley Bay between November and May and have been recorded since 2021. There are at least three trees in the Parsley Bay area observed (by the community members) to be used as roosting habitat by the Powerful Owl. These roosting trees are located east of the Proposal area (specifically from the proposed new and existing maintenance pits) and no impact on those trees is predicted to occur as a result of the current proposed works. One of the roosting trees is located nearby the route of proposed trenchless construction (i.e. non-destructive drilling, NDD) however no impact on root zone of trees is predicted to occur.

Based on this local knowledge, it is apparent that Parsley Bay is part of the territory of at least one breeding pair and one adult Powerful Owl, for roosting and likely hunting but not for breeding. Breeding trees do not occur within the Proposal Area or in the broader Parsley Bay areas assessed for this report. No roosting trees will be directly impacted by the proposal. The possibility exists for noise disturbances to affect behaviour of roosting Powerful Owls and mitigation measures are provided to minimise temporal noise disturbances. It is considered that provided mitigation measures identified in the REF and Decision Report are implemented, indirect impacts on Powerful Owl would be insignificant to the resident individuals. It is apparent that the species utilises the broader area for foraging and roosting. The Biodiversity Assessment, REF and Decision Report considered impacts to the Powerful Owl and no further assessment is required.

4 Impact assessment of additional impacts

A ToS (Appendix B) and SIA for *Macadamia tetraphylla* (Appendix C) was conducted for the removal of up to one individual in the Proposal Area, which concluded that clearance is unlikely to result in a significant impact on the local occurrence of the species.

The ToS concludes that the removal of one individual *Macadamia tetraphylla* would not be considered important to the population's survival in the locality, including that the local specimens are outside of their natural range and likely to be planted. The overall impacts of the proposal on *Macadamia tetraphylla* are considered non-significant in this context.

A ToS was also undertaken for hollow-dependent microbats (Appendix D) due to the anticipated removal of a large Swamp Mahogany *Eucalyptus robusta* containing hollows that may be utilised by microbats for roosting/nesting. The ToS concluded that the clearance was unlikely to result in a significant impact to species potentially using this habitat.

Native vegetation at Parsley Bay is identified as PCT 3594 Sydney Coastal Sandstone Foreshores. PCT 3594 is not associated with TECs, therefore, no assessment of significance was required. There are areas of vegetation which are not part of a plant community, identified in the REF and Decision Report as urban native/exotic vegetation. The Decision Report noted that up to 0.07ha of vegetation (including PCT 3594 and some urban native/exotic vegetation) may need to be removed as part of the construction works. There is no change to this.

Based on the above impact assessment, direct impacts of the Parsley Bay project and its offset requirements in accordance with Sydney Water's Biodiversity Offset Guideline are summarised in Table 1.

Table 1. Summary of residual impacts and offset multiplier requirements.

Biodiversity Value Impacted	Total impact	Residual loss of biodiversity values resulting from works*	Impact type*	Offset Multiplier Required
<i>Macadamia tetraphylla</i>	Up to one individual <1 m ²	Habitat area of a threatened flora and/or fauna	Minor impact	1
Hollow bearing tree Swamp Mahogany (<i>Eucalyptus robusta</i>) potential habitat for threatened microbats	One tree	Hollow removal ¹	Minor impact	On site: nest boxes, salvaged hollows onto trees or posts, OR Nearby site: nest boxes or salvaged hollows onto trees or on posts.
PCT 3594	Up to 0.07ha (700m ²)	Non-threatened native vegetation	Moderate impact	2
Urban native/exotic	Up to 0.07ha (700m ²)	Urban native or exotic vegetation	Minor impact	1

*Sydney Water (2023) Biodiversity Offset Guide SWEMS0019.13

5 Conclusion and recommendations

The following conclusions have been made based upon the desktop review, site assessment and field survey, and impact assessment undertaken.

- PCT 3594 Sydney Coastal Sandstone Foreshores Forest is consistent with Biodiversity Assessment and REF
- No TEC including littoral rainforest was recorded in the Study Area
- Additional threatened species found: *Macadamia tetraphylla* and habitat for threatened microbats. A Test of Significance (ToS) was undertaken for these threatened species and it was concluded that the proposal will not result in significant impact on them.
- No groundwater dependent ecosystems (GDE) or key fish habitat (KFH) were mapped within the Study Area.

Mitigation measures have been included in the REF and Decision Report, these are suitable for the works, however additional mitigation measures regarding *Macadamia tetraphylla* removal, hollow bearing trees and weeds are provided in Table 2. Despite significant impacts being unlikely, these mitigation measures should be implemented to minimise risks to threatened biodiversity. The mitigation measures are to be implemented before and during construction.

Table 2. Safeguards and Mitigation Measures

Impact	Safeguards
Minimise impacts to threatened flora	Prior to commencement of works, an ecologist will undertake a pre-clearing survey of proposed disturbance areas for threatened plants. If any additional seedlings of <i>Macadamia tetraphylla</i> are detected, measures would be taken to avoid the specimens if possible or alternatively to relocate seedlings to a nearby area of suitable habitat outside of the construction area. Any proposed relocation would be considered in consultation with Council bushcare staff. Topsoil in areas that will be permanently disturbed for proposed infrastructure or operational requirements will be carefully removed and relocated as soon as possible to suitable locations nominated by Council bushcare staff.
Trimming of native trees containing habitat features	Trimming of the foliage of trees containing habitat features would require a pre-clearing inspection by a suitably qualified ecologist/spotter-catcher. Additionally, a suitably qualified spotter catcher would be required to supervise the clearing of trees containing habitat features.
Threatened fauna - general	If unexpected threatened fauna species are discovered during works, stop work immediately and contact the environment/proposal manager. An ecologist should be engaged to determine management actions.
Introduction, establishment and/or spread of priority weeds – <i>Asparagus aethiopicus</i> (Ground Asparagus), <i>Chrysanthemoides monilifera</i> subsp. <i>Rotundata</i> (Bitou Bush) and <i>Olea europaea</i> subsp. <i>Cuspidate</i> (African Olive)	Ground Asparagus, Bitou Bush and African Olive previously identified within the Proposal Area need to be managed in line with recommendations from NSW WeedWise and removed and disposed of at a registered waste management facility.
Introduction, establishment and/or spread of weeds - General	All equipment and plant machinery to be appropriately cleaned before the start of works. All priority weeds within the Proposal Area are to be cleared and disposed of at a registered waste management facility. If herbicide is to be used, this must be applied by a person trained to do so and that has a certificate of competency, or a statement of attainment issued by a registered training organisation. Herbicide will only be used in accordance with the label/permit. Conduct toolbox talk to identify high risk priority weeds to on-site staff. Weed management plan/protocols will be established and implemented to avoid spread and establishment of weeds.

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Appendix A – Flora species identified during field survey

Table 3. Fauna observations

Common Name	Species Name
Basket Grass	<i>Lomandra longifolia</i>
Blackbutt	<i>Eucalyptus pilularis</i>
Black Wattle	<i>Calicoma serratifolia</i>
Broad-leaved Paperback	<i>Melaleuca quinquinervia</i>
Maidenhair Fern	<i>Adiantum aethiopicum</i>
Plum Pine	<i>Podocarpus elatus</i>
Port Jackson Fig	<i>Ficus rubiginosa</i>
Rough-shelled Bush Nut	<i>Macadamia tetraphylla</i>
Spotted Gum	<i>Coeymbua maculata</i>
Swamp Mahogany	<i>Eucalyptus robusta</i>
Swamp She-oak	<i>Casuarina glauca</i>
Sydney Redgum	<i>Angophora costata</i>
Australian Tree Fern	<i>Cyathea cooperi</i>
Tuckeroo	<i>Cupaniopsis anacardioides</i>
Water Vine	<i>Cissus hypoglauca</i>
-	<i>Archontopheonix sp.</i>
-	<i>Entolasia sp.</i>
-	<i>Eustrephus sp.</i>
-	<i>Oplismenus sp.</i>
-	<i>Polyscias sp.</i>
-	<i>Stephania sp.</i>

Appendix B – Test of Significance - *Macadamia tetraphylla* and threatened hollow-dependent bats

Macadamia tetraphylla

Rough-shelled Bush Nut *Macadamia tetraphylla* is listed as a vulnerable species under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). In NSW, Rough-shelled Bush Nut is categorised as a site-managed species under the DEECW (formerly DPIE) Saving our Species Program.

Rough-shelled Bush Nut is a small to medium sized densely bushy tree that can reach heights of up to 18m. Leaves are oblong or lance-shaped and are between 7 to 25cm long. During August to October, creamy pink to purplish flowers bloom among its leaves. Its fruit is globular and woody brown and between 2-3cm in diameter with fruit ripening in January (Barry & Thomas 1994). Pollinating vectors are mainly European and native bees (Wallace 1999; Australian Government Department of Climate Change, Energy, the Environment and Water 2023) and seed dispersal occurs via gravity fall, rodents and waterways. Plants have a life span of over 100 years (Queensland CRA/RFA Steering Committee 1997; Australian Government Department of Climate Change, Energy, the Environment and Water 2023).

Rough-shelled Bush Nut generally grows at a latitude between 28 and 29°S, occurring from northern NSW (around the Richmond and Tweed River areas) to south-east Queensland (from Gold Coast hinterland north to Mt Wongawallan). It generally occurs in subtropical rainforest, complex notophyll vine forest, mixed sclerophyll forest and littoral rainforest. It is usually found growing on hill slopes that are moderate to steep on well-drained alluvial soils (Queensland CRA/RFA Steering Committee 1997). Large areas of habitat it naturally occurs in have been entirely cleared (Australian Government Department of Climate Change, Energy, the Environment and Water 2023). The distribution of this species is not known to overlap with any EPBC Act listed threatened ecological community.

Within the study area, the habitat does not conform to complex notophyll vine forest but does have elements of sclerophyll forest, albeit tall sclerophyll open forest. While the habitat is consistent with where this species occurs, these individuals are outside their normal range as defined above.

Known threats to the species include habitat loss and fragmentation resulting from urban development, agriculture and road works, weed invasion, loss of genetic strains through hybridisation, risk of local extinction due to low numbers and seed predation by Black Rat (*Rattus rattus*).

It is likely that an individual Rough-shelled Bush Nut juvenile tree <1m in height will need to be removed and replanted elsewhere on the site as a result of the proposed works at Parsley Bay Reserve. There are five other mature individuals within the broader Study Area that are each between 2.5 to 5m tall and will not be disturbed by the proposed works.

Table B1 Test of Significance for *Macadamia tetraphylla*

<i>Macadamia tetraphylla</i>
1.1 Adverse effects on the life cycle of a species
(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
One juvenile individual <i>Macadamia tetraphylla</i> was observed within the Indicative Construction Footprint during the site inspection undertaken on 01/11/2023. It is likely this individual will require removal. However, it is unlikely that its removal will have an adverse effect on the life cycle of the species such that a viable local population of the <i>Macadamia tetraphylla</i> is likely to be placed at risk of extinction. This is largely because local areas of habitat are unlikely to become fragmented or isolated from other areas of habitat as a result of the proposed works (see c (ii) below), especially given that <i>Macadamia tetraphylla</i> individuals observed in the Study Area are occurring outside their naturally occurring distribution – that being northern NSW and QLD. The individual may also be replanted on site in a suitable location outside of the construction area.
Prior to commencement of works, an ecologist will undertake a pre-clearing survey of proposed disturbance areas for threatened plants. If any additional seedlings of <i>Macadamia tetraphylla</i> are detected, measures would be taken to avoid

the specimens if possible or alternatively to relocate seedlings to a nearby area of suitable habitat outside of the construction area. Any proposed relocation would be considered in consultation with Council bushcare staff. Topsoil in areas that will be permanently disturbed for proposed infrastructure or operational requirements will be carefully removed and relocated as soon as possible to suitable locations nominated by Council bushcare staff.

1.2 Adverse effects on ecological communities

(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	This species is not an ecological community, therefore this factor does not apply
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(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	This species is not an ecological community, therefore this factor does not apply.
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1.3 Adverse effects on habitats

(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	The <i>Macadamia tetraphylla</i> individuals observed in the Study Area are occurring outside their known typical distribution. Hence the removal of up to one individual <i>Macadamia tetraphylla</i> in the Proposal Area constitutes a negligible extent of the broader local occurrence of the species. Additionally, only one individual <i>Macadamia tetraphylla</i> of the six total individuals observed in the Study Area requires removal with habitat in the Study Area remaining intact for the five unimpacted individuals. As such, the removal of habitat for one individual <i>Macadamia tetraphylla</i> is considered to be negligible given the broader extent of available habitat in the Study Area. Where permanent disturbance is required to remove one individual <i>Macadamia tetraphylla</i>, the individual and topsoil will be collected and transferred to habitat occurring elsewhere within the Study Area as soon as possible to a suitable rehabilitation site determined by Council, in which case it is likely that the extent of available habitat in the locality may be eventually increased, rather than reduced.
(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	The removal of up one individual <i>Macadamia tetraphylla</i> is unlikely to fragment or isolate any other individuals in the local occurrence and is considered to have negligible impacts on local occurrence with the Study Area and the broader species distribution in northern NSW and QLD. Five other individual <i>Macadamia tetraphylla</i> individuals were observed in the Study Area and will not be affected by the proposed works. Connectivity between areas of occupied habitat and other areas of potential habitat in the Study Area will be maintained and existing opportunities for seed dispersal and genetic exchange (movements of pollinators such as bees and waterways) will not be affected. Fragmentation of potential habitat will be minimal, because existing tracks and open spaces will not be increased significantly, and disturbed areas will be rehabilitated following construction through the implementation of a Vegetation Management Plan.
(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 <i>Macadamia tetraphylla</i> individuals observed in the Study Area are occurring outside their natural distribution and there are five other mature individuals within the Study Area that will not be affected by the Proposal. As such, the removal of one individual <i>Macadamia tetraphylla</i> and disturbance of its habitat is highly unlikely to significantly affect the genetics or long-term survival of the species' local occurrence on site. Known <i>Macadamia tetraphylla</i> occupied habitat within the Study Area will be maintained and existing opportunities for seed dispersal and genetic exchange will not be affected. Additionally, the individual being removed would not be considered as important for <i>Macadamia tetraphylla</i> population survival within the broader locality of <i>Macadamia tetraphylla</i> distribution in northern NSW and QLD. As such, the removal of one <i>Macadamia tetraphylla</i> individual is considered to have a negligible effect on the long-term survival of the species. It is possible that some areas proposed for excavation contain seeds of <i>Macadamia tetraphylla</i> within the topsoil and leaf litter. As topsoil and leaf litter will be removed from the proposed pit location and will be transferred as soon as possible to suitable locations, it is possible that the existing population in the locality may eventually be augmented.

1.4 Adverse effects on areas of outstanding biodiversity value

(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)

The site and the proposed works are not situated within any Area of Outstanding Biodiversity Value (AOBV).

1.5 Key threatening processes

(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

The proposal may facilitate the following key threatening process as listed under the BC Act.

- Clearing of native vegetation
- Invasion and establishment of exotic vines and scramblers
- Invasion of native plant communities by exotic perennial grasses

Weed management protocols as outlined in the Greater Sydney Regional Strategic Weed Management Plan (2023 – 2027), the Woollahra Biodiversity Conservation Strategy (2015-2025), the *Biodiversity Conservation Act 2015* (NSW) and the NSW Biosecurity Act 2015 should be established and adhered to throughout the work stage and post work rehabilitation stage to mitigate the impacts of exotic species establishment and spread.

Conclusion

The proposed works would involve the removal of one individual *Macadamia tetraphylla*. This individual is not considered a key contributor of genetic material to the broader population within the Study Area nor to known populations of *Macadamia tetraphylla* in its wider distribution of northern NSW and QLD. As such, removal of one individual *Macadamia tetraphylla* would not be considered important to the population's survival in the locality, especially given that the individual will be replanted elsewhere on site. Therefore, the extent of removal and overall impacts of the Proposal on *Macadamia tetraphylla* are considered negligible in context and would barely alter the local occurrence extent.

A Construction Environmental Management Plan (CEMP) and Vegetation Management Sub-Plan (VMP) will be prepared and implemented that will contain specific safeguards to minimise potential impacts on native vegetation. Specific measures to minimise impacts on the Rough-shelled Bush Nut include:

- Clear delineation of the construction footprint,
- Pre-clearing surveys of proposed construction areas by a project ecologist, and
- A protocol for the collection and transfer of the removed individual and measures for the rehabilitation of disturbed areas not required for infrastructure or operational requirements following construction, which may improve existing growing conditions for *Macadamia tetraphylla* in suitable areas.

Threatened hollow-dependent bats

Hollow-dependent microbats have the potential to use the area including:

- *Saccolaimus flaviventris* – Yellow-bellied Sheathtail-bat (Vulnerable BC Act),
- *Falsistrellus tasmaniensis* – Eastern False Pipistrelle (Vulnerable BC Act), and
- *Myotis Macropus* – Southern Myotis (Vulnerable BC Act),

All microbats occur along the eastern coast of Australia and can be found roosting/breeding in hollow-bearing trees (HBTs), such as those identified within the Study Area.

Yellow-bellied Sheathtail-bat

The Yellow-bellied Sheathtail-bat is wide-ranging, occurring between northern and eastern Australia with a broader range to south-western Australia and Victoria during late summer to autumn. It is a large insectivorous bat that can grow up to 87 millimetres long with a flattened head and pointed muzzle with a white to yellow belly. Yellow-bellied Sheathtail-bat roosts singly or in groups of up to six in tree hollows and buildings. It has also been observed utilising mammal burrows in treeless areas for roosting (DPE 2023D).

Eastern False Pipistrelle

The Eastern False Pipistrelle occurs on the south-east coast and ranges of Australia, from Southern Queensland to Victoria and Tasmania, including NSW coastal areas (DPE 2022A).

It is a relatively large species of microbat, that can grow to approximately 65mm. It has dark brown to reddish fur on its back with a paler grey belly. They generally inhabit moist areas where trees are greater

than 20 metres in height and roost in Eucalyptus tree hollows in colonies of between three to 80 individuals. They have also been observed roosting under loose bark on trees and inside buildings. Their foraging habitat is typically within or just below the tree canopy and they have a strong preference for open areas and gaps within a forest (Churchill 2008).

Southern Myotis

Southern Myotis has a wide ranging distribution within the coastal band (less than 100 kilometres inland), typically occurring in north-west Australia and south to western Victoria (DPE 2022C). They have been observed roosting in groups of 10 to 15 individuals, often close to water and in hollow-bearing trees in densely vegetated areas. The Southern Myotis generally forages over open water across pools and channels that are greater than three metres wide (DPE 2022C, Law & Urquhart 2000, Campbell 2009).

Known threats to hollow-dependent microbats include disturbance to habitat by the general public, loss of foraging habitat and hollow-bearing trees from clearing for agriculture or development, the introduction of exotic pathogens, use of pesticides, hazard reduction and wildfire fires during the breeding season, and predation from feral cat and fox species.

Although no hollow-dependent microbats were sighted during the field investigation, based on existing nearby records and the presence of several HBTs that are suitable for foraging habitat within the Proposal Area, the likelihood of this species occurring on-site is considered moderate to high. The recorded hollows may provide suitable roosting/breeding habitat for hollow-dependent microbats listed as vulnerable under the BC Act and EPBC Act. Additionally, native vegetation may provide foraging habitat for these microbats.

Table B2 Test of Significance for hollow-dependent bats

Hollow-dependent microchiropteran bats including – <i>Saccolaimus flaviventris</i>, <i>Falsistrellus tasmaniensis</i> and <i>Myotis Macropus</i>.	
1.1 Adverse effects on the life cycle of a species	
<i>(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</i>	
Hollow dependent microbats are considered to have a moderate to high likelihood of occurring within the Proposal Area due to the presence of suitable habitat and multiple records within the locality.	
These species have widespread foraging habitats and can roost in tree hollows, under bark and in tree fissures. Several trees were considered potentially suitable to support roosting microbats within the Study Area, including a large Swamp Mahogany <i>Eucalyptus robusta</i> identified in the Proposal Area. This <i>Eucalyptus robusta</i> individual likely to be removed as part of the proposed works given its close proximity to the first pit location. However, the removal of this individual <i>Eucalyptus robusta</i> is considered to have a negligible impact on microbat species occurring on site because of additional available hollow dependent microbat habitat occurring within the broader locality. Hence its removal is unlikely to significantly impact locally occurring microbat species or their life cycles such that a viable local population of the species be placed at risk of extinction.	
Additionally, disturbance from the Proposal is not considered likely to interrupt the life cycle of hollow-dependent microbats occurring within the locality as the Study Area is already within a highly disturbed, urbanised area.	
1.2 Adverse effects on ecological communities	
<i>(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:</i>	
<i>(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</i>	These species are not an ecological community, therefore this factor does not apply.
<i>(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is</i>	These species are not an ecological community, therefore this factor does not apply.

likely to be placed at risk of extinction	
1.3 Adverse effects on habitats (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	A maximum of one Swamp Mahogany <i>Eucalyptus robusta</i> habitat tree for threatened microbats may be removed for the Proposal. Other HBTs occurring within the Study Area will not be impacted by the proposed works.
(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	The proposal occurs in a highly urban setting and is already subjected to fragmentation. The removal of one potential microbat roosting tree is unlikely to significantly further isolate, or fragment the area as retained vegetation will maintain connectivity to the locality and available microbat habitat in the broader landscape.
(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	If occupied, the single hollow-bearing tree to be removed would likely be one of several roosting trees utilised by threatened species as part of a wider range of the vegetated riparian corridor in the locality. Considering surrounding native vegetation nearby to the proposal area and more abundant habitat resources therein, the individual <i>Eucalyptus robusta</i> hollow-bearing tree proposed for removal within the proposal area is not considered critical to their long-term survival in the locality. Whilst some species may utilise hollow-bearing trees for roosting during breeding, it is unlikely that the removal of the small number of hollows within the study area would reduce the availability of resources in the locality to the point that the long-term survival of these species would be significantly impacted.
1.4 Adverse effects on areas of outstanding biodiversity value (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)	
No areas of outstanding biodiversity value are present or will be impacted by the proposal.	
1.5 Key threatening processes (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	
Four (4) key threatening processes are relevant to the proposed works, including: - Clearing of native vegetation - Invasion and establishment of exotic vines and scramblers - Invasion of native plant communities by exotic perennial grasses - Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants Following DPI Weedwise mitigation measures and standard weed management practices have been recommended for this project to prevent the above key threatening processes and avoid the spread and establishment of priority weeds on site. Clearing limits should be clearly delineated using bunting or flagging tape prior to the commencement of work to avoid over clearing of native vegetation and HBTs. Avoid and minimise principles would be considered in micro siting alignments to avoid impacts to biodiversity where possible. Specific mitigation measures have been recommended including clearing supervision.	
Conclusion The proposed works may remove a maximum of one <i>Eucalyptus robusta</i> that may be utilised for roosting by threatened hollow-dependent microbats. The localised nature of the proposed works would not significantly trigger or exacerbate any key threatening processes. The <i>Eucalyptus robusta</i> proposed for removal is not considered critical to the survival of microbat species that may occur on site given the context of larger and better-quality habitat in the locality. With the implementation of safeguards and mitigation measures, risks to other HBTs within the broader Study Area would be managed. The proposed works is therefore unlikely to result in a significant impact to hollow dependent microbat species.	

Appendix C – EPBC Act Self-Assessment – *Macadamia tetraphylla*

The Matters of National Environmental Significance – Significant impact guidelines 1.1 (DotE 2013) are intended to assist in undertaking a ‘self-assessment’ to decide whether or not an action is likely to have a significant impact on any matters of national environmental significance. Therefore, a ‘self-assessment’ of the likelihood of significant impacts to *Macadamia tetraphylla*, listed as Vulnerable under the EPBC Act, has been undertaken, and is summarised in the table below.

Table C1 Significant Impact Assessment for *Macadamia tetraphylla*

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	Likelihood of significant impact	Assessment
Lead to a long-term decrease in the size of an important population of a species	Unlikely	Six <i>Macadamia tetraphylla</i> individuals were recorded within the Study Area during the field investigation with one juvenile individual likely requiring removal for the Proposal. The removal of one individual is unlikely to significantly decrease the size of the <i>Macadamia tetraphylla</i> within the Study Area, especially given that this individual is likely to be replanted elsewhere on site. Connectivity between areas of occupied habitat and other areas of potential habitat in the Study Area will be maintained and existing opportunities for seed dispersal and genetic exchange (movements of pollinators such as bees and waterways) will not be affected so the species population is likely to remain in-tact. Also, as topsoil and leaf litter will be removed from the proposed pit location and will be transferred as soon as possible to suitable locations, it is possible that the existing population in the locality may eventually be augmented. Additionally, these <i>Macadamia tetraphylla</i> individuals within the Study Area are occurring outside of their natural typical distribution with populations of <i>Macadamia tetraphylla</i> generally occurring elsewhere in northern NSW and QLD. The occurrences of <i>M. tetraphylla</i> at Parsley Bay do not correspond to an important population of the species. Hence it is considered unlikely that the removal of one individual would cause this broader extent of <i>Macadamia tetraphylla</i> to be at risk of a long-term decrease in size.
Reduce the area of occupancy of an important population	Unlikely	The occurrences of <i>M. tetraphylla</i> at Parsley Bay do not correspond to an important population of the species. The proposed pit location will only affect the habitat of one out of six known <i>Macadamia tetraphylla</i> individuals occurring within the Study Area, requiring its removal and relocation. The remaining <i>Macadamia tetraphylla</i> individuals are currently subject to some disturbance and edge effects from urbanisation. However, the Proposal will not interfere with intact habitat elsewhere on site. Therefore, the removal of existing <i>Macadamia tetraphylla</i> habitat as a result of the works is not considered substantial enough to result in a reduction to the area of occupancy of the <i>Macadamia tetraphylla</i> on site.
Fragment an existing important population into two or more populations	Unlikely	The clearing of one <i>Macadamia tetraphylla</i> individual in the Proposal Area is unlikely to fragment the population as there are only five other individuals on site. Additionally, the removal and replanting of one individual <i>Macadamia tetraphylla</i> is considered to have a low likelihood of fragmenting the small population within the Study Area given that all known individuals

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	Likelihood of significant impact	Assessment
		on site occur within 200m of each other. The plant is also anticipated to be replanted on site, so no fragmentation will occur. Its removal is also not going to fragment existing populations in the known <i>Macadamia tetraphylla</i> population in northern NSW and QLD.
Adversely affect habitat critical to the survival of a species	Unlikely	<i>Macadamia tetraphylla</i> is found in complex notophyll vine forest, littoral rainforest and wet sclerophyll forests. In NSW, <i>Macadamia tetraphylla</i> is categorised as a site-managed species under the DPIE Saving our Species Program and occurs in the following seven vegetation classes and four Endangered Ecological Communities (BCA 2016): NSW Vegetation Class - Coastal Floodplain Wetlands - Coastal Swamp Forests - Dry Rainforests - Littoral Rainforests - North Coast Wet Sclerophyll Forests - Northern Escarpment Wet Sclerophyll Forests - Subtropical Rainforests NSW Endangered Ecological Community - Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion - Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions - Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions - Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion Regarding the NSW vegetation classes listed under the Saving our Species Program, the following conclusions have been drawn: - Given that The Proposal Area/construction footprint specifically is unlikely to constitute littoral rainforest TEC, it is also unlikely that the removal of one <i>Macadamia tetraphylla</i> is going to significantly affect habitat critical the survival of the species. - The sclerophyll open forest within the Study Area differs to the known vegetation classes within which <i>Macadamia tetraphylla</i> occurs, namely, North Coast Wet Sclerophyll Forests and Northern Escarpment Wet Sclerophyll Forests and so the Proposal and its associated impact on one individual <i>Macadamia tetraphylla</i> is unlikely to affect habitat critical to the survival of the species. Moreover, the habitat within the Study Area in which the remaining five <i>Macadamia tetraphylla</i> individuals occur will not be impacted by the Proposal and so the proposed works are not considered to adversely affect habitat critical to survival of species on site.
Disrupt the breeding cycle of an important population	Unlikely	The proposed works will not disrupt the breeding cycle of the population. The individual is considered a juvenile and would not currently contribute to breeding for this species.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	Likelihood of significant impact	Assessment
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The proposed works would result in the removal of a negligible proportion of potential habitat for <i>Macadamia tetraphylla</i> when compared to the total extent of habitat available in the Study Area. The Proposal Area is confined to ~ 0.8 ha of land, which will impact only one <i>Macadamia tetraphylla</i> individual. The vegetation to be cleared is also currently subject to edge effects and potential effects from fertilizers and other pollutants from urbanisation. In addition, the majority of the species as well as a large intact patch of habitat would be retained within the Study Area. Therefore, clearing is not considered likely to cause <i>Macadamia tetraphylla</i> to decline on site.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	The area of potential habitat for the species to be cleared is currently subject to minor existing weed invasion and pest animals as a result of urbanisation. The proposal is unlikely to exacerbate the current level of invasive species threat operating within the Study Area.
Introduce disease that may cause the species to decline	Unlikely	The Proposal is unlikely to result in the introduction of a disease that is harmful to <i>Macadamia tetraphylla</i> . Additionally, weed management plans and a CEMP will be implemented to mitigate any risks of disease to the species.
Interfere substantially with the recovery of the species	Unlikely	A National Recovery Plan (2023) has been prepared for <i>Macadamia tetraphylla</i> by the Department of Climate Change, Energy, the Environment and Water. The Recovery Plan outlines monitoring, management and research actions. It will support the long-term survival of wild macadamias. Key actions required for the recovery of <i>Macadamia tetraphylla</i> as of 2023 include: - Liaising with state agencies, local authorities and regional NRM organisations in order to incorporate Macadamia conservation into their biodiversity conservation and natural resource management strategies. - Negotiating appropriate agreements with landholders to establish greater long-term security for priority areas on private property. - Providing land managers with the resources to develop and implement management plans for Macadamia conservation. - Identifying gaps in the current understanding of Macadamia species ecology and commensurate research priorities for conservation. The Proposal is unlikely to interfere with these key actions assisting in the recovery of <i>Macadamia tetraphylla</i>. Additionally, the Proposal is unlikely to cause habitat loss and fragmentation, a decrease in population sizes or an increase in species specific threats that will interfere with recovery of the species within the context of the Study Area and within its broader northern NSW and QLD locality, especially considering the implementation of a CEMP and VMP prior to construction of the proposed works.